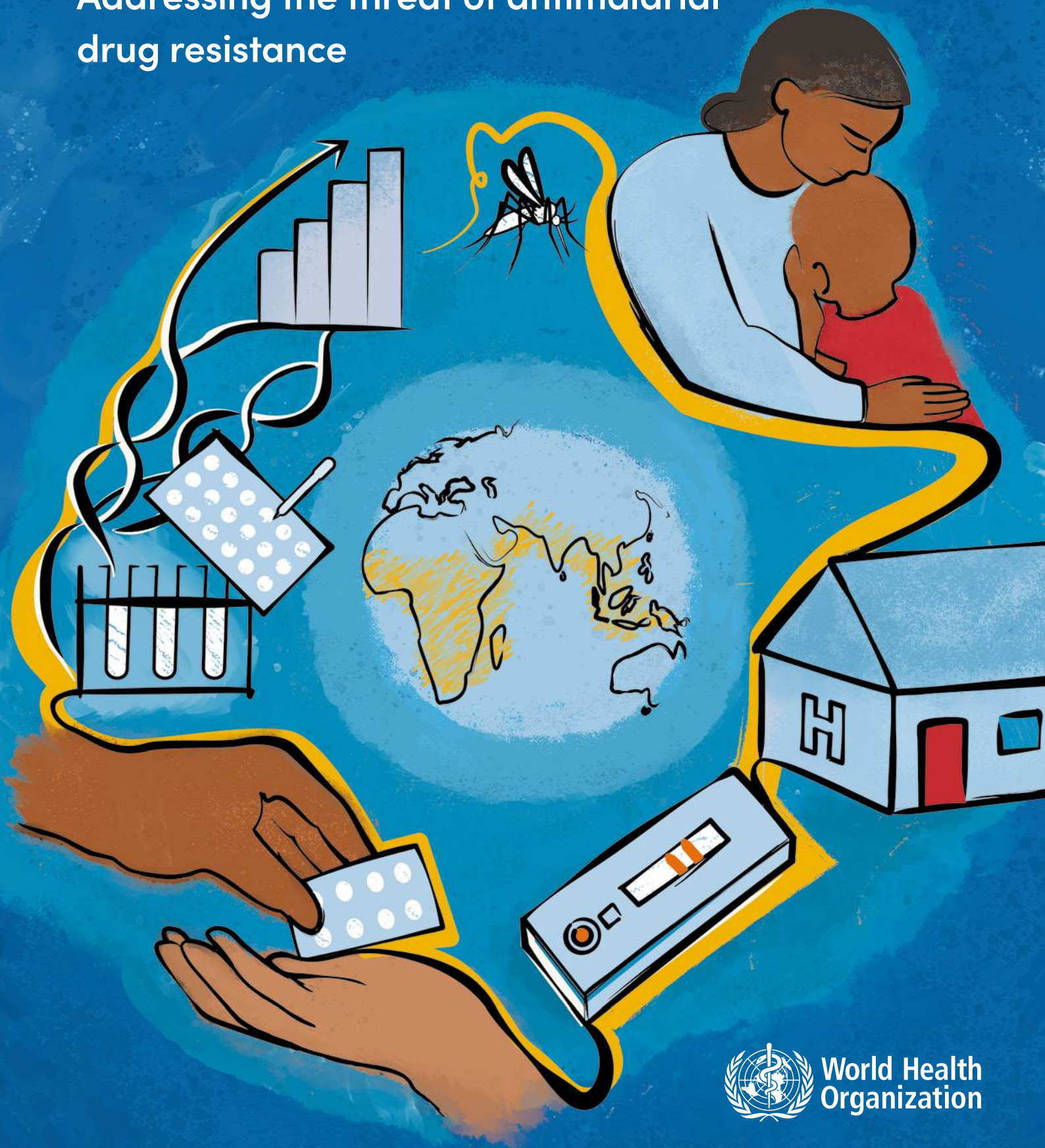
World malaria report 2025

Addressing the threat of antimalarial drug resistance



World Health Organization

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Contents

Foreword

This year's edition of the World Malaria Report provides a comprehensive overview of progress, setbacks and emerging threats in the global fight against malaria, with the latest data from 80 endemic countries.

It contains encouraging signs of progress. In 2024, we estimate that more than 170 million cases and one million deaths were prevented, thanks in part to wider use of new tools including dual-ingredient nets and WHO-recommended vaccines. As of October 2025, 24 countries have introduced malaria vaccines into their routine immunization programmes.

Seasonal malaria chemoprevention has also been expanded and is now being implemented in 20 countries, reaching 54 million children in 2024, an increase from about 0.2 million in 2012. Cabo Verde and Egypt were certified malaria-free in 2024, and Georgia, Suriname, and Timor-Leste joined them in 2025.

This report also highlights how countries are adapting to become less dependent on external aid. In 2024, Ministers of Health from high-burden African countries signed the Yaoundé Declaration, acknowledging their leadership role in scaling up the malaria response in Africa. This has been complemented in 2025 by a commitment by African Heads of State to transition from an aid-dependent health response to greater self-reliance. The Big Push, a multistakeholder approach, provides the framing for global solidarity in support of the political leadership of endemic countries and for aligning domestic and external resources behind evidence-informed, country-owned plans.

Despite these positive signals, there are also challenges. In 2024, there were over 280 million estimated cases of malaria globally and more than 600 000 malaria-related deaths, a slight increase from the previous year. These increases were concentrated in countries affected by conflict and climate change.

While some countries, such as those in South-East Asia, remain on track to meet global targets, others, particularly in Africa, continue to experience high transmission and mortality.

One of the most pressing challenges is the growing threat of antimalarial drug resistance. Partial resistance to artemisinin has now been confirmed or is suspected in multiple countries across Africa, and there are early signs of declining efficacy of the drugs that are combined with artemisinin. The undetected and unaddressed spread of drug resistance could have devastating consequences, undermining years of progress. At the same time, changes in the genetic make-up of parasites in some locations are undermining the reliability of rapid diagnostic tests, and insecticide resistance is reducing the effectiveness of core vector control tools.

Inadequate funding is a further challenge. In 2024, total malaria funding covered only 42% of the amount needed to remain on track toward global targets of reducing the rates of cases and deaths by at least 75% by 2025 compared with 2015. Sudden and drastic cuts to foreign aid in 2025 have also compounded chronic underinvestment in health systems in many countries. The consequence has been severe disruption in services, shortages of medicines and increased out-of-pocket payments, elevating the risk of malaria morbidity and mortality.

None of these challenges are insurmountable. Through the leadership of the most-affected countries, targeted investment and innovative tools, we can address current challenges effectively and make measurable progress toward the goal of a malaria-free world.

Dr Tedros Adhanom Ghebreyesus
Director-General
World Health Organization

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The publication of the *World malaria report 2025* was coordinated by Arnaud Le Menach, Head of the Strategic Information for Impact Unit and lead author of the report, together with Laura Anderson. The following WHO/MNT staff made significant technical contributions: Amy Barrette, Jane Cunningham, Tamara Ehler, Beatriz Galatas, Didier Leroy, Mwalenga Nghipumbwa, Mujahid Nouredayem, Peter Olumese, Charlotte Rasmussen, Alastair Robb, Silvia Schwarte, Saira Stewart, Ryan Williams and Xiao Hong Li. Laurent Bergeron, Laura Anderson and Corinne Jegouzo provided programmatic support for overall management of the project. The editorial committee for the report comprised Daniel Ngamije, Andrea Bosman, Elkhan Gasimov, Seth Irish and Alastair Robb.

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Abbreviations and acronyms

ACT	artemisinin-based combination therapy
AIDS	acquired immunodeficiency syndrome
AL	artemether–lumefantrine
AMFm	Affordable Medicines Facility – malaria
AMVIRA	Accelerating Malaria Vaccine Introduction and Rollout in Africa
ANC	antenatal care
ANC1	first ANC visit
AQ	amodiaquine
AS	artesunate
CDC	United States Centers for Disease Control and Prevention
COVID-19	coronavirus disease
CQ	chloroquine
CRS	creditor reporting system
DDT	dichloro-diphenyl-trichloroethane
DHA	dihydroartemisinin
DHS	demographic and health surveys
E-2025	malaria eliminating countries for 2025
EANMAT	East African Network for Monitoring Antimalarial Treatment
EU	European Union
FCDO	Foreign, Commonwealth and Development Office
Gavi	Gavi, the Vaccine Alliance
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GMP	Global Malaria Programme
GMS	Greater Mekong subregion
GNI	gross national income
GTS	*Global technical strategy for malaria 2016–2030*
HANMAT	Horn of Africa Network for Monitoring Antimalarial Treatment
HBHI	high burden to high impact
HRP2	histidine-rich protein 2
HRP3	histidine-rich protein 3
iCCM	integrated community case management
iDES	integrated drug efficacy surveillance
IPTi	intermittent preventive treatment of malaria in infants
IPTp	intermittent preventive treatment of malaria in pregnancy
IPTp1	first dose of IPTp
IPTp2	second dose of IPTp
IPTp3	third dose of IPTp
IPTp4	fourth dose of IPTp
IRS	indoor residual spraying
ITN	insecticide-treated mosquito net
IVCC	Innovative Vector Control Consortium
LLIN	long-lasting insecticidal net
MFT	multiple first-line therapies
MIS	malaria indicator surveys
MME	Mekong Malaria Elimination
MNT	Malaria and Neglected Tropical Diseases
MQ	mefloquine
MVIP	Malaria Vaccine Implementation Programme
NMP	national malaria programme
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PAR	person at risk
PBO	piperonyl butoxide
pfhrp	*Plasmodium falciparum* histidine-rich protein (gene)
PfKelch13	*P. falciparum* Kelch13 (gene)
PMC	perennial malaria chemoprevention
PPQ	piperaquine
PQ	primaquine
PSI	Population Services International
PY	pyronaridine
R&D	research and development
R21	R21/Matrix-M
RDT	rapid diagnostic test
RTS,S	RTS,S/AS01
SDG	Sustainable Development Goal
SMC	seasonal malaria chemoprevention
SP	sulfadoxine–pyrimethamine
TES	therapeutic efficacy studies
UN	United Nations
UNICEF	United Nations Children's Fund
United Kingdom	United Kingdom of Great Britain and Northern Ireland
United States	United States of America
USAID	United States Agency for International Development
WHO	World Health Organization
WHO-CHOICE	WHO-CHOosing Interventions that are Cost-Effective

1 Introduction

The world malaria report, published annually by the World Health Organization (WHO), offers an in-depth analysis of trends in malaria control and elimination across the globe. The initial draft was developed by a core team within WHO/Malaria and Neglected Tropical Diseases (MNT) following a thorough data collection, review and analysis process involving staff from the national malaria programmes (NMPs) and WHO at all levels of the Organization. The consolidated draft was shared for engagement with multiple external stakeholders and financial and technical partners. External reviewers contributed to the report, and WHO assessed their declarations of interest; no conflicts were identified. External reviewers also provided feedback, which was used at the discretion of WHO to refine the draft before a comprehensive internal WHO executive clearance process.

This year's report draws on 2024 data from 80 malaria endemic countries, including the territory of French Guiana. The report presents trends in malaria morbidity and mortality globally and by region, as well as progress towards the milestones and targets of the WHO *Global technical strategy for malaria 2016–2030* (GTS) (*1*). It tracks investments in malaria programmes and research, advancements and gaps across all intervention areas (including prevention, diagnosis, treatment and elimination) and biological threats. This year, a special chapter focuses on progress and challenges in relation to antimalarial drug resistance, after health leaders from malaria endemic African countries and global partners called for urgent, coordinated action to combat this growing threat at the May 2025 World Health Assembly. A high-level side event at the Health Assembly, led by the Rwanda Ministry of Health and supported by multiple African governments and organizations such as WHO, Medicines for Malaria Venture, the RBM Partnership to End Malaria, and Africa Centres for Disease Control and Prevention, emphasized the need for robust surveillance, timely data sharing and sustainable financing to strengthen malaria response efforts (*2*).

Although the focus of this year's report is on 2024 data, events in 2025 have brought significant disruption to the global health community. Global development assistance for health declined significantly from 2024 to 2025, largely due to reductions in funding from major contributors (*3*), reflecting strategic shift, competing domestic priorities and broader fiscal pressures. For the past 2 decades, the United States of America (United States) has been the leading government donor to humanitarian response plans, development aid and multilateral development banks, primarily through the United States Agency for International Development (USAID). However, current and proposed cuts in aid from the United States and from other international donors threaten to further undermine malaria control and elimination efforts. While the full financial and programmatic impacts are still being evaluated, these events have caused widespread disruption to health operations around the world. The burden of these setbacks is expected to fall disproportionately on children and younger populations. In response, several countries have stepped forward to help bridge funding gaps, highlighting the importance of domestic leadership, strategic resource allocation and a renewed focus on targeting limited resources where they are most needed. The impact of global development assistance funding is further discussed at the end of the report. This chapter focuses on selected priority initiatives of WHO/MNT, as well as new and updated guidance developed by WHO in the period 2024–2025.

1.1 WHO/MNT priority initiatives

1.1.1 Operational strategy

In April 2024, WHO/MNT unveiled a new operational strategy describing its technical direction for the period 2024–2030 and contribution to the broader GTS. The operational strategy reflects insights gathered through an extensive consultative process, including candid and anonymous feedback from more than 50 stakeholders. It outlines four core objectives:

- provide technical leadership of the global malaria response
- develop and disseminate norms and standards
- stimulate the development and timely introduction of new tools and innovation
- promote the use of strategic information for impact.

An annual report (*4*), published in March 2025, reflects the progress of WHO/Global Malaria Programme (GMP) in advancing these four strategic objectives in 2024. It also describes WHO/GMP's efforts in providing context-based country support, particularly in high burden to high impact (HBHI) countries and those moving towards elimination. Key 2024 highlights covered in the WHO/GMP annual report include the Malaria Ministerial Conference in Yaoundé, Cameroon; malaria free certifications of Cabo Verde and Egypt; WHO guiding principles to help countries prioritize interventions in resource-constrained settings; and a spotlight on the special topic of equity in the *World malaria report 2024* (*5*).

1.1.2 Big Push

Achieving the targets of WHO's GTS will require stepped-up resources and action in high-burden African countries. In March 2024, WHO and the RBM Partnership to End Malaria convened the Malaria Ministerial Conference in Yaoundé, Cameroon, involving more than 400 stakeholders, to galvanize political will, community engagement and innovation. Ministers of health from 11 countries, which carry two thirds of the global malaria burden, endorsed the Yaoundé Declaration, reaffirming that "no one should die from malaria" and committing to seven priorities: stronger political leadership, data-driven action, effective technical guidance, multisectoral collaboration, resilient health systems, sustainable partnerships and robust accountability. To date, an accountability framework for the Yaoundé Declaration has been developed and communicated to countries. Three countries (Cameroon, Nigeria and Uganda) have developed performance frameworks for the adopted actions, including indicators and processes for monitoring specific outcomes (*4*).

Building on the Yaoundé Declaration and the HBHI approach, the Big Push is a collaborative, multistakeholder effort aimed at reinvigorating global malaria control by better aligning the support from global partners with the specific needs of affected countries. This initiative emphasizes the importance of united action to tackle the root causes of malaria, optimize resource allocation, simplify funding processes and accelerate the introduction of new tools. The Big Push has provided further impetus for strong national leadership of the malaria response, championed by high-level political leadership in Africa. Examples include the Ministerial Malaria Champions Initiative. This will be complemented by the "Accra Reset" (*6*) as African leaders take ownership and control over their own health and development strategies. The Government of Nigeria demonstrated strong leadership by convening other governments, parliamentarians, civil society, the private sector and partners at the Abuja high-level meeting in September 2025 (*7*). The Big Push also builds on the appeal by ministers for international partners to align their resources to support national malaria policies and priorities. Several countries have been developing costed, optimized operational plans, so that the finances of both government and partners are allocated efficiently and equitably. This approach relies on using data to identify the optimal use of funding in resource-constrained settings. The Big Push has provided a forum for strengthening partner harmonization, with particular focus on key technical areas, such as antimalarial drug resistance in Africa. Further partner collaboration is planned to coordinate global advocacy, market shaping and resource mobilization.

1.2 New and updated guidance

1.2.1 Consolidated malaria guidelines

WHO's evidence-based technical recommendations are a cornerstone of the global response to malaria. Normative guidance supports the translation of evidence into action by aligning countries and partners under one common technical vision and strategic direction.

In recent years, WHO/MNT has enhanced access to WHO's global guidance, with a view to optimizing its use at the country level. Notably, WHO/MNT has made a consolidated set of malaria guidelines available on a web-based platform in four languages (English, French, Spanish and Arabic).

These guidelines are continually revised to reflect new or updated recommendations.

The latest update to these consolidated guidelines was published on 13 August 2025 (*8*) and includes includes a new recommendation supporting the use of spatial emanators and an update to add two new insecticides (chlorfenapyr and isocycloseram) to the indoor residual spraying (IRS) recommendation. The previous update, from 30 November 2024 (*9*), includes a revised recommendation on malaria vaccines; new recommendations on the use of near-patient glucose-6-phosphate dehydrogenase (G6PD) tests to guide the treatment of *Plasmodium vivax* and *P. ovale* infections; and updated treatment recommendations on the use of primaquine and tafenoquine.

1.2.2 Other key guidance

WHO's ***Strategy to respond to antimalarial drug resistance in Africa*** calls for innovative approaches to delay the spread of drug-resistant malaria using currently available drugs (*10*). One such approach is to extend the lifespan of artemisinin-based combination therapy (ACT) regimens using multiple first-line therapies (MFT). An implementation guide, released in November 2024, provides guidance for malaria programmes on assessing the impact of MFT on resistance and considerations for policy and implementation (*11*).

According to the *World malaria report 2024*, malaria parasites with *P. falciparum* histidine-rich protein 2 (*pfhrp2*) gene deletions had been identified in 42 countries as of 2024. Such parasites undermine the accuracy of rapid diagnostic tests (RDTs) that target the histidine-rich protein 2 (HRP2) antigen, threatening the lives of people with malaria. In December 2024, WHO published the **second edition of a response plan to *pfhrp2* gene deletions** (*12*), drawing upon country experiences and modelling to predict the evolution of this challenge to global malaria control.

In June 2025, WHO convened a technical consultation to review and provide feedback on the **ACTwatch Lite toolkit and methodology** developed by Population Services International (PSI) (*13*). ACTwatch Lite is a streamlined malaria market study designed to generate timely and actionable data on the availability, price and sales volumes of antimalarial medicines and RDTs in the private sector at the retail and wholesale levels. Building on the original ACTwatch methodology (implemented between 2008 and 2017), it leverages technological solutions to reduce both the time and resources required for study implementation. The methodology was piloted in Benin, Cameroon and Nigeria from 2023 to 2024, resulting in the development of a toolkit to guide future country-led implementation.

In July 2025, WHO released its first global guidance on **preventing the re-establishment of malaria** (*14*) – a vital resource for countries that have succeeded in eliminating the disease or are approaching that milestone. Although relevant to all malaria free countries (where there is no continuing local mosquito-borne malaria transmission), the guidance is targeted to countries in tropical and subtropical zones, where the risk of re-establishment is highest.

In August 2025, WHO released ***Malaria control in emergencies: field manual*** (*15*), a practical resource for humanitarian actors, health professionals and policy-makers, for responding to malaria in crisis-affected settings. Although relevant to all humanitarian contexts, the manual is targeted to areas where emergencies disrupt health systems and increase the risk of malaria outbreaks. It provides guidance on assessing risk, targeting populations in situations of vulnerability, planning and implementing prevention and treatment interventions, case management, vector control, and integrating malaria response with broader humanitarian activities.

In September 2025, WHO's Strategic Advisory Group of Experts on Immunization (SAGE) and the Malaria Policy Advisory Group (MPAG) reviewed the results of the RTS,S/AS01 (RTS,S) malaria vaccine case–control study (*16*). The study (2021–2025) used the surveillance platforms established during the Malaria Vaccine Implementation Programme (MVIP) and was designed specifically to assess the value of the fourth vaccine dose, the incremental benefit of four doses over three doses, and the occurrence of rebound of severe malaria cases if a child received only three doses. The case–control study showed that a four-dose schedule reduced cases of severe malaria by about 54% throughout the study period, and the fourth dose provided a 30% incremental effectiveness above three doses in reducing severe malaria. There was no evidence of rebound among children who missed the fourth dose. SAGE and MPAG concluded that the four-dose schedule provides higher protection against clinical and severe malaria than the three-dose schedule in moderate to high transmission areas and that the recommendation for a four-dose schedule should be retained. Where the delivery of the fourth dose may temporarily not be possible (e.g. in fragile, conflict-affected and vulnerable settings), children will still benefit from three doses until obstacles to the delivery of the fourth dose are resolved. SAGE and MPAG also expressed support for WHO's recommendation that countries align the timing of the fourth dose with the timing of other vaccines and, where appropriate, other health interventions administered in the second year of life, thereby reducing the additional delivery burden. In 2025, up to eight additional countries were expected to introduce the malaria vaccine into their childhood immunization programmes, while several others planned to expand implementation to additional areas of moderate to high transmission. These combined efforts are projected to increase the annual

target population for malaria vaccination across the African continent to more than 10 million children.

The second edition of ***Malaria surveillance, monitoring and evaluation: a reference manual*** was published in September 2025 (*17*). The manual provides comprehensive guidance on making malaria surveillance a core intervention across all transmission settings. Specifically, it provides guidance on data collection, reporting, analysis and use across diverse transmission settings. It promotes integration of surveillance into health information systems and offers tools to monitor drug and insecticide resistance and to detect and effectively respond to outbreaks. Practical tools, indicators and case studies support implementation, while proposed solutions address gaps in data quality, case detection and preparedness to advance elimination and sustain malaria free status.

In October 2025, WHO released ***Guidance on establishing a national malaria data repository*** (*18*), a practical guide to help countries and partners build national repositories that consolidate malaria data across routine and non-routine systems, ranging from health facility cases and deaths to interventions, entomology, climate, surveys and other sources to improve analysis and decision-making. Aimed at NMPs, subnational authorities, partners, technical experts and donors, the document outlines a phased approach from planning and governance through system set-up, iterative module integration, training and oversight. It includes readiness assessments to gauge feasibility or strengthen existing repositories and provides templates for work planning, budgeting, data auditing and integration workshops that countries can adapt to local needs. The guidance emphasizes governance, standardized malaria modules and indicators, capacity-building and long-term sustainability to ensure data quality and effective data use.

In October 2025, WHO released ***Subnational tailoring of malaria strategies and interventions: reference manual*** (*19*), a practical guide for tailoring malaria strategies to the local context. The manual, targeted at NMPs, partners, subnational authorities, technical experts and funders, helps countries use local data and contextual information to select appropriate interventions, allocate resources efficiently and develop evidence-informed, country-owned plans. It provides guidance on stratification, modelling, cost–effectiveness analysis and alignment with broader health strategies. It also offers practical criteria and case examples to support implementation and strengthen national capacity.

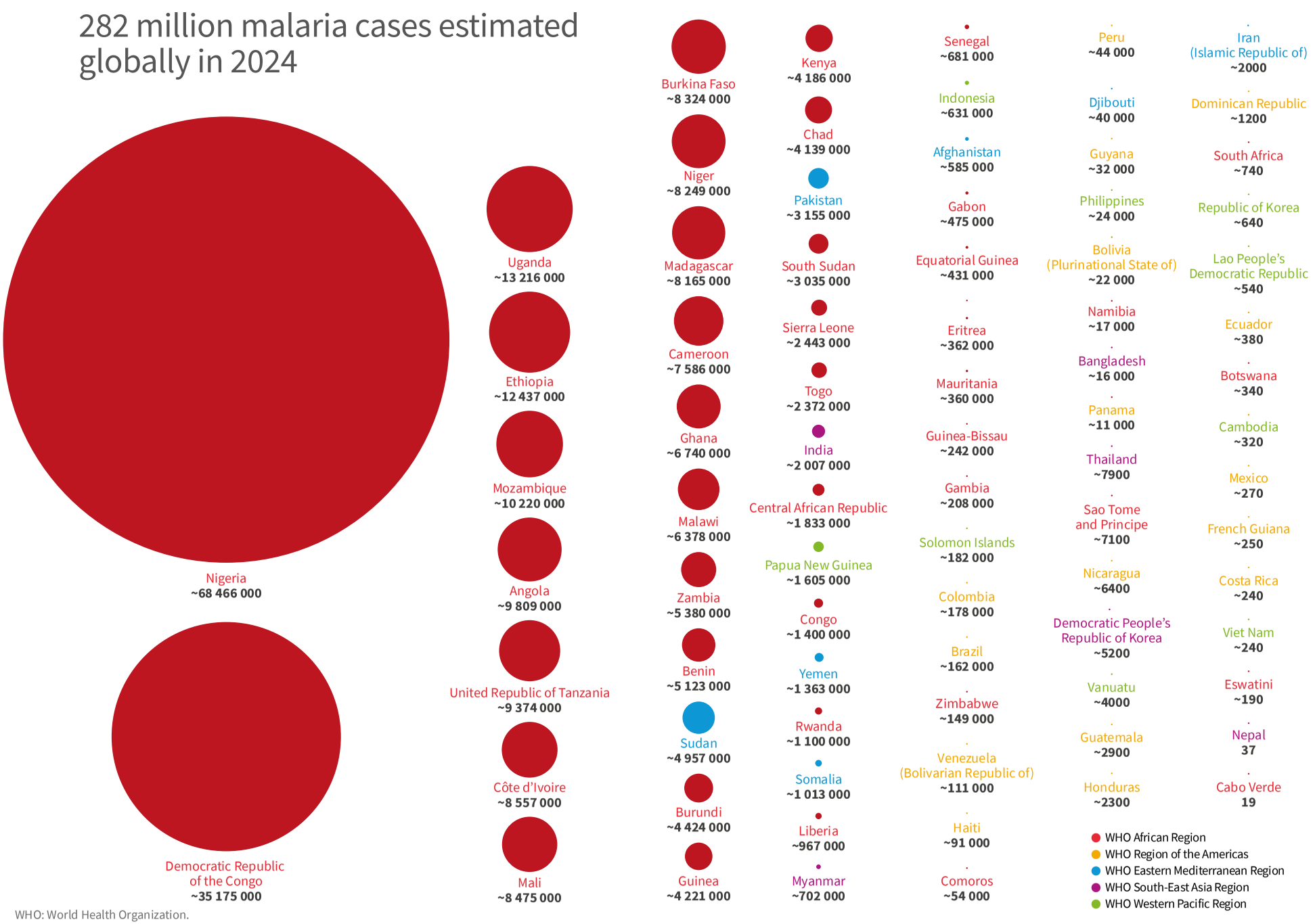
2 Global trends in the burden of malaria and progress towards GTS milestones

This chapter presents the number of clinical malaria cases and deaths estimated to have occurred between 2000 and 2024, and the malaria case incidences and mortality rates. These estimates were used to track progress towards meeting GTS milestones for incidence and mortality and to compute the number of cases and deaths averted, globally and by WHO region, since 2000.

The methods used to estimate the burden of malaria cases and deaths depend on the quality of the national surveillance systems and the availability of data over time (see **Annex 1**). Most of the global malaria burden is accounted for by countries in sub-Saharan Africa with moderate to high transmission (**Fig. 2.1**); however, these countries generally have less robust surveillance systems. Case estimates for these countries are calculated using an approach that transforms modelled community parasite prevalence into case incidence. Each year, population estimates are updated in line with United Nations (UN) population estimates (*20*). Malaria deaths for these countries are estimated from country-specific annual cause of death fractions (*21*) for malaria that are applied to the annual estimates of all-cause mortality in children aged under 5 years (*22*).

For countries with adequate surveillance systems, either reported national indigenous cases are used without adjustments or cases are estimated by adjusting reported cases for rates of treatment seeking, testing and reporting. Where adjustments are applied to reported cases, malaria deaths are estimated by applying species-specific case fatality rates to the estimated number of *P. falciparum* and *P. vivax* cases.

For the years 2020–2022, estimates for both cases and deaths included the impact of disruptions to essential malaria services during the coronavirus disease (COVID-19) pandemic (as reported by countries through the WHO global pulse surveys on continuity of essential health services during the pandemic) (*23*).



WHO: World Health Organization.

Fig. 2.1. Estimated number of malaria cases per country and area in 2024 *Source: WHO database.*

2.1 Global estimates of malaria cases and deaths, 2000–2024

Globally in 2024, there were an estimated 282 million malaria cases (**Table 2.1**) in 80 malaria endemic countries (including the territory of French Guiana) (**Fig. 2.2**), an increase of about 9 million cases (3%) compared with 2023. Three countries – Ethiopia (+2.9 million), Madagascar (+1.9 million) and Yemen (+378 000) – accounted for 58% of the estimated case increase from 2023 to 2024.

Between 2000 and 2015, although the trend in case numbers fluctuated, there was a slight decrease overall of about 3.8%, from 239 million to 230 million cases, across the 108 countries that were malaria endemic in 2000. Since 2015, malaria cases have increased by 22.6%. Of the regions that showed an increase (the WHO South-East Asia Region showed a decrease), most of this increase was observed in the WHO African Region (88%) and the WHO Eastern Mediterranean Region (12%). The estimated increase is multifactorial, varies according to each country's specific context and can partially be explained by an increase in population growth. In recent years, several countries have experienced increased conflict (e.g. Ethiopia and Yemen (*24*)) or extreme climate events (e.g. Madagascar (*25*)), which have also contributed to this trend by disrupting health services and delivery of interventions. As surveillance systems strengthen and coverage expands – as seen in many high-burden countries – an increase in the number of reported cases is also expected.

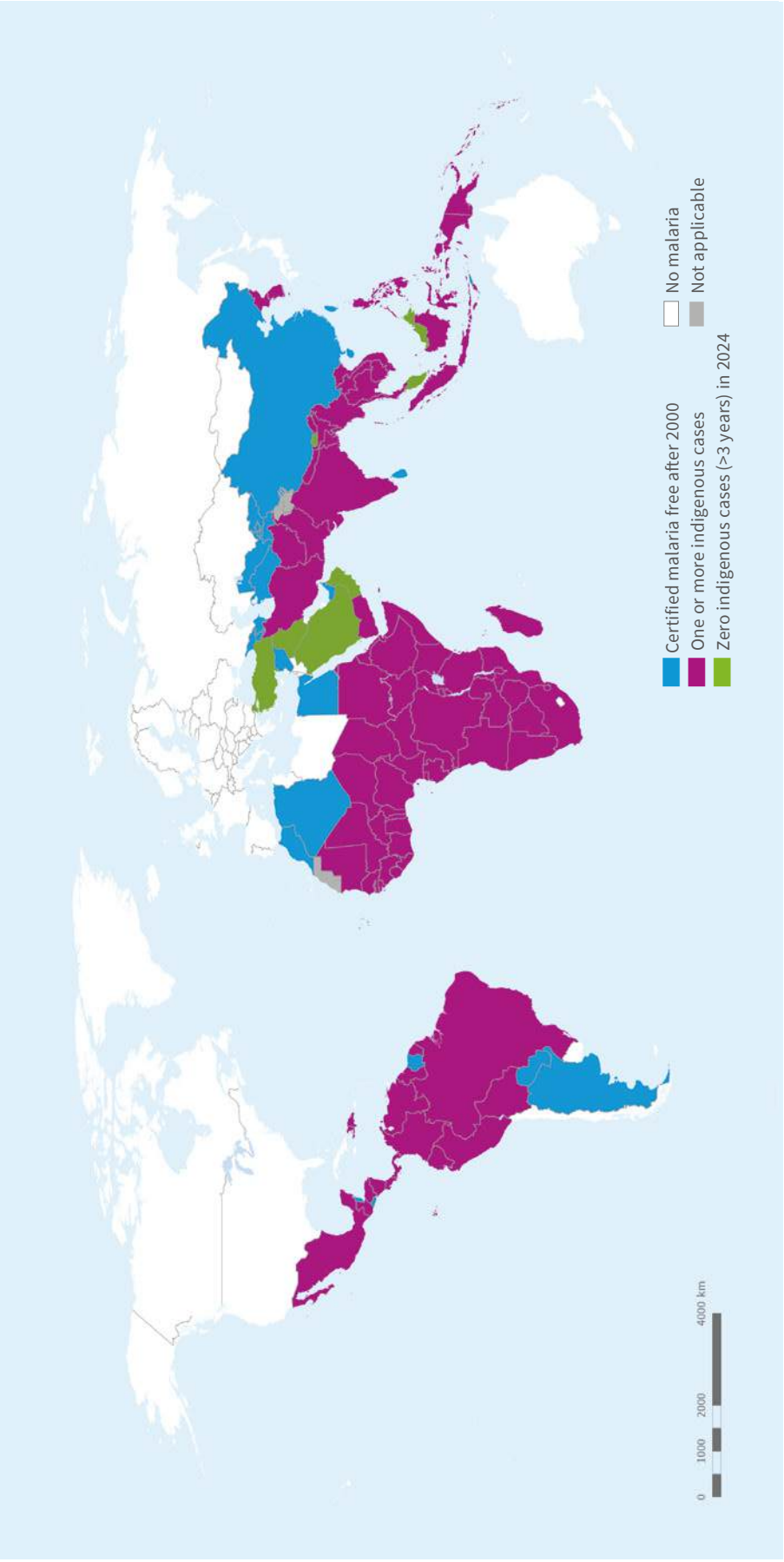
Table 2.1. Global estimated malaria cases and deaths, 2000–2024[a] *Source: WHO estimates.*

	Number of cases (000)				Number of deaths		
Year	Point	Lower bound	Upper bound	% *P. vivax*	Point	Lower bound	Upper bound
2000	**239 000**	224 000	258 000	6.4%	**864 000**	833 000	904 000
2001	**246 000**	230 000	268 000	7.2%	**873 000**	840 000	916 000
2002	**244 000**	228 000	265 000	6.7%	**840 000**	809 000	881 000
2003	**249 000**	232 000	272 000	7.2%	**811 000**	781 000	854 000
2004	**251 000**	232 000	280 000	7.5%	**806 000**	770 000	863 000
2005	**251 000**	233 000	276 000	7.6%	**767 000**	734 000	815 000
2006	**245 000**	227 000	269 000	6.2%	**771 000**	739 000	818 000
2007	**240 000**	222 000	262 000	5.7%	**747 000**	717 000	790 000
2008	**238 000**	221 000	258 000	5.3%	**708 000**	679 000	745 000
2009	**243 000**	225 000	265 000	5.2%	**715 000**	683 000	762 000
2010	**245 000**	226 000	269 000	5.3%	**693 000**	659 000	744 000
2011	**238 000**	220 000	259 000	5.3%	**655 000**	625 000	696 000
2012	**233 000**	217 000	255 000	5.0%	**610 000**	583 000	651 000
2013	**228 000**	213 000	247 000	4.0%	**583 000**	554 000	625 000
2014	**225 000**	209 000	243 000	3.1%	**579 000**	546 000	632 000
2015	**230 000**	214 000	249 000	2.8%	**578 000**	543 000	635 000
2016	**232 000**	216 000	251 000	2.8%	**576 000**	542 000	634 000
2017	**240 000**	223 000	259 000	2.5%	**574 000**	540 000	638 000
2018	**238 000**	221 000	258 000	2.3%	**575 000**	536 000	649 000
2019	**240 000**	221 000	261 000	2.1%	**567 000**	527 000	649 000
2020	**251 000**	229 000	278 000	1.5%	**621 000**	575 000	736 000
2021	**254 000**	232 000	283 000	1.5%	**601 000**	558 000	716 000
2022	**259 000**	235 000	288 000	2.1%	**598 000**	554 000	722 000
2023	**273 000**	248 000	304 000	3.1%	**598 000**	550 000	725 000
2024	**282 000**	256 000	313 000	3.5%	**610 000**	561 000	738 000

P. vivax: *Plasmodium vivax*; WHO: World Health Organization.

[a] Estimated cases and deaths are shown with 95% upper and lower confidence intervals.

Fig. 2.2. Countries and areas with indigenous cases in 2000 and their status by 2024[a,b] *Source: WHO database.*



WHO: World Health Organization.

[a] Malaysia has a significant number of indigenous malaria cases caused by *Plasmodium knowlesi* infection.

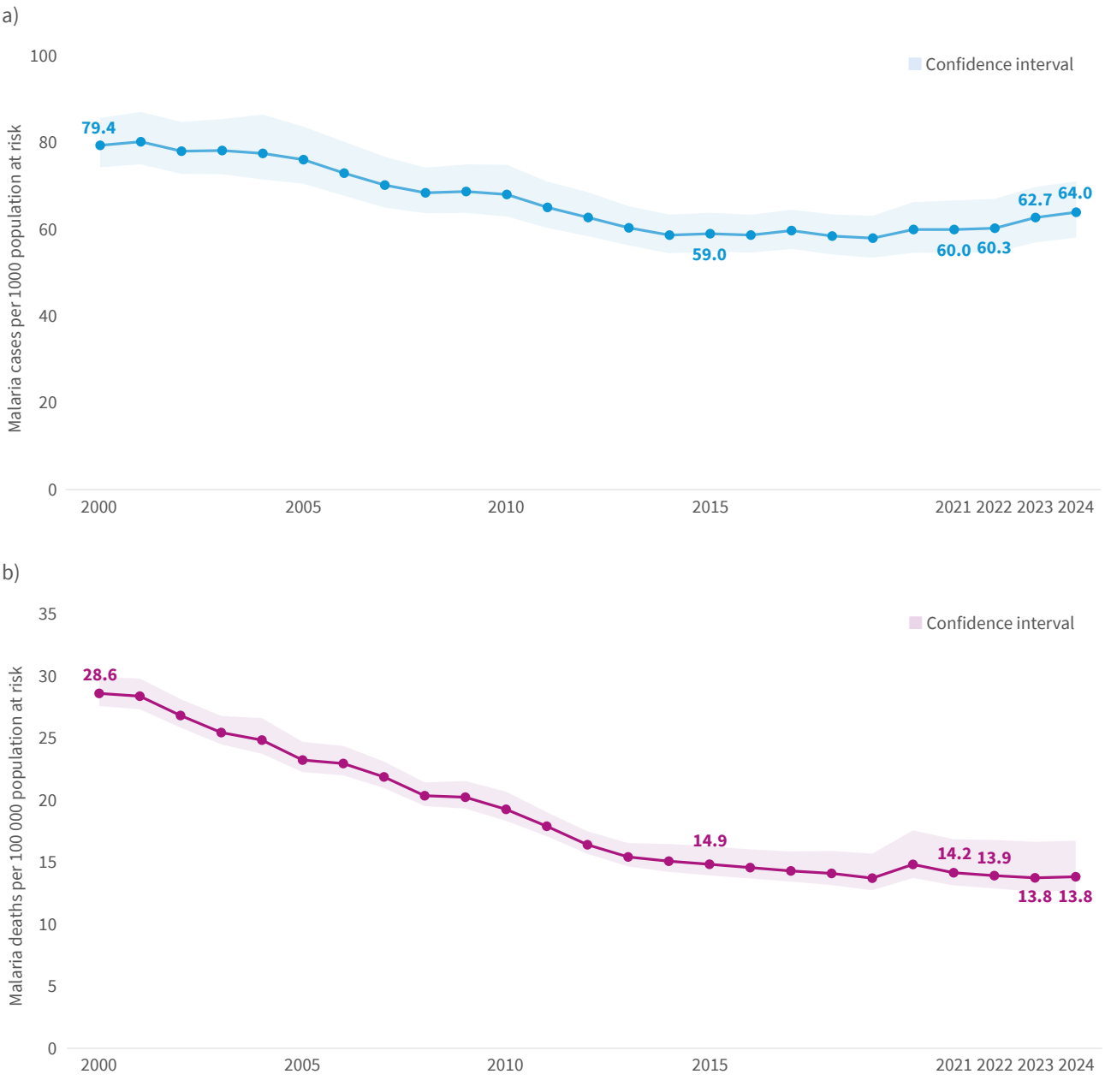
[b] Countries and areas with zero indigenous cases for at least 3 consecutive years are considered to have eliminated malaria. In 2024, Malaysia reported zero indigenous cases caused by human *Plasmodium* species for the seventh consecutive year, Saudi Arabia reported zero indigenous cases for the fourth consecutive year, and Bhutan reported zero indigenous cases for the third consecutive year, ending the malaria epidemic. Timor-Leste and Suriname were both certified malaria free in 2025.

In 2024, five countries – Nigeria (24.3%), the Democratic Republic of the Congo (12.5%), Uganda (4.7%), Ethiopia (4.4%) and Mozambique (3.6%) – accounted for almost half of all cases (**Fig. 2.3c**).

Malaria case incidence declined by 25.6% between 2000 and 2015, from 79.4 to 59.0 per 1000 population at risk. Between 2015 and 2024, the incidence increased by 8.5% (**Fig. 2.3a**). In 2024, malaria case incidence was 64.0 per 1000 population at risk, representing a 2% increase from 62.7 per 1000 population at risk in 2023 (**Fig. 2.3a**). The increase in incidence was mainly driven by year-on-year rises between 2023 and 2024 in Rwanda (43.8%), Yemen (34.3%), Madagascar (27.7%) and Ethiopia (26.7%).

Globally in 2024, there were an estimated 610 000 malaria deaths (**Table 2.1**), an increase of 12 000 compared with 2023. Three countries – Madagascar (+4900), Ethiopia (+3800) and Yemen (+932) – accounted for 85% of the increase from 2023 to 2024. Between 2000 and 2015,

Fig. 2.3. Global trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) distribution of malaria cases and d) deaths, by country, 2024 *Source: WHO estimates.*

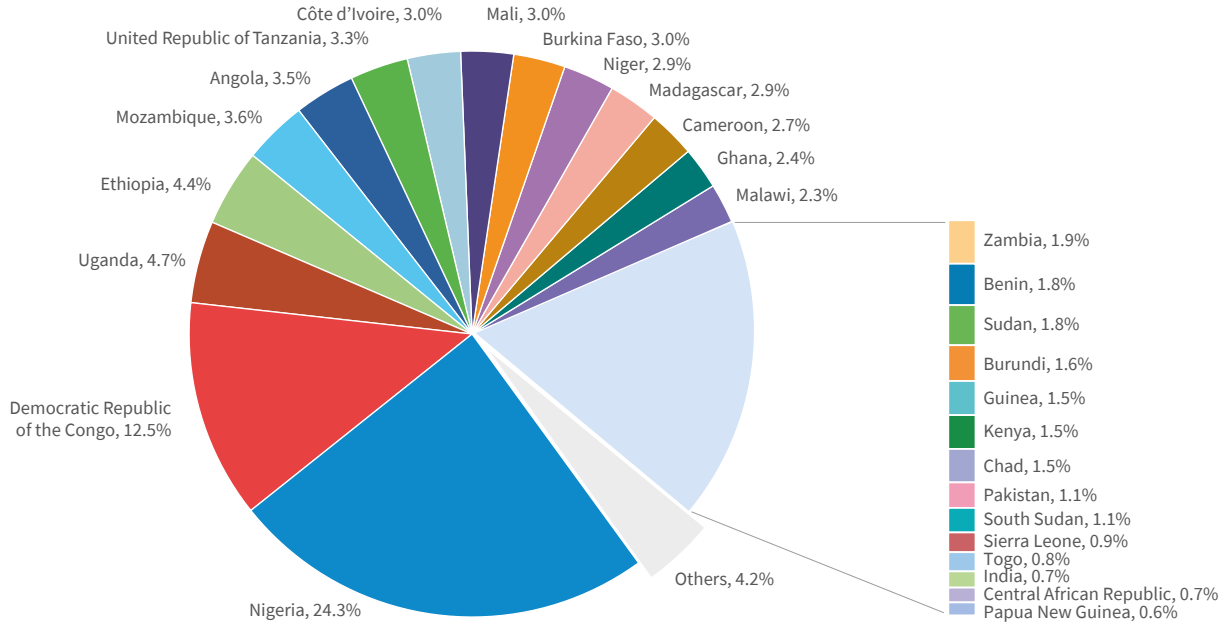


WHO: World Health Organization.

