MalaFA

Malaria Futures for Asia

APLMA
ASIA PACIFIC LEADERS MALARIA ALLIANCE

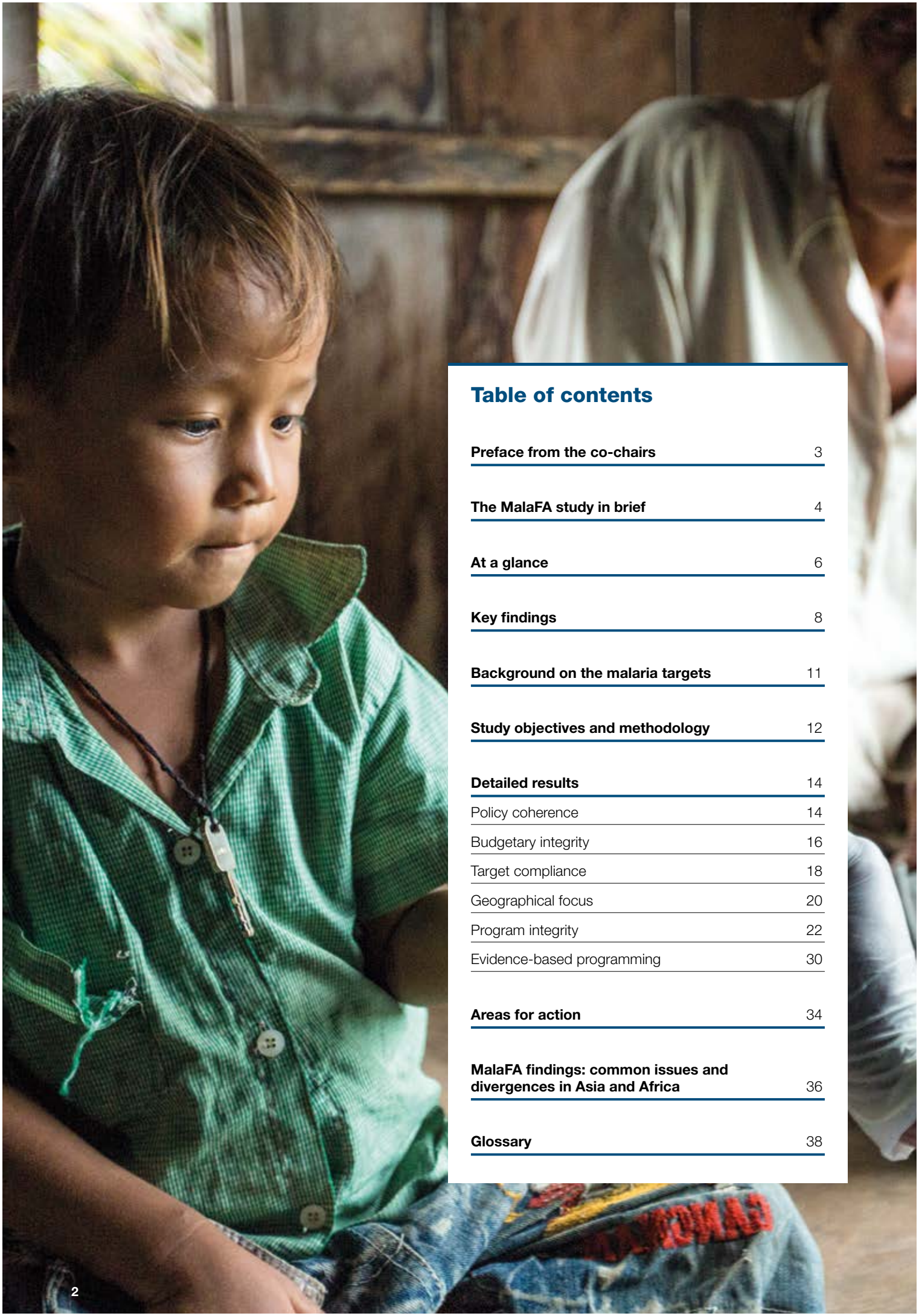
malaria consortium
disease control, better health

malaria NO MORE

malaria NO MORE united kingdom

NOVARTIS

RBM Partnership To End Malaria



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Preface from the co-chairs

Although the world has made monumental progress against malaria in the last 20 years, every two minutes a child still dies of the disease. The 2017 and 2018 World Malaria Reports rang alarm bells, showing that after unprecedented success in global malaria control, progress has stalled and funding has flatlined. Case numbers are increasing in some countries and new challenges such as resistance to insecticides and antimalarials continue to loom. Further, climate change may alter the presence and proliferation of vector populations. The global health community therefore needs to continue to work together to prevent and reverse the complacency that comes from the expectation that malaria will soon be eliminated.

With this in mind, in 2018, Novartis Social Business commissioned a stakeholder research report, Malaria Futures for Africa, to hear directly from policymakers on the ground in 15 African countries about their views on progress toward elimination. In 2019, a second report, looking at five key countries in South and Southeast Asia — four from the Greater Mekong Subregion (Cambodia, Myanmar, Thailand, and Vietnam), and in India at the national level and in two states – was commissioned to assess progress made toward global malaria goals and examine the unique issues facing the region.

The good news is that, overall, respondents in this study are optimistic about *P. falciparum* elimination, but this is tempered by less optimism around *P. vivax*. Respondents also told us about the challenges in reaching elimination goals. They are worried about the sustainability of both donor and domestic funding. Many think that current diagnostic tools are not being used to their full potential. A great number have concerns about emerging resistance in mosquitoes to existing insecticides, and many are also very apprehensive about resistance to current frontline treatments.

Almost all respondents share a strong concern around ensuring adequate numbers of healthcare workers with critical training in key skills such as microscopy diagnosis – a vital tool on the road to elimination.

Despite the incredible commitment from the Asian region to eliminating malaria by 2030, the situation could quickly deteriorate and the disease could slip down the health agenda, particularly as countries in South and Southeast Asia develop and are more affected by chronic conditions.

We hope that donors, regional institutions, national policymakers and philanthropists will listen carefully to the thoughtful recommendations respondents make in this report. They all feel that addressing migrant and hard-to-reach populations is key to elimination and they want more action in this area. They also feel it is vital to combat the looming threat of insecticide and artemisinin resistance and they want better surveillance to understand more about the speed at which this resistance may develop. In all countries, respondents identify a gap in communication and coordination between the public, private and civil society sectors leading to missed opportunities for improved access to diagnosis and treatment, particularly for hard-to-reach populations. Many also express concern about the impact climate change could have on outbreaks and call for more research in this area.

We would like to thank Novartis Social Business for commissioning this second malaria stakeholder research. It is an important contribution to the field by a company which, evidently, has a long-term commitment to it. It is important to note that the conduct of the study and the data analysis have been done independently of the study sponsor. Needless to say, this report does not necessarily reflect our views or those of Novartis. It reflects what the researchers were told by the respondents on the ground.

Professor
Yongyuth Yuthavong

Former Thailand Deputy Prime Minister and board member of the RBM Partnership to End Malaria

Professor
K. Srinath Reddy

President of the Public Health Foundation of India

The MalaFA study in brief

Following on from the 2018 Malaria Futures for Africa report, stakeholders have asked to extend the research to key countries in Asia in order to examine the specific challenges in the region.

This stakeholder research study was commissioned by Novartis Social Business to capture the views of malaria experts in South and Southeast Asia — ministers of health, members of parliament, senior civil servants working in health, heads of national malaria control programs and representatives of academia and non-governmental organizations. Although no ministers of health participated in this study, the category was left in the results in order to provide comparisons to the 2018 MalaFA study in Africa, as well as to future studies in other regions.

Please note this report expresses the views of study respondents, even if not stated explicitly.

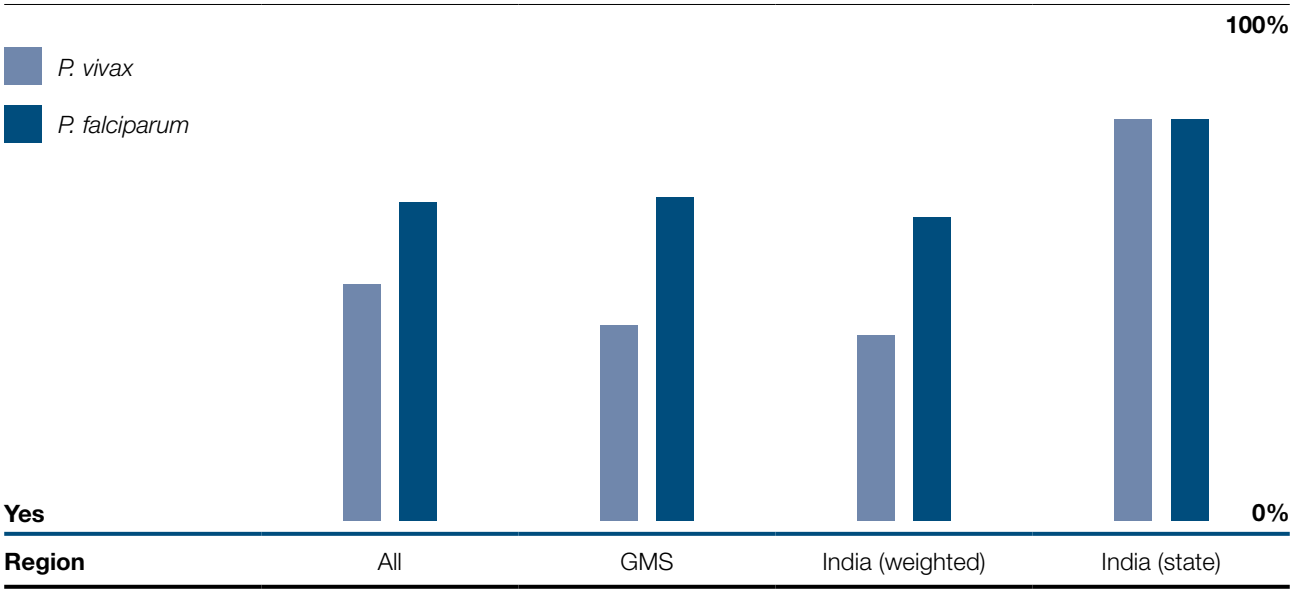
What stands out?

