WORKSHOP ON WHO POLICY GUIDANCE ON MALARIA ELIMINATION AND THE IMPLEMENTATION OF THE INTENSIFICATION PLANS FOR REDUCING MALARIA BURDEN IN THE GREATER MEKONG SUBREGION

22–23 November 2021
Virtual meeting
MEETING REPORT

WORKSHOP ON WHO POLICY GUIDANCE ON MALARIA ELIMINATION
AND THE IMPLEMENTATION OF THE INTENSIFICATION PLANS
FOR REDUCING MALARIA BURDEN IN THE GREATER MEKONG SUBREGION

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NOTE

The views expressed in this report are those of the participants of the Workshop on WHO Policy Guidance on Malaria Elimination and the Implementation of the Intensification Plans for Reducing Malaria Burden in the Greater Mekong Subregion 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 Workshop on WHO Policy Guidance on Malaria Elimination and the Implementation of the Intensification Plans for Reducing Malaria Burden in the Greater Mekong Subregion from 22 to 23 November 2021.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>DVBD</td>
<td>Division for Vector Borne Diseases (Thailand)</td>
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<tr>
<td>G6PD</td>
<td>glucose-6-phosphate dehydrogenase</td>
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<td>GMS</td>
<td>Greater Mekong Subregion</td>
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<tr>
<td>IPTf</td>
<td>intermittent preventive treatment for forest goers</td>
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<tr>
<td>LLIHN</td>
<td>long-lasting insecticidal hammock net</td>
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<td>LLIN</td>
<td>long-lasting insecticidal net</td>
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<tr>
<td>MEAT</td>
<td>Malaria Elimination Audit Tool</td>
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<td>MME</td>
<td>Mekong Malaria Elimination</td>
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<td>PAHO</td>
<td>Pan American Health Organization</td>
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<td>PPE</td>
<td>personal protective equipment</td>
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<td>TDA</td>
<td>targeted drug administration</td>
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<td>WHO</td>
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SUMMARY

The Workshop on the World Health Organization (WHO) Policy Guidance on Malaria Elimination and the Implementation of the Intensification Plans for Reducing Malaria Burden in the Greater Mekong Subregion (GMS) was convened virtually from 22 to 23 November 2021. Organized by the Mekong Malaria Elimination (MME) programme, it brought together participants from the six GMS countries – Cambodia, China, the Lao People’s Democratic Republic, Myanmar, Thailand and Viet Nam – and the Global Malaria Programme (GMP), as well as technical experts and partners to help GMS countries with the task of eliminating malaria and prepare them for the process of verification and certification of malaria elimination (WHO certification of national malaria elimination).

The main discussion points included the recent updates of the WHO Malaria Elimination Guidelines and related tools, programming methods for low-burden or malaria-free settings, and the lessons from the implementation of focalized innovative approaches to accelerate malaria elimination efforts in the GMS. The key points of the meeting included:

- **Global Technical Strategy for Malaria 2016-2030:** The Sixty-eighth World Health Assembly adopted the Global Technical Strategy for Malaria 2016–2030 in May 2015. It provides a comprehensive framework to guide countries in their efforts to accelerate progress towards malaria elimination. The updated version, endorsed by the World Health Assembly in May 2021, reflects lessons from the global malaria response over the last five years. While the milestones and targets remain the same, the approaches to tackling the disease, in some areas, have evolved to keep pace with the changing malaria landscape. The updated principles emphasize the centrality of country ownership and leadership in accelerating malaria elimination.

- **RTS,S/AS01 malaria vaccine:** More than 2.4 million doses of the malaria vaccine were administered by October 2021. The vaccine has reached areas that were not covered by bed nets. The pilot has shown that adding a malaria vaccine to current interventions can increase access and reduce gaps in malaria prevention.

- **WHO malaria guidelines:** The first consolidated version of the WHO Guidelines for Malaria was published in an online application, MagicApp, in February 2021; the first online update occurred in July 2021. The living guidelines facilitate the incorporation of new evidence and research findings as they become available. The Global Malaria Programme established guideline development groups for five key areas: vector control, elimination, chemoprevention, treatment and diagnosis. Updated recommendations from these groups will be published in MagicApp in 2022. There is also a joint guidelines development process ongoing in consultation with immunization colleagues to develop concrete recommendations on malaria vaccines.

- **Malaria surveillance assessment toolkit:** WHO and partners have developed a malaria surveillance assessment toolkit. It allows countries to identify key actionable gaps in malaria surveillance across any endemic setting. WHO is currently looking for countries willing to pilot either rapid assessments of their malaria surveillance systems or assessments in elimination settings.

- **Country updates:** Cambodia, Myanmar, the Lao People’s Democratic Republic, Thailand and Viet Nam outlined their progress according to the recommendations from the 2020 meeting. Surveillance continues to be integrated as a core intervention in all countries. Thailand completed a Malaria Elimination Assessment Tool (MEAT) exercise in 2021 and received recommendations from the Malaria Elimination Oversight Committee. Viet Nam intends to complete a second MEAT exercise with WHO in the coming months.

- **Focalized innovative approaches:** Focalized innovative approaches, including vector control, active fever screening, targeted drug administration (TDA) and intermittent preventive treatment for forest goers (IPTf), are being implemented in Cambodia and the Lao People’s Democratic Republic. Lessons from the Lao People’s Democratic Republic pilot indicated the need to change antimalarial drugs to reduce the impact of side-effects in the target population. Cambodia’s Assessment of Foci Management highlighted the need to maintain activities by regularly
strengthening community engagement and supervision from local and central authorities. The Mekong Malaria Elimination programme encouraged both to conduct annual impact analyses on the focalized innovative approaches.

- **High burden to high impact approach**: Malaria is geographically heterogeneous, with transmission intensity and burden varying subnationally, even in high-burden countries. Stratification allows national malaria programmes to design focused, tailored responses by assigning specific intervention packages and deploying strategies to designated strata. This process uses local data to determine the appropriate mix of interventions, for a given area for optimum impact on transmission and disease burden.