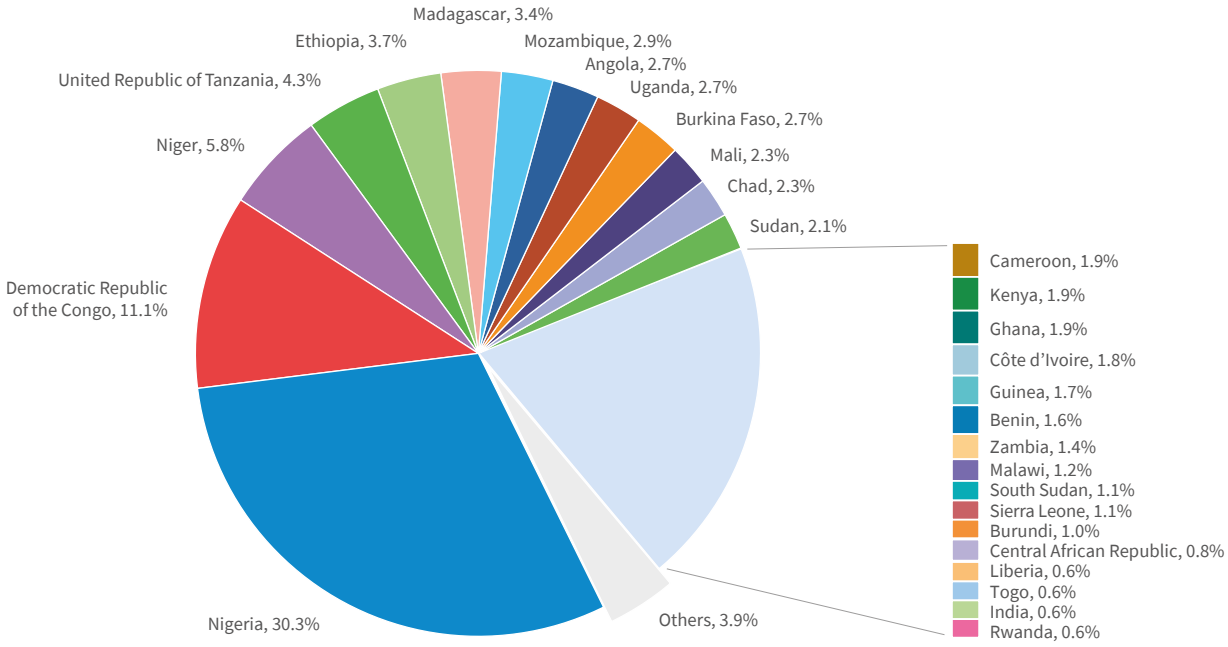
malaria deaths declined by 33.1% from 864 000 to 578 000. Between 2015 and 2024, deaths increased by 5.5%, with more than one-third of the increase occurring between 2023 and 2024. In 2024, four countries – Nigeria (30.3%), the Democratic Republic of the Congo (11.1%), the Niger (5.8%) and the United Republic of Tanzania (4.3%) – accounted for just over half of all malaria deaths globally (**Fig. 2.3d**). Nigeria accounted for 38.6% of global malaria deaths in children aged under 5 years.

The malaria mortality rate almost halved between 2000 and 2015, from 28.6 to 14.9 per 100 000 population at risk. Since 2015 the decline has slowed, decreasing by a further 7.4% over the past 9 years (**Fig. 2.3b**). The increase in the estimated number of deaths, despite the decline in mortality rates over recent years, primarily reflects the impact of population growth. The mortality rate remained unchanged in 2024 compared with 2023, at 13.8 per 100 000 population at risk (**Fig. 2.3b**).

c)



d)



2.2 Global progress towards GTS milestones

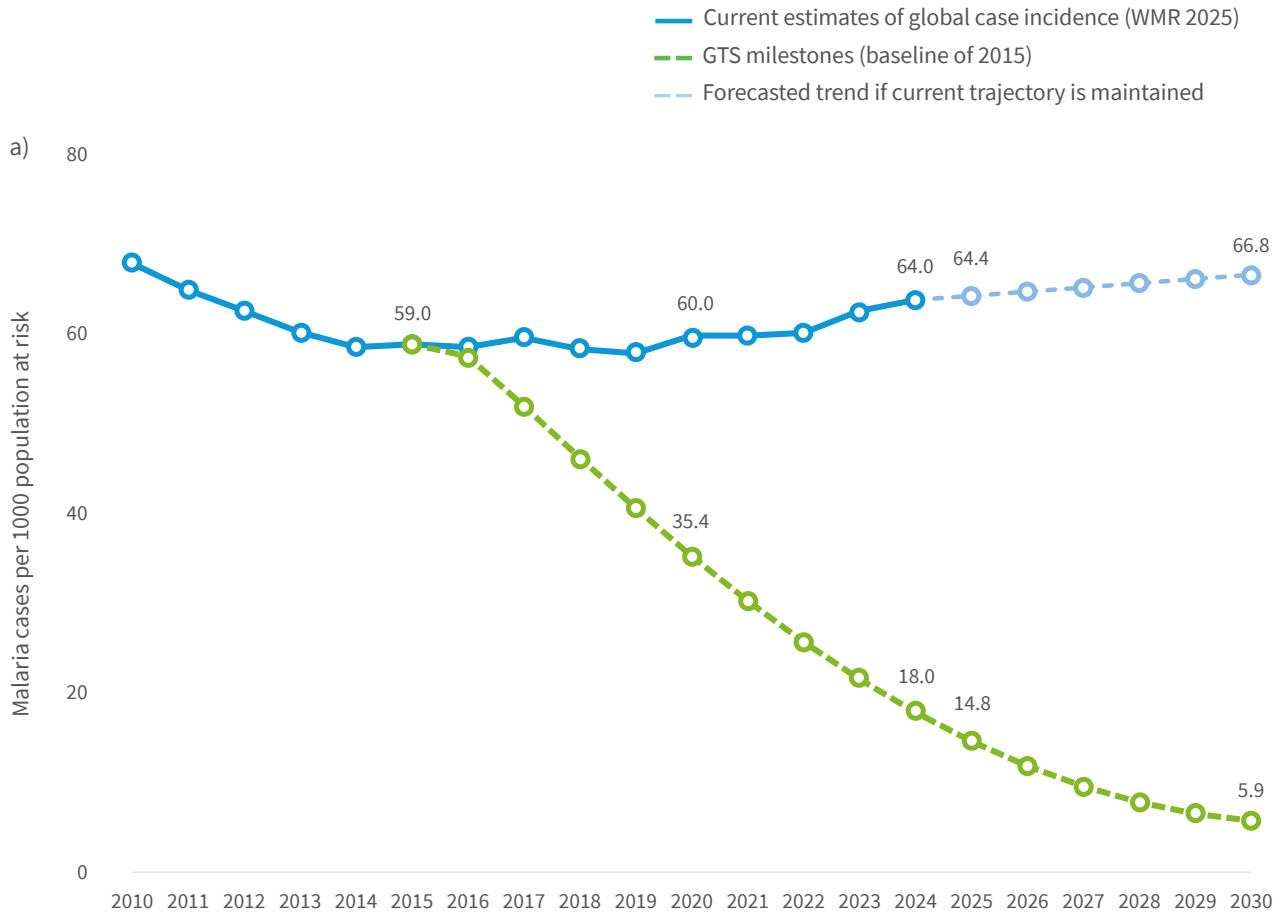
The GTS calls for a reduction in malaria case incidence and mortality rate (compared with a 2015 baseline) of at least 40% by 2020, 75% by 2025 and 90% by 2030 (**Table 2.2**) (*26*). Despite considerable progress since 2000, the ambitious GTS 2020 targets for morbidity and mortality were not achieved globally in 2024 (**Fig. 2.4**). The GTS and Sustainable Development Goal (SDG) 2025 and 2030 targets for malaria morbidity and mortality are unlikely to be met (**Fig. 2.4**). The 2024 malaria incidence of 64 cases per 1000 population at risk is 3.5 times higher than the 18 cases per 1000 population at risk needed to reach the target (**Fig. 2.4a**). Malaria incidence increased by 8.5% from 2015 to 2024. Malaria deaths per 100 000 population at risk decreased from 14.9 in 2015 to 13.8 in 2024 (three

Table 2.2. Goals, milestones and targets for the GTS

	Milestone		Target
Goals	**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

GTS: *Global technical strategy for malaria 2016–2030.*

Fig. 2.4. Comparison of global progress in malaria a) case incidence and b) mortality rate considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green) *Source: WHO estimates.*



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

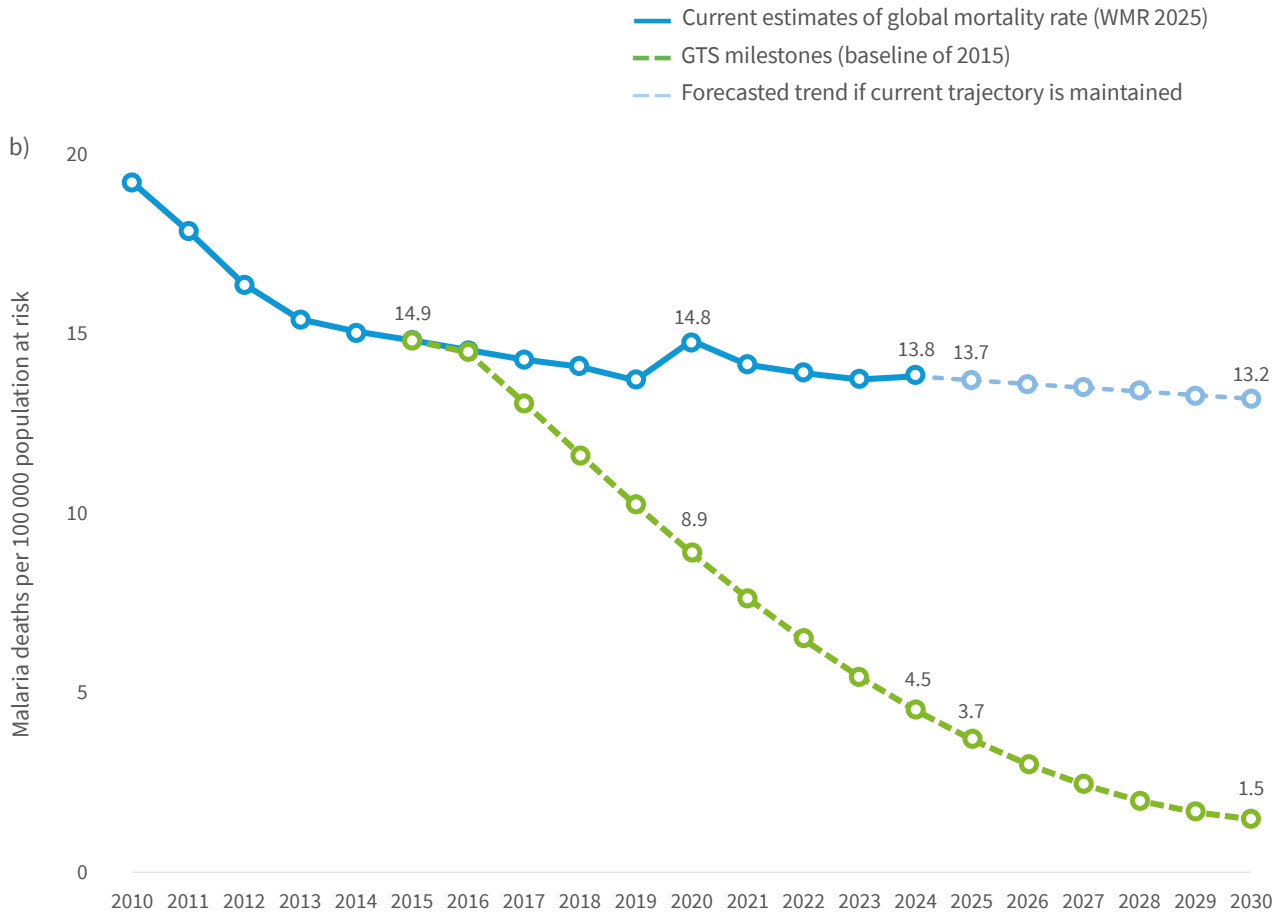
times the target of 4.5 deaths per 100 000 in 2024). If this trajectory continues for incidence and mortality, by 2030, incidence will be 11 times higher than the target of 5.9 per 1000 population at risk and mortality will be almost nine times higher than the target of 1.5 per 100 000 (**Fig. 2.4b**).

Fig. 2.5, **Fig. 2.6** and **Table 2.3** present progress in all countries considered to be malaria endemic in 2015. Countries were ranked into eight categories to assess progress towards the GTS targets for malaria case incidence and mortality rate in 2024 from the 2015 baseline:

- on track (zero malaria cases);
- on track (decrease of 70% or more), where 70% represents the estimated reduction from 2015 to 2024 required to be on track, considering the GTS targets of 2020 (40% reduction) and 2025 (75% reduction);
- decrease by between 25% and less than 70%;
- decrease by less than 25%;
- less than 5% increase or decrease;
- increase by less than 25%;
- increase by between 25% and less than 70%; and
- increase by 70% or more.

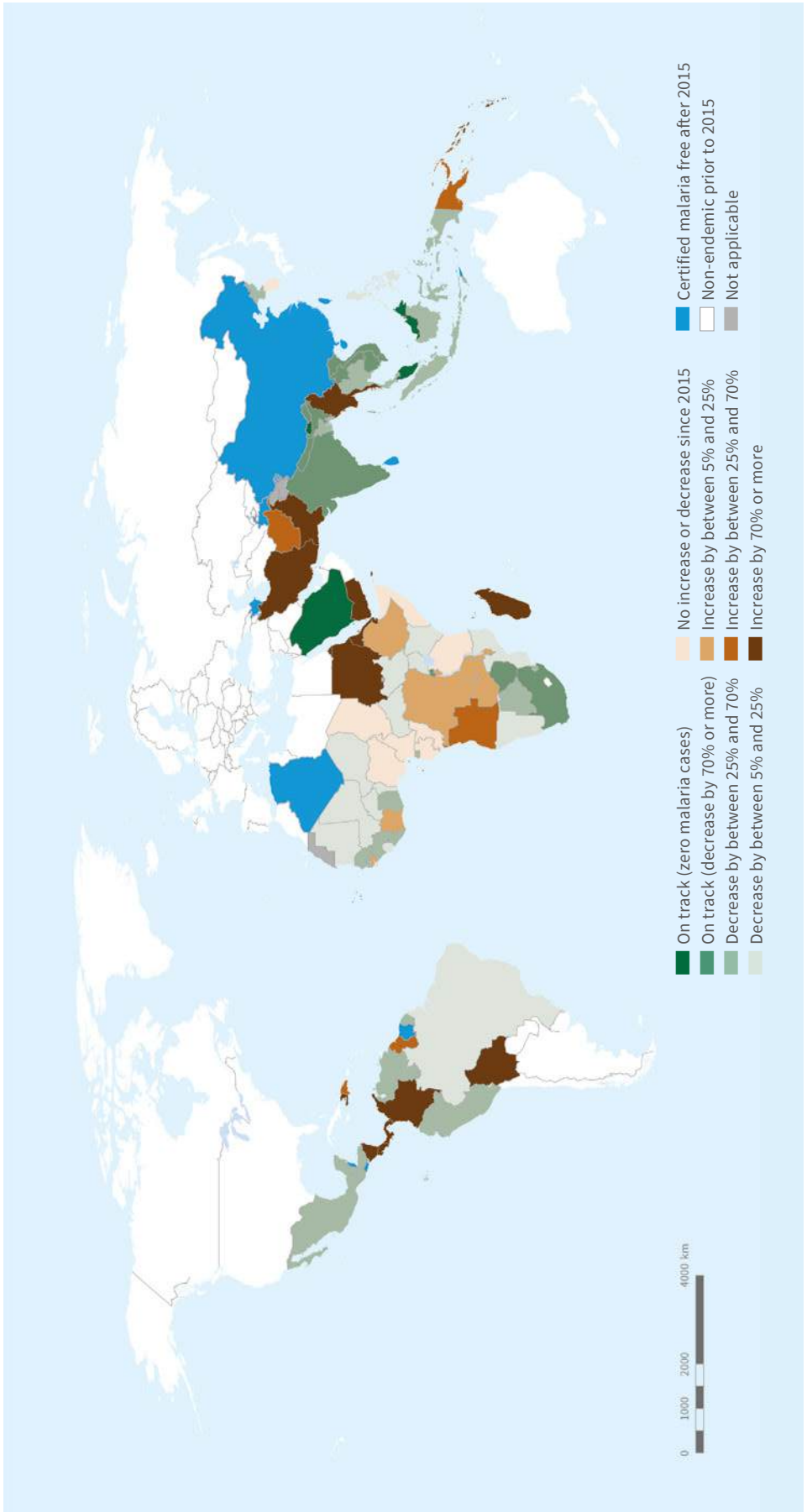
Of the 93 countries that were malaria endemic (including the territory of French Guiana) in 2015, 10 countries have been certified malaria free since 2015: Algeria, Azerbaijan, Belize, Cabo Verde, China, El Salvador, Sri Lanka, Suriname, Tajikistan and Timor-Leste. A total of 21 countries (22.6%), including those that are certified malaria free, met the GTS morbidity milestone for 2024, having achieved a reduction of 70% or more in case incidence or reporting zero malaria cases. A further 34 countries (36.5%) made progress in reducing malaria case incidence but by less than the expected target (decrease between 5% and 70%). Thirty countries (32.3%) experienced increased case incidence, including 18 countries (19.4%) experiencing an increase of 70% or more in 2024 compared with 2015. In eight countries (8.6%), malaria case incidence in 2024 was similar to that of 2015.

Thirty-five countries (37.6%) that were malaria endemic in 2015 met the GTS mortality milestone for 2024, with 29 of them reporting zero malaria deaths (including those that have been certified malaria free). An additional 38 countries (40.9%) achieved reductions in the mortality rate, but progress was below the 70% target. In three countries, malaria mortality rates remained at the same level in 2024 as in 2015 (3.2%), whereas rates increased in 17 countries (18.3%), among which 12 countries had increases of 70% or more.



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

Fig. 2.5. Map of malaria endemic countries (including the territory of French Guiana) showing progress towards the GTS 2025 malaria case incidence milestone of at least 70% reduction by 2024 from a 2015 baseline[a,b] *Source: WHO estimates.*

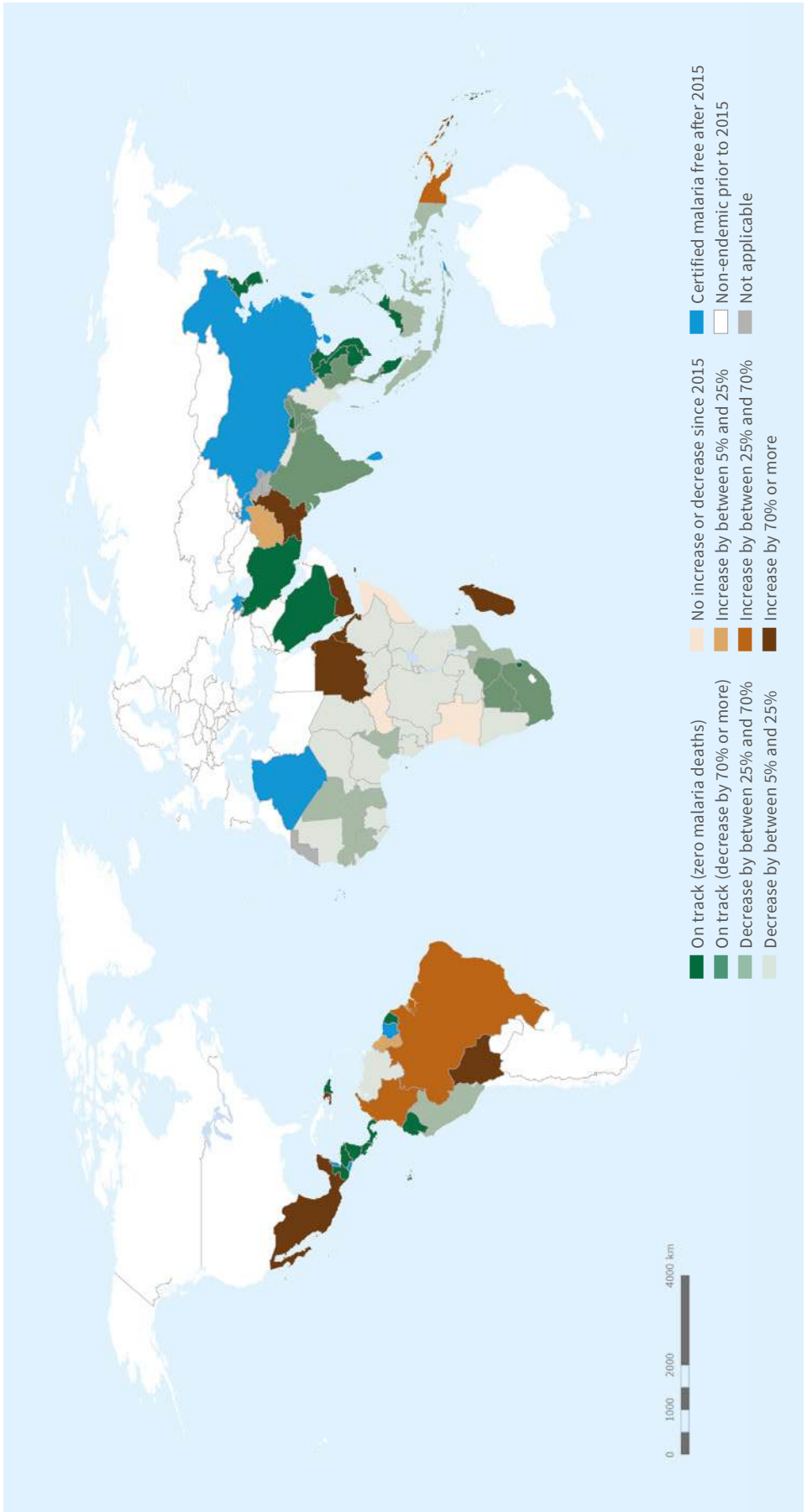


GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization.

[a] Countries that experienced reductions of 70% or more in 2024 are considered to be on track to meet the GTS 2025 targets because 70% represents the estimated expected reduction for 2024 between the GTS targets of 2020 (40%) and 2025 (75%).

[b] The following countries that were non-endemic in 2015 have since been certified: Argentina (2019), Egypt (2024), Georgia (2025), Kyrgyzstan (2016) and Uzbekistan (2018).

Fig. 2.6. Map of malaria endemic countries (including the territory of French Guiana) showing progress towards the GTS 2025 malaria mortality rate milestone of at least 70% reduction by 2024 from a 2015 baseline[a,b,c] *Source: WHO estimates.*



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization.

[a] Countries that experienced reductions of 70% or more in 2024 are considered to be on track to meet the GTS 2025 targets because 70% represents the estimated expected reduction for 2024 between the GTS targets of 2020 (40%) and 2025 (75%).

[b] The following countries that were non-endemic in 2015 have since been certified: Argentina (2019), Egypt (2024), Georgia (2025), Kyrgyzstan (2016) and Uzbekistan (2018).

[c] Mexico and Sao Tome and Principe reported zero indigenous malaria deaths in 2015 and one indigenous malaria death in 2024, which significantly inflates the percentage increase in these countries.

Table 2.3a. Progress towards GTS 2025 milestone for reduction in malaria incidence by 70% in 2024 *Source: WHO estimates.*

	On track		Decrease or no change in incidence			Increase in incidence		
WHO Region	**Certified malaria free**	**Zero or ≥70% decrease**	**25–<70% decrease**	**5–<25% decrease**	**No change**	**5–<25% increase**	**25–<70% increase**	**≥70% increase**
African	Algeria Cabo Verde	Rwanda South Africa Zimbabwe	Botswana Equatorial Guinea Eswatini Gambia Ghana Guinea Liberia Senegal Togo	Benin Burkina Faso Central African Republic Kenya Mali Mauritania Mozambique Namibia Niger Sierra Leone South Sudan Uganda	Cameroon Chad Congo Gabon Nigeria United Republic of Tanzania	Burundi Côte d'Ivoire Democratic Republic of the Congo Ethiopia Guinea-Bissau Malawi Zambia	Angola	Comoros Eritrea Madagascar Sao Tome and Principe
Americas	Belize El Salvador Suriname		Ecuador French Guiana Guatemala Honduras Mexico Peru Venezuela (Bolivarian Republic of)	Brazil			Dominican Republic Guyana	Bolivia (Plurinational State of) Colombia Costa Rica Haiti Nicaragua Panama
Eastern Mediterranean		Saudi Arabia			Somalia		Afghanistan	Djibouti Iran (Islamic Republic of) Pakistan Sudan Yemen
South-East Asia	Sri Lanka Timor-Leste	Bhutan India Nepal	Bangladesh Democratic People's Republic of Korea Thailand					Myanmar
Western Pacific	China	Cambodia Lao People's Democratic Republic Malaysia Viet Nam	Indonesia[a]	Philippines	Republic of Korea		Papua New Guinea	Solomon Islands Vanuatu

GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization.

[a] As of 27 May 2025, Indonesia has been reassigned to the WHO Western Pacific Region (resolution WHA78.25, https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R25-en.pdf).

Table 2.3b. Progress towards GTS 2025 milestone for reduction in malaria mortality by 70% in 2024

Source: WHO estimates.

	On track		Decrease or no change in incidence			Increase in mortality		
WHO Region	**Certified malaria free**	**Zero or ≥70% decrease**	**25–<70% decrease**	**5–<25% decrease**	**No change**	**5–<25% increase**	**25–<70% increase**	**≥70% increase**
African	Algeria Cabo Verde	Botswana Eswatini South Africa Zimbabwe	Burkina Faso Cameroon Ghana Guinea Mali Mozambique Senegal Sierra Leone Togo	Benin Burundi Chad Congo Côte d'Ivoire Democratic Republic of the Congo Equatorial Guinea Ethiopia Gabon Gambia Guinea-Bissau Kenya Liberia Malawi Mauritania Namibia Niger Nigeria Rwanda South Sudan Uganda United Republic of Tanzania Zambia	Angola Central African Republic			Comoros Eritrea Madagascar Sao Tome and Principe
Americas	Belize El Salvador Suriname	Costa Rica Dominican Republic Ecuador French Guiana Guatemala Honduras Nicaragua Panama	Peru	Venezuela (Bolivarian Republic of)		Guyana	Brazil Colombia	Bolivia (Plurinational State of) Haiti Mexico
Eastern Mediterranean		Saudi Arabia Iran (Islamic Republic of)			Somalia	Afghanistan		Djibouti Pakistan Sudan Yemen
South-East Asia	Sri Lanka Timor-Leste	Bangladesh Bhutan Democratic People's Republic of Korea India Thailand		Myanmar Nepal				
Western Pacific	China	Cambodia Lao People's Democratic Republic Malaysia Republic of Korea Vanuatu Viet Nam	Indonesia[a] Philippines				Papua New Guinea	Solomon Islands

GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization.

[a] As of 27 May 2025, Indonesia has been reassigned to the WHO Western Pacific Region (resolution WHA78.25, https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R25-en.pdf).

2.3 Estimated malaria cases and deaths in the WHO African Region, 2000–2024

In 2024, there were 265 million malaria cases in the WHO African Region (**Table 2.4**), which accounted for 94% of cases globally. Five countries – Nigeria (25.8%), the Democratic Republic of the Congo (13.3%), Uganda (5.0%), Ethiopia (4.7%) and Mozambique (3.9%) – accounted for just over half of all cases in the region (**Fig. 2.7c**).

Between 2000 and 2015, there was an estimated malaria case increase of 5.4%, from 203 million to 214 million cases, and cases increased by an additional 23.8% between 2015 and 2024. From 2023 to 2024, the number of cases increased by 9 million (3.5%). The countries with the largest increases in cases between 2023 and 2024 were Ethiopia (+2.9 million), Madagascar (+1.9 million), the Democratic Republic of the Congo (+762 000), Angola (+420 000) and Rwanda (+351 000). From 2023 to 2024, Zimbabwe reduced cases by 76.6% (–487 000). There was a decline in incidence of 31.3% between 2000 and 2015, but incidence has since remained stable. In 2024, case incidence was 237.6 per 1000 population at risk,

Table 2.4. Estimated malaria cases and deaths in the WHO African Region, 2000–2024[a]

Source: WHO estimates.

Year	Number of cases (000)				Number of deaths		
	Point	Lower bound	Upper bound	% *P. vivax*	Point	Lower bound	Upper bound
2000	**203 000**	189 000	220 000	0.0%	**804 000**	781 000	834 000
2001	**211 000**	195 000	229 000	0.9%	**815 000**	789 000	851 000
2002	**211 000**	195 000	229 000	0.9%	**786 000**	761 000	819 000
2003	**215 000**	198 000	236 000	1.1%	**758 000**	733 000	792 000
2004	**216 000**	197 000	244 000	1.2%	**751 000**	722 000	803 000
2005	**215 000**	198 000	237 000	0.8%	**712 000**	686 000	755 000
2006	**215 000**	197 000	237 000	1.0%	**723 000**	695 000	766 000
2007	**213 000**	196 000	234 000	1.0%	**704 000**	677 000	742 000
2008	**212 000**	196 000	230 000	0.8%	**666 000**	641 000	700 000
2009	**217 000**	200 000	238 000	1.0%	**673 000**	646 000	716 000
2010	**219 000**	200 000	241 000	1.1%	**650 000**	620 000	698 000
2011	**215 000**	198 000	237 000	1.4%	**618 000**	592 000	658 000
2012	**213 000**	197 000	233 000	1.5%	**578 000**	552 000	616 000
2013	**212 000**	196 000	230 000	1.2%	**556 000**	526 000	598 000
2014	**209 000**	194 000	227 000	0.7%	**550 000**	518 000	601 000
2015	**214 000**	198 000	233 000	0.6%	**550 000**	517 000	605 000
2016	**215 000**	199 000	234 000	0.4%	**546 000**	513 000	602 000
2017	**225 000**	208 000	244 000	0.3%	**548 000**	513 000	608 000
2018	**225 000**	208 000	244 000	0.2%	**552 000**	514 000	624 000
2019	**227 000**	209 000	249 000	0.3%	**545 000**	505 000	626 000
2020	**239 000**	217 000	266 000	0.3%	**598 000**	553 000	711 000
2021	**242 000**	219 000	270 000	0.3%	**577 000**	535 000	691 000
2022	**245 000**	221 000	273 000	0.5%	**573 000**	530 000	698 000
2023	**256 000**	231 000	286 000	1.1%	**567 000**	520 000	694 000
2024	**265 000**	238 000	296 000	1.7%	**579 000**	531 000	706 000

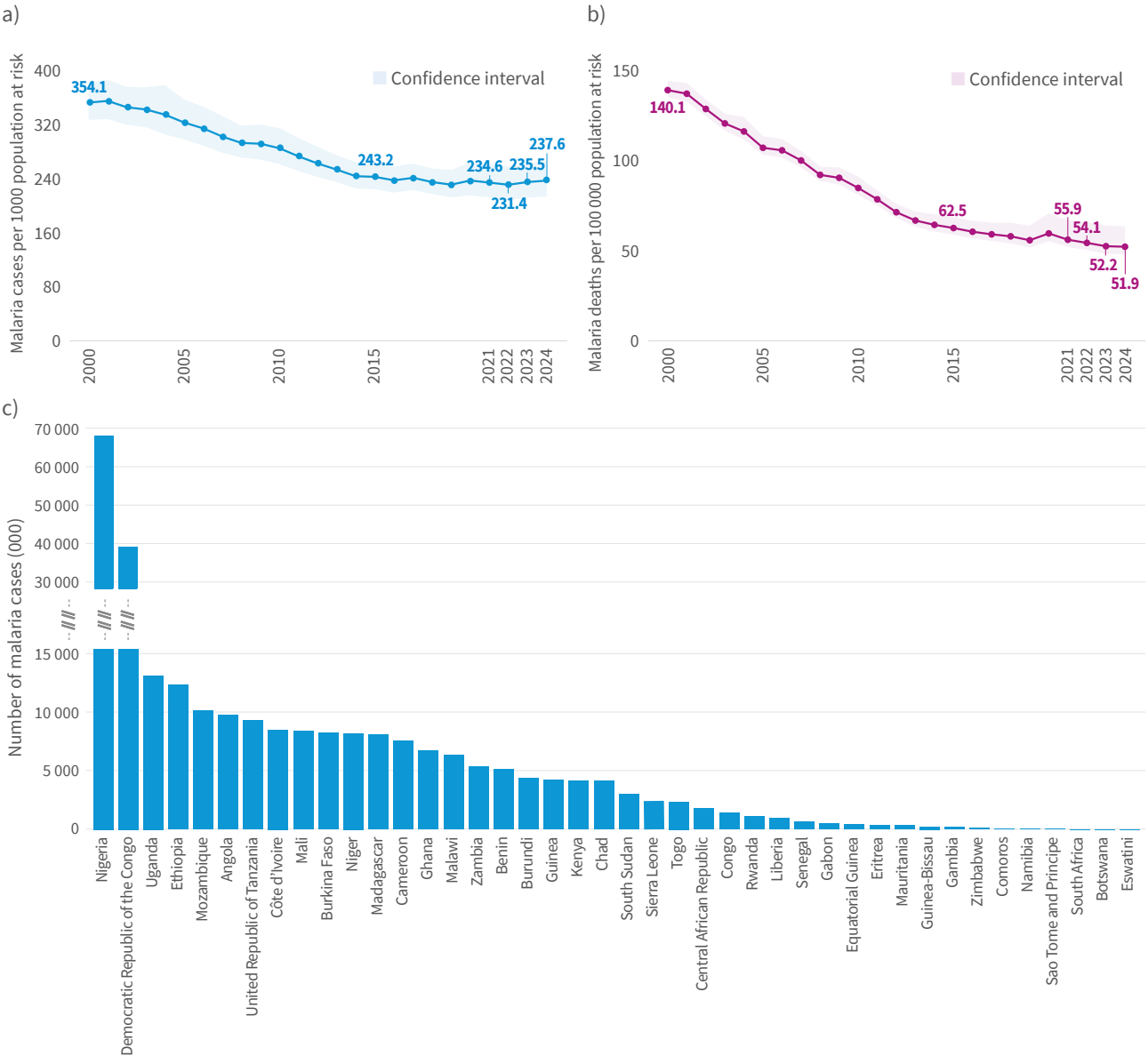
P. vivax: *Plasmodium vivax*; WHO: World Health Organization.

[a] Estimated cases and deaths are shown with 95% upper and lower confidence intervals.

representing an increase of less than 1% compared with 2023 (235.5 per 1000 population at risk) (**Fig. 2.7a**). The countries that saw the biggest increases in incidence were Rwanda (43.8%), Madagascar (27.7%) and Ethiopia (26.7%). The estimated incidence in the Democratic Republic of the Congo declined slightly (1%), but the number of cases increased marginally due to population growth.

In Rwanda, the increase in malaria incidence can be attributed to multiple factors, including climatic variations such as rising temperatures, increased humidity and heavier rainfall, along with resistance to antimalarial drugs, vector resistance to insecticides, and changes in mosquito biting behaviour that may reduce the effectiveness of existing control measures. Furthermore, reduced coverage of integrated vector control interventions due to funding constraints may have contributed to the resurgence, particularly in areas that previously received multiple vector control interventions. Likewise in Ethiopia, the increase in malaria cases can be attributed to multiple factors, including suboptimal implementation or disruption of malaria prevention and control interventions in conflict-affected regions, systemic health service delivery challenges,

Fig. 2.7. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO African Region, 2024[a] *Source: WHO estimates.*



WHO: World Health Organization.

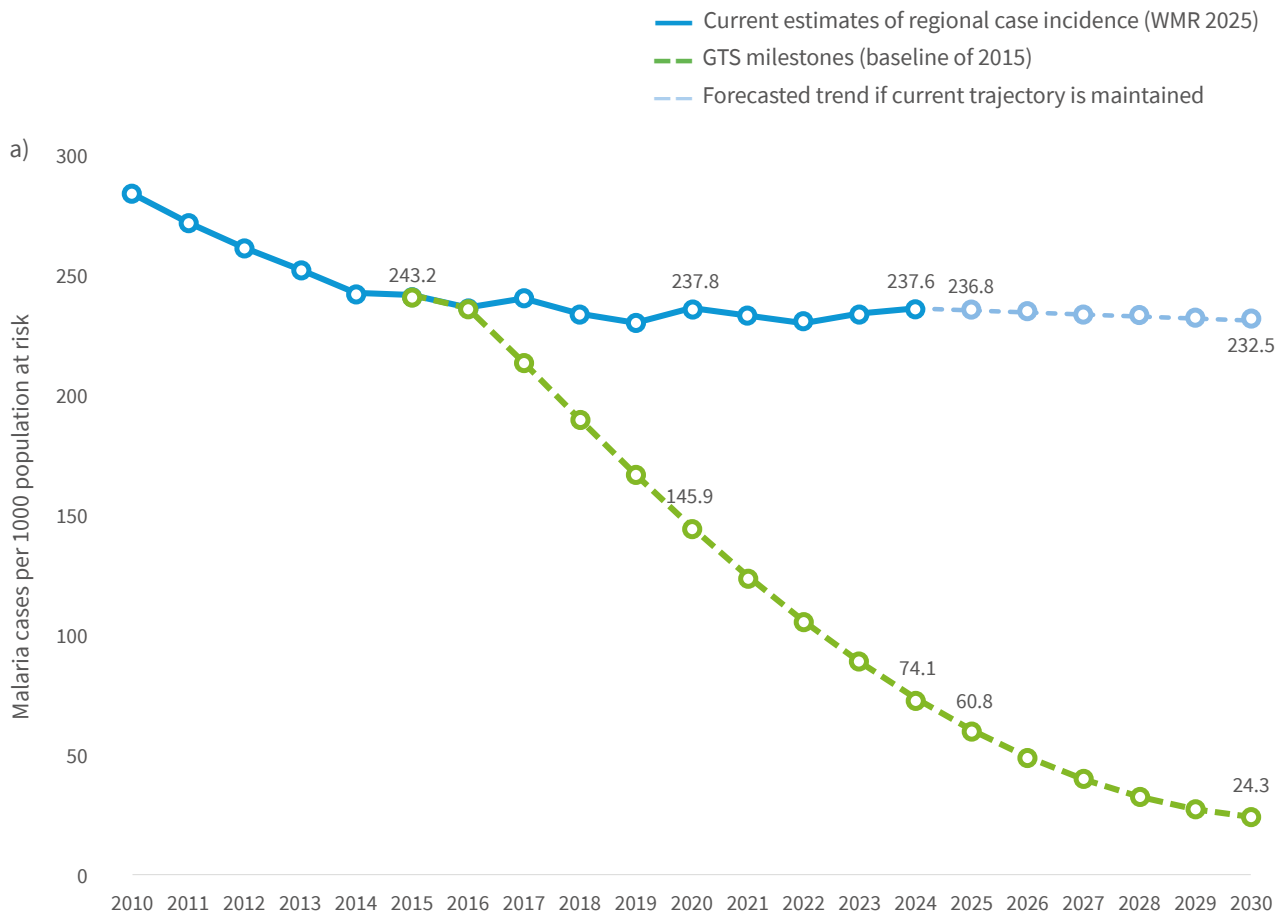
[a] Algeria and Cabo Verde have been certified malaria free.

and the influence of climate variability and change. In Madagascar, the observed increase in malaria incidence is driven by a combination of ecological, operational and epidemiological determinants (*25*). Extreme weather events have created favourable breeding habitats for *Anopheles* vectors, while simultaneously damaging infrastructure and constraining access to health services. The long-lasting insecticidal nets (LLINs) distributed in 2021 have exceeded their effective lifespan, with the subsequent replacement campaign delayed until late 2024, leading to diminished vector control efficacy. LLIN use remains below target levels, and expanded community outreach activities have increased detection of asymptomatic infections.

In 2024, there were 579 000 malaria deaths in the WHO African Region (**Table 2.4**), which accounted for 95% of malaria deaths globally. Three countries – Nigeria (31.9%), the Democratic Republic of the Congo (11.7%) and the Niger (6.1%) – accounted for half of all deaths in the region. Just over 75% of all deaths in the region are of children aged under 5 years.

In the region, after a decline in malaria deaths of almost one third from 2000 to 2015, this downward trend reversed between 2015 and 2024, when overall deaths rose by 5%. From 2023 to 2024, the number of estimated deaths rose by nearly 12 000, with over 75% of this increase occurring in Ethiopia and Madagascar, where deaths increased by 20.4% and 30.9%, respectively. In contrast, Zimbabwe had a large reduction (76.6%) in estimated deaths from 2023 to 2024. Between 2000 and 2015, the mortality rate more than halved, from 140 to 62.5 per 100 000 population at risk. Since 2015, this decline has slowed, decreasing by only an

Fig. 2.8. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO African Region considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green) *Source: WHO estimates.*

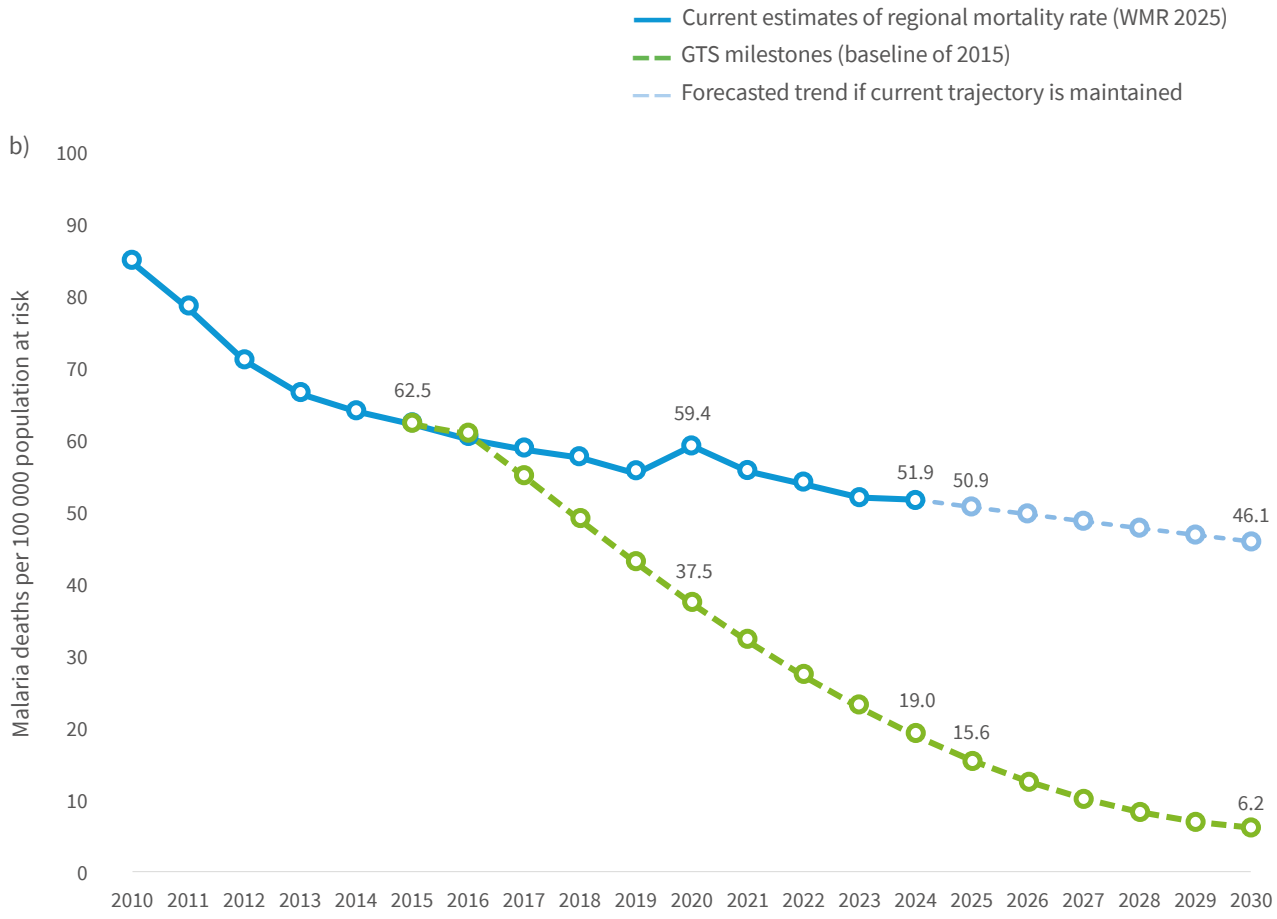


GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

additional 17%. The mortality rate declined slightly in 2024, to 51.9 per 100 000 population at risk, compared with 2023 (52.2 per 100 000 population at risk) (**Fig. 2.7b**).

Since 2015, the rate of progress in both cases and deaths has stalled in several countries in the region with moderate to high transmission. This situation was made worse, especially in sub-Saharan Africa, by extreme weather events caused by climate change and by humanitarian emergencies. Analysis of progress towards meeting GTS 2025 targets shows that, in 2024, the WHO African Region was off track for both the malaria morbidity and mortality milestones. The estimated incidence in 2024 was more than three times higher than the GTS target of 74.1 estimated cases per 1000 population at risk, and the mortality rate was 2.7 times higher than the GTS target of 19 estimated deaths per 100 000 population at risk (**Fig. 2.8**). Algeria and Cabo Verde have been certified malaria free. Rwanda, South Africa and Zimbabwe are all on track to meet the 2025 milestone of at least a 75% reduction in malaria case incidence, despite the number of cases increasing from 2023 to 2024. Although not on track, a further 21 countries (47.7%) achieved reductions in malaria case incidence in 2024 compared with 2015 (**Fig. 2.5**, **Table 2.3a**). The Comoros, Eritrea, Madagascar and Sao Tome and Principe have had increases in case incidence of 70% or more since 2015.

Botswana, Eswatini, South Africa and Zimbabwe all met the GTS mortality target, with either zero estimated malaria deaths or a decrease in mortality of 70% or more in 2024 compared with 2015 (**Fig. 2.6**, **Table 2.3b**). A further 32 countries (72.7%) had reductions in mortality rates, but by less than the 70% target. The Comoros, Eritrea, Madagascar and Sao Tome and Principe had increases in the mortality rate of 70% or more since 2015.



