

ELIMINATING MALARIA

IN THE GREATER MEKONG SUBREGION

UNITED

TO **END** A DEADLY **DISEASE**



World Health
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A woman and her two-year-old son sit under a mosquito net in their home in Svayor village, Cambodia, after receiving guidance from a village malaria worker on how to properly hang it.

Overview

“For decades, WHO has worked alongside countries and partners in the Greater Mekong Subregion to provide strategic guidance and technical support in the malaria fight. We will continue to support this effort until we have achieved our shared goal: eliminating malaria transmission altogether.”

Dr Pedro Alonso, WHO Global Malaria Programme Director

Recent efforts to fight malaria in the Greater Mekong Subregion (GMS) have yielded impressive results. According to the latest WHO estimates, the six GMS countries cut their malaria case incidence by an estimated 54% between 2012 and 2015. Malaria death rates fell by 84% over the same period (Figures 1 and 2).

Progress was made possible through greater access to effective malaria control tools, particularly artemisinin-based combination therapies (ACTs), rapid diagnostic tests (RDTs), and insecticide-treated mosquito nets (ITNs). Since 2012, the targeted provision of these core tools for vulnerable populations has increased substantially across the subregion, leading to an acceleration in the pace of progress.¹

However, the spread of antimalarial drug resistance threatens to undermine these gains. To date, resistance of malaria parasites to artemisinin – the core compound of the best available antimalarial medicines – has been detected in five countries of the GMS.² In some areas, resistance to artemisinin and its partner drugs has reached alarming levels (Figure 3).

WHO has coordinated global efforts to counter artemisinin resistance from the beginning, providing technical guidance and mobilizing partners to action. In 2013, WHO launched the *Emergency response to artemisinin resistance (ERAR) in the Greater Mekong Subregion*, a high-level plan of attack to contain the spread of drug-resistant parasites and to provide life-saving tools for all populations at risk of malaria.

The ERAR initiative brought fresh energy and resources to the GMS, generating new research, facilitating coordination and technical

¹ Between 2012 and 2015, there was a 54% decline in malaria case incidence across the GMS compared to a 6% increase over the preceding 3-year period (2008–2011). Malaria mortality rates fell by 84% from 2012–2015 compared to a 48% decline from 2008–2011 (data not included for Yunnan Province, China).

² To date, artemisinin resistance has been detected in Cambodia, Lao People's Democratic Republic (PDR), Myanmar, Thailand and Viet Nam.

84%

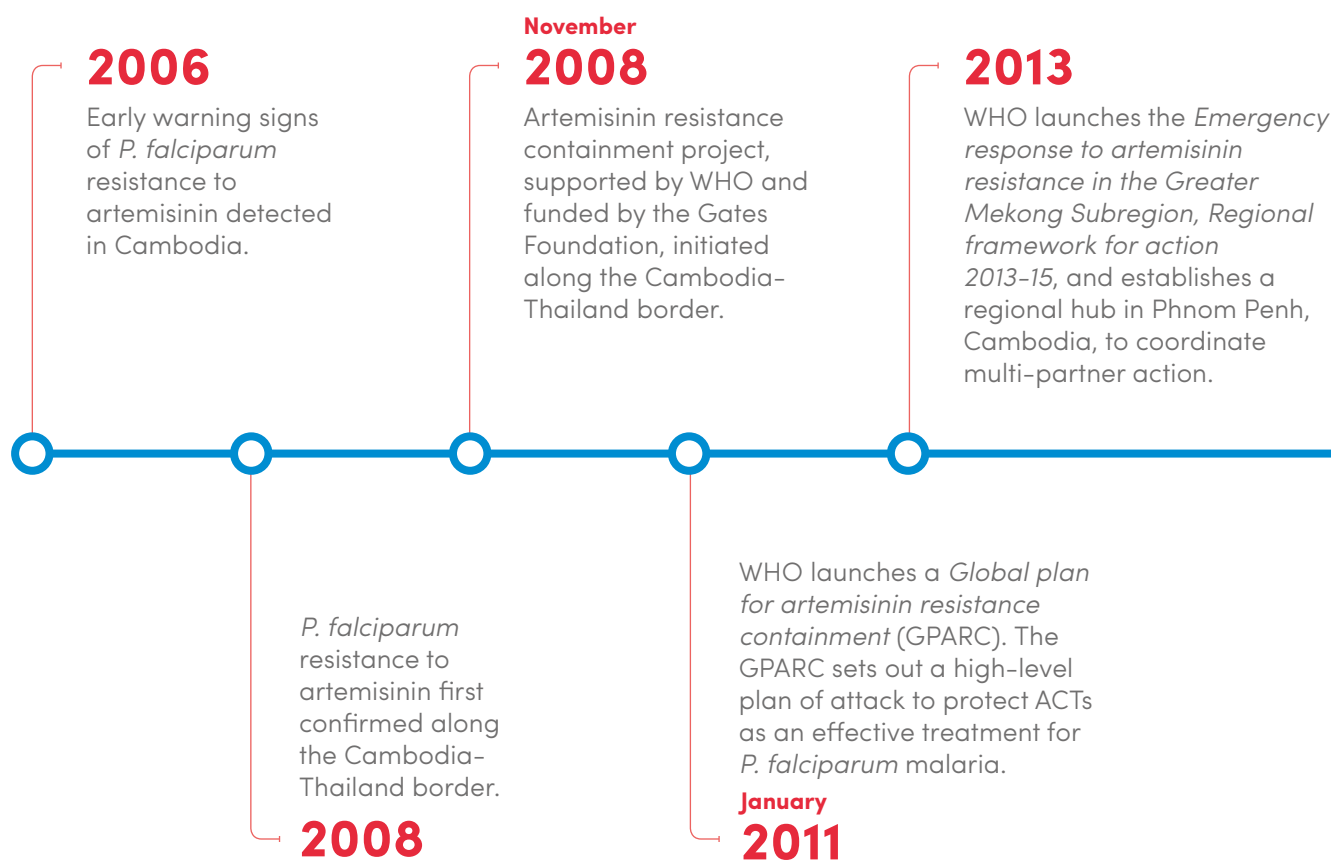
reduction
in malaria
deaths
between
2012 and
2015.

support and accelerating progress. But even as this work was under way, additional pockets of resistance emerged independently in new geographic areas of the subregion. In parallel, there were reports of increased resistance to ACT partner drugs in some settings. A new approach was needed to keep pace with the changing malaria landscape.

