APLMA Malaria Elimination Roadmap: Methodology and Background
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<th>DEFINITION</th>
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<tr>
<td>APLMA</td>
<td>Asia Pacific Leaders Malaria Alliance</td>
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<tr>
<td>AQMTF</td>
<td>Access to Quality Medicines Task Force</td>
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<tr>
<td>GMS</td>
<td>Greater Mekong Sub-Region</td>
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<tr>
<td>LLIN</td>
<td>long lasting insecticidal nets</td>
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<tr>
<td>MDR</td>
<td>multidrug-resistant (malaria)</td>
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<tr>
<td>MoH</td>
<td>Ministry of Health</td>
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<tr>
<td>NMCP</td>
<td>National Malaria Control Programme</td>
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<td>NRA</td>
<td>National Regulatory Agency (Medicines)</td>
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<td>NMRA</td>
<td>National Medicines Regulatory Agency</td>
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<tr>
<td>SSFFC</td>
<td>Spurious, sub-standard, falsely labelled, falsified, or counterfeit product</td>
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<td>WHO</td>
<td>World Health Organization</td>
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EXECUTIVE SUMMARY

Introduction

Malaria elimination requires a different type of programme than malaria control. First, universal access to prevention, diagnosis and treatment is increasingly essential, and this requires a significant scale up in commodities and services. Second, programmes must become more and more flexible in order to tailor initiatives to the evolving disease landscape, and this requires strong, real-time data and regular adjustments. Finally, staff must be increasingly responsive in order to actively seek out cases, and this requires a high degree of training and updated approaches. Each of these changes can mean a significant transition for countries.

To support the Asia Pacific as it pursues of a region free of malaria, the Asia Pacific Leaders Malaria Alliance (APLMA) has assessed key barriers to elimination and ways that Heads of Government can drive progress. This document outlines focus areas for programme development execution and the methodology that the APLMA Secretariat used to identify them. Please see the companion documents on mobilizing financing and improving regional governance for corresponding details on those areas.

Methodology

To identify key priorities, the APLMA Secretariat conducted a rigorous consultation and analysis with National Malaria Control Programmes (NMCP). This included:

i. Convening APLMA’s Access to Quality Medicines Taskforce in March and June of 2014, (attended by a cross-section of government, donor, and partner experts, and chaired at the Secretary level);

ii. Conducting a consultation on health commodities with National Regulatory Agencies (NRAs) in May of 2014, (attended by NRA Leaders and regional experts);

iii. Conducting a five-month scoping and consultation process with NMCPs in the Greater Mekong Subregion (GMS) and with national, regional, and international experts in malaria elimination (October 2014 to February 2015); and

iv. Conducting follow up discussions on the key issues identified in a reference group meeting of regional ministry and technical experts in February 2015.

These consultations with NMCPs, NRAs and partners yielded five technical approaches that Leaders can use to accelerate towards elimination. Combined with the APLMA recommendations on financing and governance, these are the six recommendations for Leaders in the APLMA Malaria Elimination Roadmap:

1. Unite national efforts and regional actions.
2. Map, prevent, test and treat the disease, everywhere.
3. Ensure high quality malaria services, tests, medicines, nets and insecticides.
4. Improve targeting and efficiency to maximize impact.
5. Mobilize domestic financing and leverage external support.
6. Innovate for elimination.

Each of these actions is critical for achieving effective and sustainable elimination, and each has been identified as a particular need in the Asia Pacific. The relative prioritization between them will vary based on circumstances in each country.
BACKGROUND

Defining the problem

Between 2005 and 2013, investment in malaria programmes increased from US$0.4 billion to US$2.7 billion per year.1 This facilitated a global scale up of bed-nets, diagnostic testing and more effective treatments. In many parts of the world, this achieved substantial declines in malaria incidence, and reversed decades of resurgence and stagnation. The Asia Pacific Region has been at the forefront of these successes, reducing the regional malaria burden by nearly 50%.2

This is an extraordinary achievement, but it has been threatened by the rise in multi drug-resistant (MDR) malaria. Reductions in cases and transmission can only continue as long as funding is sustained, programme coverage is maintained, and anti-malaria tools are effective. Mosquito and parasite resistance, donor fatigue, and complacency will eventually reverse progress unless a strong push is made to secure these gains.