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

2.4 Estimated malaria cases and deaths in the WHO Region of the Americas, 2000–2024

Between 2000 and 2015, there was a decrease of 63.8% in malaria cases in the WHO Region of the Americas, from 1.6 million to 573 000 cases (**Table 2.5**). The downward trend was reversed between 2015 and 2024, with an increase of 15.7%. In 2024, there were 663 000 malaria cases in 16 endemic countries (including the territory of French Guiana) in the region (**Fig. 2.9c**), which accounted for less than 1% of cases globally. The Bolivarian Republic of Venezuela, Brazil and Colombia accounted for more than 75% of all cases in the region. Four countries and territories had fewer than 500 estimated cases: Costa Rica (240), Ecuador (380), French Guiana (246) and Mexico (266). Almost two thirds of all cases in the region were due to *P. vivax*. From 2023 to 2024, there was an increase of 15.9% in the number of estimated malaria cases. This recent increase in cases was mainly driven by increases in Haiti (+68 000, 238.8%), Colombia (+31 000, 21.3%), Peru (+14 500, 49.9%) and the Plurinational State of Bolivia (+7600, 55%). A smaller increase of just over 1000 estimated cases was seen in Panama, continuing an upward trend seen since 2018. The Bolivarian Republic of Venezuela had a significant reduction in estimated cases, by 17.9% (about 24 000 cases). Between 2000 and 2015, malaria case incidence in the region declined by

Table 2.5. Estimated malaria cases and deaths in the WHO Region of the Americas, 2000–2024[a]

Source: WHO estimates.

Year	Number of cases (000)				Number of deaths		
	Point	Lower bound	Upper bound	% *P. vivax*	Point	Lower bound	Upper bound
2000	**1 583**	1 429	1 753	71.5%	**946**	788	1 162
2001	**1 297**	1 173	1 434	67.3%	**838**	706	1 046
2002	**1 183**	1 078	1 300	67.9%	**763**	619	972
2003	**1 159**	1 066	1 261	68.5%	**734**	592	940
2004	**1 147**	1 069	1 234	69.5%	**709**	568	922
2005	**1 273**	1 201	1 356	70.3%	**685**	538	900
2006	**1 097**	1 031	1 173	68.3%	**584**	443	792
2007	**989**	906	1 073	70.2%	**504**	382	694
2008	**696**	643	761	71.1%	**468**	321	703
2009	**688**	635	753	70.5%	**461**	319	684
2010	**818**	744	902	70.9%	**499**	351	726
2011	**615**	569	672	68.9%	**464**	320	672
2012	**585**	545	634	68.9%	**430**	307	610
2013	**576**	530	629	65.0%	**472**	338	652
2014	**475**	444	511	69.8%	**348**	259	451
2015	**573**	531	620	70.1%	**390**	287	502
2016	**688**	637	749	67.3%	**529**	379	690
2017	**946**	879	1 031	73.9%	**666**	447	903
2018	**929**	861	1 014	78.1%	**573**	384	772
2019	**897**	826	984	77.2%	**509**	338	700
2020	**651**	603	706	68.4%	**408**	288	540
2021	**580**	540	626	71.5%	**333**	246	436
2022	**528**	491	568	72.6%	**342**	262	431
2023	**572**	525	622	72.0%	**332**	256	419
2024	**663**	597	739	63.1%	**504**	340	743

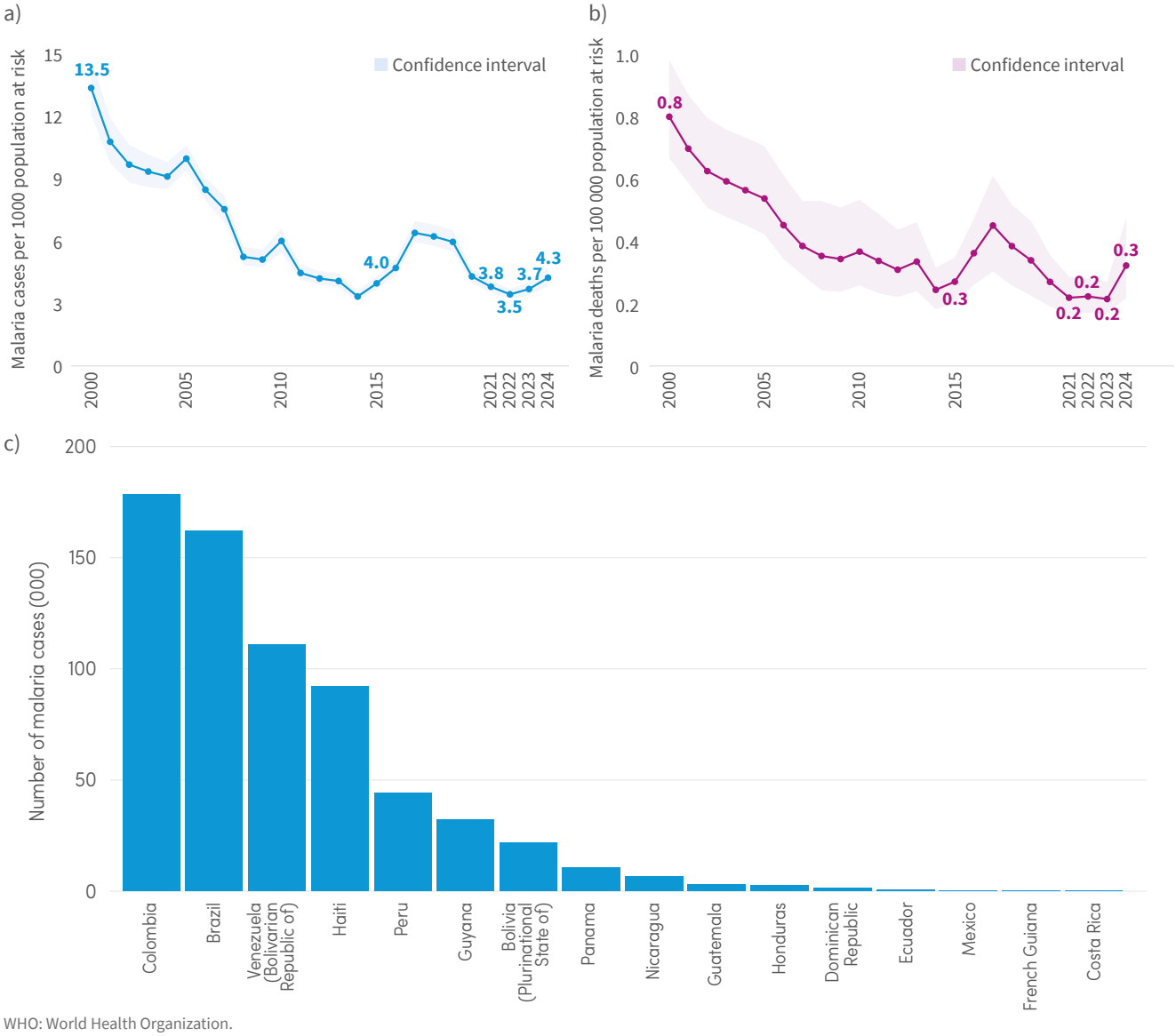
P. vivax: *Plasmodium vivax*; WHO: World Health Organization.

[a] Estimated cases and deaths are shown with 95% upper and lower confidence intervals.

70.4% from 13.5 to 4.0 per 1000 population at risk. Since 2015, incidence has remained relatively stable, with a slight increase of 7.5%. From 2023 to 2024, malaria case incidence increased by 16.2% from 3.7 to 4.3 per 1000 population at risk (**Fig. 2.9a**).

In several countries of the region, increases in malaria cases observed in 2024 were due to a combination of environmental, social and operational factors. In the Plurinational State of Bolivia, transmission rose over the past few years in the municipality of Riberalta, where nearly half the country's cases were reported, driven by rapid periurban population growth and increased population movement (linked to economic activities) in geographically challenging areas for access to diagnosis and treatment. In Colombia, an increase in case numbers was noted in the context of environmental conditions associated with the El Niño phenomenon, gold-mining activities in remote areas, and broader diagnostic coverage through community health workers. In Haiti, the departments of Grand'Anse and Sud, which account for 88% of the country's malaria cases, recorded sharp increases in cases. These increases occurred in a context of ongoing sociopolitical crisis, population displacement, roadblocks, shortages of medicines and health personnel, limited diagnostic and treatment options, and reduced use of mosquito nets in high-burden communities where there has also been intense population movement in periurban areas. In Peru, increased transmission occurred in the Loreto region, where 14 districts account for 83% of all malaria in the country, and five districts account for

Fig. 2.9. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO Region of the Americas, 2024[a] *Source: WHO estimates.*



WHO: World Health Organization.

[a] Argentina, Belize, El Salvador, Paraguay and Suriname have been certified malaria free.

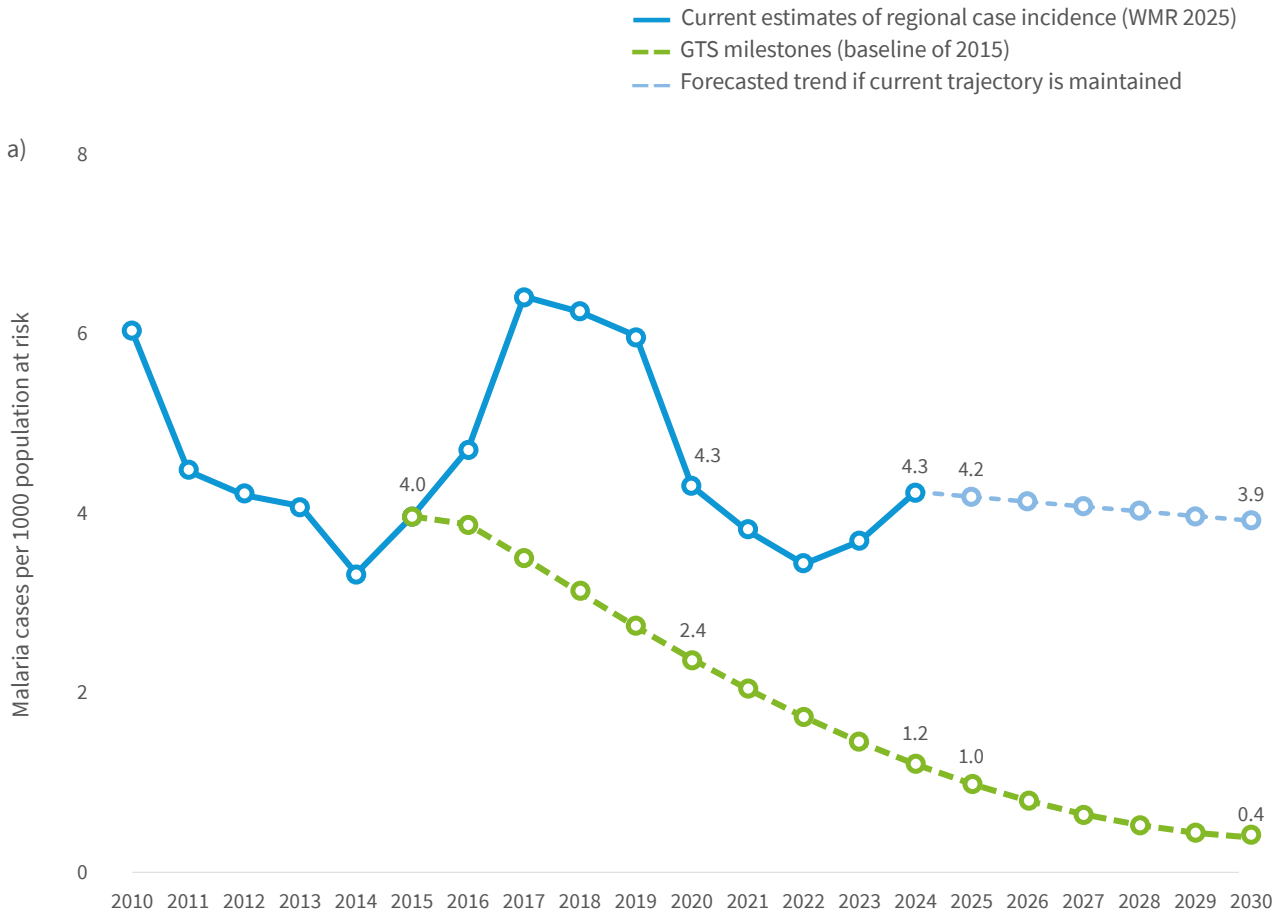
88% of *P. falciparum* cases. The increase was observed in Amazonian districts with dispersed Indigenous Peoples, border areas and limited access to health services, where gold mining and other economic activities have intensified. In Panama, rising malaria transmission was observed along population movement routes, primarily affecting local communities that face diagnostic and treatment challenges.

As in other Amazonian countries, malaria transmission in the Bolivarian Republic of Venezuela remains influenced by occupational risk factors, such as gold mining, and by the challenges of providing services to Indigenous Peoples in hard-to-reach areas. In recent years, however, the country has expanded the network of community-based diagnosis and treatment centres, particularly in remote areas of the Bolívar and Amazonas states, which together accounted for 68% of all reported malaria cases in 2024. This intervention has improved access to RDTs and timely treatment, contributing to a reduction in malaria cases.

In the region, malaria deaths more than halved between 2000 and 2015, but this downward trend was reversed between 2015 and 2024, with an increase of 29.2%. In 2024, there were an estimated 504 deaths (**Table 2.5**). There were zero indigenous malaria deaths reported in half the countries and areas (Costa Rica, the Dominican Republic, Ecuador, French Guiana, Guatemala, Honduras, Nicaragua and Panama). Children aged under 5 years accounted for less than 25% of all deaths in the region. From 2023 to 2024, deaths increased in Haiti almost fourfold, which led to an overall increase of 172 deaths in the region.

The malaria mortality rate in 2024 was 0.3 per 100 000 population at risk (**Fig. 2.9b**). Mortality more than

Fig. 2.10. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO Region of the Americas considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green) *Source: WHO estimates.*



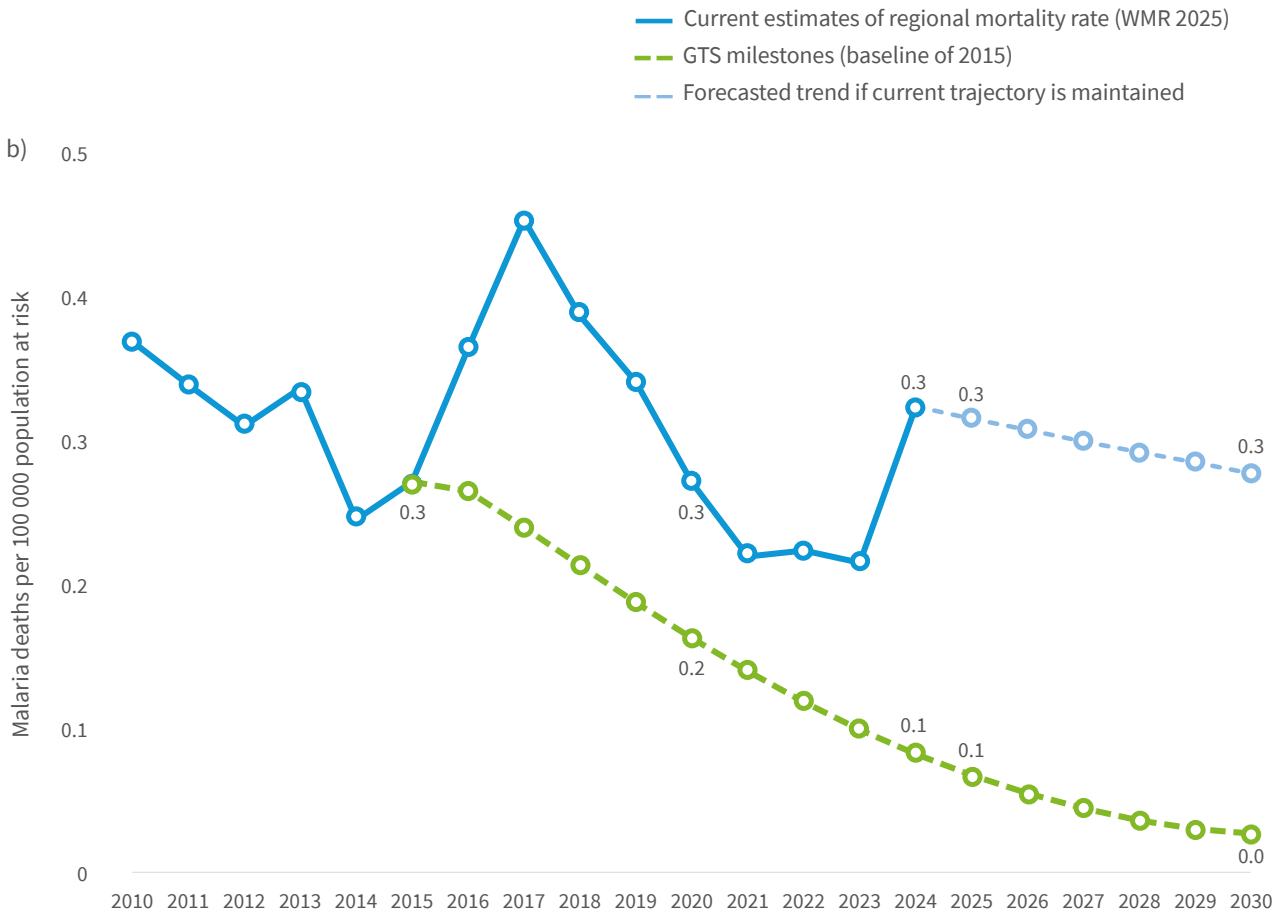
GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

halved between 2000 and 2015, but the 2024 mortality rate remained similar to the rate seen in 2015, despite fluctuations in the intervening years.

The WHO Region of the Americas did not achieve the GTS 2020 milestones for malaria morbidity or mortality and, in 2024, case incidence and mortality rate were both off GTS 2025 targets. Incidence in 2024 was 3.5 times higher than the target of 1.2 per 1000 population at risk, and mortality was three times higher than the target of 0.1 malaria deaths per 100 000 population at risk (**Fig. 2.10**).

For countries that were endemic in 2015, El Salvador, Belize and Suriname were certified malaria free in 2021, 2023 and 2025, respectively. No other countries in the region are on track to meet the GTS 2025 targets (**Fig. 2.5**, **Table 2.3a**). The Bolivarian Republic of Venezuela, Brazil, Ecuador, French Guiana, Guatemala, Honduras, Mexico and Peru all had a reduction in incidence of between 5% and 70%. All other countries had an increase in incidence. The following countries had an increase of more than 70%: Colombia, Costa Rica, Haiti, Nicaragua, Panama and the Plurinational State of Bolivia.

There are few malaria deaths in the WHO Region of the Americas, and changes in 2024 relative to the GTS 2015 baseline should be interpreted with caution. For example, although the mortality rate in Haiti, Mexico and the Plurinational State of Bolivia has increased by 70% or more (**Fig. 2.6** and **Table 2.3b**), the estimated number of deaths in 2024 were 234, 1 and 12 (reported), respectively.



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

2.5 Estimated malaria cases and deaths in the WHO Eastern Mediterranean Region, 2000–2024

In 2024, there were 11.1 million malaria cases in seven endemic countries in the WHO Eastern Mediterranean Region (**Table 2.6**), which accounted for 3.9% of cases globally. The Sudan accounted for most of the estimated malaria cases in this region (44.6%), followed by Pakistan, Yemen, Somalia, Afghanistan, Djibouti and the Islamic Republic of Iran (**Fig. 2.11c**). More than one quarter of all cases in the region were due to *P. vivax*. Iraq, Morocco, Oman and the Syrian Arab Republic last reported indigenous malaria cases in 2008, 2004, 2007 and 2004, respectively.

Between 2000 and 2015, there was a decrease in cases of 37.1%, from 7 million to 4.4 million. This downward trend reversed between 2015 and 2024, when overall cases rose by 152.3%. From 2023 to 2024, there was a decline of 4.3% in the estimated number of malaria cases. This recent decline in cases was mainly driven by a reduction in Pakistan of 1.1 million cases (26.4%). In Pakistan, the largest increase in cases and deaths occurred between 2021 and 2023 as a result of a malaria outbreak caused by flooding, which initially affected more than 30 million people. The flooding damaged more than 1000 health

Table 2.6. Estimated malaria cases and deaths in the WHO Eastern Mediterranean Region, 2000–2024[a] *Source: WHO estimates.*

Year	Number of cases (000)				Number of deaths		
	Point	Lower bound	Upper bound	% *P. vivax*	Point	Lower bound	Upper bound
2000	**7 000**	5 600	11 200	25.4%	**14 000**	8 800	25 200
2001	**7 200**	5 700	12 100	25.4%	**14 500**	9 100	26 600
2002	**6 900**	5 400	11 600	26.5%	**13 600**	8 700	26 000
2003	**6 500**	5 200	11 000	27.3%	**12 700**	8 100	24 800
2004	**5 300**	4 300	8 900	23.2%	**10 800**	6 800	20 500
2005	**5 500**	4 400	9 600	20.6%	**11 500**	7 200	22 400
2006	**5 500**	4 300	10 100	18.6%	**11 800**	7 300	24 400
2007	**4 700**	3 800	6 400	22.1%	**9 800**	6 300	14 700
2008	**3 700**	2 900	5 100	26.8%	**7 200**	4 600	10 800
2009	**3 600**	2 800	5 300	27.5%	**7 100**	4 600	11 200
2010	**4 500**	3 400	6 500	27.3%	**8 900**	5 700	13 700
2011	**4 600**	3 500	6 600	37.7%	**8 100**	5 200	11 900
2012	**4 400**	3 300	6 200	31.6%	**8 100**	5 200	11 900
2013	**4 200**	3 300	5 600	32.6%	**7 700**	5 000	11 000
2014	**4 000**	3 200	5 000	28.6%	**7 700**	4 800	11 100
2015	**4 400**	3 600	5 600	26.8%	**8 700**	5 400	12 600
2016	**5 300**	4 500	6 400	28.4%	**10 300**	6 500	14 800
2017	**5 600**	4 800	6 700	25.7%	**11 300**	6 900	16 300
2018	**5 800**	4 800	7 100	21.1%	**12 100**	7 200	18 100
2019	**5 800**	4 500	7 600	16.1%	**12 700**	7 400	20 400
2020	**5 700**	4 300	7 800	12.4%	**13 100**	7 400	21 700
2021	**6 200**	4 600	8 400	9.8%	**14 400**	8 200	23 900
2022	**8 500**	6 700	10 900	23.9%	**17 300**	10 600	26 800
2023	**11 600**	9 200	14 900	27.4%	**22 800**	13 800	35 800
2024	**11 100**	8 700	14 500	26.3%	**22 100**	12 900	35 200

P. vivax: *Plasmodium vivax*; WHO: World Health Organization.

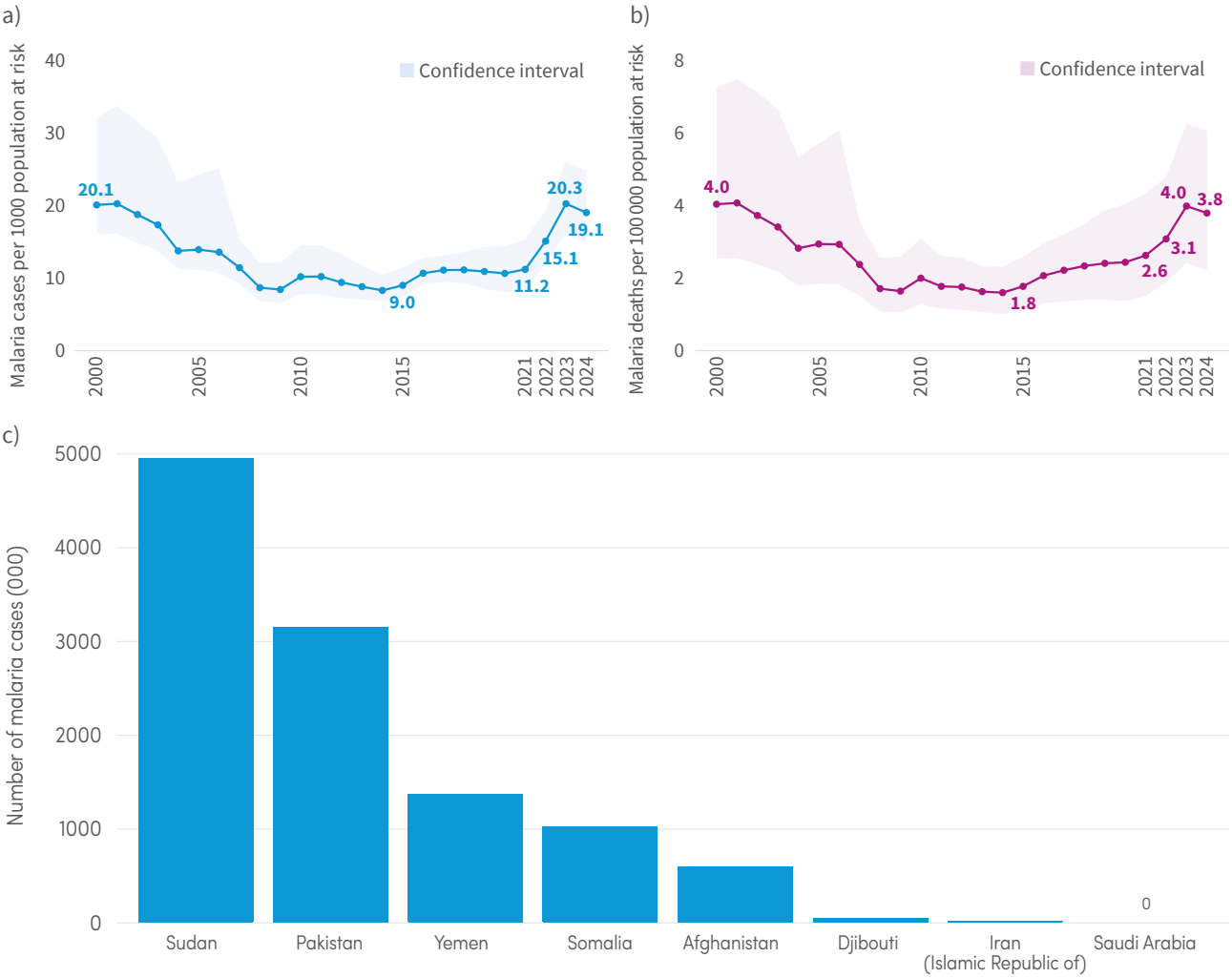
[a] Estimated cases and deaths are shown with 95% upper and lower confidence intervals.

facilities in the country, resulting in lack of access to health care for millions of people in affected districts (*27*). The Government of Pakistan, supported by WHO and partners, implemented a coordinated public health response to the malaria outbreak, focusing on restoring access to diagnosis, treatment and vector control. Targeted interventions, including the distribution of insecticide-treated mosquito nets (ITNs), expanded screening of suspected cases and prompt treatment of confirmed cases, contributed to the reduction in malaria incidence seen in 2024. Increases in estimated malaria cases were seen in Afghanistan (37.8%) and Yemen (38.3%). Increases in all these countries may be linked to factors such as poor use of, or lack of access to, bed nets; conflict (*24*, *28*) and security issues limiting access to diagnostics and treatment; and displacement of non-immune populations from non-endemic areas to areas of medium to high risk of transmission.

Between 2000 and 2015, malaria case incidence in the region declined by 55.2%, from 20.1 to 9.0 per 1000 population at risk. Since 2015, however, incidence has increased by 112.2%. From 2023 to 2024, malaria case incidence declined by 5.9%, from 20.3 to 19.1 per 1000 population at risk (**Fig. 2.11a**).

Malaria deaths decreased by nearly 37.9% between 2000 and 2015, but this downward trend was reversed between 2015 and 2024, with an increase of 154%. In 2024, there

Fig. 2.11. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO Eastern Mediterranean Region, 2024[a] *Source: WHO estimates.*



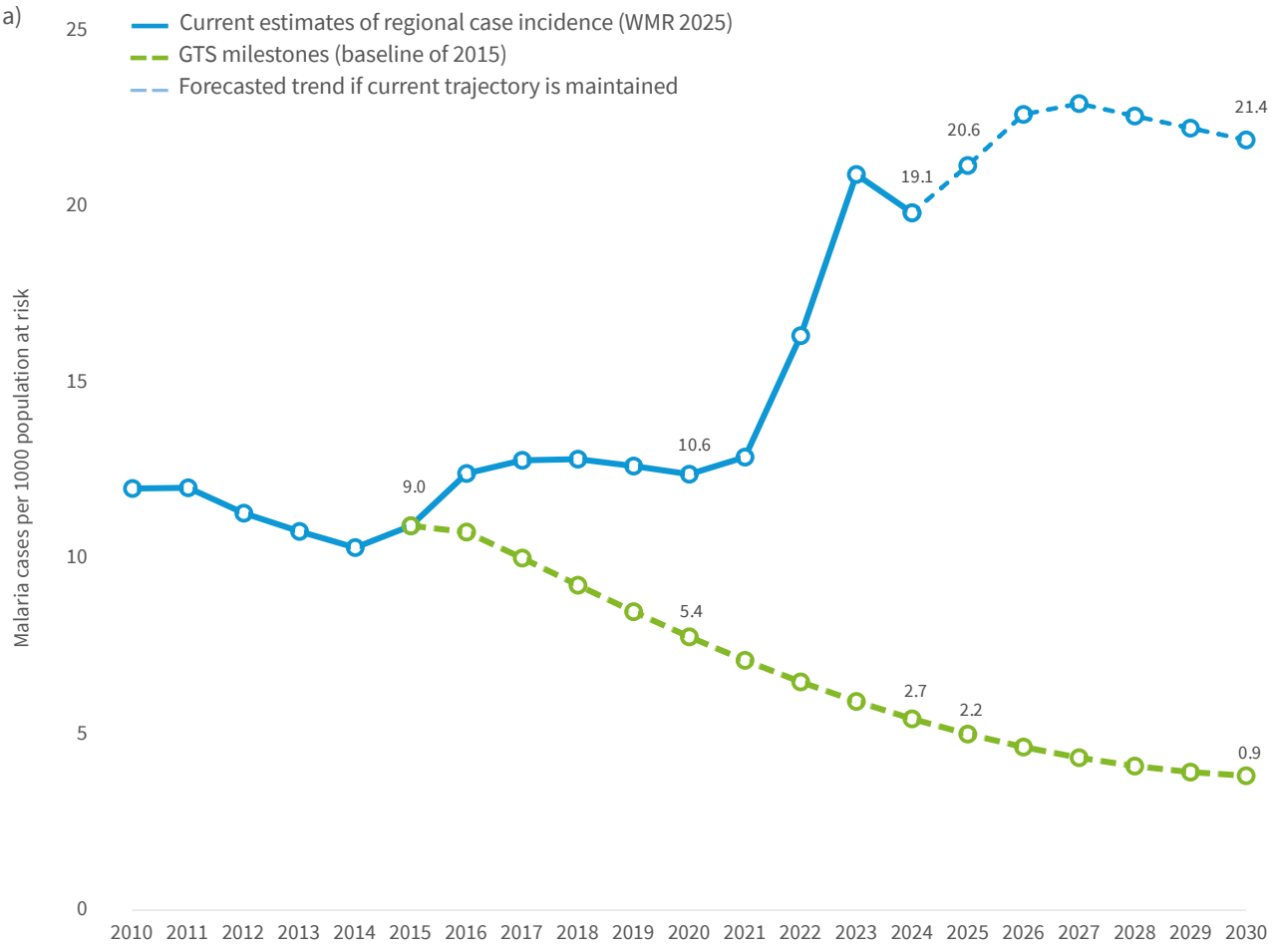
WHO: World Health Organization.

[a] Saudi Arabia is no longer considered a malaria endemic country, with zero indigenous cases reported for at least 4 consecutive years.

were an estimated 22 100 malaria deaths (**Table 2.6**). The Sudan accounted for 57.5% of all deaths in the region; about 89% of cases in the Sudan are due to *P. falciparum*, which is responsible for almost all malaria-related fatalities and has a higher case fatality rate than *P. vivax*. Children aged under 5 years accounted for 36.4% of all deaths. From 2023 to 2024, there was an overall decrease of 700 deaths. This was mainly due to a decrease of almost 2000 estimated deaths in Pakistan, while Yemen (+932), the Sudan (+189), Afghanistan (+68) and Somalia (+37) each saw an increase in estimated deaths. Between 2000 and 2015, the malaria mortality rate declined by 55%, from 4.0 to 1.8 per 100 000 population at risk, followed by an increase of 111% since 2015 to 3.8 per 100 000 population at risk in 2024. However, from 2023 to 2024, the mortality rate declined by 5% (**Fig. 2.11b**).

Since 2015, there has been an increase in malaria case incidence and mortality rate in the WHO Eastern Mediterranean Region, and the region is now off track to reach both the GTS 2025 targets. In 2024, the estimated incidence was seven times higher than the GTS target of 2.7 estimated cases per 1000 population at risk, and the mortality rate was 7.6 times higher than the GTS target of 0.5 estimated deaths per 100 000 population at risk (**Fig. 2.12**). Saudi Arabia reported zero indigenous malaria cases for the fourth consecutive year in 2024, ending the malaria epidemic in that country. All other countries in the region were off track, with increases in case incidence and mortality rate of 70% or more in Djibouti, Pakistan, the Sudan and Yemen (**Fig 2.5**, **Fig 2.6**, **Table 2.3**). There was an increase of between 25% and 70% in incidence and mortality rate in Afghanistan,

Fig. 2.12. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO Eastern Mediterranean Region considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green) *Source: WHO estimates.*



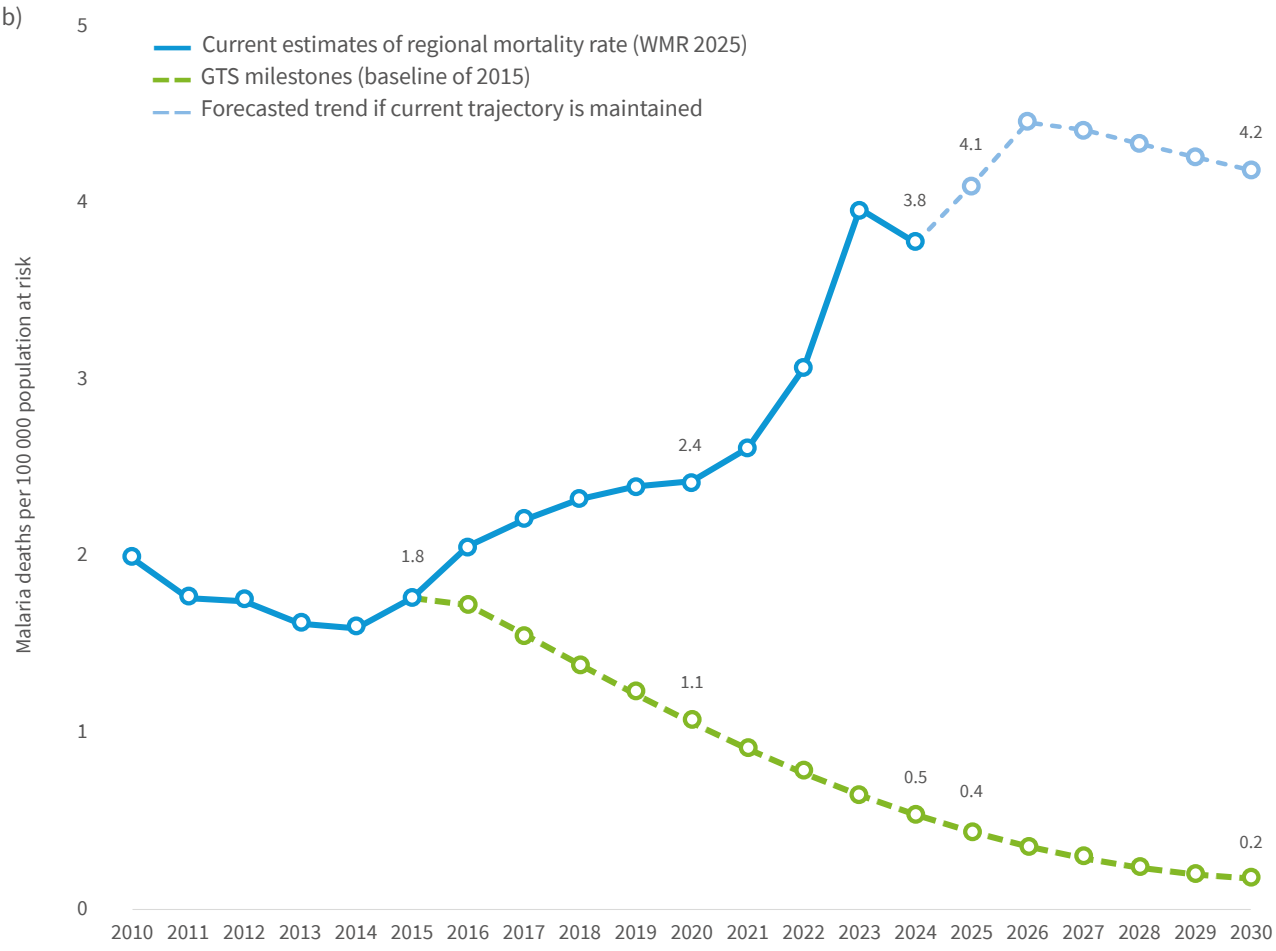
GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report*.

and it is estimated that there was no change in incidence or mortality rate in Somalia. Despite having no indigenous cases for 4 consecutive years between 2018 and 2021, the Islamic Republic of Iran reported 1439 confirmed cases in 2022, 2528 confirmed cases in 2023, and 2034 confirmed cases in 2024 (locally acquired cases, including both indigenous and introduced cases). The Islamic Republic of Iran has now seen more than a 70% increase in malaria case incidence since 2015. The upsurge in cases in neighbouring Pakistan was a contributing factor to this increase in cases, particularly along the border area where there is frequent movement of people. Other contributing factors include lack of funding and difficulties in procuring commodities (*29*). Reduced resources resulted in the lack of, or delays in, diagnosis and treatment, in addition to difficulties in effectively carrying out case investigation and classification. As a result, it was not possible to accurately distinguish between indigenous and introduced cases.

Zero malaria deaths have been reported in Saudi Arabia since 2000, and zero indigenous malaria deaths have been reported in the Islamic Republic of Iran since 2009.

2.6 Estimated malaria cases and deaths in the WHO European Region, 2000–2024

Since 2015, the WHO European Region has been free of malaria. The last country to report an indigenous malaria case was Tajikistan in 2014. Throughout the period 2000–2024, no malaria deaths were reported in the WHO European Region.



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report*.

2.7 Estimated malaria cases and deaths in the WHO South-East Asia Region, 2000–2024

In 2024, there were 2.7 million malaria cases in six endemic countries in the WHO South-East Asia Region (**Table 2.7**), which accounted for less than 1% of cases globally. India accounted for 73.3% of all cases in the region (**Fig. 2.13c**). More than half of all cases in the region were due to *P. vivax*.

Between 2000 and 2015, there was a decrease in cases of 64.8%, from 23.6 million to 8.3 million. This decline continued between 2015 and 2024, with a further reduction in cases of 67.5%. There was no change in the estimated number of malaria cases from 2023 to 2024. Despite there

Table 2.7. Estimated malaria cases and deaths in the WHO South-East Asia Region, 2000–2024[a]

Source: WHO estimates.

Year	Number of cases (000)				Number of deaths		
	Point	Lower bound	Upper bound	% *P. vivax*	Point	Lower bound	Upper bound
2000	**23 600**	18 900	29 500	47.4%	**36 500**	19 900	57 000
2001	**23 700**	19 200	29 800	50.4%	**35 100**	19 400	54 200
2002	**21 900**	17 400	27 800	49.7%	**32 900**	17 900	51 200
2003	**22 900**	18 100	29 000	52.3%	**32 900**	18 100	51 400
2004	**24 900**	19 600	32 200	51.6%	**36 200**	19 400	56 800
2005	**25 900**	19 800	34 600	53.7%	**36 300**	19 400	58 600
2006	**19 400**	15 000	25 800	51.2%	**28 400**	15 100	46 000
2007	**18 200**	14 200	23 900	48.7%	**27 200**	14 500	44 000
2008	**18 300**	14 100	23 900	46.6%	**28 300**	15 200	44 800
2009	**17 600**	13 700	23 100	44.2%	**28 100**	15 000	45 300
2010	**17 000**	13 600	21 400	44.0%	**27 100**	14 800	42 000
2011	**13 900**	11 300	17 300	45.0%	**21 900**	12 100	33 600
2012	**11 600**	9 500	14 200	47.1%	**17 700**	10 000	26 900
2013	**8 300**	6 700	10 100	46.0%	**12 800**	6 800	19 900
2014	**8 300**	6 800	10 000	34.2%	**15 000**	7 600	23 700
2015	**8 300**	6 900	10 000	33.5%	**15 200**	7 600	24 000
2016	**8 100**	6 400	10 100	34.7%	**14 600**	7 200	23 800
2017	**6 000**	4 800	7 400	37.3%	**10 500**	5 200	16 900
2018	**4 500**	3 200	5 900	51.7%	**6 500**	3 200	10 700
2019	**3 800**	2 500	5 100	53.6%	**5 300**	2 500	8 900
2020	**3 400**	2 200	4 800	37.1%	**6 000**	2 600	10 500
2021	**3 600**	2 200	5 300	40.8%	**6 000**	2 600	10 900
2022	**2 500**	2 000	4 400	51.8%	**3 500**	1 900	6 000
2023	**2 700**	2 100	5 400	53.0%	**3 800**	2 100	6 700
2024	**2 700**	2 100	5 100	52.4%	**3 900**	2 000	6 600

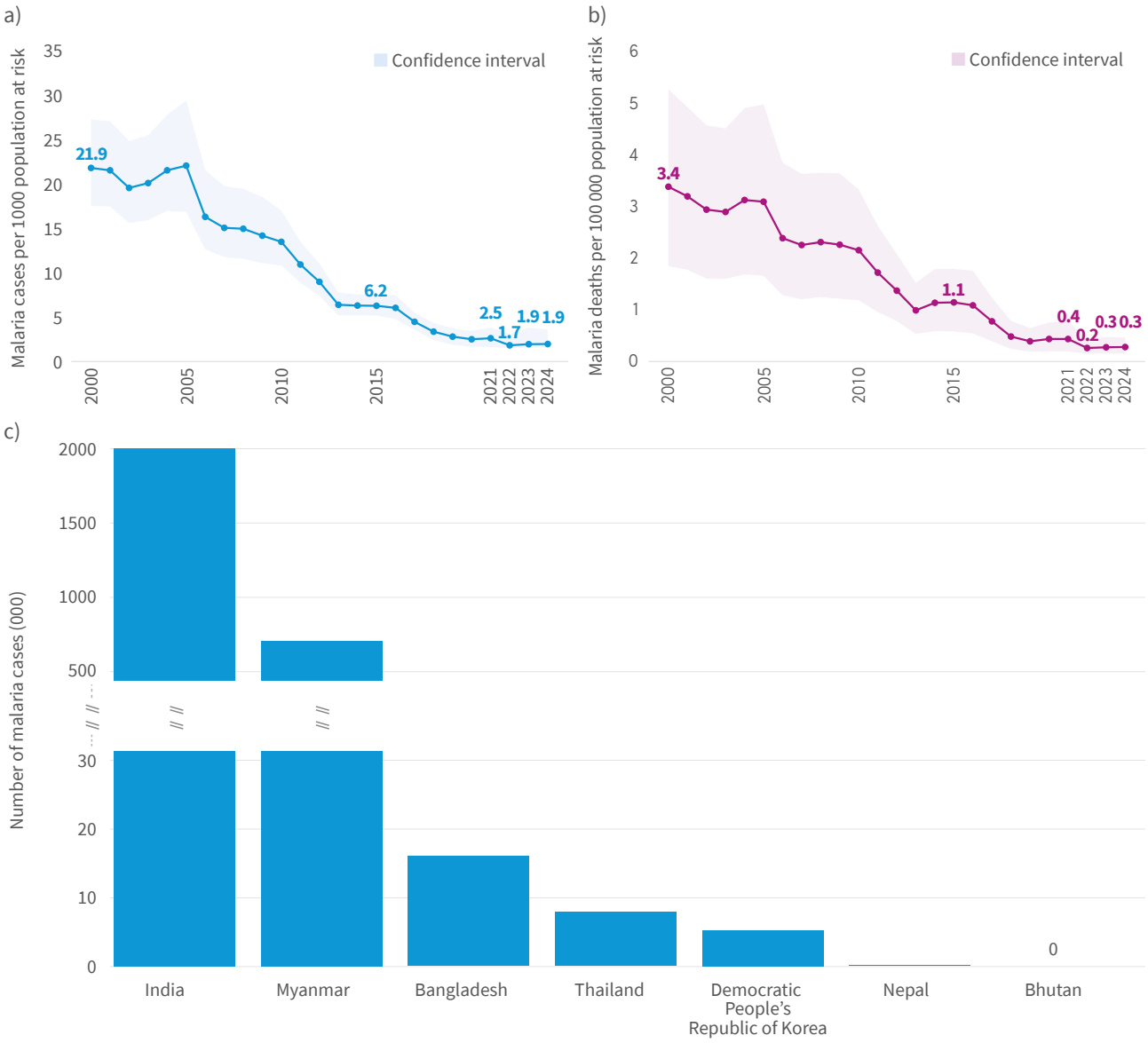
P. vivax: *Plasmodium vivax*; WHO: World Health Organization.