- Overall, respondents in this study were optimistic about *P. falciparum* elimination but far less so about *P. vivax*. When asked if their country would hit its elimination targets, two thirds were confident that the 2030 target for *P. falciparum* would be met, but less than half were confident this target would be met for *P. vivax:*
  - There were notable differences in opinion in India regarding meeting elimination targets. Respondents working on malaria elimination programs at state level were far more optimistic (more than three quarters of these respondents felt that both *P. falciparum* and *P. vivax* could be eliminated by 2030) than those working in central government or in multilateral organizations
- Access to accurate diagnosis and effective treatment was seen to be good across all countries except for mobile and migrant populations (MMPs) and forest workers who were mentioned as hard to reach, hard to engage with, and hard to monitor. The majority of all respondents were confident there was universal access to ACTs in their countries but were less confident that all fevers were properly diagnosed, either by RDT or microscopy
- Resistance to ACTs was seen as a pressing issue, especially in Cambodia where there was great concern over resistance and the frequent changes in recommended ACT combinations needed to combat resistance. Concern was lowest in India although a small minority recognized resistance as a substantial threat that was not currently addressed
- While two thirds of all respondents said they were concerned about insecticide resistance, they did not elaborate about this during interviews. Only one person in Cambodia shared a specific concern that mosquitos that stayed on the impregnated net did not die
- The perception about the strength of surveillance and response systems varied both within and between countries, where those in the field were often more pessimistic about control than senior researchers, advisors and civil servants

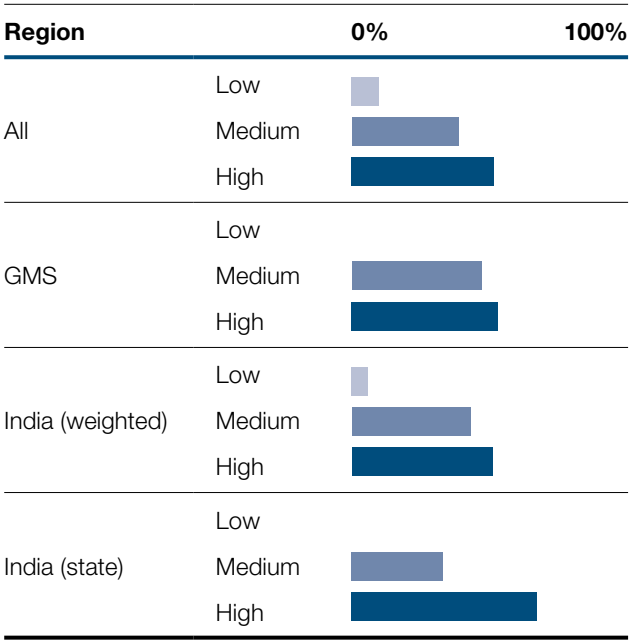
  There were two exceptions:
  - In India, respondents working at state level were significantly more confident in their systems than respondents in central government and international advisors were about national surveillance and response
  - All respondents in Thailand described a strong surveillance system using mobile technology and real-time reporting that triggered a rapid control response
- Across all countries, respondents described a gap in communication and coordination between the public, private and civil society sectors, missing opportunities for improved access to effective diagnosis and treatment, particularly for hard-to-reach populations. Few national collaborations and coalitions were described and civil society organizations were less mentioned
- Concerns were voiced throughout the study over the loss of skills and expertise in malaria diagnosis and treatment, especially in microscopy diagnosis. Fewer cases have reduced demand for microscopy, and skilled technicians are not being replaced. While the shift from disease-focused programs to primary care systems is important for long-term health systems strengthening, respondents expressed that this may lead to a lack of the expertise needed for malaria elimination
- Migrants and hard-to-serve populations across all countries, as well as people living in Myanmar's conflict areas, are not being served by current policies and practices; further, these populations are potentially spreading resistance and preventing disease elimination
- Vector control is at risk due to incomplete delivery and inconsistent use of insecticide-treated nets, and a lack of appropriate alternatives, particularly for night-time transmission and for mobile populations
- The overwhelming majority of respondents said climate change could have an impact on malaria outbreaks in the future, changing breeding patterns and increasing vector range

At a glance*

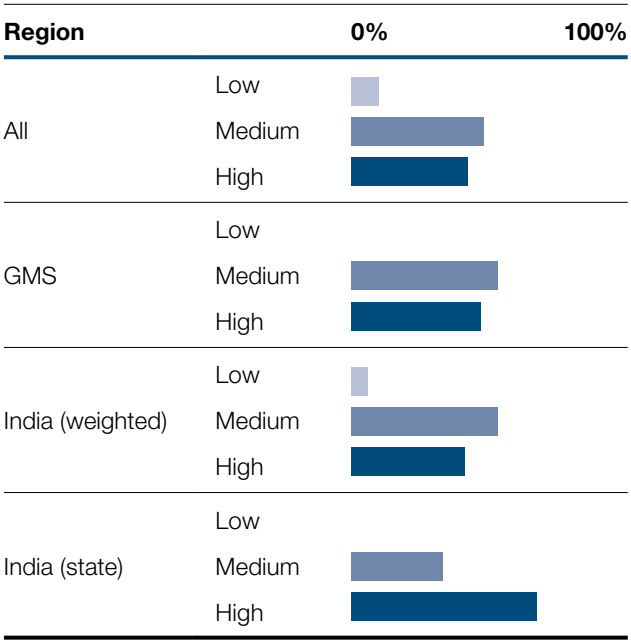
Do you think your country will achieve ***Plasmodium vivax* / *Plasmodium falciparum* elimination by 2030**?
(Target date adapted to country)



How optimistic are you about your country making progress toward **universal access to ACTs**?

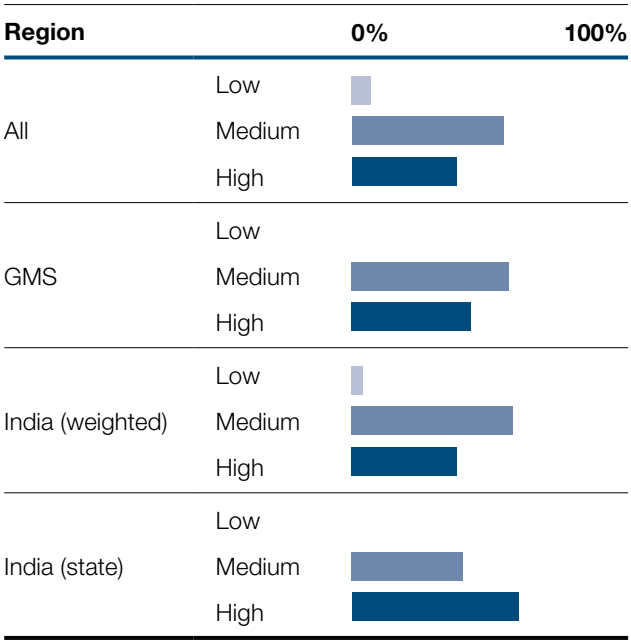


How optimistic are you about your country's progress to properly **diagnose all fevers either by microscopy or rapid diagnostic test**?

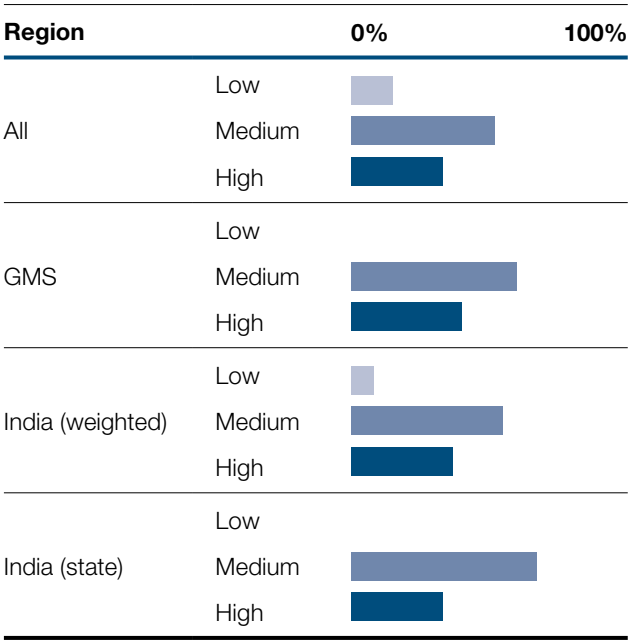


* The Greater Mekong Subregion (GMS, i.e. Cambodia, Myanmar, Thailand and Vietnam) and India proportions are reported separately to avoid overemphasis on the views of the larger Indian sample. Research in India was conducted at national level (New Delhi) and in two states (Odisha and Assam).

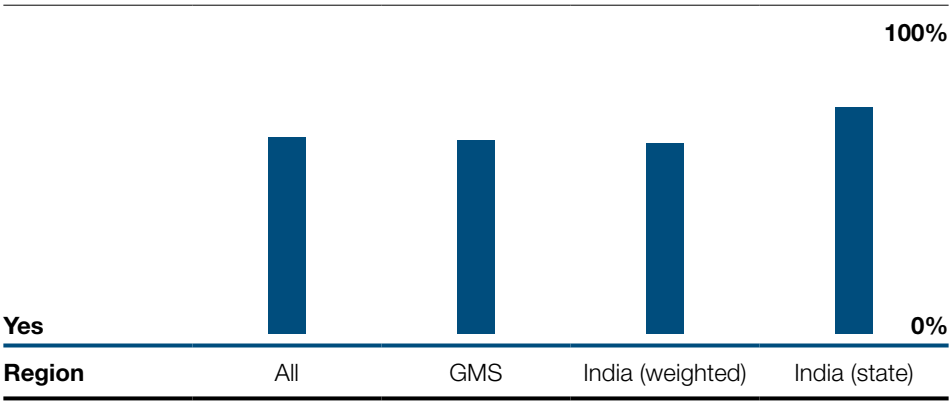
How optimistic are you about your country's progress in **building capacity to prevent and treat malaria**?



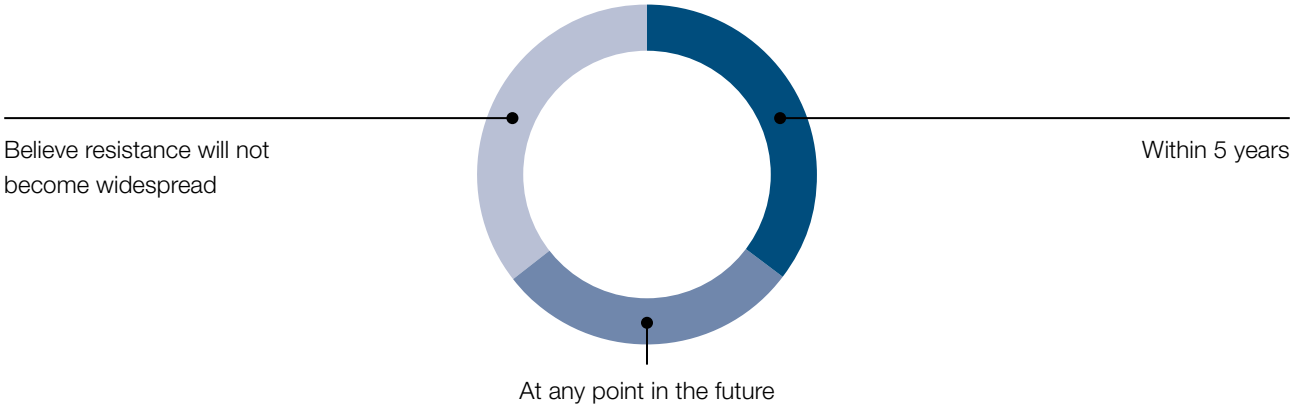
How optimistic are you about your country making progress in **surveillance and response systems and policies to enable elimination**?



Is **resistance to insecticides** used in bed nets a concern?