The most sustainable way to maintain progress is to eliminate malaria altogether.3 The gains that countries have made this past decade mean that elimination is in sight. Recognizing this opportunity and the need to combat drug resistance, Heads of Government across the Asia Pacific have committed to achieving a region free of malaria by 2030.4

However, malaria elimination requires a different type of programme to malaria control. First, universal access to prevention, diagnosis and treatment is increasingly essential, and this requires a significant scale up in commodities and services. Second, programmes must become more and more flexible in order to tailor initiatives to the evolving disease landscape, and this requires strong, real-time data and regular adjustments. Finally, staff must be increasingly responsive in order to actively seek out cases, and this requires a high degree of training and updated approaches. Each of these changes can mean a significant transition for countries.

APLMA and the Malaria Elimination Roadmap

To support the Asia Pacific as it pursues of a region free of malaria, APLMA has assessed key barriers to elimination and ways that Heads of Government can drive progress. These have been brought together in an APLMA Malaria Elimination Roadmap that outlines the path for an Asia Pacific free of malaria by 2030.

3 A review of past elimination programs identified 50 that were successful and 49 that attempted but failed to eliminate. (Feachem RG, Phillips AA, Targett GA, Snow RW. 2010. Call to action: priorities for malaria elimination. Lancet 376, 1517-1521) For the 49 programs that reduced malaria but did not eliminate it – programs that may be analogous to today’s successful control programs – a literature review (Cohen JM, Smith DI, Cotter C, Ward A, Yamey G, Sabot O, Moonen B. 2012. Malaria resurgence: a systematic review and assessment of its causes. Malaria Journal 11(1), 122.) identified documented resurgence in 36 (73%). In the majority of these cases, the intensive efforts required to suppress transmission could not be maintained due to eventual funding challenges, fatigue, or because countries eventually came to believe malaria was no longer an extant threat. Of the 50 successful elimination programs only 4 (8%) were documented to experience resurgence. (Smith DL, Cohen JM, Chiyaka C, Johnston G, Gething PW, Gosling R, Buckee CO, Laxminarayan R, Hay SI, Tatem AJ. 2013. A sticky situation: the unexpected stability of malaria elimination. Philosophical Transactions of the Royal Society B: Biological Sciences 368, 1623.)
4 East Asia Summit: Yangon, Myanmar. 2014.
METHODOLOGY

Scoping

In order to build the programmatic sections of the Roadmap, the APLMA Secretariat conducted a broad-based assessment of technical needs. This began in March and June of 2014 with the convening of an Access to Quality Medicines Taskforce (AQMTF). These sessions were attended by government, donor, and partner representatives from across the region. Participants discussed a group of input analyses and initially outlined twelve issues on programmatic requirements for elimination.

The APLMA Secretariat then tested taskforce recommendations in each country in the GMS. This took place through a detailed scoping effort to:

- incorporate the most recent country by country data and priority setting by NMCPs;
- inform findings and conclusions with interviews and email correspondence with >25 national and regional experts; and
- prioritize and focus AQMTF recommendations on the largest unmet needs and highest impact areas for Leaders to engage, (including a particular focus on drug resistance).

This yielded a focused group of issues and recommendations. These were then discussed with ministry and technical experts at the APLMA Reference Group Meeting in Bangkok, in February 2015. In this way, the taskforces AQMTF, scoping and subsequent analysis provided the programmatic recommendations in the APLMA Malaria Elimination Roadmap.

Triangulating the fact base

The taskforce and scoping used three sources to develop a triangulated evidence base:

i. A comprehensive document review of key analyses, national plans, and reports;
ii. Interviews with government experts; and
iii. Interviews with national, regional, and international experts in malaria elimination.