[a] Estimated cases and deaths are shown with 95% upper and lower confidence intervals.

being no change at a regional level, there was a decline in cases in Bangladesh (21.0%), Myanmar (17.2%) and Thailand (14.1%), while estimated cases increased in the Democratic People's Republic of Korea (65.6%), India (11.1%) and Nepal (146.7%; from 15 to 37 cases). In India, most districts reported reductions, although localized outbreaks occurred. The increase in Nepal's estimated malaria cases may be linked to its proximity and porous border with India, which can affect malaria elimination efforts. In 2024, malaria case incidence remained the same as for 2023, at 1.9 per 1000 population at risk (**Fig. 2.13a**). Between 2000 and 2015, and between 2015 and 2024, there were large decreases in incidence of 71.7% and 69.4%, respectively.

In 2024, there were 3900 malaria deaths (**Table 2.7**), with India accounting for 88.7% of all deaths in the region. Just under a quarter of all malaria deaths in the region were

Fig. 2.13. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO South-East Asia Region, 2024[a] *Source: WHO estimates.*



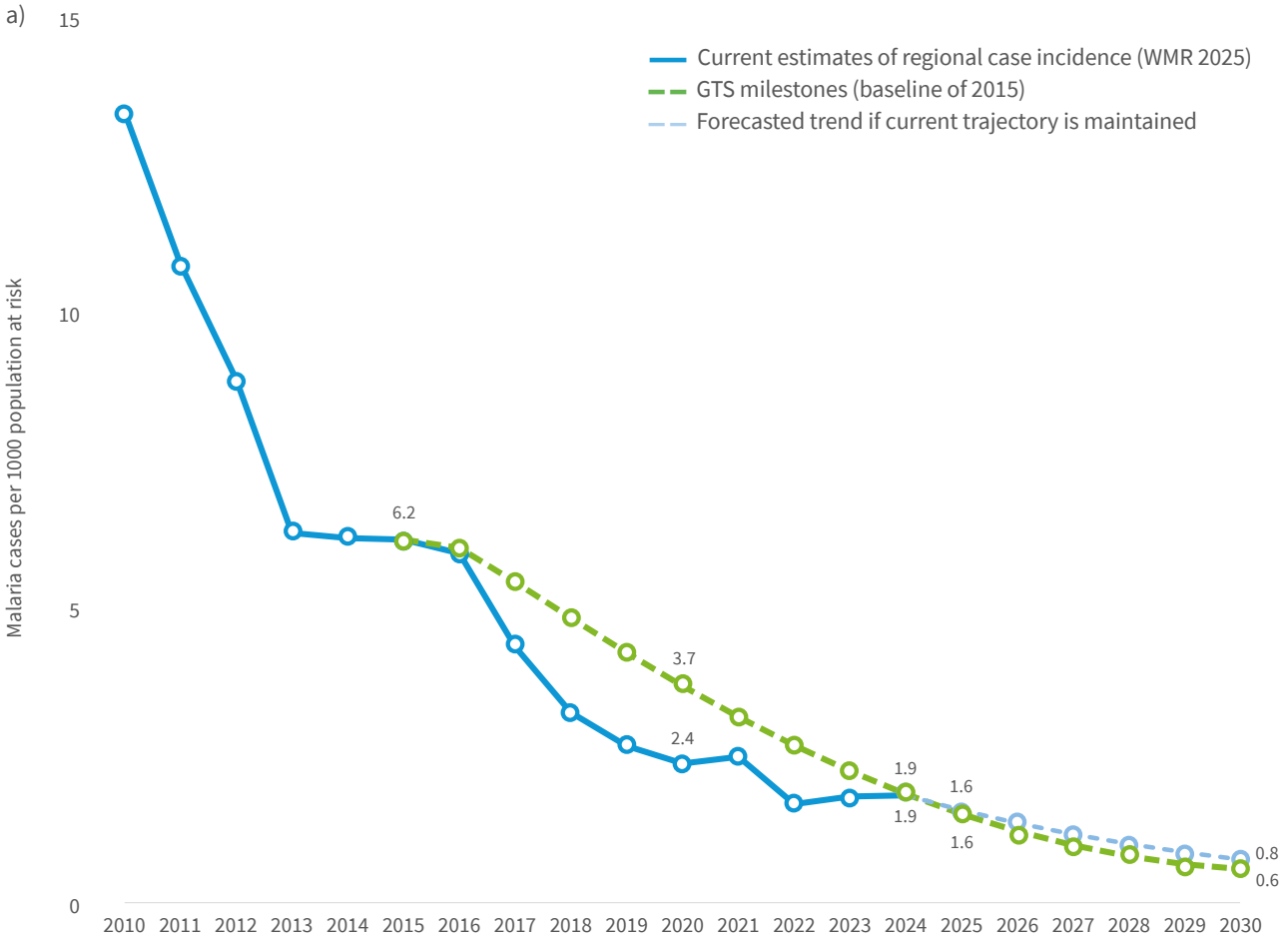
WHO: World Health Organization.

[a] Bhutan is no longer considered a malaria endemic country, with zero indigenous cases reported for at least 3 consecutive years. Timor-Leste and Sri Lanka have been certified malaria free.

in children aged under 5 years. Between 2000 and 2015, deaths declined by nearly 60%, and this downward trend accelerated from 2015 to 2024, with a further reduction of 74%. Between 2000 and 2015, and between 2015 and 2024, the mortality rate declined by 67.6% and 72.7%, respectively. The malaria mortality rate remained similar from 2023 to 2024 (**Fig. 2.13b**).

The WHO South-East Asia Region met the GTS 2020 milestones for both malaria mortality and morbidity (**Fig. 2.14**) and remains on track to meet the GTS 2025 targets and the GTS 2030 target for mortality. Sri Lanka and Timor-Leste were certified as malaria free in 2016 and 2025, respectively, and Bhutan has reported zero malaria cases since 2022. Both India and Nepal are on track to meet the

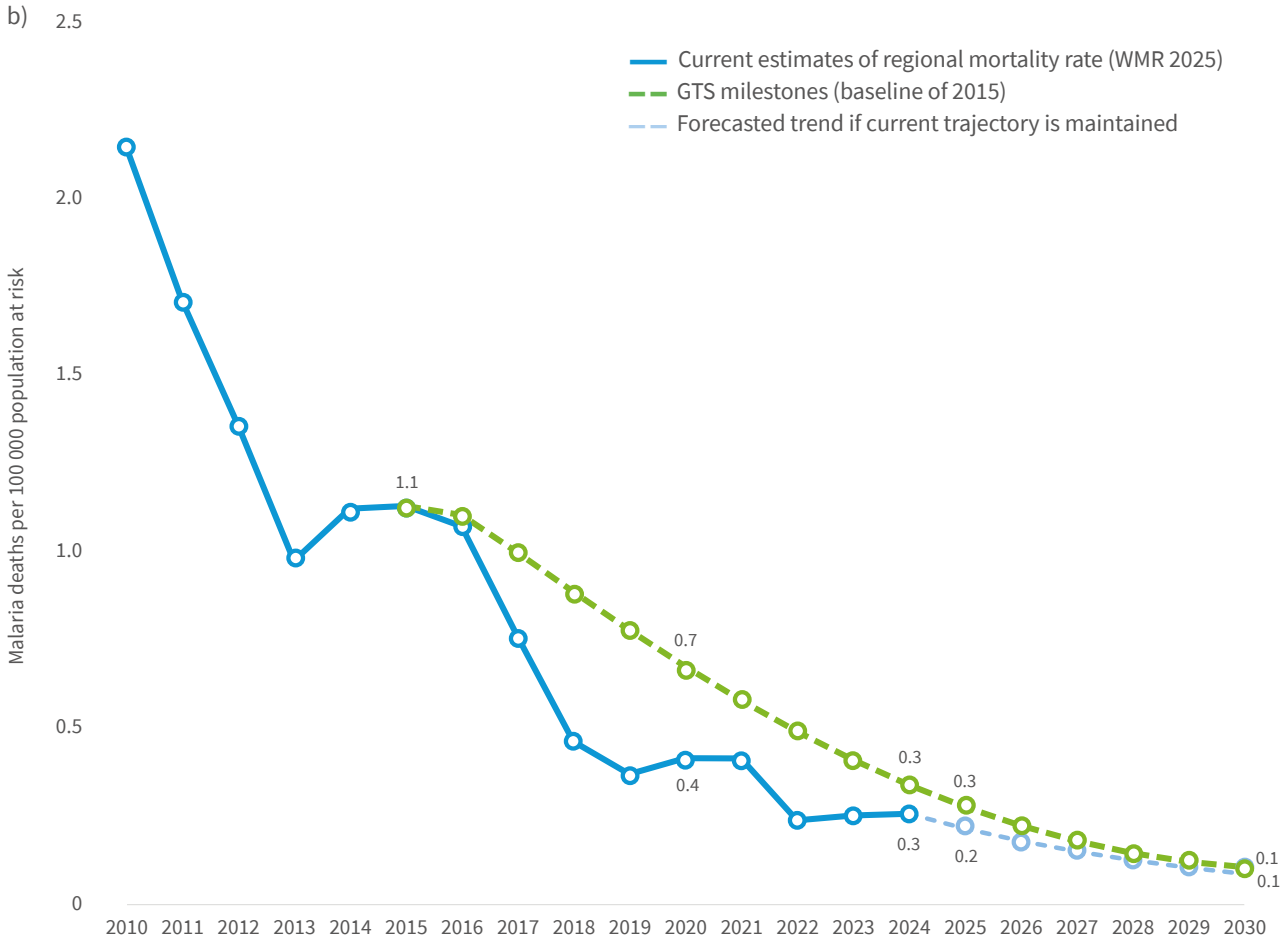
Fig. 2.14. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO South-East Asia Region considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green) *Source: WHO estimates.*



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

GTS target for reductions in incidence by 75% in 2025, with reductions of 70% or more in 2024 (**Fig. 2.5**, **Table 2.3a**). Bangladesh, the Democratic People's Republic of Korea and Thailand had reductions in incidence of 25–70%, while Myanmar had an increase of 70% or more. Increases in cases in Myanmar are due to the political and social instability in the country (*30*).

In 2024, zero malaria deaths were reported in Bhutan and the Democratic People's Republic of Korea. Bangladesh, India and Thailand are on track to meet the GTS target for mortality, with a reduction in mortality rate of 70% or more, and Myanmar and Nepal had reductions of between 25% and 70% (**Fig. 2.6**, **Table 2.3b**).



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

2.8 Estimated malaria cases and deaths in the WHO Western Pacific Region, 2000–2024

In 2024, there were 2.4 million malaria cases in nine endemic countries in the WHO Western Pacific Region (**Table 2.8**), which accounted for less than 1% of cases globally. Papua New Guinea accounted for more than half the estimated malaria cases in this region (65.6%), followed by Indonesia (25.8%) and Solomon Islands (7.4%) (**Fig. 2.15c**). Four countries had fewer than 1000 estimated cases: Cambodia (322), the Lao People's Democratic Republic (538), the Republic of Korea (640) and Viet Nam (239). More than one quarter of all cases in the region were due to *P. vivax*.

Between 2000 and 2015, there was a decrease in cases of 42.1%, from 3.9 million to 2.3 million. This decline slowed to 7.1% between 2015 and 2024. There was an 8.6% increase in the estimated number of malaria cases from 2023 to 2024. This recent increase in cases was mainly driven by increases in Indonesia (+121 000, 23.7%), Papua New Guinea (+75 700, 5.0%) and the Philippines (+8200, 53%). Reductions in cases were seen in all other countries in the region.

Between 2000 and 2015, malaria case incidence declined by 48.9%, from 4.5 to 2.3 per 1000 population at risk, but

Table 2.8. Estimated malaria cases and deaths in the WHO Western Pacific Region, 2000–2024[a]

Source: WHO estimates.

Year	Number of cases (000)				Number of deaths		
	Point	Lower bound	Upper bound	% *P. vivax*	Point	Lower bound	Upper bound
2000	**3 947**	2 884	5 207	28.3%	**8 200**	5 300	12 400
2001	**3 635**	2 629	4 839	31.4%	**7 200**	4 600	11 000
2002	**3 366**	2 457	4 498	32.6%	**6 300**	3 900	9 700
2003	**3 548**	2 614	4 673	31.8%	**6 700**	4 200	10 400
2004	**3 789**	2 673	5 165	33.1%	**7 000**	4 100	11 400
2005	**3 489**	2 518	4 682	37.2%	**6 100**	3 700	9 700
2006	**3 849**	2 864	5 060	36.2%	**6 800**	4 300	10 500
2007	**3 100**	2 222	4 200	35.3%	**5 600**	3 200	8 900
2008	**2 942**	2 120	3 992	35.4%	**5 300**	3 000	8 500
2009	**3 510**	2 497	4 749	33.1%	**6 500**	3 700	10 500
2010	**3 668**	2 953	4 543	33.7%	**6 700**	4 000	10 000
2011	**3 233**	2 648	3 965	34.5%	**5 900**	3 500	8 700
2012	**3 495**	2 642	4 866	34.4%	**6 300**	3 500	10 300
2013	**3 286**	2 612	4 109	27.7%	**6 400**	3 700	10 000
2014	**3 177**	2 488	4 089	35.1%	**5 700**	3 400	8 800
2015	**2 286**	1 953	2 680	34.9%	**4 100**	2 600	5 900
2016	**2 559**	2 147	3 025	30.3%	**4 800**	2 900	7 200
2017	**2 323**	1 889	2 850	31.2%	**4 400**	2 600	6 600
2018	**2 155**	1 699	2 702	33.2%	**3 900**	2 200	6 200
2019	**2 087**	1 644	2 584	31.7%	**3 900**	2 200	6 100
2020	**2 149**	1 687	2 658	29.5%	**4 100**	2 300	6 500
2021	**1 845**	1 460	2 259	32.8%	**3 400**	1 900	5 400
2022	**2 398**	1 884	2 957	29.1%	**4 600**	2 500	7 200
2023	**2 255**	1 779	2 766	31.0%	**4 200**	2 400	6 700
2024	**2 448**	1 951	2 981	28.7%	**4 700**	2 600	7 400

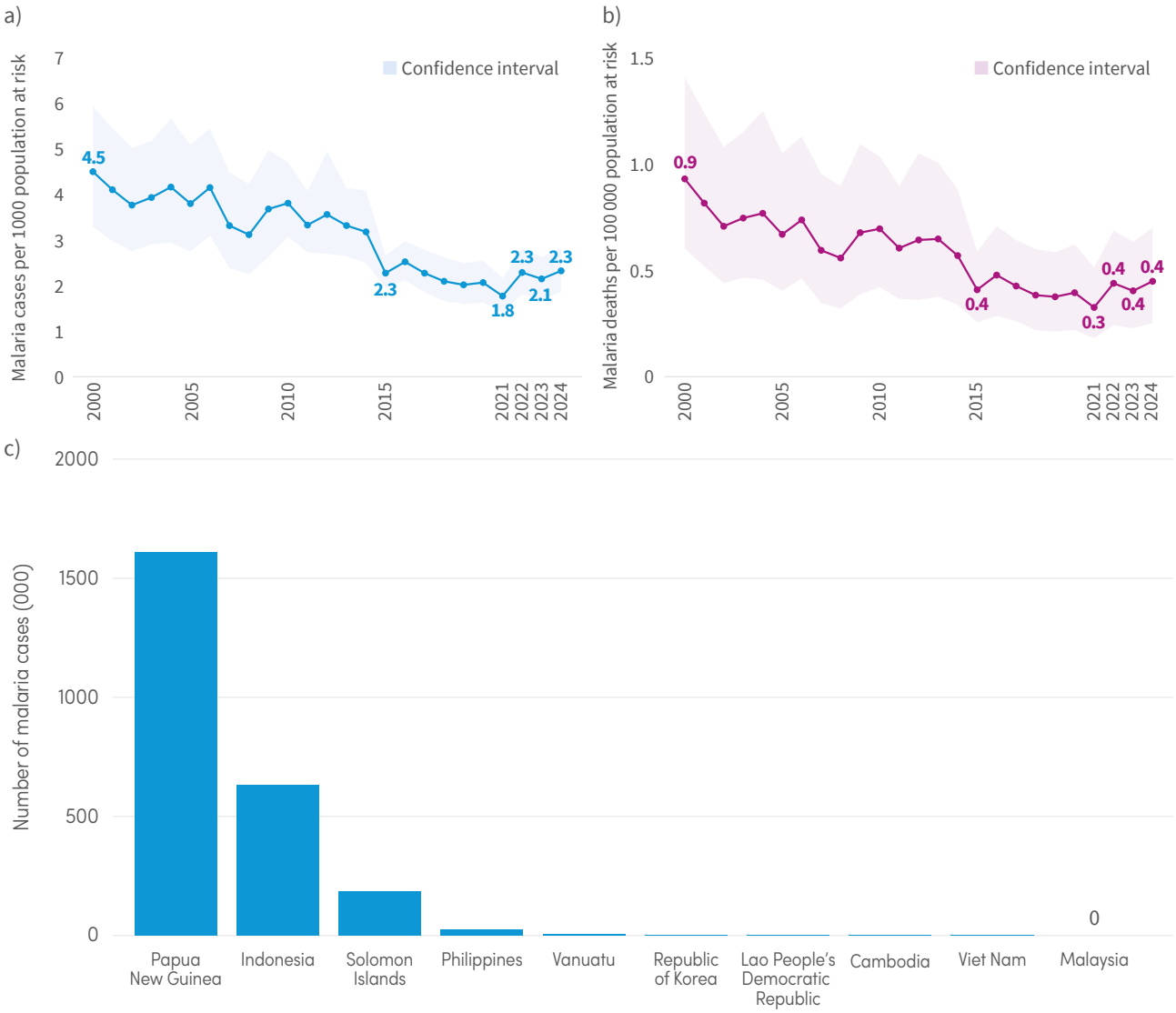
P. vivax: *Plasmodium vivax*; WHO: World Health Organization.

[a] Estimated cases and deaths are shown with 95% upper and lower confidence intervals.

incidence has remained relatively stable since 2015. From 2023 to 2024, malaria case incidence increased by 9.5%, from 2.1 to 2.3 per 1000 population at risk (**Fig. 2.15a**). The increase in malaria in Papua New Guinea coincides with delayed vector control interventions, stock-outs of diagnostics and treatment, limited access to services in remote areas, and climate-related increases in vector breeding sites. Malaria case trends in Indonesia are primarily observed in remote eastern provinces, such as Papua and West Papua, that are influenced by population mobility, limited access to health services and variations in vector control coverage, within a context of increased and extensive active case detection activities. In the Philippines, localized malaria outbreaks (particularly in Palawan and conflict-affected areas) occur in the context of forest-related transmission, gaps in health service delivery and incomplete surveillance among mobile populations and Indigenous Peoples.

In 2024, there were a total of 4700 malaria deaths in the region, representing an 11.9% increase compared with 2023 (**Table 2.8**). Papua New Guinea accounted for 78.2% of all deaths in the region; about 77% of cases in Papua New Guinea are due to *P. falciparum*. Children aged under 5 years accounted for 40.0% of all deaths in the region. From 2023 to 2024, there was an overall increase of nearly 500 deaths due to increases in Indonesia, Papua New Guinea and the Philippines. The number of deaths halved between 2000 and 2015, but this downward trend was reversed

Fig. 2.15. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO Western Pacific Region, 2024[a,b] *Source: WHO estimates.*



WHO: World Health Organization.

[a] Malaysia is no longer considered a malaria endemic country, with zero non-zoonotic indigenous cases reported for at least 3 consecutive years.

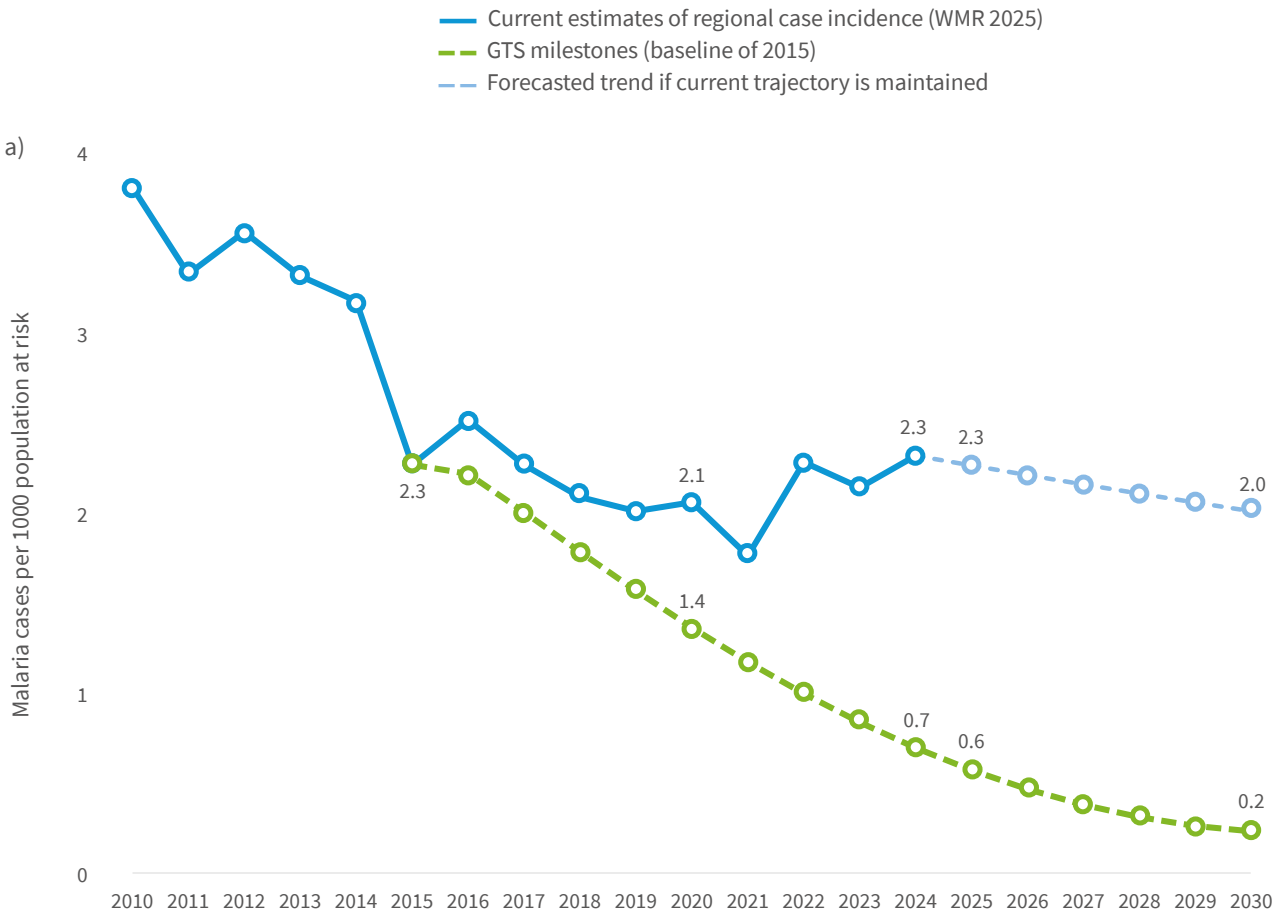
[b] As of 27 May 2025, Indonesia has been reassigned to the WHO Western Pacific Region (resolution WHA78.25, https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R25-en.pdf).

between 2015 and 2024, with an increase of 14.6%. There have been zero reported malaria deaths in the Republic of Korea and Vanuatu since 2012, Cambodia since 2018 and Viet Nam since 2019. Cambodia and the Lao People's Democratic Republic both reported zero malaria deaths in 2024. No indigenous deaths due to human malaria have been reported in Malaysia since 2018; however, a small number of *P. knowlesi* malaria deaths have been reported every year since then, with three deaths occurring in 2024. The mortality rate halved between 2000 and 2015 but has remained unchanged since, despite fluctuations between 2015 and 2024, and was estimated at 0.4 per 100 000 population at risk in 2024 (**Fig. 2.15b**).

The WHO Western Pacific Region did not achieve the GTS 2020 milestones for malaria morbidity or mortality, and case incidence and mortality rate in 2024 were both off GTS targets. Incidence was three times higher than the target of 0.7 per 100 population at risk, and mortality was four times higher than the target of 0.1 malaria deaths per 100 000 population at risk (**Fig. 2.16**).

The lack of reduction in malaria case incidence and mortality rate is mainly due to an increase of between 25% and 70% in cases and deaths in Papua New Guinea, which accounts for most of the malaria burden in the region (**Fig. 2.15c**). Increases of 70% or more in case incidence were estimated in Solomon Islands, which also accounts

Fig. 2.16. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO Western Pacific Region considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green) *Source: WHO estimates.*

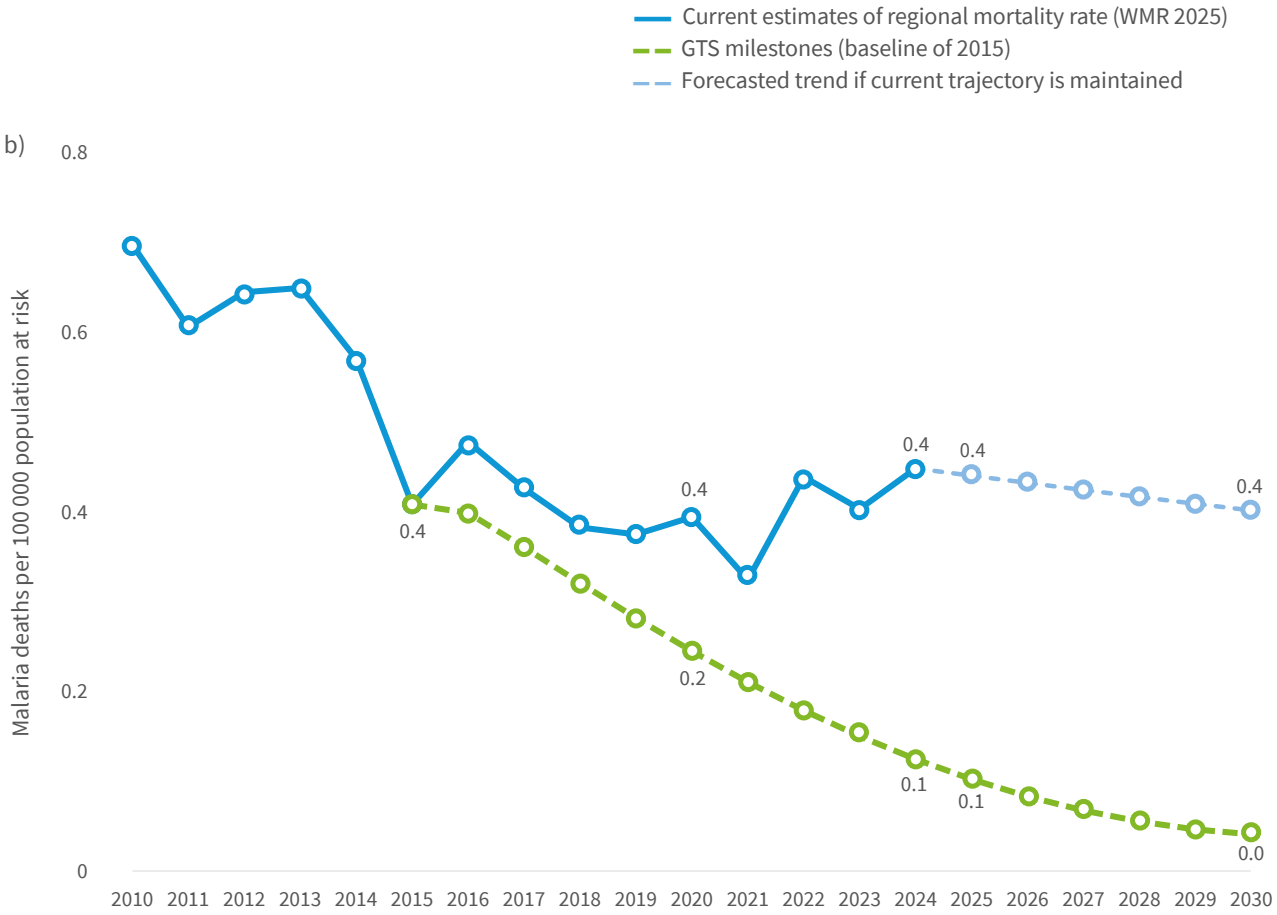


GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

for a large proportion of cases in the region, and Vanuatu, for which trends should be interpreted with caution due to the low number of cases. In 2015, Vanuatu was affected by a major cyclone that severely disrupted malaria diagnostic services and care seeking. As a result, it is likely that malaria cases in 2015 were underestimated. This confounds assessment of progress towards the GTS targets relative to a 2015 baseline for Vanuatu.

China was certified malaria free in 2021, and Malaysia reported zero malaria cases caused by human *Plasmodium* species for the seventh consecutive year in 2024. Decreases in case incidence of 70% or more occurred in Cambodia, the Lao People's Democratic Republic and Viet Nam, while Indonesia and the Philippines each had a decrease of between 25% and 70% (**Fig. 2.5**, **Table 2.3a**). There was no difference in incidence between 2015 and 2024 in the Republic of Korea.

Most countries in the region are on track to meet the GTS 2025 target for mortality, with zero reported malaria deaths (Cambodia, the Lao People's Democratic Republic, Malaysia, the Republic of Korea, Vanuatu and Viet Nam). Indonesia and the Philippines had a reduction of between 25% and 70% (**Fig. 2.6**, **Table 2.3b**). Increases in mortality were estimated to have occurred in Papua New Guinea (increase of between 25% and 70%) and Solomon Islands (increase of 70% or more).



GTS: *Global technical strategy for malaria 2016–2030*; WHO: World Health Organization; WMR: *World malaria report.*

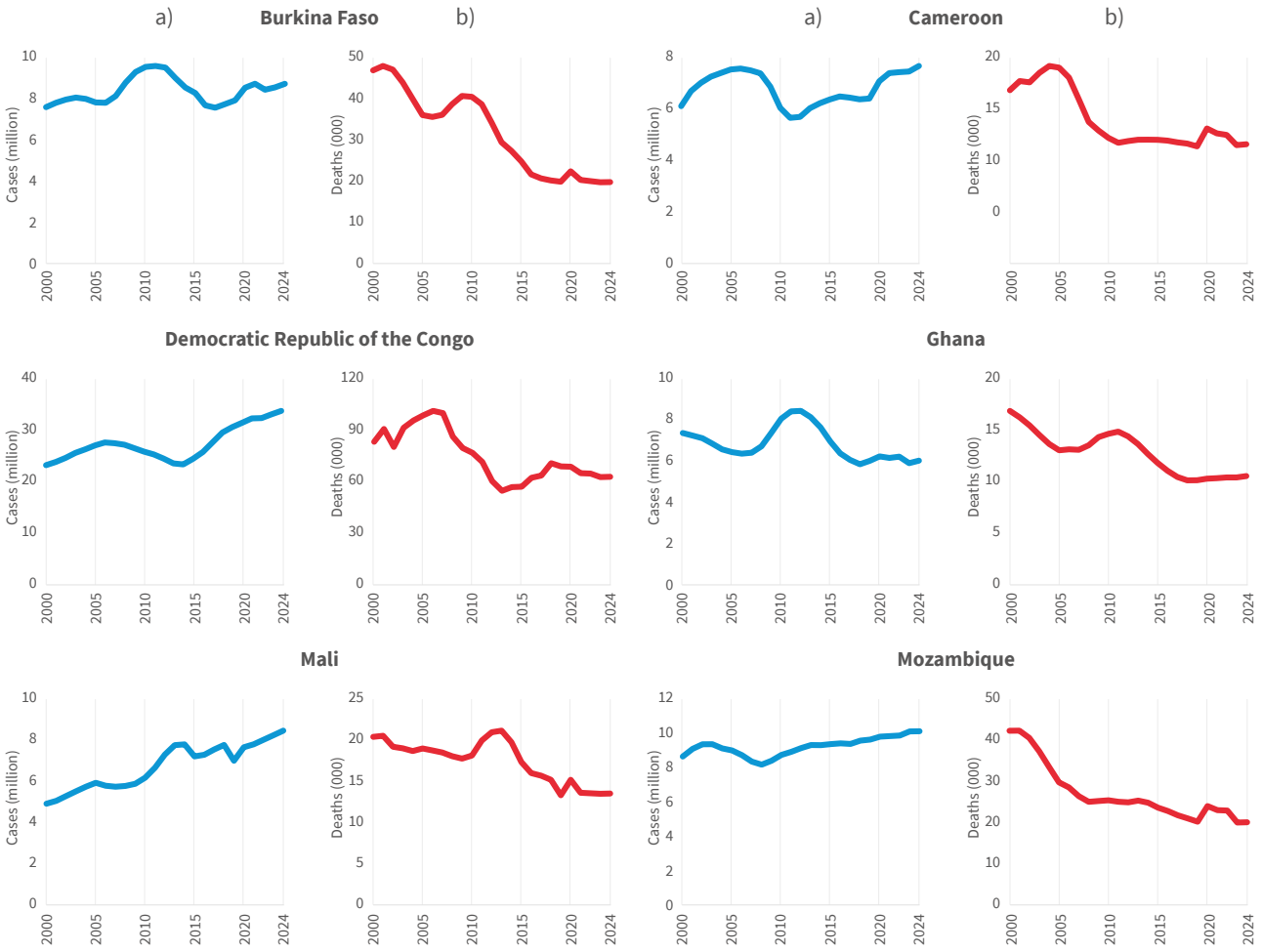
2.9 Malaria burden in HBHI countries

The HBHI initiative focuses on four key pillars: political will, strategic use of data, improved technical guidance and strong coordination. These efforts are supported by two enabling environments: integrated health systems and multisectoral action. HBHI is country-led, prioritizes tailored interventions and aims to reduce malaria-related deaths swiftly.

Launched in 2018 by WHO and the RBM Partnership, the HBHI initially supported 11 high-burden countries (Burkina Faso, Cameroon, the Democratic Republic of the Congo, Ghana, India, Mali, Mozambique, the Niger, Nigeria, Uganda and the United Republic of Tanzania). These countries accounted for 70% of estimated global malaria cases and 71% of deaths in 2017, before they joined the initiative (*31*). The Sudan joined the group in 2022, but its full implementation has been hindered by conflict since early 2023, diverting all resources and focus to the unprecedented emergency response that has displaced millions of people as internally displaced persons and refugees. India officially exited the HBHI group in 2024 due

Fig. 2.17. Estimated malaria a) cases and b) deaths in the 11 current HBHI countries, 2000–2024

Source: WHO estimates.



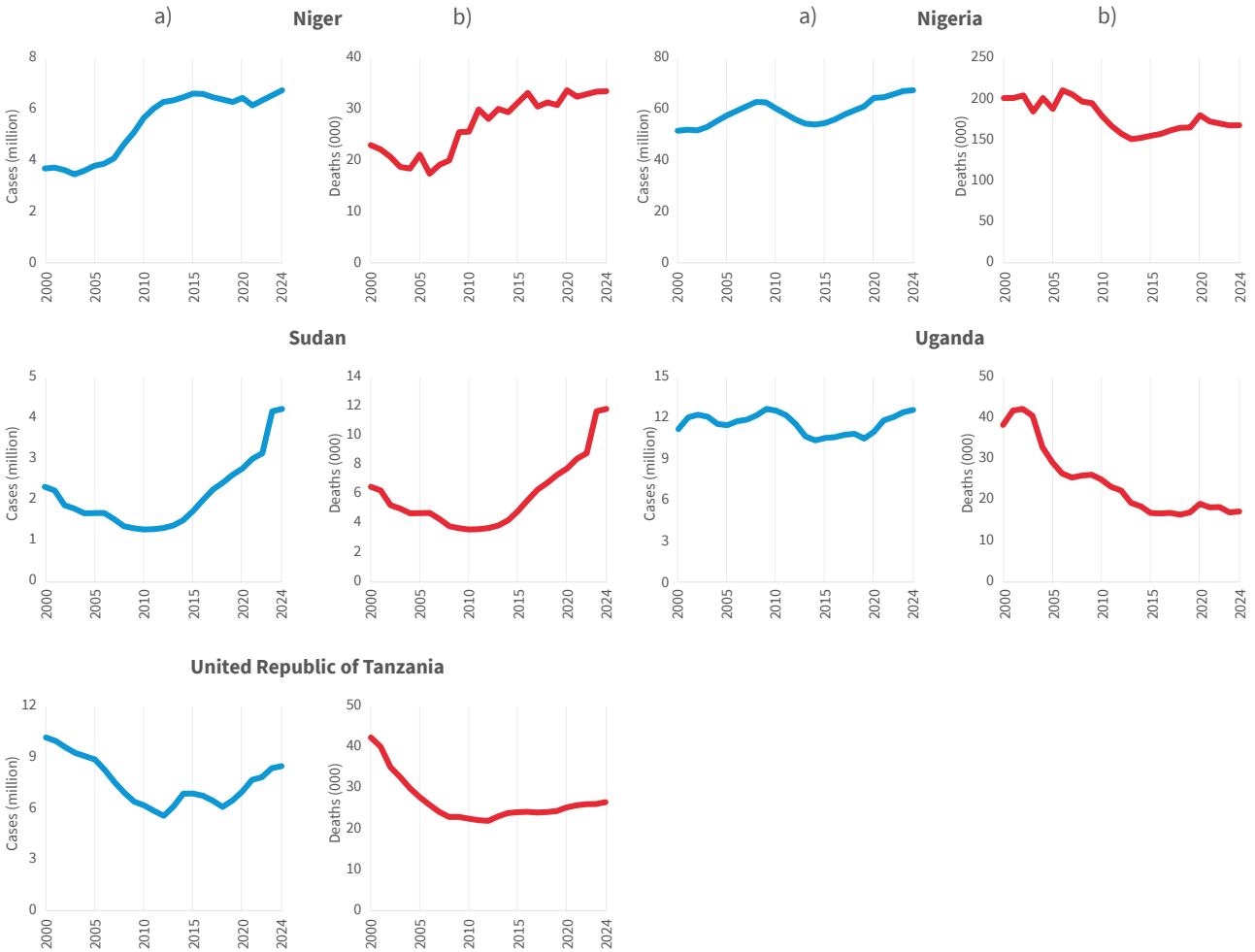
HBHI: high burden to high impact; WHO: World Health Organization.

to significant progress in reducing malaria incidence and mortality in its high-endemic states.

In 2024, the 11 HBHI countries (excluding India, and including the Sudan) were responsible for 64% of global malaria cases and 68% of deaths. Since 2017, the year before the inception of the HBHI initiative, estimated malaria cases in these 11 countries increased by 20%, from 151 million to 181 million in 2024. Malaria incidence slightly decreased from 266 to 264 estimated cases per 1000 population at risk from 2017 to 2024, meaning that the increase in number of cases is primarily due to population growth.

Between 2017 and 2024, estimated malaria deaths increased by 3.8%, from 400 000 to 415 000 deaths, while the mortality rate decreased by 13.8%, from 70.3 to 60.6 estimated deaths per 100 000 population at risk. Deaths peaked at 444 000 in 2020 and remained high at 423 000 in 2021, before decreasing again (**Fig. 2.17**).

Key challenges include limited access to quality health care, ongoing conflicts and emergencies, insufficient funding and suboptimal coverage of implementation capacity for interventions.

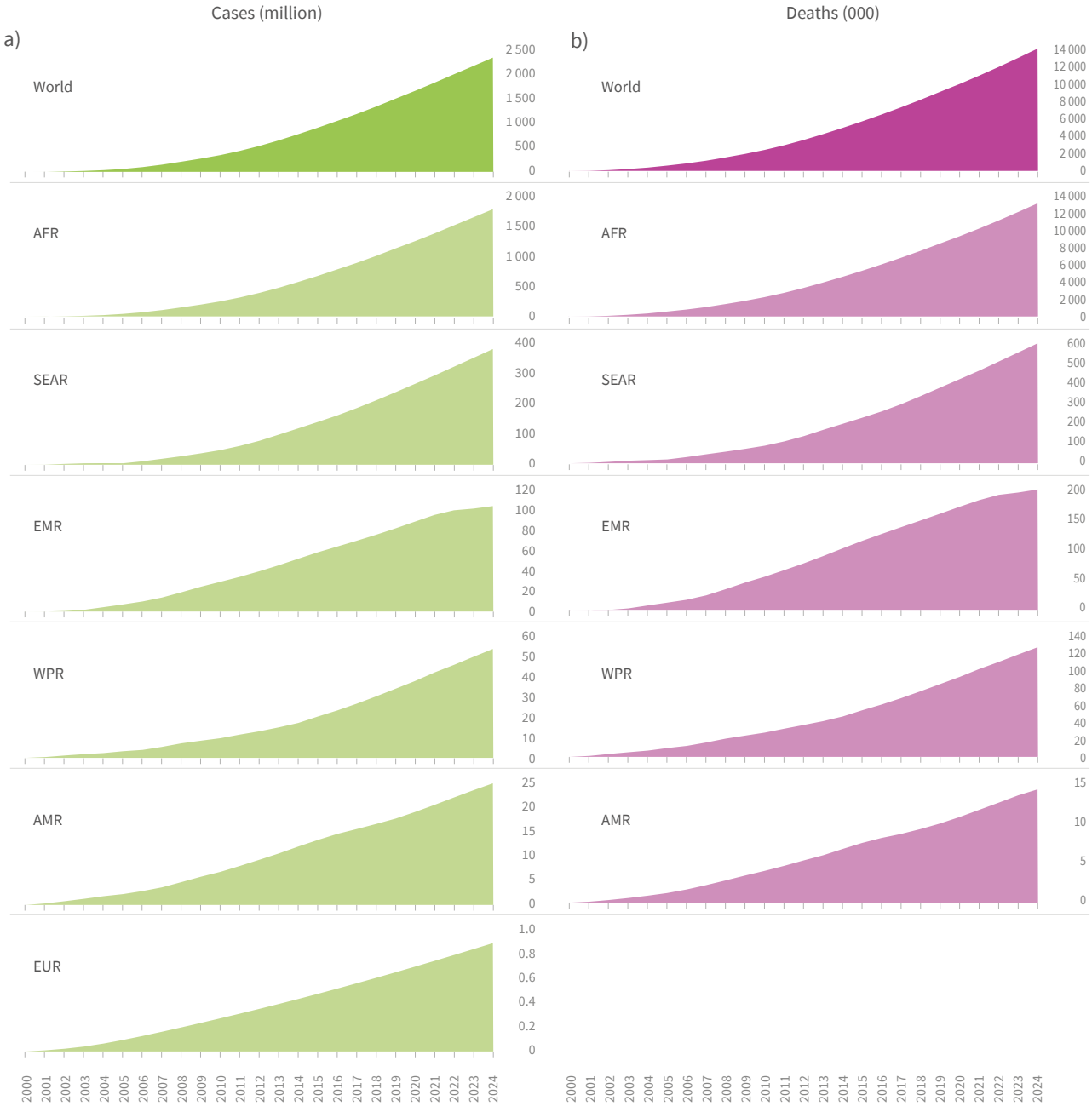


HBHI: high burden to high impact; WHO: World Health Organization.

2.10 Cases and deaths averted since 2000, globally and by WHO region

Cases and deaths averted over the period 2000–2024 were calculated by comparing the current annual estimated burden of malaria with the malaria case incidence and mortality rate from 2000, assuming that, as a comparison, they remained constant throughout the same period (see **Annex 1**). The analysis showed that 2.3 billion malaria cases and 14 million malaria deaths were averted globally in the period 2000–2024. Most of the cases (75.8%) and deaths (93.3%) averted were in the WHO African Region, followed by the South-East Asia Region (16.4% of cases and 4.3% of deaths averted) (**Fig. 2.18**, **Fig. 2.19**). In 2024 alone, more than 170 million cases and 1 million deaths were averted globally. In addition to malaria interventions and overall improvements in health systems and infrastructure, cases and deaths could also have been averted by other factors that modify malaria transmission or disease, such as improvements in socioeconomic status, malnutrition, infrastructure, housing and urbanization.

