Workshop on external competence assessment and national competence assessment for malaria microscopists (ECAMM and NCAMM)

Report of the meeting (virtual)

New Delhi, India, 24–25 June 2021
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<tr>
<td>ACT Malaria</td>
<td>Asian Collaborative Training Network for Malaria</td>
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<td>AFRIMS</td>
<td>Armed Forces Research Institute of Medical Sciences</td>
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<td>(WHO) AFRO</td>
<td>(WHO) Regional Office for Africa</td>
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<td>Amref</td>
<td>African Medical and Research Foundation</td>
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<td>ATD</td>
<td>aerosol transmissible diseases</td>
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<td>CC</td>
<td>collaborating centre</td>
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<td>DDC</td>
<td>Department of Disease Control</td>
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<td>DGHS</td>
<td>Directorate General Health Services</td>
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<td>DPM</td>
<td>deputy programme manager</td>
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<td>ECAMM</td>
<td>external competence assessment of malaria microscopists</td>
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<td>EQAP</td>
<td>external quality assurance programme</td>
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<td>(WHO) GMP</td>
<td>(WHO) Global Malaria Programme</td>
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<td>L1</td>
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<td>L2</td>
<td>Level 2</td>
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<td>MM</td>
<td>malaria microscopy</td>
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<td>MT</td>
<td>medical technologists</td>
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<td>MSB</td>
<td>malaria slide bank</td>
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<td>NAAT</td>
<td>nucleic acid amplification test</td>
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<td>NCAMM</td>
<td>national competence assessment of malaria microscopists</td>
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<td>NHL</td>
<td>national health laboratories</td>
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<td>NMCP</td>
<td>National Malaria Control Programme</td>
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<td>NRL</td>
<td>national reference laboratories</td>
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<td>PCR</td>
<td>polymerase chain reaction</td>
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<td>PNG</td>
<td>Papua New Guinea</td>
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<td>QA</td>
<td>quality assurance</td>
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<td>QC</td>
<td>quality control</td>
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<td>RDT</td>
<td>rapid diagnostic test</td>
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<td>RITM</td>
<td>Research Institute for Tropical Medicine</td>
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<td>SARS-COV 2</td>
<td>severe acute respiratory syndrome coronavirus 2</td>
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<td>(WHO) SEARO</td>
<td>(WHO) Regional Office for South-East Asia</td>
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<td>SOP</td>
<td>standard operating procedures</td>
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<td>ToT</td>
<td>training of trainers</td>
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<td>USB</td>
<td>Universal Serial Bus</td>
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<td>WELCOMM</td>
<td>Worldwide e-Learning Course of Malaria Microscopy</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>(WHO) WPRO</td>
<td>(WHO) Regional Office for the Western Pacific</td>
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Summary

The workshop on external competence assessment and national competence assessment for malaria microscopists (ECAMM and NCAMM) was convened virtually on 24–25 June 2021.

Organized by the malaria unit, CDS-SEARO, it brought together more than 70 participants from 10 South East-Asia (SEA) Region countries – Bangladesh, Bhutan, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste – including representatives from the national malaria control programmes and heads of laboratories, focal points from countries as well as technical experts and partners, to review the current status of microscopy trainings and microscopy quality assurance (QA) as a whole. Technical experts and WHO collaborating centres (CC) shared updates, standard operating procedures (SOP) and best practices.

The main points of discussion included the microscopy QA status per country, challenges to continuing the proficiency trainings given the pandemic situation since last year, slide banks, external competency assessment programme, setting up a national reference laboratory (NRL) as a prerequisite for elimination and support from WHO.

General objective

To review the programmes of external competence assessment of malaria microscopists (ECAMM) in the South-East Asia Region and national competence assessment for malaria microscopists (NCAMM) in the Member States and plan the way forward.

Specific objectives

➢ to review and evaluate the programme of external competence assessment of malaria microscopists (ECAMM) in the SEA Region and that of national competence assessment for malaria microscopists (NCAMM) in the Member States;
➢ to review the status and capacities of national reference laboratories in the Member States;
➢ to review the uptake and challenges to virtual trainings/ ECAMMs and use of digital technologies for capacity-building; and
➢ to discuss and agree on a new roadmap for ECAMM and NCAMM in the Region, including intercountry and regional support for external quality assurance (EQA) and reference materials.

Key findings

➢ ECAMMs could not be conducted as planned for 2020 and 2021.
➢ SOP for virtual ECAMMs are in place, but there are challenges (most challenges can be overcome with effective internet and suitable local facilitator).
➢ Extension of certificates of competence is one of the stopgap measures taken by WHO globally last year. An issue under discussion at the Global Malaria Programme (GMP) HQ in consultation with other regions involves whether an extension of maximum two years will be allowed.
➢ NRLs and dependable slide banks are not existing/functional in most of the countries.
➢ NCAMMs were conducted only in two countries in recent years.
➢ Few refresher trainings were conducted, but many deferred.
➢ Different standards were being followed, including accreditation for NRLs and NCAMMs, despite access to WHO guidelines on malaria microscopy QA and SOP.
➢ Funding is generally not an issue, but more technical support is desired by the countries.

The way forward
➢ There is a need to recognize that quality microscopy is critical for all countries in line with the malaria elimination framework. National programmes should have short-term and long-term plans for diagnostics quality assurance and setting up NRL.
➢ Capacity-building and expertise in microscopy should be available not only at the national level, but more importantly at the lower levels as well, since these are the frontline workers delivering the services.
➢ Identification of qualified local facilitators, including the ECAMM lead facilitator, and networking should be carried out by countries with guidance from WHO.
➢ Regular refresher trainings also need to be conducted by certified resource persons, using quality slide panels.
➢ Organize a training of trainers (ToT) for the national core of trainers of existing Level 1 (L1)/Level 2 (L2) that can cascade the training to microscopists at the peripheral level.
➢ WHO and relevant programmes should encourage/support countries to conduct regular NCAMMs.
➢ Use of e-learning platforms needs to be promoted and improved, looking also at local conditions of the information technology available.
➢ Countries should maintain standards and quality of NCAMM, NRL and slide banks with support from WHO, including collaborating centres.
➢ Worldwide e-Learning Course of Malaria Microscopy (WELCOMM) needs to be promoted by the national programme.
➢ More innovative approaches need to be adopted for continuity of activities related to quality assurance in malaria microscopy (QAMM), including the necessary public health safety measures (PHSM) and infection prevention and control (IPC), given the current pandemic situation.
1. **Background**

Malaria is one of the most common infectious diseases in the world. The SEA Region accounted for about 3% of the burden of malaria cases globally. Malaria cases reduced by 73%, from 23 million in 2000 to about 6.3 million in 2019. Similarly, the Region showed a decrease in mortality by 90% in 2019, compared with 2010 (World Malaria Report 2019). Countries like Maldives and Sri Lanka remain malaria-free while Bhutan and Timor-Leste are nearing elimination. India and Indonesia show significant reduction in cases.

