Regional Meeting for Malaria Programme Managers: Progress Towards Malaria Elimination in the Western Pacific

Manila, Philippines
10–12 August 2011
Participants of the Regional Meeting for Malaria Programme Managers:
Progress towards malaria elimination in the Western Pacific
10–12 August 2011, Manila, Philippines
MEETING REPORT

REGIONAL MEETING FOR MALARIA PROGRAMME MANAGERS:
PROGRESS TOWARDS MALARIA ELIMINATION IN THE WESTERN PACIFIC

Convened by:
WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR THE WESTERN PACIFIC

Manila, Philippines
10-12 August 2011
NOTE

The views expressed in this report are those of the participants of the Regional Meeting for Malaria Programme Managers: Progress towards Malaria Elimination in the Western Pacific and do not necessarily reflect the policies of the Organization.

Key words: malaria, progress, elimination, universal access, surveillance, monitoring and evaluation, diagnosis, quality assurance, artemisinin resistance, vivax malaria, programme management, operational research

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<td>HIS</td>
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<td>IVM</td>
<td>Integrated vector management</td>
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<td>Lao PDR</td>
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<td>LLIN</td>
<td>Long-lasting insecticidal nets</td>
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<td>LQMS</td>
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<td>Medicines for Malaria Venture</td>
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<td>PCR</td>
<td>Polymerase chain reaction</td>
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<td>Pf</td>
<td>Plasmodium falciparum</td>
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<td>PMI</td>
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<td>PPM</td>
<td>Public-private mix</td>
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<td>Acronym</td>
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<td>PPP</td>
<td>Public-private partnership</td>
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<td>(P_v)</td>
<td><em>Plasmodium vivax</em></td>
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<td>Quality assurance</td>
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<td>RAP</td>
<td>Regional action plan</td>
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<td>Red Amazónica de Vigilancia de la Resistencia a los Antimaláricos</td>
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<td>Respondent-driven sampling</td>
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<td>RITM</td>
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<td>Regional malaria indicator framework</td>
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<td>SEAR</td>
<td>South-East Asia Region</td>
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<td>SDSS</td>
<td>Spatial Decision Support System</td>
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<td>Short messaging system</td>
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<td>TDR</td>
<td>Tropical Disease Research, Special Programme for Research and Training in Tropical Diseases</td>
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<td>TES</td>
<td>Therapeutic Efficacy Study</td>
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<td>US</td>
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<td>Western Pacific Region</td>
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SUMMARY

Malaria is one of the most important parasitic diseases in the Western Pacific Region, with 262,912 confirmed malaria cases and 898 deaths reported in 2010 from the ten malaria-endemic countries (Cambodia, China, Lao People’s Democratic Republic, Malaysia, Papua New Guinea, the Philippines, Republic of Korea, Solomon Islands, Vanuatu and Viet Nam). The Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010–2015) was endorsed by the Regional Committee for the Western Pacific in 2009. The plan lays out a road map to guide national malaria programmes and monitor implementation, and serves as a tool for advocacy and resource mobilization.

Significant success was observed during the first two years (2009–2011) of implementing this plan. Nine out of ten countries are now aiming for national or subnational malaria elimination. Innovative strategies were also deployed to scale up access to malaria interventions, especially for vulnerable populations such as migrants, children under five years and pregnant women. Surveillance has been strengthened, sizable resources were mobilized for country programmes and partnerships have been expanded.

Antimalarial drug resistance, which is one of the biggest threats to the progress in the Region, is currently being addressed on the Cambodia-Thailand border. However, the possible emergence of artemisinin-resistant malaria in neighbouring countries of the Greater Mekong Subregion has become a major concern that requires a coordinated response.

The challenge now is to sustain the gains in order to meet the 2015 targets, including the malaria-related Millennium Development Goals 1, 4, 5 and 6. Malaria programme re-orientation is critical; management capacity must be strengthened and diagnosis of all cases must be quality assured to ensure malaria elimination.

The Malaria, other Vectorborne and Parasitic Diseases Unit of the WHO Regional Office of the Western Pacific organized a three-day workshop to:

1) Review progress and challenges faced in the implementation of the national malaria strategies and the Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010-2015) including alignment of both;

2) Share information and updates on malaria priority issues in the Region, especially on surveillance, monitoring and evaluation, artemisinin resistance, malaria elimination, vivax malaria, and quality assurance of malaria diagnosis; and

3) Review and revise country plans for quality assurance of malaria diagnosis.

The meeting brought together malaria programme managers, government decision-makers, other stakeholders, partners and experts to review progress and define the way forward for each malaria-endemic country in the Region. The last day of the meeting was dedicated to quality assurance of malaria diagnosis, which involved the Asian Collaborative Training Network for Malaria (ACTMalaria).

The following were the conclusions of the meeting:

1) Significant progress has been achieved in reducing malaria mortality and morbidity.
2) Number of partners, both technical and donors, has increased.
3) Examples of innovative and intersectoral approaches exist in a rapidly changing socioeconomic development context.
4) Huge amounts of funding were mobilized both externally and domestically; however funding gaps still exist.
5) Most countries have committed to malaria elimination and are reorienting their programmes. Targets are ambitious with many challenges across all countries embarking on it (high- or
low-income). These challenges include migration, private sector engagement, civil unrest, and limited technical tools for vivax malaria.

6) Drug resistance is a huge threat in the Region, but response to artemisinin resistance is in place in Cambodia and Thailand while antimalarial drug resistance monitoring is intensified throughout the region.

7) Programmes face significant challenges in terms of skilled staffing, procurement, supply management, rapid diagnostic test and microscopy quality assurance, and engagement of private sector.

8) Universal access to malaria interventions has not yet been achieved, especially in vulnerable and hard-to-reach populations.

9) Most countries do not have a comprehensive functional malaria diagnosis quality assurance.

The following were the recommendations of the meeting:

**Progress towards elimination**

1) Guidelines and standard operating procedures for phased subnational elimination to be produced by WHO, should be completed by 2012.

2) All countries which have committed to elimination should continue to strengthen their programmes based on sound evidence such as from programme review (nationally or sub-nationally).

3) The containment/elimination of artemisinin-resistant *Plasmodium falciparum* parasites should be intensified and a regional approach should be developed and implementation supported.

4) Intercountry cooperation, commitment, and innovations should be strengthened, through existing platforms (ASEAN+ 3, WHO, APMEN, IHR, ESCAP).

5) WHO may develop terms of reference for a Regional malaria technical advisory group and obtain concurrence of Member States.

**Universal access**

1) Programme management should be strengthened through standard operating procedures or a manual, capacity building, supply management and logistics, remuneration/incentives, financial management, technical support for management.

2) As procurement is a major obstacle to achieving universal access, partnerships with major funders may be strengthened to simplify and accelerate procurement procedures.

3) Best country practices in achieving universal access to malaria interventions should be documented and shared.

4) Vivax research should be intensified to enable the safe use of primaquine for radical cure in all countries.

**Surveillance, monitoring and evaluation**

1) Better documentation of progress in terms of financing, programme coverage and impact is needed.

2) Malaria information systems should be significantly strengthened and better harmonized with the country health information systems.

3) Surveillance should move to a case-based and single-stream reporting system, and engaging all potential sources of information should be supported in all elimination settings.


5) The WHO web-based Asia-Pacific Network for Vector Resistance, coordinated by ACTMalaria, should be made functional with active participation of all countries and adequate funding.

6) High quality antimalarial drug efficacy monitoring should continue and be expanded throughout the Region including through strengthening the existing Mekong Network and establishing the Pacific Antimalarial Drug Resistance Monitoring Network (including Day 3 positivity monitoring as a marker for artemisinin resistance).
Programme

1) Malaria resources should be considered to be used in support of control/elimination of other communicable diseases, particularly neglected tropical diseases, and for health system strengthening.
2) Synergies with other programmes and sectors should be explored using WHO’s framework for action for strengthening health systems.

Malaria diagnosis quality assurance

1) National malaria diagnosis quality assurance systems should be strengthened in all countries. 
2) Strengthened malaria diagnosis should be part of overall integrated laboratory quality assurance.

Research

1) Research priorities should be defined and funded to address the technical, programmatic and health system challenges.
1. INTRODUCTION

1.1 Background

Malaria is one of the most important parasitic diseases in the Western Pacific Region, with 262,912 confirmed malaria cases and 898 deaths reported in 2010 from the ten malaria-endemic countries (Cambodia, China, Lao People’s Democratic Republic, Malaysia, Papua New Guinea, the Philippines, Republic of Korea, Solomon Islands, Vanuatu and Viet Nam). The annual reported incidence is relatively low, with 0.15 confirmed cases per 1000 population, but this is considerably underreported. While there is an observed significant overall decline of malaria in the Region, the malaria burden is still worrisome in some countries, especially in Papua New Guinea.

The Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010-2015) was endorsed by the Regional Committee for the Western Pacific through Regional Committee resolution WPR/RC60.R5 in 2009. The plan includes performance indicators to monitor progress and evaluate outcomes and impact. The plan also aims to consolidate and build on the recent achievements in malaria control in the Region and progressively eliminate malaria where possible. Member States are urged to update national malaria strategic plans and use the regional plan as an advocacy tool to mobilize resources as well as use the indicator framework to track implementation progress.

The political commitment to reduce malaria burden has risen dramatically since 2000, and external funding has grown at an unprecedented rate. With increasing malaria resources and intensified implementation using improved diagnostic, treatment and vector control tools, the burden of disease continues to decline steeply in most countries. Given the progress, eight out of ten malaria-endemic countries in the Region have changed their national goals from malaria control to elimination (with Cambodia and Viet Nam doing so most recently in 2011). Success stories and challenges faced in the move towards elimination are to be shared in order for all endemic countries to rapidly scale up proven malaria interventions and accelerate towards elimination.

Significant gaps still exist in implementing WHO’s policy of universal access to parasite-based diagnosis. The quality assurance tools for malaria diagnosis developed by the WHO Regional Office for the Western Pacific need to be translated into programmatic use at country levels throughout the Region. Other WHO Regions such as the Regional Office for the Americas and the Regional Office for the Eastern Mediterranean remain eager to learn from the experiences in the Western Pacific Region.

Artemisinin resistance has emerged in the region. The experience from the WHO coordinated implementation of artemisinin-resistance containment project along the Cambodia-Thailand border has become a success story, largely contributing to the WHO global plan for artemisinin-resistance containment (2011). Other countries need information so as to be more vigilant, improve their antimalarial drug efficacy monitoring and adequately respond should artemisinin resistance emerge.

The Western Pacific Region has also made significant progress in specific malaria issues. Information that should be shared among all Member States includes radical treatment of vivax malaria and G6PD deficiency; public health interventions to address human infections due to the monkey malaria parasite *Plasmodium knowlesi*; strategies to improve access to some highly vulnerable population groups including ethnic minorities and mobile populations/migrants; engagement of private sector providers for malaria diagnosis and treatment; and creation of a regional network to monitor insecticide resistance under the umbrella of integrated vector management. Furthermore, there are good examples of integration of malaria interventions into the overall health system and using malaria as an entry point to strengthen health systems.

The three-day meeting took place at the Sofitel Philippine Plaza Manila Hotel, back-to-back with the preceding two-day Pacific Malaria Drug Resistance Monitoring Network meeting. The meeting brought together malaria programme managers, government decision-makers, other stakeholders, partners and experts to review progress and define the way forward for each
malaria-endemic country in the Region (for programme and list of participants see Annexes 1 and 2). The last day of the meeting was dedicated to quality assurance of malaria diagnosis, which was jointly organized with the Asian Collaborative Training Network for Malaria (ACTMalaria).

1.2 **Objectives**

The objectives of the meeting were the following:

1) to review progress and challenges faced in the implementation of the national malaria strategies and the Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010–2015), including alignment of both;

2) to share information and updates on malaria priority issues in the Region, especially surveillance, monitoring and evaluation, artemisinin resistance, malaria elimination, vivax malaria, and quality assurance of malaria diagnosis; and

3) to review and revise country plans for quality assurance of malaria diagnosis.

1.3 **Opening remarks**

Dr Shin Young-soo, WHO Regional Director for the Western Pacific, delivered the opening remarks. He congratulated everyone for the significant successes on the first two years of implementing the Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010–2015). Dr Shin said that the action plan is a road map to guide national malaria programmes and monitor implementation. It also serves as a tool for advocacy and resource mobilization.

In two years, five out of ten malaria-endemic countries in the Region updated their national malaria strategies, so that altogether nine are now aiming for malaria elimination. Innovative strategies were also employed to scale up access to malaria interventions, especially for vulnerable populations such as migrants. Surveillance has been strengthened, sizable resources were mobilized for country programmes and partnerships have been expanded.

Dr Shin highlighted the decrease in malaria-related deaths by 15% in 2010 compared to 2009. He said that firm political commitment, strong technical assistance and unprecedented financial support from donor agencies and development partners made all these possible. The challenge now is to sustain the gains in order to meet the 2015 targets, including the malaria-related Millennium Development Goals 1, 4, 5 and 6. To eliminate malaria, programme re-orientation is critical, management capacity must be strengthened and diagnosis of all cases must be laboratory confirmed (microscopy or RDT) and quality assured.

Dr Shin then urged everyone to learn from one another and absorb the many useful lessons from the past two years. He closed his speech by thanking everyone who attended the workshop and wished them a productive meeting and a pleasant stay in Manila.

1.4 **Nomination of chair, vice-chair and rapporteur**

Dr Shin presided over the election of the officers of the meeting. Dr Chang Chee Kheong, Director of Disease Control Division of Malaysia was selected as the chairperson. Dr George Taleo, Health Manager, Ministry of Health, Vanuatu was elected as Vice-chairperson while Dr Siv Sovannaroth, Vice Director, National Center for Parasitology, Entomology and Malaria Control in Cambodia, was selected as rapporteur.
2. PROCEEDINGS

2.1 Update and global direction in malaria

Dr Robert Newman, Director of the Global Malaria Programme, WHO, gave an update on key developments in global direction on malaria. He said that there has been a tremendous increase in external funding for malaria during the last decade as well as domestic funding especially in the WHO Western Pacific Region. However, there is still a large fund gap for malaria activities. Dr Newman showed the current status of insecticide-treated nets (ITNs) distribution and indoor residual spraying (IRS) use. He mentioned that universal diagnostic testing is now recognized as the norm as fever does not equal plasmodium infection even in Africa. He highlighted the reduction in malaria cases and deaths from 2000 to 2009 and mentioned that majority of malaria deaths are still occurring in Africa. He also warned that progress can evaporate in one year, sighting Zambia as an example.

There has been tremendous activity in the Global Malaria Programme (GMP) with a large number of reports and guidelines either accomplished or planned. A malaria policy advisory committee (MPAC) is currently being formed to provide independent strategic advice and technical input to WHO for the development of policies related to malaria control and elimination.