Fig. 2.18. Cumulative number of a) malaria cases and b) malaria deaths averted, globally and by WHO region, 2000–2024 *Source: WHO estimates.*



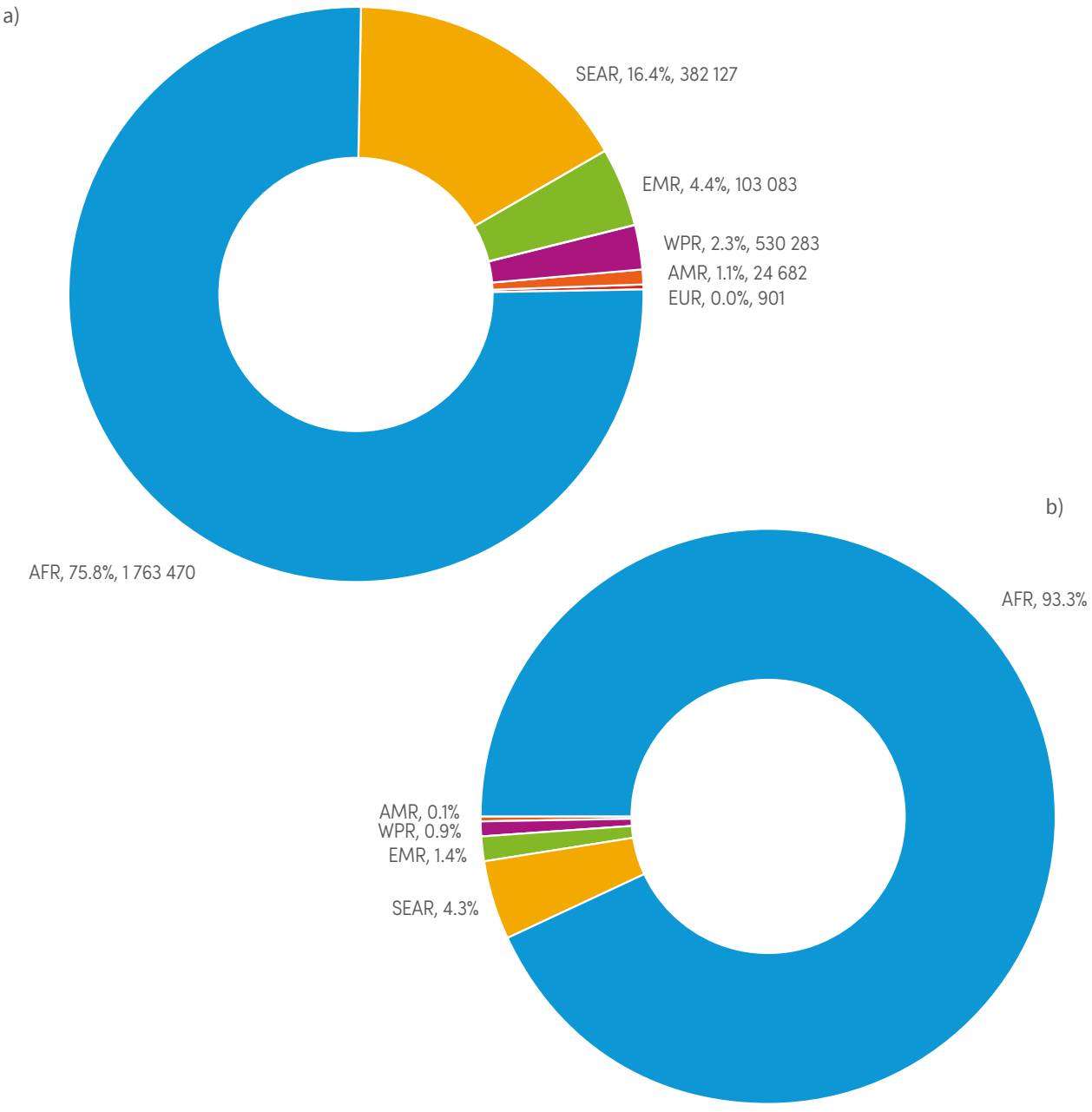
AFR: WHO African Region; AMR: WHO Region of the Americas; EMR: WHO Eastern Mediterranean Region; EUR: WHO European Region; SEAR: WHO South-East Asia Region; WHO: World Health Organization; WPR: WHO Western Pacific Region.

2.11 Country-reported malaria cases disaggregated by sex

The *World malaria report 2024*, under the theme of addressing inequity in the global malaria response, highlighted the importance of going beyond aggregate data to better understand who is most affected by malaria, why inequities persist and how data disaggregation supports equitable programming.

Historically, the data collection tools used for the world malaria report primarily focused on female populations, particularly pregnant women and girls, while data on male populations were often not collected. The inclusion of sex-disaggregated data enables a more comprehensive picture of malaria epidemiology, by helping to identify who is at risk and why. Examining and understanding these differences in malaria burden, alongside qualitative evidence, sheds light on the gender dimensions of vulnerability to the disease and access to care. Overlapping biological, social, structural and environmental factors – such as indigeneity, disability or living in hard-to-reach areas – disproportionately shape

Fig. 2.19. Percentage of a) malaria cases, with absolute number (in thousands) and b) malaria deaths averted, by WHO region, 2000–2024 *Source: WHO estimates.*



AFR: WHO African Region; AMR: WHO Region of the Americas; EMR: WHO Eastern Mediterranean Region; EUR: WHO European Region; SEAR: WHO South-East Asia Region; WHO: World Health Organization; WPR: WHO Western Pacific Region.

malaria risk among different population groups. Sex-disaggregated data can reveal different vulnerabilities related to gender inequities. For example, adolescent girls may face increased vulnerability due to biological factors, such as pregnancy, coupled with social factors, such as limited access to malaria prevention measures, while also encountering barriers to quality care because of economic constraints, remoteness and harmful gender norms. Similarly, men may be at higher malaria risk due to being engaged in traditionally male-dominated occupations that involve outdoor or night-time work. Such insights, generated from both disaggregated and qualitative data, enable for better tailoring of malaria interventions and ensuring inclusive responses that can better identify and address inequities through targeted intervention rollout.

The *World malaria report 2025* report takes a step forward by, for the first time, presenting country-reported malaria cases disaggregated by sex (**Fig. 2.20**). The capacity to report this data varies considerably across WHO regions: 45% of countries in the African Region, 86% in the Eastern Mediterranean Region (with Somalia being the only country unable to disaggregate), 75% in the Western Pacific Region, and all countries in both the South-East Asia Region and Region of the Americas are able to disaggregate data by sex. Key system-related constraints to comprehensive reporting remain. These include non-standardized data collection tools that lack dedicated fields for sex, optional rather than mandatory data capture for sex, digital reporting platforms not configured to record sex-disaggregated data, and early data aggregation within surveillance systems that results in loss of disaggregation. Despite these gaps, the 2025 analyses provide the first opportunity to assess differences in malaria burden between females and males in country-reported data.

2.11.1 Regional overview of sex-disaggregated malaria data, 2024

WHO African Region: In this region, completeness of sex-disaggregated malaria data remains limited. Among all reported malaria cases, 76.5% were not disaggregated by sex. Among cases that were sex-disaggregated, 57.1% were female and 42.9% were male, with a median proportion of female cases of 49.5% across reporting countries. The lowest proportion of female cases was observed in the United Republic of Tanzania (Zanzibar) (24.4%), while the highest was reported in South Sudan (64.0%).

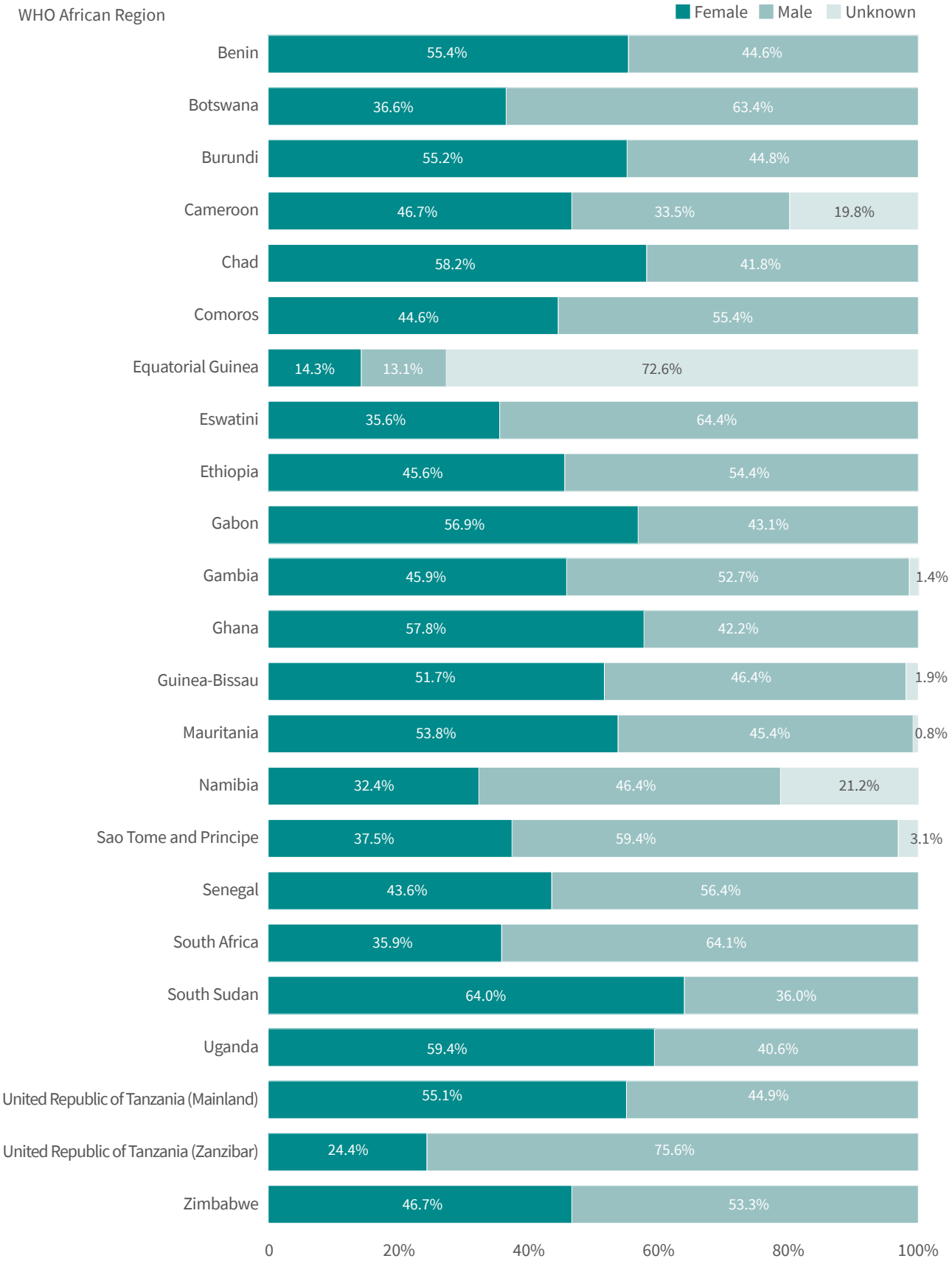
WHO Region of the Americas: In this region, a total of 95.9% of malaria cases were disaggregated by sex and 4.1% were not. Among disaggregated cases, 40.8% were female and 59.2% were male, with a median proportion of female cases of 41.5% across reporting countries. The lowest proportion of female cases was observed in the Dominican Republic (28.8%), while the highest was recorded in Nicaragua (47.7%).

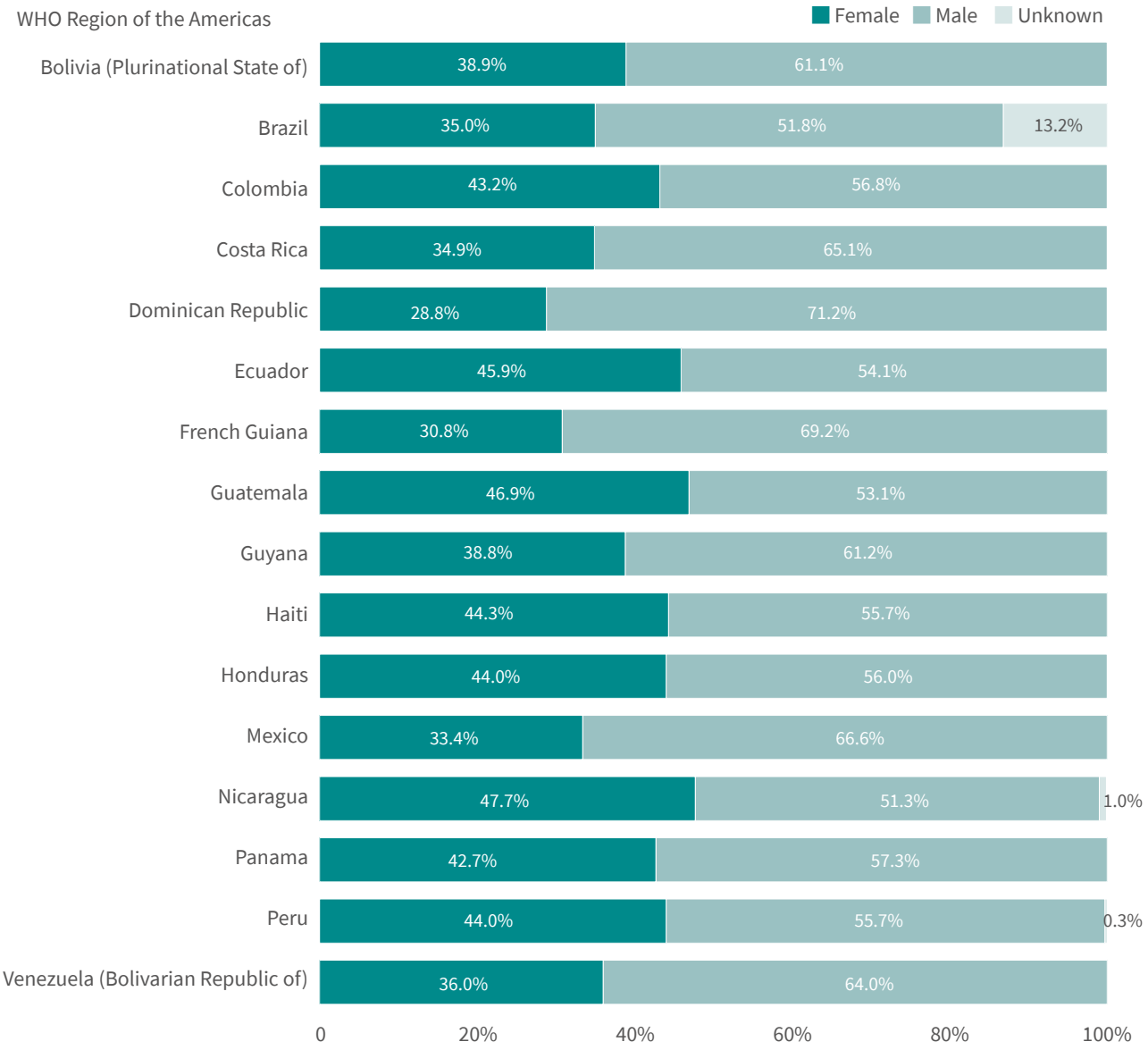
WHO Eastern Mediterranean Region: In this region, 96.9% of reported malaria cases were disaggregated by sex, while 3.1% were not. Among classified cases, 44.8% were female and 52.6% were male, with a median proportion of female cases of 44.8% across reporting countries. The lowest proportions of female cases were reported in Djibouti (32.6%) and the Islamic Republic of Iran (12.9%), while the highest was observed in the Sudan (52.2%).

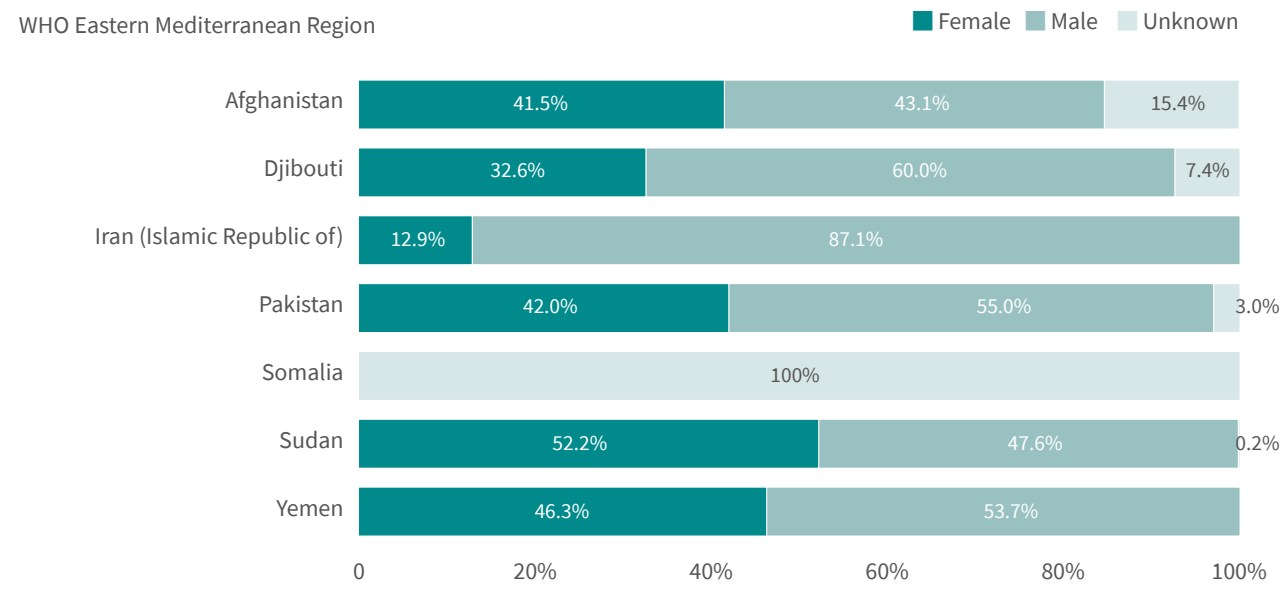
WHO South-East Asia Region: In this region, all reported malaria cases were disaggregated by sex, demonstrating strong data completeness across the region. Among reported cases, 39.1% were female and 60.9% were male, with a median proportion of female cases of 34.9%. The lowest proportion of female cases was reported in Nepal (7.5%), while the highest was recorded in India (42.7%).

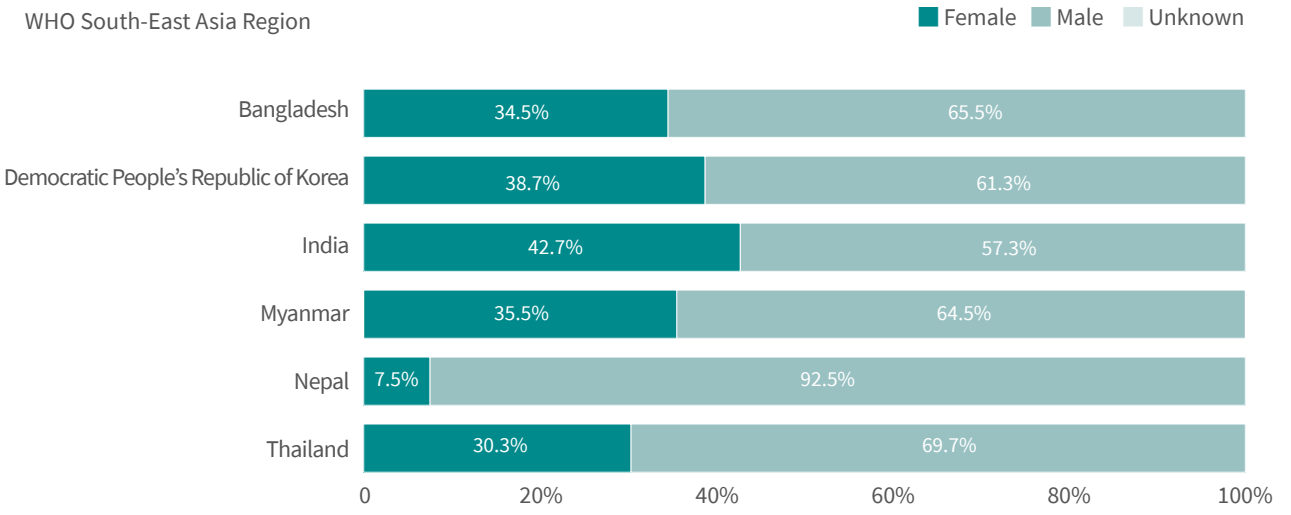
WHO Western Pacific Region: In this region, a total of 58.2% of malaria cases were not disaggregated by sex, reflecting ongoing reporting limitations in countries. Among disaggregated cases, 44.3% were female and 55.7% were male, with a median proportion of female cases of 40.9% across reporting countries. The lowest proportion of female cases was reported in the Republic of Korea (16.3%), while the highest was observed in Solomon Islands (54.3%).

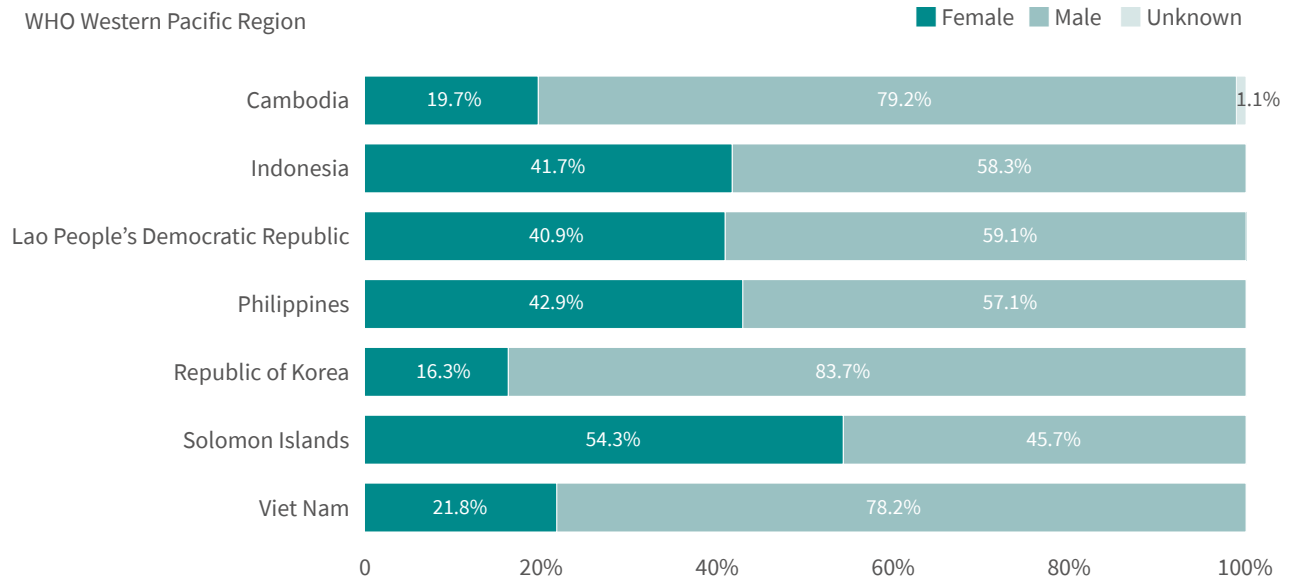
Fig. 2.20. Sex-disaggregated malaria cases, by WHO region and country or area, 2024[a] *Source: WHO estimates.*




WHO Region of the Americas
Female
Male
Unknown
Bolivia (Plurinational State of)
38.9%
61.1%
Brazil
35.0%
51.8%
13.2%
Colombia
43.2%
56.8%
Costa Rica
34.9%
65.1%
Dominican Republic
28.8%
71.2%
Ecuador
45.9%
54.1%
French Guiana
30.8%
69.2%
Guatemala
46.9%
53.1%
Guyana
38.8%
61.2%
Haiti
44.3%
55.7%
Honduras
44.0%
56.0%
Mexico
33.4%
66.6%
Nicaragua
47.7%
51.3%
1.0%
Panama
42.7%
57.3%
Peru
44.0%
55.7%
0.3%
Venezuela (Bolivarian Republic of)
36.0%
64.0%
0
20%
40%
60%
80%
100%


WHO Eastern Mediterranean Region
Female
Male
Unknown
Afghanistan
41.5%
43.1%
15.4%
Djibouti
32.6%
60.0%
7.4%
Iran (Islamic Republic of)
12.9%
87.1%
Pakistan
42.0%
55.0%
3.0%
Somalia
100%
Sudan
52.2%
47.6%
0.2%
Yemen
46.3%
53.7%
0
20%
40%
60%
80%
100%





WHO: World Health Organization.

[a] As of 27 May 2025, Indonesia has been reassigned to the WHO Western Pacific Region (resolution WHA78.25, https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R25-en.pdf).

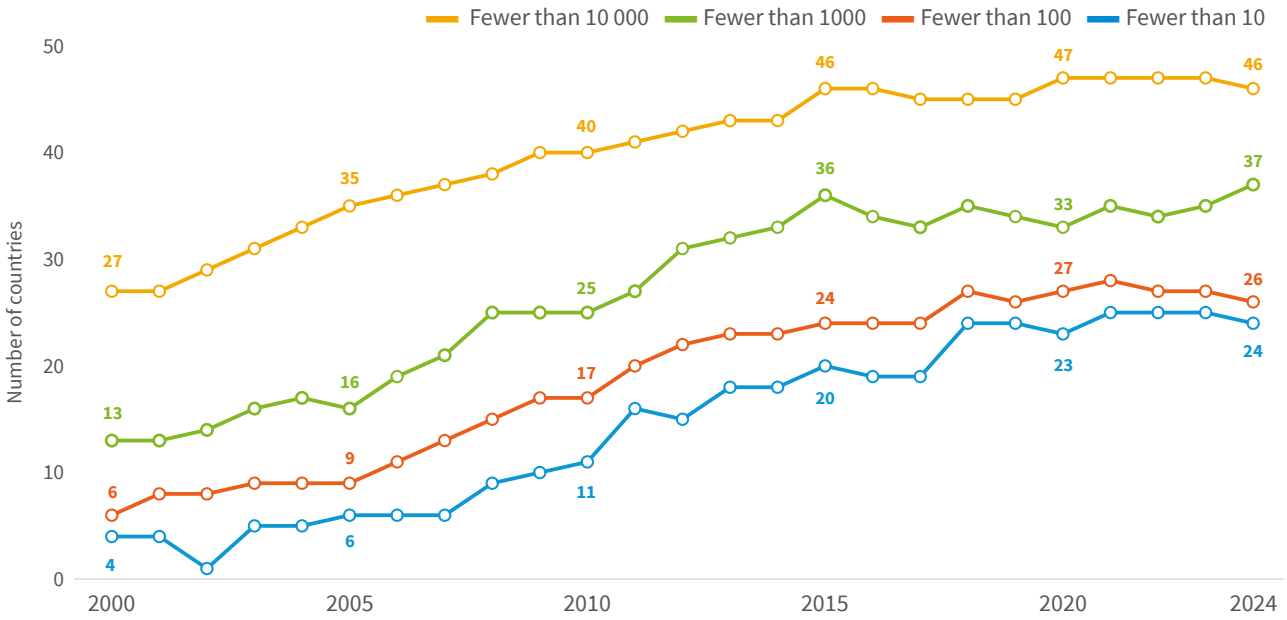
3 Elimination and prevention of re-establishment

3.1 Progress to elimination

Progress towards malaria elimination has continued in 2024, with more countries achieving and maintaining zero indigenous cases. A total of 80 countries (including the territory of French Guiana) remained endemic in 2024 – a decrease from 108 in 2000 and 82 in 2023 – following Suriname and Bhutan reporting zero indigenous cases for 3 consecutive years. The number of countries reporting fewer than 1000 cases increased from 35 in 2023 to 37 in 2024, while those reporting fewer than 10 000 cases declined from 47 to 46 (**Fig. 3.1**). Overall, from 2000 to 2024, the steady increase in the number of countries falling below each threshold demonstrates sustained global progress in reducing malaria. However, progress slowed between 2015 and 2024, as the number of countries reporting fewer than 1000 or 10 000 cases remained nearly unchanged over this period, indicating that many countries have reached a plateau despite continued efforts to advance elimination.

As malaria elimination advances globally, the experiences of different countries reveal both momentum and fragility of progress. In the Greater Mekong subregion (GMS), several countries are nearing elimination. Through the WHO Mekong Malaria Elimination (MME) programme, covering the six countries in the GMS – Cambodia, China (Yunnan Province), the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam – notable strides have

Fig. 3.1. Number of countries that were malaria endemic in 2000 and had fewer than 10, 100, 1000 and 10 000 indigenous malaria cases, 2000–2024 *Sources: NMP reports and WHO estimates.*



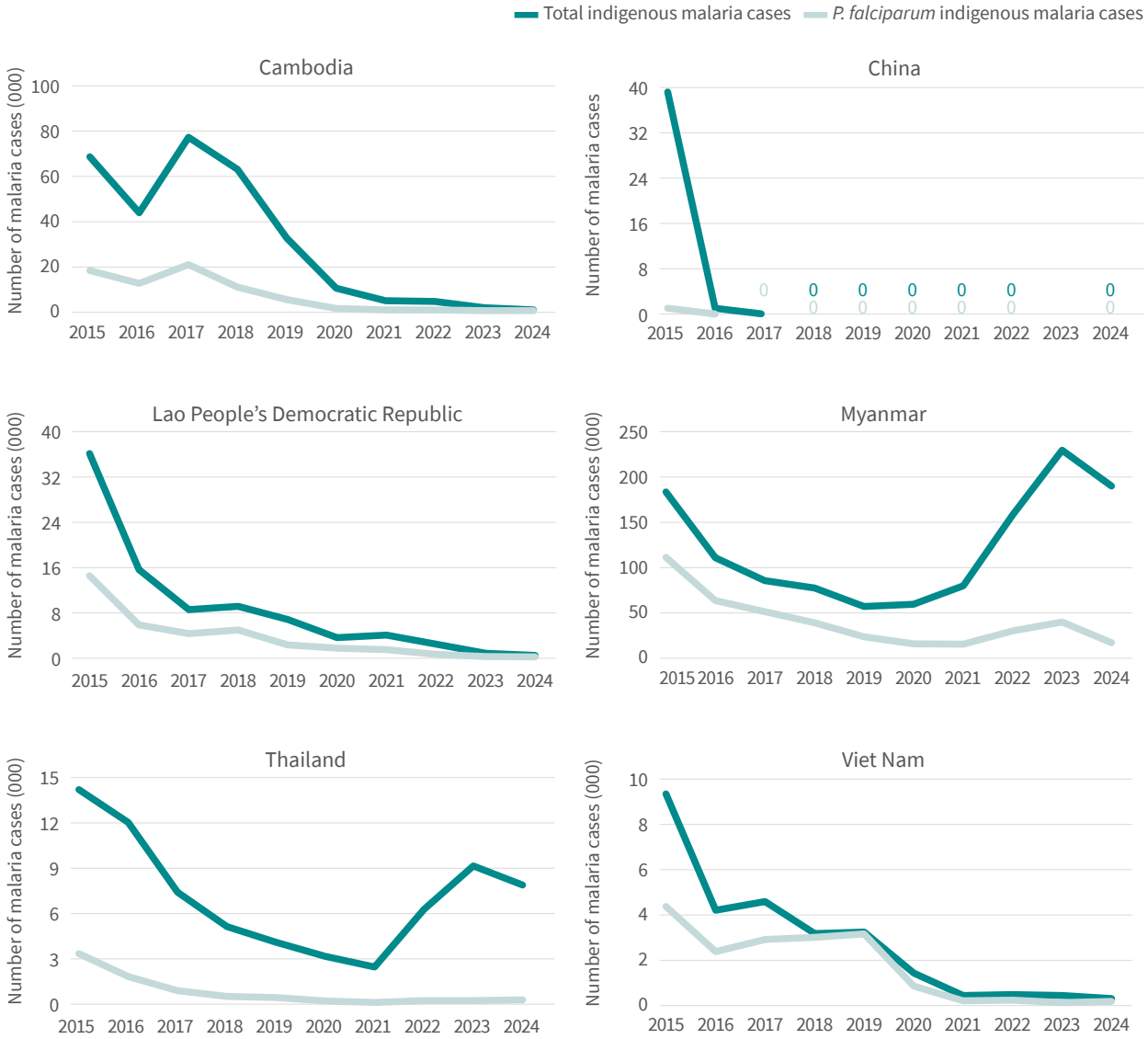
NMP: national malaria programme; WHO: World Health Organization.

been made towards achieving elimination of all species of human malaria by 2030. The GMS countries are also intensifying efforts to eliminate indigenous transmission of *P. falciparum* by 2025, driven by the pressing threat of multidrug-resistant strains.

Between 2015 and 2024, the GMS recorded a 36.8% reduction in indigenous malaria cases and an 88.8% reduction in indigenous *P. falciparum* cases. China was certified malaria free in 2021, while several other countries have reported substantial declines between 2015 and 2024: Cambodia (99.5%), the Lao People's Democratic Republic (99.1%) and Viet Nam (97.4%) (**Fig. 3.2**).

Myanmar, however, continues to bear the highest malaria burden in the GMS, accounting for 95.5% of all indigenous malaria cases and 97.7% of indigenous *P. falciparum* cases. Despite this, Myanmar achieved a 17.1% decline in indigenous malaria cases and a 58.1% decline in *P. falciparum* cases from 2023 to 2024. Thailand, after several years of steady decline, has seen a gradual increase in indigenous cases since 2021. In 2024, the country reported a 14.6% decrease in total indigenous malaria cases but a 34.5% increase in indigenous *P. falciparum* cases, with transmission concentrated along the border with Myanmar.

Fig. 3.2. Total indigenous malaria and *P. falciparum* cases in endemic countries in the GMS, 2015–2024 *Source: NMP reports.*



GMS: Greater Mekong subregion; NMP: national malaria programme; *P. falciparum*: *Plasmodium falciparum*.
Data from 2023 for China are not available.

3.2 Malaria elimination and certification

Between 2000 and 2024, a total of 26 countries that were malaria endemic in 2000 achieved 3 consecutive years of zero indigenous malaria cases. By 2024, 17 of these countries were certified malaria free, and in 2025 an additional three countries have been certified malaria free (**Fig. 3.3**). Certification of malaria elimination is the official recognition by WHO of a country's malaria free status. It is granted when a country has proven, beyond reasonable doubt, that local transmission of all human malaria parasites has been interrupted nationwide for at least 3 consecutive years and that a fully functional surveillance and response system is in place to prevent re-establishment of indigenous transmission (*32*).

In 2024, Cabo Verde and Egypt were the two countries certified malaria free (*33*). By mid-2025, a total of 47 countries and one territory had achieved malaria free status, with Georgia, Suriname and Timor-Leste all being certified malaria free in 2025 (*33*).

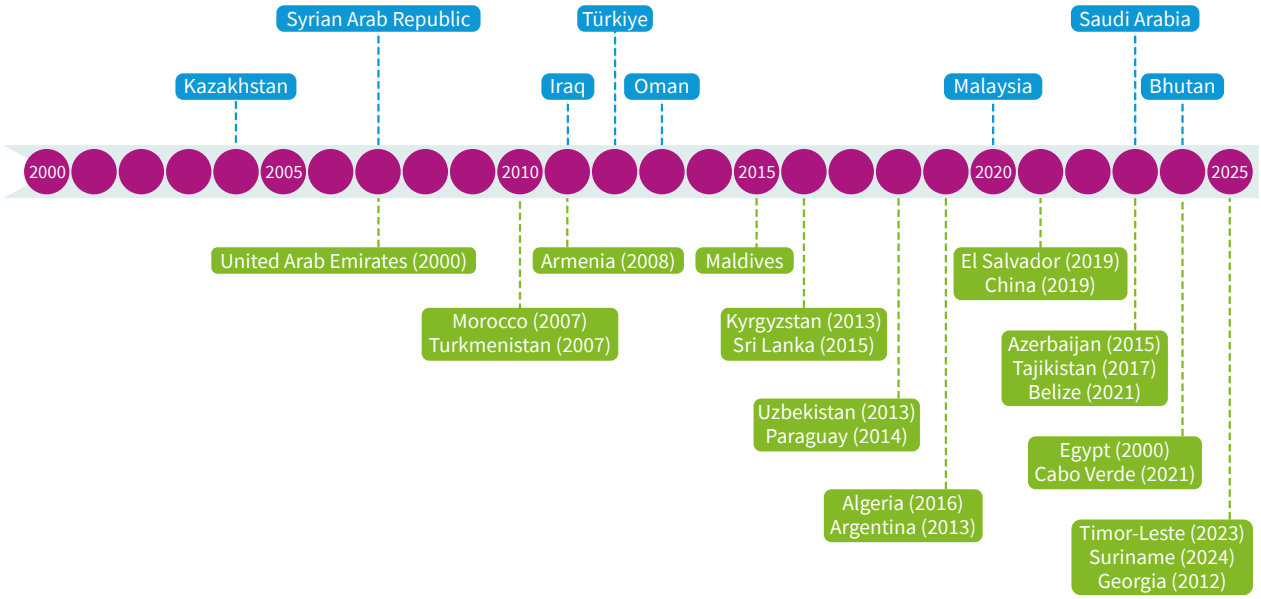
Although they have not yet submitted their applications for certification, Bhutan has reported 3 consecutive years without indigenous cases, Saudi Arabia has sustained 4 years, and Malaysia achieved 7 years without human malaria transmission by the end of 2024. Türkiye, the only country in the WHO European Region yet to be certified, has formally submitted its application, and an increasing number of countries have expressed interest in pursuing certification in the future.

3.2.1 Georgia

After nearly a century of sustained effort, Georgia has officially been certified malaria free in 2025. During the 1920s, it was estimated that nearly one third of the Georgian population was affected, predominantly by *P. vivax*. The expansion of large-scale mosquito control operations by 1940, combined with wider access to diagnosis and treatment, led to a decline in malaria cases. However, the disruption caused by the Second World War, including population displacement and pressure on health systems, sparked a resurgence (*34*). In the decades after the war, Georgia mounted an intensive elimination programme using new medicines, insecticide spraying and strong

Fig. 3.3. Countries and areas eliminating malaria and certified malaria free since 2000[a,b,c]

Sources: Country reports and WHO.



WHO: World Health Organization.

[a] Countries in blue are not yet certified and are placed on the year that they attained 3 consecutive years of zero indigenous cases.

[b] Countries in green are placed on the year that they were certified as malaria free, with the year that they attained 3 consecutive years of zero indigenous cases given in parentheses.

[c] Maldives was certified in 2015; however, it was already malaria free before 2000.

entomological monitoring. These efforts progressively halted transmission of *P. falciparum* (by 1953), *P. malariae* (by 1960) and *P. vivax* (by 1970) (*34*, *35*).

The country remained malaria free for several decades; however, in 2002, transmission reappeared, with 474 cases reported. In 2005, Georgia joined nine other countries in the WHO European Region in signing the Tashkent Declaration, renewing its commitment to malaria elimination. With reinforced interventions, including the use of newer medicines, insecticide spraying and robust entomological surveillance, incidence declined sharply, and the last locally acquired case was detected in 2009. By 2015, Georgia had reported zero indigenous malaria cases, paving the way for its eventual certification (*34*).

3.2.2 Suriname

Suriname has become the first country in the Amazon basin to achieve malaria free certification, following nearly 70 years of malaria control efforts (*36*). Situated on the north-eastern coast of South America and bordered by Brazil, French Guiana and Guyana, about 90% of the country is covered by rainforest. Population mobility – driven by economic activities, such as gold mining, and cultural practices, such as visiting relatives in remote communities – facilitates the movement of people across malaria endemic areas, posing significant challenges for malaria control.

Malaria control activities in the country began in the 1950s in the coastal region, where dichloro-diphenyl-trichloroethane (DDT) spraying and antimalarial treatment eliminated the disease by the 1960s. Although the country's coastal region has remained malaria free since 1968, efforts later shifted to the forested interior, particularly within the Maroon and Amerindian village communities. In 1974, malaria control activities were decentralized through the primary health care system, training local workers to provide diagnosis and treatment.

Transmission persisted, particularly in mining areas. Gold mining, often involving travel between malaria endemic areas, drove malaria cases to record highs, peaking at more than 15 000 cases in 2001 – the highest level ever reported in the Americas (*36*). Between 2000 and 2015, indigenous malaria cases declined from 11 361 to 81 cases, shifting the focus from Indigenous populations to high-risk mobile populations in mining areas (*36*). Renewed momentum came in 2005 with Global Fund support, which expanded diagnostic capacity through microscopy and RDTs, particularly among mobile and high-risk populations (*37*). Artemisinin-based treatments with primaquine were also introduced in Suriname and neighbouring countries under the Amazon Malaria Initiative, while prevention among high-risk groups was strengthened through the distribution of ITNs (*37*).

To reach these populations – many of whom were migrants from neighbouring endemic countries – Suriname established the Malaria Service Deliverer network. This is a network of community workers recruited directly from mining communities to provide free malaria diagnosis, treatment and prevention interventions. This model, alongside the national taskforces and Malaria Elimination Fund, and cross-border collaborations with Brazil and French Guiana played a critical role in closing access gaps in hard-to-reach areas (*36*, *38*).

Through providing universal access to care (regardless of legal status), deploying an extensive network of community health workers and implementing nationwide malaria screening (including at border crossings), Suriname successfully eliminated malaria. The last locally transmitted *P. falciparum* case was reported in 2018, and the final *P. vivax* case in 2021.

3.2.3 Timor-Leste

Timor-Leste became the third country to be certified in the WHO South-East Asia Region in 2025, joining Maldives and Sri Lanka, which were certified in 2015 and 2016, respectively (*39*). Between 2006 and 2024, Timor-Leste reduced malaria cases from 177 890 to zero indigenous cases reported from 2021 onwards, despite a tropical and mountainous environment conducive to malaria transmission (*40*). This success was largely driven by the rapid establishment of the NMP in 2003 under the Ministry of Health, which combined strong technical leadership, effective management and rigorous operational oversight. These early efforts enabled the country to achieve malaria elimination within 2 decades of independence (*39*).

In 2007, Timor-Leste introduced RDTs and ACT into the national malaria treatment guidelines, alongside the distribution of free LLINs to the most at-risk communities. In 2009, with support from the Global Fund, the country scaled up nationwide vector control through mass LLIN distribution and the implementation of IRS. At the same time, access to malaria diagnosis was strengthened and expanded, with microscopy and RDTs made available at points of care across all local health posts (*41*).

A three-tier health system was established, consisting of national and referral hospitals, community health centres, and health posts, and a policy of providing free health services was implemented to improve access and equity. Monthly mobile clinics and community outreach programmes further extended services to remote and rural populations (*41*). These broader investments in health system capacity facilitated timely malaria diagnosis, treatment and follow-up, even in hard-to-reach areas.

Timor-Leste will continue to implement its national plan for preventing the reintroduction of malaria (2021–2025) and national plan for vector-borne diseases (2021–2030) beyond 2025, with a focus on integrating malaria services within broader public health programmes and enhancing cross-border collaboration, particularly with Indonesia (*40*).

Table 3.1. Number of indigenous malaria cases in E-2025 countries and areas, 2010–2024[a,b]

Source: NMP reports.

WHO region Country/area	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
African															
Botswana	1 046	432	193	456	1 346	284	659	1 847	534	169	884	703	397	560	231
Comoros	36 538	24 856	49 840	53 156	2 203	1 884	1 467	3 896	15 613	17 599	4 546	10 537	20 675	21 049	54 413
Eswatini	268	379	409	728	389	318	250	440	686	252	233	505	214	597	193
Sao Tome and Principe	3 146	8 442	12 550	9 243	1 754	2 056	2 238	2 239	2 937	2 447	1 933	2 719	3 970	2 348	7 087
South Africa	8 060	9 866	6 621	8 645	11 705	4 959	4 323	23 381	9 562	4 821	4 463	2 972	2 043	5 291	735
Americas															
Costa Rica	110	10	7	0	0	0	4	12	70	95	90	189	406	543	240
Dominican Republic	2 482	1 616	952	473	459	631	690	341	433	1 291	826	284	320	253	1 203
Ecuador	1 888	1 219	544	368	242	627	1 191	1 275	1 653	1 803	1 934	2 175	1 348	604	380
French Guiana	1 632	1 209	900	875	448	374	217	554	546	212	140	74	21	189	246
Guatemala	7 384	6 817	5 346	6 214	4 929	5 538	5 000	4 121	3 018	2 069	1 058	1 273	1 856	3 046	2 925
Honduras	9 745	7 618	6 439	5 364	3 378	3 555	4 094	1 273	632	330	810	1 542	3 534	2 593	2 292
Mexico	1 226	1 124	833	495	656	517	551	736	813	619	356	242	160	44	226
Panama	418	354	844	696	864	546	769	649	684	1 757	1 948	4 354	4 746	9 485	10 600
Suriname	1 771	795	569	525	401	81	78	137	37	104	147	22	0	0	0
Eastern Mediterranean															
Iran (Islamic Republic of)	1 847	1 632	756	480	358	167	81	57	0	0	0	0	1 439	2 528	2 034
Saudi Arabia	29	69	82	34	30	83	272	177	61	38	83	0	0	0	0
South-East Asia															
Bhutan	436	194	82	15	19	34	15	11	6	2	22	9	0	0	0
Democratic People's Republic of Korea	13 520	16 760	21 850	14 407	10 535	7 022	5 033	4 603	3 698	1 869	1 819	2 357	2 136	3 160	5 233
Nepal	3 894	2 335	2 204	1 974	832	591	507	623	493	131	73	32	36	15	37
Thailand	32 480	24 897	46 895	41 602	41 218	17 495	12 076	7 416	5 110	4 065	3 123	2 426	6 263	9 169	7 879
Timor-Leste	48 139	19 735	5 208	1 025	344	80	81	16	0	0	3	0	0	0	0
Western Pacific															
Malaysia[a]	5 194	3 954	3 662	1 028	596	242	266	85	0	0	0	0	0	0	0
Republic of Korea	1 267	505	394	383	557	627	602	436	501	485	356	274	382	662	640
Vanuatu	9 817	6 179	4 532	2 883	1 314	571	2 243	1 227	632	567	493	312	1 102	2 261	1 576
Total	**192 337**	**141 997**	**171 712**	**151 069**	**84 575**	**48 282**	**42 707**	**55 552**	**47 719**	**40 725**	**25 340**	**33 001**	**51 048**	**64 397**	**98 170**

E-2020: malaria eliminating countries for 2020; E-2025: malaria eliminating countries for 2025; NMP: national malaria programme; WHO: World Health Organization.