In 2014, the Malaria Policy Advisory Committee – a WHO advisory body comprised of leading malaria experts – agreed that there was only one way forward: eliminating malaria transmission altogether from the GMS. In collaboration with national malaria programmes and partners, WHO led the development of the *Strategy for malaria elimination in the Greater Mekong Subregion (2015–2030)*.

Urging immediate action, the strategy calls for the elimination of all species of human malaria across the GMS by 2030, with priority

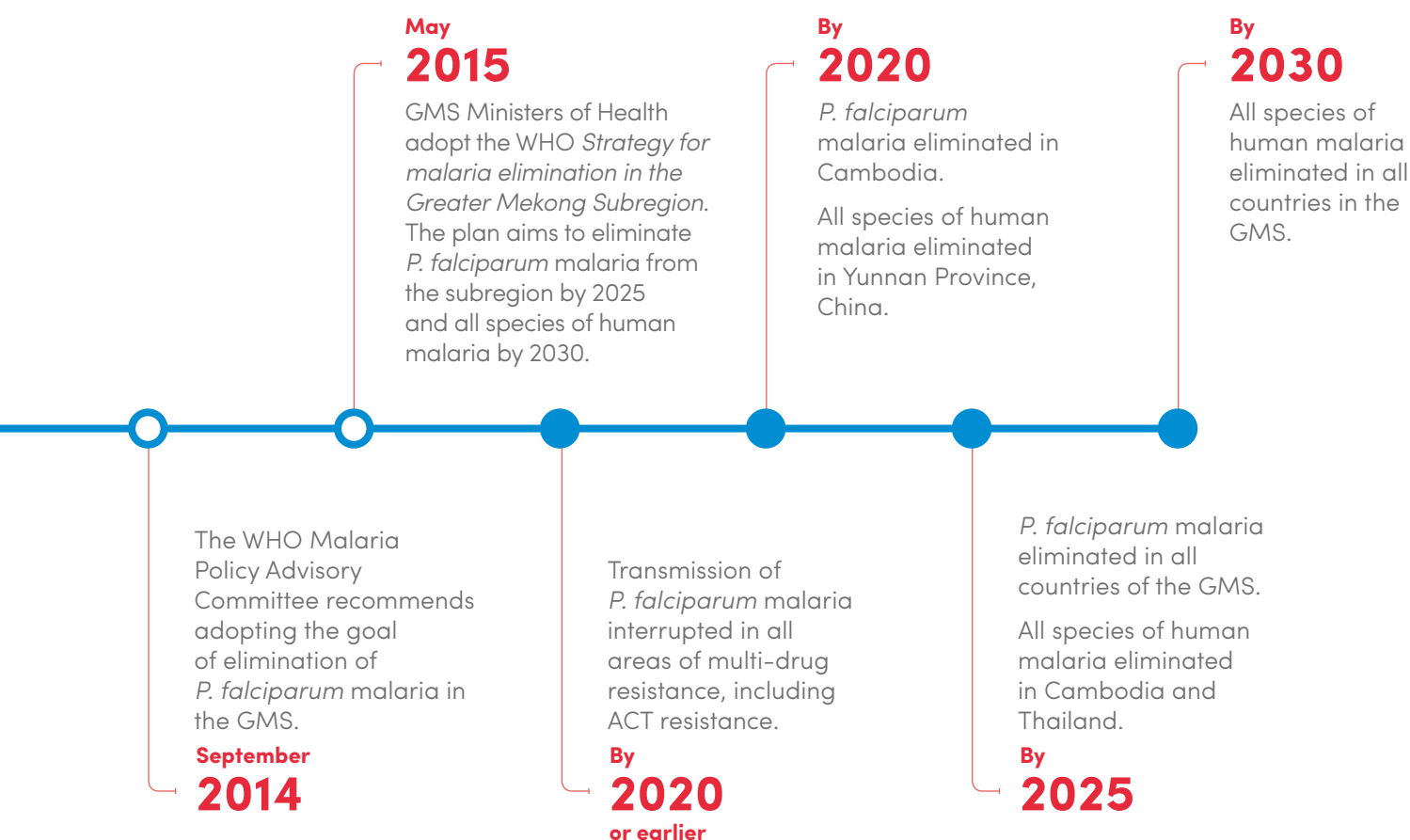
TIMELINE AND KEY TARGETS



action targeted to areas where multi-drug resistant malaria has taken root. This subregional strategy is fully aligned with the goals and targets of the WHO *Global Technical Strategy for Malaria 2016–2030*, adopted by the World Health Assembly in May 2015.

With technical guidance from WHO, all GMS countries have developed national malaria elimination plans. Together with partners, WHO will provide ongoing support for country elimination efforts through the Mekong Malaria Elimination (MME) project – a new initiative that replaces the former ERAR hub.

To succeed, GMS countries must continue to develop and roll out effective policies that address the challenges head-on and galvanize action on the ground. This report offers a brief overview of several tried-and-tested approaches that can help countries across the subregion end transmission of this deadly disease.



A steep decline in malaria cases and deaths across the GMS (2010-2015)

FIGURE 1.