For the document review, the team drew on national strategic and regional elimination plans and built out analyses and reports for the taskforce sessions. These were then mapped against the WHO Global Technical Strategy in order to ensure full alignment. Where possible, these sources were supplemented with needs assessments by donors and implementing partners.

For interviews with government experts, the team invited Ministries of Health from across the region to participate in the taskforce sessions and supplemented those discussions by engaging NMCPs in the follow-up scoping. In each case, in-depth interviews/discussions were used to identify the barriers and unmet needs for elimination.

For interviews with national, regional, and global experts, the team used a purposive sample that: a) incorporated a representative sample of experts in the taskforce sessions; b) followed up to engage major partners in the GMS who had not yet been consulted; and c) complemented these sources by reaching out to a selection of contacts at the regional and global levels with
expertise that had not yet been incorporated. Experts were identified by the APLMA Secretariat and NMCPs. Further interviews were incorporated during the process based on recommendations from those engaged.

In order to objectively test needs, interviews with government and partner experts during the scoping phase examined elimination barriers and unmet needs independently to the task force recommendations. Scoping findings were then cross-referenced with the task force recommendations during the analysis phase and used to ‘pressure test’ and prioritize between them and the findings were then tested and validated during the reference group meeting in Bangkok.

**Figure 1: Establishing the fact base**
Prioritizing barriers
During the analysis phase, the team aggregated and scored each barrier cited in the triangulated fact base. Barriers that ranked as priority initiatives and unmet needs in the regional sources and in a majority of GMS countries were identified as top tier needs. They are:

1. **Ineffective coordination** which appeared in three forms: inadequate coordination between funders and the national programme (leading to the creation of parallel systems, government disenfranchisement, and missed opportunities for funding), ineffective coordination between nongovernmental/private sector partners and the national programme (leading to the creation of parallel systems and mismatched or unregulated areas of work), and ineffective coordination between government departments (leading to disjointed action between different branches of the programme). See Policy Discussion section for further details on each barrier.

2. **Low visibility** into disease burden, resource allocation, and deployment, which resulted from: insufficient mapping of the epidemiological landscape (preventing programmes from identifying needs and effectively targeting actions), ineffective surveillance and epidemiological reporting (limiting NMCP identification of cases and outbreaks), and inadequate commodity tracking (increasing the risks of expiries and stock outs). Each of these challenges reduces the NMCP’s ability to respond to a rapidly changing epidemic. As such, visibility represents a particularly challenging barrier for the highly responsive programmes required for elimination.

3. **Insufficiently rolled out health systems** which had three main components: understaffing of needed positions (limiting the ability to effectively design and implement needed programmes), inadequate roll-out of key commodities systems (leading to partial or interrupted care for populations at risk), and inadequate roll-out of health infrastructure (leading to regions without access to services). Together these lead to critical gaps in access to prevention and care for the populations at risk. This can be further exacerbated by the difficulty in reaching some populations. This is particularly true where geographical inaccessibility, conflict or population mobility place a group outside the normal reach of the health system. In an increasingly open and interconnected region, migrant populations have been cited as an especially difficult group to reach for many national programmes.

4. **Inadequate training and quality** assurance for services which cited as a critical need at the programme management level (where inadequate national capacity limits the design and execution of elimination plans) and at the implementation levels (where inadequate health worker capacity and high levels of turnover limit the effective application of programmes). This has been exacerbated by the limited resources available for health worker compensation, leading to high levels of turnover and difficulty hiring staff. The impact of these challenges is to undercut effective elimination through inadequate capacity among health workers.

5. **Low product quality** which has been cited as a challenge in three key areas: the importation/in-country distribution of spurious, sub-standard, falsely labelled, falsified, or counterfeit (SSFFC) products, the use of products that have degraded in the supply chain, and/or the use of non-guideline products for the treatment of malaria. In each case, these challenges contribute to poor
treatment outcomes and potentially accelerate the spread of drug resistance. Strong efforts have been made to remove non-guideline drugs in particular however this effort is often complicated by large unregulated sections of the market where data and monitoring is poor – especially private outlets and providers.