Dr Newman then gave an update on malaria in the Western Pacific Region. He introduced the Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010–2015) which serves as a road map for all countries in updating their national strategies, plans of action and monitoring and evaluation plan. He ended his presentation with messages related to ensuring universal access; building and sustaining partnerships; ensuring political commitment; continued malaria control efforts even if cases wane; addressing mobile and migrant populations; engaging community and ensuring ownership; involving the private sector; strengthening capacity; vigilance against drug and insecticide resistance; keeping on innovating and refining tools and strategies. He observed that the WHO Regional Office for the Western Pacific should continue to lead the global malaria elimination efforts.

2.2 Progress towards malaria elimination in the Region

Dr Eva Christophel, Team Leader of the Malaria, other Vectorborne and Parasitic Diseases (MVP) unit in the WHO Regional Office for the Western Pacific, gave a brief history of malaria control and elimination efforts, globally and in the region. In the Western Pacific Region, there are four different epidemiological regions: Mekong, Malaysia and the Philippines, Pacific Island Countries, and the Republic of Korea and China. Malaria mortality has been halved in the last decade but incidence in 2010 increased in some countries which may be attributed in part to improved surveillance. Some major activities that helped in the programme’s success are distribution of long-lasting insecticidal bednets (LLINs); IRS; and information, education, and communication campaigns. Roll-out of rapid diagnostic tests (RDT), community-based interventions, surveillance, and engagement of private sector are also equally important parts of the programme. *Plasmodium falciparum* (*Pf*) is still predominant but management of *Plasmodium vivax* (*Pv*) is also essential especially since national targets are now towards elimination and glucose 6 phosphate dehydrogenase (G6PD) deficiency is prevalent in some countries.

Dr Christophel discussed the Regional Action Plan (RAP) for Malaria Control and Elimination in the Western Pacific (2010–2015) and its progress by impact indicator.

She mentioned that nine out of ten endemic countries in the region have already updated their national strategy using the RAP and several countries have also updated their malaria monitoring and evaluation plans. Dr Christophel briefly mentioned that malaria programmes have been very successful in getting financial support from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) and eight endemic countries have US$850 million in total funding.
Despite the gains, however, there are still challenges that need to be addressed. These challenges are the following:

- Artemisinin-resistant falciparum malaria has emerged along the Cambodia-Thailand border and possibly elsewhere.
- Improving the quality of malaria diagnostic and treatment services provided by the public and private sector.
- Oral artemisinin monotherapy continues to be widely available in the Region with very serious implications.
- Counterfeit and substandard antimalarial medicines are still being produced and marketed in the Region, but multisectoral efforts to stop these are now advancing.
- Evidence is emerging that combating vivax malaria may not be as simple as previously thought. Several countries do not use primaquine for radical cure.
- Many different categories of mobile groups in the Region present a particular challenge to health services. Access to malaria prevention and diagnosis and treatment through routine channels is not well suited to their transient nature.
- There are limited cross-border collaborations.
- Most malaria programmes in the Region tend to be vertical in nature with limited integration.
- There is limited human resources capacity.

Given the above challenges, the following activities were identified as priorities:

- providing leadership and guidance;
- country support and capacity building;
- progress tracking;
- intensified support for elimination;
- sustaining donor interest and forging new partnerships;
- intersectoral collaboration addressing multiple diseases; and
- research on infectious diseases of poverty.

2.3 Technical session 1: malaria elimination

2.3.1 Malaria elimination in the Republic of Korea

Dr Jin Gwack of the Korea Centers for Disease Control and Prevention presented a comprehensive and realistic programme of working towards elimination by 2015, with a target of 10% reduction yearly in risk areas. He said that malaria was the fifth cause of infectious disease incidence in 2010 with 1772 cases. High transmission rates usually occur from June to September. Main method of diagnosis is microscopy with or without rapid diagnostic test (RDT) kits. Vivax malaria found largely near the border between the Republic of Korea and the Democratic People’s Republic of Korea continues to be a problem. There are very few imported cases, with most cases associated with military bases: military, veterans and civilians. The Republic of Korea has a strong surveillance system that includes the use of geographical information system (GIS) to map reported malaria cases based on current address of the patient.

Standard case treatment in the Republic of Korea includes chloroquine (CQ) and primaquine (PQ). PQ is used as G6PD prevalence is very low in the country; however, there was a small number of CQ-resistant cases were reported recently. Military people are given CQ in July through early-October and PQ in mid-October as a prophylaxis. Larval control (Bacillus thuringiensis (BtI), insect growth regulators (IGR)), space spraying (thermal fogging, cold fogging, and mist), or IRS are used as control measures.

Since most of the high-risk areas are found near the border of Democratic People’s Republic of Korea, the Republic of Korea is donating cash and goods to support Democratic People’s Republic of Korea’s malaria control programme. In-kind items include medications for prevention
and treatment (CQ, PQ); laboratory equipment (mosquito nets, microscopes); bednet treated with insecticide (ITN); and insecticides for mosquito control. Cash donations are for technical staff training. In addition, the Global Fund supported Democratic People’s Republic of Korea’s malaria programme in 2010. All these efforts resulted in the decrease of malaria cases in Democratic People’s Republic of Korea.

Dr Gwack then presented the ways forward in order to sustain the gains of its elimination programme. Some of the recommendations are to strengthen surveillance and early warning system using GIS; enhance education and training; improve coordination through public-private military sector partnership; and expand collaborations for global malaria elimination programme including working with Democratic People’s Republic of Korea’s malaria control programme.

2.3.2 Malaria elimination in Malaysia

Dr Christina Rundi of the Ministry of Health Malaysia said that the government has set the target elimination date to 2020 nationwide (2020 in Sarawak and Sabah and 2015 in West Malaysia). The majority of malaria cases are in Sarawak and Sabah, while several states in peninsular Malaysia and all the federal territories have seen no locally acquired malaria in 2010, raising hopes of elimination. Critical success factors include political and financial commitment; access to early diagnosis and treatment; community support and participation especially the health volunteers; comprehensive coverage of vulnerable poor and marginalized population at high risk of malaria with appropriate malaria control measures; and staff commitment and dedication.

Despite the success, the following challenges still remain: improving access to control measures among high-risk groups (mobile population, migrant workers from endemic areas, plantation workers, rubber tappers, loggers, travellers to endemic countries, those involved with forest related activities). Inaccessible areas need to be reached especially in Sabah and Sarawak; control activities should be strengthened at the border areas; and role of partners (Ministry of Health, private sector, community, other government agencies and nongovernmental organizations) should be emphasized. To address these challenges, there should be a greater commitment from all agencies towards elimination of malaria. Surveillance system, monitoring of activities and progress should be improved. New technologies and innovations such as LLINs should be incorporated into the current control programmes.

Dr Rundi mentioned that to improve surveillance and timely reporting, a new database system is currently being used. In addition, malaria is a notifiable disease in Malaysia. Furthermore, foreign workers are required to undergo medical check-up which involves screening for malaria. With regard to *Plasmodium knowlesi* (*Pk*) in Malaysia, Dr Rundi said that so far it is still a zoonotic disease and is notified under the existing surveillance system. As with human malaria, diagnosis is based on microscopy and, in addition, all *Plasmodium malariae* slides are tested again using PCR.

2.3.3 Malaria elimination in the Philippines

The Philippines moved its malaria goal from control to phased elimination of the disease. Dr Mario Baquillod, National Malaria Control Programme Head of the Department of Health, said that the Philippines stratified its provinces according to monthly pattern and distribution of malaria cases by year(s). As of 2010, five provinces have high-stable transmission1; eighteen provinces have medium-stable transmission; six provinces have low-stable transmission; ten provinces have unstable transmission2; eighteen are epidemic-risk provinces3; and twenty three are malaria-free provinces4.

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1 Stable transmission: continuous presence of at least one indigenous malaria case in a month for six months or more at any time during the past three years.

2 Unstable transmission: continuous presence of at least one indigenous malaria case in a month for less than six months at any time during the past three years.
Dr Baquilod said that the elimination goal is realistic. Morbidity and mortality data from 2000–2009 showed that numbers are decreasing. This trend may be attributable to strong political commitment from the national and local governments including increased malaria budget and manpower and finalized plans. Improved diagnostic procedures and treatment courses; vector control; and sustained cooperation, collaboration and external support all contributed to the downward trend of malaria cases.

In order to achieve the country’s goal of a malaria-free Philippines, the government formulated four objectives: to (1) ensure universal access to reliable diagnosis, highly effective and appropriate treatment and preventive measures; (2) enable local government to own, manage and sustain the malaria programme in their respective localities; (3) sustain financing of antimalaria efforts at all levels of operations; and (4) ensure functioning quality assurance system for malaria operations.

Challenges to the elimination programme such as high number of population-at-risk (12 million), varied performance of provinces, and high number of imported malaria cases in some highly urbanized cities still continue. Steady progress in reduction, universal access, standardized quality assurance of diagnosis and treatment services, scaling up of vector control, adoption of integrated vector management, community and other stakeholder involvement and sustainable financing are key factors to the success of the Philippine malaria programme.

2.3.4 Malaria elimination in China

Dr Wang Rongrong from the Division of Parasitic Disease of the Ministry of Health opened her presentation by showing the malaria risk by county. Most malaria cases are in the southeastern part of the country, bordering the Lao People’s Democratic Republic. However, Dr Rongrong said that malaria elimination is feasible within ten years since malaria cases decreased steadily over the past five years. There is also a strong political commitment, existing policies related to malaria elimination and increased investment to support activities. Dr Rongrong then showcased China’s web-based disease reporting system where malaria foci can be identified in real time and response can be rapid.

Increase in number of imported cases, need for new tools and methods and the end of Global Fund support are challenges that could affect the success of the programme. The role of partners including national and local governments, nongovernmental organizations, World Health Organization and donors were listed and emphasized.

Dr Rongrong listed the ways to move forward the malaria programme: strengthening coordination of stakeholders; development of technical scheme of China malaria elimination; development of guideline of certification of malaria elimination by county in China; and conducting national malaria elimination programme meeting as well as national microscopy skills and knowledge competition to improve the capacity of diagnosis. She also said phased/subnational certification is needed since there is no WHO standard subnational operation. WHO MPAC said that they will look into this.

2.3.5 Malaria elimination in Vanuatu

Mr George Taleo, Programme Manager of the National Malaria Control Programme, Ministry of Health, presented the malaria situation in Vanuatu. Since 1990, malaria cases have been decreasing due to substantial resources available. However when funding ended, cases increased. Mr Taleo said that since Vanuatu has already made a lot of progress including an improved health system, available diagnostic and treatment tools, malaria elimination is feasible.

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3 Epidemic-risk: presence of at least one indigenous malaria case at any time in the past five years
4 Malaria-free: absence of indigenous malaria case for the past five years, even in the presence of malaria vector(s).
The main strategies of the Vanuatu malaria action plan (2008/2009 to 2013/2014) which includes vector control, case management, surveillance/monitoring/evaluation, and community involvement were highlighted. For under-five children, nets are freely distributed and the plan works closely with health facilities on the implementation of integrated management of childhood illness (IMCI). Further, health system strengthening is also planned. GIS-based surveillance to map cases is currently being used and short messaging system (SMS)-based reporting systems are under development.

Mr Taleo mentioned several lessons learnt during the implementation of malaria programme including the need for strong coordination of stakeholders at all levels and capacity building in human resources. He then ended his presentation by listing some of the ways forward that the national government should do or continue to do in order to sustain the gains of the malaria programme.

2.3.6 Malaria elimination in Viet Nam

Dr Nguyen Manh Hung, Director of the National Institute of Malariology, Parasitology and Entomology (NIMPE) and National Malaria Control Program (NMCP), opened his presentation by saying that malaria elimination in Viet Nam is realistic as morbidity and mortality are decreasing. He supported this statement by saying that the national malaria control programme has experience in malaria control in the last 10 years and more than 50% of the provinces have now < 1 confirmed malaria case per 1000 population at risk.

The national government stratified the country according to malaria endemicity by zone. More than 50% of the zones have no malaria. Seventy one million are living in malaria-free zones and only 1.2 million are living in high-risk areas.

Dr Nguyen Manh Hung said that they enjoyed strong commitment from the government for the last 20 years and are currently finalizing the new malaria control and elimination strategy. However, there are still a large number of populations-at-risk and seasonal migrants and cross-border movement are uncontrolled and these pose some challenges to the programme. Low personal protection in some areas, lack of human resources and difficulty in mobilizing resources were also identified as challenges. In addition, malaria parasite resistant to current drugs used (artesunate) is emerging. Dr Nguyen Manh Hung then presented the Viet Nam National Strategy for Malaria Control and Elimination for 2011–2020 that aims to eliminate malaria by 2030.

2.3.7 Role of networks – Asia Pacific Malaria Elimination Network

Dr Chong Chee Kheong, Director of Disease Control, Ministry of Health, Malaysia and Asia Pacific Malaria Elimination Network (APMEN) country partner, introduced APMEN and its work in malaria elimination. He started with a brief background of the APMEN and discussed the need for a network for malaria elimination. APMEN is composed of 11 countries from the WHO Southeast Asia and Western Pacific regions. Dr Chong said that working through a network allows for an exchange in knowledge and experiences across country programmes and partners; capacity building through countries and partners; building the evidence base by linking and leveraging partnerships; a bigger voice towards common goals and bringing attention and support to newly emerging priorities in malaria elimination and flexibility by using the network’s varied experience.

APMEN brings together a diverse array of partners including malaria control programmes, academic institutions, donors, private sector, nongovernmental organizations, faith-based organizations and other community-based organizations. The network develops and enhances links among programmes and organizations through annual meetings, technical discussions and support, and operational research. APMEN plans to further the research work to support country programmes on vector control, cross-border issues, mobile populations and other elimination priorities. Their next annual meeting will be in May 2012 in the Republic of Korea.
2.4 Technical session 2: universal access to malaria diagnosis, treatment, prevention

2.4.1 Lao People's Democratic Republic

The Lao People’s Democratic Republic presentation focused on community-based diagnosis and treatment, public-private mix and ethnic minority groups. Dr Bouasy Hongvanthong, Acting Director of the Center for Malariology, Parasitology and Entomology (CMPE), first discussed the community-based diagnosis and treatment. This initiative was piloted in three provinces in 2005 where *Plasmodium falciparum* RDTs and ACTs were used to provide early detection and treatment. It was later expanded nationwide resulting to significant proportion of suspected cases getting confirmed diagnosis and a resultant drastic reduction in mortality. Results of this nationwide coverage down to village level were used to identify epidemiological stratification and design different malaria strategies.

The public-private mix (PPM) in malaria diagnosis and treatment was also introduced in the Lao People’s Democratic Republic in 2007–2008. This is to increase access to diagnosis and treatment, improve quality of service, and enhance comprehensiveness of malaria case reporting and data while at the same time control circulation of fake and substandard drugs using PPM initiative at targeted areas. According to Dr Deyer Gopinath, Technical Officer at the WHO Representative’s office in the Lao People’s Democratic Republic, currently they are dealing with only registered private practitioners – private clinics and pharmacies but they recognize that in the future unregistered practitioners should also be included although this will prove to be difficult to do. The immediate plan is to extend the PPM concept to development projects – hydro dams and plantations. A standard operating procedure for PPM includes a standard set of forms to gather data. The process is decentralized and the district level malaria control is responsible for the implementation, supervision and monitoring while the province compiles and reviews the data.