Do you think it is inevitable that **ACT resistance** becomes widespread in Asia over the next five years?



Key findings

2030 elimination goal is seen as realistic, but structural challenges are causing delays

- While two-thirds felt *P. falciparum* would be eliminated by 2030, less than half shared similar optimism for elimination of *P. vivax* within the same timeframe. Challenges eliminating *P. vivax* included initial diagnosis and combining G6PD (glucose-6-phosphate dehydrogenase) screening and compliance with a 14-day treatment regimen to provide a radical cure for *P. vivax* (i.e. one which eradicates disease reservoirs in the body). Government officials responsible for malaria programs were generally far more positive than researchers or non-governmental organizations (NGOs) that work on program delivery
- Political support was strong overall and respondents did not expect this support to shift away from malaria as progress is made on elimination targets. Some, however, felt that malaria elimination did not have the same political drive behind it as tuberculosis
- Across the board, respondents mentioned the need to shift from a vertical to a horizontal care management system and to integrate malaria programs into primary care. Yet, countries fear moving malaria into a more generalized primary care setting could dilute expertise in diagnosis and treatment; a new generation of healthcare workers could struggle to recognize, diagnose and treat malaria as there are fewer cases
- Outbreak control was reported to be highly effective in Thailand and Odisha, India. Almost all countries felt positive about plans in place to manage a malaria outbreak, but many pointed to weaknesses in diagnosis, surveillance and inappropriate treatment
- In some areas, surveillance across countries is hampered by a lack of real time reporting, weak mobile phone connectivity, and the removal of malaria expertise from emerging primary care facilities. As many regions are in the malaria elimination phase, smaller numbers of patients – often in remote areas – make detection more difficult and expensive

Supportive policies are in place

- Overall, respondents in this study felt that all countries have high-level political support for malaria elimination from heads of states and / or health ministers, with integrated five-year national plans and strategies in place. All the countries surveyed have endorsed the Asia Pacific Leaders Malaria Alliance Roadmap to elimination by 2030[1]

Budgets are stable but future expectations are mixed

- Respondents in all countries said donor funding was supportive of their country plan and of an integrated regional response to malaria. The Regional Fund of the Global Fund to Fight AIDS, Tuberculosis and Malaria provided additional support and consistency across countries
- Less than a third felt donor support was getting stronger, but over two-thirds felt that donor support was at the same level or weakening
- Almost all said there was a specific figure for malaria funding, but not all domestic funding was ring-fenced, so it could be diverted to other disease programs within broader primary care programs. Many felt domestic funding should increase. This is particularly important as countries prosper and are no longer eligible for Global Fund support
  - There was greater emphasis on the role of domestic funding in India, where federal and state government funding was expected to support elimination efforts
- Respondents felt that fewer malaria case numbers could lead to smaller budgets

Mobile and migrant populations present prevention and access challenges

- All countries expressed concern about reaching MMPs, who are the most vulnerable. Many MMPs are undocumented and may be reluctant to seek diagnosis or treatment from the formal health sector
- New approaches and tools are needed, such as insecticide-treated hammocks instead of the bed nets they sleep in. Regional strategies and surveillance are also critical, since MMPs frequently cross borders
- The involvement of civil society organizations (CSOs) is also essential in reaching mobile and migrant populations living in the more remote and hard-to-reach areas

[1] www.aplma.org/upload/resource/Roadmap/APLMA_Roadmap_final_EAS_2015.pdf

Vector control is at risk

- The majority of all respondents, regardless of the region, said long-lasting insecticide-treated nets supplied through the public sector were used consistently. There was no concern over resupply of nets across the GMS but there was some concern over resupply in India. Almost two thirds of all respondents were concerned about insecticide resistance. Non-treated bed nets sold through the private sector were reported to be widely available
- Almost three quarters of respondents across all groups and regions said they were concerned about access to tools that prevent outdoor transmission of malaria
- More than three quarters of respondents were unable to recall any new vector control initiatives or technologies

Responses to ACT resistance are mixed

- Views were divided on the threat of ACT resistance in *P. falciparum*, with a third of respondents expecting widespread resistance to affect their country within five years, a third recognizing resistance to ACTs as a threat but unable to specify a timeframe, and the remaining third not believing that resistance would become widespread in their country
  - In India, these views were more polarized and as many were concerned about resistance to ACTs as those that were not
- There was a wide belief that surveillance systems and policies to monitor resistance and eliminate malaria needed improvement, although most respondents felt their surveillance systems were adequately resourced. However, discussions revealed more extensive concerns about surveillance than resourcing alone, pointing to absent or delayed reporting as well as surveillance data not being used to inform or prompt a response
- Almost three quarters of respondents in the study said the issue of poor quality or falsified antimalarials was no longer a big concern. This was due to policies and programs to combat falsified and sub-standard drugs in the region, including cross-border initiatives, and to the fact that antimalarials are now often procured centrally or provided by donors. Despite this feeling expressed by respondents, Asia accounts for a large share of the falsified and sub-standard medicines trade[2].

  In Southeast Asia alone, an estimated 36% of antimalarial drugs were estimated of poor quality, and one of the possible contributors to antimalarial resistance across the region in addition to poor adherence.[3]

Access to prevention, diagnosis and treatment is improving, but with large variations

- Almost half of all respondents across all regions were extremely optimistic that their country delivered universal access to ACTs. However, although access to ACTs was generally good, MMPs and the hard-to-reach continue to be missed
- Respondents were less optimistic regarding the correct diagnosis of fevers. Across all countries in the study, more than half the respondents expressed concerns about proper diagnosis by either microscopy or an RDT. They thought that diagnosis was not always being included in universal healthcare coverage (UHC), not available in the private sector, restricted to district health posts, or only offered by qualified healthcare staff
- Discussions revealed that access to microscopy is a pressing issue across all countries. As the parasite load decreases, concern was expressed that expert microscopy staff and their knowledge around diagnosis of malaria are not being replaced
- Private sector healthcare and pharmacies, often the first port of call for the treatment of fevers, are not seen as being integrated into malaria programs, leading to missed opportunities for coordination and complete reporting
- There was an even divide between respondents who were very optimistic about their country's efforts to strengthen the health system and to build capacity to prevent and treat malaria, and those who were moderately optimistic or not optimistic. Yet, the majority of respondents had concerns about the insufficient numbers of well-trained healthcare staff to deliver malaria diagnosis and treatment
- More than two thirds of respondents said malaria case management was part of the insured health package where UHC was provided, with less than a third of them reporting partial coverage

[2] WHO Global Surveillance and Monitoring System for Substandard and Falsified Medical Products: www.who.int/medicines/regulation/ssffc/publications/gsms-report-sf/en/

[3] Nayyar et al (2012): www.ncbi.nlm.nih.gov/pubmed/22632187

Investments in operational research are seen as valuable but support for funding is low

- Nearly two-thirds of respondents said they were aware of operational research (which focuses on implementation of malaria programs, such as improving supply chains) having led to a change in government policy. However, most respondents were reluctant to spend more than 25% of the overall malaria program research budget on operational research

Collaboration is seen as essential but there is little awareness of malaria coalitions

- There were differences between India and GMS respondents in awareness of regional, cross-border or national coalitions. GMS countries were all aware of the Asia Pacific Leaders Malaria Alliance (APLMA), saw elimination as a regional ambition and were also aware of memorandums of understanding with neighboring countries. This was in direct contrast to India where few mentioned APLMA or specific cross-border coalitions. Fewer national collaborations were reported across all countries
- There were fewer differences between GMS and India in awareness of regional partnerships to improve regulatory capacity, with half of all respondents citing regional collaborations in this area
- The need for greater collaboration and coordination between basic research, epidemiology / surveillance, operational research, program management and policy was consistently mentioned in the interviews. Where a comprehensive level of coordination was reported, as in Odisha, significant and rapid progress toward elimination was reported as well

Innovations are not consistently shared, and require more coordination and support

- Over half the study participants were unaware of emerging technologies and tools for prevention
  - Awareness was lowest in India with less than one fifth of respondents mentioning new prevention tools
  - Across GMS countries, awareness was higher and almost two thirds knew about latest tools
- There was far greater awareness of new treatment technologies with more than half of all respondents cognizant of emerging treatment technologies, including new treatments for *P. vivax*
- All groups said regulatory processes were slow, resulting in delays in getting innovative diagnostics and treatments into healthcare services. Over half of all respondents felt their country should provide better funding and support to regulatory authorities to expedite the registration process for priority drugs and diagnostics. A similar proportion felt their country should improve pharmacovigilance capacity for antimalarial commodities. This concern was higher in India, where more than two thirds of respondents expressed this view

Climate change could have an impact on malaria outbreaks

- The great majority of respondents said that climate change is a concern, and over eight in ten anticipated climate change having an impact on malaria outbreaks in the future. However, of those concerned, most noted there was a need for additional evidence in this area to inform an effective response

Background on the malaria targets

The Global Technical Strategy for Malaria 2016-2030, published in 2015 by the World Health Organization (WHO), sets ambitious yet feasible global targets for 2030 with milestones for measuring progress in 2020 and 2025. Countries set their own national or subnational targets, which may differ from the global targets. When conducting interviews, respondents were asked to assess their country's progress against these goals, as laid out and monitored through APLMA's Leaders' Malaria Elimination Roadmap and Leaders Dashboard.

Goals, milestones and targets for the Global Technical Strategy for Malaria 2016-2030

GOALS	MILESTONES		TARGETS
	2020	**2025**	**2030**
1. Reduce malaria mortality rates globally compared with 2015	At least 40%	At least 75%	At least 90%
2. Reduce malaria case incidence globally compared with 2015	At least 40%	At least 75%	At least 90%
3. Eliminate malaria from countries in which malaria was transmitted in 2015	At least 10 countries	At least 20 countries	At least 35 countries
4. Prevent re-establishment of malaria in all countries that are malaria-free	Re-establishment prevented	Re-establishment prevented	Re-establishment prevented

Study objectives and methodology

Novartis Social Business commissioned research consultancy Baird's CMC to conduct an opinion research study involving 36 key stakeholders in India and four Southeast Asian countries belonging to the Greater Mekong Subregion (Cambodia, Myanmar, Thailand and Vietnam) affected by malaria. Study co-chairs are Professor Yongyuth Yuthavong, the former Thailand Deputy Prime Minister and board member of the RBM Partnership to End Malaria, and Professor K. Srinath Reddy, President of the Public Health Foundation of India.

The study, called Malaria Futures for Asia (MalaFAsia), has been designed to help guide domestic and donor commitments toward malaria elimination in the face of increasing challenges. The list of countries was developed in consultation with the co-chairs and partners: the Asian Pacific Leaders Malaria Alliance, RBM Partnership to End Malaria, the Malaria Consortium, Malaria No More UK and Malaria No More US.

This study is qualitative and represents the personal views of respondents. The sample was chosen deliberately to include only people with a major influence on malaria programs, but it is not representative of any broader group or defined universe of respondents. It may be that a different set of interviewees in a same country would have given different responses. However, all the people we interviewed are known to have significant influence in setting local, national or regional malaria policies.