- **Plasmodium vivax elimination**: Anti-relapse treatment is an integral part of the complete management of *P. vivax* malaria. National malaria programmes should explore all efforts and avenues to safely administer primaquine to patients. The glucose-6-phosphate dehydrogenase (G6PD) status of patients should be used to guide the dosing schedule and health-care support system to safely administer primaquine and prevent relapse.

- **Maintaining microscopic capacity in the Americas**: The Pan American Health Organization (PAHO) works with microscopists at the regional, national and local levels to sustain the quality of microscopy among the countries of the Americas. This standardizes microscopic malaria diagnosis processes and protocols across the Americas and ensures the availability of skilled lab technicians.

- **China’s malaria-free certification**: China’s recent experience highlights that high-level political commitment and effective multisectoral collaboration are integral to facilitating the process of malaria-free certification. Once countries or areas have eliminated malaria, national malaria programmes must pivot to preventing re-establishment by integrating malaria activities in general health services.

- **Developing prevention of re-establishment guidelines in Thailand**: Thailand has developed a subnational prevention of re-establishment plan which supports the country’s preparedness for malaria-free certification. Subdistrict administrative organizations have taken on more responsibilities to manage health activities, including malaria elimination and prevention of re-establishment. This strategy brings together agencies, offices and partners that contribute to implementing the existing prevention of re-establishment guidelines and ensure that all provinces have sufficient capacity to continue implementing vector control, case/foci responses and preparedness activities.
1. INTRODUCTION

1.1 Meeting organization

The Workshop on the World Health Organization (WHO) Policy Guidance on Malaria Elimination and the Implementation of the Intensification Plans for Reducing Malaria Burden in the Greater Mekong Subregion (GMS) was convened with the intention of supporting GMS countries with the task of eliminating malaria and preparing them for the process of verification and certification of malaria elimination.

1.2 Meeting objectives

The objectives of the meeting were:

1) to align country field actions with the Framework of Malaria Elimination and the Global Technical Strategy for Malaria 2016-2030;
2) to provide guidance on key principles underlying malaria elimination and their adaptation to local contexts;
3) to prepare countries for the process for obtaining malaria-free certification from WHO;
4) to assess the Intensification Plans for Hard to Reach Populations and provide recommendations to accelerate malaria elimination in the GMS.

2. PROCEEDINGS

2.1 Opening session

Dr Tran Huong, Director, Division of Programmes for Disease Control, WHO Regional Office for the Western Pacific, delivered the welcome address to the workshop participants. She congratulated China for the recent malaria-free certification. She emphasized that the workshop links to WHO’s broader efforts to reach the unreached, which is one of four thematic priorities identified in For the Future: Towards the Healthiest and Safest Region. This vision for WHO work with Member States and partners in the Western Pacific Region has helped to bring malaria services closer to hard-to-reach populations by aligning activities with their movement patterns and intervention preferences. Following this, Dr Pedro Alonso, Director of the WHO Global Malaria Programme, provided the opening remarks for the workshop. He emphasized that new tools for WHO certification of malaria elimination are already being applied in the GMS. These include the Malaria Elimination Audit Tool, which helps countries assess their readiness for malaria-free certification.

Dr Luciano Tuseo from the Mekong Malaria Elimination (MME) programme provided a briefing of the meeting objectives and epidemiological situation in the GMS. This was followed by the nomination of Dr Siv Sovannaroth, representative from Cambodia’s National Centre for Entomology and Parasitology Control (CNM), as the chair of the meeting for day 1.

2.2 Session 1: Align country field actions with WHO Guidelines for Malaria

2.2.1 Update of the Global Technical Strategy for Malaria 2016-2030 and WHO’s recommended malaria vaccine for children at risk

Dr Pedro Alonso provided an overview of the updated Global Technical Strategy for Malaria 2016–2030. The Strategy provides a comprehensive framework to guide countries in their efforts to accelerate progress towards malaria elimination by 2030. The updated version, endorsed by the World Health Assembly in May 2021, reflects lessons from the global malaria response over the last five years. While the milestones and targets remain the same, the approaches to tackling the disease, in some areas, have
evolved to keep pace with the changing malaria landscape. As a result, the principles were updated as follows:

1. Country ownership and leadership, with involvement and meaningful participation of communities, are essential to accelerating progress through a multisectoral approach.
2. All countries can accelerate efforts towards elimination through combinations of interventions tailored to local contexts.
3. Improve impact through the use of data to stratify and tailor interventions to the local context
4. Equity in access to quality health services, especially for populations experiencing disadvantage, discrimination and exclusion, is essential.
5. Innovation in interventions will enable countries to maximize their progression along the path to elimination.
6. A resilient health system underpins the overall success of the malaria response.

The 2021 update urges Member States to step up the pace of progress, extending investment and support of health services to ensure no one is left behind. It also encourages countries to sustain and scale up sufficient funding and boost investment in the research and development of new tools.

Dr Alonso also provided an overview of the new RTS,S/AS01 malaria vaccine. The vaccine is designed to prevent the malaria parasite from infecting, maturing and multiplying in the liver. In 2021, WHO recommended the RTS,S/AS01 malaria vaccine should be used for the prevention of *P. falciparum* malaria in children living in regions with moderate to high transmission as defined by WHO. By October 2021, more than 2.4 million doses of the malaria vaccine were administered to children in Africa. The combination of tools allows programmes to add extra protection to those that are using a bed net as well as reaching areas not covered by bed nets. The roll-out has shown that adding a malaria vaccine to current interventions can increase access and reduce gaps in malaria preventive tools.

During the discussion, Dr Alonso noted that the vaccine is targeting the reduction in infections and is showing a high efficacy for the first few months. While it could potentially be a useful addition to elimination settings, given that it requires a four-dose schedule over 18 months, national malaria programmes can likely achieve similar results in the elimination stage with medicines. There may be other tools being field tested that could be more appropriate for elimination settings.

### 2.2.2 Update on the new WHO malaria guidelines

Dr Kimberly Lindblade, Team Leader for the Malaria Elimination Unit within the Global Malaria Programme, delivered an update on the WHO Guidelines for Malaria. WHO published new consolidated malaria guidelines in February 2021 (later updated in July 2021). The Guidelines can be accessed in a mobile app and cover vector control, elimination, chemoprevention and treatment. Further guidelines on vaccines and diagnosis are also being developed.