The detection of malaria parasites by light microscopy remains the reference method for diagnosis of malaria. Quality assured microscopy is a key factor for accurate diagnosis. The effectiveness of malaria microscopy depends on maintaining a high level of staff competence and performance, ensuring quality laboratory facilities at all levels and regular external assessments.

Early diagnosis and prompt treatment lead to a faster public health response, and hence, the need for confidence in laboratory services. Member States have been participating in external competency assessments of malaria microscopists (ECAMMs) since 2008, and this has created a pool of expert microscopists in each country, who in turn have facilitated basic and refresher microscopy courses of the national programme.

WHO developed a *Malaria microscopy quality assurance manual* in 2009, which was updated in 2016, the second edition QA manual. The WHO framework for elimination highlights in its strategies and interventions the role of quality assurance and national reference laboratories (NRLs) in malaria elimination.

The physical trainings and assessments of malaria microscopists have been hampered since last year due to the pandemic. To overcome these challenges, strong planning and sustained commitment, and new available initiatives, i.e. the--use of pen drives for microscopy trainings and virtual refresher trainings and assessments, will be explored.

WHO is continuously supporting countries for strengthening malaria diagnosis through development of technical guidance and procedures, building the technical capacity of microscopists through trainings and assessments, review and update of quality assurance systems, provision of high-quality blood films available in regional and national malaria slide banks, implementation of an external quality assessment (EQA) programme for key laboratories and provision of technical expertise as needed.

2. **Objectives**

2.1 **General objective**

To review the programmes of external competency assessment of malaria microscopists (ECAMM) in the South-East Asia Region and national competency assessment for malaria microscopists (NCAMM) in the Member States and plan the way forward.
2.2 Specific objectives

➢ to review and evaluate the programme of (ECAMM) in South-East Asia Region and that of NCAMM in the Member States.
➢ to review the status and capacities of national reference laboratories in the Member States;
➢ to review the uptake and challenges to virtual trainings/ECAMMs and use of digital technologies for capacity-building; and
➢ to discuss and agree on a new roadmap for ECAMM and NCAMM in the Region, including intercountry and regional support for external quality assurance and reference materials.

3. Proceedings

3.1 Session 1: Opening Session

Dr Suman Rijal, Director, CDS, WHO SEARO, delivered his opening remarks.

Dr Pedro Alonso, Director, WHO Global Malaria Programme, delivered his remarks.

Dr Neena Valecha, Regional Adviser for Malaria, WHO SEARO, articulated the objectives of the meeting. She announced the names of the Chair and the Rapporteur.

Dr Maria Dorina Bustos, Malaria Technical Officer, announced administrative reminders for the workshop.

3.2 Session 2: Implementation of ECAMM

Summary of ECAMMs (Mr Ken Lilley)

Mr Ken Lilley, WHO ECAMM Lead Facilitator, provided an update on review of ECAMM courses planned and conducted in the SEA Region. ECAMM courses have certified thousands of malaria microscopists at L1 and L2 that play important roles in the national malaria control programmes of in-country basic and refresher trainings, national competence assessment for malaria microscopists (NCAMM) and other quality assurance activities.

A fundamental requirement of the course is having a qualified, independent, external and Level 1 ECAMM facilitator travelling internationally on a given schedule to facilitate the said course. The certification issued upon completion of the ECAMM course is valid for three years. Unfortunately, due to the current pandemic and travel restrictions imposed globally, except for four courses conducted in early 2020 (two in India and two in Indonesia), eight planned ECAMMs were not conducted later in 2020.

In May 2020, WHO decided to extend all ECAMM certifications for one year, especially with regard to L1 and L2, to continue the malaria microscopy training activities within the countries. It is still being decided whether to extend all certificates again in 2021 until the end of this year. Meanwhile, countries were encouraged to implement NCAMM courses to assess and improve the competence of their malaria microscopists.

An important and interesting discussion is being held on how local ECAMM facilitators can conduct the course in their own country, which Sri Lanka implemented earlier this year. There have been extensive communications and discussions among the facilitators and other key stakeholders. The use of the WELCOMM platform on malaria microscopy, developed by the African Medical and Research Foundation (Amref Health Africa) needs to increase.
For the development of the virtual ECAMM course, comprehensive SOP were prepared with a checklist to be followed by the country local facilitator. A virtual ECAMM was piloted in the WHO Western Pacific Region, in Papua New Guinea in November 2020, with extensive preparations and with many lessons learnt and challenges identified, associated with increased coaching and mentoring by the lead facilitator on L1, who facilitated the course at the local level. No virtual course has yet been conducted in the SEA Region.

Maintaining the standard and quality of the ECAMM course is vitally important. The virtual ECAMM course must be conducted under the same strict conditions as the in-person course, including the timetable, slide composition, content covered, assessment conditions and the effectiveness of the facilitation. If a suitable local facilitator is not available, then the course should not proceed. We need to ensure that any virtual course is to be conducted under strict conditions, following all SOP and the checklist.

If the internet and software are effective, the external facilitator will present and control the course. However, in case of internet disruptions, maybe the local facilitator will need to take over and that is why the selection of the local facilitator is very important, according to a set criteria (Level 1 microscopist and should have successfully completed a WHO ECAMM facilitator training course and/or a WHO train the trainer course). Likewise, an extra set of slide panels for ECAMM needs to be requested from WHO CC Research Institute for Tropical Medicine (RITM) in Manila in case of loss or breakage during transport.

3.3 Country presentations

Bangladesh (Dr Afshana Alamgir Khan)

Dr Afshana Alamgir Khan, Deputy Programme Manager, presented brief updates on the malaria situation. Bangladesh has 13 endemic districts and 19.05 million at-risk population, reporting 6130 cases and 9 deaths in 2020. In the last 10 years, cases got reduced by 88% and deaths by 75% with eight districts close to elimination.

For the malaria microscopy QA and QC, there is one central-level and 13 district-level laboratories, 72 upazila-level and 67 NGO laboratories working together. Two ECAMMs were conducted since 2017 in which seven participants attained Level 1 while 14 achieved Level 2. Seven NCAMMs were conducted since 2017 where 15 participants attained Level A and 25 Level B. A total of 795 participants completed the basic and refresher trainings for malaria microscopy between 2017 and 2021.

In 2020, one batch of ECAMM and four batches of NCAMM were planned but were not implemented due to the pandemic. The country plans to conduct one ECAMM and four NCAMMs each year from 2021 to 2023. They have no experience with Amref WELCOMM USB. However, the USBs have been procured by WHO and the programme plans to initiate undertaking the course.

Recruitment of consultant is under process by the WHO regional office. There are existing NMCP guidelines on malaria microscopy training and SOP on quality assurance of microscopy. The QA implementation and monitoring for malaria microscopy are presented briefly. All positives and 10% of negative blood smears are sent to national reference laboratory for cross-checking. The national programme and BRAC (NGO) participated in an EQA programme in 2013, conducted by the Swiss Centre for International Health in Bangladesh.
As the way forward, the country plans to strengthen its capacities by participating in EQA programmes, regularly implement NCAMM and ECAMM with WHO consultants, develop its national slide bank to ensure quality training of laboratory medical technologists and develop linkages with WHO CC slide bank to gain experience of maintaining a quality slide bank.