6. **High costs** which appear in two primary forms: high unit costs of key products and high implementation costs of necessary interventions. Both can limit the roll-out of the system. Unit cost has been a particular challenge for long-lasting insecticidal nets (LLINs). However, like mosquito control as a whole, the key area for potential price reduction appears to be on the implementation side, where mass distribution campaigns have led to exceptionally high costs in implementation.

7. **Low/diminishing efficacy of tools** which has been a particular issue in the context of MDR malaria. Here, the diminishing efficacy of artemisinin-based combination therapy (ACTs) in the GMS has come under particular scrutiny. Additional issues have been the lack of effective technologies to address challenges for malaria in the Asia Pacific region. These include day time and early biting mosquitoes, treatment for the *P. Vivax* strain of malaria, and prevention measures for night time and forest workers. A lack of effective technologies in these areas limits the efficacy of current programmes and renders treatment for particular high-risk populations difficult.

**Making recommendations**

Each of these barriers was selected for a deeper dive assessment and a recommendation to Leaders. This focused on identifying a recommendation based on the unmet need that takes full advantage of Leaders’ unique ability to:

a) set national priorities;
b) focus attention and resources; and
c) mobilize sustained political and financial commitments across sectors.

This has meant defining concrete leverage points that require Leaders’ attention, while leaving the specific selection of strategies to the deep technical expertise of the Ministry of Health, the NMCPs and WHO.
ROADMAP SECTIONS

The major recommendations were then consolidated into five overarching actions, each with sub-activities. These recommendations were combined and integrated with the APLMA recommendations on financing and governance and form the basis for the technical sections of the APLMA Malaria Elimination Roadmap. The result is six major actions represent the APLMA Secretariat’s recommendations for Leaders. Head of Government support in these areas will help ensure adequate access to/use of appropriate interventions for malaria elimination.

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Key components</th>
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| 1. Unite national efforts and regional actions     | • Develop a fully costed plan for elimination, led by the MOH and directly supported by Leaders;  
• Form a National Malaria Elimination Task Force (or similar body) chaired by a senior central agency official to follow through on priority actions, harmonize policy, coordinate different actors and take forward bilateral, subregional and regional activities;  
• Engage the National Task Force Chair to:  
  − Join an annual Senior Official’s Meeting on malaria elimination to achieve strong interagency cooperation, monitor progress against a common Malaria Elimination Dashboard, identify recommendations to accelerate progress towards elimination;  
  − Drive these recommendations nationally under the leadership of the National Task Force Chair; and  
  − Ensure that Heads of Government are aware of progress.                                                                                                      |
| 2. Map, prevent, test and treat the disease, everywhere | • Staff and supply the anti-malaria effort to achieve universal access to prevention, testing and treatment;  
• Develop robust, real-time information systems for reporting disease data and the supply of commodities;  
• Map all populations at risk – especially remote, mobile and underserved communities – to identify gaps in the programme;  
• Work with underserved populations to ensure that all those in need receive uninterrupted malaria prevention, testing and treatment;  
• Track ongoing transmission and respond rapidly to control outbreaks; and  
• Share information and coordinate with neighbours to address the regional spread of the disease.                                                                                                                      |
### Interventions