The goal was to conduct a minimum of four interviews per country from the following four categories:

- → **Category A:** Minister or deputy minister of health; parliamentarian with direct interest in malaria*
- → **Category B:** Senior civil servant (either first or second level in the ministry of health)
- → **Category C:** Director of National Malaria Control Program (NMCP) or equivalent
- → **Category D:** Senior malaria researcher (outside the ministry of health) / NGO leader

The majority of respondents in this study were from categories B and C.

The breakdown of respondent type by region was as follows:

Data from India has been weighted for comparison to the other four countries in this study.

Each person was interviewed for about 45 minutes in a face-to-face interview from December 2018 to February 2019. In almost every case, the interview was conducted in the interviewee's working language by an expert interviewer based in the same country. Interviewers were trained to minimize variability in interviewing and reporting techniques. Respondents agreed to participate on the basis that no answers would be attributed to any specific individual.

Interviews were not recorded to encourage free discussion, but a detailed, standardized report with verbatim quotes was prepared following each interview. This study was conducted under the supervision of Mark Chataway, a member of ESOMAR. ESOMAR is the global voice of the data, research and insights community, speaking on behalf of more than 4,900 individual professionals and 500 companies that provide or commission data analytics and research in more than 130 countries, all of whom agree to uphold the ICC / ESOMAR International Code.[4]

The discussion guide contained 21 items grouped under four main sections:

- → Policy and the 2030 malaria targets, based on the targets in the WHO Global Technical Strategy for Malaria Targets 2016-2030 (see table on page 11)
- → Current and future priorities for prevention and treatment
- → Rising threats and the development of new tools and technologies to respond
- → Development of an operational research agenda

* It was not possible to recruit any ministers or deputy ministers of health or parliamentarians with direct responsibility for malaria (category A) from any of the five countries in this study. This could be due to the fact that there are many more competing health priorities in Asia, whereas malaria is one of the dominant health issues in Africa.

[4] The Code is available at: www.esomar.org/uploads/public/knowledge-and-standards/codes-and-guidelines/ICCESOMAR_Code_English_.pdf

Analysis

The data set comprised data from respondents with different levels of responsibility, insight and expertise across five countries, each with their own unique experience of malaria and public health. For these reasons, the interview questions were not always all answered, or all answered completely, and questions were not always answered with the same level of detail. All interview reports were analyzed independently by two researchers. After testing for coherence with a small sample of scripts, the researchers coded the data using key themes previously identified in the Africa data. These themes were then reviewed against global, regional and national targets, resulting in the six overarching themes presented in this report.

The themes are:

- **Policy coherence:** Participants' awareness of their countries' antimalarial policies and the extent to which they are applied
- **Budgetary integrity:** Whether or not there is a specific domestic budget for malaria and the extent to which it is consistently made available
- **Target compliance:** Adoption of international targets for the control and elimination of malaria and the likelihood of achieving them
- **Geographical focus:** Engagement with regional and subregional partnerships to optimize program effectiveness
- **Program integrity:** Budget and efforts devoted to short-term needs for diagnosis and treatment compared to the longer-term needs for elimination (dependent on country)
- **Evidence-based programming:** Deployment of newer, more effective treatments and chemical agents based on scientific evidence of resistance development

Data was then coded by theme and grouped by region. This analysis resulted in summary statements showing consistency between countries and exceptions to patterns within the region. This demanded judgement, given sometimes conflicting responses in a country, for example, between government officials and independent scientists. The researchers did not consider each answer alone, but in the context of everything a particular interviewee said. Responses from those who offered greater insight and detail in their understanding of their country's malaria response overall were given more weight. The analysis used similar methods to give an accurate view of the differences between planned or intended policy, funding, approaches and programs, and the operational reality on the ground.

Detailed results

Policy coherence

Cambodia

Strong support is reported from the ministry of health and the national malaria control program, with a revised 2016-2020 Cambodia Malaria Elimination Action Framework in place. The health sector is actively involved in malaria elimination, from referral hospitals to the provincial level down to village malaria workers. However, respondents suggest that this support is not always translated into effective implementation, and integration with the private sector is not consistent.

Political support is not expected to decline, even with reduced numbers of malaria cases and deaths. Cambodia reported zero deaths from malaria in 2018, ahead of its 2020 target. Elimination of *P. falciparum* is expected to be achieved ahead of the 2025 target date. However, *P. vivax* is not expected to be eliminated by 2025, this will take at least another two to three years.

India

In 2017, India launched its five-year National Strategic Plan for Malaria Elimination. The plan shifts focus from malaria control to elimination. With a 23% decline in malaria cases in 2017 over 2016, India is on track to reduce malaria cases by 20-40% by 2020, according to the World Malaria Report 2018. However, there are many roadblocks detailed in further sections.

As expected with a small sample of respondents for a large and populous country, the views expressed were diverse. Respondents working in multilateral organizations thought that malaria is not a priority for India, with tuberculosis repeatedly mentioned as being more important. However, Indian nationals felt political commitment was in place centrally, although they acknowledged results were mixed at the state level. Representatives from the two states surveyed (Odisha and Assam) were more positive about their state's policy and described political support as good.

Myanmar

Myanmar has a national malaria control plan approved by the Global Fund, and expects to achieve elimination of *P. falciparum* by 2030. There is political support centrally from the ministry of health and sports and data sharing with the ministry of defense. Further, universal healthcare coverage includes access to diagnosis by microscopy or rapid diagnostic tests, and access to ACTs. However, respondents suggest that specific policy and structures still need to be developed to deal with surveillance and human resources issues. There is particular concern in accessing hard-to-reach groups such as forestry workers.

Government representatives are less optimistic about the prospect of eliminating *P. vivax* by 2030, unless a standalone strategy to ensure adherence to a radical treatment is in place.

Thailand

The country has a national strategic plan for malaria elimination and a national plan for an integrated elimination strategy to achieve elimination by 2024. Political will is seen as strong and not waning, despite the decreasing malaria incidence and deaths.

All respondents consistently recognized the same challenges. These included the shift from a vertical malaria-specific program to a horizontal program. This shift makes diagnosis and treatment dependent on doctors working out of primary care centers. Respondents felt that the policy needs to include non-medical staff and CSOs, especially when dealing with migrant populations.

Another challenge that all respondents highlighted was inadequate staffing due to retirement and other staff turnover. This has led to lost skills and knowledge, particularly around microscopy expertise.

Vietnam

Central political support and plans are in place, but malaria elimination does not seem to be a priority. Respondent said that political focus was likely to wane as incidence and deaths decline. As all drugs are now procured centrally, falsified and poor-quality drugs are less of a concern than five years ago.

In their own words

Cambodia

"In order to achieve malaria elimination, we need to have effective antimalarial drugs in place, ACTs, as well as quantitative diagnostic tests to detect G6PD for P. vivax."

India

"Malaria is taken very seriously in Odisha. … our chief minister is very dynamic and very interested. He immediately addresses all issues … he really jumps into action."

"Political commitment can vary state to state, and since health is a state subject, this is important."

"We need to study malaria according to who it affects more socially and economically. Malaria deaths start where political power ends."

Myanmar

"Most of the malaria cases are from forested areas. A situation analysis should be done for these groups [forestry workers] and strategies should be developed from these findings."

Thailand

"For the elimination strategy, we focus only on the foci areas. When we do not look at the other areas that are not foci, they could become foci again … they should not be cut off immediately because one year you did not find a case."

"The issue is getting access to the remote populations in the South and migrants. You need civil society to reach them and the civil society organizations have been very restricted in the permissions on what they are allowed to do."

Vietnam

"The continuous decrease of malaria cases and deaths has already shifted attention from [the] malaria program to other [disease] programs. In addition, the merging of different programs at the community level also makes malaria not a priority anymore."

Budgetary integrity

Cambodia

Respondents alluded to low levels of domestic funding for malaria in the country being a challenge. The malaria response still relies on international funding from donors and research institutions to achieve elimination. Until last year, funding from all sources had steadily increased, given malaria was a priority disease for the country; yet in 2018, funding was cut significantly because of decreasing malaria case numbers.

Coordination and use of donor funds is seen as poorly organized, with suggestions of inefficient use and lack of alignment with the strategy, leading to delays with program implementation. Funding from the Global Fund was perceived as administratively demanding.

India

Respondents were split evenly between those who saw overall funding as adequate and those who did not. At the state level, domestic funding was seen as excellent, with no shortages and easy access. However, they said the country depends on international funding for malaria elimination.

Myanmar

Current funding is considered adequate. Respondents noted that international funding still covered the supply of all commodities. The country's integrated 2020 malaria program is considered robust, including health system strengthening and, over time, delivery of UHC.

Domestic funding is for staffing and administration, not program delivery, and comes from an overall budget for six diseases under the National Disease Control Program. Respondents believe that this could put future funding at risk. Further, with Myanmar's burden of noncommunicable diseases increasing and malaria cases declining, the disease could become less of a priority.

Primaquine is included in the Essential Basic Health Services Package, but UHC is only in the planning stage.

Respondents expressed concerns at funding the 1-3-7 surveillance strategy borrowed from China as this model is felt to be resource-intensive. The 1-3-7 strategy requires the reporting of malaria cases within one day, confirmation and case investigation within three days, and a follow-up response within seven days. Respondents suggest that a focus on case notification and investigation (including foci investigation) could help reduce cost and human resources for the program.

Thailand

Respondents expressed that Thailand's donor funding has adequately supported the country's malaria elimination efforts, with a specific budget for the next three to five years. Funding by the Global Fund will stop after 2020, with domestic funding expected to take over. This is due to both declining malaria cases and the country's rise to becoming an upper-middle income country. Sustainable funding from government is seen as the biggest issue. Additional sources of funding are therefore being explored as budget is needed to build capacity and deliver on the program. Malaria care is provided free of charge to everyone and included in health insurance.

Vietnam

Most respondents rated current funding as adequate. Vietnam was the only country where respondents could identify the level of domestic funding, which is USD 1.8 million per year for five years as listed in its national plan (2016-20). Donor support is getting stronger, but there is concern about long-term sustainability. Universal healthcare covers malaria treatment, but the diagnosis of fever is funded separately by the malaria program.

In their own words

Cambodia

"I think that all donors should have a meeting to discuss on this issue [of coordination] to identify a proper mechanism so that the funds are efficiently and effectively used. [Better] to have a small fund used efficiently than to have a big fund but not used efficiently."

India

"I would say that research funding is quite adequate, but … infrastructure, manpower, etc. is not well funded."

Thailand

"The biggest concern is the sustainability of funding after 2020. It [malaria care] is well funded at the moment, but the funding is not secure for the coming decades. Domestic funding needs to be increased and it should be feasible, but the governments [in the region] have to commit much more."

Target compliance

Cambodia

Cambodia recently announced no deaths due to malaria in 2018. Respondents felt that both elimination targets are achievable, with *P. falciparum* gone by as early as 2020 but *P. vivax* taking longer. To do this, funding will need to be maintained and resistance to ACTs addressed. Cambodia's current target is to be malaria-free by 2025, with *P. falciparum* eliminated by 2020.