**Bhutan (Mr Kesang Wangchuk)**

Mr Kesang Wangchuk, Laboratory Officer, presented updates on ECAMM and NCAMM programmes conducted in Bhutan: two ECAMMs in 2017 and 2018, with four participants achieving Level 1 and five participants Level 2. All L1s and L2s are still active after extension of certification by WHO. No NCAMM was conducted in 2019 and 2020. However, five basic and two refresher trainings were conducted since 2017. COVID-19 negatively impacted the planned ECAMM/NCAMM activities in Bhutan in 2020. Therefore, the country hopes to conduct one in 2021.

There are NMCP guidelines (3rd edition) and SOP (2021) on microscopy trainings and QA (blinded rechecking, panel testing, M&E and immediate/long-term testing). For refresher trainings and NCAMM, they require WHO slide panels, although the Malaria Reference Laboratory has initiated its own inhouse slide bank (but needs external slide bank validation). This reference laboratory’s role is to provide technical support to the Vector-Borne Disease Control Programme by conducting microscopy trainings/capacity-building, perform malaria molecular tests and National Quality Assurance System (NQAS) for malaria diagnosis and take other QA measures, including slide panel testing and feedback on blinded rechecking.

With the support of WHO SEARO, five USBs were received for malaria microscopy training and one microscopist completed the course without certification, but challenges were presented with use of Amref USB for virtual trainings for malaria microscopy. Bhutan was supposed to participate in the UK NEQAS 2021, but had not yet received EQA samples due to the pandemic.

**India (Dr Vinod Choudhury)**

Dr Vinod Choudhary, Medical Officer, briefly presented the malaria situation in India, targeting elimination by 2030 in a phased manner. Therefore, it is crucial to strengthen malaria microscopy. Being a huge country, it is necessary to have more L1 microscopists nationwide. There are many basic and reorientation trainings and refresher trainings conducted at various state levels by National Vector-Borne Disease Control Programme (NVBDCP) in collaboration with WHO, National Institute for Malaria Research (NIMR) and Regional Office for Health and Family Welfare (ROHFW) since April 2017.

India has conducted four ECAMMs since 2017, producing 18 L1 and 18 L2 WHO-certified malaria microscopists. All are actively engaged, having conducted four national and 35 subnational refresher trainings at different state levels of India. The plan for NCAMM is in process and will be initiated soon. He further talked about the impact of COVID-19 on malaria microscopy trainings, thanks to lockdown and travel restrictions. Despite this, the L1 and L2 trainers conducted 35 training batches at their respective state/Union Territory for 1005 microscopists under the programme in 2020 until April 2021.

India plans to initiate training with the WELCOMM USB received from WHO SEARO. Some issues and technical challenges with the use of USB were pointed out during the workshop (discussed further in Section 4). Dr Choudhary pointed out that USB training is a self-learning process and hence, the willingness of participants is most important. The
national programme is planning to establish the National Reference Laboratory to strengthen quality assurance in the country. There is an existing manual on QA of laboratory diagnosis of malaria by microscopy accessible online at www.nvbdcp.gov.in. ICMR-NIMR supports the national programme regarding the establishment of the malaria slide bank and provision of slide panels for refresher trainings and species validation by PCR assays.

As the way forward, the National Reference Laboratory for MM needs to be formally established for capacity-building. India is planning to conduct four refresher and two ECAMM trainings in 2021 for lab technicians across the country with support from NIMR, WHO, ROHFWs and states, undertake the EQA programme for higher proficiency and utilize available e-learning platforms for training.

**Indonesia (Ms Nurasani)**

Ms Nurasani, malaria diagnosis focal point, presented the status of ECAMM and NCAMMs in the country since 2017: six ECAMMs conducted and 35 participants achieved L1 and 25 L2, and all are active. A total of 187 malaria microscopists participated in the NCAMMs in 2017 and 2019, generating 32 and 37 Level As and Bs respectively. Expert microscopist national facilitators, provincial cross-checkers (from ECAMM) and district cross-checkers (from NCAMM) are actively engaged and widely distributed across the whole country. Training of trainers (ToT) and refresher trainings were conducted from 2017 to 2020, with 42 participants in ToT, that were able to cascade the training to 1514 malaria microscopists in the refresher courses.

The programme will continue to roll out self-learning, using Amref WELCOMM USB for another 20 participants at district and peripheral health facilities. Participants shared some issues and challenges in the use of USBs. Trainers follow the SOP and training manual from the National Malaria Control Programme (NMCP). NMCP is in charge of the National Slide Bank (NSB), carrying out onsite supervision and proficiency testing by distributing slide panels to the regional referral labs, provinces and districts. The NSB slides were handled in 2018 and 2021, with slides validated blindly by 10 ECAMM L1s at different provinces/institutions.

The National Institutes of Health (NIH) laboratories are designated as the NRL (pending official Ministry of Health (MoH) regulaton), specifically the NIH parasitology laboratory (pending ISO certification), with specific roles in malaria microscopy QA, national cross-checker (ECAMM L1) and re-confirmation with PCR. PCR results are validated by Eijkman Institute, Jakarta as part of EQAP.

For the way forward, NMCP will establish the NRL lab for rapid diagnostic test (RDT) lot testing in NIH lab (2021–2023 pending approval of support from the Global Fund for AIDS/HIV Tuberculosis and Malaria; continue roll-out self-learning, using USBs, for 20 participants from district and peripheral health facilities; continue blended learning with local laboratory units and refresher trainings; continue ECAMM, NCAMM and proficiency tests; and cascade onsite supervision using national, subnational and GF funding.

**Maldives (Dr Sana Saleem)**

Dr Sana Saleem, Public Health Programme Manager, started the presentation with Malaria Free Maldives, WHO-certified in 2015, with no indigenous malaria cases since 1984. No cases were reported in 2020 and only one imported case of Pf malaria was reported in 2019. There has been only one ECAMM conducted since 2017 in which one malaria microscopist achieved Level 2 who is no longer in active service. The guidelines on malaria microscopy training manual and SOP, according to the National Malaria Control
Programme, are followed. She further talked about that challenges faced during the pandemic.

As the way forward, Dr Saleem suggested the involvement/training of reference and regional laboratory technicians in malaria microscopy, as, currently, only the central hospital laboratory is carrying out microscopy diagnosis, with experts from India or Sri Lanka. Sometimes slides are referred externally for validation. Another suggestion pertains to the possibility of hands-on training in endemic countries and technical guidance on monitoring and evaluation tools to stay malaria-free and maintain the public health elimination status. In the Q&A, it was suggested that local trainings be conducted to capacitate local microscopists and also for the country to participate in EQA programme for proficiency testing of existing microscopists.

**Myanmar (Dr Bhadri Thapa on behalf of the programme)**

Dr Bhadri Thapa, WHO Scientist, delivered a comprehensive presentation of the malaria situation and overall microscopy QA in Myanmar. The malaria activities were hampered due to the pandemic as well as political crises, with many operational difficulties, limited travel, safety/security issues and challenges to communication, coordination and collaboration. These led to the interruption of COVID-19 response, disruptions in service delivery, reporting and supply chain, and human resource limitations.