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<td><strong>3. Ensure high quality malaria services, tests, medicines, nets and insecticides</strong></td>
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<tr>
<td>• Strengthen regulatory and supply systems to ensure the exclusive use of high quality products;</td>
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<tr>
<td>• Regulate and motivate the private sector to promote use of effective medicines in pharmacy retail outlets and health clinics; and</td>
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<tr>
<td>• Regularly train health workers and managers to promote high quality services across communicable disease priorities.</td>
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<td><strong>4. Improve targeting and efficiency to maximize impact</strong></td>
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<tr>
<td>• Tailor the supply of products and services to local conditions;</td>
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<tr>
<td>• Wherever possible, use of existing national systems and programmes by all partners; and</td>
</tr>
<tr>
<td>• Engage other stakeholders, such as the private sector and community representatives, to join the fight.</td>
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<tr>
<td><strong>5. Mobilize domestic financing and leverage external support</strong></td>
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<td>• Re-prioritize existing resources to reflect the threat of drug-resistant malaria and the opportunity for elimination;</td>
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<td>• Increase domestic budget allocations for elimination for a time-limited period, as appropriate;</td>
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<tr>
<td>• Make the case for increased external support through higher levels of domestic funding, enhanced efficiency, demonstrated impact and accountability; and</td>
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<tr>
<td>• Mobilize in-kind contributions and investigate opportunities for cross-regional financing and technical support.</td>
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<tr>
<td><strong>6. Innovate for elimination</strong></td>
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<td>• Support initiatives that invest in new technologies;</td>
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<tr>
<td>• Fast-track adoption and roll-out of innovative approaches as they become available;</td>
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<tr>
<td>• Consider introducing/expanding hypothecated taxes such as alcohol and tobacco taxes, and tourism and airline levies;</td>
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<tr>
<td>• Explore ways to leverage national lotteries and earmarked financing for elimination; and</td>
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<tr>
<td>• Consider expanding and leveraging innovative debt financing such as malaria bonds.</td>
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Rigorously track and report progress through the Malaria Elimination Dashboard.
POLICY DISCUSSION

1. Unite national efforts and regional actions

Background

Coordination is a major challenge for malaria elimination programmes. As outlined in the body of this document, this has appeared in three forms: i) inadequate coordination between funders and national programmes (leading to the creation of parallel systems, government disenfranchisement, and missed opportunities for funding); ii) ineffective coordination between nongovernmental/private sector partners and national programmes (leading to the creation of parallel systems and mismatched or unregulated areas of work); and iii) ineffective coordination between government departments (leading to disjointed action between different branches of malaria programmes).

i. 4–5 donors supply the majority of international funding for malaria programmes. Given the degree of support required, multiple donors often support the same national effort in different ways. This funding is critical for the elimination effort, however donor requirements for tailored data reporting or varying indicators can make coordination between actors and efficient reporting a challenge. Programmes become particularly vulnerable to the risks of overlap and misalignment when the Ministry of Health is not acting as the central coordinator for the country’s major grants.

ii. Technical assistance from the WHO and other nongovernmental partners can play a critical role in strengthening the malaria programme. This is especially true in cases of rapid growth or evolution, where it can take a period of adjustment to fully establish the systems required. However the coordination of partners can create a significant challenge. For example, the Mekong Delta alone has more than 20 large scale partners working on malaria and coordination, data sharing and collaborative planning remains a major gap for programmes. Coordination with the private sector can be particularly challenging as private employers, private medical outlets and private providers often represent a ‘black box’ for malaria programmes. 75% of all health services in countries like Indonesia are provided by non-state providers and 80% of Cambodia’s population seeks treatment from private facilities. However, data from these interactions is often unavailable to the elimination programme. This creates significant risks of duplication, overlap and sub-par quality.

iii. Finally, elimination programmes often cross ministerial boundaries in order to effectively address requirements for funding, the treatment of migrant populations and the regulation of areas like insecticides. This requires concrete links and policy coordination with Ministries of Health, Foreign Affairs, Finance, Agriculture and others. Within the Ministry of Health itself, coordination can also be a challenge as different elements of an elimination programme can be directed by different departments, each with parallel data systems and processes.

6 “Non-State providers and health services delivery: Lessons for Asia and the Pacific”. Briefing note prepared in preparation for the UNICEF-ADB workshop ‘The Role of Non-State Providers in Delivering Basic Services For Children’. April 2010 by Dr. Dominic Montagu and Dr. Abby Bloom
Key Message

The key point is that it is critical to develop a unified approach to elimination in each endemic country that:

• incorporates visibility from each part of the system;
• clearly defines roles for the relevant stakeholders; and
• includes mechanisms to coordinate between them, both nationally and regionally.