Finally, Dr Hongvanthong discussed health education activities focusing on ethnic minority groups (EMG) located in the northern and southern parts of the country. While not all areas with EMGs have high incidence of malaria, the data that they gather could draw significant conclusions that could encourage the Government to develop a framework to map quality health services for EMGs.

2.4.2 Solomon Islands

Mr Albino Bobogare, Director of Vectorborne Disease Control Programme of the Ministry of Health, presented Solomon Islands’ progress towards universal coverage. He briefly discussed the current status of malaria in Solomon Islands and discussed the key interventions of the national malaria strategy that includes vector control, case management, behavioural change communication, health system strengthening and progressive elimination.

Mr Bobogare gave an update on the status of LLIN distribution and IRS coverage which increased since the 2006 survey. Data from 2010 showed that 81% of the health facilities are able to diagnose malaria and there was an ongoing microscopy quality assurance (QA) and refresher training course. ACT roll-out started in 2009. All health facilities had ACT supplies and care providers trained and provided with treatment guidelines. Solomon Islands also conducted a study on malaria in pregnant women from May 2009 to June 2010 but the study was suspended due to low number of cases. Furthermore, preliminary results showed that women in Solomon Islands do not accept using Fansidar for treatment.

Malaria elimination programme started in 2008, with the support of the Ministry of Health and Pacific Malaria Initiative (PacMI), with the aim of eliminating malaria from Temotu and Isabel provinces by 2014. In Temotu, data showed a decreasing number of cases during the first quarter from 282 in 2008 to nine in 2011. In Isabel, malaria cases dropped during the first quarter from 60 in 2008 to 4 in 2011. Success factors include government commitment, availability and flexibility of funding, full complement of technical support from all partners, full commitment of programme staff, established technical working group, active malaria steering committee, and strengthened logistic capacity of the programme. Mr Bobogare concluded his presentation by discussing the current challenges and the different ways on how to overcome them.
2.4.3 Papua New Guinea

Mr Leo Makita, Principal Adviser, Malaria and other Vectorborne Diseases, National Department of Health, presented Papua New Guinea’s experience in ensuring universal access to malaria diagnosis, treatment and other services. He opened his presentation by providing an overview of the current malaria situation and the results of the ongoing Global Fund Round 8 project. Mr Makita mentioned that Papua New Guinea was still in the stage of controlling malaria. He said that malaria incidence was gradually decreasing, quality of malaria diagnosis service is increasing and more people are protected by LLIN.

Weak health systems, low capacity of health workers due to weak administrative and human resource policies, poor medical supply system, and poor financial management were the key challenges in their fight against malaria. Mr Makita proposed that the ways forward were to improve the implementation of Global Fund Round 8 activities and apply for Phase II; conduct midterm review of the national malaria control strategic plan (2009 – 2013), and implement KOICA and AusAID-supported malaria activities.

2.4.4 Cambodia

The Cambodia experience on scaling up universal access to malaria diagnosis, treatment and prevention was presented by Dr Chea Nguon, Vice Director of the National Center for Parasitology, Entomology and Malaria Control (CNM). He discussed briefly the ongoing artemisinin-resistance containment project; its goal, strategies, key activities and impact. Dr Nguon also mentioned vector control through the distribution of LLIN and long-lasting insecticidal hammock nets (LLIHN) and discussed Cambodia’s different initiatives in scaling up universal access including reaching mobile and migrant populations, private-public mix strategy and a malaria in pregnancy initiative in Rattanakiri province. The importance and benefits of organizing village/mobile malaria workers to provide the needed manpower in conducting community-based malaria activities was also emphasized. He highlighted as well the obstacles/challenges faced by the national malaria control programme.

Dr Nguon then discussed the great reduction in malaria mortality in Cambodia due to the impact of the joint efforts made and the key issues that need to be addressed. Some of these issues are the safe use of primaquine (PQ) for *Plasmodium falciparum* and *Plasmodium vivax*; detection and treatment of asymptomatic malaria parasite carriers through the use of FSAT vs. mass drug administration in the context of the containment project, stopping the use of artemisinin monotherapies in the private sector, and strengthening health information system. Dr Nguon mentioned that in order to move forward, quality of diagnostic tools and treatment should be improved; surveillance and monitoring and evaluation strengthened; and policies and guidelines set. He has emphasized the ways forward and appealed for the continued funding that must be secured for strengthening and scaling up all existing and ongoing activities, for instance, contribution of village/mobile malaria workers, border collaboration. He highlighted that activities must coordinate with other programmes to strengthen health systems.

2.4.5 Thailand

Mrs Saowanit Vijaykadga, Technical Officer of the Malaria Control Programme Bureau of Vector Borne Disease of the Ministry of Public Health, discussed the strategy for the containment of artemisinin resistant malaria parasites on the Cambodia-Thailand border. The goals, objectives and organization of this two-country project were presented. Cases and deaths decreased from 2000–2010 with the number of *Plasmodium falciparum* cases decreasing and *Plasmodium vivax* cases increasing from 1965–2010.

Mrs Vijaykadga cited four major strategies that contribute to the decline of malaria: change in treatment policy; community-based diagnosis and treatment; information, education and communication (IEC)/behaviour change communication (BCC); and cross-border cooperation that includes fixed schedule malaria clinic (FSMCs) for Thai and non-Thai migrant workers. FSMC improved access to early diagnosis and effective treatment, attitude and collaboration of cross-border
migrants, and collaboration among military and citizens of Thailand and Cambodia. However, collaboration with employers to locate migrant population is still lacking.

For BCC, four strategies were developed to promote positive behaviours. IEC materials are originally produced in Thai language and then translated to Khmer language. Still, some IEC/BCC materials should be more appropriate for the migrant populations. An assessment of BCC implementation needs to be conducted to determine its impact to target population.

2.5 Group work 1: peer review of country posters -- progress, challenges and innovations

2.5.1 Introduction to group work

Dr Bayo Fatunmbi, Technical Officer (Monitoring & Evaluation) of the MVP Unit in the WHO Regional Office for the Western Pacific, introduced the group work that focused on reviewing the progress made with regard to the implementation of the Regional Action Plan for Malaria Control and Elimination in the Western Pacific Region (2010–2015).

Participants were divided into two groups. The first group, the Mekong plus group, consisted of Cambodia, China, Lao People’s Democratic Republic, Thailand and Viet Nam. The second group, the Pacific plus group, was composed of Malaysia, Papua New Guinea, Philippines, Republic of Korea, Solomon Islands and Vanuatu. Each group appointed a chairperson who facilitated the discussion and a rapporteur who reported the group work in the next session. Participants and peers reviewed the country posters and flagged critical issues in implementation based on findings. National malaria control programme officers responded to identified issues focusing on innovations, challenges and the way forward. Each group then reached agreements on key points. Rapporteurs summarized group findings using a ten-slide template.

2.5.2 Presentation of group work

Dr Sylvia Meek was appointed facilitator for the Mekong plus group, while Dr Nguyen Manh Hung was appointed chairperson and Dr Christina Rundi was rapporteur. Common themes identified were G6PD deficiency screening, drug resistance, public-private partnership, data or health information, community involvement and distribution of LLIN. Countries responded to specific questions. However, not all themes were addressed due to time constraints. The group also said that country-by-country review of country posters was a very good idea.

Dr Richard Cibulskis was appointed facilitator for the Pacific plus group. Best practices in the six countries were identified. Some of these are the adequate government resources for malaria; public-private partnership building; identification of most-at-risk population groups and availability of community-based diagnosis and treatment centres. Declaration of malaria-free provinces using a phased approach was also commended. Key challenges common to each country were also identified. These challenges include migrant workers surveillance; compliance of private and public clinicians on diagnosis and treatment protocols; patient compliance on treatment and follow-up; quantification of RDTs and antimalarials and development of supply systems to avoid stock-outs; timely reporting of malaria information using new technology systems; increased vector control using a single class of insecticide (i.e. pyrethroids); sustainability of community-based diagnosis centres; and working effectively with other partners in different sectors. However, the group identified several ways on moving forward with malaria elimination. Activities included standardization of guidelines in malaria risk stratification; modeling of trajectory towards elimination; establishing cross-border collaboration between countries and/or districts; facilitating exchange of experts and experiences through networking; ensuring robustness of surveillance system; implementation of insecticide resistance management strategy; and mobilizing resources.
2.6 Technical session 3: surveillance, monitoring and evaluation

2.6.1 Surveillance, monitoring and evaluation: Global Malaria Programme perspective

Dr Richard Cibulskis of the Global Malaria Programme (GMP) in WHO Headquarters presented the perspective on surveillance, monitoring and evaluation. He discussed the different indicators being used and sources of information and data. He introduced the malaria surveillance guidelines that GMP was developing to guide disease surveillance and response. He said that surveillance guidelines have not been issued since the 1960s. Tools and strategies have now changed, thus new guidelines need to be developed. Dr Cibulskis briefly went through over the contents of the draft malaria surveillance guidelines and the current status of its development. He urged everyone to review the draft before it is finalized.

2.6.2 Assessment of monitoring and evaluation capacity of malaria in selected Western Pacific endemic countries

Ms Cecilia Hugo, Executive Coordinator of the Asian Collaborative Training Network for Malaria (ACTMalaria), presented the results of a monitoring and evaluation (M&E) assessment study, coordinated by the WHO Regional Office for the Western Pacific with Global Fund financial support. The study examined current malaria programme M&E capacity in terms of strengths, weaknesses or barriers in the implementation of functional M&E system. It also aimed to identify priority areas for capacity strengthening in participating countries, namely, Cambodia, China, the Lao People’s Democratic Republic, Malaysia, the Philippines, Papua New Guinea, Solomon Islands, Vanuatu and Viet Nam. Desk review, self-administered questionnaires/score sheets and e-mail exchanges with key contacts (M&E country programme focal points and WHO malaria technical officers) were used to gather data. Score sheets were based on modified Global Fund M&E systems strengthening tools; the Regional Action Plan for Malaria Control and Elimination in the Western Pacific Region (2010–2015); and the regional malaria indicator framework.

Ms Hugo discussed the components of the study, the strengths identified as well as the issues and opportunities. She concluded that current capacity to effectively monitor and evaluate malaria programmes in most endemic countries needs urgent strengthening measures in order to meet the demands of the elimination goal. She then made the following recommendations to strengthen M&E capacity in the participating countries: development and implementation of national M&E guidelines, policies and plans; linking of national health information system with malaria information system; exchange of M&E experiences; capacity building (including re-orientation of existing M&E officers); and dissemination and utilization of results.

2.6.3 Regional Malaria Indicator Framework for the Western Pacific

A brief background on the Regional malaria indicator framework (RMIF) for the Western Pacific was presented by Dr Bayo Fatunmbi. The goals of the RMIF are the following: to create a framework and indicator set that reflect the factors affecting malaria control in the Region; to capture the information that is useful for programme management; and to harmonize indicators with global reporting requirements of international organizations and donors. Six areas were selected to illustrate the malaria control priorities: programme management; vector control; IEC/BCC; case management; engaging vulnerable populations; and strategic information. Indicators were selected to reflect the objectives and interventions identified by the national malaria control programmes with the goal of malaria control or elimination.

Dr Fatunmbi listed additional indicators — i.e. non-global malaria indicators and the reasons for including them. He also discussed on how countries could use the RMIF to strengthen surveillance, monitoring and evaluation. Dr Fatunmbi stressed that the role of surveillance and M&E in malaria elimination is critical as it provides updated quality data for decision making. He stressed that an effective M&E system produces results and justifies value for money. Technical assistance is needed at country and subnational levels to strengthen surveillance and M&E capacity.
2.6.4 Malaria indicator surveys: Solomon Islands and Vanuatu

Mr George Taleo shared Solomon Islands and Vanuatu's experience in conducting malaria indicator surveys (MIS). The two countries' MIS follows the standard RBM monitoring and evaluation reference group (MERG) MIS questionnaires among randomly selected households and health facilities. The nationwide surveys were implemented in parallel in Solomon Islands (Isabel and Temotu provinces) and Vanuatu (Tafea province) in April to June 2011. The MIS provided national representative estimates on a number of indicators including prevalence of malaria using microscopy and PCR; prevalence of anaemia; intervention coverage rates; household knowledge of malaria and their treatment behaviour; diagnosis and treatment practices at health facilities; and health worker knowledge of current treatment guidelines. In Vanuatu, rapid assessment of yaws was also piggybacked on to the MIS.

Mr Taleo mentioned some lessons learnt from the two surveys: support from the national statistics office (NSO) in providing household GIS data and interviewers was essential; personal digital assistants (PDA) can be used in gathering standard MIS questions— they made it easy to compile and clean data and results were available rapidly. Mr Taleo said that the use of this methodology would be highly useful for future surveys by the Ministry of Health, NSO or others.

2.6.5 Beyond routine malaria surveillance

Dr Deyer Gopinath, Technical Officer at the WHO Representative's office in the Lao People’s Democratic Republic, opened his presentation by saying that, "Predicting the likelihood of a disease outbreak should make it possible to start surveillance programmes before outbreaks occur and to initiate control programmes before the population has become seriously affected". He said that current routine surveillance systems need to be strengthened to capture changes in the population, vectors, the private sector and non-health sectors. Dr Gopinath showed the rapid development in the Greater Mekong Subregion, i.e. roads, railways, dams, plantations, mining and others. All these could change vector ecology, contribute to the spread of drug resistant malaria or the proliferation of substandard antimalarials or artemisin monotherapies, among others.

Dr Gopinath ended his presentation by listing discussion points such as how and to what extent should the current surveillance of development projects in control and elimination settings be extended; what the entry points for engaging different development projects are; how to map shared GMS interests; and how to use existing knowledge, information and databases in forecasting trends.

2.6.6 Development of health information system for managing health care services in remote areas

Mrs Saowanit Vijaykadga discussed the development of a health information system (HIS) using web and mobile technologies. She said that the development of this system was to strengthen surveillance system, data management, analysis and consolidation of data in Thailand and to share information among neighbouring countries. The system applied modern and affordable technology to assess situation of malaria epidemics and evaluate the effectiveness of the malaria control programme of the Bureau of Vectorborne Diseases of the Ministry of Health. The HIS could also conduct disease mapping and spatial analysis in order to enhance activities of the rapid response teams in the project areas. Mrs Vijaykada then showed the prototype of this system with different modules such as case detection/registry module, case investigation/treatment module, and drug compliance module.

