

THE MEKONG MALARIA ELIMINATION PROGRAMME

# Countries of the Greater Mekong zero in on falciparum malaria

BULLETIN #8

DECEMBER 2019



## KEY MESSAGES

- Countries of the Greater Mekong Subregion (GMS) have achieved **remarkable progress toward malaria elimination** in the face of an ongoing but manageable drug resistance problem. Between 2012 and 2018, the number of malaria cases in the six GMS countries fell by 74%; malaria deaths fell by 95% over the same period.
- Collectively, GMS countries reported **the steepest decline to date in *P. falciparum* malaria**. The number of *P. falciparum* cases dropped by 65% in the first half of 2019 compared to the same period last year.
- Several countries attained **significant national milestones**: Cambodia reported zero malaria-related deaths for the first time, China reported its third consecutive year of zero indigenous cases, and Thailand saw a 38% drop in *P. falciparum* cases between 2017 and 2018.
- Cases are now **highly concentrated in a few remaining areas** of the Subregion. Most cases are reported among forest goers and mobile and migrant populations. Targeted action and sustained commitment from countries, partners and WHO are essential to reach the goal of malaria elimination in the Subregion by 2030.



## BACKGROUND

The six countries of the Greater Mekong Subregion (GMS) – Cambodia, China (Yunnan Province), the Lao People's Democratic Republic (PDR), Myanmar, Thailand and Viet Nam – continue to make significant gains in their battle to eliminate malaria by 2030. In recent years, there has been remarkable progress towards elimination of the disease. Between 2012 and 2018, the reported number of malaria cases fell by 74%; malaria deaths fell by 95% over the same period.

For the first time, *P. falciparum* (*Pf*) cases no longer comprise the majority of cases in the Subregion. In 2018, less than 40% of total cases were *Pf*. This is a substantial achievement in the fight against a parasite species that causes the highest number of malaria cases and deaths globally each year. The Subregion reported its steepest decline in *Pf* cases to date: a decrease of 65% from January to June 2019 compared to the same time period last year.

The accelerated decrease in *Pf* is notable in view of the ongoing threat posed by drug resistance. Drug-resistant *falciparum* parasites continue to circulate in the Subregion but have not expanded beyond the Greater Mekong. If first-line treatments fail, alternative and efficacious drug regimens remain available to cure patients with drug-resistant malaria. The availability of efficacious drugs, combined with the substantial drop in *Pf*, presents a unique window to defeat *Pf* malaria. Resolute political and partner commitment is needed to finish the job.

Such commitment has already yielded impressive results. In 2018, Cambodia reported zero malaria-related deaths for the first time in the country's history. This year, China reported its third consecutive year of zero indigenous cases. Meanwhile, Thailand is nearing *Pf* elimination, with a 38% decrease in *Pf* cases between 2017 and 2018.

FIGURE 1.

**Malaria deaths in the six GMS countries (2012-2019)**

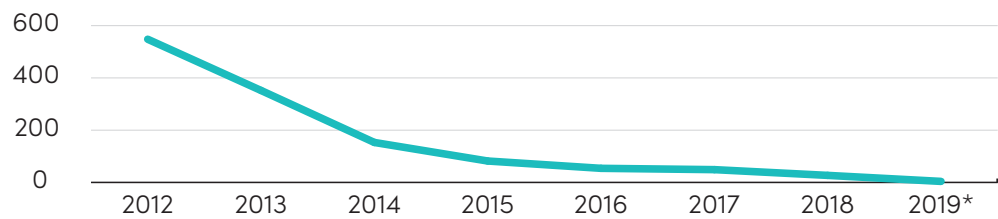
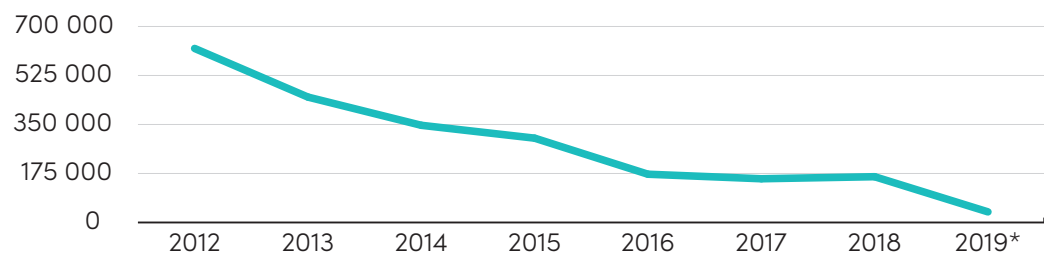


FIGURE 2.