2. Map, prevent, test and treat the disease, everywhere

Background

Increasing the visibility of the programme and improving the roll-out of malaria care are two of the most significant changes that malaria programmes must undertake as they transition from control to elimination.\(^7\) This challenge stems from four key areas: i) understaffing of needed positions (limiting the ability to effectively design and implement needed programmes); ii) insufficient mapping of the epidemiological landscape (preventing programmes from identifying needs and effectively targeting actions); iii) ineffective surveillance and epidemiological reporting (limiting NMCP identification of cases and outbreaks); iv) inadequate roll-out of key commodities systems and health infrastructure (leading to partial or interrupted care for populations at risk).

i. In order to reach every case, malaria elimination programmes engage particularly human resource-intensive models for patient diagnosis, care and tracking. This is coupled with a degree of flexibility and tailoring of the national strategy that necessitates a highly responsive form of staffing and strong management at the national level. This has proven difficult for many national programmes to establish. It is put at particular risk in the region when malaria budgets are cut as a result of decreasing cases. In this context, it is critical to understand the unique needs of an elimination programme and develop strong hiring to account for these needs.

ii and iii. As outlined in the WHO Global Technical Strategy, the presence of an effective health management and information system is critical to “direct resources to the most affected populations, identify gaps in programme coverage, detect outbreaks, and assess the impact of interventions in order to guide changes in programme orientation.”\(^8\) The degree of mapping and surveillance required in elimination programmes reaches a degree of intensity and specificity that sets it apart from its counterparts in control programmes, making it critical to collect patient specific data and ensure that all sectors involved in the malaria programme are contributing to the data systems.\(^9\) These have created key areas of adjustment for programmes and a majority of malaria programmes in the region are still progressing through this transition.

iv. Finally, the roll out of commodity systems and health infrastructure itself has also been a challenge. On the commodity systems side, the need for specific processes and systems that account for the seasonal nature of the disease and the requirement for programmes to stock

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8 Ibid. pg 10
9 Ibid. pg 20
more product than individual cases might require in an elimination setting create specific characteristics that must be accommodated for in an elimination programme. On the health infrastructure side, elimination programmes’ imperative to reach and track all cases requires a degree of roll out which is often not established in status quo systems. Some of the largest specific challenges relate to migrant populations for malaria elimination. These are outlined in greater detail below.

Spotlight – mobile, migrant and hard to reach populations

Reaching mobile and migrant populations has come to light as a particular challenge and a driver of existing pockets of malaria and increasing epidemic spread. This is particularly true where geographical inaccessibility, conflict or population mobility place a group outside the normal reach of the health system. In the GMS in particular, this is facilitated by economic corridors and new infrastructure and mobility.

In 2009, the Mekong Migration Network estimated that the GMS was home to 3 to 5 million migrants. With new infrastructure and road networks facilitating economic development the flow of people has increased significantly over the past 5–10 years. Specific investment and construction zones bring large numbers of migrant labour from China and Viet Nam into Cambodia, Laos and Myanmar. This mobility is expected to increase even further with the ASEAN Economic Integration that is set to start at the end of 2015.

Migrant and mobile populations (MMPs) are a key risk group for malaria because they are often: (i) more exposed to dangerous disease mosquitoes; and (ii) out of reach of the health system. In addition, their mobility puts them at particular risk of spreading malaria as they move between regions and mosquito populations. Despite their at-risk status for communicable disease, information on MMPs is still incomplete throughout the GMS. Most remain at the margins of national malaria programmes and few interventions have been designed to meet their specific needs. In order to achieve elimination, national malaria programmes must engage specific strategies to reach these populations with prevention and treatment.

Key messages

In this context, the key take-aways are to create:

• Fully staffed and supplied malaria programmes;
• Robust, real time information systems for reporting disease data and commodity data;
• Strong mapping of all populations at risk in order to identify gaps;
• Ongoing, universal access to commodities;
• Tracking of ongoing malaria transmission to respond rapidly to outbreaks; and
• Share information across borders.
3. Ensure high quality malaria services, tests, medicines, nets and insecticides

Background

In order for universal access and effectively targeted approaches to yield results, elimination programmes must be supplied with high quality services and commodities. Both have been challenging to create and maintain across region.