2.6.7 Respondent-driven sampling study on migrants at the Thai-Cambodian border

Mrs Saowanit Vijaykadga also presented a respondent-driven sampling study on migrants at the Thai-Cambodian border that aims to understand population characteristics of migrants and to obtain information to guide containment strategy. In studying migrant populations, generating a sampling frame is difficult as the actual number of migrants may be largely hidden from the official system, migrant populations move around frequently and may be isolated in remote areas. Mrs Vijaykada then briefly discussed what a respondent-driven sampling (RDS) is and how it works. RDS is a methodology often used to study population in difficult-to-access areas. A handful of participants are recruited who serve as the initial recruits or seeds. Seeds are interviewed and
receive primary incentive, then are provided with a set number of coupons to use in recruiting their peers. Seeds receive a secondary incentive for each successful recruit. The study is discontinued as soon as the required sample size is achieved.

The RDS study of migrant population at the Thai-Cambodian border has some limitations and challenges. However, some important lessons were learnt. More time should be allowed for sensitization of community, employers and other groups involved with migrants as well as for training. A system should be developed to space out recruits. Translators are needed to engage migrant workers and overcome language barriers. Pilot testing questionnaires is important. Budget should be well-planned. Mrs Vijaykadga said that RDS cannot be used for routine surveillance but is very useful in obtaining information about migrants.

2.6.8 Strengthening malaria surveillance in Cambodia

Dr Siv Sovannaroth of the National Center for Malaria Control, Parasitology and Entomology in Cambodia discussed the ways how Cambodia strengthened its malaria surveillance. He first talked about the malaria burden in the country and the related key concerns. The information required to address key concerns were listed and compared with the information currently available. The results of the gap analysis facilitate necessary improvements with regard to surveillance and monitoring.

A number of improvements have been made to Cambodia’s information system since 2009. There are now more village malaria workers (VMW) and mobile malaria workers (MMW). A database was developed to process malaria cases and other malaria-related data (e.g. bednets) from VMW and health facilities. A real-time monitoring system for Day 3 positive cases was also developed using short messaging system (SMS) to identify patients and alert district officials. A public-private partnership between CNM and a mobile company was established to develop and implement a web-based real-time alert system of all Plasmodium falciparum cases, also using SMS. A quarterly malaria bulletin was started on the CNM website. Lastly, a real time web-based monitoring system for stock- outs of essential malaria drugs was also developed. Currently, the Day 3 monitoring system is being reviewed and the health information system is being revised. All at-risk villages in Cambodia are in the process of re-stratification based on village-level incidence from the malaria database.

Despite the improvements in surveillance and monitoring, there are still challenges the programme is facing. Among these are artemisinin resistance, inadequate and poorly motivated staff, procurement delays, improper health-seeking behaviour and mobile and migrant populations. Challenges in implementing the Global Fund financial support were also summarized by Dr Sovannaroth.

2.6.9 Monitoring the durability of long lasting insecticidal nets (LLINs) under operational conditions

A study in Palawan province in the Philippines that evaluated the durability of three brands of LLINs distributed by Global Fund support in 2007–2010 was presented by Ms Majhalia Torno from the Research Institute for Tropical Medicine of the Department of Health. This study identified local practices of LLIN use and maintenance and determined the bio-efficacy of different LLIN types and ages. Ms Torno described the methodology of the study including study sites and number of LLIN samples inspected. Households were interviewed, damages sustained by LLINs in the field were identified, and the hole index was calculated.

The study provided data on the range of LLIN physical deterioration (torn, full of holes) in the field. The increasing hole indexes show a decreasing bio-efficacy of LLINs with one exception. The physical condition or integrity of the net has to be considered as a potential functional loss when evaluating its “useful life”. However, the study will not be able to measure net survival and attrition rates in the field. A prospective design to allow comparison of different LLINs based on prior census and random allocation and to systematically monitor loss of nets in the field is suggested.
The main message of the study was that LLINs do not last forever. Understanding the factors that influence bednet longevity was vital as this information can inform the planning strategies for replacing non-functional nets, budgeting campaigns and testing the manufacturers’ claims. Durability, user preference, cost, delivery time and registration in the country are all important factors in making procurement decisions. Currently, understanding of LLIN longevity is incomplete and needs to be addressed soon.

2.6.10 Geographical information system for malaria elimination in Solomon Islands and Vanuatu

Mr Gerard Kelly, from the School of Population Health, University of Queensland, Australia, presented a spatial decision support system (SDSS) approach that supported the scaled-up demands of malaria elimination and intensive malaria control in Solomon Islands and Vanuatu. Mr Kelly explained that the SDSS provided computerized support for decision-making where there is a geographical or spatial component. SDSS was generally based around GIS that integrates database management systems, analytical models, graphical map display, tabular reporting capabilities and expert knowledge.

In Solomon Islands (Temotu and Isabel provinces) and Vanuatu (Tafea province), the objectives of the SDSS were to provide an effective and practical operational tool to support intervention management and ensure maximum coverage/service delivery is achieved across target areas; and to serve as a routine geo-spatial surveillance system. Status and results of implementation of several interventions such as geographical reconnaissance, focal IRS and blanket LLIN distribution were summarized. A practical demonstration of SDSS was also conducted.

2.6.11 Progress in antimalarial drug efficacy monitoring

Dr Dorina Bustos, Technical Officer from the WHO Mekong Malaria Programme (MMP), introduced the MMP goals and activities, and the therapeutic efficacy surveillance of antimalarial medicines. There are 35 sentinel sites in six Greater Mekong Subregion (GMS) countries: Cambodia, China, Lao People’s Democratic Republic, Myanmar, Thailand and Viet Nam. She also presented the progress and updates from these studies.

The clinical and parasitological responses of \textit{Plasmodium falciparum} (Pf) parasites to different ACTs in the GMS countries from 2006–2010 were presented, as per the WHO global report on antimalarial drug efficacy and drug resistance (2000–2010). In addition, data on the percentage of cases positive on Day 3 of the therapeutic efficacy studies, a marker for artemisinin resistance, were highlighted. ACT efficacy remained high in all sites, with the exception of Pailin in Western Cambodia. However, foci of artemisinin resistance were increasingly found. Artemisinin resistance had been confirmed in Pailin, Cambodia and Trat, Thailand, with an increasing percentage of day 3 positivity in these sites as shown in the 2010 studies: > 30% Day 3 positivity to dihydroartemisinin-piperaquine (DHA-PIP) in Pailin, and to artesunate-mefloquine (ASU+ MEF) in Trat. Increased day 3 positivity (> 10%) has recently been demonstrated in Binh Phuoc province in Viet Nam and Kawthaung, Myanmar; confirmatory studies were ongoing. For \textit{Plasmodium vivax} (Pv), chloroquine and ACTs were highly efficacious. Cambodia shifted to DHA-PIP as national first line treatment of \textit{Pv} (and \textit{Pf}) in 2010, while all other countries are still using chloroquine. A summary table of the national malaria treatment policies in the Mekong countries was shown, including the therapeutic efficacy of the first line antimalarial drugs in each country.

Routine therapeutic efficacy studies (TES) provide the required evidence for national malaria treatment guidelines. They also provide early warning information, through the Day 3 positivity data, on the emergence of artemisinin resistance and its possible spread. Taking into account the dynamic population (parasite/gene) flows within countries and across borders, within and outside the region, the need for intensified high quality malaria drug efficacy monitoring was evident. Drug resistance monitoring networks such as the Mekong network, the Amazon RAVREDA network in South America, and the newly established Pacific Drug Resistance Monitoring Network, a biregional effort of the WHO Regional Offices of the Western Pacific and Southeast Asia, which includes Malaysia, Papua New Guinea, the Philippines, Solomon Islands, Vanuatu, Timor-Leste and Indonesia, have an important role in supporting countries for high quality TES and for facilitating exchange of data as the basis for joint action.
2.6.12 Monitoring insecticide resistance

Dr Chang Moh Seng, Technical Officer of the MVP Unit in the WHO Regional Offices for the Western Pacific, introduced the Asia-Pacific Network for Vector Resistance Network (APNVR) and the rationale of establishing it. He said that malaria vector control was exceptionally dependent on a single class of molecule – the pyrethroids. Pyrethroid insecticides are currently the only class of insecticides recommended by the WHO pesticide evaluation scheme (WHOPES) for treatment of bednets. Pyrethroids were substantially less expensive and longer-lasting than almost all of other alternatives. This is also true for dengue- control programmes which relied on insecticides to control dengue vectors. There is evidence that insecticide resistance was negatively impacting operational activities such as larviciding and space spraying for dengue vector control.

Several activities and meetings were already conducted to support the establishment of the APNVR. Objectives were drafted as follows: to standardize a common insecticide resistance reporting template for malaria and dengue vectors; to establish an online centralized resource for collating data on insecticide resistance in disease vectors and integrate this with the APNVR database; to update and review data quality of reports submitted by APNVR member countries in consultation with WHO staff or other experts from WHO collaborating centres; to develop electronic maps of insecticide resistance situation in the Asia Pacific; and to strengthen national capacity to manage the emergence and spread of insecticide resistance in malaria and dengue vectors.

Two models of APNVR were proposed:

Model 1: a subregional South-East Asian network comprising Member States of the Southeast Asia Region (Bangladesh, Indonesia, Myanmar, Thailand and Timor Leste) and the Western Pacific Region (Cambodia, China, the Lao People’s Democratic Republic, Malaysia, the Philippines and Viet Nam);

Model 2: an enlarged network comprising, in addition to the South-East Asian Countries, Pacific Island countries and areas: Papua New Guinea, Solomon Islands, Vanuatu, plus selected dengue-endemic countries in the Pacific.

ACTMalaria and WHO SEARO and WPRO are coordinating the network. Organization, flow of resources, coordination mechanisms, partners and outputs for the two models were discussed. Workplan elements for 2012–2013 included the establishment of national database management; standard susceptibility tests; management of sentinel sites; capacity building, ensuring quality of data; data/report review and resistance management.

2.7 Technical session 4: programme management

2.7.1 World Malaria Day celebration in the Western Pacific Region

A five-minute PowerPoint presentation showing photos of the various activities conducted during the World Malaria Day on 25 April 2011 was made. The theme of the 2011 celebration was "Achieving Progress and Impact". Countries that participated were Cambodia, China, the Lao People’s Democratic Republic, Malaysia, Papua New Guinea, the Philippines, Vanuatu and Viet Nam.

2.7.2 National malaria control programme management in the time of malaria elimination

Mr John Storey, a malaria consultant and former WHO malariologist, said that a malaria elimination programme is like a jigsaw puzzle, complex and comprised of many parts. The malaria programmes usually were vertical where government policies, leadership, training, community participation, supervision and quality assurance play important roles. A sound knowledge of the subject, high skill levels and a positive attitude were important to achieve and maintain excellence in implementing programme activities. Any progress/error resulting from good/bad programme management or poorly implemented activities would eventually reach every part of the programme due to the ripple effect.
Mr Storey warned programme managers against complacency when improvements in malaria morbidity and mortality are seen, as cases could still increase quickly when the programme was disregarded. He explained the need for continued funding to prevent resurgence even after the successful reduction of malaria. He also emphasized the need to integrate activities with other health programmes such as tuberculosis, dengue and soil-transmitted helminthes. Common activities such as IEC dissemination, microscopy, surveillance, M&E and training should be conductedrationally. Polyvalent staff, inter-department collaboration and cooperation should be ensured.

2.7.3 Cross-cutting interventions and strengthening health systems

Dr Momoe Takeuchi, Technical Officer of the Health Services Development Unit at the WHO Regional Office for the Western Pacific explained the need for using cross-cutting interventions to strengthen health systems. She explained that health system is a platform for all the diseases control programmes to deliver services to target population. Although each disease programme was already implementing health systems strengthening (HSS) efforts within itself, the intervention may not be necessarily sustainable or cost-effective. The idea of cross-cutting HSS is to go beyond a single disease and implement interventions which will benefit more than one disease area and maximize health outcomes across different programmes. In order to do so, programmes have to work together, identify common health systems bottlenecks and synergistic interventions.

Dr Takeuchi demonstrated that health systems bottlenecks which are found in tuberculosis, HIV, malaria or immunization can be quite common. Given these common challenges, she cited several examples of cross-cutting interventions that could strengthen health systems. Some of these examples are: strengthening integrated surveillance, laboratories, data collection, and health worker capacity; reaching mobile, migrant and vulnerable populations; community participation for comprehensive primary health care; retention of health workers in the remote areas; and reduce financial barrier for seeking treatment. Integrating cross-cutting interventions could yield greater value for money to achieve outcomes.

The importance of Global Fund/GAVI/World Bank joint health systems funding platform and the systems approach for integrating service delivery (e.g. sharing resources and capacities) was discussed. At the primary care level of health services, parallel and uncoordinated management of different health programmes sometimes result in overburdened health workers, conflicting priorities, duplication of work and inadequate logistics. Health facilities become understaffed and under-funded. There is a need for a long-term sustainable planning. Programmes should follow national plans and priorities and harmonize activities with other health programmes. The whole health system should be looked at (including available human and financial resources) even if programmes work only in one part. Delivery of health services must be strengthened using a systemic approach.

2.7.4 Shaping the outcomes of Global Fund financing for malaria programmes in the Western Pacific Region

Mr Bernard Thomas, Technical Officer, Country Support Unit in the Regional Office for the Western Pacific, gave an update on Global Fund financing of malaria control in the Region from 2003 to 2010. He explained how countries in the Region had obtained grants amounting to US$ 854 million to date through 24 grants funded by the Global Fund. He demonstrated the impact of funding on malaria transmission rates and mortality rates, and explained where grant funds were invested to achieve these results. He demonstrated that a significant proportion of funding had already been invested in systems strengthening approaches. Less than 1% of the funds (approximately US$ 20 million) had been utilized for the provision of technical assistance through WHO. He highlighted the need for further strategic investments to achieve sustainable reduction in disease transmission and mortality in countries through investments in systems strengthening and local capacity building. He concluded by sharing the timelines of Round 11 to be announced on 15 August 2011.

2.7.5 Sustainable malaria financing

Health economist Ms Carol Beaver explained the need for sustainable malaria financing and explained how the nature of the disease requires some degree of funding consistency and continuity
She emphasized the need for countries to ensure sustainability of funding by taking a structured approach to understanding what is spent where and what needs to be spent in the future to be able to identify funding gaps. She explained the need for governments of countries to include a percentage of co-financing for future Global Fund proposals. She encouraged countries in the Western Pacific Region to consider the financial implications of malaria elimination and the associated costs to prevent reintroduction. She suggested countries explore opportunities for integrated vector management and urged them to identify deliverables to ensure sustainable malaria financing.

2.7.6 Practical steps forward with integrated vector management: Philippines

Dr Jeffry Hii, Technical Officer at the WHO Representative’s office in the Philippines and Dr Chang Moh Seng presented practical steps forward with integrated vector management, using the Philippines as an example. They stressed that integrated vector management (IVM) is a management concept where decisions are based on evidence and surveillance data. IVM involves several vector control methods addressing single or multiple diseases and there is broad participation across sectors and within community. A draft of the Regional integrated vector management strategic framework was presented and the expected results for the period of 2010–2015 were explained. The burden of vector-borne diseases in the Western Pacific Region was highlighted. Problems in vector control included suboptimal targeting and lack of adaption of methods to local circumstances; missed opportunities for integrating diseases; and insecticide resistance. Key challenges to IVM implementation were also briefly discussed. The terms of reference for IVM in the Philippines was highlighted and the way forward for the other countries in the Region was presented.