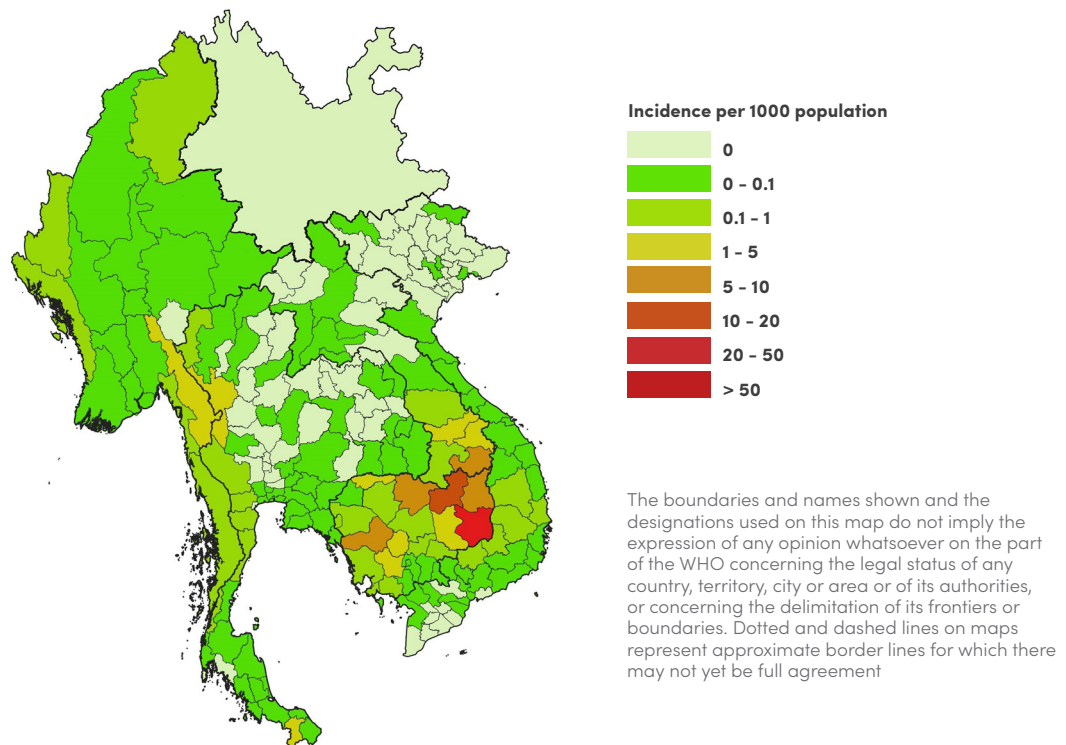
**Malaria cases in the six GMS countries (2012-2019)**



\* 2019 covers the period January to June.

MAP 1.

**Regional map of malaria incidence by province (Jan-Jun 2019)**



In this publication, reported cases include cases reported from all sources of public health facilities, community health workers and the private sector, except for Myanmar data which do not include partner data in 2018. The case count in China includes only indigenous cases. This Bulletin presents available data as of October 2019.

## TARGETED ACTION

After an increase in cases in some parts of the GMS last year, countries have swiftly responded with targeted action. Cambodia, for example, launched an intensified response plan. Countries are working to strengthen surveillance and improve collaboration across borders. Increased access to malaria prevention, diagnosis and treatment has enabled countries to better protect vulnerable communities.

Cases are now highly concentrated in a few remaining areas of the Subregion. Most cases are reported among forest goers and mobile and migrant populations. Targeted action to reach these populations is necessary not only for eliminating malaria but also for ensuring universal health coverage (UHC). Key interventions such as the use of mobile malaria workers and malaria posts are helping to reach at-risk populations living in remote areas.

FIGURE 3.  
***P. falciparum* cases in the GMS (2016–2019)**

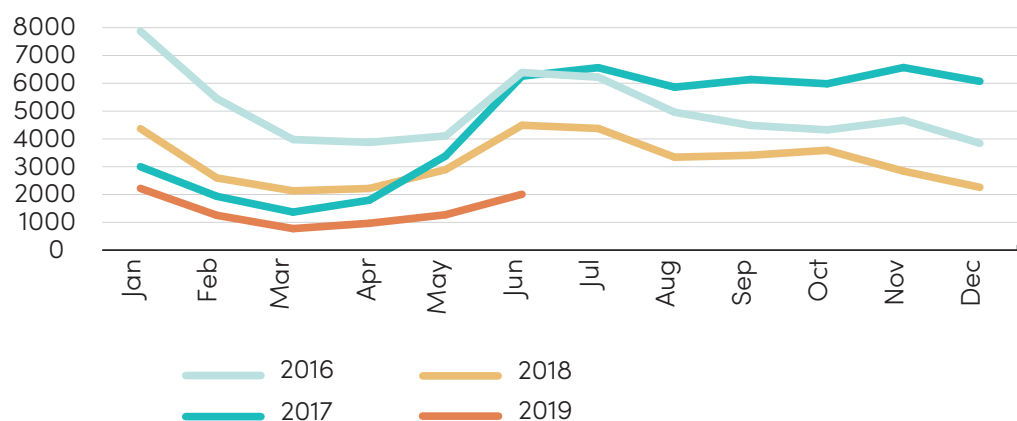
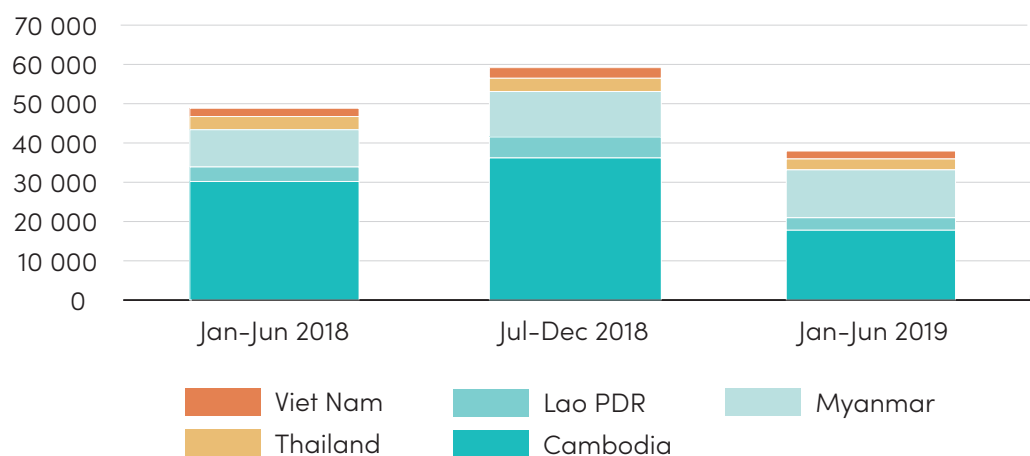


FIGURE 4.  
**Malaria case distribution in GMS countries (2018–2019)**





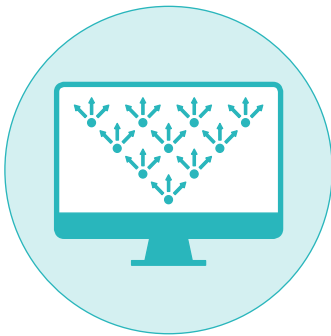
## SUSTAINED COMMITMENT

To drive away malaria from the GMS once and for all, sustained commitment from countries, partners and WHO is essential. Since the adoption of the WHO *Strategy for malaria elimination in the GMS* (2015–2030), GMS countries have worked toward the shared goals of *Pf* elimination by 2025 and of all species of human malaria by 2030. Last year the GMS Ministers of Health recommitted to hastening elimination by signing the "Ministerial Call for Action to Eliminate Malaria in the GMS before 2030".