i. Creating and maintaining high quality services presents a particular challenge in an elimination setting where the effectiveness of prevention, testing and treatment services is at a premium but health care staff encounter fewer and fewer cases of the disease. Fostering strong mechanisms for training, monitoring and quality assurance across the health system and maintaining high quality national leadership throughout the programme are critical goals in these scenarios.

ii. Maintaining high quality commodities is an equally challenging effort and is particularly important in the context of growing drug resistance in the region. For example, a 2015 study of malaria medicines in a GMS country concluded: “25.4% (37) of the samples were outside the 90–110% pharmacopeial limits of the label claim, suggesting that they were substandard or degraded” and that many “patients are still exposed to poorly manufactured drugs or to ineffective medicines such as chloroquine.” Such low quality medicines are not only a direct threat to treatment outcomes for patients, they may also contribute to the rise in multiple drug resistance by providing inadequate treatment strengths.

Key messages

• Strengthening of regulatory enforcement activities for medicines and health commodities is essential;

• Regulating and motivating the private sector to promote the use of effective medicines provides critical coverage across the system; and

• Developing strong training and monitoring structures for malaria workers enables an effective approach for the programme as a whole.

4. Improve targeting and efficiency to maximize impact

Background

If elimination is to be feasible and each of the necessary improvements are to be undertaken, programmes will need to make significant improvements in targeting and efficiency. Current cost challenges for elimination programmes stem primarily from the mix of interventions in use and the high costs of implementation. Here the transition from malaria control to malaria elimination requires a significant adjustment in processes. Specifically blanket campaigns no longer represent an efficient use of funds in scenarios during the elimination phase as the epidemiological landscape is increasingly heterogeneous. In that context, there are group of assessments and decisions that

programmes can make in order to improve the targeting of the interventions at hand. As outlined in the example below, this can create significant savings at the national and regional level.

**Spotlight on mosquito control**

Provisional modelling indicates that 90% of the investment required to achieve elimination in the Asia Pacific will be spent on mosquito control strategies such as bed nets. Moving from current mosquito control strategies, such as mass net distribution, to a more targeted set of approaches could save significant costs in an elimination setting. Recent analyses of optimized bed net strategies have shown potential savings of approximately 89 million nets between now and 2030 and cumulative savings of US$614 million.\(^{11}\)

Reducing the cost of mosquito control procurement and distribution could have an even greater impact. For example, a 10% reduction in the cost of mosquito control activities between now and 2030 could result in US$2.17 billion in cost savings.\(^{12}\)

**Key message**

There is a clear need to adopt focused approaches to optimize the mix of interventions to be used to address specific population and disease profile needs. In particular, this could include regularly assessing and adopting strategies that target disease and population patterns and maximize economic efficiency.

**5. Innovate for elimination**

**Background**

Finally, malaria elimination programmes face the challenge of decreasing efficacy. As was summarized in a UK DFID malaria evidence paper: “In general it should be assumed that resistance will both arise and spread to any new drug, and strategies such as combination therapy (proven) and rotating drugs (speculative) can slow this, but not stop it. It should therefore be assumed, based on past evidence, that resistance to all new antimalarials will emerge over time and a continuous pipeline of new drugs against falciparum malaria will be needed.”\(^{13}\)

The challenges with this are threefold: i) the extended timeline and high degree of failure involved in research and development for new products; ii) market incentives that lead innovation away from the products required for Asia; and iii) once innovations do become available to the market, registration, product uptake and roll out processes within each malaria programme can seriously delay the implementation of a new technology.

i. The research and development of a new medicine takes more than a decade and “many promising drugs fail at late stages of development, either because they do not work as well as initially expected or because new side effects are found in large scale phase three trials or during Phase 4 post-marketing studies.