Respondents said Cambodia and Laos are the only two countries in GMS that do not yet routinely use a 14-day course of primaquine for the radical cure for *P. vivax* (i.e. one which eradicates disease reservoirs in the body), and no routine G6PD testing.

India

There was wide variation in people's perception of progress toward the targets in India, pointing out differences in infrastructure and support in the country. However, there was concern overall that malaria is less of a priority than other diseases, and does not attract the highest political attention. People working in multilateral organizations expressed the least optimism, with over two-thirds believing *P. falciparum* elimination would not be achieved, and three quarters believing *P. vivax* elimination was not possible. At the federal level, opinions were split evenly, but nearly four in five of those in the two states surveyed – Odisha and Assam – believed elimination was possible. Odisha respondents felt both *P. falciparum* and *P. vivax* elimination were on track.

Myanmar

All respondents believe elimination of *P. falciparum* by 2030 is possible. International support for malaria in Myanmar is seen as essential because of limited domestic funding. Yet, as the spread of the disease has declined, respondents alluded to many implementation challenges, including finding the last pockets of malaria in more remote areas, weak surveillance and drug compliance issues with *P. vivax*, which may push the elimination target from 2030 to 2035. Respondents felt there was considerable variation between states and regions in terms of progress in the fight against malaria. One respondent said the Mandalay region was particularly challenging geographically, requiring people to travel for hours on foot and then on a boat down a river to reach the nearest hospital.

Thailand

All respondents believed Thailand's commitment to malaria elimination was high. They found the 2030 target achievable for both *P. falciparum* and *P. vivax*, but elimination of the latter was dependent on four elements: successful cross-border collaboration; addressing needs of migrants; reaching communities in the South; and consistent implementation of diagnosis, treatment, adherence and retesting.

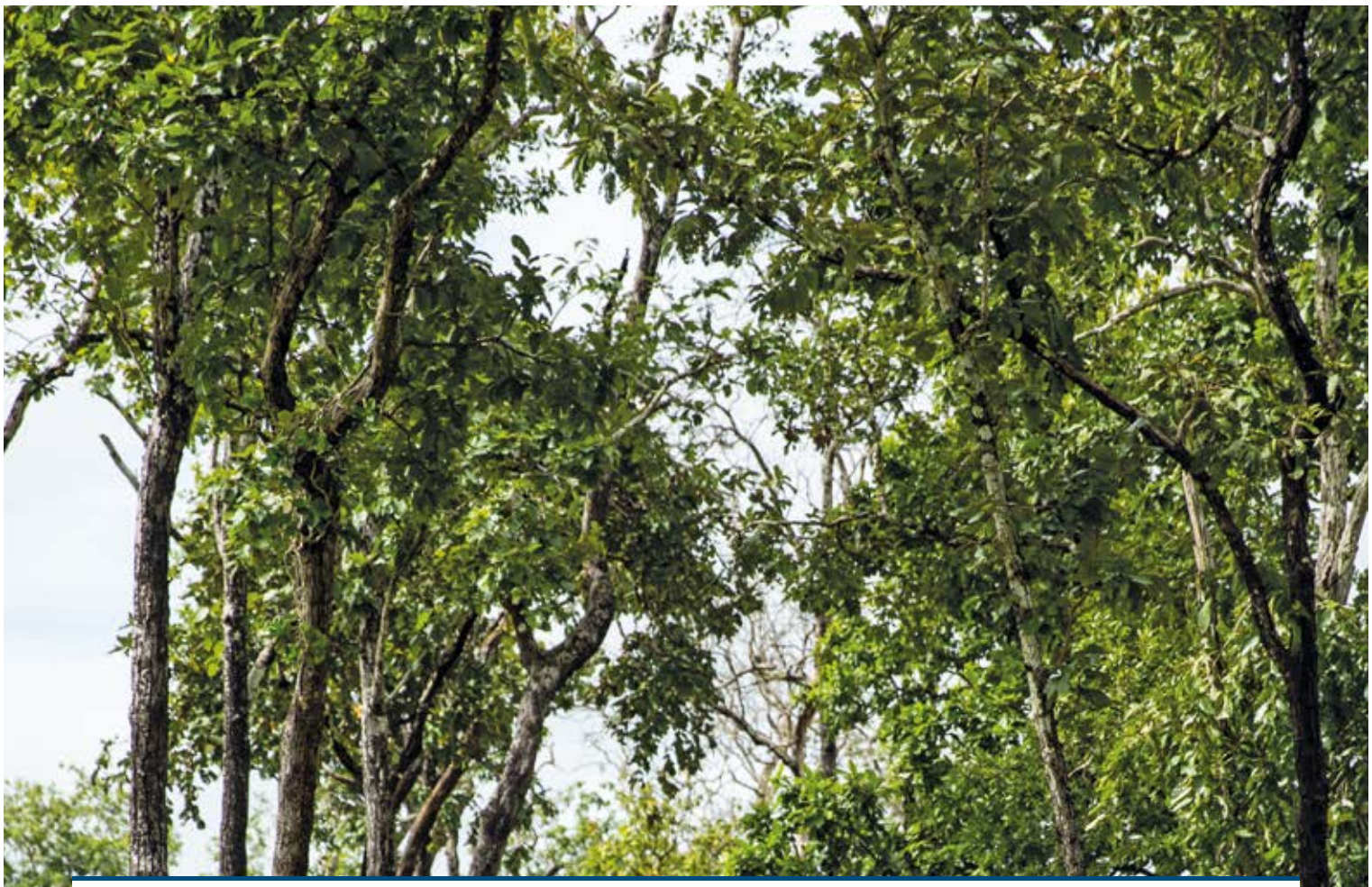
Respondents stressed the country's dependence on regional collaborations and said Thailand needed to develop new strategies to identify malaria cases faster.

Vietnam

There was an even split of respondents between those who felt elimination of *P. falciparum* was achievable by 2030 and those who did not. Those who did said there was a concurrent need for regional efforts and continued resourcing. Like in all other countries, MMPs were a concern, requiring collaboration and coordination.

Most people did not believe *P. vivax* elimination was achievable by 2030.

Elimination challenges cited were cross-border issues, climate change and limited resources.



In their own words

Cambodia

"Before using the drugs in health facilities and communities, we need to clearly study G6PD in patients. It will take time to think about the effectiveness of drugs and safety of people … "

"If all implementing partners are working together and starting at the same time [implementing the plan together], I think the elimination of P. falciparum can be achieved, but not by 2020."

India

"Elimination is possible if the program is sustained the way it was in 2017 and 2018. If we become relaxed, it won't work. Elimination can work only if every case is reported, nothing should be hidden – truth is our strength."

"We have 11 years to achieve elimination, it is a government of India mandate – but to me, this is very difficult to achieve because there are too many hidden myths about malaria, and it is complicated. Even after 2030, there will be several challenges."

"Cash is not a problem anymore, we want in-kind support from donors, such as more LLINs."

"As long as we keep relying on bed nets … we are not addressing the root cause at all. This cannot bring elimination. These are essentially fragile solutions. Water bodies have to be cleaned, all breeding sites have to be attacked. We cannot achieve elimination by 2030."

Myanmar

"Strengthening of our [malaria] surveillance system is nearly two years [old] and there is a manual guideline for it. However, the system is not very well functioning. Compared to other countries, our country [needs to] work more on the surveillance system."

Vietnam

"For the person who is infected, the person is mobile, their jobs are mobile, they move around, so we cannot keep track of them."

Geographical focus

Cambodia

Elimination is considered a regional effort. This is why respondents felt that sharing information and good practices between countries to inform program delivery is essential to achieving elimination. There are regional working groups and numerous cross-border initiatives. Some respondents talked about a challenge in coordination of country efforts. This includes agreement on primary and last-resort treatments to delay resistance. There are also differences in skills and resources between countries.

Those in Cambodia noted that these cross-border collaborations need to be improved to detect malaria cases and provide appropriate treatment on time, particularly to migrant populations.

India

In contrast to GMS countries, which saw elimination as a joint effort, less than a third of Indian respondents referenced regional programs (and only APLMA was mentioned). The cross-border collaborations that exist do not appear to be formalized. Less than half referenced national working groups.

Myanmar

At the national level, respondents felt there were few official activities supporting malaria elimination. However, the Myanmar Health Sector Coordination Committee has a Malaria Technical Strategic Group, and there are a number of annual meetings with implementation partners that touch on malaria elimination.

Myanmar is included in GMS coordination as part of the Global Fund's Regional Artemisinin-resistance Initiative (RAI) grant. Further, a coordination plan and memoranda of understanding exist with China and Thailand for data sharing and capacity building. The collaboration with China is seen as particularly useful for entomological training. Myanmar CSOs also play a very significant role in cross-border coalitions that include Cambodia, Laos, Thailand and Vietnam.