Malaria cases in the six GMS countries

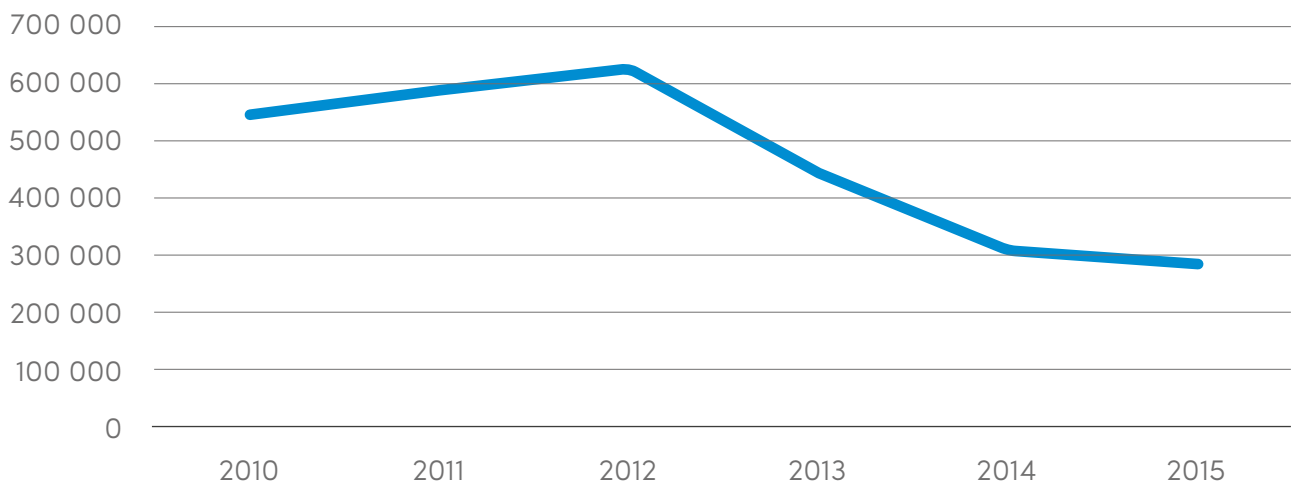
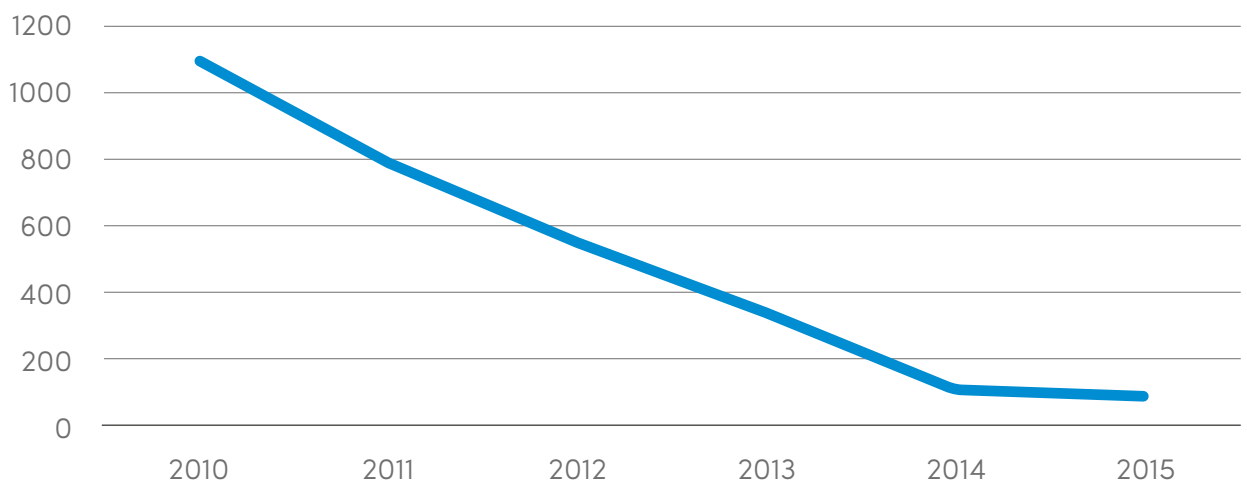


FIGURE 2.

Malaria deaths in the six GMS countries



A brief history of malaria in the GMS

The GMS is comprised of six countries bound together by the Mekong River, one the longest rivers in the world. The area, known for its lush floodplains, is home to an incredible diversity of plants and animals. It is also home to mosquitoes³ that transmit malaria and to four parasites that cause the disease in humans. *P. falciparum* and *P. vivax* are the dominant malaria parasites in the subregion.

Malaria has long ravaged the GMS and today millions of people remain at risk of contracting the disease. Despite significant progress in controlling the disease and the availability of effective treatments, the malaria parasite is adaptive and has a history of developing resistance to the most effective antimalarial medicines.

Parasites resistant to chloroquine were first detected in the late 1950s along the Cambodia–Thailand border before appearing in sub-Saharan Africa, resulting in a significant increase in malaria deaths. Resistance to sulfadoxine pyrimethamine in the late 1960s, and to mefloquine in the 1980s, led to treatment failure in many patients in the GMS and beyond.

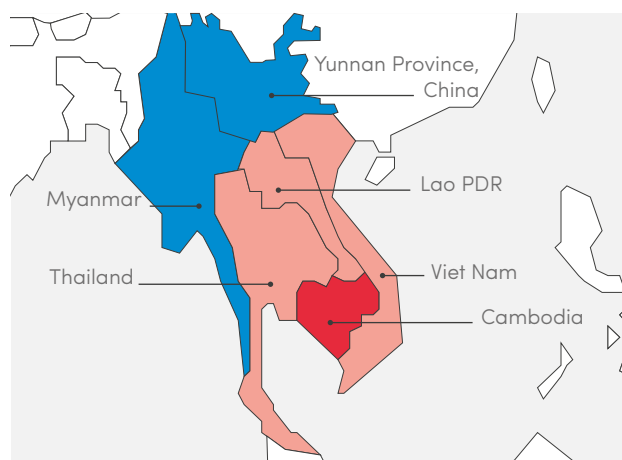
When artemisinin resistance was first confirmed along the Cambodia–Thailand border in 2008, WHO took immediate action to contain its spread. A coordinated regional effort to eliminate malaria transmission in the GMS is critical to protecting the efficacy of existing antimalarials.