Two ECAMMs were conducted from 2017 to 2020, with 17 malaria microscopists achieving L1 and five L2. One L1 microscopist had left the programme and a few certifications expired. During 2017–2019, in the NCAMMs conducted, 197 microscopists participated with 69 achieving Level A and 86 Level B, and all are active until February 2021. Basic and refresher trainings were also conducted with 178 and 126 laboratory technicians getting trained respectively.

The country has no experience with regard to the use of the WELCOMM USB. The National Malaria Control Programme, Myanmar has guidelines on malaria microscopy (2017) aligned with WHO guideline, sets of SOP for malaria activities and manuals for quality assurance and quality control with most of the trainings based on these guidelines.

There is a dedicated inhouse national slide bank with a yearly, external validation of slides (~500 slides). The National Reference Laboratory was established in 2016 with the support of WHO, the Japan International Cooperation Agency (JICA) and United States Agency for International Development – President’s Malaria Initiative (USAID-PMI). The specific roles of NRL are planning, policy and strategy for the use of microscopy and RDT, developing guidelines and SOP for training material for malaria diagnosis and quality assurance (i.e. training and supportive onsite supervision of malaria diagnostic facilities), regular panel testing and cross-checking of slides.

As part of the QA measures, the QA coordination committee between the National Health Laboratory and NMCP conducts annual and biannual meetings for national planning and review workshop for QA; ensures capacity-building on QA of microscopists through cascade training and retraining, conducts NCAMM to certify cross-checkers every three years; participates in ECAMM and the EQA programme with WHO CC RITM. Myanmar performed well in the EQAP, attaining 100% species ID and an acceptable range of 50–100% in parasite counts in a total of six rounds of testing since 2018. The EQAP consists of two rounds per year and 15 slides are read per round.

Plans to pursue ECAMM, NCAMM and other MM QA activities depends on the COVID-19 situation and the political condition. The country would like to continue with physical training for basic and refresher courses and supervision; EQAS of lab technicians...
using panel tests, cross-checking and onsite visits; external slide validation; logistic supply and technical support to state/regional level lab technicians for malaria microscopy; and strengthening and sustaining the national slide bank in support of MM quality assurance for malaria elimination.

**Nepal (Dr Rekha Mamandhar Shrestha)**

Dr Rekha Mamandhar Shrestha, Senior Consultant, presented brief updates on the ECAMM programme in Nepal. Three ECAMMs had been conducted since 2017 in which eight malaria microscopists achieved L1 and 15 achieved L2. All the malaria microscopists are active, with certifications extended until the end of 2021. Two NCAMMs were conducted in 2017 in which 24 malaria microscopists participated. Since 2017, a total 20 basic and 16 refresher trainings were organized for malaria microscopy (duration 30 and 15 days respectively) for laboratory technicians of the Vector Borne Disease Research and Training Center (VBDRTC) and the National Public Health Laboratory (NPHL).

Standard NMCP training manual and SOP for malaria microscopy have been developed and used for the training. The malaria trainings needed to be more frequent to improve the competency of health workers. COVID-19 also impacted ECAMM, NCAMM and malaria microscopy training planning and activities. There is no experience with regard to the use of Amref WELCOMM USB.

NPHL has been designated as the NRL since 2018. Its main responsibilities are to coordinate and guide malaria laboratory services in accordance with national laboratory plans; develop technical documents; ensure that the quality of laboratory services is maintained throughout the country through the established QA networks; develop the national malaria slide bank following WHO SOP; conduct monitoring at malaria testing sites, including the private sector; and conduct malaria microscopy trainings in coordination with VBDRTC and provincial public health laboratories.

The national malaria slide bank was initiated in 2017/2018, with ongoing attempts to replenish the slides.

The NMCP and the NRL are committed to ensuring that malaria QA/QC is fully functional at the provincial level; participating in EQA programme; sustaining the trained human resource through trainings and collaboration with WHO; conducting both ECAMM and NCAMM; and maintaining slide banking in collaboration with WHO CC for quality improvements.

**Sri Lanka (Dr Kumudu Gunasekera)**

Dr Kumudu Gunasekera, Parasitologist, presented the situation in Sri Lanka regarding the quality assurance and quality control of malaria microscopy. There had been four ECAMMs conducted since 2017. A total of 21 malaria microscopists achieved L1 and 13 achieved L2, of whom nine are still active and involved in MM trainings. Several NCAMMs had been conducted since 2017 with a total of 278 participants and >90% achieved Level A. They used their own slide panels until 2019 and later slide panels from WHO CC RITM. Basic and refresher microscopy trainings were conducted on a regular basis and 874 participants trained for malaria microscopy. During 2020–21, online trainings were conducted. In addition, from 2017 to 2019, additional trainings were conducted with the private sector. One virtual ECAMM course was conducted in March 2021 by the local L1 lead facilitator. ECAMM is planned for 2022 to 2024, either face-to-face or virtual, depending on the COVID-19 situation.
As Sri Lanka has eliminated the disease, malaria caseload detection by lab technicians is very low; hence, the need to sustain high-quality malaria microscopy. To maintain the efficiency of malaria diagnosis, regular trainings and ECAMM should be planned. WELCOME USBs were received from WHO SEARO for virtual training while five L1s and the facilitator had completed the course, but without certificates.

The distribution plan is to share the USBs with at least one public health laboratory technician (PHLT) per district and this is ongoing with monthly online reviews. However, challenges and technical issues with USBs need to be discussed and resolved. A hybrid training was introduced using USB with orientation for two days.

The NMCP guidelines on malaria microscopy training manual/SOP are followed for malaria activities, with recent additional safety guidelines on malaria surveillance during the pandemic response. The Anti-Malaria Campaign Programme functions as the National Reference Laboratory, coordinating QA/QC for malaria microscopy and providing technical guidance.

The National Slide Bank is ongoing, maintaining the quality of PCR-confirmed slides and validated by L1 readers as per guideline. The programme has not participated in any EQAP but, at present, microscopy slides are validated by PCR internally and PCR proficiency is subject to WHO NAAT scheme. The plan is to enrol in the EQA scheme with WHO CC RITM.

The way forward is to seek ISO certification for the NRL, participate in EQA programme to improve laboratory services and as a centre of excellence and hopefully become WHO CC for MM. More ECAMMs and NCAMMs are planned to have more L1s and L2s per region within the country.

**Thailand (Dr Aungkana Saejeng)**

Dr Aungkana Saejeng, Senior Medical Technologist, provided updates on ECAMM and NCAMM conducted in the country since 2017. Two ECAMMs were conducted each year from 2018 to 2019 in which out of a total of 48 participants, 27 achieved Level 1 and 14 Level 2. All the participants are active except for one L1 microscopist, who retired from service. NCAMM was initiated in the country in 2019 with 46 participants in attendance. The participants were from the Department of Disease Control (DDC), university hospitals and the Armed Forces Research Institute of Medical Sciences (AFRIMS).