WHO’s legitimacy and technical authority are derived from its rigorous adherence to the systematic use of evidence as the basis for all policies. Therefore, WHO has adopted internationally recognized methods and standards for guideline development to ensure that its guidelines are of the highest quality. Recommendations are based on a systematic review of the benefits and harms of an intervention, and with consideration of additional factors such as human rights, equity and gender. The process is explicit and transparent, and includes all relevant expertise and perspectives, including those of the end-user. The guideline development process is carried out in a manner to minimize the risk of bias, and all evidence used must be available to the public.

The updated guidelines include new recommendations related to housing modifications (vector control). Ongoing reviews will result in further recommendations for vector control which relate to pyrethroid and piperonyl butoxide nets, the co-deployment of indoor residual spraying and insecticide treated nets, and vector control in emergency settings. In terms of elimination, WHO is currently reviewing evidence to formulate recommendations on interventions such as mass drug administration, targeted drug administration (TDA) and chemoprevention in different populations. Treatment guidelines will
consider recommendations related to the *P. vivax* radical cure, the provision of artesunate-pyronaridine for uncomplicated *P. falciparum* and the use of artemisinin combination therapies in pregnancy.

The documents are considered living guidelines, which allows for a combination of continuous literature surveillance, rapid updating of prioritized systematic reviews and virtual consultations with guideline development groups.

### 2.2.3 Update on the Malaria Surveillance Assessment Toolkit

Dr Amanda Tiffany, Epidemiologist from the Global Malaria Programme, delivered an update on the Malaria Surveillance Assessment Toolkit. It 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 assessments provide evidence-based recommendations for surveillance system strengthening. The Toolkit includes an adaptable assessment framework that allows users to choose the type of case surveillance (burden reduction or elimination) and other malaria control strategies in the country to assess if the correct data are being collected. The standardized package of tools includes a minimum set of priority indicators and common outputs which ensures assessments can be compared between countries and within the same country over time.

The assessment framework has four objectives. The first measures performance of the surveillance system, and the remaining objectives look at the determinants that drive that performance such as infrastructure available, processes, tools, personnel and behavioural aspects. There are three approaches for carrying out an assessment. A rapid assessment includes only priority indicators and takes two to four weeks, while a comprehensive assessment includes all indicators and can take up to 12 months. Data are firstly collected through a desk review, which is implemented at national level and involves a review of documents and malaria programme statistics as well as key informant interviews. The assessors will conduct a survey that is based on the systematic sampling of health facilities. The assessment is conducted in four phases, the final phase involves developing recommendations for surveillance strengthening based on the results of the assessment and a funded activity plan.

The surveillance assessment toolkit is being digitalized in the form of a web app and will be launched by the end of 2021. WHO is currently looking for countries that are willing to carry out the rapid assessments as well as pilots in elimination settings.

### 2.3 Session 2: Updates on malaria elimination activities in the Greater Mekong Subregion

#### 2.3.1 Country updates according to the recommendations from the 2020 World Health Organization Policy Guidance on Malaria Elimination meeting

National malaria programme representatives from Cambodia (Dr Siv Sovannaroth), the Lao People’s Democratic Republic (Dr Viengphone Sengsavath), Myanmar (Dr Nay Yi Linn), Thailand (Dr Rungrawee Tipmontree) and Viet Nam (Professor Tran Thanh Duong) outlined their respective country’s progress since the 2020 WHO Policy Guidance on Malaria Elimination.

The previous meeting recommended that Member States:

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) Compare the sensitivity, specificity and ease of implementation of different suspected case definitions.
5) Make malaria a mandatory, case-based notifiable disease.
6) Ensure quality and optimal coverage of passive detection, including diagnosis, with quality assurance as a priority.
7) 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.

All countries reported progress in case notification, surveillance, case/foci investigation and case/foci management. Thailand was the only country to complete a MEAT exercise in 2021.

2.3.2 Progress on focalized innovative approaches implemented in the Greater Mekong Subregion countries

Cambodia: Dr Siv Sovannaroth from the National Center for Parasitology, Entomology and Malaria Control (CNM) delivered a presentation on the country’s focalized innovative approaches. In November 2020, the CNM, WHO and partners launched the “last mile” of malaria elimination to intensify foci responses and accelerate P. falciparum elimination. The last mile covers a package of focalized innovative approaches that include targeted drug administration (TDA) and intermittent preventive treatment for forest goers (IPTf) as well as community engagement, vector control, and weekly active fever screening in approximately 80 active foci in five provinces. This area accounts for more than 80% of Cambodia’s P. falciparum + mixed cases from 2020. The last-mile activities are implemented door-to-door by full-time village malaria workers. CNM, WHO staff and partners are deployed at the provincial level to support the activities. Community engagement and social mobilization strategies are used to raise awareness of the last-mile activities and maintain high levels of coverage among the target population. Census data define the target populations for TDA and IPTf as well as long-lasting insecticidal net (LLIN) and long-lasting insecticidal hammock net (LLIHN) top-up distributions. The purpose of TDA is to deplete parasite reservoirs in active foci. The TDA covers two rounds of antimalarial medication (artesunate-mefloquine), given at one-month intervals for all men between the ages of 15 and 49 years. IPTf (artesunate-mefloquine) is provided throughout the year to eligible men aged 15–49 who plan to go to high-risk malaria areas such as forests in the following month. Village malaria workers conduct active fever screening in the whole village on a weekly basis. People with malaria symptoms are tested for malaria and treated if they are positive. As of October 2021, 86% of participating health centre staff have been trained and 68% of villages started the activities. Among these villages, the TDA coverage reached 73% in the first round and 58% in the second round. The refusal rate during these rounds was 4% and 15%, respectively. Community engagement was very important to strengthen coverage. IPTf started to be routinely implemented in 70% of villages and will continue in 2022. IPTf coverage is increasing month by month in the provinces. Artesunate-mefloquine is generally well tolerated for the treatment of uncomplicated malaria.

