

THE REGIONAL WORKSHOP ON ADOPTION AND IMPLEMENTATION OF WHO POLICY GUIDANCE ON MALARIA ELIMINATION



26–27 November 2020

Virtual meeting

WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR THE WESTERN PACIFIC

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MEETING REPORT

REGIONAL WORKSHOP ON ADOPTION AND IMPLEMENTATION
OF WHO POLICY GUIDANCE ON MALARIA ELIMINATION

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NOTE

The views expressed in this report are those of the participants of the Regional Workshop on Adoption and Implementation of WHO Policy Guidance on Malaria Elimination and do not necessarily reflect the policies of the conveners.

This report has been prepared by the World Health Organization Regional Office for the Western Pacific for Member States in the Region and for those who participated in the virtual Regional Workshop on Adoption and Implementation of WHO Policy Guidance on Malaria Elimination from 26 to 27 November 2020.

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KEYWORDS

Malaria – epidemiology, prevention and control / Policy / Sentinel surveillance

ABBREVIATIONS

ACD	active case detection
CIFIR	malaria case notification, investigation and responses
CNM	Cambodian National Center for Parasitology, Entomology and Malaria Control
DVBD	Thailand Division of Vector Borne Disease
FSAT	focal screen and treatment
FST	fluorescent spot test
G6PD	glucose-6-phosphate dehydrogenase
GMP	Global Malaria Programme
GMS	Greater Mekong Subregion
HC	health centre
ICMV	integrated community malaria volunteers
IEC	information, education and communication
IMP	RAI-RSC Independent Monitoring Panel
IPT	intermittent preventive treatment
IRS	indoor residual spraying
LLHN	long-lasting insecticidal hammock net
LLIN	long-lasting insecticidal net
MEAT	Malaria Elimination Audit Tool
MECP	Malaria Elimination Certification Panel
MME	Mekong Malaria Elimination programme
MMW	mobile malaria worker
NMP	national malaria programme
PCD	passive case detection
RACD	reactive case detection
RAI	Regional Artemisinin-resistance Initiative
RDT	rapid diagnostic test
RSC	Regional Steering Committee
TDA	targeted drug administration
WHO	World Health Organization

SUMMARY

The Regional Workshop on Adoption and Implementation of WHO Policy Guidance on Malaria Elimination was convened virtually from 26 to 27 November 2020. Organized by the World Health Organization (WHO) Mekong Malaria Elimination (MME) programme, it brought together participants from the six Greater Mekong Subregion (GMS) countries – Cambodia, China, Lao People’s Democratic Republic, Myanmar, Thailand and Viet Nam – and the Global Malaria Programme (GMP), as well as technical experts and partners to discuss the *Framework for Malaria Elimination* and the *Global Technical Strategy for Malaria 2016–2030*.

The main discussion points included outlining areas of improvement based on the country self-assessments of the Malaria Elimination Audit Tool, presenting best practices in malaria elimination, and defining the steps needed in the GMS to eliminate malaria and obtaining malaria-free certification.

The key points of the meeting included:

- **Malaria elimination guideline:** WHO is engaged in reviewing evidence to inform recommendations for several possible malaria elimination strategies. At this stage, protocols for systematic reviews and meta-analysis of evidence are being developed. WHO will be combining existing guidelines on vector control and case management into a consolidated malaria guideline that will be published in January 2021. By June 2021, WHO will add new elimination recommendations to the consolidated guideline.
- **Malaria Elimination Audit Tool:** WHO developed the Malaria Elimination Audit Tool to help countries evaluate the implementation status of their elimination programme with respect to the guidance provided in the *Framework for Malaria Elimination*. Before this workshop, GMS countries completed a self-audit exercise to review their malaria programme implementation.
- **Best practices in malaria elimination:** The GMS has developed examples of effective, localized best practices for malaria elimination. In light of the findings from the Malaria Elimination Audit Tool, countries should continue to review these models, conduct systematic evaluations of their effectiveness and consider how these could be adapted to their national contexts.
- **Malaria Surveillance Assessment Toolkit:** This single, standardized set of tools for malaria aims to support the identification of key actionable gaps in malaria surveillance for any malaria-endemic setting. The elimination content of the toolkit and a web app are in development and will be available in 2021.
- **Malaria stratification for elimination:** Stratification for elimination allows for focused, tailored responses by assigning specific intervention packages and deploying strategies to designated strata. This type of stratification is based on multiple evidence-based and relevant data points. Intervention packages may include enhanced vector control and surveillance activities as well as systems that help identify, investigate and clear remaining foci through community-level strategies.
- ***Plasmodium vivax* elimination:** Many of the interventions used for malaria are not as effective against *P. vivax* as they are against *P. falciparum*. Successful control and elimination of *P. vivax* malaria, therefore, call for specific, additional interventions, especially against the hypnozoites.
- **Malaria surveillance in elimination settings:** Excellent surveillance and response are vital to achieving, documenting and maintaining malaria elimination. Good-quality passive case detection should serve as the backbone of any surveillance system. As countries progress towards elimination, the information obtained must become increasingly granular. The evaluation of surveillance systems for malaria elimination can identify actionable recommendations that countries can use.
- **Certification of malaria elimination:** Documentation of an effective malaria programme should start before elimination is achieved so that the evidence for certification is already prepared. Completing the process of certification of malaria elimination helps to strengthen the programme to prevent re-establishment of transmission.

1. INTRODUCTION

1.1 Background

The Regional Workshop on Adoption and Implementation of World Health Organization (WHO) Policy Guidance on Malaria Elimination was convened with the intention of aligning country field actions with the *Framework for Malaria Elimination* and the *Global Technical Strategy for Malaria 2016–2030*. The workshop provided an opportunity to review ongoing activities in consideration of global guidance and principles. Country exercises on the Malaria Elimination Audit Tool (MEAT) were conducted with national malaria programmes (NMPs) prior to the workshop in order to generate concrete and practical recommendations to support malaria elimination.

1.2 Meeting objectives

The objectives of the meeting were:

- 1) to align country field actions with the Framework and the Global Technical Strategy;
- 2) to provide key principles underlying malaria elimination, which should be tailored to local contexts;
- 3) to describe the interventions and activities suggested in areas of low transmission that are progressing to zero transmission (elimination), including additional interventions to accelerate *Plasmodium falciparum* and *P. vivax* elimination;
- 4) to define the steps required to maintain elimination: principle to prevent of re-establishment of malaria, role of quality assurance and reference laboratories in malaria elimination; and
- 5) to give an overview of the process for obtaining malaria-free certification from WHO and role of the WHO Malaria Elimination Certification Panel (MECP) (including documenting malaria elimination, certification and verification of malaria elimination).