Seven malaria microscopists achieved Level A and 11 Level B. It was deemed necessary for university-based and AFRIMS microscopists to undergo NCAMM to ensure that they are aware of the WHO training/assessment standards, as they have training curriculum for medical technologists in private hospitals. Six refresher trainings had been conducted since 2017 with a total of 210 participants. With the pandemic situation, ECAMMs and NCAMMs were not conducted as laboratory staff was involved in the COVID-19 response activities. Two batches for each year of the ECAMM course are needed so that more L1 microscopists can be achieved to cascade training to universities and private hospitals. The e-Learning course using the WELCOMM USB was initiated in 2018. Three microscopists completed the course and this can be extended to more participants. Some suggestions were also included in the presentation regarding the use of USB.

NMCP is in the process of updating the guidelines and SOP on malaria microscopy. The National Reference Laboratory was established on 6 February 2020. The specific role of NRL is to develop guidelines, SOP, action plan for malaria diagnosis and quality control, slide cross-checking, proficiency testing, competence assessment, outreach training and
supportive supervision (OTSS), laboratory information system for diseases prevention and control, validation of slides and PCR for drug efficacy study.

Research and technology development are also a part of NRL. Two modules for cross-checking of slides at different levels were presented, according to high- and low-transmission areas, where 10% of negative slides and all positive slides are collected every 10 days for cross-checking. Blood samples are collected from field sites for the National Slide Bank, with a collection consisting of all five malaria species and mixed infections. All the blood samples are confirmed by PCR and validated by six L1 microscopists. In 2020, NMCP participated in two rounds of the WHO EQAP and achieved 100% in parasite species ID and 89.89% in parasite count.

The way forward: Will implement SOP, OTSS in regional laboratory, training of trainers for malaria microscopy for the subnational (regional) reference laboratories, refresher training for hospital MTs and NCAMMs for cross-checkers and university hospitals. Due to the pandemic, there are plans for online training and competence assessment. They can plan for ECAMM course possibly in 2022. Thailand expressed its need for the WHO ECAMM facilitator training course conducted online and/or a WHO train-the-trainer course.

**Timor-Leste (Sr Antonio Gomes)**

Sr Antonio Gomes, Level 1 Microscopist, presented the status of ECAMM in the country. One ECAMM course was conducted in March 2019 where three malaria microscopists achieved Level 1 and four achieved Level 2. No NCAMM was conducted since 2017. All seven malaria microscopists are active and involved in basic and refresher trainings. Twenty-nine microscopists participated in basic training and 21 in refresher training. Due to travel sanctions and shortage of PPE, face masks, hand gloves, disinfectants and so on, malaria activities were affected. Across the border, issues related to cross-border collaboration with Indonesia, especially with regard to malaria surveillance in the border province, contributed to the increase in malaria cases in the border areas of Timor-Leste.

There is a plan to conduct NCAMM course for 12 national quality lab analysts and municipality senior lab analysts once every two years. Comprehensive refresher training for microscopists, to maintain knowledge and practical competence, for one week per year is also under process. QA is planned to focus on the district and peripheral levels. On-the-job training will be provided during supervisory visits by the national QA/QC analysts and municipality lab analysts. They have no experience of the WELCOMM USB e-Learning course. NMCP guidelines on malaria microscopy, training manual and SOP were revised in 2020–2021.

The NRL certification is pending. The specific role of NRL is to facilitate ECAMM courses, basic and refresher trainings for malaria microscopists, validation of malaria microscopy, supervision, monitoring, evaluation and development of MM guidelines/SOP, and maintenance of slide bank. Equipment maintenance quality of reagents needed for malaria diagnosis are also a part of NRL responsibilities.

Quality assurance measures such as cross-checking of slides, supervisory visits to hospitals, CHCs, HPs, private clinics and QC for RDT are supervised by the NRL. The provision and maintenance of high-quality, well-characterized malaria slides are an essential part of the QA programme. Timor-Leste participated in EQAP conducted by WHO CC RITM in March 2019 and the results showed improvements in parasite identification and quantification.
The way forward: the National Health Laboratory will be the designated NRL for the
country to act as the reference centre for malaria diagnosis. A comprehensive refresher
training course for a minimum duration of one week per year is planned for microscopists
to maintain knowledge and practical competence; WHO ECAMM should continue to be
an important component of the ongoing QA plans for Timor-Leste and continuation of
QA/QC of malaria microscopy and RDT.

Plenary discussions

In the plenary, after all the country presentations, Dr Andrea Bosman, WHO GMP
Coordinator, thanked all the participants for their detailed presentations and impressive
work in difficult times. He commended distance-learning refresher training conducted by
Sri Lanka that showed a hybrid model partly with USB and the rest with other resources.
Dr Gunasekera clarified that this was possible only for trained microscopists as the
assessments, discussions on errors and discrepant readings were carried out by
microscopists themselves after each slide examination.

Sri Lanka has a systematic approach, monitored by the NMCP every month.
Possibilities for virtual platform learning are more important now given the Covid-19
restrictions globally. But, as pointed out by several intervenors, any basic training must be
carried out face-to-face as microscopy is skills-based, individual skills vary, and sometimes
new microscopists may have unknown visual coordination problems.

As to the question whether NCAMM and ECAMM slides are the same, Ken Lilley
mentioned that countries should be using standardized slides from RITM for NCAMM, as
they follow the same QA standards in slide preparation. The slides used for NCAMM are
coded differently from those used for ECAMM. The similarities or differences between
NCAMM and ECAMM will be presented in more detail on Day 2.

Another concern raised by Dr Neena Valecha was how to maintain the standards for
NCAMM when some countries are struggling to collect and maintain quality slides in their
national slide banks intended for basic and refresher trainings. This has become more
difficult as cases are declining. Bhutan and Nepal raised the possibility of permanently
keeping or buying RITM slides that were borrowed for ECAMM and NCAMM, to be used
in local trainings.

Dr Bosman and Ms Jenny Luchavez, Chief Science Research Specialist – RITM,
clarified that the regional Malaria Slide Bank (MSB) in Manila belongs to WHO and there
is no provision to sell slides. WHO ethical standards are followed, as collection of blood
from any subject is covered by a signed, informed consent stating that the samples are not
for any commercial use. And there is the whole logistic process of slide preparation, PCR
confirmation, validation by 12 L1 microscopists, labelling and coding in a database and
proper storage. It was also mentioned that parasite morphology in specimen from in vitro
cultures in the laboratory are not the same as blood samples from an actual patient. Slide
“swapping” can be carried out with quality-assured MSB from other countries.