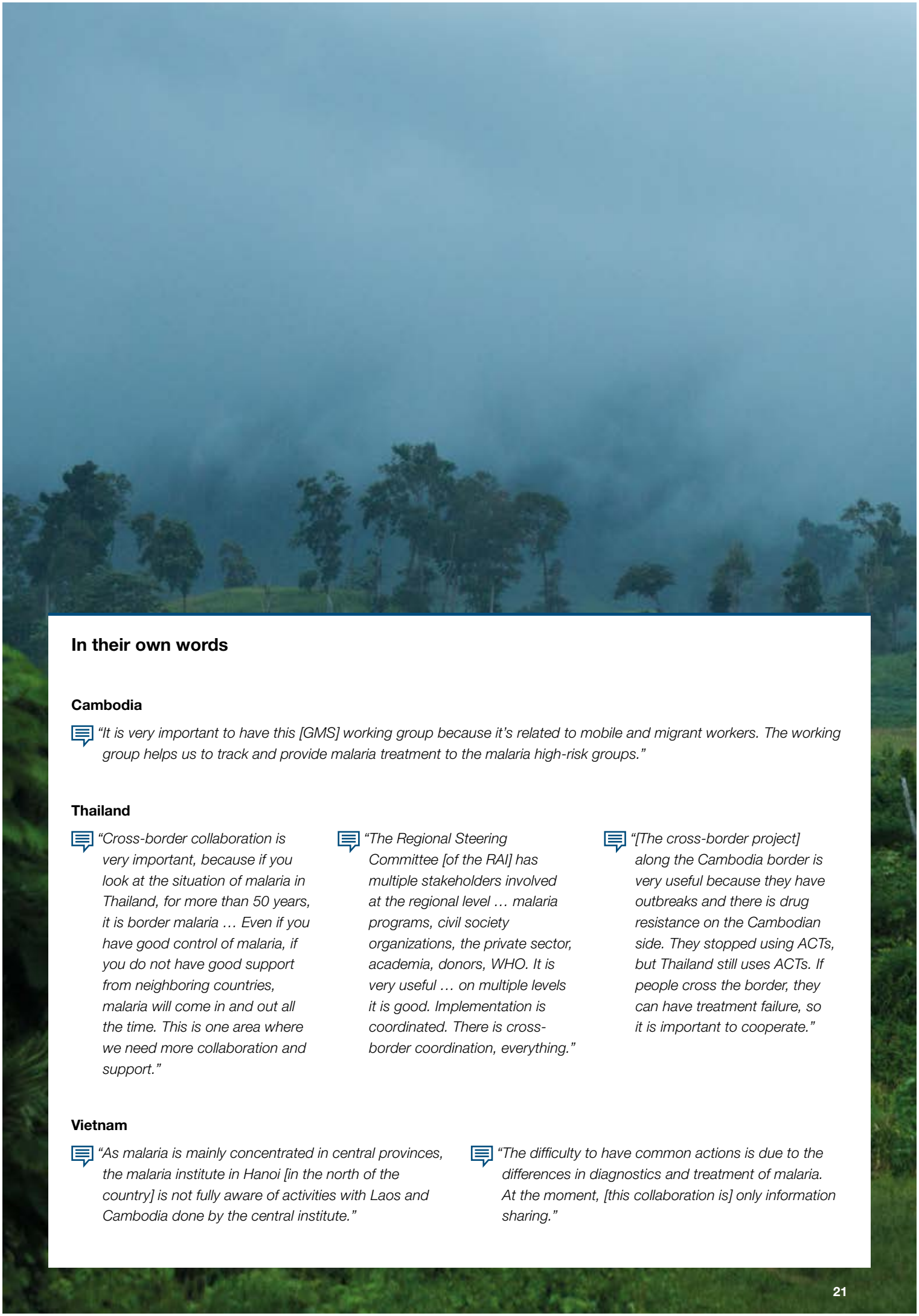
Thailand

Respondents did not mention any national coalitions, but all said cross-border coalitions were critical to helping fight malaria, given cases were mostly reported at the border with Cambodia, Myanmar and Laos.

Half of all respondents cited regional coalitions. Examples included memoranda of understanding with neighboring countries, training workers in Cambodia and Myanmar, and significant support from the Global Fund's RAI grant for regional coordination, including a CSO regional group.

Vietnam

There are no reported formalized regional collaborations, although Vietnam is included in the RAI. There is informal infectious disease data sharing and meetings are held with Cambodia and Laos. The overall perspective is that regional discussions have had no impact and have not translated into meaningful change and progress.



In their own words

Cambodia

"It is very important to have this [GMS] working group because it's related to mobile and migrant workers. The working group helps us to track and provide malaria treatment to the malaria high-risk groups."

Thailand

"Cross-border collaboration is very important, because if you look at the situation of malaria in Thailand, for more than 50 years, it is border malaria … Even if you have good control of malaria, if you do not have good support from neighboring countries, malaria will come in and out all the time. This is one area where we need more collaboration and support."

"The Regional Steering Committee [of the RAI] has multiple stakeholders involved at the regional level … malaria programs, civil society organizations, the private sector, academia, donors, WHO. It is very useful … on multiple levels it is good. Implementation is coordinated. There is cross-border coordination, everything."

"[The cross-border project] along the Cambodia border is very useful because they have outbreaks and there is drug resistance on the Cambodian side. They stopped using ACTs, but Thailand still uses ACTs. If people cross the border, they can have treatment failure, so it is important to cooperate."

Vietnam

"As malaria is mainly concentrated in central provinces, the malaria institute in Hanoi [in the north of the country] is not fully aware of activities with Laos and Cambodia done by the central institute."

"The difficulty to have common actions is due to the differences in diagnostics and treatment of malaria. At the moment, [this collaboration is] only information sharing."

Program integrity

Cambodia

Cambodia has the highest percentage of high transmission among the group surveyed, 48% of its total population[5].

A 2018 national and provincial outbreak plan supporting village malaria workers and mobile malaria workers has been established. The outbreak plan coordinates surveillance and follow-up of case contacts in elimination districts at all levels of the health system. Yet, respondents feel this situation is inadequate because there are no district-level inspections to check the work is being done to a sufficient standard. They also pointed out the lack of smartphones and broadband capacity for those in the field to collect case data for surveillance in real time. Regulatory authorities' capacity is limited and substandard and falsified drugs still exist, but are declining thanks to concerted efforts with governments and international agencies.

All respondents were concerned about resistance to ACTs. Currently, respondents note that five types of ACTs are available but there is resistance to four of these. Policy requires universal access to ACTs, but it is unclear if malaria will remain a standalone program, or if / when it will be integrated into UHC.

The central drug and commodity supply system is rated poorly, with frequent stockouts at village level. Although respondents noted that private health provision is often preferred because it is easier to access, there have been concerns about inappropriate prescribing in private clinics.

In response to these concerns, in April 2018 the ministry of health called for an immediate halt to the supply of ACTs and rapid diagnostic tests to private providers registered in the Public-Private Mix program, a mechanism to leverage the private sector into health programs. This ban has resulted in a suspension of supply of quality-assured testing kits and medicines, and a halt to the provision of testing and treatment services for malaria at private health facilities.

All fevers should be tested but usually only people who visit a health clinic get tested. Rapid diagnostic tests were described as valuable, but the decreasing parasite loads means microscopy, which has limited availability, is still needed.

There is concern that asymptomatic malaria can lead to ongoing transmission. Further, the G6PD deficiency test is not widely used to identify the genetic disorder that can lead to haemolysis when administering the radical treatment for *P. vivax* malaria.

Respondents estimated use of insecticide-treated nets to be high (90% coverage) but work is needed to reach everyone and manage resupplies. Mobile and migrant populations, illegal workers and forest workers do not want to engage with services, due to fear of their legal status and cultural and language barriers – meaning they often end up coming for treatment when their condition is severe.

[5] World Health Organization, Cambodia country profile: www.who.int/malaria/publications/country-profiles/profile_khm_en.pdf?ua=1

In their own words

Cambodia

"The challenge we face is the hard-to-reach people – forest workers. They are illegal so they don't want to show up. It's difficult for us to distribute the impregnated nets and to provide malaria education."

"The resistance to ACTs is a big concern … we have changed ACTs five times already."

"The concern is that the effectiveness of ACTs will not last long. It is only 3-5 years, then the parasite will begin to have resistance. We don't have new ACTs to replace the current ones."

"We have many prevention measures but the most effective measure is the impregnated net distribution to the high-risk population and mobile or migrant populations. Bed net for the residential [populations] and hammock nets are for mobile and migrant populations."

India

In spite of being the highest-burden country in the region, India showed a 23% decline in reported cases within a year.[6] The state of Odisha is home to approximately 40% of the country's cases, which are concentrated in remote, heavily-forested regions. Mass screening and strong political backing has resulted in a reported 80% decline in malaria cases and deaths in 2017.

Access to diagnosis and treatment through frontline accredited social health activists (ASHAs, a term used for Indian community health workers) was believed to be good, but there were a number of indications that suggest that both ASHA and private providers did not always deliver appropriate treatment or ensure adherence. One person described all these factors as the perfect combination for creating resistance to ACTs. While there was virtually no documented resistance (apart from very isolated cases), several respondents were aware of treatment failure.

Respondents felt all aspects of malaria control required strengthening from prevention to training. They felt there was a need for an integrated vector control strategy, and that diagnosis was not always available. In particular, there were strong calls to increase microscopy skills and to improve the availability of this testing kit. In general, there was a feeling that healthcare workers need more training, but that human resources are lacking.

Turning to treatment, respondents identified a low awareness of treatment guidelines and felt access to ACTs is not universal and treatment is not always applied correctly. Some doctors are still administering chloroquine as they are not aware of revised treatment guidelines. There was concern about the difficulties in identifying and treating hard-to-reach populations.

Those familiar with the state of Odisha's comprehensive strategy see it as a potential model for the country. It includes mass-screening, diagnosis of all fevers, treatment of asymptomatic malaria and distribution and promotion of long-lasting insecticide-treated nets. Surveillance is conducted with rapid diagnostic tests, and microscopy training (and retraining) is continuous. ASHAs are incentivized to support prevention, diagnosis, treatment and behavior change.

[6] World Health Organization, World Malaria Report 2018: www.who.int/malaria/publications/world-malaria-report-2018/en/

In their own words

India

"Prevention is a challenge in the hard-to-reach jungles, hilly terrain and tribal areas; slums in the cities, where access is an issue; deserted homes, and residential tribal schools; large cultivated lands, like rice paddies where there are many breeding sites – all these places are challenging."

"It is important to help health staff understand that suppressing cases, or not reporting cases, is not a great idea. We have worked to help them understand that they should not fear any penalization simply because they have reported cases. Only if the real picture is reported, can we bring solutions to bear. Let us admit the real situation."

"The problem is with asymptomatic carriers, they get left out of such [currently available] diagnostics. What we need then is molecular diagnostics like real-time PCR [polymerase chain reaction] to catch this."

"The challenge is do I have a qualified technician with a working microscope at every public health center? Do I have mobile people at the ANM [community] and sub-center level who can go house to house taking samples? If I don't have qualified people, systems and recording data … then there is nothing there."

Myanmar

Respondents had positive views about health system strengthening and the national health plan. The Essential Package of Health Services to be implemented in 2021 includes malaria case management and an expanded number of community healthcare workers.

The outbreak plan was described as needing updating to include multi-sectoral coordination and collaboration, and a strategy to target mobile populations, ethnic groups and people living in conflict areas. Respondents recommended development of local plans to address specific local epidemiological conditions.

Respondents said access to ACTs was good, but there was great concern about poor surveillance and incomplete coverage of ACTs, with conflict areas being left unserved.

Partners expressed reluctance to use primaquine as a radical treatment for *P. vivax* because of perceived risks of inappropriate and incomplete use, since it requires a 14-day treatment course and additional testing for G6PD deficiency.

There was concern over self-treatment, poor quality or falsified drugs, shortages of skilled workers for microscopy, and healthcare workers to provide diagnosis and treatment. Poor surveillance could lead to the perception that resistance is not a big problem, when in fact cases of *P. falciparum* are due to resistance, as one respondent noted.

Almost half of Myanmar's population (44%) lives in low transmission zones.[7] Therefore, maintaining existing skills as case numbers fall, and then continuing to deliver malaria services in primary care once malaria nears elimination, was seen as a challenge.

Respondents believe malaria cases are declining thanks to vector control, so resistance to insecticides is not seen as a problem. There is a pilot project to improve surveillance by collecting mobile data in real time, but its success will be dependent on recruiting community healthcare workers. There are challenges in distributing long-lasting insecticide-treated bed nets, and non-treated bed nets are in use.

Thailand

Overall, respondents feel pharmacovigilance and the mechanisms to monitor the quality and supply of antimalarials are working well. Fevers are properly diagnosed and patients have access to ACTs. Study respondents feel valuable knowledge from the earlier malaria response (when the burden was high) is being lost and not replaced, and this is compounded by a general lack of trained staff. Respondents saw challenges in moving to a horizontal malaria program, fearing the disease would be lost within primary care, but most felt this could be overcome.

Views on outbreak management are mixed, and there is concern about how to manage diagnosis and treatment among migrants and populations living in conflict areas. Treatment is only available from government facilities and not pharmacies. CSOs feel they are underutilized by policy makers, and believe they could make the system more flexible and responsive.