2. PROCEEDINGS

2.1 Opening session of day 1

Dr Ailan Li, WHO Representative, Cambodia, delivered the welcome address to the workshop participants. In the welcome address, she emphasized that GMS countries are at the stage where they can critically review the fundamental principles underlying malaria elimination and consider the steps involved in the process of obtaining malaria-free certification. Following this, Dr Pedro Alonso, Director of the WHO Global Malaria Programme, provided the opening remarks for the workshop. In his address, he emphasized that country ownership, country leadership and strong data are crucial for reaching malaria elimination and certification. As GMS countries prepare to achieve the upcoming elimination targets, WHO will provide technical support to adapt recommendations to the local contexts.

Dr Luciano Tuseo from the MME programme provided a briefing of the meeting objectives. This was followed by the nomination of Dr Aung Thi, Director of the Myanmar National Malaria Programme, as the chair of the meeting for day 1.

2.2 Session 1: Align country field actions with Framework for Malaria Elimination and the Global Technical Strategy for Malaria 2016–2030

2.2.1 A Framework for Malaria Elimination and the Global Technical Strategy for Malaria 2016–2030

Dr Kimberly Lindblade, Team Leader for the Malaria Elimination Unit within the Global Malaria Programme, outlined the *Global Technical Strategy for Malaria 2016–2030*. The strategy is built on

three pillars with two supporting elements that guide global efforts to move closer to malaria elimination. The first pillar aims to ensure universal access to malaria prevention, diagnosis and treatment. This covers a WHO-recommended package of core interventions, namely quality-assured vector control, chemoprevention, diagnostic testing and treatment. The second pillar focuses on accelerating efforts towards elimination and attainment of malaria-free status. Attaining this objective will entail targeting both parasites and vectors in well-defined transmission foci, guided by active case detection (ACD) and case investigations as part of a malaria surveillance and response programme. The third pillar concerns the transformation of malaria surveillance into a core intervention.

In support of these three pillars, countries where malaria is endemic and the global malaria community should strengthen enabling environments, harness innovation, and engage in basic, clinical and implementation research. The strategy includes four technical goals:

1. Reduce malaria mortality rates globally compared with 2015
2. Reduce malaria case incidence globally compared with 2015
3. Eliminate malaria from countries in which malaria was transmitted in 2015
4. Prevent re-establishment of malaria in all countries that are malaria-free.

WHO developed new guidance for malaria elimination in 2017. The *Framework for Malaria Elimination* encourages all countries to accelerate towards malaria elimination. It provides a clear and simplified process for WHO certification of malaria elimination. Programme actions are highlighted across the continuum of transmission intensity from high to zero and prevention of re-establishment. WHO developed the MEAT within this Framework to help countries compare the implementation status of their elimination programme to the guidance developed by WHO. Elimination training materials have been drawn from the Framework and relevant WHO guidance and will soon be available on the OpenWHO platform.

In an elimination setting, the surveillance objectives are centred around three areas: 1) early detection, diagnosis and treatment of all malaria infections; 2) investigation of cases to determine the likely location of infection and case classification; and 3) tailored and focused responses. In an elimination setting, some infections are less likely to provoke health-care seeking, symptomatic individuals may self-treat or health-care workers may fail to consider malaria in their differential diagnosis because they do not see enough cases. To minimize this, NMPs should use a combination of ACD, community mobilization and community-based surveillance, case definition, training and sensitization. The purpose of case investigations is to determine the likely location of infection. This is needed to allow NMPs to respond where the case originated in order to interrupt transmission. The location is determined through careful interviews to identify where people spent their time during the likely period of infection. When cases are low, determining the location of the infection needs to be precise. Very careful investigation is needed for 9–14 days before infection. Evidence of a response on this is needed for certification. Response plans must be tailored to the situation. A focus investigation should be conducted when there is either a new case in an area where no cases have occurred in a long time, a resurgence of cases, persistence of cases despite good intervention coverage, or the appearance of novel or unusual malaria species. Hypotheses should drive the focused investigation, and micro-response plans should be developed, implemented and monitored.

WHO is engaged in the process of reviewing evidence to inform recommendations for several possible malaria elimination strategies. These include a combination of nine accelerator, targeted and reactive strategies. At this stage, protocols for systematic reviews and meta-analysis of evidence are being developed. WHO will be combining existing guidelines on vector control and case management into a consolidated malaria guideline that will be published in January 2021. By June 2021, WHO will add new elimination recommendations to the consolidated malaria guidelines.

2.2.2 Results from Malaria Elimination Audit Tool/country evaluation

Before the workshop, GMS countries completed a self-audit exercise based on the MEAT to review their malaria programme implementation. Representatives from the NMPs of Cambodia, China, the Lao

PDR, Myanmar, Thailand and Viet Nam presented their findings according to the MEAT. Common areas of improvement identified from the country self-assessments included:

- 2: Some countries noted that a shift is still needed to annual stratification.
- 3: Diagnosis should be strengthened by improving the effectiveness of diagnostic networks and microscopy quality assurance systems.
- 4: Case management could be enhanced especially in terms of patient follow-up and integrated monitoring of drug efficacy.
- 5: Surveillance should be strengthened for case detection and case investigations at subnational levels.
- 8: Accelerator strategies may be considered to rapidly reduce transmission, and WHO is currently reviewing evidence for the efficacy of these strategies in order to prepare recommendations. WHO currently recommends mass drug administration (MDA) in the GMS.¹ Several countries noted that the implementation of population-wide parasite clearance was pending.
- 9: Prevention of re-establishment, as more focus is needed on multisectoral approaches and community engagement. Some countries still need to develop national plans to prevent re-establishment.
- 10: Documentation for certification of elimination was in progress, but most countries needed to ensure complete documentation of their activities and prepare plans to prevent re-establishment.

2.2.3 Best practices in malaria elimination and prevention of reintroduction in GMS countries

The GMS has developed examples of effective, localized best practices for malaria elimination. In light of the findings from the MEAT, countries were invited to present best practices in malaria elimination and prevention of reintroduction.

China (Yunnan province): Dr Zhou Sheng, representative from the Division of Infectious Diseases of China, provided an overview of China's efforts to prevent the re-establishment of malaria. This strategy prioritizes detecting and responding to every malaria case in a timely manner. In order to maintain prevention, China implements a four-pillar approach, which includes the 1-3-7 strategy, case tracing investigation, foci investigations and ACD among at-risk populations (such as workers returning from overseas, workers at temporary constructions sites and residents in foci). These strategies are supported by maintaining the capacity of laboratories and the diagnosis and treatment facilities of hospitals. However, an ongoing challenge is maintaining the expertise among health providers to detect and respond promptly to every malaria case. In the coming year, China (Yunnan province) will also place more emphasis on managing imported malaria cases, particularly from border areas.