FIGURE 3.

Number of ACTs with a high failure rate in the GMS*

- 1 ACT
- 2 ACTs
- 4 ACTs

* There are currently five ACTs recommended by WHO. Resistance to artemisinin and its partner drugs is the primary cause of ACT failure in the GMS. This map shows the number of ACTs with a high failure rate (exceeding 10%) by GMS country.



³ *Anopheles dirus* and *A. minimus*, the most prevalent mosquito species in the GMS, are efficient vectors of human malaria.

How WHO is helping countries accelerate towards malaria elimination

For more than 60 years, WHO has provided guidance and technical support to all countries with ongoing malaria transmission. WHO's work in the GMS is supported by technical experts based at six country offices, regional offices in New Delhi and Manila, the MME hub in Phnom Penh, and WHO's Geneva headquarters.

WHO is committed to helping countries achieve their malaria goals through:

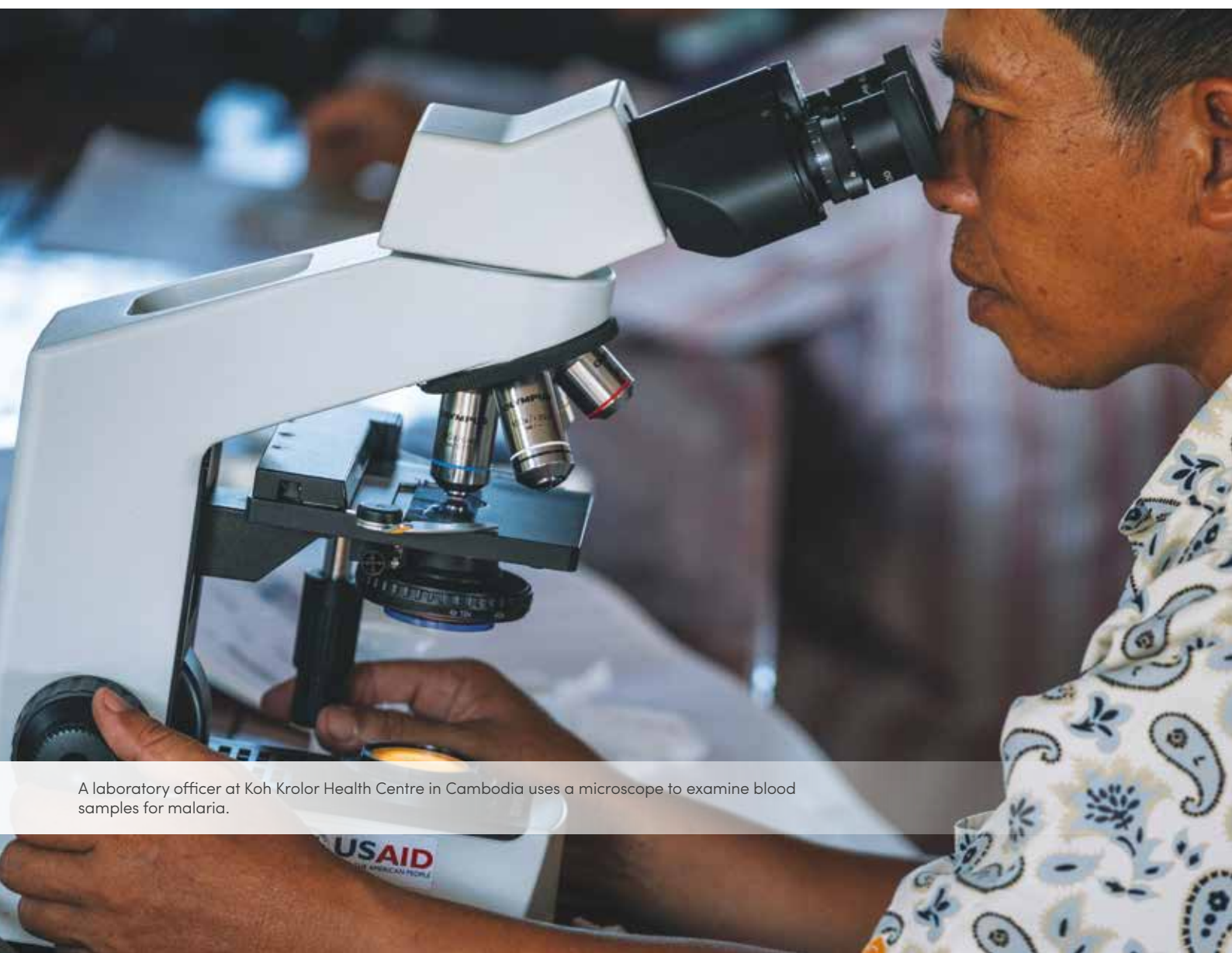
- setting and disseminating global guidance and policies on malaria control and elimination;
- supporting countries as they adapt, adopt and implement WHO global norms and standards for malaria control and elimination;
- assisting countries as they formulate national malaria strategic plans;
- helping countries develop robust malaria surveillance systems;
- responding to requests from countries to address biological threats, operational emergencies and bottleneck issues.