2.7.7 Integrating neglected tropical diseases into malaria and other health system strengthening activities

Dr Le Anh Tuan, Technical Officer, MVP unit of the WHO Regional Office for the Western Pacific, discussed the need for an integrated approach to control the neglected tropical diseases (NTDs) in the Region through funding available for malaria and health systems strengthening. He highlighted the opportunity for countries to utilize existing and future funding to address the NTD burden. While appreciating the degree of integration that had already taken place in countries, he discussed opportunities for further strengthening NTD control through strategic investment of malaria resources in areas where there is an overlap of distribution of malaria with other NTDs, such as for example in Papua New Guinea where malaria and lymphatic filariasis were co-endemic and had the same mosquito vector. He urged countries to include activities through recognized programmes and approaches to reduce the burden of NTDs in other programmes and approaches, such as in the Integrated Management of Childhood Illness (IMCI) and maternal and child health programmes.

2.7.8 Climate change and vectorborne diseases

Mr Joshua Nealon, Technical Officer of the MVP unit in the WHO Regional Office for the Western Pacific, explained the need for an integrated approach to vectorborne disease prevention and control given the possible impacts of climate change. He emphasized the risks of expanding spatial and temporal distribution of vectorborne disease cases for specific reasons including increased geographical range of vectors in a changing environment. There is considerable commitment within member countries to address these risks. An ongoing multicountry project to strengthen control of vectorborne diseases to lessen the impact of climate change was presented. This intersectoral project in Cambodia, Mongolia and Papua New Guinea targets diseases including malaria, dengue, chikungunya, lymphatic filariasis, tick-borne diseases and plague. Climate change and health involves a diverse group of stakeholders and project outputs are achieved through involvement of many sectors including environmental, developmental, meteorological, veterinary, agricultural and health.
2.7.9 Update on priority operational research

Dr Jun Nakagawa, Technical Officer of the MVP unit, provided an update on operational research priorities for the Western Pacific countries. He described the operational research priorities identified in the Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010–2015) that include: research coordination and priorities setting; vector control and personal protection; BCC and community mobilization; malaria diagnosis and treatment; vulnerable populations; and malaria elimination. He also described the operational research priorities for the GMS and for vivax malaria. Results of recently conducted and continuing operational research studies such as the artemisinin-resistance containment project; non-malarial febrile illness; focused screening and treatment, and on *Plasmodium knowlesi*, were also highlighted. Lastly, the draft regional research plan of action on infectious diseases of poverty was briefly discussed.

2.7.10 Programme reviews and technical support for moving towards malaria elimination in the Western Pacific

Dr Eva Maria Christophel made a presentation on the possible need for a regional review group such as a technical advisory group (TAG). The proposed terms of reference of the TAG included: independent periodic review of country progress towards regional goals; technical and policy advice on specific issues; and advocacy/resource mobilization. While a number of such bodies existed for other diseases in the Region, including for immunization, emerging diseases and NTDs, there was none for malaria.

Dr Robert Newman emphasized the possible benefit of having such a body which could then have representation in the proposed global malaria policy advisory committee of the GMP.

The proposed TAG and its terms of reference were discussed. While the majority of countries supported the establishment of such a body, some representatives requested more time to consider the issues and discuss with their respective governments.

2.7.11 Partner session: discussion on engagement and role of partners in malaria in the Region

Dr Robert Newman chaired a session on the engagement and role of partners in malaria in the region. He urged member countries, technical partners and donors to work together to achieve goals spelt out under the Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010–2015). Donors were urged to continue funding the identified funding gap. A firm commitment for sustainable funding from AusAID was provided. Dr Sylvia Meek of Malaria Consortium, speaking on behalf of the technical partners expressed the need for a harmonized approach to technical assistance to countries and urged WHO to maintain its leadership role in technical issues. She also suggested the need for Global Fund to fund WHO directly as a proportion from grants rather than through country grants as is the current practice. Dr Thomas Teuscher from the Roll Back Malaria Partnership highlighted the need for continuing with the principles of the Paris Ais effectiveness declaration and the need for countries to be transparent and accountable. Dr Newman concluded by drawing attention to the importance of issues raised and discussed, especially noting that it was an exciting time in global health and particularly so for malaria globally and regionally.

While concluding the session and providing a wrap-up, Ms Cecil Hugo emphasized the need to act now, and to act proactively in harmonizing and integrating approaches to achieve sustainable reduction of malaria burden and finally elimination in the Western Pacific Region.

2.8 Technical session 5: quality assurance of malaria diagnosis

2.8.1 Updates on malaria diagnosis quality management system

Dr Robert Newman gave an update on the quality management system which is a critical part of malaria diagnosis. Since there is a myriad of documents available on quality requirements of malaria diagnostic testing, it is sometimes difficult to determine which document to use. Recently,
an operations manual on universal access to malaria diagnostic testing was published to help managers at national, regional or district levels strengthen malaria diagnostic testing with microscopy and malaria rapid diagnostic tests (RDTs). To ensure high-quality malaria testing, a quality management plan for malaria diagnostic testing should be prepared at the central level and be integrated or coordinated with quality management plans for other related laboratory activities.

Dr Newman underscored that five performance standards ensure a functioning quality management system: competence of test performers, testing site performance, supervisor competence, trainer competence, and equipment/supplies standards. Roles of the national malaria reference laboratory were discussed. The national malaria reference laboratory should establish a national reference group of expert microscopists. It should also set up a national blood slide bank with reference slide sets for training and external quality assessment of testing sites.

The main components of monitoring performance in malaria diagnosis and the activities directly related to quality management of malaria diagnosis at point of care were also discussed. The importance of validation of routine blood results was emphasized. This is needed to detect and quantify number of false-positive and false-negative results, and assess quality in slide preparation and staining. Monitoring of diagnostic performance of RDT’s in the field is equally important. Even if there is no standardized test with which to compare the end-point of RDTs, it is better to focus on other determinants of RDT diagnostic performance such as competence to prepare and read an RDT (through supervision checklist), and correct storage conditions for RDTs.

Dr Newman ended his presentation with four key messages. A well-performing diagnostic programme requires a well-designed, fully implemented quality management system. High-quality standards in malaria diagnosis are needed to ensure clinicians have faith in results they receive. Quality management systems should be flexible and cover both malaria microscopy and RDT, and have measurable performance indicators for monitoring.

2.8.2 Asia-Pacific strategy for strengthening health laboratory services

Mr Paul Rogers, Technical Officer of Essential Medicines and Technologies Unit at the Regional Office for the Western Pacific, introduced the WHO Asia-Pacific Strategy for Strengthening Health Laboratory Services (2010–2015). This is a biregional strategy (Southeast Asia and the Western Pacific Regions) to assist Member States to develop national laboratory policies, strategies and plans within a health system framework and based on the following seven key elements: establishing a national framework, ensuring sustainable financing, building capacity, assuring quality, promoting rational use, strengthening safety and supporting the use of research and an ethical approach. Component parts of each element were presented. All elements and components should be considered during development of laboratory-related issues within national disease control programmes. Furthermore, such programmes should be considered in the wider context of development of comprehensive national laboratory systems that cover public and curative health services. He requested that the strategy document be used to facilitate this process to improve efficiency and effectiveness of service delivery for improved health outcomes.

2.8.3 Quality assurance of malaria rapid diagnostic tests

Ms Jennifer Luchavez, Senior Science Research Specialist at the Research Institute for Tropical Medicine (RITM) in the Philippines, discussed the importance of quality assurance of malaria RDTs and gave updates on the product and lot testing activities under the WHO/TDR-Foundation for Innovative New Diagnostics (FIND) malaria RDT evaluation programme.

Product testing of malaria RDTs wherein RDTs are challenged against an extensive panel of well-characterized malaria positive and negative blood samples, started in 2008 (Round 1) at US CDC and continued yearly until 2011 with Round 4 currently underway. Rounds 1 and 2 results (already published) were compared with some results from Round 3 (to be published in late 2011). In general, more RDTs achieved a panel detection score (PDS, or the percentage of malaria samples in the panels detected as positive by the RDTs) of 80% or higher at 200p/µL for either *P. falciparum* or *P. vivax* in Round 3 compared to the previous two rounds of product testing.
Moreover, products resubmitted in Round 3 had considerably higher PDS compared to Round 1, indicating improvement in quality of the resubmitted products.

Lot testing of malaria RDTs wherein RDTs are tested against a smaller panel of malaria positive and negative blood samples, started in 2007 at the RITM (Philippines) and Institut Pasteur Cambodia (IPC). Lot testing supports quality assured RDT-based diagnosis for national programmes and UN agencies implementing malaria programmes. The lot testing scheme and profile of its users were presented briefly indicating that majority of those who availed of lot-testing at RITM are government aid and procurement agencies (52%) such as USAID/Deliver, PMI and Global Fund. Lot testing results in the last two years showed very low failure rates.

The malaria RDT quality assurance programme has made a large step forward in setting up a quality assurance system along the production and distribution process of malaria RDTs. Currently, the programme is confronted with the issue of limited funding which has implications on the sustainability of the product and lot testing activities and other related initiatives.

2.8.4 External competency assessment of malaria microscopists in Asia-Pacific

Lt Col Ken Lilley, Quality Manager and Scientific Officer of the Australian Army Malaria Institute, discussed the external competency assessment (ECA) of malaria microscopists in the Asia-Pacific. He gave a brief historical background and its importance in malaria diagnosis. He also discussed the duration, methodology and progress of the ECA. This model for the competency assessment of malaria microscopists has been used successfully over the last ten years by the WHO Regional Office for the Western Pacific in selected WHO Southeast Asia and WHO Africa Regional countries. There were already 55 ECA courses conducted in 16 countries so far and almost all microscopists have shown significant increases in performance during the ECA and when tested prior to the next ECA. Data from countries also show significant improvement in species identification and counting accuracy from pre- to post-assessment.

As with all other efforts, challenges exist. Many microscopists still have not been assessed for competency. Some participants are not sufficiently prepared. Participants from previous ECA courses are not transferring new knowledge and skills to other microscopists. ECA results are not used as per WHO quality assurance (QA) manual and QA issues are often not being addressed, year after year.

2.8.5 Establishing and maintaining a Regional malaria slide bank

Ms Jennifer Luchavez presented updates on the establishment and maintenance of the WHO regional malaria slide bank (MSB) at the RITM. The MSB was initiated in 2007 following a WHO meeting recommendation in 2004 to develop a repository of high quality, standardized, validated malaria blood films to support microscopists training and assessment programmes. The setting up of the MSB included collection and preparation of high quality, standardized blood films from malaria positive and negative cases, validation by microscopy and PCR, proper storage and maintenance of the slides and dispatch of slides to borrowers. Currently, the MSB includes approximately 18 000 slides from 127 malaria positive and negative donors. ACTMalaria is coordinating the MSB.

The MSB collection is now available to loan to identified borrowers including national malaria control programmes within the ACTMalaria network, the regional microscopy accreditation programme facilitators, and established in-country and other regional slide banks for information exchange purposes. Non-member countries (i.e. non-ACTMalaria network members) can still borrow from the slide bank but need prior agreement with the WHO Regional Office for the Western Pacific and ACTMalaria to obtain slides.

All data and information on the MSB slides are stored in a database which has two main sections: slide inventory section and documents section. The main challenges presented were the difficulty of finding acute and appropriate cases in the field due to declining number of cases, lost or damaged slides by borrowers and how to compensate for or replace them, and the recurring issue of slide shipping costs being charged to the RITM when it should be covered by the borrower. The continuing tasks for the MSB are validation of the new collection and updating the database, review
and revision of the standard operating procedures for collection and preparation of blood films for future collection, collection/sourcing of samples with other plasmodium species and other parasite densities required for external competency assessments and trainings.

The establishment of the MSB is a big achievement for the Region. Having multiple, good quality, blood films for national microscopy trainings and competency assessments is a big step towards achieving one of the QA goals of malaria control programmes in the Region.

2.8.6 Microscopy external competency assessments

Dr David Bell, Head of Malaria Diagnostics Programme of FIND, discussed the outcomes and usefulness of microscopy external competency assessments (ECA). A draft report by the WHO Regional Office for the Western Pacific showed that there is an improvement in parasite counting and species identification in the 2009 ECAs. The report also showed that malaria quality assurance (QA) programmes in some countries have become quite static or essentially non-functional. The WHO-ACTMalaria training and accreditation programme outputs are also poorly utilized within some of the countries’ existing QA schemes and thus, these country programmes benefit little from the ECAs. In some notable exceptions, the microscopists accredited by the ECA programme were recognized by national programmes and are performing roles that utilized the QA scheme effectively.

External national accreditation is needed to build confidence in quality of diagnosis and to legitimize the expertise of higher-level microscopists. It also establishes performance benchmarks for technicians and basis for career structure. However, this only makes sense if good performance is practices in the national system, poor performance is addressed, and microscopists can see a clear gain, not just a threat.

Dr Bell then discussed the WHO malaria microscopy QA manual that functions as a guide which programmes can use and adapt locally. A national core (reference) group (NCG) of expert microscopists, accredited to internationally recognized standards for malaria microscopy, is an essential part of all malaria QA programmes. The NCG oversees the re-training programme and standards in national slide bank/ training sets and makes the final referral level for cross-checking programme. The NCG is composed of experts who are externally quality-assured, ensuring strong local, independently-recognized capacity for research and functions as a core of national supervisory programme. The place of microscopy within the national diagnostic programme was then discussed, noting that microscopy is useful in malaria control when it is of high quality. However, maintaining high-quality microscopy requires significant effort and resources. Also, as transmission drops, peripheral level microscopy for case management will be harder to sustain as less resources are available, parasites are rarely seen and remaining patients scattered.

2.8.7 Malaria laboratory training and training materials

Mr John Storey talked about Giemsa malaria-microscopy (GM-M). He said that training materials pre-date the discovery of Giemsa stain in 1896 and covers a wide variety of health subjects. Now we are standardizing competency-based GM-M through improved training and QA. Competency-based training organizes the process in to sequential steps where trainees must reach the required standard before moving to the next step. They must successfully complete all steps to the trainer’s satisfaction before they can graduate. The importance of a prompt, correct diagnosis for patient well-being must be strongly recognized.

National programmes should have the ability and facilities to train microscopists to the basic level. They should also be able to produce sets of reference slides for trainees to take with them after graduation. Training materials are better utilized in the national language even though translation is expensive. Most public health laboratories can serve as the national training centre. WHO is still needed for guidance and support. There are few national replacements for the old malaria eradication training centre (METC) and this is considered a loss to programmes. ACTMalaria provides excellent support at international and national levels and represents both national and international interests. Malaria education has also come a long way. There is now greater awareness of educational needs, curricula are re-designed and distance learning introduced.
Job aids and training materials have also been improved. Training of trainers, or instructional skills development (ISD) is seen as essential to upgrading and strengthening technical skills. However, the question still remains why malaria education and training are always last on the agenda or often populated by personnel with little interest in training.