Cambodia: Dr Siv Sovannaroth, representative from the Cambodia National Centre for Entomology and Parasitology Control (CNM), gave a presentation of the lessons from Cambodia's intensification plan. Following a peak in malaria transmission in 2017, the country mobilized the Malaria Intensification Plan for Hard to Reach Populations to halt and reverse this trend. The Plan involved strengthening surveillance and implementing more aggressive interventions for travellers to forested areas and migrant populations. It also includes a combination of ACD, test/treat services, commodity supplies, information, education and communication (IEC), activities, and record-keeping. Mobile malaria workers (MMWs) play an important role in providing these services. Following the implementation of this strategy, testing increased by 14% from 2018 to 2019. One lesson from this programme was the need to implement more aggressive approaches to eliminate *P. falciparum* in malaria hotspots in six provinces. The aggressive approach was formally launched in November 2020 and includes a synergized approach consisting of:

¹ Given the threat of multidrug resistance and the WHO call for malaria elimination in the GMS, MDA may be considered as a component of accelerated malaria elimination efforts in areas of the GMS with good access to treatment, vector control and surveillance.: <https://www.who.int/malaria/publications/atoz/role-of-mds-for-malaria.pdf?ua=1>

- the implementation of targeted drug administration (TDA) and intermittent preventive treatment (IPT) for travellers to malaria-risk areas to interrupt transmission and accelerate malaria elimination;
- house-to-house (H2H) fever-screening every week to ensure every fever is tested for malaria and treated if positive;
- top-up distributions of long-lasting insecticidal nets (LLINs), long-lasting insecticidal hammock nets (LLIHNs) and repellent to ensure vector control measures are in place;
- community engagement and social mobilization activities to raise awareness of the synergized approach; and
- pharmacovigilance surveillance to monitor adverse events;

Dr Siv outlined other lessons from the implementation of the intensification plan. The high positivity rate among tested cases means that all individuals presenting a fever are tested and diagnosed. All *P. falciparum* and mixed cases receive a single low dose of primaquine and focus supervision visits are conducted to health centres (HCs) with high positivity rates. The NMP set a testing target of 10 tests per positive case and ensures that there are sufficient stocks of rapid diagnostic tests (RDTs). In order to map hotspots, the CNM conducts planning and mapping meetings in the areas with the highest cases. HCs and civil society organizations are responsible for assisting MMWs to review the results of outreach activities.

The following are key recommendations from Cambodia's Intensification Plan:

- Forest packs should contain LLHINs, insect repellent and information, education and communication materials as these products have shown to encourage good prevention behaviours among forest goers.
- Capacity-building should target the subnational level so that activities can be carried out independently.
- Strong financial management and planning are needed to ensure that disbursement is completed and activities are implemented on schedule.
- Rapid responses are needed to halt any suspected outbreaks.

Lao People's Democratic Republic: Dr Odai Sichanthongthip, representative from the Lao Center for Malaria, Parasitology, and Entomology (CMPE) presented an overview of the country's system for monitoring outbreaks. He noted that the District Health Information System, or DHIS2, includes outbreak monitoring dashboards, which were rolled out in 2018. The dashboards automatically update graphs with monthly cases (all species) against epidemic thresholds. The outbreak response intervention package includes six key components:

1. Village malaria worker and HC assessment and refresher training
2. ACD and treatment for infected cases for the whole village
3. LLIN coverage assessments and top-up
4. Indoor residual spraying (IRS) (targeted and if village transmission is indicated)
5. IEC materials and community mobilization
6. Targeted entomological surveillance.

The systematic monitoring of outbreaks that is linked to a standard response package has allowed provinces and districts to understand and adopt a more proactive footing. Responses were slow to start with but have improved, although timeliness and fund release can still be an issue. Routine focal test and treat ACD has also been implemented to complement outbreak response. This has provided higher test positivity rates. Dr Odai noted that the outbreak alert system now needs to graduate to weekly monitoring at a more granular level (health facility catchment level). In addition, the outbreak response interventions need to graduate to a more aggressive approach that better targets forest-going populations (such a TDA, IPT for forest goers). In 2021, the Lao People's Democratic Republic expects to upgrade its outbreak and response system.

Myanmar: Dr Wyint Pho Than, representative from the Myanmar National Control Malaria Programme, presented an outline of Myanmar's intensification plans and outbreak response systems. Myanmar's intensification plan for high transmission areas is at the heart of the programme to flatten the curve and accelerate elimination. This plan includes hotspot identification, ensuring full coverage of malaria services, full implementation of malaria activities (including case management, vector control, surveillance) and elimination activities (case and foci investigation). From January to September 2020, Myanmar conducted passive case detection (PCD) in 5315 villages covering 20 townships. This was combined with intensified case finding in 116 identified hotspot villages and worksites. In terms of vector control activities, 20 townships received 1 037 636 LLINs through mass distributions in 2019. In 2020, an assessment of LLIN coverage and utilization was conducted in eight townships. The findings led to the distribution of 29 566 LLINs, which covered hotspots and outbreak areas. The primary targets of this activity were migrants and forest goers and risk groups (such as pregnant women and positive cases). Additionally, supervision and monitoring support has been provided to 835 health staff and integrated community malaria volunteers (ICMVs). In 2021, Myanmar will focus on optimizing intensification plans by harnessing the strength of civil society organizations, ethnic health organizations and ICMVs. The ICMVs will take on a role to conduct household censuses, promote awareness among local populations on malaria, check and top up LLINs and forest packs, and conduct fever screening and tracking. This will be complemented by regular reporting duties and supervisory and monitoring visits. Other priorities include identifying malaria case notification, investigation and responses (CIFIR) for all *P. falciparum* and mixed cases and adopting approaches for conflict-affected areas and COVID-19.

2.3 Session 2: Provide key principles underlying malaria elimination, which should be tailored to local contexts

2.3.1 The sensitivity and specificity of surveillance system for malaria elimination

Dr Amanda Tiffany, Epidemiologist from the Global Malaria Programme, delivered the presentation on surveillance systems for malaria elimination. Surveillance is defined as the continuous and systematic collection, analysis and interpretation of disease-specific data as well as the use of those data in the planning, implementation and evaluation of public health practice. Surveillance is critical to support reduction of the burden of malaria and to contribute to the elimination of malaria and prevention of re-establishment. A malaria surveillance system relies on patients, communities, HC staff and decision-makers and implies a commitment to record, report and analyse malaria cases and take appropriate action. In contexts of malaria elimination, surveillance is used to identify infections early to prevent onward transmission, determine the most likely location of infection, and identify, investigate and eliminate foci of continuing transmission. A robust surveillance system should be coupled with an evaluation plan that covers both organizational and functional components. Differences in surveillance systems themselves, including data collection and activity implementation, make assessment challenging. Commonly identified challenges include documentation, data quality, coverage, vigilance, and the simplicity and sensitivity of the structure so that it is functional for health workers. The GMP has developed the Malaria Surveillance Assessment Toolkit, which is a single, standardized set of tools for malaria that aims to support the identification of key actionable gaps in malaria surveillance for any malaria-endemic setting. The elimination content of the toolkit and a web app are in development and will be available in 2021.