Countries are requesting if WHO and RITM can provide technical support in the
establishment of their NRLs, setting up a quality slide bank, slide cross-checking and
conduct of NCAMM. Dr Bustos mentioned that this was possible as this had already been
implemented in Thailand in 2019, with two batches of NCAMM facilitated by trained local
L1s under the supervision of an external consultant. The same consultant was previously
sent to different countries (including Thailand) several years ago to help set up their slide
banks. But it is the responsibility of the programme (or NRL) to sustain the subsequent slide
collections/preparations and the long-term maintenance of their NSB.
3.4 Session 3: National competence assessment of malaria microscopists

Conduct of NCAMMs (vs refresher training vs ECAMM) (Mr Ken Lilley)

Mr Ken Lilley presented the difference and importance of refresher training versus NCAMM versus ECAMM: (1) Refresher training – the goal is to refresh the knowledge and skills in malaria microscopy and associated topics; (2) NCAMM – the primary goal is to assess the knowledge and skills of a malaria microscopist at the national level, with a national facilitator; and (3) ECAMM – the primary goal is to assess the knowledge and skills of malaria microscopists at the international level by an external facilitator.

The goal of refresher training is not competence assessment, although there may be opportunities to refresh the skills and knowledge of malaria microscopists, who have completed basic training. The important aspects are detection, species identification and quantification of malaria parasites and theoretical and practical knowledge. The primary goal of the ECAMM course is to assess the competence level of malaria microscopists.

An independent external facilitator conducts ECAMM whereas NCAMM is conducted at the national level by qualified national facilitators. The NCAMM course is very similar to but varies from the ECAMM course in its certification level, using Level A, B, C and D gradings, and is conducted at the national level. He pointed out that most countries do not regularly conduct refresher trainings or a comprehensive training that includes all four relevant parasite species for detection, identification and quantification, and sometimes five if *P. knowlesi* is included.

Very few face-to-face courses are conducted in the SEA Region and no virtual ECAMM has so far been conducted. The NCAMM course has been held in Thailand and Myanmar but is not yet developed in India. If conducted, it must be carried out as per the required standards, according to the WHO QA manual. It should be similar to the structure and composition of the ECAMM course, including all topics covered, timing for slide readings and slides to use for the assessment. It is recommended that slides from the WHO Slide Bank be used with correct composition of all four species and relevant densities, from low to mid to high.

Recommendations are to improve the quality and frequency of refresher trainings, develop and conduct NCAMM courses meeting the same strict conditions as the ECAMM course, conduct virtual ECAMMs where qualified, trained and local L1 facilitators are available and move to in-person ECAMM courses as soon as possible.

A question was raised on how many ECAMM L1/L2s should a country have. It’s really for the country to decide, based on the need for subnational or regional expert microscopists to carry out the NCAMMs and cascade trainings and supervision.

Virtual ECAMMs and SOP (Mr Ken Lilley)

Mr Ken Lilley presented the SOP and associated checklist developed for the virtual ECAMM course. ECAMMs have been conducted successfully for over 18 years in countries of the WHO African, Eastern Mediterranean, South-East Asia and Western Pacific regions. It remains the preferred mode of competence assessment of malaria microscopists but has been interrupted in the COVID-19 environment by the inability of external ECAMM facilitators to travel internationally.

There is demand from many countries to conduct ECAMM courses as competence of microscopists is “expiring” and the course certification is valid for only three years. The SOP developed (WHO SOP 036, version 11, dated 17 June 2021) included wide consultations with other ECAMM facilitators and key stakeholders. The checklist is to guide local facilitators to conduct correctly the virtual ECAMM course ensuring that it complies with strict conditions and quality as in a physical ECAMM course.
A virtual ECAMM course was piloted in Papua New Guinea from 9–13 November 2020 and it was successful as the local facilitator (an experienced L1 microscopist, who conducts QA at the national laboratory) performed very well. The internet connection was reliable and there was no time difference nor language barrier. The SOP and checklist were improved after feedback was received and lessons learnt after the conduct of the course.

There are some ongoing issues. Firstly, a major improvement for the next virtual course includes a mobile microphone to allow participants to communicate better with the external facilitator and use of directional camera to allow the external facilitator to move the camera and zoom in on the work areas so that participants feel like they are really pursuing a proper course. Secondly, regarding slide panels for the course, the WHO Malaria Slide Bank has agreed to provide two sets of slides to any external facilitator to enable him or her to alternate between two sets that may be in transit in and out of a country, where a virtual course is to be conducted.

There are two likely scenarios when a local facilitator is used. Firstly, with a reliable internet connection, the external facilitator conducts the course completely onscreen, delivering all presentations and instructions to the participants; the local facilitator primarily just hands out slides and scans results to the external facilitator to assess, analyse data, and write the reports. Secondly, where the internet connection is not effective and reliable, and there is no immediate contact with the external facilitator, then the local facilitator is basically on his/her own. If email is available, it would be possible to send scanned results to the external facilitator to assess, analyse data and write report. Hence, in the second scenario, it is very important that the selected local facilitator has the right attributes and experience to conduct courses. As mentioned above, the local facilitator is an L1 microscopist, who has successfully completed a WHO ECAMM facilitator training course and/or a WHO train-the-trainer course.

Future plans and recommendations are to resume the ECAMM courses, preferably in person, when international travel is possible. The virtual approach provides a learning opportunity for further development of ECAMM courses at a distance and additional development of regional malaria slide banks following WHO SOP to be used for the courses.

Discussions including future plans and countries for NCAMMs (Ms Bina Srivastava)

Ms Bina Srivastava, Senior Technical Officer, presented a summary compilation of the Day 1 country presentations of the status and plans to conduct NCAMM courses. External facilitators and participants also joined the discussions. Some suggestions are:

- Limit the number of participants in NCAMM following COVID-19 precautions.
- Slide panels are to be sent to different remote provinces to ensure regular refresher learning and that technicians are being evaluated.
- It is important to maintain competency and interest as countries now have declining malaria cases.
- Combination training: It consists of two-day theoretical part with slide presentations through virtual platform and three days in person for slide examination and assessment.
- NCAMM can be conducted within the country depending on where the COVID-19 travel restrictions are lifted within states/regions/provinces and districts.
The feasibility of virtual NCAMM was also discussed in detail. As pointed out by Mr Ken Lilley, the primary, basic requirement to conduct virtual NCAMM course is the presence of a local Level 1 and Level 2 facilitator, who will have direct control over the conduct of the course, according to set WHO standards, as mentioned in the WHO QA manual. Hopefully, early next year, facilitators and participants can travel internally and conduct the NCAMM physically.

WHO is ready to technically support the conduct of courses if countries have well-equipped facilities, microscopes and trained personnel. The experience two years ago in Thailand was shared: a WHO consultant supervised the NCAMM conducted by local L1 facilitators and the performance of the facilitators was assessed in parallel, if they were capable of carrying out NCAMM and the results were quite commendable. The local L1 facilitators had previously undergone ToT and were ready with protocols, SOP and PowerPoint slides (in Thai language). They used WHO MSB slide panels, according to WHO standards.

Other suggestions are to conduct NCAMM in countries where it has not been initiated yet as a pilot course so that any problems and issues can be resolved; to have a virtual training (ToT) of existing L1 facilitators in how to conduct NCAMM; and to try having a blended NCAMM and refresher training.