Lao People’s Democratic Republic: Dr Keobouphaphone Chindavongsa from the Center for Malaria, Parasitology, and Entomology (CMPE) outlined the country’s “accelerator strategies” to target high-burden areas where residual P. falciparum transmission continues to be a problem. A pilot covering 200 households in five villages began in July 2021 in Khammouane Province. Upon completing a household census, health centre staff and village malaria workers conduct community engagement activities and top up LLINs. Anyone spending nights in forests receives a LLIHN. Two rounds of TDA (artesunate-mefloquine) are provided with meals to anyone aged 7–49 years. Three rounds of IPTf are given to anyone between the ages of 7 and 49 years sleeping in forests. Village malaria workers visit houses every two weeks to conduct active fever screening and test individuals with a fever. The TDA coverage reached 87% in the first round and 47% in the second round. The refusal/absentee rate for each round was 0% and 43%, respectively. The reported side-effects of artesunate-mefloquine had a negative impact on the coverage of TDA in the second round. As a result, the CMPE recently switched to artesunate-pyronaridine. There was a large difference in TDA participation across villages. This indicates that good community engagement and strong village leadership are key to maintaining coverage. The impact of the TDA has been very impressive, with a 95% reduction in malaria cases reported in August to October 2021 compared to the same period in 2020. The accelerator strategies
will be launched across selected villages in four more provinces by early 2022. These villages accounted for 70% of *P. falciparum* + mixed cases in 2020.

**Viet Nam:** Dr Nguyen Quang Thieu from Viet Nam’s National Institute of Malariology, Parasitology, and Entomology (NIMPE) noted that the country does not have plans to launch IPTf in the near future. Due to COVID-19-related restrictions, the movement (and transmission) among high-risk groups such as mobile populations and forest goers decreased in 2020 and 2021. The country is currently reporting the lowest case numbers it has ever recorded. As a result, Viet Nam plans to use other approaches to eliminate malaria among hard-to-reach populations.

### 2.3.3 Assessment of the last mile activities in Cambodia

Dr Giulia Mazoni, WHO Mekong Malaria Elimination programme, presented the results of a quantitative and qualitative assessment completed between 28 September and 1 October 2021 in Phnom Srouch Operational District by the CNM, WHO, Clinton Health Access Initiative (CHAI) and the provincial health directorate. The assessment reviewed the progress of the last-mile activities in four active foci (Peam Lvea, Rumduol Thmei, Krang Check and Srae Dong), which had a total population of 1128, of which 440 were forest goers.

The quantitative assessment revealed that LLIN coverage reached 111% and LLIHN coverage was 122%. Among these foci, the TDA coverage reached 63% in the first round and 46% in the second round. The refusal rate for each round was 12% and 53%, respectively. The average IPTf coverage for the four foci from June to August 2021 was 45.5%.

Feedback from interviews with key stakeholders (operational district staff, health centre staff, village/mobile malaria workers, village leaders and villagers) indicated that ongoing community engagement has been critical to raise awareness and encourage uptake of TDA, IPTf and increase malaria testing. Community engagement could be improved through the use of panel billboards, spots, and voice messages on malaria, vector control measures and the possible side-effects of antimalarial medication. Small gifts could be used as incentives to encourage community participation in the activities. Food should be provided during drug administration. LLINs and LLIHNs should be kept at the village malaria worker level to ensure that villagers have appropriate LLIHNs before going to the forest. The active inclusion of local authorities and village-level leaders is another factor driving community participation in the activities.

Preliminary data from the pilot indicate a 85% decrease in *P. falciparum* + mixed cases from 2020 to 2021. *P. vivax* cases decreased by 63% during the same period. The impact of the activities are very encouraging with a decrease of the positivity rate from 6.4% to 2.5%. Active fever screening and IPTf will continue to be implemented in 2022 and reinforced through more frequent community engagement events involving local authorities, district and provincial health departments, CNM, WHO and partners.

### 2.3.4 Lessons from field implementers

**Cambodia:** Dr Pen Kim Heng, Provincial Malaria Supervisor, Mondulkiri Province, and Ms Ly Kanha, Provincial Malaria Supervisor, Kampong Speu Province, presented lessons learnt from the implementation of the last-mile activities in their respective provinces. Cooperation and support from village chief and from members of the commune council were crucial for the implementation of the activities and support from the community. As malaria incidence is very low in Cambodia, the communities do not feel a strong incentive to participate in malaria activities. Therefore, village chiefs or community leaders attending community engagement events helped to underline the importance of continuing malaria activities during the COVID-19 pandemic. The provision of personal protective equipment (PPE) was essential to support village malaria workers mitigate the risk of COVID-19. Clear messages need to be developed with key information on TDA and IPTf in the villages. The establishment of a “last mile” committee at the health centre level that includes the malaria supervisors,

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1 The coverage is estimated by comparing individuals that took IPTf versus the targets from the village census. This may not reflect the actual coverage as not all IPTf targets visit high-risk areas every month. Men who do not intend to visit high-risk areas are not eligible for IPTf for that given month.

2 The time period was considered according to the village of interest. January to August or March to August or April to August 2021 versus the same period in 2020.
health centre staff, local authorities, village chiefs and village malaria workers could improve implementation of activities. A referral system and budget should be allocated to manage the cases with side-effects from TDA and IPTf. Lastly, incentives such as clothing for completing TDA and IPTf could increase coverage rates among communities.

**Lao People’s Democratic Republic:** Dr Somchit Thavongsak, Head of Malaria Control, Provincial Centre for Disease Control, Khammouane Province, outlined the findings from the pilot accelerator strategies. The pilot in Khammouane began implementation at a period when COVID-19-related movement restrictions were in place. As a result, antimalarial stock in hard-to-reach health centres was increased from a one-month to a three-month supply. Segmenting village malaria workers into smaller groups during onboarding improved the effectiveness of the training and maintenance of COVID-19 safety measures. Key lessons were that activities should be conducted prior to the harvesting season and malaria transmission season. Developing information, education and communication messaging for specific ethnic minority target groups ensured a positive perception of the activities. Working with and educating village and community leaders on the purpose of the malaria activities also improved the willingness of villagers to participate in the various activities. Initial findings from the pilot indicate that the reported side-effects of artesunate-mefloquine had a negative impact on the coverage of TDA and IPTf. The coverage could be improved through the provision of TDA and active case detection cards, as well as organizing breakfast to be provided with TDA. Job aids for village malaria workers could also improve their ability to follow up and implement IPTf. Lastly, incentives should also be allocated for village malaria workers to ensure their ongoing engagement in the activities.