2.3.2 Surveillance system for malaria elimination in Cambodia

Dr Siv Sovannaroth, representative from the Cambodia CNM, delivered a presentation on the national surveillance system. ACD is conducted in line with case investigation and classification guidelines, which are outlined in Cambodia's 2017 Surveillance Operational Manual. Foci management is based on receptivity and vulnerability scores resulting from foci investigation and classification. From January to June 2020, Cambodia implemented reactive case detection (RACD) for neighbouring households of index cases and co-travellers. In total, 5853 persons were tested, of which 0.8% had malaria. RACD was complemented by focal screen and treatment (FSAT) services through MMWs. During the same

period, the MMWs conducted FSAT for 26 389 forest goers across six provinces. Malaria was detected in 21% of all tested individuals.

2.4 Opening session of day 2

Dr Tuseo opened the session of the second day and nominated Dr Xiao Ning, Deputy Director from the National Institute of Parasitic Diseases of China, as the chairperson. Dr Xiao accepted the nomination and started the introductions for the agenda.

2.4.1 Effectiveness of reactive case detection and mass screening in GMS

Dr Jim Tulloch, Chair of the Regional Artemisinin-resistance Initiative (RAI)-Regional Steering Committee (RSC) Independent Monitoring Panel (IMP), delivered a presentation on IMP's recommendations on RACD and mass screening in the GMS. Dr Tulloch noted that the IMP is an independent body that monitors the RAI grant implementation and reviews particular topics at the request of the RSC. This is to help the Committee and the Global Fund ensure that RAI grant resources are used for maximum impact. He reminded participants that IMP findings and suggestions/recommendations are made to the RSC according to its mandate. The IMP does not advise WHO or provide guidelines to countries. The IMP conducted a review of CIFIR guidelines and procedures in the GMS by comparing national malaria guidelines/data and scientific publications from the region in relation to WHO guidelines. The review covered published data in the GMS from 2010 to 2020 as well as unpublished information from NMPs. The findings indicated that CIFIR is time and labour intensive with overall low yields. Screening is inefficient and diagnostic tests do not detect all parasitaemia. IMP did highlight that there were limitations for the review, given the availability and varying methodologies for the data.

The IMP suggested that CIFIR is best deployed as an endgame approach (required for WHO certification of elimination). It is very labour intensive and, in some cases, countries struggle to implement high-quality CIFIR. Countries near elimination and already implementing CIFIR at a manageable level could continue to recommend simplified guidelines and forms and conduct CIFIR at the national or subnational level. Countries struggling to carry out CIFIR in more endemic areas and countries not yet carrying out CIFIR nationwide should reconsider the criteria for applying. WHO recommends CIFIR in elimination areas with fewer than three cases per week (per investigation team). NMPs should maintain a record and six-monthly summaries of foci investigations conducted and what response activities were carried out. In the meantime, emphasis could be placed on: strengthening PCD and treatment; providing basic health services at the community level to encourage continued care for malaria; and implementing aggressive interventions to rapidly reduce the burden in endemic areas. If RACD, proactive case detection or mass surveys are continued, NMPs and nongovernmental organizations doing CIFIR should systematically record the number of index cases investigated, which group of people were screened, the type of test and the number of new cases detected. RACD could be changed from "screening of contacts" to "presumptive treatment of contacts" using appropriate schizontocidal antimalarials. It could also include co-travellers and co-workers, aside from household contacts of index cases. CIFIR should be conducted where caseloads are sufficiently low, and personnel and logistics are adequate, for it to be practicable. This will vary depending on the country and context. The 1-3-7 approach could be collapsed down to a 1-7 approach whereby case investigation happens within 1 day of detection and, if required, focus investigation and initiation of confirmed focus response within 7 days of case detection. Other recommendations include simplifying reporting forms and to only conduct wide-scale ACD in endemic areas or receptive areas. This would allow CIFIR to be less labour intensive, cost effective and more productive in terms of secondary cases. In the closing remarks, Dr Tulloch noted that the IMP is not suggesting to standardize surveillance procedure in the GMS countries, as each is adapted to the local health system, local culture and the different malaria transmissions.

During the discussion, the IMP noted that providing six monthly summaries of case and foci investigations would be valuable for monitoring purposes. The RAI grant would particularly benefit

from more qualitative information about what is happening at the country level in terms of case and foci investigations.

2.5 Session 3: Interventions and activities suggested in areas of low transmission that are progressing to zero transmission (elimination)

2.5.1 Malaria transmission and stratification

Dr James Kelley, Technical Officer in the WHO Regional Office for the Western Pacific, delivered a presentation on malaria stratification in elimination settings. Malaria stratification is the classification of geographical areas according to the epidemiological, ecological, social and economic determinants for the purpose of guiding malaria interventions. Macro-stratification characterizes higher-level geographical units such as provinces or districts, with relatively lower resolution, for phasing-in of malaria interventions over time. Micro-stratification characterizes lower-level geographical units, such as localities or health facility catchment areas, with higher resolution, for implementation of tailored interventions and responses based on the local context. Dr Kelley noted that in an elimination setting, stratification should be consistent with foci classification. It is important to note that there is a distinction between malaria stratification and mapping. Stratification should be understood as the classification of geographic units by single or multiple variables to answer questions, or to make a decision. Mapping relates to the visualization of data on a map.

Stratification is important because it allows for the classification of geographical units according to their current transmission intensity. When transmission intensity has been reduced, according to their vulnerability and risk of importation of malaria. Stratification is critical to accelerate progress towards elimination as it allows for better targeting and efficiency, assignment of specific packages of interventions and the deployment of strategies to designated strata. Malaria transmission categories should be based on the levels of local transmission and the capacity to implement response activities. Stratification should differentiate receptive from non-receptive areas and identify receptive areas in which malaria transmission has already been curtailed by current interventions. It should also distinguish between areas with widespread transmission and those in which transmission occurs only in discrete foci. Distinction should also be made on transmission intensity, particularly if different intensities are being addressed by different sets of interventions. Lastly, stratification should determine geographical variations and population characteristics that are associated with the risk of importation. Dr Kelley also provided examples from Malaysia's foci-based responses and Cambodia's strata-based interventions.