Regional and international partners have supported the ambitious targets through continued financial and technical support. WHO supports partner coordination, communication with external stakeholders and cross-border initiatives through the Mekong Malaria Elimination (MME) programme. This MME team, along with WHO staff based in six GMS country offices, regional offices in Manila and New Delhi, and headquarters in Geneva, support the rapid implementation of the GMS malaria elimination strategy.

WHO's work in the GMS is supported through generous contributions from the Bill & Melinda Gates Foundation, the Global Fund to Fight AIDS, Tuberculosis and Malaria, the UK Department for International Development and the US Agency for International Development.

As countries in the Subregion work to stamp out *Pf* malaria, strong country ownership is essential. Sustaining the momentum built thus far is critical to reaching malaria elimination.



## REGIONAL DATA-SHARING PLATFORM

Progress toward elimination can be measured through the WHO Regional Data-Sharing Platform (RDSP). Funded by the Regional Artemisinin-resistance Initiative (RAI) of the Global Fund to Fight AIDS, Tuberculosis and Malaria, the web-based platform hosts monthly surveillance data from all GMS countries. Through the platform, detailed analyses can be produced, enabling a range of applications such as outbreak monitoring and hotspot identification. Data from the platform are also used to produce the quarterly WHO MME Epidemiology Summary and this annual bulletin.

Data-sharing is the core feature of the platform. Since 2018, the RDSP has been used to share data across the Thai-Cambodia border as well as the China-Myanmar border. At bi-country meetings, malaria focal points work side-by-side to analyse trends along border areas. Access to the platform is provided to national malaria control programme (NMCP) focal points as well as partners in Cambodia. WHO MME helps train both national and subnational focal points on the latest RDSP tools.

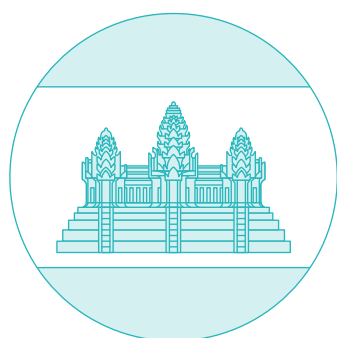
WHO works with national programmes to continually improve the platform. In October, MME hosted the second annual GMS surveillance meeting, with

discussions centred on how to use the platform to facilitate targeted action. Decisions at the local level are informed by more detailed and timely data.

The usefulness of the RDSP has even extended beyond the GMS. For example, lessons learned from the RDSP have supported other regional initiatives such as the WHO South-East Asia regional database and the annual global forum on malaria-eliminating countries.

TABLE 1.  
**National elimination plans and strategies**

COUNTRY	NATIONAL ELIMINATION PLANS AND STRATEGIES IN THE GMS	TARGETS
<b>Cambodia</b>	<i>Malaria Elimination Action Framework (2016–2020)</i>	<i>Pf malaria eliminated by 2020</i> <i>Malaria eliminated by 2025</i>
<b>China (Yunnan)</b>	<i>National Malaria Elimination Action Plan (2010–2020)</i>	<i>Malaria eliminated by 2020</i>
<b>Lao PDR</b>	<i>National Strategic Plan for Malaria Control and Elimination (2016–2020)</i>	<i>Pf malaria eliminated by 2025</i> <i>Malaria eliminated by 2030</i>
<b>Myanmar</b>	<i>National Strategic Plan for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination (2016–2020)</i> <i>National Plan for Malaria Elimination in Myanmar (2016–2030)</i>	<i>Pf malaria eliminated by 2025</i> <i>Malaria eliminated by 2030</i>
<b>Thailand</b>	<i>National Malaria Elimination Strategy (2017–2026)</i>	<i>Malaria eliminated by 2024</i>
<b>Viet Nam</b>	<i>National Strategy for Malaria Control and Elimination in the Period 2020 and Orientation to 2030</i>	<i>Pf malaria eliminated by 2025</i> <i>Malaria eliminated by 2030</i>



## CAMBODIA

Following a peak in malaria transmission in 2017, Cambodia mobilized a Malaria Intensification Plan to halt and reverse this increase. For the first time, in 2018, no malaria-related deaths were reported. In the first half of 2019, the number of cases decreased by 26% compared to the same period in 2018.

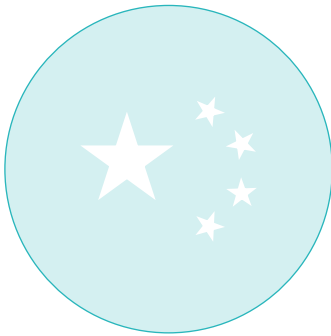
The country has reported a rapid decline in *Pf* cases. From January to June 2019, the number of *Pf* cases fell by 76% compared to the corresponding period in 2018. Cambodia is now presented with a unique opportunity to reach its ambitious national target of *Pf* elimination by 2020.

The substantial drop in cases coincides with the implementation of the country's Intensification Plan. Key pillars of this plan include strengthened surveillance and more aggressive interventions for forest goers and migratory populations. Over 100 mobile malaria workers (MMWs) were recruited among forest goers living in malaria hotspots. These MMWs

provide screening and treatment to forest goers inside forests, during forest outreach and at the village level. At the peripheral level, a team of WHO epidemiologists supports surveillance and case mapping and facilitates coordination among stakeholders.