[a] Algeria (E-2020), Belize, China (E-2020), Cabo Verde, El Salvador, Paraguay, Suriname and Timor-Leste have all been certified malaria free.

[b] Entries in red from 2021 to 2024 indicate numbers of cases in E-2020/E-2025 countries that were higher than in the previous year.

3.2.4 E-2025 elimination initiative

As the malaria eliminating countries for 2025 (E-2025) initiative enters its final year, countries continue to advance towards the shared goal of malaria elimination. Launched by WHO, and building on the earlier E-2020 framework, the initiative seeks to accelerate malaria elimination in a targeted group of countries, supporting them in halting local malaria transmission by 2025. Through technical assistance, surveillance guidance, advocacy and cross-border collaboration, participating countries have been capacitated to advance the shared goal of elimination.

By mid-2025, these initiatives have contributed to notable progress, with eight countries – Algeria, Belize, Cabo Verde, China, El Salvador, Paraguay, Suriname and Timor-Leste – certified malaria free, while others continue to make significant progress towards zero indigenous malaria transmission.

Reported malaria cases from the E-2025 countries show substantial fluctuations, with an overall decline from 192 337 reported cases in 2010 to 25 340 in 2020, followed by a sharp increase, reaching 98 170 cases in 2024 (**Table 3.1**). The increase between 2023 (64 397) and 2024 (98 170) represents a 52.4% rise in cases, reversing earlier progress and underscoring the fragility of gains in several settings.

The increase of more than 30 000 cases between 2023 and 2024 was driven largely by sharp rises in the Comoros, (+33 364), Sao Tome and Principe (+4739), Panama (+1115), and the Dominican Republic (+950). These rises outweighed notable declines reported in South Africa (–4556 cases), Thailand (–1290 cases), Vanuatu (–685 cases) and several other countries with smaller reductions.

Although several countries, such as Bhutan, Malaysia, Saudi Arabia and Timor-Leste, have successfully maintained zero indigenous cases for 3 years or more, increases in other countries, such as the Comoros and Panama among others, contributed to the rise in cases.

In 2024, a total of 47 malaria-related deaths were reported under the E-2025 initiative, of which 25 were indigenous malaria deaths reported in Botswana (1), Cabo Verde (2), the Comoros (3), Malaysia (3), Mexico (1), Nepal (2), Sao Tome and Principe (1), South Africa (10) and Thailand (2).

Several E-2025 countries that have been certified as malaria free or have achieved 3 consecutive years of reporting zero indigenous cases since 2015 continue to face challenges in sustaining these achievements. Between 2022 and 2024, many countries reported fluctuating numbers of imported and introduced cases (**Table 3.2**). These trends highlight the continued vulnerability of countries to malaria importation and the risk of introduced cases that could lead to the re-establishment of transmission, potentially reversing hard-won gains.

Table 3.2. Number of introduced and imported malaria cases between 2022 and 2024 in E-2025 countries that reported zero cases over at least a consecutive 3-year period (including those that have been certified malaria free under the initiative) *Source: NMP data.*

WHO region Country	2022		2023		2024	
	Introduced	Imported	Introduced	Imported	Introduced	Imported
African						
Algeria	0	1292	0	427	0	3106
Cabo Verde	1	26	1	36	6	30
Americas						
Belize	0	0	0	2	0	1
El Salvador	–	–	0	–	0	–
Paraguay	0	3	0	0	0	2
Suriname	1	60	0	102	0	56
Eastern Mediterranean						
Saudi Arabia[a]	274	4045	301	6159	191	6850
South-East Asia						
Bhutan	3	3	4	14	71	73
Timor-Leste	0	2	3	4	0	1
Western Pacific						
China	0	819	–	–	0	2781
Malaysia[a]	16	291	82	675	59	398

E-2020: malaria eliminating countries for 2020; E-2025: malaria eliminating countries for 2025; NMP: national malaria programme; WHO: World Health Organization.
"–" indicates data not available.
[a] Countries that have attained 3 years of zero indigenous cases since 2015 but are not certified malaria free under the E-2020 and E-2025 initiatives.

The experience of the E-2020 initiative showed that malaria elimination must be driven by strong national ownership, political will and domestic financing, which are essential to achieve elimination and prevent re-establishment of transmission (*42*). Although outcomes were mixed, the lessons learned informed WHO guidance and the development of new tools to strengthen elimination programmes and strategies to prevent re-establishment. The public visibility of malaria free certification of countries brought about positive news coverage, which helped sustain high-level political attention and momentum during a period of slowing global progress (*42*). Building on the country achievements and lessons of E-2020, the E-2025 initiative continues to demonstrate that, with national leadership and sustained commitment, malaria elimination remains an achievable goal. Notably, the E-2025 initiative, previously supported by the Global Fund, has remained unfunded since 2024, constraining ongoing efforts to accelerate elimination and prevent the re-establishment of malaria transmission.

3.3 *P. knowlesi* disease burden and transmission

In recent years, *P. knowlesi* has emerged as a growing concern in the global malaria landscape. Its transmission is primarily concentrated in South-East Asia, where the zoonotic parasite circulates between monkeys and is transmitted to humans via mosquitoes, posing unique and distinct challenges for malaria elimination.

In 2024, a total of 2164 *P. knowlesi* cases were reported globally, of which 2148 were indigenous infections. Compared with 2023, this represents a 34% reduction in total cases and a 35% decline in indigenous infections. However, the detection of *P. knowlesi* outside its traditional range is of particular note.

Malaysia continues to represent the global hotspot of *P. knowlesi*, accounting for 89.0% of all reported infections and all three indigenous malaria deaths due to *P. knowlesi* in 2024. Neighbouring countries – including Cambodia (11 cases), Indonesia (139 cases) and Thailand (78 cases) – have reported far smaller numbers, though infections persist in forested and border regions (**Fig. 3.4**). Even in countries where case counts are low, maintaining vigilance is essential. The detection of both indigenous and imported *P. knowlesi* cases in Brunei Darussalam, a WHO-certified malaria free country, highlights the importance of sustained surveillance.

WHO continues to monitor the evolving epidemiological situation of *P. knowlesi*. Technical support is being provided to affected countries to strengthen diagnostic capacity, surveillance and reporting systems. The increasing burden and transmission of *P. knowlesi* calls for coordinated efforts to enhance regional data sharing, cross-border collaboration and operational research, all of which remain essential to understanding zoonotic malaria and mitigating its associated risks.

3.4 Preventing re-establishment and maintaining malaria free status

3.4.1 Guidance on prevention of re-establishment

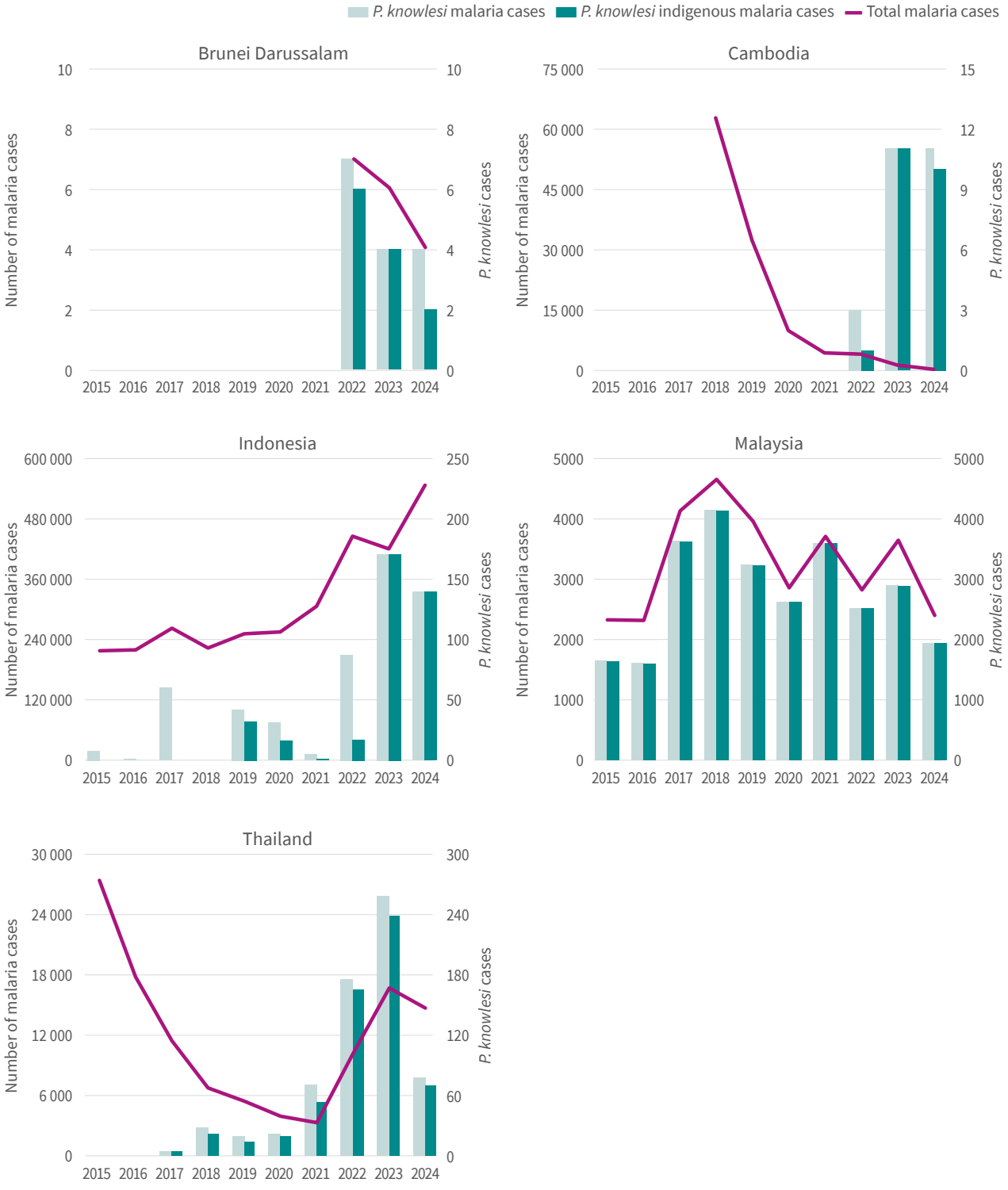
Prevention of re-establishment of malaria is one of the four specific goals of the GTS. Globally, more than 100 countries are free of malaria, and many more have achieved elimination at subnational levels.

To guide countries in sustaining elimination and preventing the re-establishment of malaria, WHO has released the first-ever global guidance for the *Prevention of re-establishment of malaria* (*43*). For the first time, preventing re-establishment in all malaria free countries has been defined as a global malaria goal. This document is designed to assist countries and areas that have eliminated malaria, or are close to elimination, in planning and implementing effective programmes to prevent re-establishment (*43*). The guidance highlights that preventing re-establishment relies on early detection, prompt notification and rapid response to every case through strong, functional surveillance and response systems. Effective management of receptivity and importation risks, supported by a skilled health workforce, multisectoral collaboration and community engagement, is essential to sustain malaria free status. Furthermore, continued political commitment, adequate resources and ongoing monitoring, evaluation and research are critical to ensure long-term prevention of re-establishment (*43*).

Most malaria free countries have been able to sustain malaria elimination, with many achieving this milestone during the Global Malaria Eradication Programme, led by WHO. However, maintaining malaria free status faces growing challenges linked to increased population mobility, financial sustainability, evolving public health demands and changes in climate. At the same time, constrained health financing, underinvestment in public health systems and competing priorities have tested countries' capacities to sustain surveillance and response. Strengthening primary health care and integrating essential public health functions offer important opportunities to address these challenges and preserve malaria free status.

Through the E-2025 initiative, several countries have been able to achieve zero indigenous cases for 3 consecutive

Fig. 3.4. Number of total *P. knowlesi*, indigenous *P. knowlesi* and total malaria cases in countries reporting *P. knowlesi* infection, 2015–2024[a,b,c] *Source: NMP data.*



NMP: national malaria programme; *P. knowlesi*: *Plasmodium knowlesi*.

[a] Brunei Darussalam was certified malaria free in 1987 and resumed reporting in 2022.

[b] For Malaysia (which has reported 7 years of zero indigenous human malaria cases), the total cases include *P. knowlesi* cases.

[c] As of 27 May 2025, Indonesia has been reassigned to the WHO Western Pacific Region (resolution WHA78.25, https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R25-en.pdf).

years. Following its malaria free certification in January 2024, Cabo Verde reported a resurgence, with a total of 19 indigenous cases detected that same year (**Fig. 3.5**). This resurgence followed 6 consecutive years without local transmission and occurred in an environment with high malaria receptivity, continued importation pressure and overlapping outbreaks of other febrile illnesses, notably a dengue epidemic that strained national surveillance and response systems. In response, the Ministry of Health, with support from WHO, conducted a joint assessment mission to identify gaps and propose targeted actions for outbreak management, surveillance strengthening and sustaining the country's malaria free status. To consolidate recent gains and prevent further malaria transmission, Cabo Verde has committed to strengthening malaria preparedness through finalization of an epidemic preparedness and response plan, updated risk maps and establishment of an integrated vector management working group, while expanding workforce capacity, enhancing multisectoral coordination and investing in entomology training to sustain elimination gains. Despite reporting indigenous cases, as the country has been certified, it is still considered malaria free until this status is officially withdrawn by WHO as per the Technical Advisory Group on Malaria Elimination and Certification (*44*).

Similarly, in the Islamic Republic of Iran, after 3 consecutive years of zero indigenous cases, a total of 6001 locally acquired cases, including indigenous and introduced infections, was reported between 2022 and 2024 (**Fig. 3.5**). These examples underscore the importance of sustained vigilance, even after achieving malaria elimination.

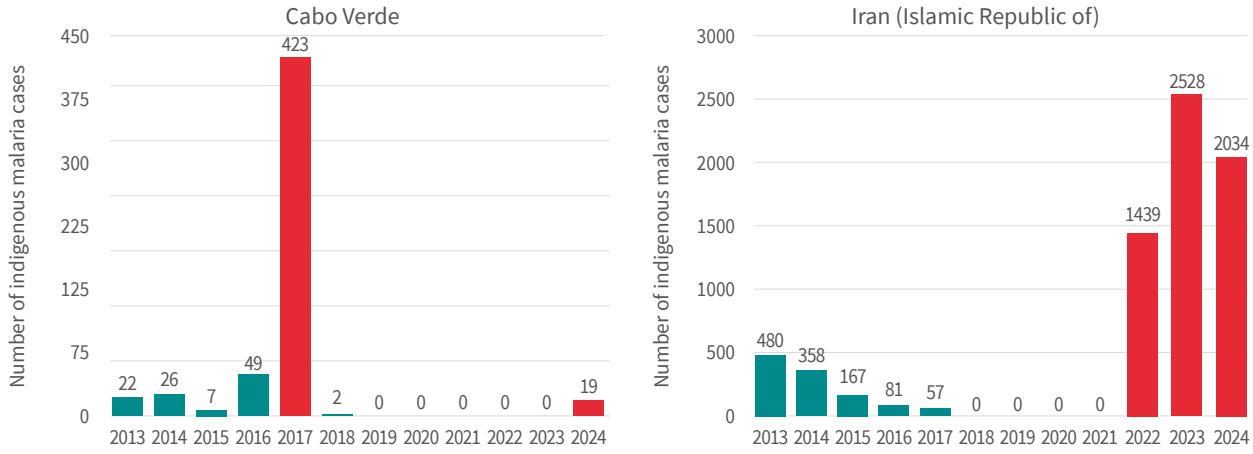
The prevention of re-establishment guidance provides strategic advice and recommendations on maintaining vigilance, ensuring continued investment and strengthening multisectoral coordination and cross-border collaboration (*43*). While the document outlines overarching principles and key concepts, it also includes real-life examples to support practical implementation at country level.

3.4.2 Regional overview of malaria free countries

Maintaining malaria surveillance is essential, even in countries that have eliminated the disease. Continued detection and reporting of malaria cases and deaths

Fig. 3.5. Number of indigenous malaria cases between 2013 and 2024 in Cabo Verde and the Islamic Republic of Iran after reporting zero cases over at least a consecutive 3-year period[a]

Source: NMP reports.



NMP: national malaria programme.

[a] Bars in red indicate the reintroduction of indigenous cases after 3 or more consecutive years of reporting zero cases. The data on the Islamic Republic of Iran reflect locally acquired cases, which include indigenous and introduced cases, as the country cannot currently distinguish between the two.

prevents resurgence (by enabling timely diagnosis and treatment), avoids onward transmission and maintains malaria free status. Even in countries that have never been malaria endemic and are not receptive to transmission, routine surveillance remains important. Monitoring imported cases, particularly among travellers returning from malaria endemic regions, informs targeted travel health advice, maintains clinical awareness that malaria poses a risk and should be considered as a differential diagnosis, and protects public health.

In 2024, 105 countries were considered malaria free, of which 80 (76%) reported information on the number of malaria cases and deaths to WHO. All countries in the WHO Eastern Mediterranean and South-East Asia regions reported data, while about a quarter of countries in the Western Pacific Region reported information (**Table 3.3**). Data were available from 2023 for European Union (EU) Member States reporting to the European Centre for Disease Prevention and Control. For countries reporting data, a few cross-cutting challenges were identified, including incomplete information on the origin of imported cases at the national level, missing travel history records (which are essential for determining the origin of infection) and the lack of national malaria surveillance guidelines on case investigation and classification in the country.

In 2024, there were a total of 23 945 confirmed malaria cases reported from malaria free countries, of which 23 413 (97.8%) were classified as imported. A total of 133 malaria deaths were reported (**Table 3.3**). There were 19 reported indigenous cases from Cabo Verde, which resulted in two indigenous malaria deaths. The majority of confirmed cases were reported in the WHO European Region (38.5%) and Eastern Mediterranean Region (25.7%), which may reflect the total number of malaria free countries in these regions, as well as reporting rates. Among malaria free countries reporting confirmed malaria cases, the highest share was reported by Algeria (98%) in the WHO African Region; the United States (93%) in the Region of the Americas; United Arab Emirates (43%) in the Eastern Mediterranean Region; United Kingdom of Great Britain and Northern Ireland (United Kingdom) (78%; non-EU) and France (44%; EU) in the European Region; Sri Lanka (83%) in the South-East Asia Region; and China (84%) in the Western Pacific Region. The countries with the majority of cases may be affected by reporting bias in regions where not all countries reported data.

Table 3.3. Number of malaria cases and deaths in malaria free countries, 2024 *Sources: WHO database and data reported to the European Centre for Disease Prevention and Control.*

WHO region	Number of malaria free countries	Number of countries reporting in 2024	Number of confirmed cases	Number of introduced cases	Number of imported cases	Number of deaths
African	5	3	3 168	6	3 142	37
Americas	20	15	2 048	0	1 910	2
Eastern Mediterranean	14	14	6 151	8	6 063	28
European (non-EU)[a]	18	13	2 310	0	2 310	11
European (EU)[b]	27	27	6 910	–	6 672	39
South-East Asia	3	3	47	0	47	1
Western Pacific	18	5	3 311	0	3 269	15
Total	**105**	**80**	**23 945**	**14**	**23 413**	**133**

EU: European Union; WHO: World Health Organization.
"–" indicates data not available.
[a] Of 26 non-EU countries, data from only 18 countries are presented here.
[b] Data for EU countries are available for 2023 only, as reported by EU Member States to the European Centre for Disease Prevention and Control.

In the WHO Eastern Mediterranean Region, the majority of imported cases were in people either infected in or with a country of origin reported as Pakistan (30%) in their travel history; whereas in the European Region, the majority of imported cases were in people infected in west or central Africa (61%). Among all malaria free countries in the European Region, France, Germany, Spain and the United Kingdom reported 71% of all confirmed malaria cases in 2024. The reported top three countries for origin of infection in these countries were all in west or central Africa but differed slightly by country (**Fig. 3.6**).

The malaria parasite can be imported into malaria free countries through residents of malaria free countries becoming infected while travelling abroad to malaria endemic countries and returning home, or by infected visitors or immigrants from malaria endemic countries bringing the pathogen into malaria free countries. People originating from malaria endemic countries who have lived

Fig. 3.6. Top countries of origin of infection for imported cases in the WHO European Region countries with the majority of malaria cases, 2024 *Sources: WHO database and data reported to the European Centre for Disease Prevention and Control.*

France

United Kingdom

for many years in non-endemic areas lose their natural immunity and may face a higher risk of severe disease when visiting friends and relatives in endemic countries. Tailored health messaging and accessible travel medicine services are essential for this group, who may not perceive themselves to be at risk.

Effective malaria surveillance in malaria free countries depends on strong international collaboration. Coordinated data sharing and joint responses are crucial for sustaining malaria free status and advancing global elimination. Yet, challenges remain in the timely collection and exchange of surveillance data, with differences in reporting systems and data governance often limiting comparability and rapid action. Strengthening interoperability, standardizing reporting and strengthening collaboration between neighbouring countries will improve early detection and response to imported cases and help support progress towards achieving and maintaining malaria free status.

Germany

Spain

United Kingdom: United Kingdom of Great Britain and Northern Ireland; WHO: World Health Organization.

4 Investments in malaria programmes and research

This chapter presents an overview of estimated investments in malaria programmes and research. **Section 4.1** outlines funding trends from 2000 to 2024, with a focus on the most recent data (2010–2024), disaggregated by source, delivery channel, region and income group. **Section 4.2** reviews malaria-related research and development (R&D) funding from 2015 to 2024. This chapter focuses on investment data up to and including 2024. Global development assistance for health, however, declined significantly from 2024 to 2025, largely due to reductions in funding from major contributors, reflecting competing domestic priorities and broader fiscal pressures. The impact of these changes in global development assistance is discussed further in **Chapter 8**.

Global financing for malaria has evolved substantially since the 1990s, marked by the creation of major funding mechanisms, including the RBM Partnership (1998), the Gates Foundation (2000), the Global Fund (2001), the United States President's Malaria Initiative (PMI) (2005) and Unitaid (2006). The SDGs, adopted in 2015, reinforced global commitments to combat malaria under SDG 3: Ensure healthy lives and promote well-being for all at all ages (*45*). Also in 2015, WHO launched the GTS (*1*), which established global malaria targets and outlined the estimated investment needs to achieve them.

According to the 2021 GTS update (*26*), an estimated US$ 6.8 billion was required annually in 2020, increasing to US$ 9.3 billion by 2025 and US$ 10.3 billion by 2030, to cover malaria prevention, diagnosis, treatment and programmatic costs across endemic countries. An additional US$ 8.5 billion was projected to be needed for malaria-related R&D between 2021 and 2030, averaging US$ 851 million per year (constant 2021 US dollars).[1]

4.1 Funding trends for malaria control and elimination

This section analyses funding data from 90 countries in 2024, comprising 80 malaria endemic countries and 10 recently non-endemic countries, six of which were certified malaria free between 2016 and 2024. These non-endemic countries remain included due to their historic financing patterns and, in some cases, ongoing receipt of malaria-related support. For simplicity, all 90 countries are referred to as "malaria endemic countries" throughout this chapter.

Between 2000 and 2024, total funding for malaria control and elimination across endemic countries was estimated at US$ 68.3 billion, including US$ 23.3 billion in domestic resources and US$ 45.4 billion in international funding. These values are expressed in constant 2024 US dollars.

In 2024, total malaria funding was estimated at US$ 3.9 billion, marking a slight decline from US$ 4.0 billion in 2023. This follows a brief rise in 2022 and remains

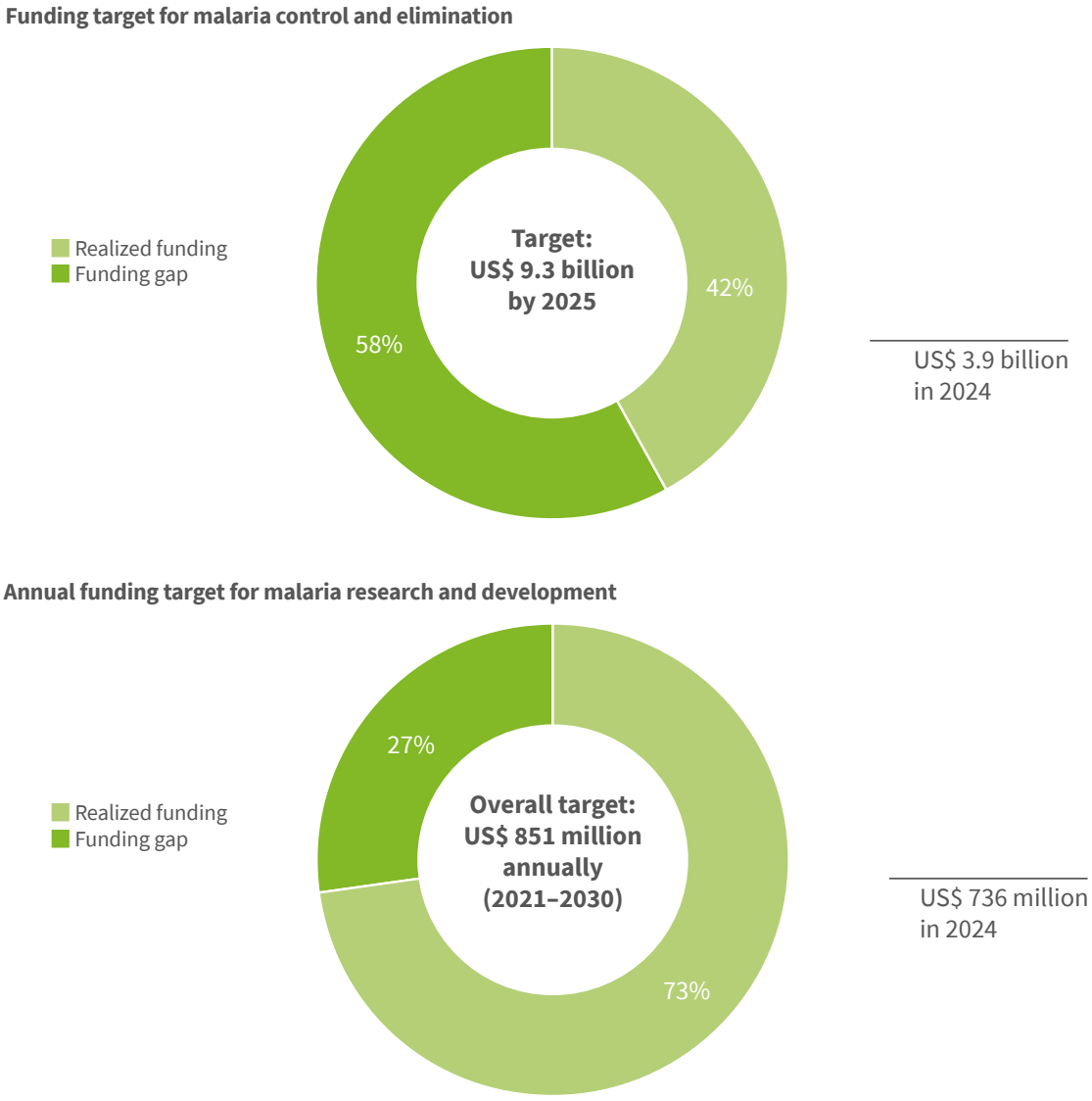
[1] These figures have not been adjusted for inflation in the present analysis but are retained for continuity with previous editions of the world malaria report.

slightly below the 2020–2021 funding levels. The pattern reflects, in part, reduced disbursements from the Global Fund compared with recent years. Contributions from the United States Government remained stable in 2024, while some other sources showed minor fluctuations. The marginal variation may also reflect shifts in the timing of disbursements and updates to reporting from key funders.

The 2024 total represents 42% of the US$ 9.3 billion required annually by 2025 to meet the GTS targets (as set in the 2021 GTS update, expressed in 2021 US dollars). The funding gap has steadily widened over the past 5 years, from US$ 2.6 billion in 2019 to US$ 5.3 billion in 2024, with available funding covering less than half the estimated global need (**Fig. 4.1**).

The sources of funding for malaria control and elimination efforts are outlined in **Table 4.1**. Estimates reflect total malaria funding from international and domestic sources, as shown in **Fig. 4.1** to **Fig. 4.6**. All funding estimates are adjusted to constant 2024 US dollars to account for inflation, unless stated otherwise. As such, historical values may differ slightly from those published in previous editions of the report. Comparisons across years should be interpreted with caution due to inconsistent reporting across data sources and ongoing revisions.

Fig. 4.1. GTS funding targets for 2025 and 2030[a,b] *Sources: GTS and 2021 GTS update.*



GTS: *Global technical strategy for malaria 2016–2030*.

[a] The data sources, boundaries, accounting rules and estimation methods used in this report are different from those of the System of Health Accounts 2011 (SHA2011). The malaria expenditure data reported here are thus not comparable with the disease expenditure data, including for malaria, that are reported in WHO's Global Health Expenditure Database. In this report, malaria expenditure data in endemic countries exclude out-of-pocket spending.

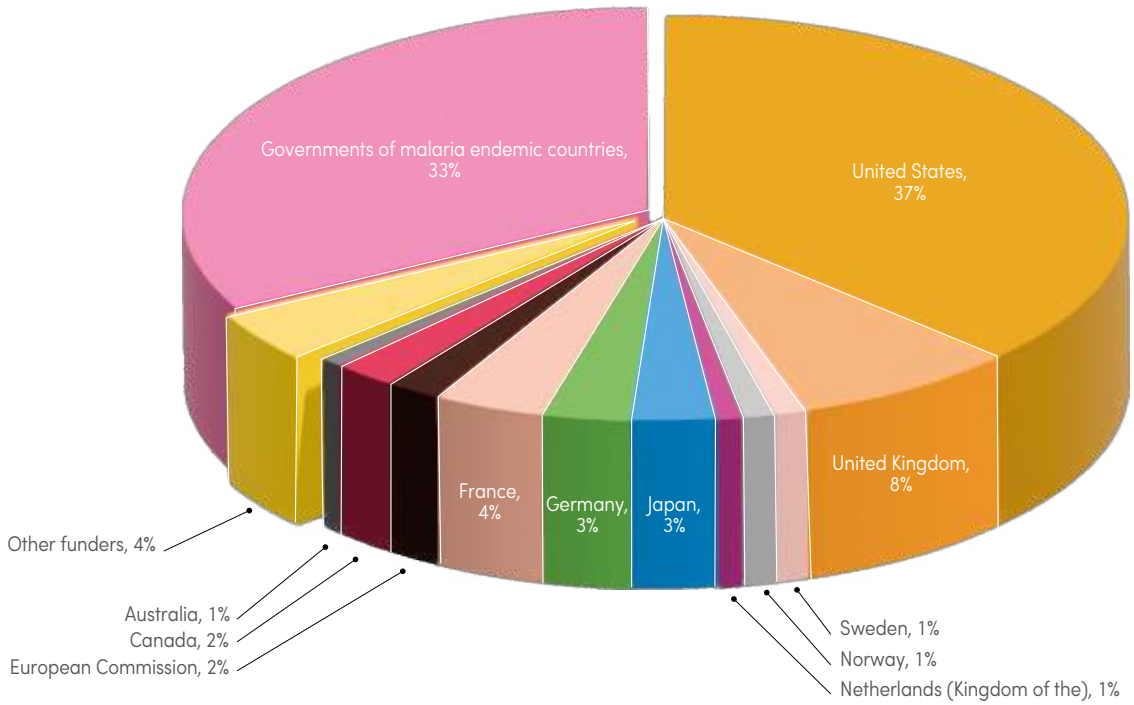
[b] GTS targets were costed in 2021 and are expressed in 2021 US dollars. They have not been adjusted for inflation in this analysis and are retained for continuity with previous editions of the world malaria report. The 2024 totals shown for malaria control and research and development are expressed in constant 2024 US dollars to ensure comparability across all funding analyses in this chapter.

Table 4.1. Sources of data on funding for malaria

	International funding	
Domestic funding	**Multilateral**	**Bilateral**
NMP-reported domestic budget or expenditures when available, or estimates from WHO/MNT 2000–2024	Donor contributions to the Global Fund 2010–2024 sourced from the Global Fund and WHO/MNT estimates	United Kingdom final aid spend 2017–2024 from the Foreign, Commonwealth and Development Office
Patient care delivery estimates 2010–2024 from WHO/MNT	Global Fund disbursements to malaria endemic countries 2003–2024 sourced from the Global Fund	United States funding for malaria 2001–2024, by agency and recipient country, sourced from KFF (formerly Kaiser Family Foundation)
	Donor disbursements to multilateral funders 2011–2023 sourced from OECD members' total use of the multilateral system, and 2011 and 2023 data used as a proxy for 2010 and 2024, respectively	Donor disbursement to malaria endemic countries from OECD CRS (2002–2023, except for United Kingdom 2007–2016) and WHO/MNT estimates for 2024

CRS: creditor reporting system; Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; NMP: national malaria programme; OECD: Organisation for Economic Co-operation and Development; United Kingdom: United Kingdom of Great Britain and Northern Ireland; United States: United States of America; WHO/MNT: World Health Organization/Malaria and Neglected Tropical Diseases.

Fig. 4.2. Funding for malaria control and elimination, 2010–2024 (% of total funding), by source of funds (constant 2024 US$)[a] *Sources: United States Government's ForeignAssistance.gov; Global Fund; NMP reports; OECD CRS database; United Kingdom Foreign, Commonwealth and Development Office; WHO/MNT estimates and World Bank DataBank.*



CRS: creditor reporting system; Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; NMP: national malaria programme; OECD: Organisation for Economic Co-operation and Development; United Kingdom: United Kingdom of Great Britain and Northern Ireland; United States: United States of America; WHO: World Health Organization/Malaria and Neglected Tropical Diseases.

[a] The data sources, boundaries, accounting rules and estimation methods used in this report are different from those of the System of Health Accounts 2011 (SHA2011). The malaria expenditure data reported here are thus not comparable with the disease expenditure data, including for malaria, that are reported in WHO's Global Health Expenditure Database. In this report, malaria expenditure data in endemic countries exclude out-of-pocket spending.

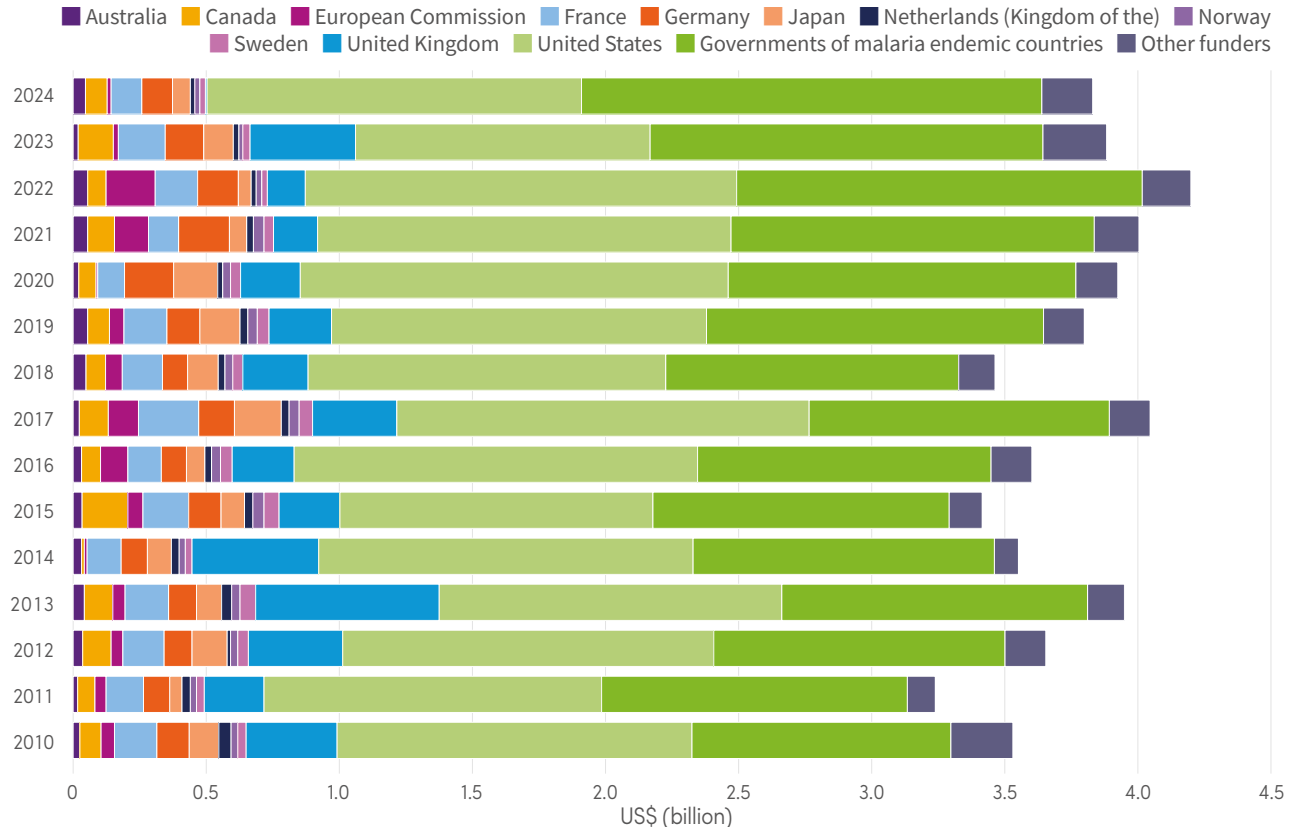
Estimates of government spending on patient care delivery by malaria endemic countries are derived by combining the estimated number of malaria cases (uncomplicated and severe), the proportion of these cases seeking care at different facility levels, and the corresponding treatment unit costs from WHO's CHOosing Interventions that are Cost-Effective (WHO-CHOICE) (*46*). These estimates are incorporated into government funding totals to reflect domestic spending on the routine delivery of malaria care through health facilities, as further detailed in **Annex 1**.

Estimated funding by source (**Fig. 4.2**, **Fig. 4.3**) relies on an allocation method that combines donor pledges, contributions and disbursements to estimate each donor's share of overall malaria funding – regardless of whether funding was delivered bilaterally, through multilateral partners or via other mechanisms. This approach is particularly useful in capturing the role of donors who fund malaria programmes through indirect channels or pooled funds. For example, many high-income governments contribute to the Global Fund, which then disburses funding to endemic countries – meaning the original donor's contribution may not appear in country-level disbursement records but still plays a major role in overall financing. Rather than tracking absolute disbursement volumes alone, this method offers a snapshot of how global malaria funding is shared among key international and domestic actors.

Over the 2010–2024 period, governments of endemic countries contributed roughly 33% of total malaria funding, underscoring their importance alongside the United States, which alone accounted for over 37%. Together, these two sources represented about 70% of total funding over this period (**Fig. 4.2**). Given its scale, fluctuations in United States Government funding have a substantial influence on overall investment levels. Other high-income country donors, including Canada, France, Germany, Japan and the United Kingdom, contributed smaller, but consistent, shares over time.

In 2024, the United States remained the single largest contributor, providing about US$ 1.4 billion (36% of the

Fig. 4.3. Annual funding for malaria control and elimination, 2010–2024, by source of funds (constant 2024 US$)[a] *Sources: United States Government's ForeignAssistance.gov; United Kingdom Foreign, Commonwealth and Development Office; Global Fund; NMP reports; OECD CRS database; the World Bank DataBank and WHO/MNT estimates.*



CRS: creditor reporting system; Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; NMP: national malaria programme; OECD: Organisation for Economic Co-operation and Development; United Kingdom: United Kingdom of Great Britain and Northern Ireland; United States: United States of America; WHO/MNT: World Health Organization/Malaria and Neglected Tropical Diseases.

[a] The data sources, boundaries, accounting rules and estimation methods used in this report are different from those of the System of Health Accounts 2011 (SHA2011). The malaria expenditure data reported here are thus not comparable with the disease expenditure data, including for malaria, that are reported in WHO's Global Health Expenditure Database. In this report, malaria expenditure data in endemic countries exclude out-of-pocket spending.

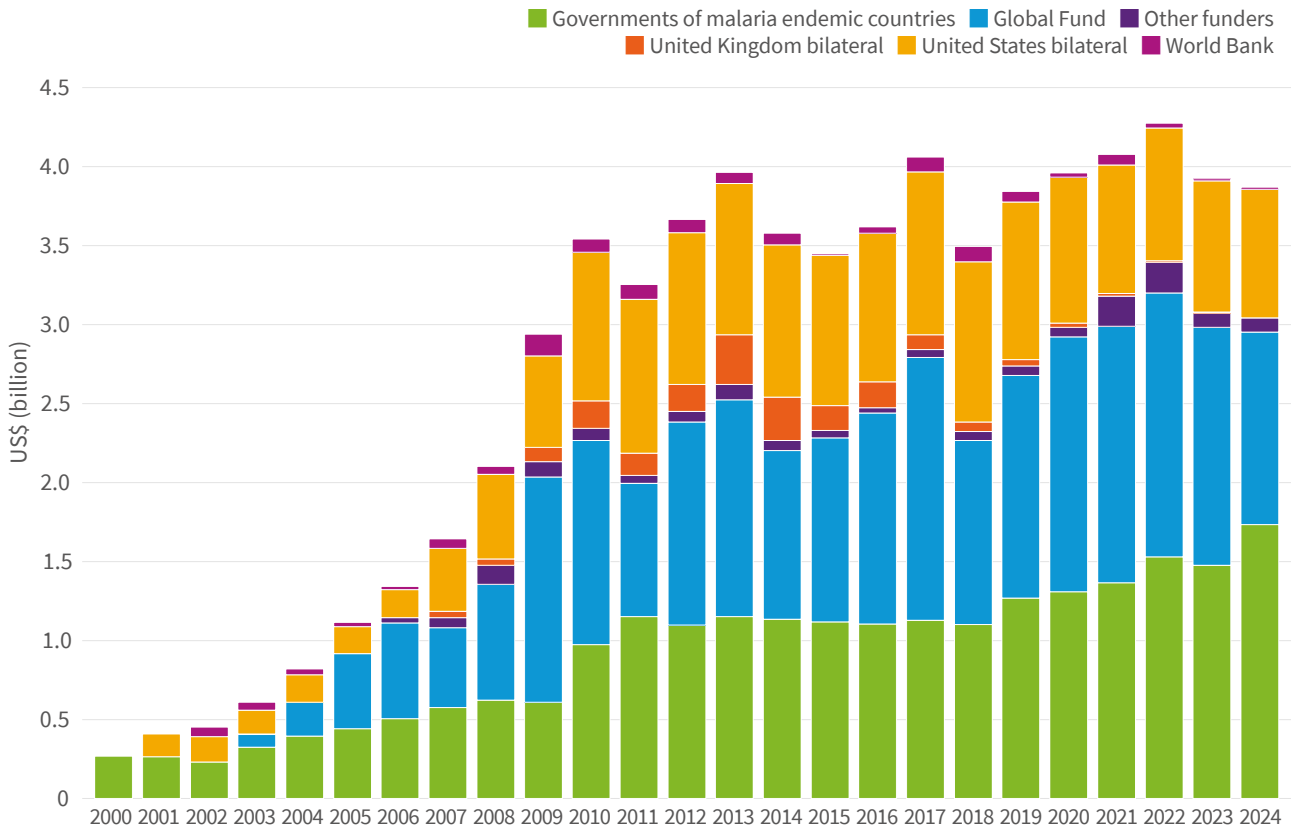
total). Governments of endemic countries contributed about US$ 1.7 billion (44%) – a notable increase compared with their historical share of roughly one third of total funding over the past 15 years. This shift reflects higher reported public domestic spending in a few countries, including some larger-than-usual values, as well as year-to-year variation in reporting from international donors. Contributions from several high-income donors – notably the United Kingdom, France, Germany, Japan and Canada – also declined relative to recent years, further amplifying the apparent increase in the domestic share. Together, these donors contributed nearly US$ 400 million, while an additional US$ 320 million came from other Development Assistance Committee donors, the European Commission, private foundations and the Gates Foundation (**Fig. 4.3**).

The following discussion focuses on funding flows from donors to recipients – whether delivered bilaterally or through multilateral channels – alongside government malaria spending in endemic countries (**Fig. 4.4**). These values reflect a mix of international disbursements and domestic expenditures (or budgets when unavailable, and, in some instances, estimates), depending on the data source.

In 2024, international funding flows accounted for over US$ 2.1 billion. Within international funding, the Global Fund disbursed US$ 1.2 billion (32%), marking its lowest contribution since 2015. Despite this decline, it remained the largest international channel of malaria funding (*47*). Disbursement levels in 2024 partly reflect typical end-of-grant cycle dynamics, as malaria spending within grants tends to peak during campaign or renewal years and fall in intervening periods, explaining much of the observed year-to-year variation in Global Fund disbursements.

The United States allocated US$ 812.7 million (21%) for malaria in 2024, remaining the largest bilateral donor. However, due to actions by the United States administration – including the suspension and cancellation of global health projects and the restructuring of USAID – these funds may be disbursed over multiple years, and it is not yet known which countries received funding (*48*).