In the concluding remarks Dr Kelley noted that stratification allows for better targeting and efficiency, as it allows for the assignment of specific intervention packages and deployment strategies to designated strata. A package of stratification can enhance and optimize vector control, accelerate the clearance of parasites and vectors, identify, investigate and clear remaining malaria foci, ensure optimal coverage of commodities such as LLHINs and contribute to other vector control interventions such as larval source management. In addition, an intervention package can include: information, detection and response systems to identify, investigate and clear remaining malaria foci; and community-level strategies to accelerate clearance of parasites or vectors in order to reduce transmission rapidly when possible. Other vector control interventions may also be conducted in addition to insecticide-treated bed nets, LLINs and/or IRS according to the principles of integrated vector management and evidence-based WHO-recommended strategies.

2.5.2 *Plasmodium vivax* elimination

Dr Risintha Gayan Premaratne, Technical Officer in the WHO Regional Office for South-East Asia, presented an overview of malaria programming for *P. vivax* elimination. He provided an outline of malaria cases globally and in South-East Asia, noting that the Region has the largest decline globally. Although *P. vivax* cases are often eliminated after *P. falciparum*, Timor-Leste is an example of a country that was successful in eliminating both simultaneously. Similarly, Sri Lanka has eliminated malaria despite the prevalence of armed conflict in the country. During the elimination period, most of the foci

were recorded in conflict areas and cases were among the armed forces. The *P. vivax* outbreaks were predominately caused by relapsing cases. Targeted work with the soldiers including training, provision of parasitological testing, high-quality surveillance, ACD and rapid responses enabled Sri Lanka to end *P. vivax* outbreaks and eliminate malaria. The basic principles for controlling *P. vivax* malaria are the same as for *P. falciparum*; however, many of the interventions used for controlling *P. falciparum* malaria are not as effective against *P. vivax*. Thus, in areas where these species coexist, the incidence of *P. falciparum* has been seen to decrease more rapidly than *P. vivax*, which may then persist as the principal cause of malaria and pose the main challenge to eliminating malaria. Successful control and elimination of *P. vivax* malaria therefore call for specific, additional interventions, notably against the liver stage of the parasite or hypnozoites.

Vector control is critical in reducing transmission of *P. vivax* malaria, because the *P. vivax* gametocytes often appear before a patient develops symptoms and seeks treatment. Thus, transmission can continue despite the best efforts at prompt diagnosis and treatment of cases. It is particularly important to prevent infections in pregnant or lactating women and infants, because these populations cannot be treated with primaquine, and are thus more liable to relapse and to experience repeated episodes of malaria after the initial (primary) infection. Migrant populations also represent high-risk groups that require special attention. The greatest impact on vector control is likely to come from a mix of different strategies targeting different life stages, based on local vector abundance, ecology and behaviour.

Vector surveillance should collect information on the presence, abundance and behaviour of vector species, to develop and monitor the strategies for vector control and personal protection. Breeding sites and risk areas should be mapped, and susceptibility patterns of vectors to insecticides should be monitored. To maintain malaria-free status, vector surveillance activities should continue after malaria elimination has taken place, to monitor the receptivity of areas. An understanding of local human behaviour patterns will allow adaptation of strategies and application of tools that are both socially acceptable and effective.

The use of preventive chemotherapy of *P. vivax* malaria may include a full therapeutic course of primaquine to the whole population at risk, to prevent relapses from the hypnozoite reservoir. The mass primaquine preventive treatment has been applied in areas where transmission is seasonal, to prevent onward transmission from relapses. Chloroquine prophylaxis may be given to prevent *P. vivax* malaria in pregnant women in endemic areas where transmission is high. Chemoprophylaxis could be an important strategy in selected population subgroups in which glucose-6-phosphate dehydrogenase (G6PD) deficiency testing can be undertaken, such as the military, and in groups that have high exposures to malaria and present a high risk of introducing malaria into populations otherwise exposed to very low risk or no risk of infection. WHO does not currently recommend the use of mass primaquine preventive treatment as a general strategy.

P. vivax frequently presents at a lower parasite density (typically 10 times lower) than *P. falciparum*, making *P. vivax* infections more difficult to detect with RDTs and microscopy. Thus, low-density, single-species infections with *P. vivax* may remain undiagnosed and be recorded as testing negative, whereas mixed infections may be recorded as *P. falciparum*. In order to diagnose *P. vivax* infection, the parasitological confirmation by microscopy or by RDT is recommended in all patients suspected of malaria before a course of treatment is started. Efforts should be made to ensure access to diagnostic testing in the private sector as well as the public sector. The results of parasitological diagnosis should be available within a short period of time (less than 2 hours) of the patient presenting. In the absence or delay of parasitological diagnosis, patients with suspected severe malaria and other high-risk groups should be treated immediately on presumptive clinical grounds.

Where feasible, all patients should be tested for G6PD deficiency before administering primaquine. Testing for G6PD deficiency in *P. vivax* malaria should be considered an integral part of ensuring universal access to diagnosis and treatment. G6PD testing should be incorporated into treatment guidelines, and services made available as tools are developed. Where no G6PD test is available, it is difficult to generalize the correct approach to patient management, because each individual assessment depends on the risk of adverse consequences and the potential benefits. In some circumstances, the

assessment will favour withholding primaquine, and in others it will favour starting radical treatment after educating the patient about the possible risks, and informing the patient that they should stop the drug if they become ill or their urine becomes red or black.

The treatment recommendations to prevent relapses of uncomplicated *P. vivax* malaria is primaquine for 14 days together with, or after schizonticidal treatment, having excluded G6PD deficiency. In order to minimize the risk of haemolysis health providers should obtain a past history or family history of haemolysis in response to medication. Counselling should be provided on the risks and how to recognize the earliest signs of haemolysis. Medication should be stopped if there is evidence of haemolysis. At the same time, NMPs should assess the prevalence of G6PD deficiency. If the risk is high or unknown, health providers should use an eight-week course of 0.75 mgs/kg per week of primaquine. It is essential that cases adhere to a full 14-day treatment. There is evidence that when care is taken to explain the importance of the 14-day course of treatment and its potential associated risks, adherence is as high as it is with directly observed treatment or DOT.