Despite Cambodia's success in drastically reducing *Pf* cases, a remaining challenge is the fight against *P. vivax* malaria. Unlike *Pf*, *P. vivax* can cause relapses in a patient. So far this year, approximately 85% of malaria cases in Cambodia were *P. vivax*. The country is piloting radical cure for *P. vivax* in an operational district of Pursat Province and in Kampong Speu Province.

On World Malaria Day 2019, Cambodia's national celebrations served as a prime example of high-level governmental commitment to elimination. Events to raise awareness were held in Koh Nhek, Monduliri – one of the remaining endemic areas – and the Minister of Health of Cambodia and WHO Regional Director for the Western Pacific both attended in support of the country programme.



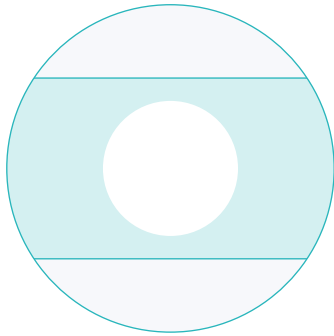
## CHINA

China is on track for malaria elimination, with the last indigenous case reported in August 2016. Seven of the 24 historically endemic provinces have received subnational verification of elimination, including Shanghai, Zhejiang, Jiangxi, Jiangsu, Guangdong, Fujian and Shanxi. The country aims to verify all provinces by early 2020.

Stopping onward transmission from imported cases is a top priority. This year China reported 2111 imported malaria cases and 12 malaria deaths (as of October 2019). The country is strengthening regional and intersectoral collaboration to prevent imported cases. Four co-prevention and co-control partnerships were established, and the country's health sector is working more closely with customs, trade and travel departments.

China continues to implement the "1-3-7" surveillance strategy, whereby case notification occurs within one day, case investigation within three days and foci investigation and targeted action within seven days. To avoid transmission and re-establishment, monthly bulletins are issued on reported and detected cases. Training, technical support and supervision are provided regularly to sustain capacity.

In June, China hosted the third global forum of malaria-eliminating countries in Wuxi, Jiangsu Province. The forum included a specific focus on high-risk populations for malaria elimination. Mutual learning was promoted among countries within the E-2020 initiative, a group of 21 countries aiming to eliminate malaria by 2020. Countries discussed ways to help spread innovations from one context to another.



## LAO PEOPLE'S DEMOCRATIC REPUBLIC

Between 2012 and 2018, the number of malaria cases in Lao PDR fell by 80%. There was a 14% reduction in cases from January to June 2019 compared to the same time period in 2018. The number of *Pf* cases also decreased by 50% in the first half of 2019 compared to the first half of last year.

The country has greatly strengthened its surveillance system, with malaria data from all sectors (e.g. public, private, community and military) now integrated into a single platform. All passively detected cases are reported through line-listed, village-level data. These data enable the programme to conduct analyses at a very granular level, which allows for effective and targeted responses in high-burden villages. Elimination areas are also using an elimination-dedicated database to record and track the implementation of case and foci-based activities, including notification, investigation, classification and response.

In 2019, Lao PDR adopted an enhanced response strategy to target areas with elevated and prolonged levels of transmission. The response includes enhancing the roles and function of the village malaria workers to: proactively and routinely test forest-going populations, who are disproportionately affected by malaria; provide health-seeking and malaria risk education; and conduct these activities in close collaboration with the village head. The response strategy also involves point-of-care testing for *P. vivax* patients in high-burden health centers.

In two northern provinces, the country is piloting integrated Drug Efficacy Surveillance, which integrates follow-up information on every patient into routine surveillance reporting. The country is also working to approve a new second-line treatment for uncomplicated malaria, including fast-tracking the registration process.



## MYANMAR

Myanmar has made unprecedented progress in curtailing its number of malaria cases. The caseload decreased dramatically between 2012 to 2018, with cases dropping by 85% and malaria deaths by 95%. In the first half of 2019, cases continued to fall by 61% compared to the same period last year.

Through major improvements in access to early diagnosis and appropriate treatment, the proportion of *Pf* cases has dropped significantly. Last year *Pf* accounted for 52% of all malaria cases. *Pf* cases decreased by 70% in the first half of 2019, compared to the same period last year.

In Myanmar, surveillance systems currently capture information from over 12 000 public health facilities, over 21 000 Integrated Community Malaria Volunteers and 1800 general practitioners. The NMCP, with support from WHO, is developing a web-based online data entry platform that will enable the programme and partners to enter real-time data. The digital platform



will be scaled up to include data on case management, notification, case and foci investigation, classification and response.

Currently, Myanmar is in the fourth year of implementing its National Malaria Strategic Plan (2016–2020). The NMCP recently underwent its mid-term external malaria programme review that will guide the development of the next strategic plan for 2021–2025. A multi-stakeholder consultation workshop was held in June to develop the costed "National Strategic Plan for Malaria Elimination and Monitoring and Evaluation Plan (2021–2025)".

Although significant progress has been made, there are still challenges: forest-related malaria, limited access to at-risk populations such as internally displaced persons residing in conflict areas and delays in reporting from partners. The ongoing conflict in non-state actor areas such as Kayin, Kachin and Rakhine is also a serious hindrance to protecting hard-to-reach groups from malaria.



## THAILAND

Since 2012, there has been an 81% reduction in the total number of cases reported in Thailand. From 2017 to 2018, the number of cases fell by 42%, with another drop of 17% in the first half of 2019 compared to 2018.

Thailand is nearing *Pf* elimination with only 612 *Pf* cases reported so far this year. The country reported a 38% drop in *Pf* cases from 2017 to 2018. *Pf* cases decreased by 2% in the first half of 2019 compared to the same period last year.