Fig. 4.4. Funding for malaria control and elimination, 2000–2024, by channel (constant 2024 US$)[a] *Sources: United States Government's ForeignAssistance.gov; Global Fund; NMP reports; OECD CRS database; United Kingdom Foreign, Commonwealth and Development Office; WHO/MNT estimates and World Bank DataBank.*



CRS: creditor reporting system; Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; NMP: national malaria programme; OECD: Organisation for Economic Co-operation and Development; United Kingdom: United Kingdom of Great Britain and Northern Ireland; United States: United States of America; WHO/MNT: World Health Organization/Malaria and Neglected Tropical Diseases.

[a] The data sources, boundaries, accounting rules and estimation methods used in this report are different from those of the System of Health Accounts 2011 (SHA2011). The malaria expenditure data reported here are thus not comparable with the disease expenditure data, including for malaria, that are reported in WHO's Global Health Expenditure Database. In this report, malaria expenditure data in endemic countries exclude out-of-pocket spending.

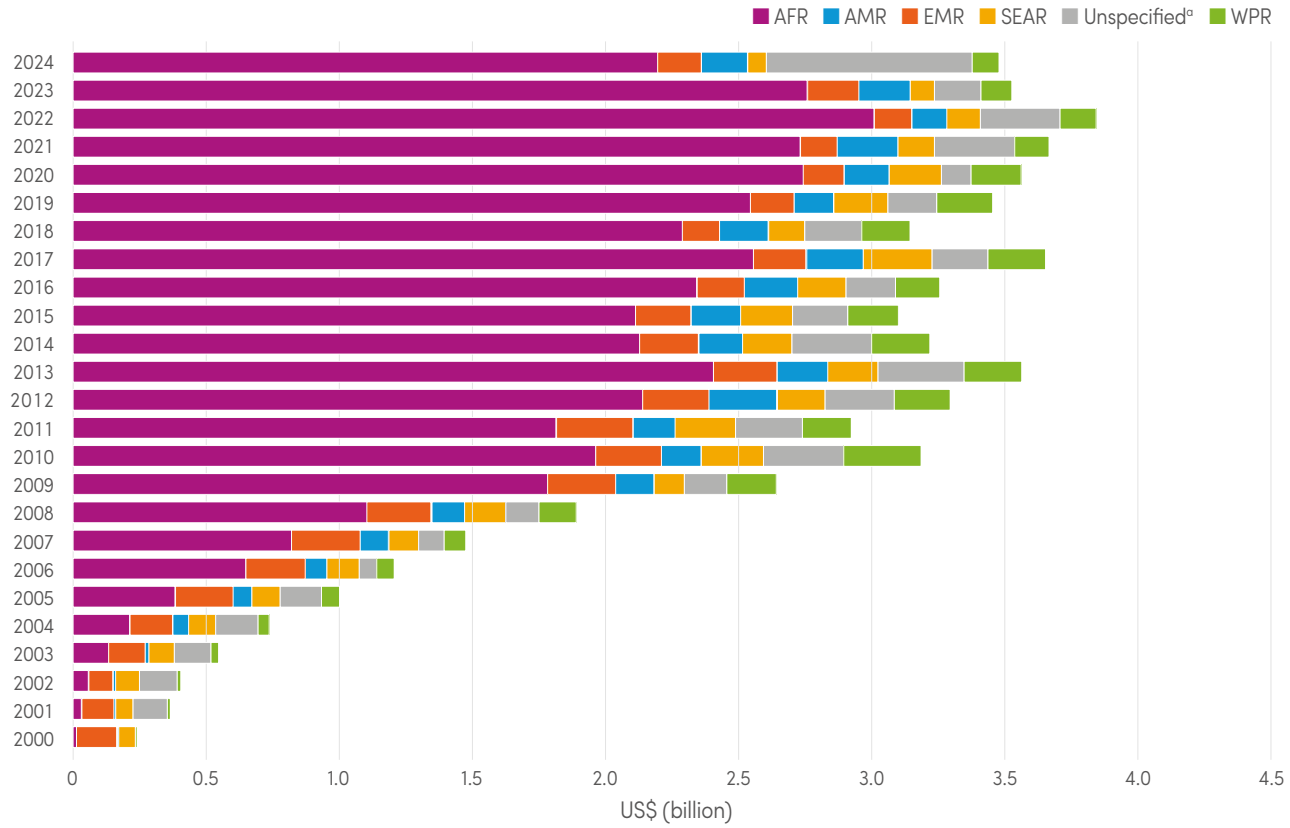
The United Kingdom contributed US$ 2.3 million in 2024 – a very small share relative to earlier years. Since 2017, data have been sourced from the United Kingdom's Final Official Development Assistance (ODA) spend reports (previously the Organisation for Economic Co-operation and Development creditor reporting system through 2016 (*49*)). This change in source aligns with lower reported malaria-specific amounts, and the ODA series may not fully capture malaria-relevant contributions, including R&D investments (discussed in **Section 4.2**), as well as health systems support or multilateral investments (*50*).

Fig. 4.5 shows the regional distribution of malaria funding from 2000 to 2024. In 2024, the WHO African Region received 63% of the total US$ 3.9 billion in funding. The smaller share (down from 75% in 2023) primarily reflects a classification change rather than an actual shift in funding flows. The full United States bilateral malaria allocation for 2024 (US$ 813 million) could not be assigned to recipient countries due to reporting disruptions following the suspension of United States global health programming. Unlike in previous years, PMI's Malaria Operational Plans – which provide country-level allocations – were not published for 2024, resulting in this funding being recorded as "unspecified". In previous years, a substantial proportion of this funding had been reported under the African Region.

The WHO Region of the Americas and Eastern Mediterranean Region each accounted for 5% of total funding, reflecting targeted support for countries including Afghanistan, Brazil and Yemen. The South-East Asia Region received 2%, with funding directed primarily to India, while the Western Pacific Region received 3%, including support to Papua New Guinea and neighbouring countries.

Funding attributed to unspecified regions rose sharply to 22% in 2024, compared with 9% in 2023. This category captures disbursed funds that were not yet geographically classified in the available data – such as regional or multi-country initiatives – and, this year, the unallocated United States bilateral amount noted above. Overall, the pattern reflects continued concentration of resources in high-

Fig. 4.5. Funding for malaria control and elimination, 2000–2024, by WHO or unspecified region (constant 2024 US$)[a] *Sources: United States Government's ForeignAssistance.gov; United Kingdom Foreign, Commonwealth and Development Office; Global Fund; NMP reports; OECD CRS database; World Bank DataBank and WHO/MNT estimates.*



AFR: WHO African Region; AMR: WHO Region of the Americas; CRS: creditor reporting system; EMR: WHO Eastern Mediterranean Region; Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; NMP: national malaria programme; OECD: Organisation for Economic Co-operation and Development; SEAR: WHO South-East Asia Region; United Kingdom: United Kingdom of Great Britain and Northern Ireland; United States: United States of America; WHO/MNT: World Health Organization/Malaria and Neglected Tropical Diseases; WPR: WHO Western Pacific Region.

[a] Refers to funding flows with no information on the geographical localization of their recipients. The data sources, boundaries, accounting rules and estimation methods used in this report are different from those of the System of Health Accounts 2011 (SHA2011). The malaria expenditure data reported here are thus not comparable with the disease expenditure data, including for malaria, that are reported in WHO's Global Health Expenditure Database. In this report, malaria expenditure data in endemic countries exclude out-of-pocket spending.

burden settings, while a larger share remains temporarily classified as unspecified pending recipient detail (**Fig. 4.5**).

In 2024, malaria funding per person at risk (PAR) varied widely across regions. Countries in the WHO African Region received the highest level of funding per PAR at US$ 2.24, up from US$ 2.13 in 2020 but down from US$ 2.71 in 2015. However, 2024 figures are not directly comparable with previous years, as the full United States bilateral malaria allocation (US$ 813 million, or 23% of global funding) was classified as unspecified, following reporting disruptions, temporarily affecting regional totals.

Countries in the WHO Region of the Americas recorded the second highest malaria funding per PAR at US$ 1.18, while those in the Eastern Mediterranean Region reached US$ 0.51, and the lowest levels were observed in the South-East Asia and Western Pacific regions, at US$ 0.05 and US$ 0.14, respectively. These variations largely reflect regional differences in malaria burden and donor targeting, with major investments concentrated in high transmission settings.

Fig. 4.6 shows how malaria funding in 2024 was distributed across income groups, based on the World Bank's income classification (*51*). Countries in the low- and lower-middle-income groups received the majority of total funding, reflecting their high malaria burden and greater reliance on external support.

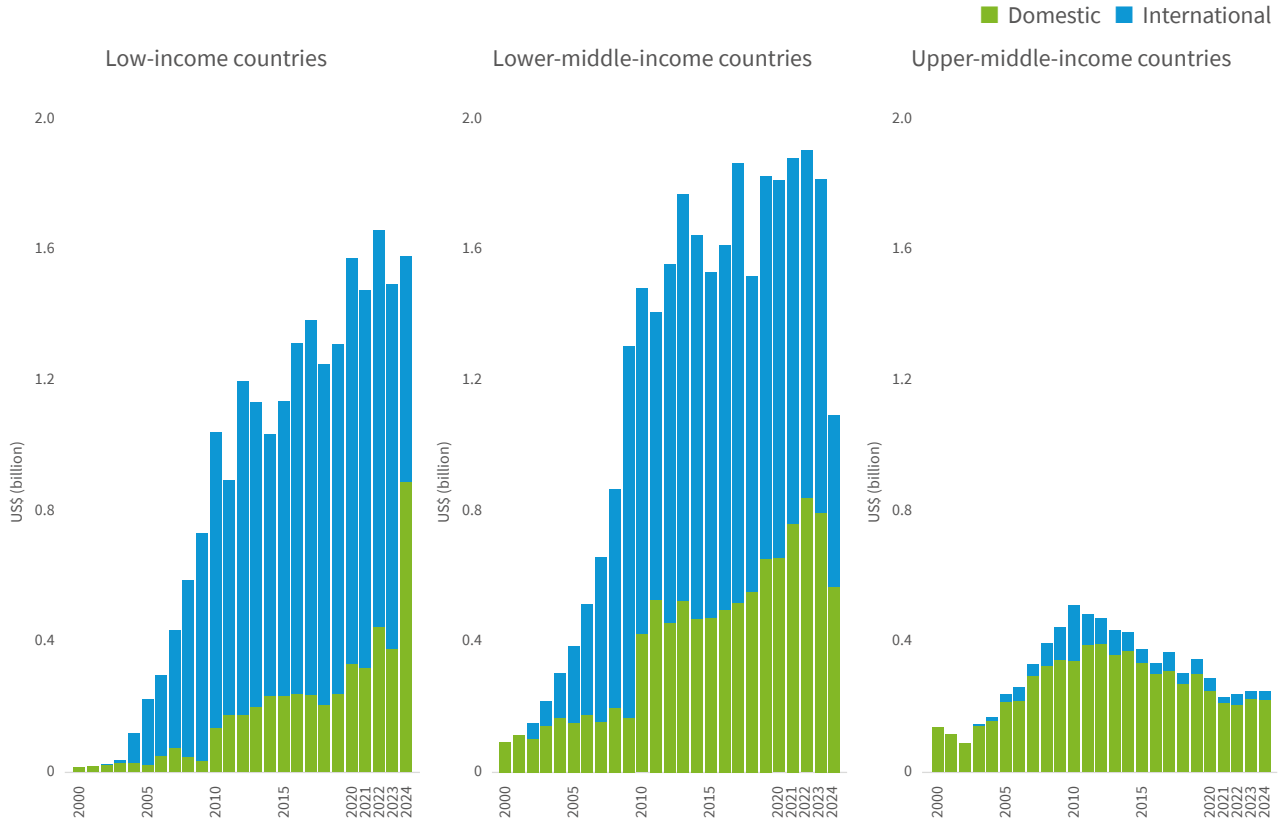
In 2024, low-income countries (*n*=24) received 41% of total malaria funding, with 44% coming from international sources and 56% from domestic contributions. This higher domestic share partly reflects the temporary reclassification of the United States bilateral malaria allocation as unspecified, which understates international support to low-income countries in 2024.

Lower-middle-income countries (*n*=38) accounted for 28% of total funding, with a near-even split between international (52%) and domestic (48%) sources.

Upper-middle-income countries (*n*=21) received 6% of total funding, with about 90% sourced from domestic budgets. This proportion has remained relatively stable year-on-year.

Fig. 4.6. Funding for malaria control and elimination, 2000–2024, by World Bank 2025 income group and source of funding (constant 2024 US$)[a]

Sources: United States Government's ForeignAssistance.gov; Global Fund; NMP reports; OECD CRS database; United Kingdom Foreign, Commonwealth and Development Office; WHO/MNT estimates and World Bank DataBank.



CRS: creditor reporting system; Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; NMP: national malaria programme; OECD: Organisation for Economic Co-operation and Development; United Kingdom: United Kingdom of Great Britain and Northern Ireland; United States: United States of America; WHO/MNT: World Health Organization/Malaria and Neglected Tropical Diseases.

[a] The data sources, boundaries, accounting rules and estimation methods used in this report are different from those of the System of Health Accounts 2011 (SHA2011). The malaria expenditure data reported here are thus not comparable with the disease expenditure data, including for malaria, that are reported in WHO's Global Health Expenditure Database. In this report, malaria expenditure data in endemic countries exclude out-of-pocket spending.

High-income countries (*n*=5) received less than 1% of total malaria funding, all of which came from domestic sources.

The remaining 25% of funding was not assigned to a specific income group. This includes allocations categorized as unspecified, as well as funding directed to Ethiopia and Venezuela, which were not included in the income group classification in 2024.

This distribution reinforces the observed trend: as income levels increase, the proportion of domestic public malaria financing also rises. Meanwhile, countries with lower income levels remain heavily dependent on international contributions. Notably, low- and lower-middle-income countries account for over 90% of global malaria cases and deaths.

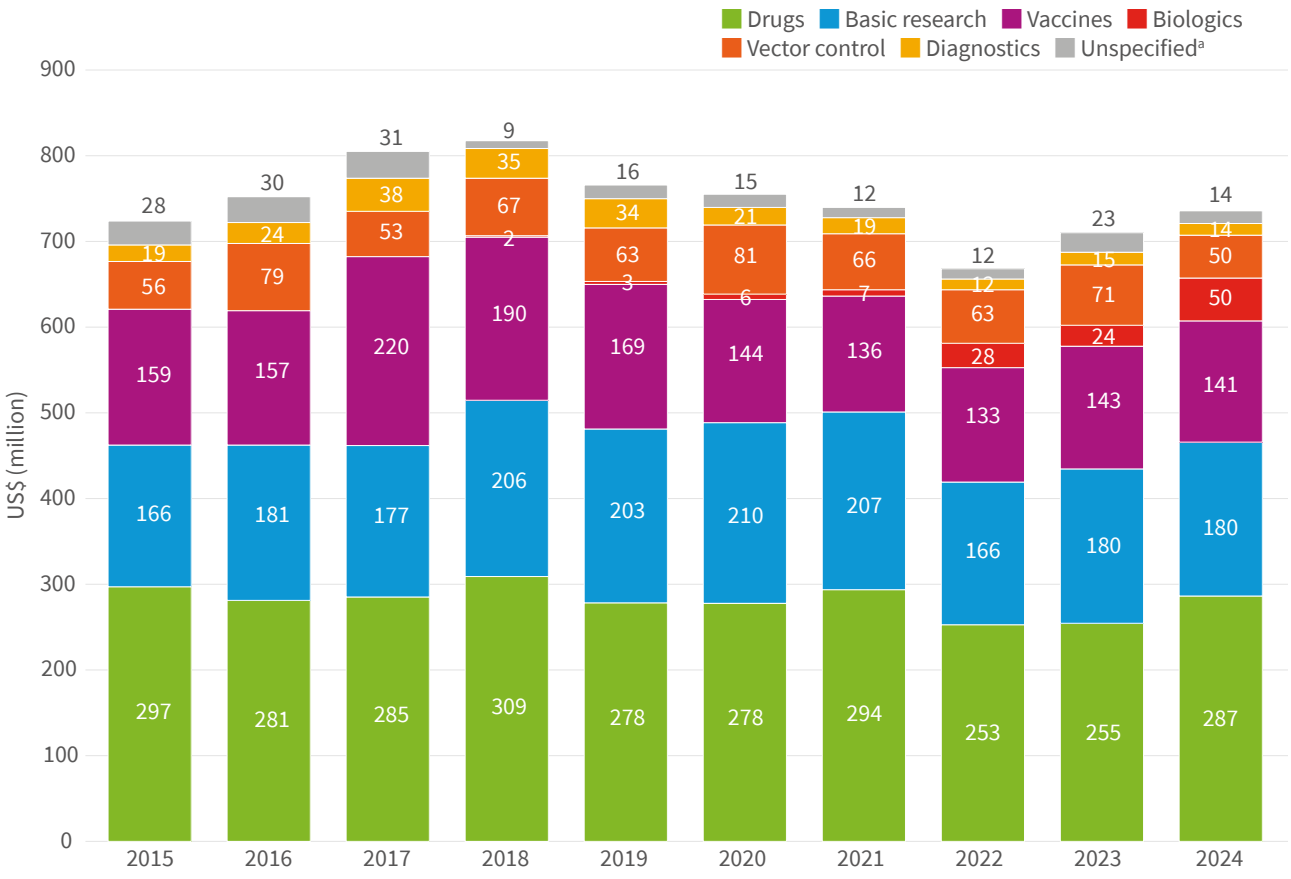
4.2 Investments in malaria-related R&D

Global funding for malaria basic research and product development was US$ 736 million in 2024. This represented a small rise of US$ 25 million (4%) since 2023, or about US$ 38 million after accounting for differences in survey participation. This second straight year of increased investment comes after 4 consecutive years of decline, which had led to the record low of US$ 668 million in 2022. Despite this ongoing recovery, funding remained slightly below its 10-year average.

The 2024 increase was driven by rises in both drug and biologic R&D funding since 2023, with drug funding up US$ 32 million (13%) and biologic R&D funding more than doubling (up US$ 26 million, or 107%) to US$ 50 million – its highest ever funding total (**Fig. 4.7**). This was partially offset by smaller drops across all other product areas, especially vector control products (down US$ 21 million, –29%).

Drug R&D continued to receive the largest share of funding (39%), followed by basic research (24%) and vaccines (19%). The successful registration of two malaria vaccines has meant that shares of funding for drugs and vaccines have gradually diverged over the life of the G-FINDER survey, with a slow upward trend for drug R&D and a downward trend

Fig. 4.7. Malaria R&D funding by product type, 2015–2024 (constant 2024 US$)[a] *Source: G-FINDER data portal (52).*



R&D: research and development.

[a] "Unspecified" refers to funding flows with no information on the product type.

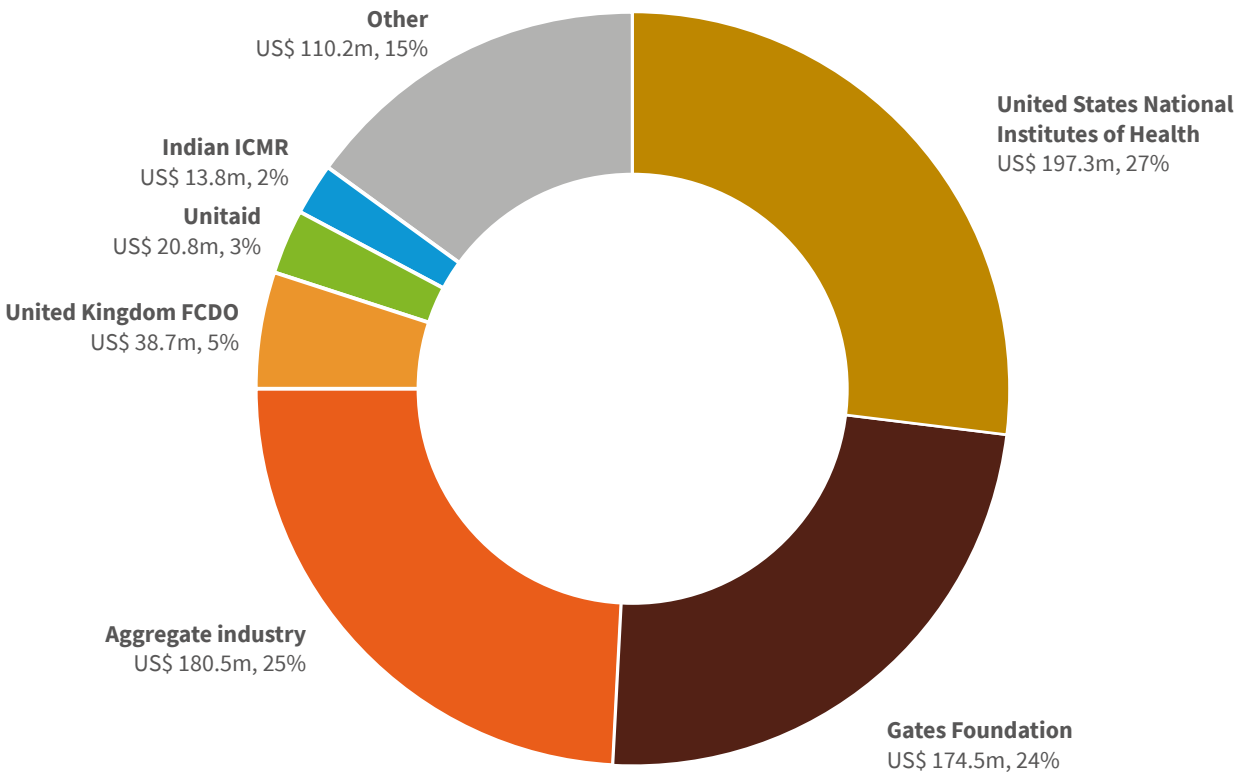
for vaccines. This has taken them from relatively equal funding shares in 2008 to the substantial gap seen over the past 5 years. Vaccine funding partially rebounded in 2023, due to increased investment from the Gates Foundation, then remained relatively stable in 2024, dropping by just US$ 2 million (2%). This year's record funding for biologics R&D was the result of another big increase in the Gates Foundation's disbursements to the Gates Medical Research Institute for its Phase I trial of a *P. falciparum*-targeted monoclonal antibody candidate, which saw its funding rise by US$ 20 million (116%) to US$ 38 million.

The overall increase in funding was largely driven by a US$ 30 million (31%) jump in industry drug R&D, alongside a smaller increase from the United Kingdom's Foreign, Commonwealth and Development Office (FCDO). FCDO funding rose by three quarters (US$ 16 million) to US$ 39 million, making it the fourth largest funder overall and restoring it to a level similar to its pre-Brexit peak. Malaria funding from Open Philanthropy, which tends to vary substantially from year to year, also rebounded sharply (up US$ 12 million) from last year's record low of US$ 0.7 million.

Funding from the European Commission and United States Department of Defense increased by almost three quarters (about US$ 5 million each). There was a US$ 7.3 million rebound in the Department of Defense's self-funded drug R&D, which had slumped to US$ 0.3 million in 2023 – from a high of nearly US$ 30 million – following the end of a previous funding programme. Funding from the Australian Department of Foreign Affairs and Trade rose to US$ 6 million, up from no funding in each of the previous 2 years, as it began a new round of Product Development Partnership funding, with US$ 4 million going to the Medicines for Malaria Venture for drug R&D and US$ 2 million to PATH for diagnostics.

The funding environment has become increasingly concentrated in recent years, with three quarters of 2024's malaria-related R&D funding coming from the top three funders – the United States National Institutes of Health (27%), aggregated industry funding (25%) and the Gates Foundation (24%) – slightly below last year's record high of 77% (**Fig. 4.8**). Twenty-five different funders contributed at least US$ 1 million each, down slightly from 26 last year and substantially less than the 34 such funders in 2018.

Fig. 4.8. Top funders for malaria-related R&D, 2024 (constant 2024 US$) *Source: G-FINDER data portal.*



FCDO: Foreign, Commonwealth and Development Office; ICMR: Indian Council of Medical Research; R&D: research and development; United Kingdom: United Kingdom of Great Britain and Northern Ireland; United States: United States of America.

5 Distribution and coverage of malaria prevention, diagnosis and treatment

5.1 Distribution and coverage of ITNs

5.1.1 ITN distribution, shipment and coverage

The widespread uptake of ITNs has been credited with leading to a 70% reduction in malaria cases in Africa between 2000 and 2015 (*53*). However, the effectiveness of ITNs is threatened by the development of resistance to pyrethroids, the insecticide used on all prequalified nets. To enhance the effectiveness of ITNs against pyrethroid-resistant mosquitoes, WHO made an initial recommendation in 2017 to add the synergist piperonyl butoxide (PBO) to standard pyrethroid ITNs (*54*). This was followed by a strong WHO recommendation in 2023 for two new classes of dual active ingredient ITNs, each featuring a different mode of action: pyrethroid–chlorfenapyr nets, which combine a pyrethroid and a pyrrole insecticide to enhance the killing effect of the net; and pyrethroid–pyriproxyfen nets, which combine a pyrethroid with an insect growth regulator that disrupts mosquito growth and reproduction. Dual active ingredient ITNs have been shown to be more effective than conventional pyrethroid-only ITNs in areas where mosquitoes are resistant to pyrethroids (*55*, *56*).

5.1.2 ITN distributions by NMPs

In 2024, 181 million ITNs were distributed globally by NMPs in malaria endemic countries (**Fig. 5.1**).[1] Of the 181 million ITNs distributed, 74 million (41%) were conventional (i.e. pyrethroid-only) ITNs, 74 million (41%) were PBO nets and 33 million (18%) were dual active ingredient nets. Nearly 90% of the ITNs were distributed in sub-Saharan Africa (161 million). Among the ITNs distributed in sub-Saharan Africa, 55 million (34%) were conventional ITNs, 73 million (45%) were PBO nets and 33 million (21%) were dual active ingredient nets. About half the ITNs delivered in sub-Saharan Africa were distributed in five countries: Kenya (16.6 million), the Niger (16.6 million), the Democratic Republic of the Congo (16 million), Madagascar (15.4 million) and Ghana (14.6 million). Outside of sub-Saharan Africa, 20 million ITNs were distributed, of which 19 million (95%) were conventional ITNs. PBO and dual active ingredient ITNs made up 4% and 0.3%, respectively, of ITNs distributed outside of sub-Saharan Africa. The largest distributions of ITNs were in Pakistan (7.7 million), India (4.6 million), Yemen (2.2 million) and Papua New Guinea (1.5 million). Outside of sub-Saharan Africa, procurement of conventional ITNs is more common due to the lower prevalence of resistance to pyrethroids.

The total number of ITNs distributed by NMPs in sub-Saharan Africa decreased by 33% in 2024, with 81 million fewer ITNs distributed in 2024 than in 2023 (**Fig. 5.1**). About 75% of the decrease observed in 2024 is accounted for by the decrease in ITNs distributed through mass campaigns. Outside of sub-Saharan Africa, ITN distributions increased by 71%, with 8 million more ITNs distributed in 2024 than in 2023.

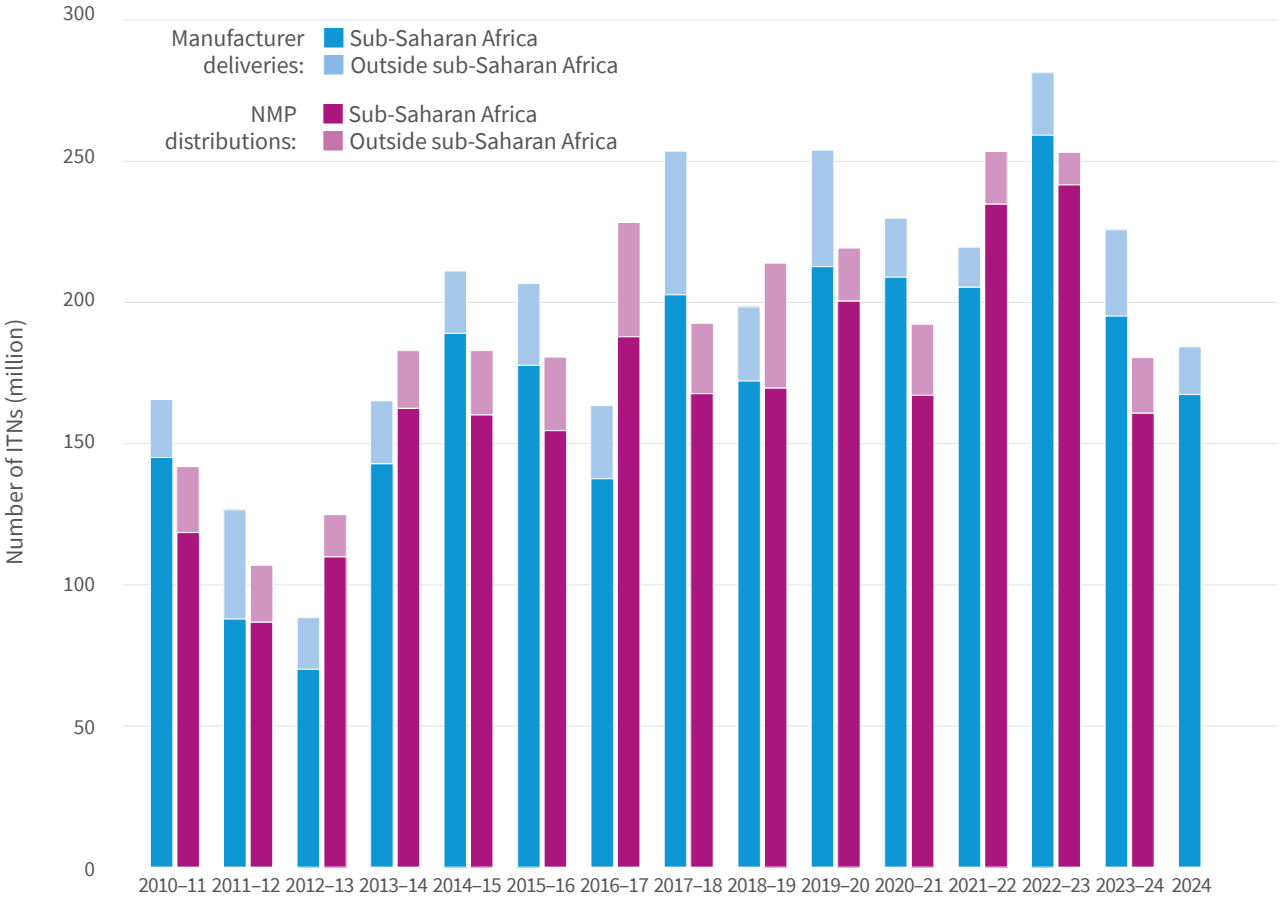
5.1.3 ITNs distributed by NMPs during mass campaigns

Data on mass campaigns reported by countries, and supplemented by information from the Alliance for Malaria Prevention in 2024, indicated that 29 countries planned and carried out mass ITN distribution campaigns in 2024. A total of 145 million ITNs were planned for distribution through mass campaigns during the year, of which 133 million were successfully distributed; this includes 26 million nets carried

[1] This includes all ITNs distributed by NMPs through mass campaigns and through routine channels.

Fig. 5.1. Number of ITNs delivered by manufacturers and distributed by NMPs,[a,b] 2010–2024

Sources: Milliner Global Associates and NMP reports.



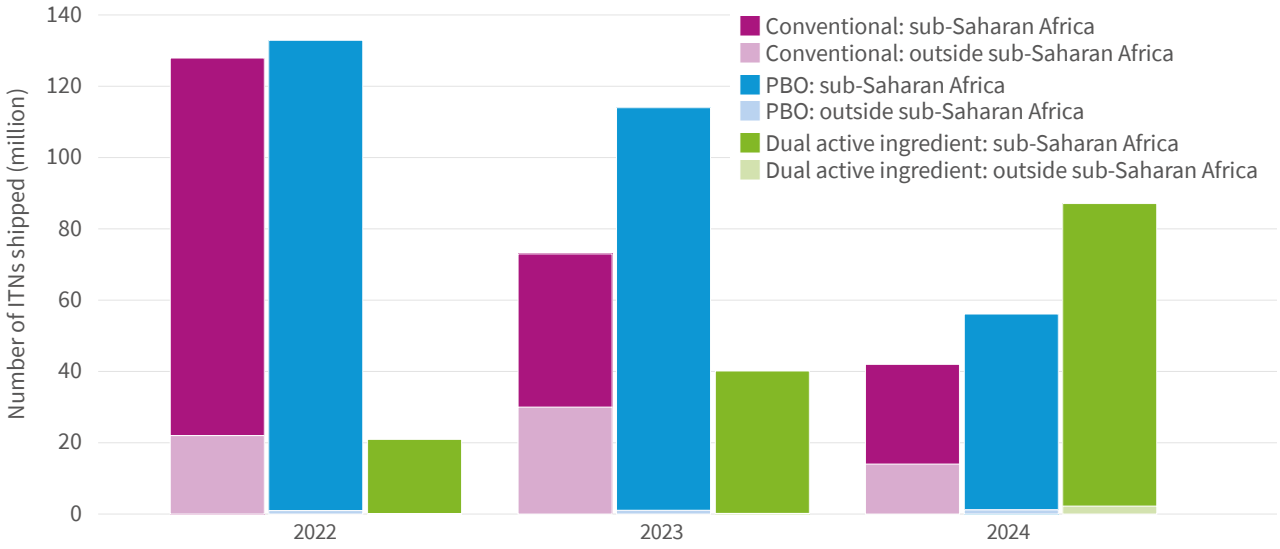
ITN: insecticide-treated mosquito net; NMP: national malaria programme.

[a] A lag between manufacturer deliveries to countries and NMP distributions of about 6–12 months is expected; thus, deliveries by manufacturers in a given year are often not reflected in distributions by NMPs in that year. Also, distributions of ITNs reported by NMPs do not always reflect all the nets that have been distributed to communities, depending on completeness of reporting. These issues should be considered when interpreting the relationship between manufacturer deliveries, NMP distributions and likely population coverage. Additional considerations include nets that are in storage in-country but have not yet been distributed by NMPs and those sold through the private sector that are not reported by programmes. For this reason, in the chart, the distributions by NMPs in a given year are shown together with the deliveries by manufacturers from the previous year.

[b] In 2024, ITNs were not distributed in the Republic of Korea or Solomon Islands.

Fig. 5.2. Total number of ITNs shipped by manufacturers globally, by net type, 2022–2024

Source: Milliner Global Associates.



ITN: insecticide-treated mosquito net; PBO: piperonyl butoxide.

over from 2023 (**Fig. 5.3**). By the end of 2024, 91.3% of the ITNs planned for distribution through mass campaigns in 2024 had been distributed. Two countries distributed less than 60% of their planned number of ITNs: the Comoros (59%) and the Democratic Republic of the Congo (46%) (see **Annex 2**). Low distribution of ITNs is driven by multiple factors within countries, including, but not limited to, geographical inaccessibility and competing programme priorities.

In 2024, the total number of ITNs distributed by NMPs in mass campaigns decreased by 31%, with 61 million fewer ITNs delivered in 2024 than in 2023 (**Fig. 5.3**). Similarly, there was a 34% decrease between 2022 and 2024. The number of ITNs distributed through mass campaigns in 2024 was closer to the level observed in 2021, when 144 million ITNs were distributed. Given that the number of ITNs distributed through mass campaigns follows a 3-year distribution cycle, this type of fluctuation in ITN distributions over time is expected.

5.1.4 ITNs shipped by manufacturers, by region, net type and over time

Between 2004 and 2024, a total of 3.3 billion ITNs were shipped globally, of which 2.8 billion (87%) were supplied to sub-Saharan Africa.

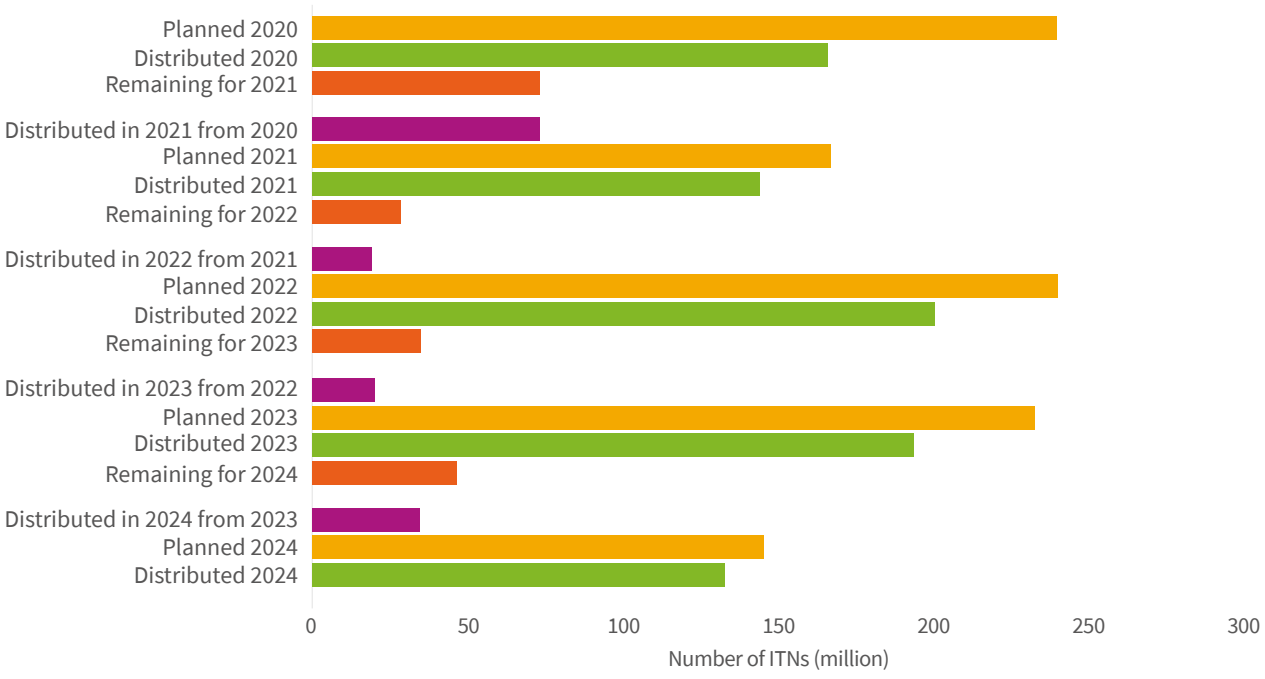
According to manufacturer data, 185 million ITNs were shipped worldwide in 2024 (**Fig. 5.1**). Of the total ITNs shipped, 42 million (23%) were conventional ITNs, 56 million (30%) were PBO nets and 87 million (47%) were dual active ingredient nets (**Fig. 5.2**). In sub-Saharan Africa, there were 168 million ITN shipments in 2024, accounting for 91% of all shipments. Dual active ingredient ITNs made up 85 million (51%) of ITNs shipped, a sharp increase from the 40 million (20%) shipped in 2023 and 21 million (8%) in 2022. About half the ITNs shipped to sub-Saharan Africa in 2024 were shipped to five countries: Nigeria (23.5 million), the Democratic Republic of the Congo (23.4 million), Madagascar (14.9 million), Malawi (13 million) and Burkina Faso (12.5 million).

Outside of sub-Saharan Africa, 18 million ITNs were shipped in 2024. Of these, 14.4 million (80%) were conventional ITNs, 1.2 million (7%) were PBO nets and 2.2 million (12%) were dual active ingredient nets. Although dual active ingredient ITNs represent the smallest proportion, there has been a marked increase since 2022 and 2023, when only 12 000 (0.1%) and 200 000 (1%) such ITNs, respectively, were shipped.

In recent years, the total number of ITNs shipped globally has declined, from 283 million in 2022 to 227 million in 2023 and 185 million in 2024 (**Fig. 5.1**).

The total number of ITNs shipped by manufacturers and the number of ITNs distributed by NMPs gives an indication of the massive scale at which this key malaria intervention is implemented. However, when interpreting the relationship between manufacturer ITN shipments, NMP distributions and population coverage of ITNs, the following should be considered: 1) there is an estimated 6–12-month delay between the date of manufacturer shipment and

Fig. 5.3. ITNs planned and distributed during mass campaigns in endemic countries or areas, 2020–2024 *Sources: NMPs, Alliance for Malaria Prevention, RBM Partnership to End Malaria and the Global Fund.*



Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; ITN: insecticide-treated mosquito net; NMP: national malaria programme.

distribution of the ITNs by the NMP; 2) manufacturer shipments include shipments to non-endemic countries; 3) incomplete reporting of the number of ITNs distributed by countries underestimates the true number of ITNs distributed; 4) ITNs sold through the private sector are not included in country reports; and 5) ITN distribution data are unavailable from some countries. For these reasons, the number of shipments by manufacturers in a given year is not expected to match the number of ITN distributions by countries in that year.

5.1.5 Population coverage of ITNs in sub-Saharan Africa

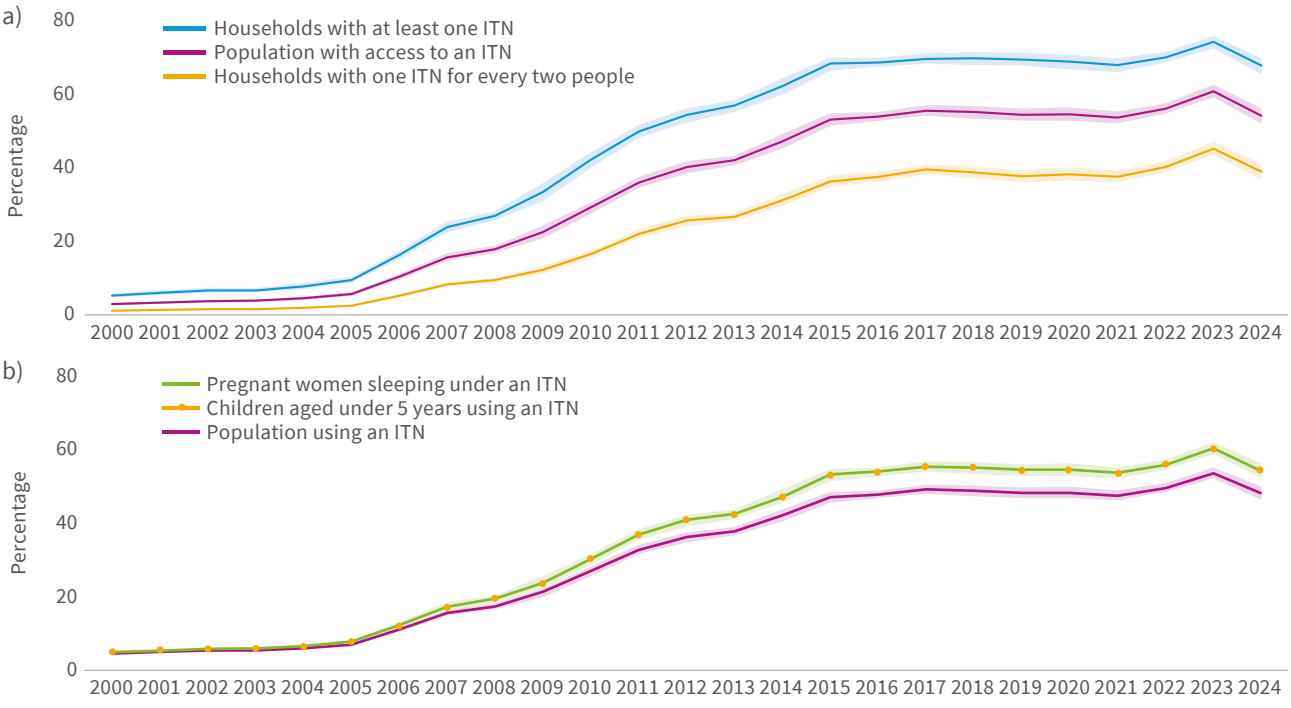
Indicators of population-level coverage of ITNs were estimated for sub-Saharan African countries in which ITNs are the main method of vector control. The methods of estimation are described in **Annex 1**. The following indicators were estimated from household surveys, manufacturer deliveries and NMP distributions:

- ITN ownership (i.e. percentage of households that own at least one ITN);
- percentage of households with at least one ITN for every two people;
- percentage of household members with access to an ITN (assuming access is limited to one ITN for every two people); and
- ITN use (i.e. percentage of a given population group that slept under an ITN the night before the survey).

By 2024, 68% of households in sub-Saharan Africa (excluding low transmission countries, see **Annex 1**) had at least one ITN, returning to the value of 68% observed in 2015 following an increase from about 5% in 2000 (**Fig. 5.4a**). The percentage of households owning at least one ITN for every two people increased from 1% in 2000 to 36% in 2015 and to 39% in 2024. In the same period, the percentage of the population with access to an ITN within their household increased from 3% in 2000 to 53% in 2015 and to 54% in 2024 (**Fig. 5.4a**). The percentage of the population sleeping under an ITN also increased between 2000 and 2024, for the whole population (from 2% to 47%), for children aged under 5 years (from 3% to 53%) and for pregnant women and girls (from 3% to 53%) (**Fig. 5.4b**). In 2024, there was a decrease in access to and use of ITNs compared with 2023, with access and coverage returning to levels observed in 2021 and 2022 (**Fig. 5.4**). Survey results on key ITN coverage indicators, by country, are shown in **Annex 4-Ca**.