Dr Premaratne concluded his presentation by noting that a major barrier to the successful control and elimination of *P. vivax* malaria is a lack of tools that address the specific biological challenges posed by the parasite. The development and deployment of new tools is also constrained by gaps in knowledge surrounding the biology and epidemiology of *P. vivax* malaria. Therefore, more effort is needed on supporting innovations on eliminating *P. vivax* malaria. However, there are also examples of countries that have managed to eliminate malaria with the existing tools and this is very much contextual. He concluded the presentation by referring participants to two WHO publications: *Control and Elimination of Plasmodium Vivax* and the *Guide to G6PD Deficiency Rapid Diagnostic Testing to Support P. vivax Radical Cure*.

During the discussion, Dr Premaratne noted that one of the major challenges with anti-relapse therapy is the duration of treatment regimes. The compliance for treatment for *P. vivax* can be improved by various methods including, directly observed treatment or one-on-one consultations. However, he noted that this depends on the particularities of the context and population.

2.5.3 Thailand: Experience in G6PD fluorescent spot tests and quantitative point-of-care test

Dr Darin Areechokchai, representative from the Thailand Division of Vector Borne Disease (DVBD), delivered an outline of Thailand's experience in implementing G6PD fluorescent spot test (FST) and quantitative tests at point of care. The national treatment guidelines for uncomplicated *P. vivax* malaria cases is chloroquine for three days and a low dose of primaquine for 14 days. Individuals with a G6PD deficiency receive chloroquine for three days and eight weekly doses of primaquine. However, in practice, a G6PD test is not performed in most health facilities, particularly in rural areas, because of time and procedural constraints. Therefore, Thailand developed a modified G6PD FST for Thai health facilities. The modified FST uses a low-cost ultraviolet box developed by the DVBD as well as microtubes, two pasture pipettes, filter paper and a sterile loop for blood samples. It has proven to be cost and time effective and can be installed in health facilities in remote areas or used within communities. The modified G6PD FST takes 15 minutes to provide a result and has shown 100% accuracy. Notably, it is more accurate than methylene blue oxidation, which is a method most commonly used in Thai HCs.

The DVBD is conducting a feasibility study of the appropriate *P. vivax* radical cure with tafenoquine. The study findings include quantitative tests and will be used to determine the appropriate use of tafenoquine in line with G6PD activity. This will also provide guidance on the acceptable frequency of drug-induced acute haemolytic anaemia. Prior to the research activity, the DVBD delivered a series of training workshops and on-site trainings on the quantitative test for health workers and hospitals in Yala province (which has been selected as the study site). Upon completion of the training, the DVBD conducted assessments with hospital laboratories in Yala province on malaria diagnosis and quantitative G6PD testing. The DVBD also completed quality controls to ensure the testing procedures are being accurately implemented.

Dr Darin also noted the key challenges for FST and quantitative tests. FST and quantitative tests have a short shelf life and require low temperatures for storage, which increases the risk of expiration. In addition, most of the reagents expire particularly in the low malaria incidence areas. Commercial quantitative tests provide one code chip that is specific to 25 strips per box, and this confounds the ability to share the strips among health facilities. The high price of commercial quantitative tests also means they cannot be distributed to all health facilities. On the other hand, the DVBD's FST is more cost effective, but it needs a good system for assay and distribution. To minimize this issue, the DVBD is planning to develop a lyophilized reagent for the FST to improve distribution in the country.

During the discussion, Dr Darin outlined that the DVBD's FST has not been compared with the spectrophotometric assay because the latter is not commonly used at the provincial level. The FSTs are available to provincial hospitals, community hospitals at the district level and malaria clinics at the sub-district level. The quantitative tests are available to hospitals which will administer tafenoquine in Yala province.

2.6 Questions and answers

Dr Xiao led the question-and-answer session for the presenters from the second day. During this discussion, Dr Premaratne noted that Sri Lanka did not use seasonal malaria chemoprevention as a strategy during its elimination phase. When malaria was endemic, pregnant women in affected provinces were given chloroquine prophylaxis throughout the pregnancy. The only other prophylactic medication is provided (mefloquine) to armed forces conducting peace missions abroad. Individuals who are travelling abroad can also access this medication free of charge from the NMP if they are travelling to malaria-endemic regions. In order to prevent the reintroduction of malaria, Sri Lanka coordinates with the International Organization for Migration to ensure that health screening is provided to stranded Sri Lankan nationals when they return from endemic countries in Africa. Health screenings were also provided by the United Nations High Commissioner for Refugees for returning Sri Lankan nationals after the cessation of the conflict. Similarly, authorities also screen any apprehended irregular migrants who have entered Sri Lankan territory.

2.7 Session 4: Defining the steps required to maintain elimination: principle to prevent of re-establishment of malaria, role of quality assurance and reference laboratories in malaria elimination

2.7.1 Required steps to maintain elimination and principles to prevent the re-establishment of malaria

Dr Kim Lindblade outlined the steps required to maintain elimination and the principles to prevent the re-establishment of malaria. The concept of reintroduction of malaria and re-establishment of transmission are based on the definitions of introduced cases and indigenous cases. Reintroduction of malaria is defined as: introduced cases in a country or area where the disease had previously been eliminated. The re-establishment of malaria transmission is defined as sustained transmission, suggested by the occurrence of three or more indigenous malaria cases of the same species per year in the same focus, for three consecutive years. Malaria elimination is more likely to be sustained in some areas or countries. For example, where vectoral capacity is naturally low or decreased by improving socioeconomic factors, and in geographically isolated areas with limited cross-border population movement and importation of parasites. In the context of preventing the re-establishment of transmission, the concept of receptivity is related to the vector, while the risk of importation refers to the parasites. Receptivity is defined as the degree to which an ecosystem in a given area at a given time allows for the transmission of malaria. This definition means that receptivity varies across different areas and might change over time. This concept reflects vectoral capacity, the susceptibility of the human population to malaria infection and the strength of the health system, including malaria interventions. It also depends on vector susceptibility to particular species of *Plasmodia*, as some cannot be transmitted by certain species of anophelines. Ecological and climatic factors influence transmission, and these factors also influence receptivity.

The risk of importation is defined as the risk or potential influx of parasites via infected individuals or infected *Anopheles* mosquitoes. The infected individuals could be residents infected while visiting endemic areas or infected immigrants. Vector control should be implemented on the basis of continually updated information on the local situation. In the longer term, it is preferable to use interventions that durably reduce the risk of transmission in these areas, without repeated application of chemicals. Different interventions can be used in different areas based on the level of risk:

- In areas with zero risk of re-establishment of transmission, good case management, namely, quality assured diagnosis and treatment should be provided to patients, should cases occur.
- In areas with low receptivity and vulnerability, early case detection by a vigilant general health service, complemented by epidemiological investigation of every suspected local case and focus of origin may be sufficient provided that rapid and appropriate curative and preventive measures are in place.
- In areas with higher receptivity and vulnerability, it may be necessary to supplement these activities with ACD, which could be combined with other regular activities involving house visits.
- In localities that are highly receptive and have high risk of importation, it may be necessary to reduce receptivity during the transmission season by using timely, targeted vector control measures, including IRS and, where applicable, larvicide.