The Department of Disease Control aims to accelerate to zero local cases by 2021, based on achievements in 2017 and 2018, which were far beyond the targets in the malaria elimination operational plan. Currently, 35 of a total 77 provinces are malaria-free. Preliminary evidence suggests that a further five provinces could meet criteria for subnational verification of a malaria-free status for next year.

Thailand continues to implement the highly successful "1-3-7" malaria surveillance strategy. From January to June 2019, 81% of malaria cases were notified within one day, 82% of cases were confirmed and investigated within three days and 76% of reactive case detection events were conducted within seven days.

Foci mapping at the sub-village level is being enhanced through a mobile application. Currently, a pilot initiative is being tested in two provinces which would enable real-time mapping of foci and tracking of responses.

One of the challenges for Thailand's malaria elimination effort has been the concurrent dengue outbreaks which have put a strain on human resources. Measures are being taken to mobilize additional health personnel for malaria field responses.



## VIET NAM

Viet Nam has reduced its malaria cases by 75% in the period from 2012 to 2018. The country has already met and exceeded its strategic targets for 2020, including malaria elimination in over 40 provinces. Most cases are concentrated in hilly, forested areas in only four provinces, with one province alone accounting for nearly one-third of all cases.

After a decade of steep decline, Viet Nam reported a slight increase in malaria cases between 2016 and 2018. This year the country has reversed the trend, with a 4% drop in cases in the first half of 2019 compared to the corresponding period in 2018. Although total cases decreased, the number of *Pf* cases increased by 8% in the first half of 2019 compared to last year.

In some areas, malaria cases have increased mostly due to an influx of migrant workers and forest goers. Other challenges remain, such as reaching the most vulnerable populations with quality malaria services and updating national and sub-national treatment policies to ensure effective case management.

The waning efficacy of the current first-line malaria treatment in the Central Highland provinces bordering Cambodia is a critical situation for Viet Nam and the region. This challenge requires urgent attention and action. In September, the national malaria programme, with support from WHO and United Nations Office for Project Services (UNOPS), launched an alternative first-line treatment in the provinces of Binh Phuoc and Dak Nong.

A joint mission conducted by WHO and the National Institute of Malariology, Parasitology and Entomology in June 2019 reviewed the elimination efforts and highlighted the progress made thus far, particularly the 75% drop of malaria cases in Binh Phuoc this year. The review highlighted the need to focus on the few remaining areas of transmission, improve understanding of the factors contributing to residual transmission, and develop tailored interventions for at-risk groups.



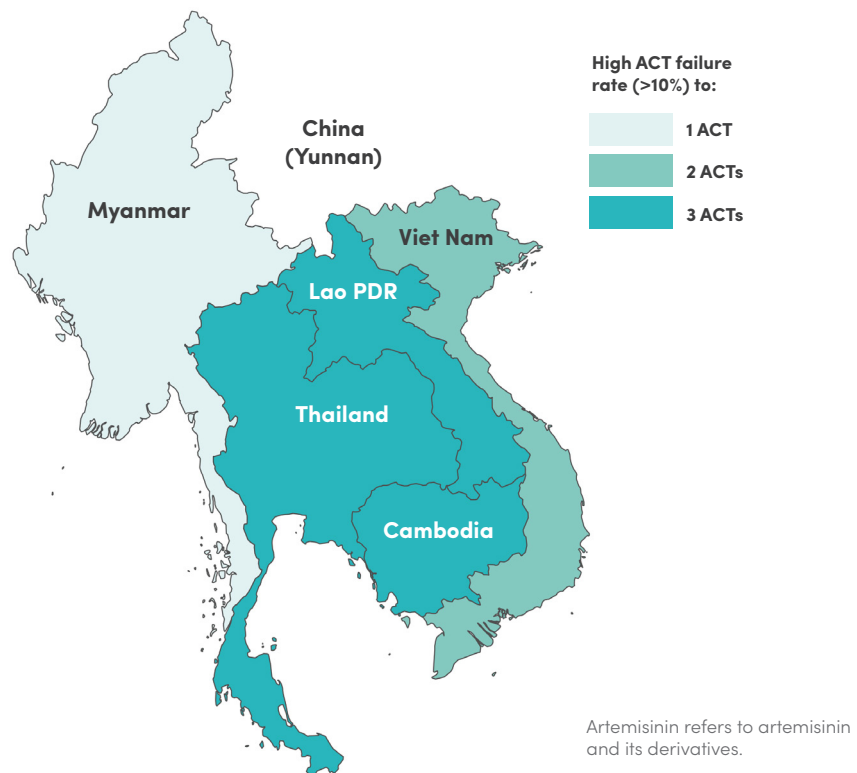
## DRUG EFFICACY

To cure malaria patients and save lives, effective antimalarials are essential. Globally, the most effective antimalarial medicines are artemisinin-based combination therapies (ACTs). Countries use ACTs to treat patients with *Pf* malaria and chloroquine-resistant *P. vivax*. But in the last decade, *Pf* parasites in the GMS have developed partial resistance to artemisinin, as well as resistance to some ACT partner drugs. This resistance makes it more imperative than ever to defeat *Pf* malaria.

A serious concern with artemisinin partial resistance is the potential emergence of total resistance, which may cause the loss of artemisinin as an effective treatment for severe malaria. Currently, however, most patients treated with ACTs are cured, as long as partner drugs are still effective.

## MAP 2.

### Number of ACTs failing in the GMS



High treatment failures in the GMS are usually detected when there is both artemisinin partial resistance and resistance to partner drugs.

To monitor drug efficacy, WHO and partners work with national programmes on therapeutic efficacy studies (TES). Results from these studies help to detect treatment failures and inform changes to national treatment policies. Keeping each country's treatment guidelines up-to-date with effective antimalarial drugs is crucial for elimination.