Key definitions: ACTs and artemisinin resistance

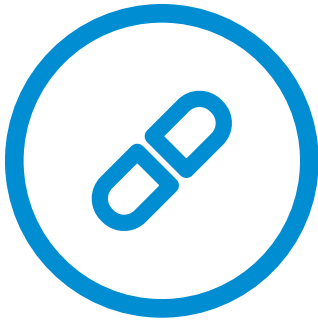
Isolated from the plant *Artemisia annua*, or sweet wormwood, artemisinin and its derivatives are very effective medicines known for their ability to swiftly reduce the number of parasites in the blood of patients with malaria. ACTs are recommended by WHO as the first-line treatment for uncomplicated *P. falciparum* malaria. Over the last 15 years, expanded access to ACTs in malaria-endemic countries has played an important role in reducing the global malaria burden.

ACTs combine artemisinin with one of several partner drugs. The role of artemisinin is to dramatically reduce the number of parasites in the bloodstream during the first three days of treatment. The role of the partner drug is to eliminate any remaining parasites thereafter.

Artemisinin resistance is defined as a delay in the clearance of parasites from the bloodstream following treatment with an ACT. Currently, most patients with delayed parasite clearance are still cured by ACTs provided the partner drug remains effective. Thus, protecting the efficacy of artemisinin and its partner drugs is critically important.



A laboratory officer at Koh Krolor Health Centre in Cambodia uses a microscope to examine blood samples for malaria.



Improving access to high quality drugs

High quality, efficacious antimalarial medicines are the cornerstone of effective malaria case management, and their availability must be ensured. Poor quality medicines not only adversely affect the health and lives of patients but also damage the credibility of health care programmes, increase the burden on health systems, and can contribute to drug resistance.

In recent years, national malaria programmes in the GMS, with support from WHO, have made significant strides in eliminating counterfeit and substandard medicines. The production and marketing of oral artemisinin-based monotherapies (oAMT) have been banned across the subregion. National supply chains have been strengthened to improve the availability of high quality drugs in areas where they are needed.

To achieve elimination, these efforts must be continued and enhanced. National drug regulatory agencies, with WHO support, have been working to improve their capacity to conduct quality control testing and reduce the flow of counterfeit and substandard products across borders. Surveillance systems have been bolstered to facilitate the detection and elimination of low quality and fake medicines.



Country progress towards banning oral artemisinin-based monotherapies

With support from WHO and partners, GMS countries have developed strategies to phase out the use of oAMT and to remove from markets antimalarial medicines that do not meet WHO prequalification standards. According to a recent survey by Population Services International in Cambodia, antimalarial medicines were sold at 858 drug outlets⁴ in Cambodia in 2015; of these, only one oAMT product was found in one private sector outlet. Viet Nam has also reported significant reductions in the availability of malaria monotherapies. In 2015, half of all drug outlets in five endemic provinces were surveyed; of these, only 2% were found to have oAMT compared to 21% the previous year.

⁴ These outlets included health facilities, pharmacies, drug stores, general retail outlets and mobile drug vendors.



Mass drug administration for malaria elimination

In recent years, mass drug administration (MDA) has been viewed with renewed interest as an approach for accelerating malaria elimination. Through MDA, all individuals in a defined population or geographic area are given antimalarial medicines regardless of whether or not they show symptoms of the disease. The aim is to ensure that all people infected with malaria in the targeted population or area are treated – including those who are unwittingly carrying the disease.

In 2015, WHO issued recommendations on MDA, as well as on other mass and focal screening and treatment approaches. WHO recommended that MDA may be considered as a component of malaria elimination efforts in the GMS in areas with good access to treatment, vector control and surveillance.



A physician dispenses ACTs at a health clinic located along the Thailand–Myanmar border.



Ensuring drug efficacy and detecting drug resistance

Monitoring the efficacy of antimalarial drugs is a key component of malaria elimination. Since 2000, WHO has partnered with countries in the GMS to regularly track changes in the susceptibility of malaria parasites to currently-recommended antimalarial drugs. This monitoring, through therapeutic efficacy studies (TES), allows for the early detection of antimalarial resistance and helps ensure that patients are provided with effective treatments.

It was through routine TES that the first warning signs of artemisinin resistance were observed along the border shared by Thailand and Cambodia. WHO responded immediately, leading efforts to confirm study findings and define the geographic distribution and intensity of the problem. Following initial containment efforts in 2008, WHO launched a *Global plan for artemisinin resistance containment* in 2011 and the *Emergency response to artemisinin resistance in the Greater Mekong Subregion* in 2013.

WHO emphasizes the need for all malaria-endemic countries to regularly conduct TES. Such monitoring is essential to inform timely changes to national treatment policies; a treatment failure rate exceeding 10% for a particular antimalarial should trigger a change in treatment policy.

Since 2000, WHO has maintained a global database to monitor antimalarial drug efficacy in malaria-endemic countries; this database houses the world's largest collection of TES.



Dy Sam Art holds a box of ACTs prescribed by a village malaria worker to cure his malaria infection.



Strengthening surveillance of malaria cases

“Strong surveillance systems and dynamic response mechanisms will be the cornerstone of success in elimination efforts across the Mekong. Significant investments are needed to improve the collection of timely malaria data so that we can better target interventions for affected populations.”

Dr Rabintra Abeyasinghe,
Coordinator, Malaria, other
Vectorborne and Parasitic
Diseases Unit, WHO

To achieve malaria elimination, strong surveillance systems must be in place. Data collected through these systems helps countries understand who is affected by the disease, how trends in malaria cases and deaths are changing, and what impact programmatic efforts are having. This information is then used by national programmes to inform planning and action.