### 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 of the second day.

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

#### 2.5.1 Tailoring the malaria response to the subnational context

Dr Beatriz Galatas Andrade, WHO Global Malaria Programme, delivered a presentation on adapting the high burden to high impact approach to low burden and elimination settings. Malaria is geographically heterogeneous, with transmission intensity and burden varying subnationally, even in high-burden countries. These variations are not only geographic but also temporal (seasonal and secular trends). This heterogeneity is a function of variations in climatic and ecological factors such as temperature, rainfall and humidity but also modulated by anthropogenic factors such as malaria interventions, health system performance, movement and migration, urbanization, agriculture, mining and other factors. Current malaria interventions are highly cost-effective but have variable impact on the main burden endpoints (infection, mild disease, severe disease and death). All the prevention interventions have modest efficacies, and they are not suitable everywhere and their effectiveness changes over time. A single value of cost-effectiveness is therefore unreliable. Therefore, the best pathway to impact (depending on the desired burden end point) is through optimized and prioritized combinations (or intervention mixing). It redefines universal coverage not to mean everything everywhere, but matching interventions to need driven by a desire to achieve the biggest possible impact with available resources. This must be driven by the best possible subnational data, and evidence that informs a nationally owned and governed approach to decision-making, recognizing that social justice and equity are not secondary but primary considerations in the decision-making process.

#### 2.5.2 *P. vivax* infection: WHO guidelines on anti-relapse treatment

Dr Peter Olumese, WHO Global Malaria Programme, delivered a presentation on treatment for *P. vivax* malaria. The objectives of treatment of *P. vivax* malaria are to cure the acute blood stage infection and to clear hypnozoites from the liver to prevent future relapses. WHO recommends that people with *vivax*
or ovale malaria are given a 14-day course (0.25–0.5 mg/kg daily) of primaquine to prevent relapses. This excluded pregnant women, infants aged less than 6 months, those breastfeeding infants less than 6 months of age, or people with glucose-6-phosphate dehydrogenase (G6PD) deficiency. Anti-relapse treatment is an integral part of the complete management of vivax malaria. All efforts and avenues to safely administer primaquine should be explored for all patients. The G6PD status of patients should be used to guide the administration of primaquine for relapse prevention. It should not be applied as an exclusion or contraindication to the use of primaquine. In addition, it should guide the dosing schedule and support system required to ensure safe administration of primaquine. Where status is unknown and G6PD testing is unavailable, the decision to prescribe primaquine must be based on an assessment of the risks and benefits of treating versus not treating. In people with G6PD deficiency or where it cannot be determined, health providers should consider relapse prevention with primaquine 0.75 mg base/kg once a week for eight weeks under close medical supervision.

The WHO Guideline Development Group is currently drafting a recommendation on the length of the radical cure. The recommendation will consider whether the radical cure for vivax or ovale malaria can be given safely and effectively over a shorter period than 14 days.

2.5.5 The experience of P. Vivax elimination in China

Professor Gao Qi, Chair of National Malaria Elimination Experts Group from China outlined the steps taken by the country to eliminate P. vivax malaria. In June 2021, China was certified as malaria-free by WHO. This achievement was thanks to a whole-of-government approach, which involved commitment from both central and local government as well as the involvement of communities and the private sector. In the years preceding elimination, domestic funding for malaria increased. Capacity-building focused on developing a diagnostic laboratory network in hospitals and quality control mechanisms through the Chinese Center for Disease Control and Prevention. Real-time reporting was strengthened by establishing a national case reporting system in each hospital and a national malaria information reporting system based on each disease control centre. China continues to operate the so-called 1-3-7 surveillance approach, which targets case reporting within one day, case investigation within three days, and focus investigation and response to prevent further transmission within seven days. Since eliminating malaria, foci classification and stratification exercises also allow China to identify areas with a risk of reintroduction. District-level reporting mechanisms allow for early identification of imported cases and appropriate responses to prevent transmission.

2.6 Session 4: Prevent re-establishment of malaria transmission

2.6.1 Maintaining elimination and preventing re-establishment of malaria transmission

Dr Risintha Gayan Premaratne, WHO Regional Office for South-East Asia, outlined the steps for maintaining elimination and preventing the re-establishment of malaria transmission. Reintroduction relates to introduced cases in a country or area where the disease had previously been eliminated. The re-establishment of malaria refers to 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.

The risk of re-establishment of malaria transmission is the combined effect of receptivity and vulnerability. It depends on ecological, climatic, sociodemographic, epidemiological, entomological, health system and other factors. Receptivity is the degree to which an ecosystem allows for the transmission of malaria. Receptivity is determined by the vectorial capacity, the susceptibility of the human population to malaria infection, the vector susceptibility to a particular species of Plasmodium, ecological and climatic factors as well as the strength of the health system. The risk of importation (vulnerability) considers the risk or potential influx of parasites via infected individuals or infected Anopheles spp. mosquitoes. These factors influence the targeted intervention package for prevention of re-establishment to be implemented in different areas.

A high-performing health system is essential for preventing the re-establishment of malaria transmission. It requires ongoing surveillance, a trained malaria workforce, cooperation, cross-border
collaboration and resources for diagnosis, treatment and vector control. Integrating malaria activities in
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2.6.2 Practical lessons in maintaining the microscopic capacity in the Region of the Americas

Dr Roberto Montoya, Pan American Health Organization (PAHO), provided an overview of maintaining the microscopists’ capacity in the Region of the Americas. PAHO works with microscopists at the regional, national and local levels to sustain the quality of microscopy among the countries of the Americas. In terms of quality assurance, a laboratory network that includes certified microscopists is active at national, departmental and local levels. At the country level, quality assurance is ensured through national competency assessments, supervision visits, monitoring, direct evaluation of panels, indirect evaluation and cross-checking of slides. At the regional level, PAHO supports these activities through external competency assessments, an external quality assurance programme, reference malaria slide banks and web-based courses. These tools and structures standardize microscopic malaria diagnosis processes and protocols across the Americas and ensures the availability of skilled lab technicians.