Genetic monitoring is a key tool for tracking drug resistance. For example, *Pf* parasites can carry mutations in the Kelch 13 (K13) gene which are associated with artemisinin partial resistance. Information on the proportion of parasites with certain mutations helps in detecting the emergence and spread of resistance. Molecular markers like K13 mutations still have limitations though. Not all antimalarial medicines have markers associated with them, and genetic mutations cannot predict whether a treatment will fail. For these reasons, genetic markers supplement, rather than replace, monitoring through TES.

As countries near elimination, stronger surveillance systems incorporate new tools, like case-based investigation and molecular markers. Some GMS countries are using integrated Drug Efficacy Surveillance (iDES) to monitor drug efficacy as part of their routine surveillance. With iDES, every patient is followed up, ensuring compliance with the full course of treatment and cure.



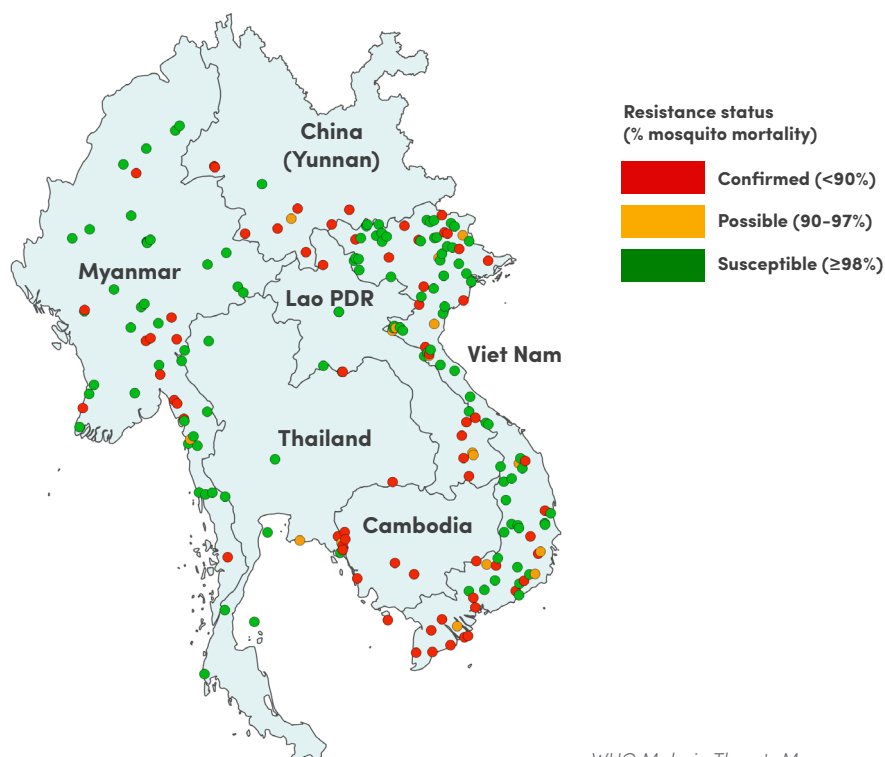
## INSECTICIDE RESISTANCE IN THE GMS

Resistance to pyrethroids – one of the main classes of insecticides used for public health – has been confirmed in malaria vectors of all six GMS countries. Pyrethroids are used in WHO-recommended long-lasting insecticidal nets (LLINs) as well as indoor residual spraying (IRS). Nearly half of the GMS sites for which data are reported show evidence of pyrethroid resistance to at least one malaria vector species. Nevertheless, the geographical coverage of resistance monitoring is unevenly distributed. While some GMS countries have strong resistance monitoring coverage, there are significant gaps in other areas.

Given that LLINs and IRS are the main vector control interventions used in the Subregion, better resistance monitoring and reporting is needed to fully understand the status of resistance and allow appropriate resistance-management action to be taken. Alternatives to traditional vector control products, such as nets treated with a pyrethroid and the synergist piperonyl butoxide (PBO), have been pre-qualified by WHO. The new WHO *Guidelines for malaria vector control* is a key resource on effective vector control interventions. Data on insecticide resistance for the GMS are available on the WHO Malaria Threats Map and are regularly updated.