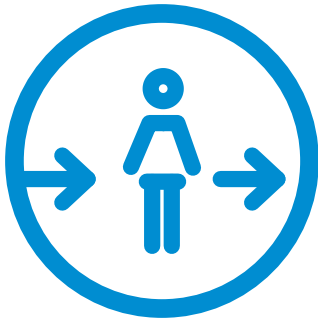
- ◉ In areas where the malaria burden is high, data informs how to direct resources and lifesaving tools to where they are needed most.
- ◉ In areas where the malaria burden is low, surveillance systems are used to identify any remaining pockets of infection and inform an appropriate response. Identifying and treating every infection in a timely manner can help interrupt the chain of malaria transmission and prevent outbreaks of the disease.

WHO and partners have worked to strengthen the design and management of malaria surveillance systems across the GMS. With support from WHO and the Global Fund to Fight AIDS, Tuberculosis and Malaria, a web-based platform was launched in May 2016 to help countries collect and analyse data on the malaria burden from regional to district level. The platform will serve as an important tool for aligning and harmonizing malaria surveillance and response strategies across the subregion, and globally.



Village malaria workers hold tablets equipped with a special application for capturing malaria data. This data is then sent to a centralized server where it is used to inform malaria programmatic activities.

While this work represents an improvement in surveillance capacity, additional funding is needed to support trainings for better data management at all levels. In areas approaching elimination, surveillance systems must be reoriented to ensure that any new malaria cases are rapidly detected and treated. Investing in robust surveillance systems – and the people who manage them – will help make our work more efficient and effective.



Reaching migrant & mobile populations

“Reaching our malaria goals in the GMS will only be possible when we have better data on the disease burden among migrant and mobile populations. National policies that allow for equal and uninterrupted access to malaria diagnosis and treatment for all people within and across borders is essential.”

Dr Deyer Gopinath,
Medical Officer, Thailand
Country Office, WHO

All people living in malaria-endemic areas must have equal access to tools that prevent and treat the disease. Migrant and mobile populations (MMPs) are at high risk of becoming infected with malaria. They are also among the hardest populations to protect from this disease.

MMPs often work in areas of high malaria transmission and frequently change locations to pursue temporary employment in forestry or agriculture. They tend to work and sleep outdoors or in poorly constructed shelters, increasing their exposure to malaria-carrying mosquitoes in or near forested areas.

WHO supports national programmes in their efforts to design strategies to better target MMPs. To this end, toolkits have been created that guide programmatic decision-making and inform research methods. Together with partners, WHO has also supported the implementation of innovative approaches including:

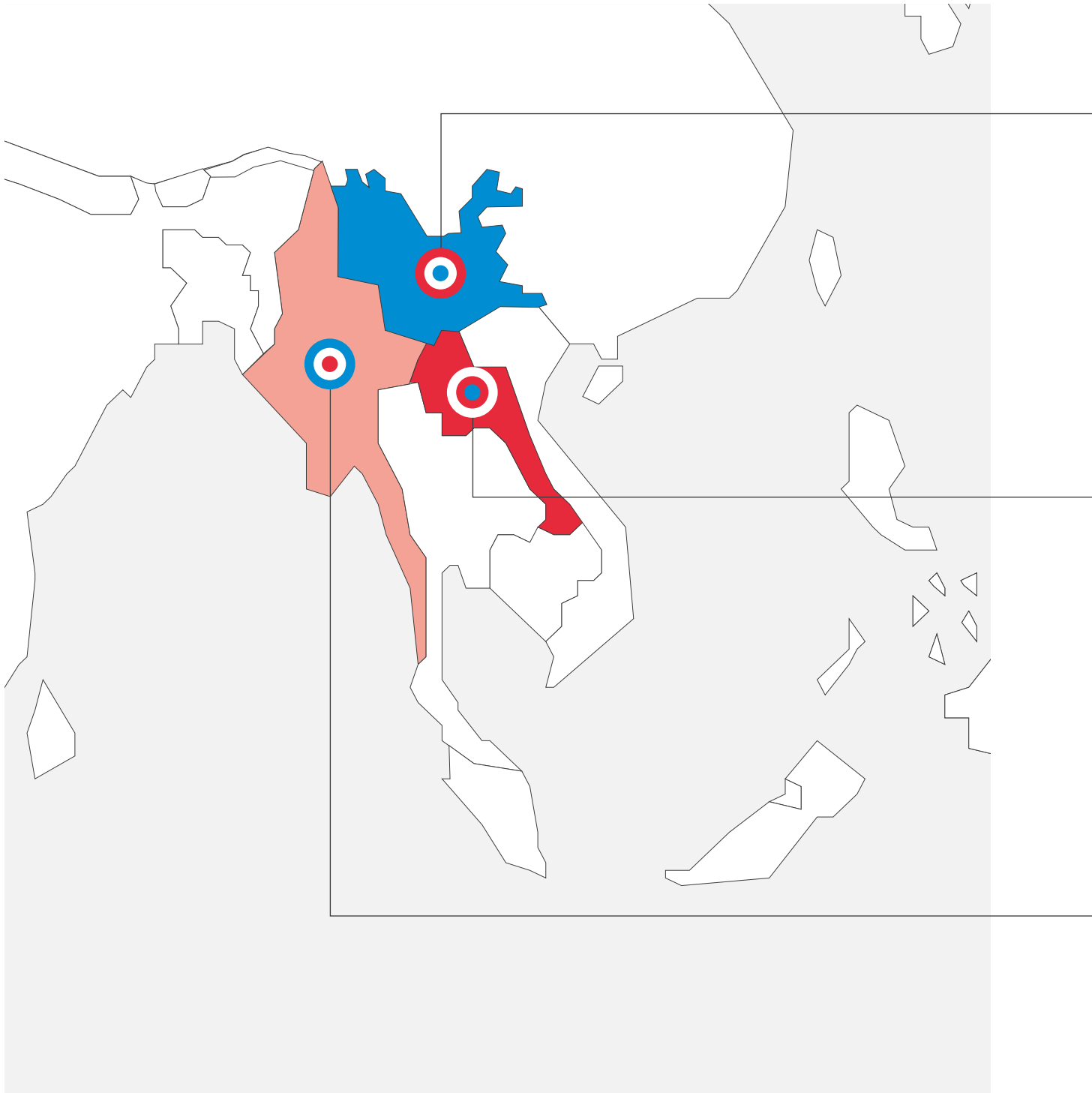
- training migrant workers as mobile health volunteers so that they can provide malaria information, testing and treatment for their peers;
- providing malaria prevention and treatment services – mosquito nets, rapid diagnostic testing and antimalarial medicines – in areas frequented by MMPs such as forest entry points, border crossings and bus stations.