2.6.3 Preparing for WHO certification of malaria elimination: experiences and lessons from China

Dr Zhou Xiao Nong, National Institute of Parasitic Diseases at the Chinese Center for Disease Control and Prevention, delivered a presentation on China’s lessons learnt in preparing for malaria elimination. After the Government launched the national elimination action plan in 2010, the documentation followed the requirements for certification by WHO. A malaria elimination verification manual was published in 2013 followed by a subnational malaria elimination verification manual in 2017. To prepare for WHO certification, the National Health Commission organized subnational verification missions. By July 2020, all 24 formerly malaria-endemic provinces passed the malaria elimination verification at the provincial level. This process ensured that the evidence including data and documentation, which supported the two certification criteria, was in place.

In 2019, the National Malaria Elimination Certification Committee was established, including a leading group, taskforce group and expert group. The Committee prepared the national elimination report, supervised by senior malariologists.

In 2020, the Administrative Management for the Prevention of Re-establishment of Malaria Transmission and Technical Program for the Prevention Re-establishment of Malaria Transmission were issued. Immediate actions were taken to improve the programme for prevention of re-establishment, particularly in relation to managing malaria at borders, in the export sector and among returnees/residents in border regions. Focus has been placed on intensifying the 1-3-7 approach, maintaining the capacity of the malaria workforce, strengthening the mechanisms for joint prevention and control and having the resources for emergency responses.

After the Government submitted the official request to the WHO Director-General in November 2020, an independent evaluation mission by the members of the Malaria Elimination Certification Panel was conducted in May 2021. The mission concluded that China met the two certification criteria; the country was subsequently certified malaria-free.

2.6.4 Challenges and experiences in preventing re-establishment of malaria transmission in Yunnan

Professor Zhou Hong Ning, Yunnan Institute of Parasitic Diseases, presented an overview of Yunnan Province’s experience in preventing the re-establishment of malaria. In August 2019, the Yunnan Provincial Health Commission completed the assessment of malaria elimination at prefecture and county levels. In January and June 2020, the technical assessment for malaria elimination and the final assessment were conducted by the National Health Commission.
The main challenges in preventing the re-establishment of malaria in Yunnan are linked to the risk of cross-border importation. The China–Myanmar border is closely linked by mountains and rivers. In the first three quarters of 2021, 115 malaria cases were reported in Yunnan, of which 51% were imported from cross-border positive *Anopheles* spp. mosquitoes from areas near Myanmar. In total, 114 of these cases were *P. vivax* malaria, which is complicated by the fact that stocks of primaquine are limited.

Yunnan has implemented a sensitive malaria surveillance and rapid response system to prevent re-establishment of malaria. This includes a comprehensive malaria surveillance network at the provincial, prefectural, county, township, and village levels. All hospitals at the provincial, prefectural, and county levels have the capability of malaria microscopic examination. Health clinics in remote villages in border areas are equipped with rapid diagnostic tests for malaria. The province also has an established mechanism for recommending and introducing suspected malaria cases to private clinics or hospitals without testing capability. All county-level disease control and prevention centres have the capacity to carry out malaria vector surveillance, malaria re-examination, case investigation and treatment.

On the basis of the 1-3-7 strategy, Yunnan also developed a three-line defence strategy to strengthen the elimination of malaria in border areas. The first line involved strengthening capacity for malaria diagnosis, treatment and rapid response in 25 border counties of Yunnan. In the second line, 68 malaria service stations were set up at the entry and exit ports along the frontier lines to provide services such as malaria publicity and diagnosis and treatment for suspected malaria patients. The third line involved improving malaria control capacity in neighbouring countries by training clinic personnel, providing equipment, antimalarials and insecticides. These actions are complemented by the joint malaria control and prevention cooperation mechanisms in the Lancang-Mekong region and the Bangladesh-China-India-Myanmar Economic Corridor: which also cover joint malaria monitoring stations in six countries of the region.

### 2.6.5 Practical considerations in the development of prevention of re-establishment guidelines: Thailand’s experience

Ms Jerdsuda Kanjanasuwan, Thailand Division of Vector Borne Diseases (DVBD), delivered a presentation on the development of Thailand’s prevention of re-establishment plan. In 2018, the DVBD conducted a subnational validation for malaria-free provinces. In 2021, 37 out of Thailand’s 77 provinces were verified as malaria free. Verification will be completed in five further provinces in 2022. The verification exercises highlighted the need to have a prevention of reintroduction plan for provinces that have achieved malaria-free status. With a prevention of reintroduction plan nearing finalization, the DVBD will launch a pilot plan in two provinces by the end of 2021. Thailand’s prevention of re-establishment plan will implement preparedness activities and strategies to prevent malaria transmission in malaria-free areas. The DVBD has developed a simplified risk matrix to prevent re-establishment and support the malaria-free validation of provinces. The purpose of the simplified model is to support subdistrict validation exercises and support stratification exercises based on their receptivity and vulnerability to malaria transmission. The plan involves a multisectoral approach led by the national malaria steering committee and includes the DVBD, health promoting hospitals, local administrative offices, WHO and civil society organizations.

### 2.7 Questions and answers

Dr Xiao led the question-and-answer session for the presenters from the second day.

### 3. CONCLUSIONS AND RECOMMENDATIONS

Dr Tuseo 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

**Global Technical Strategy for Malaria 2016–2030:** The Global Technical Strategy was adopted by the World Health Assembly in May 2015. It provides a comprehensive framework to guide countries in their efforts to accelerate progress towards malaria elimination. The updated version, endorsed by the World Health Assembly in May 2021, reflects lessons from the global malaria response over the last five years. While the milestones and targets remain the same, the approaches to tackling the disease, in some areas, have evolved to keep pace with the changing malaria landscape. The updated principles emphasize the centrality of country ownership and leadership in accelerating malaria elimination.