2.8.8 Country experiences on quality assurance for malaria diagnosis

Philippines

Ms Arlene Santiago, WHO Philippines, talked about the quality assurance (QA) system for malaria microscopy in the Philippines. The history and background of the malaria QA was briefly shown. The number and types of trainings focusing on malaria diagnosis and QA conducted since 2003 were also presented. The detailed processes and procedures in ensuring accurate and reliable microscopy services were then discussed. To ensure quality of diagnosis, cross-checking through validation of blood films is regularly conducted. Proficiency assessments of regional, provincial, and municipal validators are done every two-to-three years by the national reference centre (i.e. RITM). Accreditation of NCG of trainers through WHO regional accreditation is also done every two-to-three years.

To ensure adequate supply and equipment, five zonal Giemsa production centres were established (including in RITM). Laboratory supplies and binocular microscopes were also provided including training on preventive maintenance and trouble-shooting of microscopes. Strong points and successes of the malaria QA in the Philippines were emphasized. There is continuous improvement in the competency level of microscopists. Most doctors now rely on microscopic diagnosis rather than clinical diagnosis. Microscopists are motivated through monitoring and onsite visits. There is no stock-out of laboratory supplies and equipment are improved and standardized.

Some of the challenges were also mentioned. Continuous support from the local government as well as other stakeholders is needed for sustainability. There is still inadequate number of validators per microscopists and inadequate collection of positive slides for the EQA panel. Work overload for some personnel also is a challenge.

Solomon Islands

Mr Lyndes Wini, Medical Officer of the Solomon Islands VBDC programme, discussed the quality assurance (QA) of malaria microscopy and RDT in Solomon Islands. He said that confirmation of malaria diagnosis prior to treatment is an integral part of good clinical practice. Effective roll-out of QA programme is part of ongoing efforts to address the issue of presumptive treatment for malaria together with IEC/BCC interventions. National slide bank and a national QA programme structure are currently being developed. External accreditation is also being conducted for microscopists.

A pre-implementation assessment was conducted before the roll-out of the QA programme in May 2010. Laboratory environment, staffing and workload, up-to-date SOPs and adherence, slide cross-checking, logistics and supplies, and supervision were assessed in 8 health facilities. After the assessment, a national QA plan was developed and adopted with input from provincial laboratory supervisors. The QA plan includes training and re-training of staff, standardization (through updating of guidelines) and accreditation, slide cross-checking, microscopy maintenance programme, and QA for RDTs.

Challenges identified include integration of QA activities in the context of broader national laboratory quality management system (LQMS); maintaining momentum for RDT QA in a context of low uptake; and lack of a central laboratory. Some ways forward were then listed to tackle these challenges including advocacy for integration in national LQMS; harmonization of deployment strategy for RDT; and establishment of a national slide bank.
Lao People's Democratic Republic

Dr Viengxay Vanisaveth, Chief of the Laboratory and Treatment Unit of CMPE, discussed the quality assurance (QA) for rapid diagnostic tests (RDTs) in the Lao People’s Democratic Republic. There are four QA programme for malaria control: for microscopists, for Coartem, for LLIN, and for RDT. His presentation, however, focused only on QA for RDT.

RDTs started to be used from 2005 and were scaled up since 2006. Transport and storage of RDTs from the central level down to the health centre level were shown. Problems encountered with the use of RDTs included: RDT buffer does not run to control line in 15 minutes; RDT results are positive but negative in microscopy; how to interpret faint bands. To address these problems and to ensure quality, RDTs are lot tested at the Institut Pasteur Cambodia (IPC). In conclusion, it is easy to use RDT but extra care is needed in storage and transport, and supportive supervision is essential.

Viet Nam

Dr Nguyen Manh Hung, Director of the National Institute for Malariology, Parasitology and Entomology (NIMPE), talked about quality assurance of malaria diagnosis in Viet Nam. He started his presentation by describing the malaria laboratory system from the national level to the commune level. At the national level, there are three institutes: NIMPE in Ha Noi, IMPE Qui Nhon in Central Viet Nam and IMPE Ho Chi Minh in the South. At the commune level, there are microscopic points at commune health station or at inter-communal stations. He then discussed the malaria microscopy QA programme and the training programme for microscopists.

Cross-checking of slides is done monthly. Quality control of lower-level microscopic points through routine supervision is carried out annually. In 2010, there were 75 microscopic points supervised where 45.3% had good and very good performance; 38.7% had fine performance; 9.3% had weak performance; and 6.7% were not functioning at the time of supervision. A microscopist training programme was in place.

With funds from the Global Fund, in 2011, 631 400 combination RDTs were procured. NIMPE is planning to collect RDT in the field for evaluation of stability.

2.9 Group work 2: quality assurance of malaria diagnosis

2.9.1 Guidelines to group work

Ms Cecil Hugo presented the tasks for the second group work. The tasks were to review/develop country malaria diagnosis QA plans; identify national malaria reference laboratories and national malaria laboratory networks and external quality assurance (EQA) network; and discuss regional malaria reference laboratory.

Group 1, facilitated by Ms Jennifer Luchavez, was composed of the GMS countries: Cambodia, China, the Lao People’s Democratic Republic, Myanmar, Thailand, and Viet Nam. Group 2, facilitated by Lt Col Ken Lilley, was composed of Pacific plus countries: Malaysia, Papua New Guinea, the Philippines, the Republic of Korea, Solomon Islands and Vanuatu.

2.9.2 Presentation of group work

Groups 1 and 2 presented their QA plans highlighting cross-cutting and country-specific issues. Please see Annex 3 for the summary matrix.
3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

The following were the conclusions of the meeting:

1) Significant progress has been achieved in reducing malaria mortality and morbidity.

2) Number of partners, both technical and donors, has increased.

3) Examples of innovative and intersectoral approaches exist in a rapidly changing socioeconomic development context.

4) Huge amounts of funding were mobilized both externally and domestically; however funding gaps still exist.

5) Most countries have committed to malaria elimination and are reorienting their programmes. Targets are ambitious with many challenges across all countries embarking on it (high-income or low-income). These challenges include migration, private sector engagement, civil unrest, and limited technical tools for vivax malaria.

6) Drug resistance is a huge threat in the Region, but response to artemisinin resistance is in place in Cambodia and Thailand while antimalarial drug resistance monitoring is intensified throughout the region.

7) Programmes face significant challenges in terms of skilled staffing, procurement, supply management, rapid diagnostic test and microscopy quality assurance, and engagement of private sector.

8) Universal access to malaria interventions has not yet been achieved, especially in vulnerable and hard-to-reach populations.

9) Most countries do not have a comprehensive functional malaria diagnosis quality assurance.

3.2 Recommendations

The following were the recommendations of the meeting:

Progress towards elimination

1) Guidelines and standard operating procedures for phased subnational elimination to be produced by WHO, should be completed by 2012.

2) All countries which have committed to elimination should continue to strengthen their programmes based on sound evidence such as from programme review (nationally or subnationally).

3) The containment/elimination of artemisinin-resistant Plasmodium falciparum parasites should be intensified and a regional approach should be developed and implementation supported.

4) Intercountry cooperation, commitment, and innovations should be strengthened, through existing platforms (ASEAN+ 3, WHO, APMEN, IHR, ESCAP).

5) WHO may develop terms of reference for a Regional malaria technical advisory group and obtain concurrence of Member States.
Universal access

6) Programme management should be strengthened through standard operating procedures or a manual, capacity building, supply management and logistics, remuneration/incentives, financial management, technical support for management.

7) As procurement is a major obstacle to achieving universal access, partnerships with major funders may be strengthened to simplify and accelerate procurement procedures.

8) Best country practices in achieving universal access to malaria interventions should be documented and shared.

9) Vivax research should be intensified to enable the safe use of primaquine for radical cure in all countries.

Surveillance, monitoring and evaluation

10) Better documentation of progress in terms of financing, programme coverage and impact is needed.

11) Malaria information systems should be significantly strengthened and better harmonized with the country health information systems.

12) Surveillance should move to a case-based and single-stream reporting system, and engaging all potential sources of information should be supported in all elimination settings.


14) The WHO web-based Asia-Pacific Network for Vector Resistance, coordinated by ACTMalaria, should be made functional with active participation of all countries and adequate funding.

15) High quality antimalarial drug efficacy monitoring should continue and be expanded throughout the Region including through strengthening the existing Mekong Network and establishing the Pacific Antimalarial Drug Resistance Monitoring Network (including Day 3 positivity monitoring as a marker for artemisinin resistance).

Programme

16) Malaria resources should be considered to be used in support of control/elimination of other communicable diseases, particularly neglected tropical diseases, and for health system strengthening.

17) Synergies with other programmes and sectors should be explored using WHO’s framework for action for strengthening health systems.

Malaria diagnosis quality assurance

18) National malaria diagnosis quality assurance systems should be strengthened in all countries.

19) Strengthened malaria diagnosis should be part of overall integrated laboratory quality assurance.

Research

20) Research priorities should be defined and funded to address the technical, programmatic and health system challenges.
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<tr>
<th>Day 1</th>
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<tr>
<td>8:00</td>
<td><strong>Registration</strong></td>
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<tr>
<td>8:30</td>
<td><strong>Opening Ceremony</strong></td>
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<td></td>
<td>Opening remarks by the Regional Director</td>
<td><strong>Presentation of group work</strong></td>
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<td><strong>Self-introduction of participants</strong></td>
<td>Country Progress, Challenges and Innovations in the Greater Mekong Subregion and the Pacific</td>
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<tr>
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<td><strong>Nomination of Chair, Vice-Chair and Rapporteur</strong></td>
<td><strong>Technical session 3: Surveillance, Monitoring and Evaluation</strong></td>
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<td></td>
<td><strong>Group photograph</strong></td>
<td>10 minute presentations followed by 5 minutes discussion</td>
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<tr>
<td></td>
<td></td>
<td>- Surveillance, Monitoring and Evaluation - GMP Perspective - Richard Cibulskis, GMP HQ</td>
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<td>- Country M&amp;E assessments – Cecil Hugo, ACTMalaria</td>
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<td>- Regional Malaria Indicator Framework: Getting it to work in the Region - Bayo Fatumumbi, WPRO</td>
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<td>- Malaria Indicator Surveys: Lessons Learnt and Innovations from Vanuatu and Solomon Islands 2011 – George Taleo/Albino Bobogare/L. Vestergaard</td>
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<td>- Beyond routine malaria surveillance – Deyer Gopinath, WHO Lao PDR (5 min.)</td>
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<td>9:15</td>
<td><strong>Coffee Break</strong></td>
<td>10:30</td>
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<td>9:45</td>
<td><strong>Update and Global Direction in Malaria</strong> – Robert Newman, WHO GMP/HQ</td>
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<td>11:00</td>
<td><strong>Coffee Break</strong></td>
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<td>11:00</td>
<td><strong>Technical session 3 (continued)</strong></td>
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<td></td>
<td>- Innovative approaches to SM&amp;E:</td>
<td><strong>Country experiences on quality assurance for malaria diagnosis:</strong></td>
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<td>10:05</td>
<td><strong>Progress towards Malaria Elimination in the Region,</strong> <strong>Introduction to the Meeting</strong> – Eva Christophel, WHO WPR</td>
<td>- Web-based reporting (BIOPHICS), respondent-driven sampling - Thailand</td>
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<tr>
<td>10:15</td>
<td>10 minutes discussion</td>
<td>- Artemisinin resistance surveillance including SMS reporting, cross-border surveillance, VMW database and links with HIS - Cambodia</td>
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<tr>
<td>10:25</td>
<td><strong>Technical session 1: Malaria Elimination</strong></td>
<td>- Monitoring the durability of LLINs under operational conditions – Jeffrey Hii, WHO Philippines/Mrs Majhalia Torno, RITM/</td>
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<tr>
<td></td>
<td>10 minutes presentations followed by 5 minutes discussion</td>
<td>• Progress with antimalarial drug efficacy monitoring - Dorina Bustos, WHO MMP</td>
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<td>• Nationwide elimination: Malaysia, Republic of Korea</td>
<td>• Insecticide resistance monitoring in Asia-Pacific – Chang Moh Seng/Jeffery Hii/ACTMalaria</td>
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<td>• Phased elimination: Philippines, China, Vanuatu</td>
<td>Plenary discussion on priority actions to improve SM&amp;E in the Region</td>
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<td>• &quot;Newcomers&quot;: Viet Nam</td>
<td>Wrap-up &amp; recommendations – Richard Cibulskis, WHO GMP</td>
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<td>• Role of networks: APMEN</td>
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<td>Wrap-up &amp; recommendations - Charles Delacollette</td>
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<td>12:30</td>
<td>Lunch</td>
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<td>1:30</td>
<td><strong>Technical session 2: Universal Access to Malaria Diagnosis,</strong> <strong>Treatment, Prevention, IEC/BCC</strong> Successes. Challenges. Vulnerable populations (pregnant women, under-five children, HIV positive persons, ethnic minorities, others). Lessons learnt. Partners. Way</td>
<td>- Technical session 4: Programme Management 10 minute presentations followed by 5 minutes discussion</td>
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<td>• World Malaria Day in WPR (slideshow, 5 min.)</td>
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<td>• Implications of malaria elimination</td>
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1. Revision/Development of country
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<tr>
<td><strong>Forward</strong>&lt;br&gt;Country case studies, 10-15 minute presentations followed by 5 minutes discussion</td>
<td>for program management – John Storey&lt;br&gt;Programme funding:&lt;br&gt;- Cross-cutting interventions and strengthening health systems – Momoe Takeuchi, WPRO&lt;br&gt;- Update on Global Fund in the Region – Bernard Tomas, WPRO&lt;br&gt;- Sustainable malaria financing: Carol Beaver/Philippines/Malaysia/Richard Cibulskis&lt;br&gt;Integrated approaches&lt;br&gt;- Practical steps forward with Integrated Vector Management - Philippines – Chang Moh Seng/Jeffrey Hii, WPRO&lt;br&gt;- How can we integrate NTDs into malaria proposals? – Le Anh Tuan, WPRO&lt;br&gt;- Climate change and vectorborne diseases – Joshua Nealon, WPRO&lt;br&gt;Update on priority operational research – Jun Nakagawa, WPRO</td>
<td>malaria diagnosis QA plans. Definition of next concrete steps. Can malaria QA be integrated in existing EQA?&lt;br&gt;2. Identification of national malaria reference laboratories and the national malaria laboratory network; and EQA network if exists&lt;br&gt;3. Discussion on regional malaria reference laboratory&lt;br&gt;Groups&lt;br&gt;1: Greater Mekong Subregion: Cambodia, China, Lao PDR, Myanmar, Thailand, Viet Nam – Facilitator: Jenny Luchavez, RITM&lt;br&gt;2. Pacific &quot;Plus&quot;: Malaysia, Papua New Guinea, Philippines, Republic of Korea, Solomon Islands, Vanuatu – Facilitator: Ken Lilley, AMI&lt;br&gt;Presentation of group work&lt;br&gt;➢ Cross-cutting issues&lt;br&gt;➢ Individual country plans</td>
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<td>Afternoon tea</td>
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<td><strong>4:00</strong></td>
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| Group work: Peer Review of Country Posters: Country Progress, Challenges and Innovations  
Introduction to group work – Bayo Fatunmbi  
Groups  
1: Greater Mekong Subregion: Cambodia, China, Lao PDR, Thailand, Viet Nam  
– Facilitator: Sylvia Meek, Malaria Consortium  
2. Pacific "Plus": Malaysia, Papua New Guinea, Philippines, Republic of Korea, Solomon Islands, Vanuatu  
– Facilitator: Richard Cibulskis, WHO GMP | Technical session 4: (continued)  
- Programme reviews and technical support - Do we need a Malaria Regional Body? – Eva Christophel, WPRO  
- PARTNERS SESSION including WHO CCs: Discussion on engagement and role of partners in malaria in the Region.  
Chair: Robert Newman, GMP  
Wrap-up & recommendations – Cecil Hugo, ACTMalaria | Plenary session: Meeting conclusions and recommendations  
Closing |
| **5:30** | **5:00** | **Close for the day** |
| Close for the day | Close for the day | |
| Refreshments hosted by WHO | Roundtable (for interested parties): Regional approach to containment of artemisinin resistance in Southeast Asia  
(MMP-organized session. Refreshments will be served) | |
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HQ/RBM Roll Back Malaria Partnership Secretariat
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Fax No. : 
E-mail : teuschert@who.int
### National Malaria Microscopy Quality Assurance Plans