Economic development is on the rise in the GMS, and the number of development projects involving MMPs is expected to increase. Stronger partnerships with private companies engaged in these projects must be forged. Ongoing and future projects should include provisions and plans to provide workers with free testing and treatment, tools for personal protection, and appropriate communication and information materials. These actions will help protect MMPs and other workers and stem the importation of malaria cases.



Many agricultural workers, like these two farmers in Battambang Province in Cambodia, must travel to find work and may stay away from their homes for months or years at a time.

Country action towards malaria



elimination

China's case reporting critical to elimination progress

China's "1-3-7 strategy," rolled out nationally in 2012, is setting a high standard for the timely reporting of malaria cases, their investigation, and the appropriate health response. In this approach, village malaria workers report cases within 24 hours of detection. Within three days, cases are investigated and the risk of local transmission is evaluated. A follow-up response is conducted within seven days. The "1-3-7 strategy" provides clear guidance on roles and timeframes. It is easy to understand, measurable, and sets a benchmark for future progress.

Lao PDR improving coverage with vector control

Insecticide-treated mosquito nets (ITNs) – when used appropriately – are a highly effective way of preventing malaria; the use of these nets has lowered the malaria burden in many settings. Lao PDR aims to provide mosquito nets for all people living in malaria-endemic areas and is making good progress towards that goal: In 2015 alone, the country had distributed 200 000 nets, reaching 82% of the population at risk.

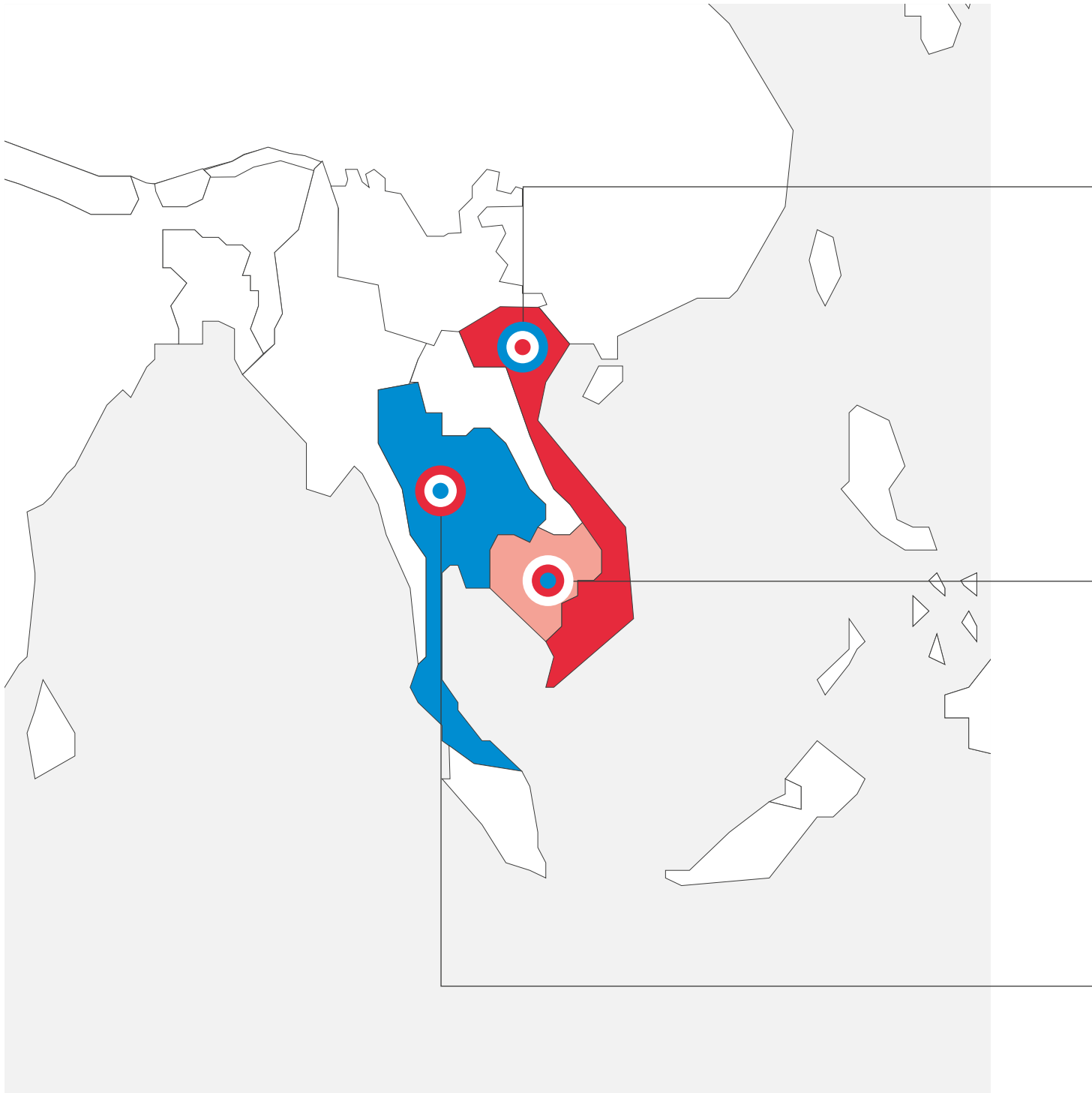
However, in some settings, preventing malaria through ITNs can be difficult. For example, in some areas of the GMS, mosquitoes bite early in the evening when people are not sleeping under a net. In addition, many MMPs work outside in the evenings and sleep in temporary shelters where traditional ITN use can be challenging.