**RTS,S/AS01 malaria vaccine:** More than 2.4 million doses of the malaria vaccine were administered by October 2021. The vaccine has reached areas that were not covered by bed nets. The pilot has shown that adding a malaria vaccine to current interventions can increase access and reduce gaps in malaria prevention.

**WHO malaria guidelines:** The first consolidated version of the *WHO Guidelines for Malaria* was published in an online application, MagicApp, in February 2021; the first online update occurred in July 2021. The living guidelines facilitate the incorporation of new evidence and research findings as they become available. The Global Malaria Programme established guideline development groups for five key areas: vector control, elimination, chemoprevention, treatment and diagnosis. Updated recommendations from these groups will be published in MagicApp in 2022. There is also a joint guidelines development process ongoing in consultation with immunization colleagues to develop concrete recommendations on malaria vaccines.

**Malaria surveillance assessment toolkit:** WHO and partners have developed a malaria surveillance assessment toolkit. It allows countries to identify key actionable gaps in malaria surveillance across any endemic setting. WHO is currently looking for countries willing to pilot either rapid assessments of their malaria surveillance systems or assessments in elimination settings.

**Country updates:** Cambodia, Myanmar, the Lao People’s Democratic Republic, Thailand and Viet Nam outlined their progress according to the recommendations from the 2020 meeting. Surveillance continues to be integrated as a core intervention in all countries. Thailand completed a MEAT exercise in 2021 and received recommendations from the Malaria Elimination Oversight Committee. Viet Nam intends to complete a second MEAT exercise with WHO in the coming months.

**Focalized innovative approaches:** Focalized innovative approaches, including vector control, active fever screening, TDA and IPTf, are being implemented in Cambodia and the Lao People’s Democratic Republic. Lessons from the Lao People’s Democratic Republic pilot indicated the need to change antimalarial drugs to reduce the impact of side-effects in the target population. Cambodia’s *Assessment of Foci Management* highlighted the need to maintain activities by regularly strengthening community engagement and supervision from local and central authorities. The Mekong Malaria Elimination programme encouraged both to conduct annual impact analyses on the focalized innovative approaches.

**High burden to high impact approach:** Malaria is geographically heterogeneous, with transmission intensity and burden varying subnationally, even in high-burden countries. Stratification allows national malaria programmes to design focused, tailored responses by assigning specific intervention packages and deploying strategies to designated strata. This process uses local data to determine the appropriate mix of interventions, for a given area for optimum impact on transmission and disease burden.

**Plasmodium vivax elimination:** Anti-relapse treatment is an integral part of the complete management of *P. vivax* malaria. National malaria programmes should explore all efforts and avenues to safely administer primaquine to patients. The G6PD status of patients should be used to guide the dosing schedule and health-care support system to safely administer primaquine and prevent relapse.

**Maintaining microscopic capacity in the Americas:** PAHO works with microscopists at the regional, national and local levels to sustain the quality of microscopy among the countries of the Region of the Americas. This standardizes microscopic malaria diagnosis processes and protocols across the Americas and ensures the availability of skilled lab technicians.
China’s malaria-free certification: China’s recent experience highlights that high-level political commitment and effective multisectoral collaboration are integral to facilitating the process of malaria-free certification. Once countries or areas have eliminated malaria, national malaria programmes must pivot to preventing re-establishment by integrating malaria activities in general health services.

Developing prevention of re-establishment guidelines in Thailand: Thailand has developed a subnational prevention of re-establishment plan that supports the country’s preparedness for malaria-free certification. Subdistrict administrative organizations have taken on more responsibilities to manage health activities, including malaria elimination and prevention of re-establishment. This strategy brings together agencies, offices and partners that contribute to implementing the existing prevention of re-establishment guidelines and ensure that all provinces have sufficient capacity to continue implementing vector control, case/foci responses and preparedness activities.

3.2 Recommendations

3.2.1 Recommendations for Member States

Member States are encouraged to consider the following:

1) Implement MEAT exercises annually to identify gaps in programmes and assess progress towards malaria elimination.

2) Consider implementing a surveillance assessment using the Malaria Surveillance Toolkit elimination module, especially when reporting $\leq 100$ indigenous malaria cases. Countries can also consider carrying out a subnational surveillance assessment in areas that are close to elimination.

3) Continue to roll out strategies that accelerate malaria elimination across the subregion based on epidemiological results and lessons from localized innovative approaches in Cambodia and the Lao People’s Democratic Republic.

4) Countries that are nearing or have achieved malaria-free status should maintain the necessary financial and human resource to ensure the effective implementation of programmes to prevent re-establishment of transmission. General health services should continue to receive malaria training and national malaria programmes should continue monitoring the sensitivity of surveillance systems and taking measures for improvement when necessary.

3.2.2 Recommendations for WHO

WHO is requested to consider the following:

1) Continue to technically support countries to align with the WHO Guidelines for Malaria in order to achieve the GMS malaria elimination targets.

2) Support countries to identify opportunities to incorporate updated WHO recommendations, once available, and monitor and evaluate their implementation and subsequent impact.

3) Support countries by carrying out training and/or directly assisting countries to conduct surveillance assessments and MEAT exercises.

4) Continue to provide technical support to countries to develop adapted localized innovative approaches to accelerate malaria elimination.