3.4 Session 4: Experience with the WELCOMM microscopy course – panel discussion

WELCOMM microscopy course (Amref, WHO, GMP, SEARO, facilitators and selected microscopists) (Dr Stephen Munene)

Dr Stephen Munene, Senior Laboratory Officer, presented the Worldwide e-Learning Course on Malaria Microscopy developed by Amref team to address challenges to refresher training of malaria microscopists, working at remote places. The benefit of USB-based training is to refresh the skill and knowledge at their own time and to practise prior to the formal ECAMM course, in case refresher training could not be conducted. One can take the course as many times if they need practice.

The constraints are costs involved and the time or leaving the workplace for the period of training. The WELCOMM course was developed in 2015 and then revised a few times after receiving feedback on challenges faced by end users. Until 2020, 461 participants took the course from 41 countries and it is still trying to reach more users.

The main goal is to promote quality malaria case management and elimination strategies through accurate diagnosis of malaria. Target users are trained malaria microscopists, who wish to improve their skills in malaria microscopy. Laboratory staff performing malaria microscopy can benefit from self-directing refresher training and preparation for competence assessments. The course structure consists of seven modules with pre- and post-theory and practical tests. There are MCQs after each module and practical involving slide examination for detection, identification and quantification of parasites.

Internet is not required during the course except once during the initiation of the course. It also contains non-malaria parasites and artefacts so that the comparison can be seen. The calculator is also inbuilt and hence, it can count the parasites accordingly. The certificate is provided after final assessment is completed and its validity is for one year. The challenges faced by users are presented and their possible resolutions were discussed during the workshop.
WHO AFRO/WHO SEARO experience on the use of USB – gaps, challenges and suggestions (Ms Bina Srivastava)

Ms Bina Srivastava presented a summary compilation from the country presentations regarding gaps, challenges and suggestions for the use of the WELCOMM course. Comments received from Mr Ken Lilley regarding the use of USB were briefly discussed. Issues and challenges included the facts that login is “system-specific”, not “user-specific”, and hence, requires a dedicated system which may not be available with the participants – if the system gets defunct, the licence is lost/wasted; the virtual microscopic field is less expansive compared to that of the real microscope; there are not enough parasite-counting exercises on virtual practical slides; “font size” of the write-ups needs to be increased; it is better to have option for other languages in the slides; and the validity of certificate after completion of training should be indicated on the certificate.

It was also mentioned that varying IT capacities and capabilities of the computers of the participants hampered the training process/progress; if an error occurred in the middle of the training, participants needed to restart it; some passed the training modules but failed to record the progress; suggest to include sample slides of *P. ovale* and additional slides from Africa since the parasite morphology may be slightly different; can use a microscope Scanner slide; and some had hardware and software issues. A major constraint is the time conflict with other priorities in the programme, and hence, some participants cannot complete the training.

Dr Munene discussed the feedback received on structure, contents, parasite-counting and the time needed to complete the course. Dr Jane Carter, Director Amref, appreciated the suggestion of identifying a regional contact person to support the course. Language has been an issue in many countries and the Amref team is open to the course getting translated in regional languages. As suggested, *P. knowlesi* and *P. ovale* slides can be added, as this is a global course.

She also suggested completing the module once initiated, otherwise participants need to retake it from the beginning. The built-in programme in the system does not recognize if one has taken the module, and hence, this issue will be looked at for resolution. Cost is another issue, but as there is no core funding for the course and it being a non-profitable organization, there is a need to generate enough funds to support the course.

Discussion: How many countries are interested? What are the challenges, issues

There was an open discussion for suggestions and ideas to formalize USB WELCOMM course as a refresher training programme, which countries need to consider. Course completion takes about 40 hours, so time allocation for the course beyond or during regular office hours and incentives to the participants must be decided upon by the institution or programme managers and participating microscopists. The course can accommodate a group of people, but for final assessments, an individual key is required, if generated, so that more participants can be benefitted. Dr Munene also mentioned that individual results are not shared in the database.

Most countries are interested and hence, WHO can support the national programmes to promote the use of USB, instead of leaving it to the discretion of individual participants. A qualified national resource person must be identified to lead the conduct of the course per country and programme managers need to plan the course within and outside the programme.
3.5 Session 5. National reference laboratory (NRL), slide banks and external quality assurance programme (EQAP)

**WHO CC RITM: Current activities, slide banks (video 25 min.), including slide validation (Jennifer Luchavez/Christian Luna, RITM)**

A video film of 25 minutes was played during the workshop. The film was very informative and details of malaria slide banking, such as supply/reagent requirements, collection of blood samples, slide preparation methods, safety measures, validation of blood films and proper storage, from start to completion, were covered. The WHO Malaria Slide Bank in Manila is the key resource for slides for ECAMM and NCAMM courses in different countries.

MSB slides last for several years as all slides during preparation use a preservative mounting media for the cover slips and are stored in optimum conditions. So far, there have been no reports of deterioration in the quality of specimen slides from experts. WHO is ready to support the activities for validation of slides collected by countries upon request, by sending two slides per patient for validation.

**EQA programme – results and resources (Amref/WPRO/WHO CCs)**

David Isaboke, Project Officer, delivered a presentation from Amref regarding external quality assurance. The EQA programme has three main components – testing proficiency, rechecking and onsite evaluation. The proficiency testing is carried out by sending slides to participants or laboratory for detection, identification and counting of parasites. Rechecking of slides are conducted by NRL, where the quality of blood smears and staining of slides are assessed. The third component involves periodic onsite visit and provision of technical guidance, if required.

The option of providing on-the-job training and supportive supervision is included. EQAP is recommended for ISO 15189 certification for laboratories. EQAP serves as an early warning for systemic problems; it provides objective evidence of testing quality and competence of staff. It is a measure of laboratory performance and it helps identify the areas for improvement and training needs. The EQA programme of Amref has a malaria slide bank repository of high-quality slides for proficiency testing and works with support from WHO GMP and RITM. It also conducts training of trainers for malaria diagnosis, a three-module training package on essential training skills and adult learning approaches.

Ms Jenny Luchavez presented the WHO EQA programme for malaria microscopy proficiency. It is being conducted for the Western Pacific Region countries over the past 10 years and will now expand to include SEA Region countries. There are two rounds per year, 15 slides are sent to the laboratories for proficiency testing and the online reports are sent to RITM. The summary of results is sent back to the laboratories.

There are, currently, 21 participating laboratories in EQAP, from 11 Western Pacific Region countries and two SEA Region countries. Countries, namely Bangladesh, Bhutan, India, Indonesia, Maldives, Nepal and Sri Lanka, have expressed their interest in participating and Thailand and Myanmar will continue in the EQA scheme.

**Country NRL: SOP, accreditation/designation and resources (Dr Andrea Bosman)**

Dr Bosman presented the role of NRL in QA of malaria microscopy, based on the WHO QA manual for malaria microscopy. He emphasized that microscopy is very important for malaria diagnosis and has specific roles, compared to RDTs, in the management of severe malaria and investigating treatment failures. In addition, over the past few years, the emerging threats of pfhrp2 and pfhrp3 deletions have assigned additional role for
microscopy in the detection of *P. falciparum* with suspected deletions. This is an important role as the prevalence of **pfhrp2/3** gene deletions increases. However, RDTs remain essential for confirmation of malaria in most malaria-endemic areas as MM is not widely available.