Village malaria workers at the front lines of the malaria fight in Myanmar

In recent years, thousands of village malaria workers (VMWs) have been recruited, trained and deployed across the GMS to fight malaria. Where access to health services is limited, VMWs are diagnosing and treating malaria in the home, referring severe cases to the nearest health centre. As a result, a higher proportion of cases are being reported to the national malaria registry, strengthening databases and informing programme planning.

Myanmar, in particular, has developed an extensive network of VMWs. Their presence and geographic distribution have contributed significantly to the early detection of malaria cases, contributing to a 62% decrease in malaria cases in Myanmar between 2012 and 2015.

Country action towards malaria



elimination

Viet Nam making big strides towards elimination

Between 2012 and 2015, Viet Nam achieved a 52% decline in malaria cases. This success was underpinned by strong national leadership, expanded access to mosquito nets and quality antimalarial medicines. A robust surveillance system has allowed Viet Nam to better target interventions where they are needed most.



With the malaria burden sufficiently lowered, Viet Nam has set its sights on finishing the job: a national elimination action plan aims to end transmission of the disease over the next 15 years. Says Dr. Tran Thanh Duong, Director of Viet Nam's National Institute of Malariology, Parasitology and Entomology, "With strong financial and technical support from WHO and international agencies, and the commitment of the Viet Nam government, malaria will be eliminated in the country by 2030."

Cambodia pilots innovative approaches to protect vulnerable populations

The malaria burden in Cambodia is heavily concentrated in forested areas. To protect forest workers as they sleep, the government expanded access to hammock nets treated with insecticides. These nets were provided in Cambodia as part of a "forest pack" that also included topical insect repellent and information on malaria prevention and treatment. The impact and utility of these forest packs is being assessed to guide future use.



Thailand's new malaria strategy spotlights community prevention and engagement

With strong national leadership, a robust health system, and universal health policies, Thailand reduced its malaria cases by 85% between 2000 and 2015. To build on this progress, the country recently launched a 10-year malaria elimination strategy with innovative approaches for reaching people most at risk of malaria. Emphasis is placed on strengthening malaria surveillance and response systems to inform the delivery of targeted interventions for all populations at risk of malaria. Community members will be empowered to become active participants in local malaria control and elimination activities to better protect themselves and their families from the disease.





A path towards malaria elimination

“The level of progress we’ve seen in the GMS in just a few short years is remarkable. With robust funding and national leadership, we can eliminate malaria in this subregion once and for all.”

Dr Fred Binka,
Coordinator of the Mekong
Malaria Elimination project

Eliminating malaria in the GMS by 2030 is possible. The *Strategy for malaria elimination in the Greater Mekong Subregion* – and the corresponding national elimination plans for each GMS country – outline the way forward (Table 1). The subregional strategy is based on the following guiding principles:

- All countries can accelerate efforts towards elimination through combinations of interventions tailored to local contexts.
- Country ownership and leadership, with participation of communities, are essential to accelerate progress through a multisectoral approach.
- Improved malaria case management and entomological surveillance, monitoring and evaluation, and stratification by malaria disease burden are required to optimize implementation of malaria interventions.
- Equity in access to services is essential, especially for the most vulnerable and hard-to-reach populations.
- Innovation in tools and implementation approaches will enable countries to maximize progress.

The GMS elimination strategy underscores the importance of applying interventions that are tailored to a particular setting. Priority is given to reducing malaria cases and preventing deaths; where this has been achieved, efforts should focus on robust surveillance and active management of remaining cases.

A supportive policy environment is necessary for success. Country leadership is essential together with engagement from all relevant

sectors, in particular agriculture, labour, forestry and mining. Cross-border collaboration on surveillance and on the targeted provision of services for at-risk groups is also critical.

The goals of the GMS elimination strategy reflect a broader global commitment to end malaria infection and death and to protect the efficacy of our most powerful antimalarial treatments. WHO will continue to be at the forefront of this effort, working in collaboration with governments and partners to provide coordination, strategic guidance, and technical support.

In recent years, new information on the changing malaria landscape in the GMS required a rapid, large-scale transition from a strategy of resistance containment to one of elimination. Countries and their partners, including WHO, must be ready and able to adjust approaches in real time as we learn from experience. If we can be as strong and adaptive as the parasite itself, we can end transmission of malaria and secure a happier, healthier world for all.

TABLE 1.

Tracking progress towards malaria elimination in the GMS countries

| Country | Status of national malaria elimination planning | National malaria elimination target date |
|---|---|--|
| Cambodia | "Malaria Elimination Action Framework (2016-2020)" launched in January 2016. | 2025 |
| China | "Malaria Elimination Strategy 2015-2020" completed in 2015. | 2020 |
| Lao People's Democratic Republic | "National Strategic Plan for Malaria Control and Elimination (2016-2020)" completed and endorsed by the Ministry of Health in November 2016. | 2030 |
| Myanmar | "National Strategic Plan for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination 2016-2020" has been finalized. Launch planned in December 2016. | 2030 |
| Thailand | "National Malaria Elimination Strategy 2017-2026" launched in April 2016. | 2024 |
| Viet Nam | "National Strategy for Malaria Control and Elimination 2011-2020" with orientation to 2030 and detailed action plan approved by the Ministry of Health. | 2030 |

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Residents of Kwai Camp in Myanmar live and work on a rubber plantation, where malaria transmission is high.

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