Indication of receptivity may be derived from a number of factors including the history of malaria, original endemicity, the vectoral capacity (before and after vector control), environmental changes, regression in health services and infectivity. The risk of importation can be determined through passive or active surveillance data, call detail records, participatory mapping or key informant interviews. These data can allow NMPs to conduct stratification and target strategies by malariogenic potential. Dr Lindblade provided an overview of cross-border collaboration between Argentina and Bolivia to demonstrate strategies that were employed to support elimination efforts. The prevention of re-establishment must be sustainable and continue until malaria is eradicated. Multisectoral collaboration will be essential and it often requires some activities to be integrated into routine health services. A country's subnational areas should be stratified by malariogenic potential to permit tailoring of appropriate intervention packages. In addition, systems must be put in place to re-evaluate malariogenic potential periodically and maintain health system quality and vigilance.

In the conclusion of the presentation, Dr Lindblade reiterated that once countries or areas have eliminated malaria, the programme must pivot to preventing re-establishment. Preventing re-establishment must continue until malaria is eradicated and systems need to be established to ensure the quality of PCD, case management, surveillance, cross-border activities and vector control.

2.8 Session 5: Overview of the process for obtaining malaria-free certification from WHO and role for a WHO Malaria Elimination Certification Panel (MECP)

2.8.1 Overview of the process for obtaining malaria-free certification from WHO

Dr Li Xiaohong, Technical Officer from the Global Malaria Programme, presented an overview of the process for obtaining malaria-free certification from WHO. The Organization was given the mandate by its Member States to certify a country's malaria-free status. Before a country is entered in the official register, its malaria-free status must be certified by WHO. Certification of malaria elimination requires that local transmission is interrupted for all human malaria parasites. Although certification is granted by the WHO Director-General, the independent Malaria Elimination Certification Panel (MECP) advises WHO on certification. The MECP assesses whether malaria transmission has been interrupted throughout the country, resulting in zero incidence of indigenous cases for at least the past three consecutive years. This requires proof that an adequate surveillance and response system to prevent re-establishment of indigenous transmission is fully functional throughout the territory of the country. The evidence used by the MECP to determine this includes documentation of a malaria programme, submission of the national elimination report, an independent evaluation mission and documentation from other sources.

The malaria documentation should include a combination of documents and records. The documents provide written information on policies, processes and procedures and consist of essential guidelines for all the operations and activities of a programme. The records are information captured during the process of performing, reporting or evaluating a malaria activity. Records can include databases, sample logs, records of supervision and foci registers.

The national elimination report is the main document used by the MECP to consider whether certification of malaria elimination should be granted to an applicant country. It is a narrative report that provides data and information to demonstrate that the country has met the two criteria for certification. This report is required to provide evidence to substantiate the claim of elimination and identify any potential gaps. WHO has developed a template that gives detailed instructions to countries on how to write a national elimination report.

It is important to note that certification of malaria elimination can be lost should malaria transmission be re-established. The minimum indication of possible re-establishment of transmission would be the occurrence of three or more indigenous malaria cases of the same species per year in the same focus, for three consecutive years. A careful national investigation and consultation with WHO will be required before a country loses its malaria-free certification.

Dr Li ended the presentation by referring participants to WHO's *Framework for Malaria Elimination* and guidance document on preparing for certification of malaria elimination.

During the question-and-answer session, Dr Li noted that countries are encouraged to use online systems for data collection and these can be used as evidence of records to submit to WHO. The important element is to validate the data to avoid duplications and discrepancies. Considering COVID-19 restrictions, there have been some modifications in the WHO's certification missions to include a combination of virtual and field assessments. This approach will be used in an upcoming certification mission to El Salvador.

3. CONCLUSIONS AND RECOMMENDATIONS

Dr Kelley thanked the GMS country participants, donors and partners for their comments and support. He encouraged country programmes to review the recommendations so that swift action can be taken in accelerating elimination.

3.1 Conclusions

- **Malaria elimination guidelines:** WHO is engaged in the process of reviewing evidence to inform recommendations for several possible malaria elimination strategies. At this stage, protocols for systematic reviews and meta-analysis of evidence are being developed. WHO will be combining existing guidelines on vector control and case management into a consolidated malaria guideline that will be published in January 2021. By June 2021, WHO will add new elimination recommendations to the consolidated malaria guideline.
- Elimination requires problem-solvers who seek to understand why transmission is occurring or continuing in a given area, and then respond appropriately. Focus investigations should be seen as “focused” investigations and used under certain circumstances when additional information is needed to inform the response.
- WHO is currently reviewing the evidence for three “reactive” strategies, including RACD and reactive focal drug administration, to determine whether they reduce transmission of malaria. Recommendations on these interventions will be available mid next year. In the meantime, WHO recommends that countries monitor the effectiveness of their reactive strategies to determine whether the approach is useful.

- **Malaria Elimination Audit Tool:** WHO developed the MEAT to help countries evaluate the implementation status of their elimination programme with respect to the guidance provided by WHO in the *Framework for Malaria Elimination*. Before this workshop, GMS countries completed a self-audit exercise to review their malaria programme implementation. Common areas of improvement were identified from the country self-assessments (see section 2.2.2).
- **Best practices in malaria elimination:** The GMS has developed examples of effective, localized best practices for malaria elimination. In light of the findings from the MEAT, countries should continue to review these models, conduct systematic evaluations of their effectiveness and consider how these could be adapted to their national contexts.
- **Malaria Surveillance Assessment Toolkit:** This is a single, standardized set of tools for malaria that aims to support the identification of key actionable gaps in malaria surveillance for any malaria-endemic setting. The elimination content of the toolkit and a web app are in development and will be available in 2021.
- **Case investigation, foci investigation and response:** The IMP advises the RSC and was established as part of the Regional Artemisinin Initiative 2 Elimination programme. The IMP noted that completing CIFIR can be time and labour intensive and costly. In settings with limited health staff, investigating even moderate numbers of cases is sometimes not feasible. Therefore, they recommend that the criteria for conducting CIFIR should be context specific and realistic. The yield of new cases from RACD across the GMS is low but might be improved by targeting certain groups. Screening with RDTs misses many infections. In addition, all documentation is time-consuming and not always fully used. Monitoring of RACD and CIFIR more broadly, including qualitative information, would help evaluate how to improve it in given settings.
- **Malaria stratification for elimination:** Stratification for elimination allows for focused, tailored responses by assigning specific intervention packages and deploying strategies to designated strata. This type of stratification is based on multiple evidence-based and relevant data -points. Intervention packages may include enhanced vector control and surveillance activities as well as systems that help identify, investigate and clear remaining foci through community-level strategies.
- ***Plasmodium vivax* elimination:** Many of the interventions used for malaria are not as effective against *P. vivax* as they are against *P. falciparum*. Successful control and elimination of *P. vivax* malaria, therefore, call for specific, additional interventions, especially against the hypnozoites.
- **Malaria surveillance in elimination settings:** Excellent surveillance and response are vital to achieving, documenting and maintaining malaria elimination. Good-quality PCD should serve as the backbone of any surveillance system. As countries progress towards elimination, the information obtained must become increasingly granular. The evaluation of surveillance systems for malaria elimination can identify actionable recommendations that countries can use.
- **Certification of malaria elimination:** Documentation of an effective malaria programme should start before elimination is achieved so that the evidence for certification is already prepared. Completing the process of certification of malaria elimination helps to strengthen the programme to prevent re-establishment of transmission.