Despite steps being taken to tackle ACT resistance to *P. falciparum*, most felt it was inevitable but did not give a timescale. None saw a need to move to a new treatment regimen now.

P. vivax treatment poses significant challenges, especially adequate testing for G6PD deficiency and adherence to the 14-day treatment.

Respondents felt Thailand has two well-functioning areas that could provide valuable models for other GMS countries. First, the country has successfully set up systems to capture and utilize knowledge from retiring staff, thus reducing loss of expertise. Second, its use of the 1-3-7 approach is also seen as effective, in contrast to Myanmar's experience.

[7] World Health Organization, World Malaria Report 2018: www.who.int/malaria/publications/world-malaria-report-2018/en/

In their own words

Myanmar

"Resistance to ACTs is not a big issue in our country, but we should be alert [to] it."

Thailand

"If there is a case, everything is put in place to prevent another case. We have research about the case movement. We can track the patient, moving from the border site across the border, and so on."

"CSOs don't want to duplicate the work of the government, but we would like to support the government. The government thinks diagnosis is the work of the government, but they may need help. Building the capacity of the CSOs is needed for that."

"With the program in Thailand, malaria should also be something for the new generation to take care of – the old generation should not retire without passing on the knowledge to the new generation."

"[The cross-border project] along the Cambodian border is very useful because they have outbreaks and there is drug resistance on the Cambodian side. They stopped using ACT, but Thailand still uses ACT. If people cross the border, they can have treatment failure, so it is important to cooperate."

Vietnam

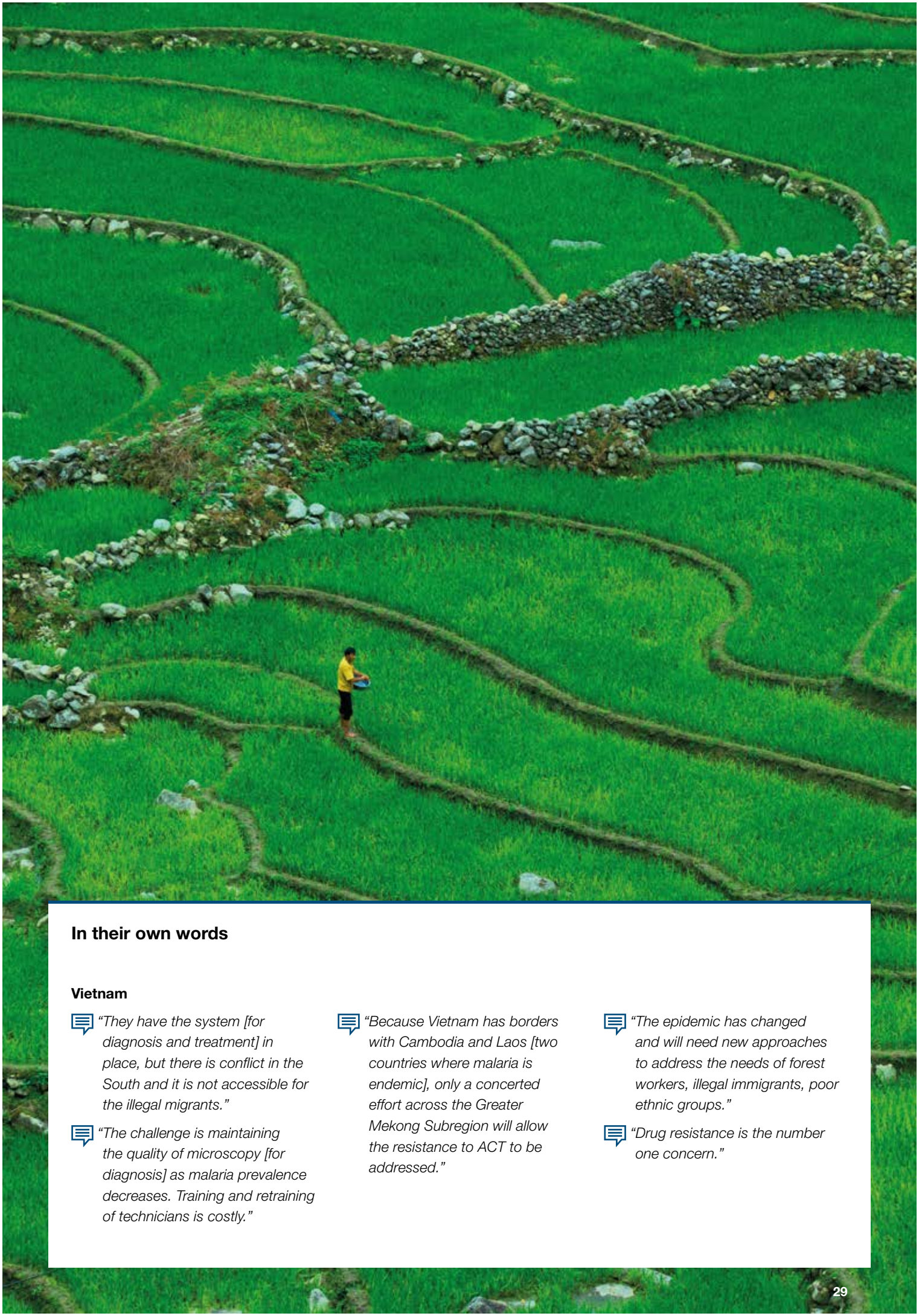
Most respondents rated the country's health system strengthening and capacity to prevent and treat malaria positively. Timely access to prevention measures, diagnosis and ACTs was seen as sufficient by all except CSOs, who rated these services poorly and noted a lack of engagement and missed opportunities for improved coordination. Resistance to ACTs is expected in the next five to 15 years, as is resistance to insecticides, but respondents were not able to estimate when this would happen.

The malaria program covers free diagnostic testing in high-priority areas with substantial caseload but community healthcare workers are not authorized by the government to conduct rapid diagnostic tests. Suspected cases of malaria need to be referred on to specific health centers for diagnosis and treatment, causing delays. Other reported challenges include maintaining the quality for microscopy diagnosis as malaria prevalence decreases, implementing new diagnostic technologies such as Polymerase-Chain-Reaction (PCR) assays, and mobile reporting in real time. Training and retraining of technicians in microscopy is seen as costly but necessary.

Treatment adherence was also perceived as an issue as there is no follow-up reported, and patients don't always take the medication long enough, particularly for the 14-day *P. vivax* treatment.

Respondents said the free long-lasting insecticide-treated nets distributed by the Global Fund were consistently used, although some noted a lack of coverage in some areas. They also mentioned nets were not systematically resupplied every three years. Non-treated bed nets are available privately, and repellents have been introduced on a small scale. Hammock nets, thought to be more useful for migrant populations, are also starting to be available.

Mobile populations are not included in the government strategy. This is a growing concern given there are now more illegal border crossings into protected forests.



In their own words

Vietnam

"They have the system [for diagnosis and treatment] in place, but there is conflict in the South and it is not accessible for the illegal migrants."

"The challenge is maintaining the quality of microscopy [for diagnosis] as malaria prevalence decreases. Training and retraining of technicians is costly."

"Because Vietnam has borders with Cambodia and Laos [two countries where malaria is endemic], only a concerted effort across the Greater Mekong Subregion will allow the resistance to ACT to be addressed."

"The epidemic has changed and will need new approaches to address the needs of forest workers, illegal immigrants, poor ethnic groups."

"Drug resistance is the number one concern."

Evidence-based programming

Cambodia

Cambodia has applied for a Global Fund grant to conduct operational research on migrant and mobile workers. The country has also identified the need to track the efficacy of antimalarials and revise national and regional treatment guidelines.

A respondent reported that a single dose tafenoquine for *P. vivax* is currently being introduced though this treatment is not yet registered in the country. Respondents also mentioned that a trial has started for a new ACT combination. Respondents mentioned a number of new technologies for prevention, diagnosis and treatment. These include mosquito sterilization, impregnated clothing and bracelets, and mobile PCR assays.

When asked about climate change, respondents felt it is a big concern. People believe it could increase mosquito populations and may lead to more outbreaks.

India

Respondents felt a pressing need for better surveillance data and making better use of existing tools. When asked about new technologies being developed for both treatment and prevention, most were unaware of any.

There was a perception that operational research was not actually used to inform strategy, and that more investment should be put into this field, and to generally better link research with the programs.

Respondents also called for more research around climate change. In particular, they said more evidence is needed on what impact climate change will have on mosquito populations and malaria outbreaks. Once evidence is collected, plans should be developed to ensure the country has the resilience to combat global warming.

Hyper-local strategies targeted at village level were mentioned, with the state of Odisha's program highlighted as a successful example that addresses the specific needs of target populations from the bottom-up through operational research.

Myanmar

ACTs are still effective in Myanmar but resistance in neighboring Thailand and Vietnam is concerning. Pharmacovigilance capacity for new treatments is not known and drug regulation is poor. Substandard drugs are produced at the borders with Myanmar and China and there are private supplies of artemisinin monotherapy, the use of which will promote resistance.

There were conflicting views about operational research. While some thought it was poorly understood and not well developed, with no budget, three-quarters of respondents said it has had an impact. Many quoted positive results from surveys assessing bed net coverage and drug supply as examples.

When asked about new technologies, respondents mentioned Pyramax, tafenoquine and the 7-day course of primaquine as radical treatments for *P. vivax*.

As in other countries, respondents said climate change is a concern, and that they expected it to increase malaria outbreaks through more rain or changes in the seasons.

In their own words

Cambodia

"We are very concerned about climate change. If the rains start early and last a long time, it may affect the breeding of mosquitoes and result in an increase in mosquitoes."

India

"This is a state [Odisha] where you find a heartening synchrony between researchers and program. In fact, policy makers come to us if they think something needs to be researched. I think that is tremendous. And they listen to us with an open mind, there is bi-directional communication, and they listen without any cynicism or skepticism. I would say this is positive, and very important for elimination. In fact, they want us to be a third party to evaluate their progress."

"Now our mandate … is to focus more on translational research. We are expected to spend 10% on basic research and 90% on translational research. This is the age to focus on impact."

"In India, it is almost like two different worlds, people doing malaria research, and the field. [The research is] very basic and very lab-oriented, it's not linked to the field."

Thailand

Most of those surveyed were involved in research or had close ties to operations based in the field. According to them, assessing drug efficacy and any signs of resistance is included in routine surveillance. Resistance to *P. vivax* is widespread and challenging because of the difficulty to diagnose the disease and for patients to adhere to treatment. Yet, the small number of cases may allow the country to cope without a new treatment regimen.

On research, they felt the focus and quality of research is more important than the size of the budget. They were most interested in research on the last mile of elimination, community diagnosis and treatment of *P. vivax* .

Views on climate change were split with equal numbers of respondents seeing it as a threat (or not) that could impact seasonality and increase the size of endemic areas.