**Group 1: Mekong Plus Group Quality Assurance Plans**

#### CAMBODIA

<table>
<thead>
<tr>
<th>Components of National Malaria Microscopy QA system</th>
<th>Current Activities</th>
<th>Status - adequate/not adequate</th>
<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>-</td>
<td>Funds for training, reagents</td>
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<tr>
<td>National Core (Expert) Group</td>
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<td>not adequate</td>
<td>experts, staff</td>
<td>-</td>
<td>within 2 years every year at national level</td>
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<tr>
<td>External competency assessment</td>
<td>Present but no specific activities listed</td>
<td>not adequate</td>
<td>funds</td>
<td>-</td>
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<td>Instructional skills development</td>
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<td>not adequate</td>
<td>funds, expertise, TA</td>
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<tr>
<td>Competency levels (national)</td>
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<tr>
<td>SOPs (lab, maintenance)</td>
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<td>-</td>
<td>translation to local language</td>
<td>funds for translation</td>
<td>one time, as soon as possible</td>
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<td>adequate</td>
<td>funds for collection, reagents; supply of materials from outside Asia (Po, Pk)</td>
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<td>At CNM. Activities not specified</td>
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**Quality Assurance**

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<thead>
<tr>
<th>Slide cross-checking</th>
<th>Present but no specific activities listed</th>
<th>not adequate, no full participation from low level health facilities</th>
<th>reagents, slides</th>
<th>funding for sending slides for cross-checking and feedback of results</th>
<th>should be an ongoing activity</th>
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<tbody>
<tr>
<td>Competency assessments</td>
<td>Present but no specific activities listed</td>
<td>not adequate</td>
<td>funds</td>
<td>human resource</td>
<td>-</td>
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<td>--------------------------------------------</td>
<td>------------------------------------------</td>
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<td>-------</td>
<td>----------------</td>
<td>------------</td>
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<tr>
<td>Regular refresher training/updating</td>
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<td>not adequate</td>
<td>training modules; translated into local dialect</td>
<td>technical assistance</td>
<td>every 2 years for all</td>
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<tr>
<td>Proficiency Testing - National</td>
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<tr>
<td>Proficiency Testing - International</td>
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<tr>
<td><strong>Procurement &amp; Logistics</strong></td>
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<tr>
<td>Procurement standards</td>
<td>Present but no specific activities listed</td>
<td>not adequate</td>
<td>need to update</td>
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<tr>
<td>Preventive Maintenance of Microscopy</td>
<td>Basic care of microscopes</td>
<td>-</td>
<td>SOPs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Transport and storage standards</td>
<td>Present but no specific activities listed</td>
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<td>SOPs</td>
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<tr>
<td><strong>Monitoring and Evaluation</strong></td>
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<tr>
<td>Supervisory or consultancy visits</td>
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<td>not adequate in terms of quality and quantity</td>
<td>checklists, SOPs</td>
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<tr>
<td>Log-books</td>
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<tr>
<td>Components of National Malaria Microscopy QA system</td>
<td>Current Activities</td>
<td>Status - adequate/ not adequate</td>
<td>Needs</td>
<td>Resource Requirement - Funding/HR/TA</td>
<td>Time frame</td>
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<td><strong>Structure</strong></td>
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<tr>
<td>Central coordination</td>
<td>Training at all levels</td>
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<tr>
<td>National Core (Expert) Group</td>
<td>Present.</td>
<td>not adequate</td>
<td>experts, staff</td>
<td>-</td>
<td>within 2 years every year at national level</td>
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<tr>
<td>External competency assessment</td>
<td>Present but no specific activities listed</td>
<td>not adequate</td>
<td>funds</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Instructional skills development</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Competency levels (national)</td>
<td>None</td>
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</tr>
<tr>
<td>SOPs (lab, maintenance)</td>
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<tr>
<td>Slidebank</td>
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<td>-</td>
<td>-</td>
<td>2-3 years</td>
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<td>dedicated staff</td>
<td>funding, HR, TA</td>
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<tr>
<td><strong>Quality Assurance</strong></td>
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<tr>
<td>Slide cross-checking</td>
<td>Present but no specific activities listed</td>
<td>not adequate, not full participation from low level health facilities</td>
<td>reagents, slides</td>
<td>funding for sending slides for cross-checking and feedback of results</td>
<td>should be an ongoing activity</td>
</tr>
<tr>
<td>Competency assessments</td>
<td>Present but no specific activities listed</td>
<td>not adequate</td>
<td>funds</td>
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<td>Regular refresher training/updating</td>
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<td><strong>External Quality Assurance (EQA)</strong></td>
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<tr>
<td>Proficiency Testing - National</td>
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<td>-</td>
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</tr>
<tr>
<td>Proficiency Testing - International</td>
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<tr>
<td><strong>Procurement &amp; Logistics</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement standards</td>
<td>Present but no specific activities</td>
<td>not adequate</td>
<td>need to update</td>
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<td>-</td>
</tr>
<tr>
<td>Preventive Maintenance of Microscopy</td>
<td>Basic care of microscopes</td>
<td>-</td>
<td>SOPs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Transport and storage standards listed</td>
<td>Present but no specific activities listed</td>
<td>not adequate</td>
<td>SOPs</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

**Monitoring and Evaluation**

| Supervisory or consultancy visits | Present but no specific activities listed | not adequate in terms of quality and quantity | checklist, SOPs | - | - |
| Log-books | None | - | - | - | - |

**Lao People's Democratic Republic**

<table>
<thead>
<tr>
<th>Components of National Malaria Microscopy QA system</th>
<th>Current Activities</th>
<th>Status - adequate/not adequate</th>
<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Central coordination</td>
<td>Training of trainors for provincial level, cross-checking</td>
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<tr>
<td>National Core (Expert) Group</td>
<td>None</td>
<td></td>
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<td>funds</td>
<td>every year at national level</td>
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<td>- External competency assessment</td>
<td>Present but no specific activities listed</td>
<td>not adequate funds</td>
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<td></td>
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<td>- Instructional skills development</td>
<td>-</td>
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<tr>
<td>Competency levels (national)</td>
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<tr>
<td>SOPs (lab, maintenance)</td>
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<td>Slidebank</td>
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<td>-</td>
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<tr>
<td>National Reference Lab</td>
<td>At CMPE. No specific activities listed.</td>
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### Quality Assurance

<table>
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<th>Activity</th>
<th>Status</th>
<th>Description</th>
<th>Reagents, Slides</th>
<th>Funding for Slides</th>
<th>Feedback of Results</th>
<th>Activity Duration</th>
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<tbody>
<tr>
<td>Slide cross-checking</td>
<td>Present but no specific activities listed</td>
<td>not adequate, not full participation from low level health facilities</td>
<td>reagents, slides</td>
<td>funding for sending slides for cross-checking and feedback of results</td>
<td>should be an ongoing activity. Every month in Lao</td>
<td></td>
</tr>
<tr>
<td>Competency assessments</td>
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<td>not adequate</td>
<td>funds</td>
<td>human resource</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Regular refresher training/updating</td>
<td>Present but no specific activities listed</td>
<td>not adequate, only for target areas</td>
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### External Quality Assurance (EQA)

<table>
<thead>
<tr>
<th>Activity</th>
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<th>Description</th>
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<tbody>
<tr>
<td>Proficiency Testing - National</td>
<td>None</td>
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<tr>
<td>Proficiency Testing - International</td>
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</tbody>
</table>

### Procurement & Logistics

<table>
<thead>
<tr>
<th>Activity</th>
<th>Status</th>
<th>Description</th>
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<tbody>
<tr>
<td>Procurement standards</td>
<td>Present but no specific activities listed</td>
<td>not adequate</td>
<td>need to update</td>
</tr>
<tr>
<td>Preventive Maintenance of Microscopy</td>
<td>Basic care of microscopes</td>
<td>-</td>
<td>SOPs</td>
</tr>
<tr>
<td>Transport and storage standards</td>
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<td>not adequate</td>
<td>SOPs</td>
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### Monitoring and Evaluation

<table>
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<th>Activity</th>
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<td>Supervisory or consultancy visits</td>
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<td>checklist, SOPs</td>
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<td>Log-books</td>
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# THAILAND

## Components of National Malaria Microscopy QA system

<table>
<thead>
<tr>
<th>Structure</th>
<th>Current Activities</th>
<th>Status - adequate/not adequate</th>
<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
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<tbody>
<tr>
<td>Central coordination</td>
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</tr>
<tr>
<td>National Core (Expert) Group</td>
<td>Present</td>
<td>not adequate</td>
<td>experts, staff</td>
<td>-</td>
<td>within 2 years every year at national level</td>
</tr>
<tr>
<td><strong>External competency assessment</strong></td>
<td>Present but no specific activities listed</td>
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<td>funds</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Instructional skills development</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Competency levels (national)</td>
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<tr>
<td>SOPs (lab, maintenance)</td>
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<td>-</td>
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<tr>
<td>Slidebank</td>
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<tr>
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<td>At. BVBD. No specific activities listed</td>
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## Quality Assurance

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<thead>
<tr>
<th>Slide cross-checking</th>
<th>Present but no specific activities listed</th>
<th>not adequate, not full participation from low level health facilities</th>
<th>reagents, slides</th>
<th>funding for sending slides for cross-checking and feedback of results</th>
<th>should be ongoing activity</th>
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<tr>
<td>Competency assessments</td>
<td>Present but no specific activities listed</td>
<td>not adequate</td>
<td>funds</td>
<td>human resource</td>
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<tr>
<td>Regular refresher training/updating</td>
<td>None</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

## External Quality Assurance (EQA)

| Proficiency Testing - National | Present but no specific activities listed | not adequate | competency testing | funds to conduct proficiency testing | every 2 years, before ECA |
| Proficiency Testing - International | None | - | - | - | - |
### Procurement & Logistics

<table>
<thead>
<tr>
<th>Procurement standards</th>
<th>Present but no specific activities listed</th>
<th>not adequate</th>
<th>need to update</th>
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<tbody>
<tr>
<td>Preventive Maintenance of Microscopy</td>
<td>Basic care of microscopes</td>
<td>-</td>
<td>SOPs</td>
</tr>
<tr>
<td>Transport and storage standards</td>
<td>Present but no specific activities listed</td>
<td>not adequate</td>
<td>SOPs</td>
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### Monitoring and Evaluation

<table>
<thead>
<tr>
<th>Supervisory or consultancy visits</th>
<th>Present but no specific activities listed</th>
<th>not adequate in terms of quality and quantity</th>
<th>checklist, SOPs</th>
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<tbody>
<tr>
<td>Log-books</td>
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### VIET NAM

#### Components of National Malaria Microscopy QA system

<table>
<thead>
<tr>
<th>Structure</th>
<th>Current Activities</th>
<th>Status - adequate/ not adequate</th>
<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
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<tbody>
<tr>
<td>Central coordination</td>
<td>TOT for provincial level; cross-checking</td>
<td>not adequate</td>
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<tr>
<td>National Core (Expert) Group</td>
<td>Present</td>
<td>not adequate</td>
<td>experts, staff funds</td>
<td>-</td>
<td>within 2 years every year at national level</td>
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<tr>
<td>External competency assessment</td>
<td>Present but no specific objectives listed</td>
<td>not adequate</td>
<td>-</td>
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<tr>
<td>Instructional skills development</td>
<td>Present but no specific objectives listed</td>
<td>not adequate</td>
<td>-</td>
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<tr>
<td>Competency levels (national)</td>
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<td>SOPs (lab, maintenance)</td>
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<tr>
<td>Slidebank</td>
<td>Present but no specific objectives listed</td>
<td>not adequate</td>
<td>-</td>
<td>-</td>
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<tr>
<td>National Reference Lab</td>
<td>At NIMPE. No current activities specified</td>
<td>-</td>
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<tr>
<td>Quality Assurance</td>
<td>Present but no specific objectives listed</td>
<td>not adequate, not full participation from low level health facilities</td>
<td>reagents, slides</td>
<td>funding for sending slides to cross-checking and feedback of results</td>
<td>should be ongoing activity</td>
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<td>Present. Every 2 years for 3-5 days</td>
<td>not adequate</td>
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<td><strong>External Quality Assurance (EQA)</strong></td>
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<tr>
<td>Proficiency Testing - International</td>
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<td><strong>Procurement &amp; Logistics</strong></td>
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<td>Present but no specific objectives listed</td>
<td>not adequate</td>
<td>need to update</td>
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<td>Basic care of microscopes</td>
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<td>SOPs</td>
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<tr>
<td>Transport and storage standards</td>
<td>Present but no specific objectives listed</td>
<td>not adequate</td>
<td>-</td>
<td>SOPs</td>
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<tr>
<td><strong>Monitoring and Evaluation</strong></td>
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<td>Supervisory or consultancy visits</td>
<td>Present but no specific objectives listed</td>
<td>not adequate in terms of quantity and quality</td>
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## MALAYSIA