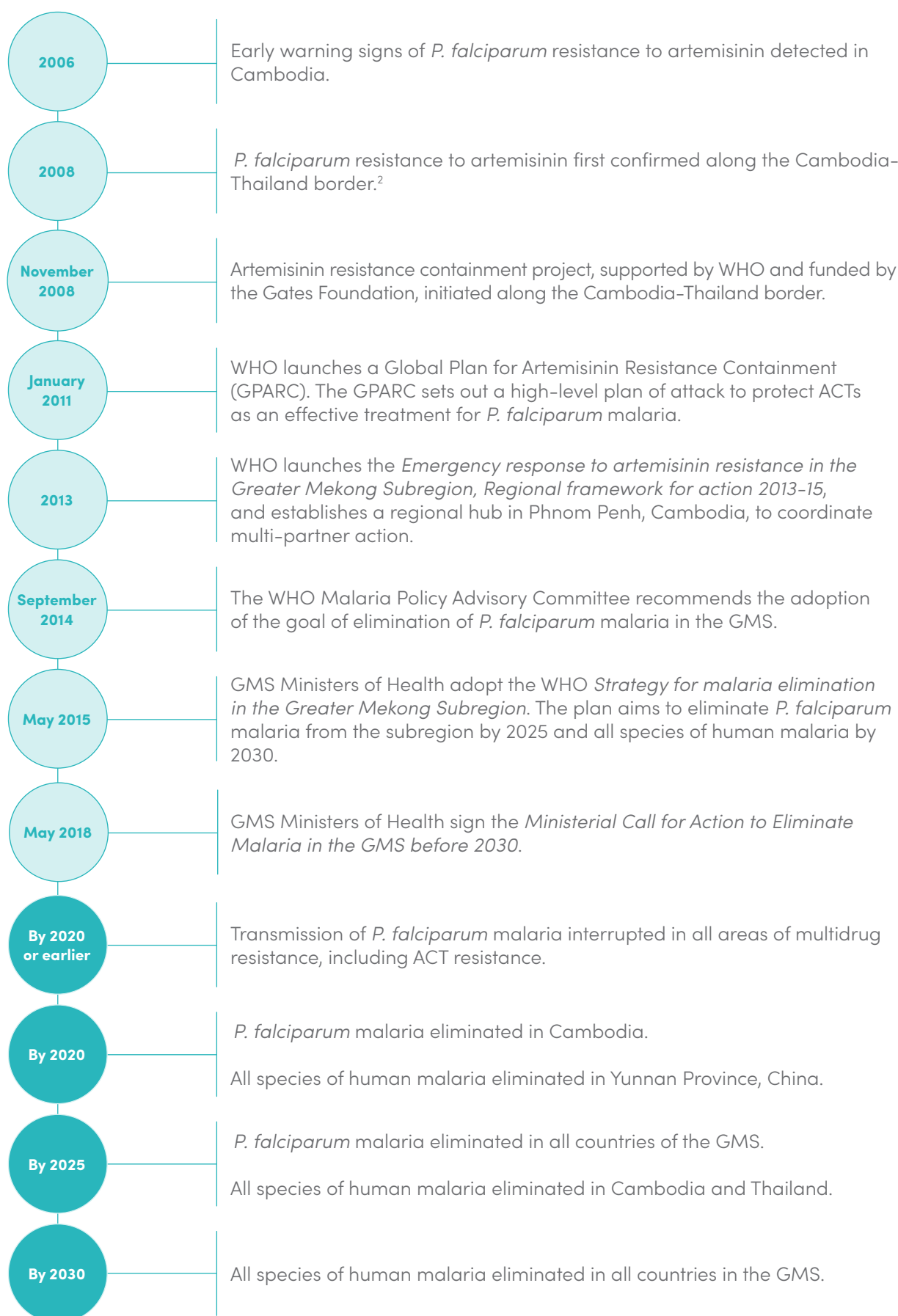
MAP 3.

### Resistance of malaria vectors to pyrethroids in the GMS (2010–2019)



WHO Malaria Threats Map,  
November 2019

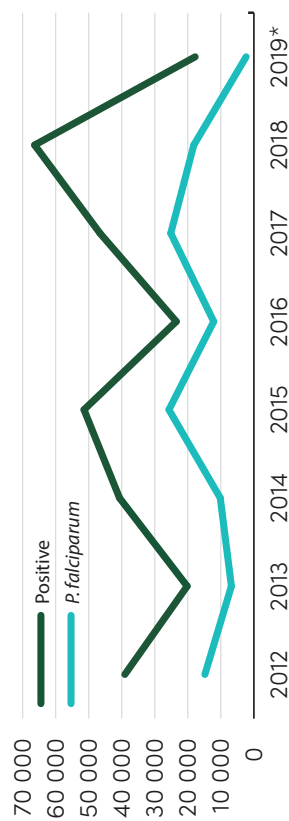
## TIMELINE AND KEY TARGETS



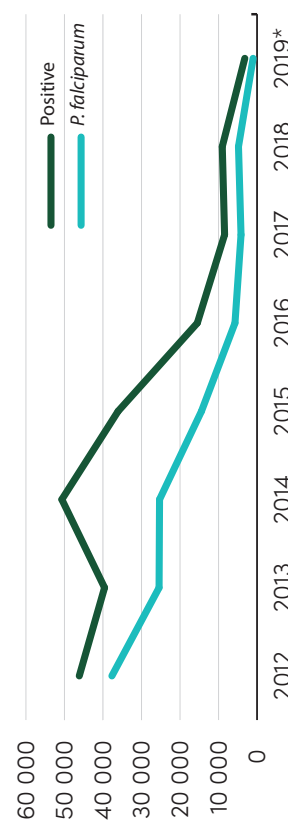
<sup>2</sup> Retrospective analysis has shown that artemisinin resistance likely emerged as early as 2001, before the widespread deployment of ACTs.



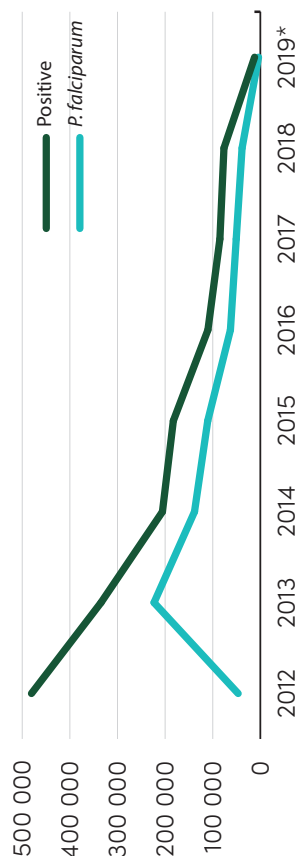
**Number of malaria cases in Cambodia (2012-2019)**



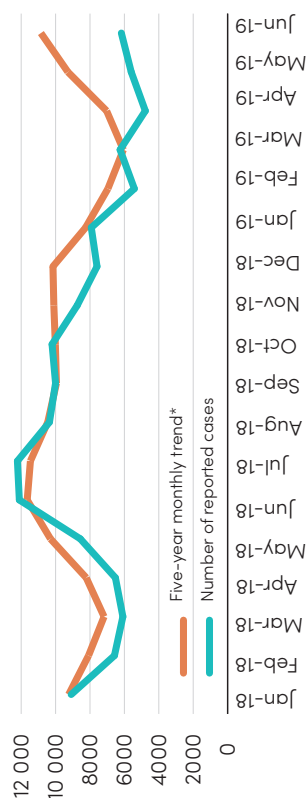
**Number of malaria cases in Lao PDR (2012-2019)**