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11 APLMA/WHO Modelling background paper (working document)
12 Ref APLMA/WHO Modelling background paper (working document
Because of this long lead-time and the relatively rapid spread of malaria drug resistance when it emerges there is therefore good indirect evidence that investment in antimalarial drugs for falciparum malaria is needed in advance of losing drug classes to drug resistance. Ideally, new drugs should be new classes of drugs using different mechanisms of action making cross resistance less likely.\footnote{14}

Thanks to investments started in the last decade and a half, there is now a considerable product development pipeline, including some products that have the potential to be complete ‘game changers’ in the way in which malaria is diagnosed and treated. However, while very encouraging, timelines for product availability remain uncertain and the number of high-impact products that could be available by 2025 is difficult to accurately assess.

ii. Innovations that are under development are largely focused on the African context. Precisely because the region is within striking distance of malaria elimination, specific Asia Pacific needs represent less of a market opportunity for suppliers and therefore less of a target for investments. While there is global donor funding for malaria basic research and product development (US$\sim0.5$ billion in 2013\footnote{15}), this non-market support also does not focus on Asia-Pacific malaria needs.

Specific research priorities include: Asia-Pacific malaria affects and kills more working-age adults; \textit{Plasmodium vivax} accounts for nearly half of all malaria deaths; G6PD deficiency, which can complicate vivax treatment, is far more common; the Asia-Pacific has a history of rapidly-emerging resistance; and the region is now focussed on malaria elimination and eradication (with its very specific research, surveillance and diagnostic needs) rather than control, as in many African countries.

For instance, in 2013, all malaria diagnostic R&D received only US$11m – a cut of over a third on the previous year – and only a fraction of this was for G6PD diagnostics. Similarly, only 11% of global malaria R&D was focussed specifically on \textit{P. vivax}, compared to 47% specifically on \textit{P. falciparum}, even though vivax malaria is an equally significant cause of death in the Asia-Pacific.

iii. Last but not least, once these innovations do reach the market significant support is required to ensure rapid assessment and roll out. This can be a challenging proposition at both a regulatory and an implementation level. On the regulatory level, regional processes require a manufacturer to secure national regulatory approval for each country in which it seeks to sell its product. However these applications can be both costly and time consuming and it can be difficult to motivate manufacturers to apply in low-patient scenarios. On the implementation level, national programmes and their staff often have dedicated programmes and processes aligned with the current products in use. As a result, introducing a new optimal product requires significant planning, training, and programme adjustment.

At each step along the way, streamlined and expedited processes will be necessary to overcome the costs and difficulties of rapidly introducing optimal new products.


Key messages

There is a need for:

• Greater investment in research and development for the particular circumstances encountered in the Asia Pacific region, and

• Rapid assessment of new products as they become available, with corresponding rapid roll out of those products proven to be effective.
CONCLUSION

A comprehensive and extensive consultation has identified barriers that are common across the region to effective malaria elimination and outlined key recommendations that help address these barriers. These solutions have been formulated into concrete actions that Leaders can choose to implement in order to help drive the elimination agenda and achieve a region free of malaria by 2030.
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Membership of ADB and Regional Cooperation Organizations
Countries affected by malaria and membership of malaria related entities

Countries supporting APLMA
- United States
- Australia
- New Zealand
- Japan
- Russian Federation
- Brunei Darussalam
- Singapore

Malaria (22)
- Pakistan
- Timor-Leste
- Afghanistan

APMEN (18)
- Philippines
- Republic of Korea
- Thailand
- People’s Republic of China
- Indonesia
- Viet Nam
- Malaysia
- Cambodia
- India
- Lao PDR
- Vanuatu
- Solomon Islands
- Papua New Guinea

Countries affected by malaria:
- Bhutan
- Nepal
- Democratic People’s Republic of Korea
- Sri Lanka
- Bangladesh
- Myanmar
- Pakistan
- Timor-Leste
- Afghanistan
- United States
- Australia
- New Zealand
- Japan
- Russian Federation
- Brunei Darussalam
- Singapore
- Philippines
- Republic of Korea
- Thailand
- People’s Republic of China
- Indonesia
- Viet Nam
- Malaysia
- Cambodia
- India
- Lao PDR
- Vanuatu
- Solomon Islands
- Papua New Guinea

Other affected countries:
- Bangladesh
An Asia Pacific Free of Malaria by 2030