5) Continue to support epidemiological data analysis through the malaria elimination database (MEDB) by strengthening the MEDB platform, ensuring quality monthly data reporting and integration of more granular data, other data sets and frequency, as decided.
## Annex 1. Programme agenda

<table>
<thead>
<tr>
<th>Date and Time</th>
<th>Agenda</th>
<th>Speaker</th>
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<tbody>
<tr>
<td><strong>Opening Ceremony</strong></td>
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<tr>
<td>Monday, 22 November 2021</td>
<td><strong>Chairperson: Dr Siv Sovannaroth, CNM Cambodia</strong></td>
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<tr>
<td>13:00-13:30</td>
<td>Welcome address by Director, Division of Programmes for Disease Control, WHO Regional Office for the Western Pacific</td>
<td>Dr Tran Huong (WHO WPRO)</td>
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<td></td>
<td>Opening remarks by Director, Global Malaria Programme</td>
<td>Dr Pedro Alonso (WHO GMP)</td>
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<tr>
<td></td>
<td>Objectives of the meeting, overview of epidemiology in GMS and nomination of chair</td>
<td>Dr Luciano Tuseo (WHO MME)</td>
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<tr>
<td><strong>Session 1: Align country field actions with WHO Guidelines</strong></td>
<td></td>
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<tr>
<td>13:30-14:10</td>
<td>Update of the Global Technical Strategy for Malaria 2016-2030 and WHO’s recommended malaria vaccine for children at risk</td>
<td>Dr Pedro Alonso (WHO GMP)</td>
</tr>
<tr>
<td>14:10-14:40</td>
<td>Update on the new WHO Malaria Guidelines (Elimination, Chemoprevention, Vector Control)</td>
<td>Dr Kim Lindblade and Dr Amanda Tiffany (WHO GMP)</td>
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<tr>
<td>14:40-15:00</td>
<td>Update on the Malaria Surveillance Assessment Toolkit</td>
<td>Dr Laura Anderson (WHO GMP)</td>
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<tr>
<td><strong>Session 2: Updates on malaria elimination activities in the GMS countries</strong></td>
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| 15:00-16:15     | Country updates according to the recommendations from the 2020 WHO Policy guidance on malaria elimination meeting  | CNM: Dr Siv Sovannaroth  
CMPE: Dr Viengphone Sengsavath  
NMCP: Dr Nay Yi Yi Linn  
DVBD: Dr Rungrawee Tipmontree  
NIMPE: Prof. Tran Thanh Duong |  
- Cambodia  
- Lao People’s Democratic Republic  
- Myanmar  
- Thailand  
- Viet Nam |
| 16:15-16:30     | Group Photo and coffee/tea break (on your own)                          |                                                                         |
| 16:30-17:15     | Progress on focalized innovative approaches implemented in the GMS Countries:  | CNM: Dr Siv Sovannaroth  
CMPE: Dr Keobouphaphone  
Knochinda  
NIMPE: Dr. Nguyen Quang Thieu |  
- Cambodia: More Focalized Approaches for *P. falciparum* malaria elimination  
- Lao People’s Democratic Republic: Accelerator strategies and preliminary results from the pilot in Khammuane Province  
- Viet Nam: Update on planning and strategy for the implementation of intermittent preventive treatment for at risk populations |
<p>| 17:15-17:30     | Assessment of the last mile activities in Cambodia                       | Dr Giulia Manzoni (WHO)                                                 |
| 17:30-17:45     | Lessons learned from field implementers: the ‘last mile’ and COVID-19 in Mondolkiri and Kampong Speu, Cambodia | Dr Pen Kimheng and Ms Ly Kanha (CNM)                                    |</p>
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<th>Speaker</th>
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<tr>
<td>17:45-18:00</td>
<td>Lessons learned from field implementers: piloting ‘accelerator strategies’ in Khammuane Province, Lao People’s Democratic Republic’s</td>
<td>Mr. Kenta Sayaseng (CMPE)</td>
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<tr>
<td>18:00-18:30</td>
<td>Questions and discussion</td>
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<tr>
<th>Date and Time</th>
<th>Agenda</th>
<th>Speaker</th>
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<tr>
<td>Tuesday, 23 November 2021</td>
<td><strong>Chairperson:</strong> Name Prof. Tran Thanh Duong, NIMPE Viet Nam</td>
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<tr>
<td><strong>Session 3:</strong> Interventions and activities suggested in areas of low transmission that are progressing to zero transmission (elimination).</td>
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<td>13:40-14:00</td>
<td>Additional interventions to accelerate malaria elimination including <em>P. vivax</em> elimination</td>
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<td>14:00-14:20</td>
<td>WHO’s policy on <em>P. Vivax</em> primaquine uptake</td>
<td>Dr Peter Olumese (WHO GMP)</td>
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<td>14:00-14:20</td>
<td>The experience of <em>P. Vivax</em> elimination in China</td>
<td>Prof Gao Qi (China CDC)</td>
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<td>14:20-14:30</td>
<td>Questions and answers</td>
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<tr>
<td><strong>Session 4:</strong> Prevent re-establishment of malaria transmission</td>
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<td>14:30-14:50</td>
<td>Define the steps required to maintain elimination: principles to prevent the re-establishment of malaria transmission, the role of quality assurance and reference laboratories in malaria elimination.</td>
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<tr>
<td>14:30-14:50</td>
<td>Steps required to maintain elimination and principles to prevent re-establishment of malaria</td>
<td>Dr Risintha Premaratne (WHO SEARO)</td>
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<tr>
<td>14:50-15:10</td>
<td>Practical lessons learned in maintaining the microscopic capacity in the Americas</td>
<td>Dr Roberto Montoya (PAHO)</td>
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<tr>
<td>15:10-15:30</td>
<td>Preparing for WHO certification of malaria elimination: experiences and lessons from China</td>
<td>Prof Zhou Xiao Nong (China CDC)</td>
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<tr>
<td>15:30-15:45</td>
<td>Coffee/tea break (on your own)</td>
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<tr>
<td>15:45-16:05</td>
<td>Challenges and experiences in preventing re-establishment of malaria transmission in Yunnan</td>
<td>Prof Zhou Hong Ning (YIPD)</td>
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<tr>
<td>16:05-16:25</td>
<td>Practical considerations in the development of Prevention of Reestablishment guidelines: Thailand’s experience</td>
<td>Ms Jerdsuda Kanchanasuwan (DVBD)</td>
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<td>16:25-16:45</td>
<td>Questions and answers</td>
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<tr>
<td>16:45-16:55</td>
<td>Short coffee/tea break (on your own)</td>
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<tr>
<td><strong>Conclusion</strong></td>
<td>Conclusions and recommendations</td>
<td>Dr Luciano Tuseo (WHO MME)</td>
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<tr>
<td>17:05-17:10</td>
<td>Closing Remarks</td>
<td>Chair of the meeting</td>
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Annex 2. List of participants, observers and Secretariat

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