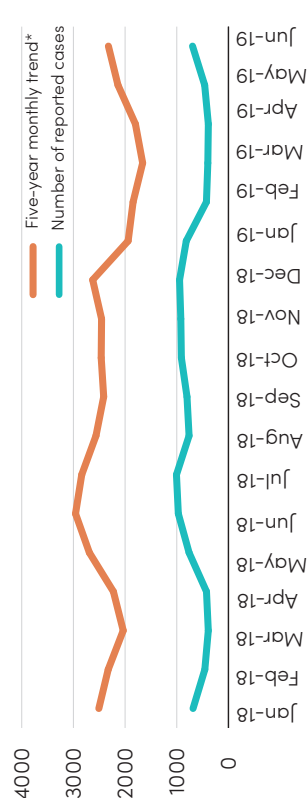
**Number of malaria cases in Myanmar (2012-2019)**



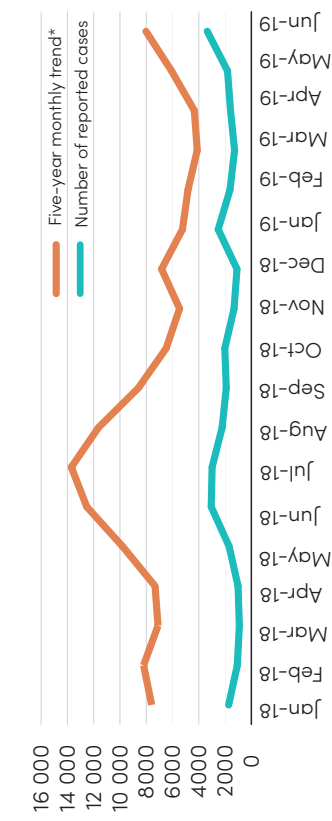
**Monthly trend of malaria cases in Cambodia (Jan 2018-Jun 2019)**



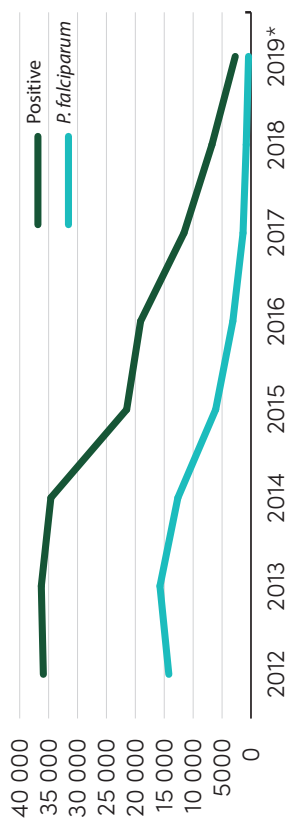
**Monthly trend of malaria cases in Lao PDR (Jan 2018-Jun 2019)**



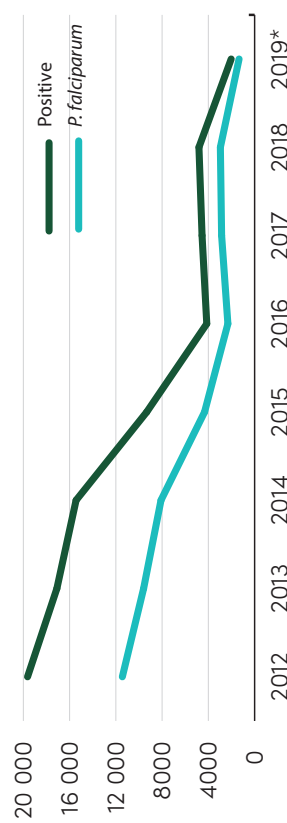
**Monthly trend of malaria cases in Myanmar (Jan 2018-Jun 2019)**



Number of malaria cases in Thailand (2012-2019)

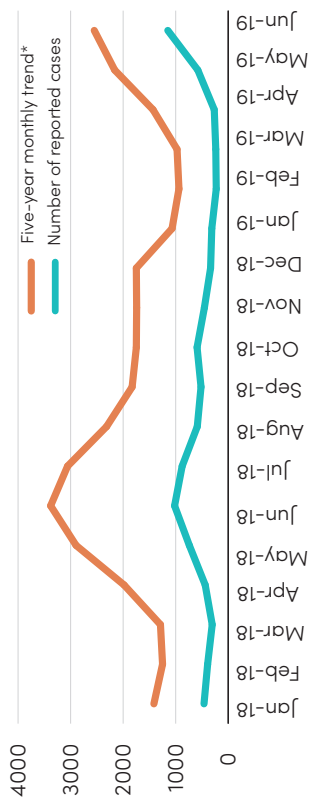


Number of malaria cases in Viet Nam (2012-2019)

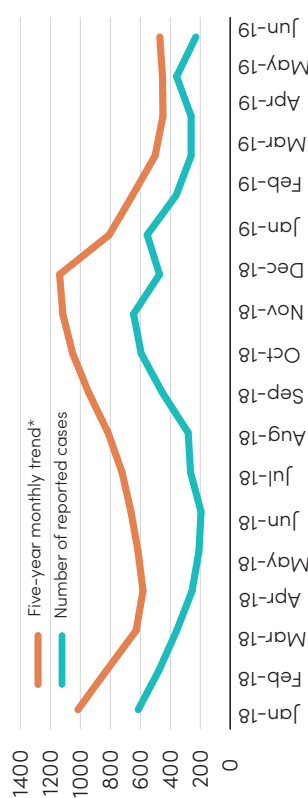


\* 2019 covers the period January to June.

Monthly trend of malaria cases in Thailand (Jan 2018-Jun 2019)



Monthly trend of malaria cases in Viet Nam (Jan 2018-Jun 2019)



\* The five-year monthly trend is calculated from historical data on monthly reported cases between 2013 and 2017. The trend line is intended as a reference tool for summarizing the overall trend of reported cases over that five-year period. To calculate the trend line, the statistical methodology called the cumulative sum (C-SUM) was applied.