### Components of National Malaria Microscopy QA system

<table>
<thead>
<tr>
<th>Structure</th>
<th>Current Activities</th>
<th>Status - adequate/ not adequate</th>
<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
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<tbody>
<tr>
<td>Central coordination</td>
<td>National PH lab 2007</td>
<td>adequate</td>
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<tr>
<td>National Core (Expert) Group</td>
<td>Yes 12 (trained in 2007) and 5 (trained in 2010)</td>
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<tr>
<td></td>
<td>Present</td>
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<td></td>
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<td>Competency levels (national)</td>
<td>Yes 2011 (Level 1 and 2)</td>
<td>not adequate</td>
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<td>SOPs (lab, maintenance)</td>
<td>Hospital and NPHL (PPM-privatized), and clinics (district)</td>
<td>currently updating</td>
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<td>Slidebank</td>
<td>National PH lab just starting 2008, previously IMR</td>
<td>not adequate</td>
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<tr>
<td>National Reference Lab</td>
<td>Yes - NPH lab 2007, previously IMR</td>
<td>adequate</td>
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### Quality Assurance

| Slide cross-checking               | Yes, 100% positive and 10% negative                     | adequate                        |       |                                      |            |
| Competency assessments             | Yes. NPHL 2011                                          | not adequate                    |       |                                      |            |
| Regular refresher training/updating| yes every year                                          | not adequate                    |       |                                      |            |

### External Quality Assurance (EQA)

| Proficiency Testing - National     | Yes                                                    | not adequate                    |       |                                      |            |
| Proficiency Testing - International| No                                                    | No                              |       |                                      |            |
### Procurement & Logistics

<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
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<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
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<td>Procurement standards</td>
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<tr>
<td>Preventive Maintenance of Microscopy</td>
<td>hospital and NPHL</td>
<td>not adequate for district</td>
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<tr>
<td>Transport and storage standards</td>
<td>Yes</td>
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### Monitoring and Evaluation

<table>
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<th>Status</th>
<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
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<tbody>
<tr>
<td>Supervisory or consultancy visits</td>
<td>Senior - MLT - health clinics, State - district health lab</td>
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<td>Log-books</td>
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### PAPUA NEW GUINEA

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<th>Current Activities</th>
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<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
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<tr>
<td>Central coordination</td>
<td>CPHL</td>
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<td>National Core (Expert) Group</td>
<td>Ad hoc</td>
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<td>Instructional skills development</td>
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<td>Competency levels (national)</td>
<td>Limited</td>
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<td>not adequate, needs improvement</td>
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<td>National Reference Lab</td>
<td>CPHL</td>
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<td>---------------------------</td>
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<td>Slide cross-checking</td>
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<td>Regular refresher training/updating</td>
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<table>
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<tr>
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<tbody>
<tr>
<td>Proficiency Testing - National</td>
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<td>Proficiency Testing - International</td>
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<table>
<thead>
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<th>Procurement &amp; Logistics</th>
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<td>Procurement standards</td>
<td>National (WHO)</td>
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<td>Transport and storage standards</td>
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<tr>
<td>Supervisory or consultancy visits</td>
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<td>Log-books</td>
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### PHILIPPINES

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<tr>
<th>Components of National Malaria Microscopy QA system</th>
<th>Current Activities</th>
<th>Status - adequate/not adequate</th>
<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
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<tbody>
<tr>
<td>Structure</td>
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<td></td>
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<tr>
<td>Central coordination</td>
<td>RITM</td>
<td>adequate</td>
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<tr>
<td>National Core (Expert) Group</td>
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<tr>
<td>External competency assessment</td>
<td>Yes</td>
<td>expansion</td>
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<td>Instructional skills development</td>
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<td>expansion</td>
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<td>Competency levels (national)</td>
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<td>SOPs (lab, maintenance)</td>
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<td>RITM, subnational planned</td>
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<td>National Reference Lab</td>
<td>Yes - RITM</td>
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**Quality Assurance**

<table>
<thead>
<tr>
<th>Slide cross-checking</th>
<th>Yes - scheme from municipal to regional</th>
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<tr>
<td>Competency assessments</td>
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**External Quality Assurance (EQA)**

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<th>Proficiency Testing - National</th>
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<td>Proficiency Testing - International</td>
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**Procurement & Logistics**

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<th>Yes: global fund</th>
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<td>Preventive Maintenance of Microscopy</td>
<td>Yes</td>
<td>needs improvement</td>
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<tr>
<td>Transport and storage standards</td>
<td>Yes (MMD)</td>
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**Monitoring and Evaluation**

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<th>Supervisory or consultancy visits</th>
<th>Yes (quarterly)</th>
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<td>Current Activities</td>
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<td>Needs</td>
<td>Resource Requirement - Funding/HR/TA</td>
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<td><strong>Structure</strong></td>
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<td>KCDC- malaria parasite division</td>
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<td>National Core (Expert) Group</td>
<td>malaria expert - advice group</td>
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<td></td>
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<td>adequate</td>
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<td>KCDC and KNIH</td>
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<td>KCDC together with local PHC</td>
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<td>Proficiency Testing - International</td>
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<td>adequate</td>
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<tr>
<td><strong>Procurement &amp; Logistics</strong></td>
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<tr>
<td>Procurement standards</td>
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<tr>
<td>Preventive Maintenance of Microscopy</td>
<td>Yes every year</td>
<td>adequate</td>
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<td>Transport and storage standards</td>
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### Monitoring and Evaluation

<table>
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<th>Supervisory or consultancy visits</th>
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<tr>
<td>Log-books</td>
<td>Yes</td>
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### SOLOMON ISLANDS

#### Components of National Malaria Microscopy QA system

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<thead>
<tr>
<th>Structure</th>
<th>Current Activities</th>
<th>Status - adequate/ not adequate</th>
<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
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<tr>
<td>Central coordination case management; working group; QA roll-out</td>
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<td>National Core (Expert) Group External competency assessment Instructional skills development</td>
<td>ongoing external competency assessment ongoing external competency assessment none</td>
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<td>Competency levels (national) ongoing refresher training and ICA</td>
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<td>SOPs (lab, maintenance) final drafts</td>
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<tr>
<td>Slidebank collection of slides</td>
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<td>National Reference Lab ongoing renovation</td>
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</table>

#### Quality Assurance

| Slide cross-checking on going selected provinces | not adequate | - | - | - |
| Competency assessments on going                  | not adequate | - | - | - |
| Regular refresher training/updating on going     | not adequate | - | - | - |

#### External Quality Assurance (EQA)

| Proficiency Testing - National on going | not adequate | - | - | - |
| Proficiency Testing - International none    | -            | - | - | - |
### Procurement & Logistics

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<td>none</td>
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### Monitoring and evaluation

| Supervisory or consultancy visits | quarterly | not adequate | - | - | - |
| Log-books | none | not adequate | - | - | - |

### VANUATU

<table>
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<tr>
<th>Components of National Malaria Microscopy QA system</th>
<th>Current Activities</th>
<th>Status - adequate/ not adequate</th>
<th>Needs</th>
<th>Resource Requirement - Funding/HR/TA</th>
<th>Time frame</th>
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<tr>
<td><strong>Structure</strong></td>
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<td>Central coordination</td>
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<td>Transport and storage standards</td>
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<td>Monitoring and Evaluation</td>
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</table>
ANNEX 4

LIST OF DOCUMENTS DISTRIBUTED

References

*Malaria Diagnosis*
- Malaria Microscopy Quality Assurance Manual Version 1, WHO (hard + e copy)
- Bench Aids for the Diagnosis of Malaria Infections, WHO (hard + e copy)
- Good practices for selecting and procuring malaria RDTs, WHO (hard + e copy)
- Transporting, storing and handling malaria rapid tests at central and peripheral storage facilities (hard + e copy)
- Transporting, storing and handling malaria rapid tests in health clinics (hard + e copy)
- Malaria RDT Performance: Results of WHO Product Testing of Malaria RDTs: Round 2 (2009) (hard + e copy)
- Development of National Health Laboratory Policy and Plan (2011), WHO WPRO (hard + e-copy)
- Laboratory Quality Standards and their Implementation (2011), WHO WPRO (hard + e-copy)

*Malaria Drug Resistance*
- Global Plan for Artemisinin Resistance Containment, WHO, 2011 (hard + e copy)
-Containment Project Newsletters 1 - 3 (hard + e copy)

*Vector Control*
- WHO Position Statement on Integrated Vector Management (hard + e-copy)
- Case studies on Integrated Vector Management – towards more cost-effective and sustainable vector control, draft, WHO WPRO (hard + e-copy)
- The Technical Basis for Coordinated Action Against Insecticide Resistance: Preserving the Effectiveness of Modern Malaria Vector Control, Meeting Report, May 2010, WHO (e-copy)
- Coordinated Action against Insecticide Resistance, WHO Report, 2010 (e-copy + hard copy)
Surveillance, Monitoring & Evaluation
- World Malaria Report 2010 (hard + e-copy)
- Surveillance guidelines for malaria control and for malaria elimination, draft, WHO (e-copies)
- Western Pacific Regional Malaria Indicator Framework, draft, WPRO (e-copy)
- Assessment of the Monitoring and Evaluation Capacity for Malaria in Selected Western Pacific Region Countries, draft, ACTMalaria (e-copy)
- Gerard Kelly: Geographical reconnaissance, Solomon Islands (e-copy)

Programme Issues
- WHO’s Provision of Global Fund-related Technical Assistance in the Western Pacific Region: The Need, the Gap, and the Solution, WHO WPRO (hard + e-copy)
- A White Paper on: Opportunities for Linking NTD Control to the Control of Malaria, HIV/AIDS and Tuberculosis with an Emphasis on Sub-Saharan Africa (by GNNTD) (e-copy)
- Dr Chanthap Lon: cooler box experiences, Cambodia (e-copy)
- Respondent-driven sampling, Thailand, Part I and II (e-copy)

Malaria Elimination

Research
- Operational Research Activities in the Western Pacific Region, WPRO (hard copy)
- Non-Malarial Febrile Illness study final review workshop, WHO 2011 (hard + e-copy)

Others
- Regional Action Plan for Malaria Control and Elimination in the Western Pacific (2010-2015) and RCM Resolution WPR/RC60.R5 (hard + e copies)
- Informal Consultation on the Public Health Importance of *Plasmodium Knowlesi*, Kuching, February 2011, Meeting Report, WHO WPRO (e-copy)

Presentations

Technical Session 1
1. Update and Global Direction in Malaria, Dr Robert Newman
2. Progress towards Malaria Elimination in the Western Pacific Region, Dr Eva Christophel
3. Malaria Control in Republic of Korea, Jin Gwack
4. Malaria Elimination in Malaysia, Dr Christina Rundi
5. Phased Elimination: Philippines, Dr Mario Baquilod
6. Malaria Elimination in China, Dr Wang Rongrong
7. Progress towards malaria Elimination in Melanesia – Vanuatu, Mr George Taleo
8. Viet Nam Malaria Strategy for 2011-2020: From Malaria Control to Elimination, Dr Nguyen Manh Hung
9. Role of Networks: APMEN, Dr Chong Chee Kheong
Technical Session 2:
1. Universal Access to Malaria Diagnosis, Treatment, Prevention, IEC/BCC in Lao People’s Democratic Republic, Dr Bouasy Hongvanthong
2. Universal Access to Malaria Diagnosis, Treatment, Prevention, IEC/BCC in Solomon Islands, Dr Larbi Kwabena
3. Universal Access to Malaria Diagnosis, Treatment, Prevention, IEC/BCC in Papua New Guinea, Mr Leo Makita
4. Universal Access to Malaria Diagnosis, Treatment, Prevention, IEC/BCC in Cambodia, Dr Chea Nguon
5. A Strategy for the Containment of Artemisinin Tolerant Malaria Parasites in South-East Asia, Mrs Saowanit Wijaykadga
6. Introduction to Group Work on Peer Review of Regional Action Plan Progress Country Posters, Dr Bayo Fatunmbi
7. Group Work Presentations

Technical Session 3
1. Malaria Surveillance, Monitoring and Evaluation, Dr Richard Cibulskis
2. Assessment of Monitoring and Evaluation Capacity for Malaria I Selected WPR Endemic Countries, Ms Cecilia Hugo
3. Regional Malaria Indicator Framework for the Western Pacific, Dr Bayo Fatunmbi
4. Malaria Indicator Survey in Vanuatu, Mr George Taleo
5. Beyond Routine Malaria Surveillance, Dr Deyer Gopinath
6. Update on Development of Health Information System for Managing Health Care Services in Remote Area: A Module for Monitoring Containment of Drug Tolerant Malaria Parasites, Mrs Saowanit Wijaykadga
7. Respondent Driven Sampling Method on Migrants at the Thai-Cambodian Borde, Mrs Saowanit Wijaykadga
8. Strengthening Malaria Surveillance in Cambodia, Dr Siv Sovannaroth
9. Monitoring the Durability of LLINs under Operational Conditions, Ms Majhalia Torno
10. GIS for Malaria Elimination in Solomon Islands and Vanuatu, Mr Gerard Kelly
11. Progress with Anti-malarial Drug Efficacy Monitoring, Dr Dorina Bustos
12. Asia Pacific Insecticide Resistance Network, Dr Chang Moh Seng

Technical Session 4
1. NMCP Management in the time of Malaria Elimination, Mr John Storey
2. Cross-cutting Interventions and Strengthening Health Systems, Dr Momoe Takeuchi
3. Shaping the outcomes of Global Fund Financing for Malaria Programmes in the WPR, Mr Bernard Tomas
4. Sustaining Malaria Financing, Ms Carol Beaver
5. Practical Steps Forward with Integrated Vector Management, Dr Chang Moh Seng/Dr Jeffrey Hii
6. How to Integrate NTD into Malaria and other Health System Strengthening Activities, Dr Le Anh Tuan
7. Climate Change and Vectorborne Diseases, Mr Joshua Nealon
8. Update on Priority Operational Research, Dr Jun Nakagawa
9. Programme Reviews and Technical Support for Moving towards Malaria Elimination in the Western Pacific: Do we need a Regional Body? Dr Eva Christophel

Technical Session 5
1. Quality Assurance of Malaria Diagnosis, Dr Robert Newman
2. Asia Pacific Strategy for Strengthening Laboratory Services, Mr Paul Rogers
3. Quality Assurance of Rapid Diagnostic Tests, Ms Jennifer Luchavez
4. External Competency Assessment of Malaria Microscopists in Asia-Pacific, Mr Ken Lilley
5. Establishing and Maintaining a Regional Malaria Slide Bank: its Role in Malaria Microscopy Quality Assurance, Ms Jennifer Luchavez
6. Microscopy External Competency Assessments: Outcomes, Place and Usefulness, Dr David Bell
7. Giema Malaria Microscopy and other Training Materials, Mr John Storey
8. Quality Assurance System for Malaria Microscopy in the Philippines, Ms Arlene Santiago
9. Quality Assurance of Malaria Diagnosis in Solomon Islands, Mr Lyndes Wini
10. Quality Assurance for Rapid Diagnosis Test in Lao PDR, Dr Viengxay Vanisaveth
11. Quality Assurance of Malaria Diagnosis in Viet Nam, Dr Nguyen Manh Hung

Background documents

1. Information Bulletin, general information
2. Information Bulletin, list of attendees
3. Timetable