3.2 Recommendations

3.2.1 Recommendations for Member States

Member States are encouraged to consider the following:

- 1) Clarify the objectives for the elements of surveillance as an intervention.
- 2) Transform malaria surveillance into a core intervention.
- 3) Continue to stratify the intensity of surveillance activities at the subnational level, depending on the number of malaria cases and the capacity of the response system.

- 4) Suspected case definition: Compare the sensitivity, specificity and ease of implementation of different suspected case definitions.
- 5) Case notification: Make malaria a mandatory, case-based notifiable disease.
- 6) Case detection: Ensure quality and optimal coverage of passive detection, including diagnosis, with quality assurance as a priority.
- 7) Case investigation: Focus on identifying the location of the case during the likely period of infection to define the “likely location of infection” where most of the response activities should take place to interrupt transmission.
- 8) When using innovative acceleration strategies, carefully monitor activities to generate evidence that the chosen method is effective.
- 9) Utilize the findings from the MEAT exercise completed for this workshop as a baseline. Complete the MEAT regularly to assess progress.

3.2.2 Recommendations for WHO

WHO is requested to consider the following:

- 1) Continue to technically support countries at all three levels (country, regional, headquarters) to achieve the agreed-upon GMS malaria elimination targets.
- 2) Provide recommendations on the targeting and use of vector control tools (LLIN, LLHINs, IRS, repellents, others) in the GMS.
- 3) Support countries to conduct surveillance assessments through defined protocols.
- 4) Provide guidance for countries on the practical classification of *P. vivax* cases.
- 5) Simplify some aspects of the audit tool and make self-assessment exercises more accessible. The tool could be modified by:
 - a. Including questions on targeted interventions to accelerate elimination. WHO could revise the section on acceleration strategies to separate:
 - i. population-wide acceleration of reduction of transmission
 - ii. targeted acceleration of elimination including TDA, FSAT or chemoprevention (which is particularly relevant for the GMS).
 - b. Providing further guidance and clarifications on completing the section relating to the prevention of re-establishment.

Programme agenda

Date and Time	Agenda	Speaker/s
Thursday, 26 November 2020		
Opening Ceremony		
13:00-13:10	Welcome address by WR, Cambodia	Dr Ailan Li (WHO)
13:10-13:25	Open Remarks by Director, Global Malaria Programme	Dr Pedro Alonso (WHO)
13:25-13:35	Objectives of the meeting and Overview of epidemiology in GMS Nomination of chair and group photo	Dr Luciano Tuseo (WHO)
Chairperson for Day 1: Dr Aung Thi, Director, Vector-Borne Disease Control, Myanmar		
Session 1: Aligning country field actions with Framework of Malaria Elimination and the Global Technical Strategy for Malaria 2016-2030		
13:35-14:05	Framework of Malaria Elimination and the Global Technical Strategy for Malaria 2016-2030	Dr Kimberly Ann Lindblade (WHO GMP)
14:05-15:35	Result from Malaria Elimination Audit Tool/country evaluation <ul style="list-style-type: none"> • China • Cambodia • Lao PDR • Myanmar • Thailand • Viet Nam 	NIPD CNM CMPE NMCP DVBD NIMPE
15:35-15:45	Coffee/tea break	
15:45-16:45	Share best practices in malaria elimination and prevent to reintroduction in GMS Countries <ul style="list-style-type: none"> • Cambodia: Intensification Plan and Aggressive Approaches for <i>Pf</i> malaria elimination • China: Maintain elimination and principle to prevent of re-establishment of malaria • Lao PDR: Malaria outbreak monitoring • Myanmar: Intensification plan and experience with outbreak response amidst COVID-19 pandemic 	CNM China CDC CMPE NMCP
Session 2: Providing key principles underlying malaria elimination, which should be tailored to local contexts.		
16:45-17:00	The sensitivity and specificity of surveillance system for malaria elimination	Dr Amanda Tiffany (WHO GMP)

17:00-17:20	Surveillance System for Malaria Elimination in Cambodia	CNM (Dr Siv Sovannaroth)
17:20-18:00	Question and discussion	
Friday, 27 November 2020		
<i>Chairperson for Day 2: Prof. Xiao Ning, Deputy Director of NIPD, China</i>		
13:00-13:15	Effectiveness of Reactive Case Detection and Mass Screening in GMS	RAI-RSC Independent Monitoring Panel – IMP (Dr Jim Tulloch)
Session 3: Interventions and activities suggested in areas of low transmission that are progressing to zero transmission (elimination).		
13:15-13:45	Malaria Transmission and Stratification	Dr James Kelley
13:45-14:15	Plasmodium Vivax Elimination	Dr Risintha Gayan Premaratne
14:15-14:45	Thailand: Experience in G6PD FST and quantitative point of care test	DVBD (Dr Darin Areechokchai)
14:45-15:00	Question and answers	
15:00-15:15	Coffee/tea break	
Session 4: Defining the steps required to maintain elimination: principle to prevent of re-establishment of malaria, role of quality assurance and reference laboratories in malaria elimination		
15:15-16:15	Required steps to maintain elimination and principle to prevent of re-establishment of malaria	Dr Kimberly Ann Lindblade (WHO GMP)
Session 5: An overview of the process for obtaining malaria-free certification from WHO and role for a WHO Malaria Elimination Certification Panel (MECP)		
16:15-17:00	Overview of the process for obtaining malaria-free certification from WHO	Dr Li Xiao Hong (WHO GMP)
Conclusion and closing		
17:00-17:15	Conclusions	Dr Luciano Tuseo
17:15-17:30	Closing Remarks	Prof. Xiao Ning

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