There are several WHO resources to support QA of malaria microscopy – MM standard operating procedures (MM-SOP), the QA manual and Bench AIDS for MM. The list of SOP for laboratory services are available at [https://iris.wpro.who.int/handle/10665.1/14214](https://iris.wpro.who.int/handle/10665.1/14214). A CD-ROM can be downloaded from WHO/GMP website and used for refresher training as it includes around 450 micro photos of slides with rare malaria parasite stages from thick and thin films. Use of these materials is strongly recommended.

In January 2019, WHO convened a technical consultation to review ECAMM procedures and results and harmonization of MM-SOP for clinical management of malaria. The following procedures were reviewed: the minimum number of thick films to declare “no parasite seen”, examination of thick film (continuous vs skipping), microscopic field to start counting parasites and parasite forms for estimating parasite density.

Also included in the QA manual is outreach training and supportive supervision (OTSS), which is a relatively new and promising approach to improve quality in peripheral health laboratories. Some countries, such as Thailand, have included OTSS as one of the roles of NRL.

In the ensuing discussion, it was pointed out that in some countries that have eliminated malaria, such as Sri Lanka, the bigger issue now is how to maintain the competence of microscopists in areas where there are no more malaria cases. The country is doing an excellent job, adapting a hybrid model to the WELCOMM USB and other resources to conduct remote and in-presence refresher training of laboratory staff regularly. In such a situation, an external proficiency testing is also important.

Participation in an external proficiency testing programme, as the one coordinated by WHO CC RITM for several countries in the Western Pacific Region, is also important to ensure quality assurance of national reference laboratories. National programmes of the South-East Asia Region expressed strong interest in participating in the EQA programme.

It is notable to see that most of the countries have their own SOP for malaria microscopy training, but these need to be revised and updated from time to time, following the latest WHO technical guidance.

### 3.6 Session 6: Next steps and closing (Dr Neena Valecha)

**Findings**

- ECAMMs could not be conducted as planned for 2020 and 2021.
- SOP for virtual ECAMMs are in place, but there are challenges (most challenges can be overcome with effective internet and suitable local facilitators).
- Extension of certificates of competence is one of the stopgap measures taken by WHO globally last year. An issue under discussion at GMP HQ, in consultation with other regions, is whether an extension of maximum two years will be allowed.
- NRLs and quality slide banks are not existing/functional in most countries.
NCAMMs were conducted only in two countries in recent years.

Few refresher trainings were conducted, but many deferred.

Different standards were being followed, including accreditation for NRL and NCAMMs, despite access to WHO guidelines on malaria microscopy QA and SOP.

Funding is, generally, not an issue, but more technical support is desired by countries.

**The way forward**

- There is a need to recognize that quality microscopy is critical for all countries in line with the malaria elimination framework. National programmes should have short-term and long-term plans for diagnostics quality assurance and setting up the NRL.

- Capacity-building and expertise in microscopy should be available not only at the national level, but also, more importantly, at the lower levels, since these are the frontline workers delivering the services.

- Identification of qualified local facilitators and networking should be carried out by countries with guidance from WHO, including the ECAMM lead facilitator.

- Regular refresher trainings also need to be conducted by certified resource persons, using quality slide panels.

- Organize a training of trainers (ToT) for the national core of trainers of existing L1/L2s that can cascade the training to microscopists at the peripheral level.

- WHO and programmes should encourage/support countries to conduct regular NCAMMs.

- Use of e-Learning platforms needs to be promoted and improved, looking also at the local conditions of information technology available.

- The WELCOMM training course needs to be promoted by the national programme.

- Countries should maintain standards and quality of NCAMM, NRL and malaria slide banks with support from WHO, including WHO CC.

- More innovative approaches need to be adopted for continuity of activities related to quality assurance in malaria microscopy (QAMM), including the necessary public health safety measures (PHSM) and IPC, given the current pandemic situation.
Annex 1

Programme

Day 1: Thursday, 24 June 2021

Opening session

- Opening remarks by Dr Suman Rijal, Director, CDS, WHO Regional Office for South-East Asia
- Remarks by Dr Pedro Alonso, Director, WHO Global Malaria Programme
- Meeting objectives and nomination of the Chair, Co-chair and Rapporteur (D1 and D2) by Dr Neena Valecha, Regional Adviser, Malaria, WHO SEARO
- Administrative announcements by Dr Maria Dorina Bustos, Malaria Technical Officer, WHO SEARO

Session 1: Implementation of ECAMM

- Summary of ECAMMs (database, work with facilitators L1/L2) by Mr Ken Lilley, WHO ECAMM Lead Facilitator Scientific Officer, Australian Defence and Consultant in Malaria Microscopy Quality Assurance for WHO
- Updates, challenges, plans for ECAMMs (next three years) and NCAMMs (10 min. country presentation, followed by discussion) by country-selected microscopists and facilitators
- Country presentations by Bangladesh, Bhutan, India, Indonesia, Maldives and Myanmar
- Country presentations by Nepal, Sri Lanka Thailand and Timor-Leste
- Plenary discussions

Day 2: Friday, 25 June 2021

Session 2: National competency assessment of malaria microscopists

- Conduct of NCAMMs (vs RT vs ECAMM) and virtual ECAMMs (SOPs) by Mr Ken Lilley
- Discussions including future plans of countries for NCAMMs by L1 facilitators: Ms Kumudu de Alwis Gunasekera, Mr Sherwin Galit, Ms Wanna Srisatjarak, Ms Bina Srivastava, Mr Norizat Bin Yaa’kub

Session 3: Experience with WELCOMM microscopy course – panel discussion

- WELCOMM microscopy course by Amref, WHO GMP, WHO SEARO, facilitators and selected microscopists
- WHO AFRO/WHO SEARO experience (gaps, challenges, commitment and suggestions) by Ms Bina Srivastava, Senior Technical Officer, ICMR – National Institute of Malaria Research, India
- Discussions: How many countries are interested? Challenges and issues
Session 4: National reference laboratories, slide banks and external quality control programme

➢ WHO CC RITM: Current activities, slide banks (video of 25 min.) including validation by Ms Jennifer S. Luchavez/ Mr Christian Luna, Research Institute for Tropical Medicine – Department of Health
➢ EQA Programme – results and resources by Amref/ WHO WPRO/ WHO CCs
➢ Country NRL: SOP, accreditation/designation and resources; country experience – Thailand by Dr Andrea Bosman, Coordinator, Global Malaria Programme, WHO HQ and Dr Jennifer S. Luchavez
➢ Discussions

Session 5: Next steps and closing

➢ Closing remarks and the way forward by Dr Neena Valecha
Annex 2

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Workshop on external competence assessment and national competence assessment for malaria microscopists (ECAMM and NCAMM)

Report of the meeting (virtual)

New Delhi, India, 24–25 June 2021