Vietnam

Vietnam has achieved all of the targets set out in its 2011-2020 National Strategy for Malaria Control and Elimination, with more than 40 of its 58 provinces now malaria-free. In 2016, the country reported less than 10,000 cases of malaria.

Unsurprisingly, respondents were extremely positive about the country's outbreak monitoring and surveillance. They felt both areas were adequately resourced to identify resistance (expected to occur in the next 5-15 years), a key concern of the ministry of health. Against this background, the national malaria program has devised a plan to monitor resistance as well as falsified and substandard drugs.

Respondents reported a variety of new drugs and emerging technologies they were aware of, from indoor spraying to community larvae prevention, repellents and PCR assays.

In their own words

Thailand

"Yes, I am concerned about resistance. It is a smaller problem than in Africa … but it can become a problem."

Vietnam

"New ACT drugs are being introduced but [they are] not enough … "

Areas for action

The malaria leaders interviewed in this study raised important points that are summarized in 10 areas for action. These should assist efforts to push forward the malaria elimination agenda in South and Southeast Asia, and achieve the targets by 2030.

Respondents identified 10 areas for action:

Sustaining political commitment at all levels and across borders

1. Advocacy at all levels – local, national, regional and global – is critical, particularly as the number of cases decreases and political and funding support is at risk. Local community leaders need to engage just as much as the ministers of health and prime ministers.

2. Enhanced cross-border cooperation allowing for a joint regional response is vital for addressing the hard-to-reach mobile and migrant populations.

Encouraging collaboration between all sectors involved in the fight against malaria

3. Coordination between basic research, epidemiology / surveillance, operational research, program management and policy makers is essential for a successful malaria response. An integrated approach should be the norm.

4. The private healthcare sector and civil society need to be included into programs as equal partners, particularly during the shift to horizontal programming and funding. They can extend the government system, educate and advocate for policy, provide technical support, and reach the most vulnerable.

Tackling emerging challenges around resistance and climate change

5. Monitoring resistance requires improved surveillance policies and systems. Monitoring and case reporting need to be more accurate, and innovative approaches applied to mobile and migrant populations that are at greatest risk. Further, more work is needed to integrate surveillance into routine work processes so that it is not an occasional add-on, and new technologies that make the work more efficient should be used.

6. Climate change needs to be studied for its potential to increase malaria incidence and deaths. Respondents identified this as a major threat to future health, with concerns on how increased rains could change breeding patterns and expand how far the mosquitoes range. Changes in temperature and rainfall patterns due to climate change will vary across sub-regions in South and South East Asian countries, with different effects on mosquito populations and malaria incidence. Apart from currently available modelled estimates, these changes also need to be tracked through ongoing research involving eco-surveillance and monitored epidemiological trends.

Improving implementation around diagnosis, treatment and access to care

7. Diagnosis of all fevers – vital to combating ACT resistance – and use of and training on microscopy diagnosis is a pressing issue across all countries. There is a need for transferring knowledge, and training and retraining healthcare workers, particularly as malaria programs become integrated into primary care. Diagnosis is often limited to those who attend health clinics or go to private pharmacies, leaving out patients that are at home and MMPs who are driving much of the caseload and adding to concerns about resistance.

Encouraging innovation in fighting malaria

8. Treatment could be improved with additional training, both for doctors and community healthcare workers, and revised guidelines.

9. A micro strategy approach can help reach vulnerable populations (migrants and forest workers) who account for the majority of new malaria cases. Immigration police and agricultural officials can help with this, technologies like GPS can assist mobile teams that work cross border, and diagnosis and treatment can be provided through new distribution channels.

10. Addressing the rising challenge of *P. vivax* requires systematic G6PD deficiency testing and treatment follow-up to ensure patients adhere to the 14-day treatment. This is the only way to ensure complete parasite elimination.

MalaFA findings: common issues and divergences in Asia and Africa

This Asian research followed on from a similar stakeholder research in 15 African countries launched in conjunction with the Malaria Summit in April 2018[8]. An extension to the African report (focusing on four Central African countries not included in the original 15) should be published at the end of 2019.

Overall, Asian respondents were more optimistic about reaching 2030 elimination goals for *P. falciparum* than their African counterparts. Yet, Asian participants were not as optimistic when it came to elimination of *P. vivax*.

Among African respondents, there was a widespread feeling that 2030 targets would not be achieved unless big changes occurred in funding and delivery.

Despite differences, respondents in Asian and African countries also agreed on common areas, including the need for: increased domestic financing; training new cohorts of healthcare workers in malaria care; and continued investment in R&D to effectively fight insecticide and ACT resistance.

Common issues in Asia and Africa

	Asia	Africa
Sustainability of funding	Asian respondents were concerned about funding from donors falling off in the face of other, more pressing, diseases (TB, NCDs) and increasing GNI gram-negative infections such as pneumonia. However, they largely felt that donors were supportive of their national plans.	African respondents were concerned about the stability of donor funds and wanted increased domestic funding. In addition, they felt donors were not particularly supportive of national plans.
Insecticide and ACT resistance	There was more mixed concern about resistance, particularly around ACT resistance. Compared to Africa, fewer respondents felt that resistance to ACTs was a significant threat, perhaps because Asian countries believe they will reach elimination targets before resistance becomes widespread. However, resistance is certainly an issue, with Cambodia, for example, reporting relatively high failure rates for ACTs.	Nearly all respondents were very concerned about insecticide and ACT resistance and felt that it was essential to pursue R&D for new tools.
Surveillance	There were big concerns that many malaria outbreaks happen in remote areas and cannot be identified and controlled quickly enough to prevent them from spreading. Indian respondents were particularly concerned about this issue.	African respondents were concerned that there was insufficient surveillance to identify and control malaria outbreaks, not just in remote areas. This becomes even more of a problem as a country nears elimination.

[8] MalaFA Africa report: www.novartis.com/news/media-library/malaria-futures-for-africa-report

Divergences in Asia and Africa

	Asia	Africa
Lack of skilled healthcare workers (HCWs)	Asian respondents were all very concerned about the lack of properly skilled HCWs, particularly in key skills such as microscopy diagnosis. There was a general feeling that there was a loss of skilled capacity as malaria declines.	While Asian respondents identified a lack of skilled HCWs as the main health system barrier, African respondents focused on the problem of limited availability of health facilities to even host HCWs to serve populations at risk of malaria, particularly in rural areas.
Climate change	This was a very frequent concern, with many respondents saying elimination could be at risk.	Very few respondents expressed concerns about the impact of climate change.
Migrant and hard-to-reach populations	Migrant and hard-to-reach populations in remote areas are the real crux of the problem in the region. Respondents are very concerned that without finding a solution to this problem, elimination will be very difficult.	This concern did not come through as strongly from African respondents – probably because malaria is much more common in many African countries.

Glossary

Source: World Health Organization

1-3-7

Developed in China, the 1-3-7 strategy requires the reporting of malaria cases within one day, confirmation and case investigation within three days, and a follow-up response within seven days. It is used in Myanmar and Thailand

Antimalarial medicine

A pharmaceutical product used in humans for the prevention, treatment or reduction of transmission of malaria

APLMA

Asia Pacific Leaders Malaria Alliance

Artemisinin-based combination therapy (ACT)

A combination of an artemisinin derivative with a longer-acting antimalarial drug that has a different mode of action

ASHA

Accredited social health activist (India)

CSO

Civil society organization

Diagnosis

The process of establishing the cause of an illness (for example, a febrile episode), including both clinical assessment and diagnostic testing

Elimination, malaria

The interruption of local transmission (reduction to zero incidence of indigenous cases) of a specified malaria parasite species in a defined geographic area; continued measures are required to prevent re-establishment of transmission

Note: The certification of malaria elimination in a country will require that local transmission is interrupted for all human malaria parasites

Global Fund

The Global Fund to Fight AIDS, Tuberculosis and Malaria

GMS

Greater Mekong Subregion

G6PD testing

G6PD deficiency test is used to identify the genetic disorder that can cause haemolysis when given antimalarials. This is an issue for *P. vivax* infections as requiring this second diagnostic test in low-resource settings can delay treatment

Incidence, malaria

Number of newly diagnosed malaria cases during a defined period in a specified population

Indoor residual spraying (IRS)

Operational procedure and strategy for malaria vector control involving spraying interior surfaces of dwellings with a residual insecticide to kill or repel endophilic mosquitoes

Insecticide

Chemical product (natural or synthetic) that kills insects. Ovicides kill eggs; larvicides kill larvae; pupacides kill pupae; adulticides kill adult mosquitoes. Residual insecticides remain active for an extended period

Long-lasting insecticidal net (LLIN)

See below

Net, insecticide-treated

Mosquito net that repels, disables or kills mosquitoes that come into contact with the insecticide on the netting material. The two categories of insecticide-treated net are:

1. Conventionally treated net: a mosquito net that has been treated by dipping it into a WHO-recommended insecticide. To ensure its continued insecticidal effect, the net should be re-treated periodically
2. Long-lasting insecticidal net: a factory-treated mosquito net made of netting material with insecticide incorporated within or bound around the fibers. The net must retain its effective biological activity for at least 20 WHO standard washes under laboratory conditions and three years of recommended use under field conditions

Note: Untreated mosquito nets can also provide substantial protection against mosquito bites, but they have less effect against vectorial capacity and transmission rates

MMPs

Mobile and migrant populations. People in these groups, who are itinerant and often have no fixed home, are highly vulnerable to malaria because of barriers to access to healthcare services for both health and malaria curative and preventive services

MoU

Memorandum of Understanding

Operational research

Research carried out using data routinely collected by disease control programs, to provide ways of improving program operations, and deliver more effective, efficient and equitable care

P. falciparum, P. vivax

Malaria is caused by Plasmodium parasites and two of these species – *P. falciparum* and *P. vivax* – pose the greatest threat. In 2017, *P. falciparum* accounted for the majority of cases in the WHO region of Southeast Asia (62.8%)

PCR

Polymerase-Chain-Reaction

Primaquine

A 14-day course of malaria treatment that is challenging for patients to complete because of the length of time required

Rapid diagnostic test (RDT)

Immunochromatographic lateral flow device for rapid detection of malaria parasite antigens

Regional Artemisinin-resistance Initiative (RAI)

The RAI has been expanded into a second phase, the RAI2-Elimination (RAI2E) program, which is a USD 243 million regional grant to accelerate elimination of *P. falciparum* malaria in the Greater Mekong Subregion over a three-year period (2018-2020). The RAI2E supports increased malaria service coverage for remote populations in border areas and other at-risk populations, as well as case management through health volunteers and strengthening of national surveillance systems

Universal healthcare coverage (UHC)

Universal healthcare coverage is a healthcare system policy that stipulates healthcare and financial protection to all residents of a specific country or region

About Baird's CMC

Baird's CMC is a policy and market research consultancy which also has a communications counselling practice. Baird's CMC has undertaken similar policy research in Africa for clients including the European & Developing Countries Clinical Trials Partnership (EDCTP), Johns Hopkins University Bloomberg School of Public Health, the International AIDS Vaccine Initiative, the International Partnership on Microbicides and PATH.

For more information: www.bairdscmc.com

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