To summarize, fewer nets were distributed in 2024 than in 2023 and 2022. Most of this decline can be explained by a reduction in ITNs distributed during mass campaigns in 2024, compared with 2022 and 2023, as fewer countries had planned mass campaigns in 2024 under the 3-year mass campaign cycle. The decline in the number of ITNs distributed has a direct impact on the estimated levels of ITN access and use in 2024, as modelled estimates of access and use are highly associated with the total number of ITNs distributed. An encouraging trend is the increasing proportion of ITNs shipped and distributed in sub-Saharan Africa that are dual active ingredient nets, which remain effective in areas of resistance to pyrethroids.

Fig. 5.4. Indicators of a) population-level access to ITNs, and b) population-level use of ITNs, sub-Saharan Africa, 2000–2024 *Source: ITN coverage model by the Malaria Atlas Project.*



ITN: insecticide-treated mosquito net.

5.2 Population protected with IRS

WHO recommends that IRS be deployed for the prevention and control of malaria in children and adults living in areas with ongoing malaria transmission. However, the use of IRS for malaria control in endemic countries continues to decline globally (**Fig. 5.5**). In 2024, 43 malaria endemic countries[1] reported implementation of IRS to prevent malaria, with a total of 48 million people protected in these 43 countries. In contrast, in 2014, 54 countries reported implementation of IRS, with a total of 118 million people protected. There has been a consistent decrease in the number of people protected by IRS across regions since 2010.

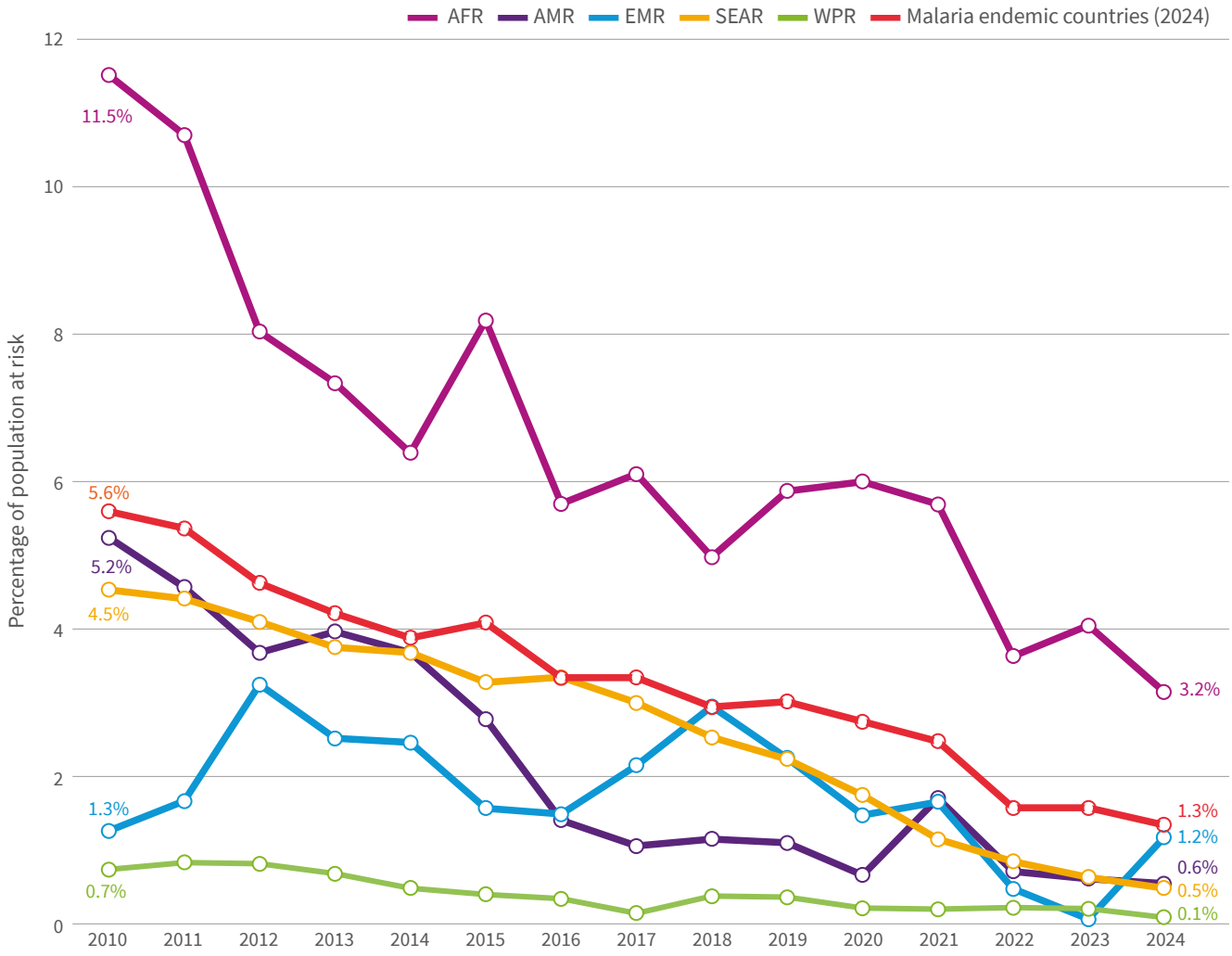
Between 2023 and 2024, there was a significant drop in the number of people protected in Mozambique, where there were 5.5 million fewer people protected; Zambia, where there were 4.8 million fewer people protected; and India, where there were 1.8 million fewer people protected in 2024 than in 2023.

Although the percentage of the total population at risk that is protected by IRS is low (1.3% in 2024), the coverage of those targeted for IRS reached 86%. IRS coverage in 2024 was similar to coverage in 2023, when 1.3% of the population at risk was protected, and 88% of the targeted population was protected. As the implementation of IRS at the population level is limited by operational and financial constraints, targeted IRS focused on specific high-risk areas may be more cost-effective than covering the entire population.

[1] The 43 malaria endemic countries that implemented IRS nationally in 2024 and provided data are: Botswana, Brazil, Burkina Faso, Burundi, the Comoros, Costa Rica, Djibouti, the Dominican Republic, Ecuador, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, French Guiana, Ghana, Guatemala, Honduras, India, the Islamic Republic of Iran, Kenya, the Lao People's Democratic Republic, Madagascar, Mexico, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Pakistan, Panama, Peru, the Philippines, Rwanda, Sao Tome and Principe, Sierra Leone, South Africa, Thailand, Uganda, the United Republic of Tanzania, Viet Nam, Yemen, Zambia and Zimbabwe.

Fig. 5.5. Percentage of the population at risk protected by IRS, by WHO region, 2010–2024[a]

Sources: IVCC data and NMP reports.



AFR: WHO African Region; AMR: WHO Region of the Americas; EMR: WHO Eastern Mediterranean Region; IRS: indoor residual spraying; IVCC: Innovative Vector Control Consortium; NMP: national malaria programme; SEAR: WHO South-East Asia Region; WHO: World Health Organization; WPR: WHO Western Pacific Region.

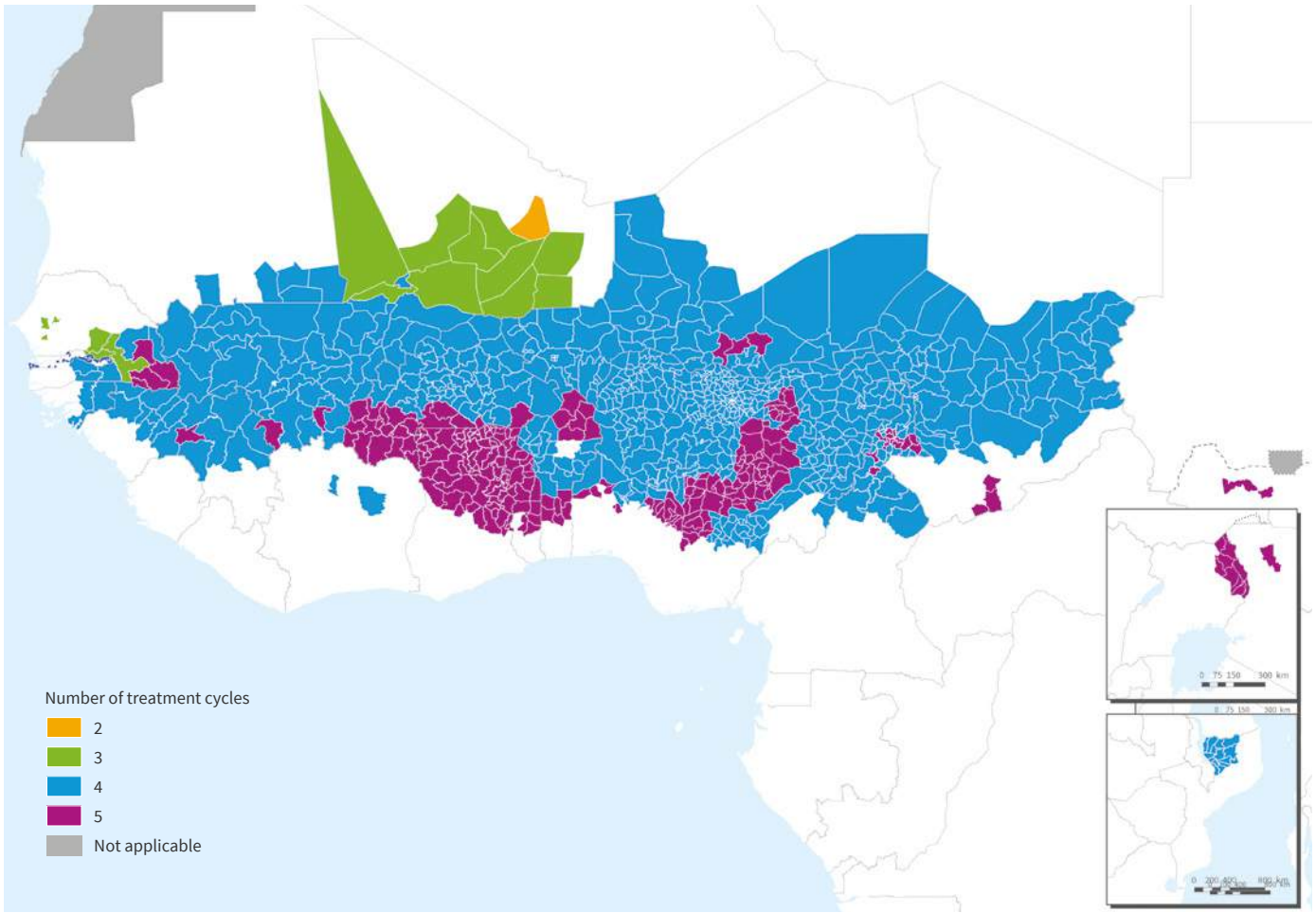
[a] Among malaria endemic countries, 2024.

5.3 Seasonal malaria chemoprevention (SMC)

SMC is currently being implemented in 20 countries in sub-Saharan Africa (**Table 5.1**). In 2024, about 228 million SMC treatment doses were delivered to implementing countries (**Table 5.2**), an increase of 3.2% from 2023. The subnational areas in each country where SMC was delivered in 2024, together with the number of cycles in each district, are shown in **Fig. 5.6**.

As shown in **Table 5.1**, the average number of children treated per cycle of SMC has steadily increased from about 0.2 million in 2012 to 54 million in 2024. SMC was implemented in Kenya for the first time in 2024. Nigeria continues to have the highest number of children treated per cycle, with an average of 28.5 million children, making up more than half of all children treated. In 15 of the 20 countries implementing SMC, more children were treated in 2024 than in 2023. The highest increase in the number of children treated was in Mali, where 4 359 410 children were treated in 2024, an increase of 550 746 (14%) compared with 2023. In Mozambique, there was a significant decrease in the average number of children treated, from 1.3 million in 2023 to 427 000 in 2024 (a 67% decrease). The decline may be partly explained by post-election disruptions, which interfered with the distribution of commodities. Mozambique planned to resume SMC in 2025 in the regions that had originally been targeted in 2024.

Fig. 5.6. Subnational areas where SMC was delivered, and number of treatment cycles per district, in implementing countries in sub-Saharan Africa, 2024[a] *Source: LSHTM.*



LSHTM: London School of Hygiene & Tropical Medicine; SMC: seasonal malaria chemoprevention.
[a] Subnational data for implementation in Madagascar is not shown.

Table 5.1. Average number of children treated with at least one dose of SMC, by year, in countries implementing SMC, 2012–2024 *Sources: WHO, LSHTM and MMV.*

Country	2012[b]	2013[b]	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Benin								114 165	236 639	374 560	414 523	447 401	643 036
Burkina Faso			307 770	954 047	2 647 713	2 970 117	3 298 397	3 298 397	4 136 042	4 409 619	4 542 230	4 766 047	5 155 475
Cameroon					1 428 964	1 581 183	1 636 658	1 681 737	1 780 742	1 908 941	2 021 094	2 039 978	2 102 104
Chad	10 000	263 972	27 307	500 153	824 806	998 595	1 184 706	1 627 324	2 259 852	2 512 920	2 664 662	2 786 338	3 054 020
Côte d'Ivoire												39 652	52 507
Gambia			65 271	76 450	73 710	76 601	112 841	110 870	121 834	76 045	79 205	84 051	78 952
Ghana				115 309	303 019	327 446	329 953	964 956	1 033 812	1 322 251	1 382 709	1 435 474	1 541 211
Guinea				201 283	442 177	575 927	840 120	841 090	1 088 194	1 122 434	1 163 812	1 196 584	1 312 116
Guinea-Bissau[a]					42 097	166 162	42 571	86 107	86 107	108 394	113 002	116 031	218 251
Kenya													37 767
Madagascar[b,c]												200 701	
Mali	160 000	537 294	524 742	1 999 987	3 980 684	3 990 096	4 299 242	3 767 820	3 767 099	3 357 846	3 838 060	3 808 664	4 359 410
Mauritania											57 574	90 582	103 974
Mozambique										119 254	1 299 671	1 319 628	427 233
Niger		225 970	528 681	624 121	2 361 924	2 545 885	3 952 400	4 151 103	4 516 729	4 457 575	4 686 792	4 745 805	5 096 146
Nigeria		209 451	370 280	787 399	1 696 770	3 538 757	3 508 924	4 191 166	13 236 139	23 922 101	25 571 387	28 612 433	28 513 827
Senegal		55 709	595 745	614 581	621 503	631 897		879 652	687 959	748 116	801 729	839 886	800 235
South Sudan											18 000	69 596	76 275
Togo		119 222	170 165		411 811	420 451	434 161	453 907	486 716	475 997	519 141	453 404	565 702
Uganda										81 899	212 158	263 016	276 153
Total	**170 000**	**1 411 618**	**2 589 961**	**5 873 330**	**14 835 178**	**17 823 117**	**19 639 973**	**22 168 294**	**33 437 864**	**44 997 952**	**49 385 749**	**53 315 271**	**54 414 394**

LSHTM: London School of Hygiene & Tropical Medicine; MMV: Medicines for Malaria Venture; SMC: seasonal malaria chemoprevention; WHO: World Health Organization.

[a] Values for 2020 were imputed from 2019.

[b] WHO data.

[c] Data were not available for Madagascar in 2024.

Table 5.2. Number of treatment doses delivered, by year, in countries implementing SMC, 2012–2024 *Sources: WHO, LSHTM and MMV.*

Country	2012[b]	2013[b]	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Benin								456 661	856 491	1 498 240	1 658 092	1 789 602	2 768 339	9 027 425
Burkina Faso			1 231 081	3 816 187	10 590 851	11 799 603	13 193 588	13 193 588	16 544 168	18 603 883	19 174 212	20 088 248	21 899 633	150 135 042
Cameroon					4 286 893	6 324 731	6 546 632	6 726 947	7 122 967	7 635 762	8 611 913	8 810 953	9 067 318	65 134 116
Chad	40 000	1 055 888	109 226	1 850 623	3 299 222	3 658 346	4 738 823	5 935 118	9 039 408	10 142 392	10 772 891	11 145 353	12 363 136	74 150 426
Côte d'Ivoire												79 303	210 027	289 330
Gambia			195 812	305 800	294 839	306 405	406 044	443 478	487 334	304 180	316 821	336 204	315 806	3 712 723
Ghana				461 236	606 037	1 309 782	1 319 813	3 859 822	4 135 249	4 803 223	5 530 837	5 741 895	7 706 056	35 473 950
Guinea				805 131	1 768 708	2 303 709	3 360 479	3 003 612	4 352 774	4 533 292	4 703 712	4 836 861	5 299 045	34 967 323
Guinea-Bissau[a]					146 718	664 647	170 284	344 429	344 429	433 574	452 008	464 123	873 002	3 893 214
Kenya													188 837	188 837
Madagascar[b,c]												802 803		802 803
Mali	640 000	2 149 176	2 098 969	7 999 948	15 398 687	15 960 382	17 113 605	15 068 821	14 956 952	12 906 775	15 016 899	15 034 772	17 111 970	151 456 956
Mauritania											230 297	271 747	415 896	917 940
Mozambique										477 016	5 198 685	5 278 512	1 708 933	12 663 146
Niger		903 880	2 072 438	2 484 694	7 977 379	10 183 541	15 243 535	16 604 412	18 066 916	17 830 299	19 099 420	19 342 524	20 694 821	150 503 859
Nigeria		837 804	1 481 118	3 149 597	6 316 916	9 298 163	13 842 931	16 764 663	52 944 556	96 002 997	107 414 919	121 007 735	120 424 214	549 485 613
Senegal		222 836	1 787 236	1 887 211	1 910 656	1 942 868		2 684 527	2 107 303	2 290 288	2 467 495	2 934 346	2 817 081	23 051 847
South Sudan											90 000	278 383	381 377	749 760
Togo		476 888	510 494		1 235 433	1 529 275	1 302 483	1 185 327	1 946 863	1 903 986	2 076 563	1 813 614	2 828 512	16 809 438
Uganda										409 495	1 000 206	1 315 080	1 380 767	4 105 548
Total	**680 000**	**5 646 472**	**9 486 374**	**22 760 427**	**53 832 339**	**65 281 452**	**77 238 217**	**86 271 405**	**132 905 410**	**179 775 402**	**203 814 970**	**221 372 058**	**228 454 770**	**1 287 519 296**

LSHTM: London School of Hygiene & Tropical Medicine; MMV: Medicines for Malaria Venture; SMC: seasonal malaria chemoprevention; WHO: World Health Organization.

[a] Values for 2020 were imputed from 2019.

[b] WHO data.

[c] Data were not available for Madagascar in 2024.

5.4 Perennial malaria chemoprevention (PMC)

PMC is the administration of a full treatment course of an antimalarial medicine at predefined intervals for children aged 0 to 24 months in moderate to high perennial malaria transmission settings. This programme leverages childhood immunization and other existing child health programmes. It is safe to give children PMC at the same time as the malaria vaccine and other routine childhood vaccines, and with vitamin A and deworming medication. The goal of PMC is to protect children who are at greatest risk of severe malaria, by establishing preventive antimalarial drug concentrations in the blood that clear existing infections and prevent new infections. Previously, preventive treatment in young children was recommended only for infants (under 12 months of age), under the intermittent preventive treatment of malaria in infants (IPTi) policy. Since the initial recommendation of IPTi, new data have demonstrated the value of extending malaria chemoprevention to children aged up to 24 months (*9*).

In 2024, at least eight countries implemented PMC, including Benin, Cameroon, Côte d'Ivoire, the Democratic Republic of the Congo, Mozambique, Nigeria, Sierra Leone and Togo (**Table 5.3**). PMC was implemented as part of the national malaria strategy in all these countries except Côte d'Ivoire, the Democratic Republic of the Congo and Nigeria, where implementation occurred only as part of a research pilot (**Table 5.3**). As of August 2025, all eight countries confirmed their plans to continue PMC implementation through 2025. Burundi, the Congo and the United Republic of Tanzania have recently added PMC to their national malaria strategies, and both Burundi and the Congo have confirmed their plans for implementation in 2025.

Although there is not yet an established recommendation for the number of PMC doses, in 2024, the maximum number of targeted doses offered in each country ranged from three to eight per child. PMC doses were delivered mainly through the childhood immunization programme and other contacts with healthy children (e.g. vitamin A campaigns). In total, nearly 1 million children aged under 24 months received their first dose of PMC in 2024. About 905 000 and 774 000 children received their second and third doses, respectively. In three countries – Cameroon, Sierra Leone and Togo – PMC was implemented in all defined eligible districts. Five of the eight countries – Benin, Cameroon, Côte d'Ivoire, the Democratic Republic of the Congo and Sierra Leone – have also introduced the malaria vaccine into districts implementing PMC in 2024.

Table 5.3. PMC delivery in countries implementing PMC through a national strategy and/or research pilot, 2024 *Source: Perennial Malaria Chemoprevention Community (PMC Community of Practice, Population Services International, PATH, Malaria Consortium and ISGlobal).*

Country	PMC included in national policy	Total number of implementing districts[a,b,c]	Maximum number of targeted doses		Number of children who received PMC1[d]	Number of children who received PMC2[d]	Number of children who received PMC3[d]
			National policy	Research pilot			
Benin	Yes	3	8	8	52 611	52 765	49 521
Cameroon	Yes	157	5	8	353 595	331 033	270 209
Côte d'Ivoire	Yes	3	–	5	56 892	46 105	33 070
Democratic Republic of the Congo	Yes	4	–	6	36 418	28 759	16 849
Mozambique	Yes	14	5	6	145 797	105 185	74 655
Nigeria	No	8	–	6	9 833	9 097	2 298
Sierra Leone	Yes	16	3	6	316 806	319 224	316 237
Togo	Yes	16	4	4	22 524	12 915	12 504
Total					**994 476**	**905 083**	**775 343**

ISGlobal: Barcelona Institute for Global Health; PMC: perennial malaria chemoprevention; PMC1: first dose of PMC; PMC2: second dose of PMC; PMC3: third dose of PMC.

[a] In general, districts are considered eligible if malaria transmission is moderate to high, defined as *Plasmodium falciparum* parasite prevalence greater than 10% or an annual parasite incidence greater than 250 per 1000. However, this is a suggested guideline and is not an absolute criterion for determining where PMC is implemented.

[b] The term "district" is used as a proxy for the Administrative 2 subnational unit. In Benin and the Democratic Republic of the Congo, this administrative level is called a Health Zone. In Nigeria, it is called a Local Government Area.

[c] Countries that started implementation at the end of 2024 did not have an opportunity to reach all eligible districts. In addition, children in those countries may only have had time to receive a single dose.

[d] Includes children who received PMC through research pilots.

5.5 Malaria in pregnancy

5.5.1 Intermittent preventive treatment of malaria in pregnancy (IPTp)

Malaria infection during pregnancy has substantial risks for pregnant women and girls, the fetus and the newborn child. For pregnant women and girls, malaria infection can lead to severe disease and death, and placental sequestration of the parasite, which can lead to maternal anaemia. Infection also puts the mother at increased risk of death before and after childbirth and is an important contributor to stillbirth and preterm birth. Placental infection can lead to poor fetal growth and low birthweight, which can in turn lead to retardation of child growth and poor cognitive outcomes. It can also be a major risk factor for perinatal, neonatal and infant mortality (*57-58-59*).

To reduce disease burden in pregnancy and adverse pregnancy and birth outcomes, WHO recommends – in combination with other interventions – the use of IPTp as part of antenatal care (ANC) in malaria endemic areas. IPTp is the administration of a treatment course of an antimalarial medicine at predetermined intervals, regardless of whether the pregnant woman is infected with malaria (*8*). The recommendation applies to pregnant women and girls of all gravidities in malaria endemic areas.

However, access to preventive treatment throughout pregnancy remains low. Barriers include long distances to ANC clinics and associated transport costs. Additionally, those who reach health care facilities may face challenges in accessing IPTp due to stock-outs of medication or insufficient information provided by health workers (*60*).

The analysis in this section is restricted to moderate to high transmission countries in the WHO African Region, where the burden of malaria in pregnancy is most pronounced. This region includes low-income countries, where marginalized and hard-to-reach communities often experience disproportionate illness burdens. Inequities in health care in these countries, such as limited access to information, critical health care services and essential commodities, significantly affect the quality of care and health outcomes. These inequities particularly affect children, adolescents and women, and especially pregnant women and girls.

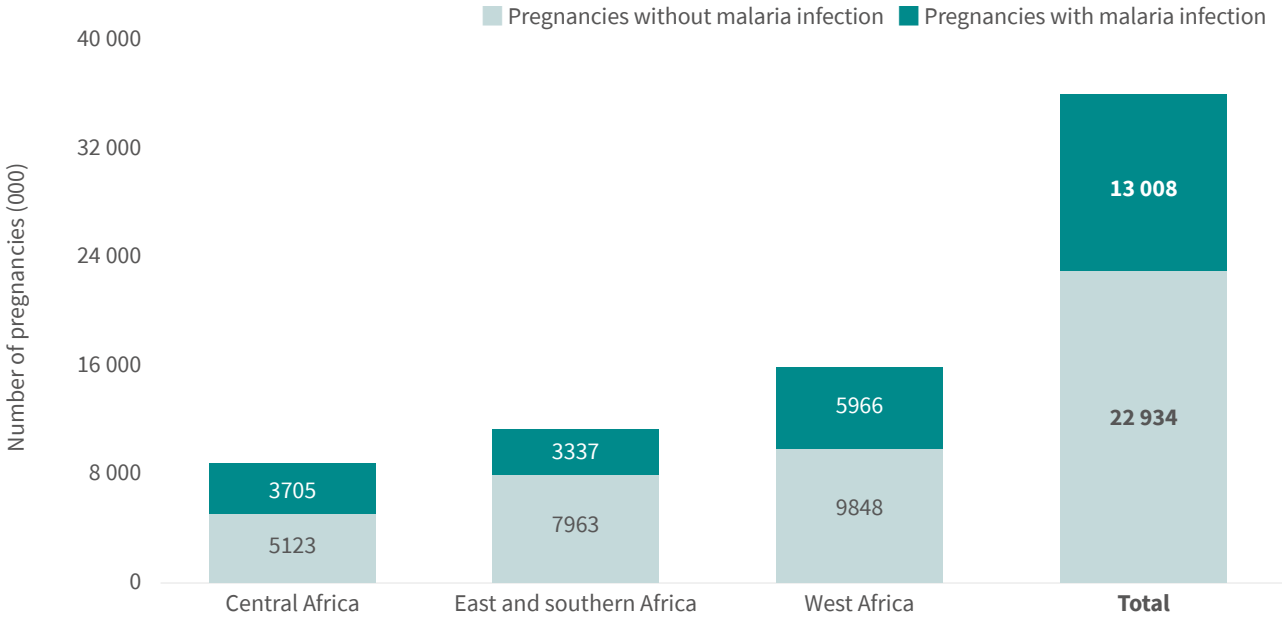
5.5.2 Prevalence of exposure to malaria infection during pregnancy

In 2024, in the 33 moderate to high transmission countries[1] in the WHO African Region, there were an estimated 36 million pregnancies, of which an estimated 13 million (36%) were infected with malaria (**Fig. 5.7**). Values were estimated using a model characterizing the relationship between the outcome, malaria prevalence in the general population, and

[1] Angola, Benin, Burkina Faso, Burundi, Cameroon, the Central African Republic, Chad, the Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, the Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, the Niger, Nigeria, Senegal, Sierra Leone, South Sudan, Togo, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe.

Fig. 5.7. Estimated prevalence of exposure to malaria infection during pregnancy, overall and by subregion in 2024, in moderate to high transmission countries in the WHO African Region

Sources: Imperial College and WHO estimates.



WHO: World Health Organization.

fertility patterns stratified by age and gravidity (see **Annex 1** for methods). By WHO subregion, prevalence of exposure to malaria during pregnancy in 2024 was highest in west Africa, where about 6 million (38%) of an estimated 15.8 million pregnant women and girls had malaria infections, and in central Africa, where about 3.7 million (42%) of an estimated 8.8 million pregnant women and girls were infected with malaria. The prevalence of malaria infection in pregnant women and girls was lower in the subregion of east and southern Africa (30%) than in other subregions in 2024.

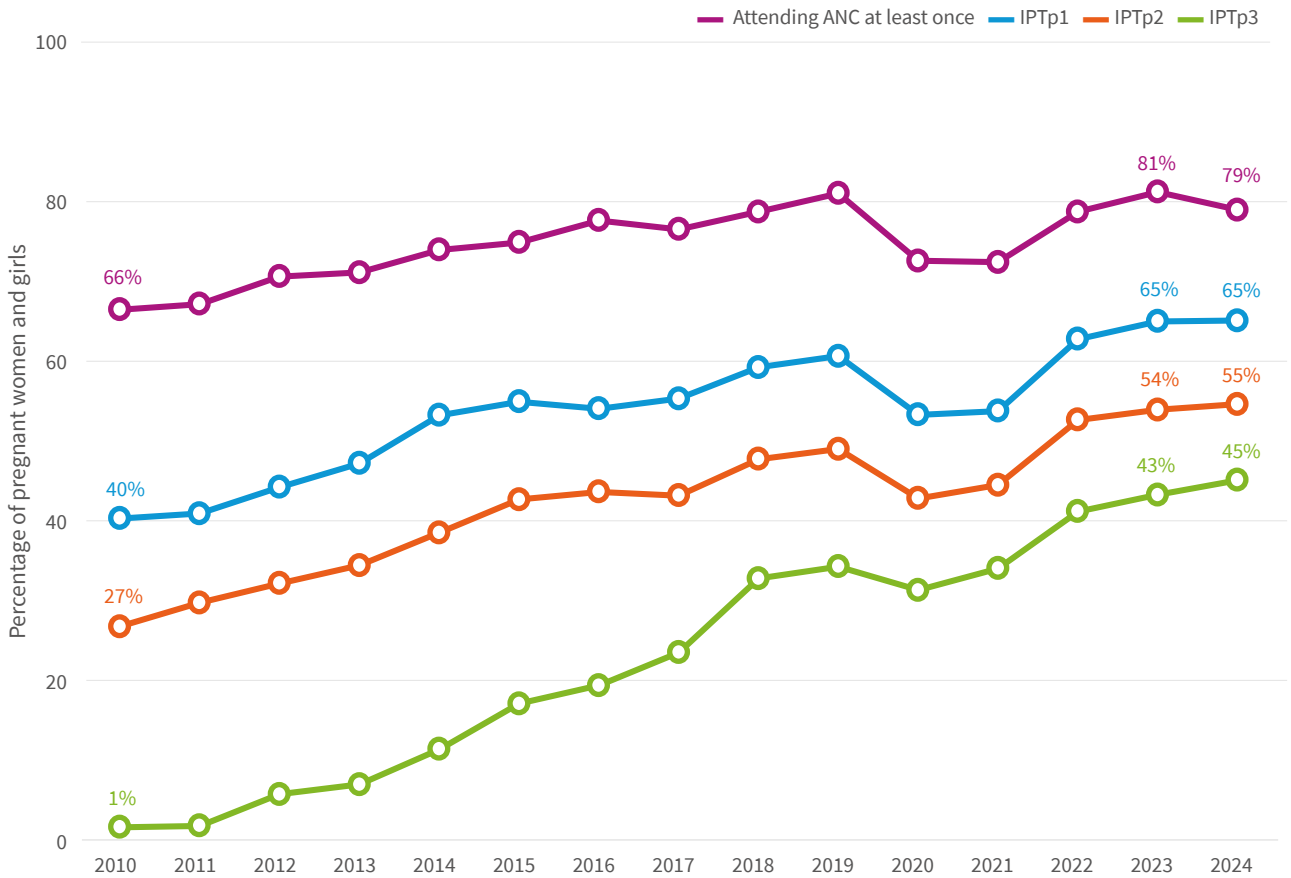
5.5.3 Percentage of women and girls receiving IPTp

As of 2024, 34 African countries[1] had adopted IPTp to reduce the burden of malaria during pregnancy. Of these, 33 countries[2] with moderate to high malaria transmission reported routine data from health facilities in the public sector on the number of women visiting ANC clinics, and the number receiving the first, second, third and fourth doses of IPTp (i.e. IPTp1, IPTp2, IPTp3 and IPTp4). Using annual expected pregnancies as the denominator (adjusted for fetal loss and stillbirths), the percentage of IPTp use by dose was computed. ANC and IPTp coverages reported for 2020 and 2021 were adjusted for disruptions in ANC services, as explained in **Annex 1**. From 2023 to 2024, the coverage of pregnant women and girls attending ANC at least once decreased slightly from 81% to 79% (**Fig. 5.8**). The coverage of IPTp1 remained the same at 65%, while the coverage of both IPTp2 and IPTp3 increased, from 54% to 55% and

[1] Angola, Benin, Burkina Faso, Burundi, Cameroon, the Central African Republic, Chad, the Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, the Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, the Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, South Sudan, Togo, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe.

[2] Sao Tome and Principe is not included in the analysis due to a low malaria burden.

Fig. 5.8. Percentage of pregnant women and girls attending an ANC clinic at least once and receiving IPTp, by number of SP doses, sub-Saharan Africa, 2010–2024 *Sources: NMP reports, CDC and WHO estimates.*



ANC: antenatal care; CDC: United States Centers for Disease Control and Prevention; IPTp: intermittent preventive treatment of malaria in pregnancy; IPTp1: first dose of IPTp; IPTp2: second dose of IPTp; IPTp3: third dose of IPTp; NMP: national malaria programme; SP: sulfadoxine–pyrimethamine; WHO: World Health Organization.

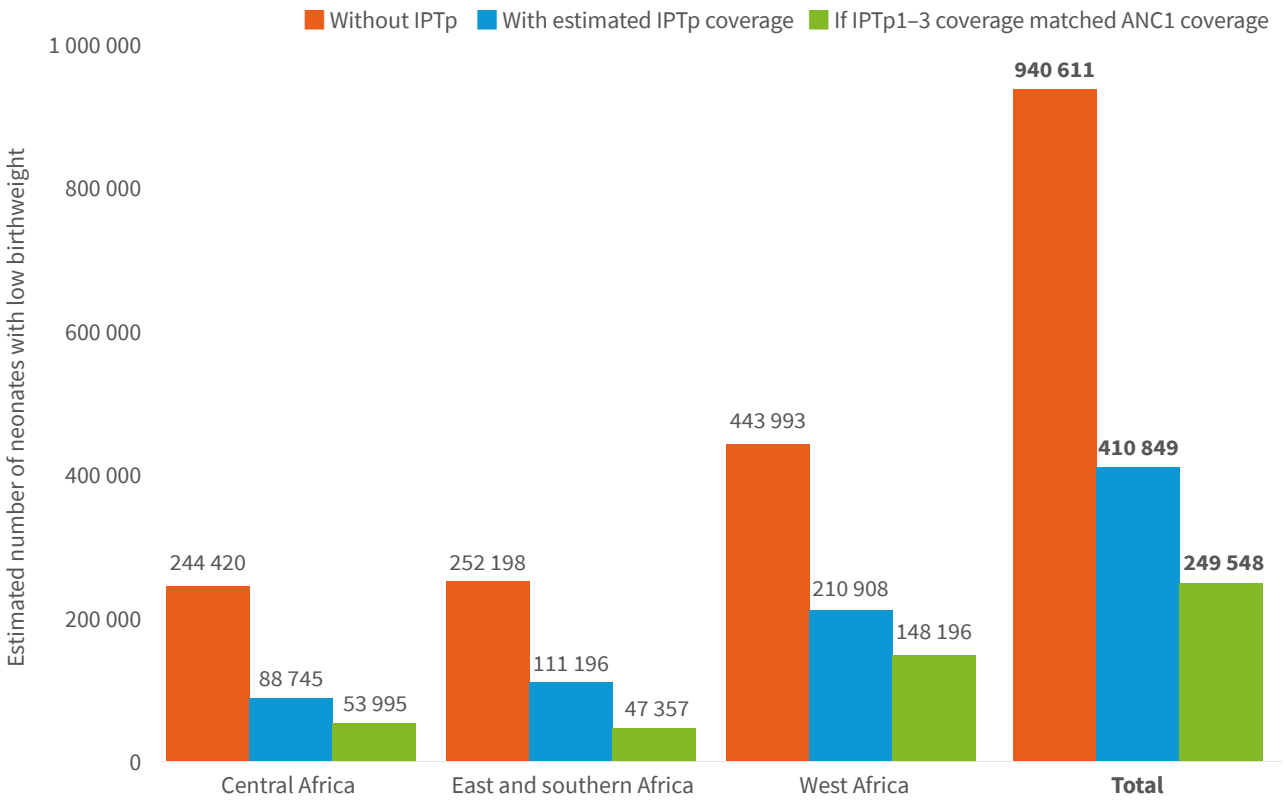
from 43% to 45%, respectively. Despite modest increases in coverage for IPTp2 and IPTp3, the overall coverage for all three doses in 2024 remained well below the target of 80%. Four countries achieved IPTp3 coverage of more than 75%: Burkina Faso (77%), the Democratic Republic of the Congo (76%), Guinea (79%) and Sierra Leone (78%). When interpreting this trend, a drop in ANC coverage while IPTp coverage remained the same (or increased) actually indicates a rise in IPTp coverage among those attending ANC, since the denominator remains all pregnant women and girls.

5.5.4 Prevalence of low birthweight in neonates due to malaria infection during pregnancy

Low birthweight is a strong risk factor for neonatal and childhood mortality. Averting low birthweight in a substantial number of neonates will have a considerable impact on all-cause mortality in children. Across the three African subregions, it is estimated that, in the absence of pregnancy-specific malaria chemoprevention, exposure to malaria would have resulted in 941 000 neonates with low birthweight in 2024, compared with the 411 000 neonates born with low birthweight at estimated current levels of IPTp coverage. This equates to low birthweight being averted in an estimated 530 000 neonates. The subregion of west Africa carries about half (51%) the burden of low birthweight in neonates due to malaria infection during pregnancy (**Fig. 5.9**).

Using the total of 411 000 neonates born with low birthweight at current levels of IPTp coverage as a baseline, if IPTp1–3 coverage were to match the coverage of first ANC visit (ANC1), assuming that subsequent ANC visits were just as high, then low birthweight would be averted in an additional 161 000 neonates (**Fig. 5.9**). This would reduce the residual number of neonates with low birthweight due to malaria infection in pregnancy to 250 000.

Fig. 5.9. Estimated number of neonates with low birthweight attributable to malaria in pregnancy under three scenarios: 1) in the absence of IPTp; 2) at current estimated levels of IPTp coverage; and 3) if IPTp1–3 coverage matched ANC1 coverage, overall and by subregion in 2024 *Sources: Imperial College and WHO estimates.*



ANC: antenatal care; ANC1: first ANC visit; IPTp: intermittent preventive treatment of malaria in pregnancy; IPTp1–3: first, second and third doses of IPTp; WHO: World Health Organization.

5.6 Malaria diagnosis and treatment

Effective malaria diagnosis and treatment remain critical to reducing disease burden, as case management improves clinical outcomes and prevents deaths among individuals with malaria. Expanding coverage of effective case management can also generate broader public health benefits by reducing malaria prevalence and incidence in some settings. This underscores the dual importance of prompt, high-quality treatment for both patient survival and sustained progress towards malaria elimination (*61*).

This section presents information on manufacturer sales and deliveries and national distribution of RDTs and ACTs; treatment seeking for fever in children aged under 5 years; and population-level coverage of malaria diagnosis and treatment with ACTs. Data include RDT sales by manufacturers eligible for procurement (i.e. under the Malaria RDT Product Testing Programme) from 2010 to 2017, RDTs eligible for WHO prequalification since 2018, and NMP distributions of RDTs. Manufacturer data on ACTs have been provided by companies eligible for WHO-prequalified products.

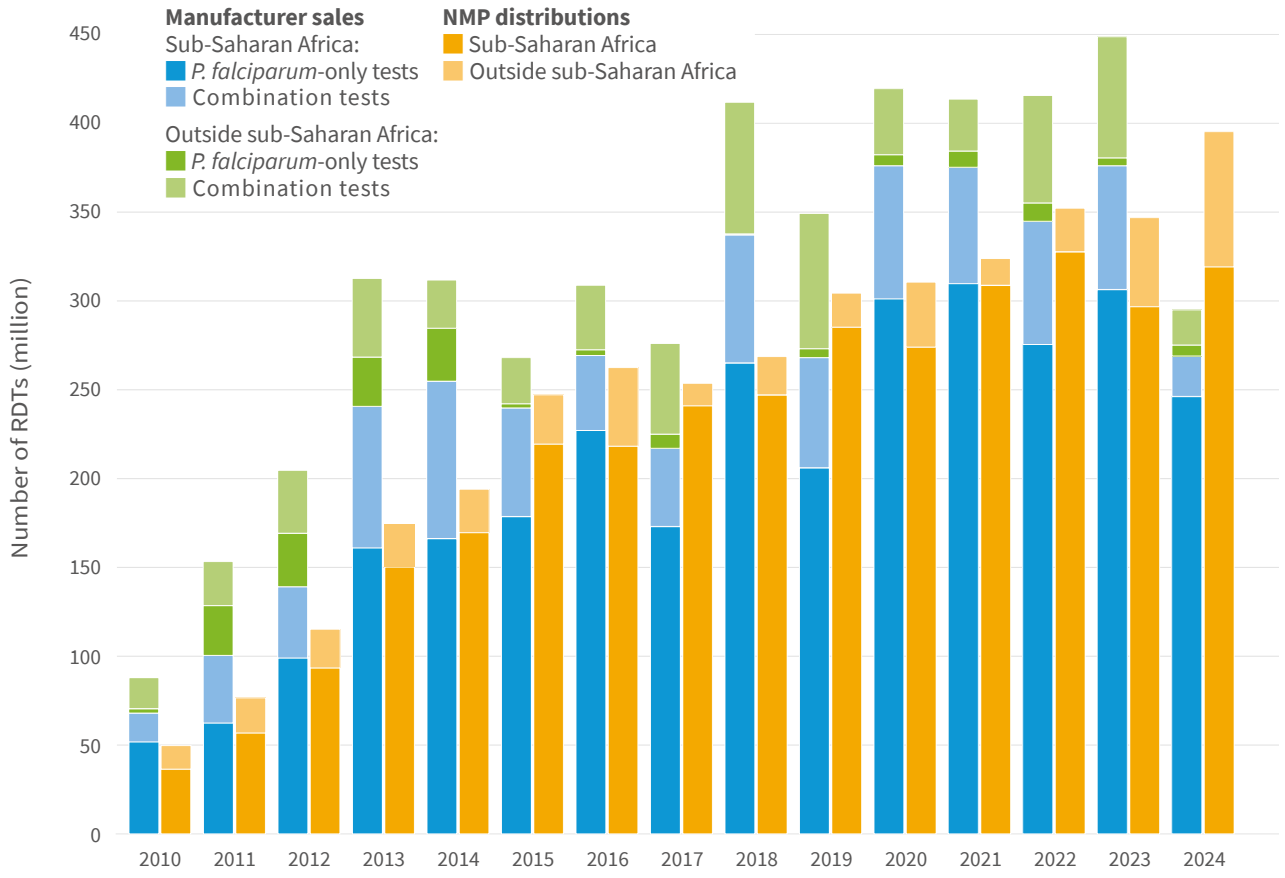
5.6.1 RDTs – sales and distribution

Globally, 4.7 billion RDTs for malaria were sold by manufacturers between 2010 and 2024, with more than 82% of sales in sub-Saharan African countries (**Fig. 5.10**). Over the same period, NMPs distributed a total of 3.7 billion RDTs, with 88% of distribution occurring in sub-Saharan Africa (**Fig. 5.10**). The difference between sales and distribution is a result of RDTs yet to be distributed to health facilities not being reported, or underreporting of RDTs used in the private sector. Manufacturers reported about 295 million RDT sales in 2024. The decrease in RDTs sold compared with 2023 is likely due to incomplete reporting in 2024. NMPs distributed 395 million RDTs in 2024, about 48.5 million (14%) more than in 2023.

5.6.2 ACT treatment coverage – deliveries and distribution

Treatment coverage for prequalified ACTs (henceforth referred to as "ACTs") was assessed using country-reported data on the total number of malaria cases and the number

Fig. 5.10. Number of RDTs sold by manufacturers and distributed by NMPs for use in testing suspected malaria cases, 2010–2024 *Sources: NMP reports and sales data from manufacturers eligible for procurement.*



NMP: national malaria programme; *P. falciparum*: *Plasmodium falciparum*; RDT: rapid diagnostic test.

of malaria cases treated with antimalarials.[1] Where data on the number of cases treated were missing, the number of treatments distributed by NMPs was used as a proxy (these estimates are based on routinely reported data and may differ from other sources, such as household surveys). In 2024, malaria endemic countries in sub-Saharan Africa reported 196.3 million cases treated among a total of 204.2 million cases (96%). Among the 45 malaria endemic countries in sub-Saharan Africa that were included in the analysis,[2] 40 countries achieved a treatment coverage rate of 90% or higher in 2024. Five countries had treatment coverage of less than 90%: Senegal (88%), Kenya (87%), the Congo (74%), the Central African Republic (62%) and Equatorial Guinea (11%). Lower treatment coverage in these countries may be due to stock-outs of antimalarials or low reporting completeness for treatment data. In Kenya, data are not available for treatment in the private sector. Poor reporting is responsible for the low treatment coverage in the Congo, the Central African Republic, Equatorial Guinea and Senegal. The Central African Republic and Equatorial Guinea also report issues with stock-outs of ACTs in some areas.

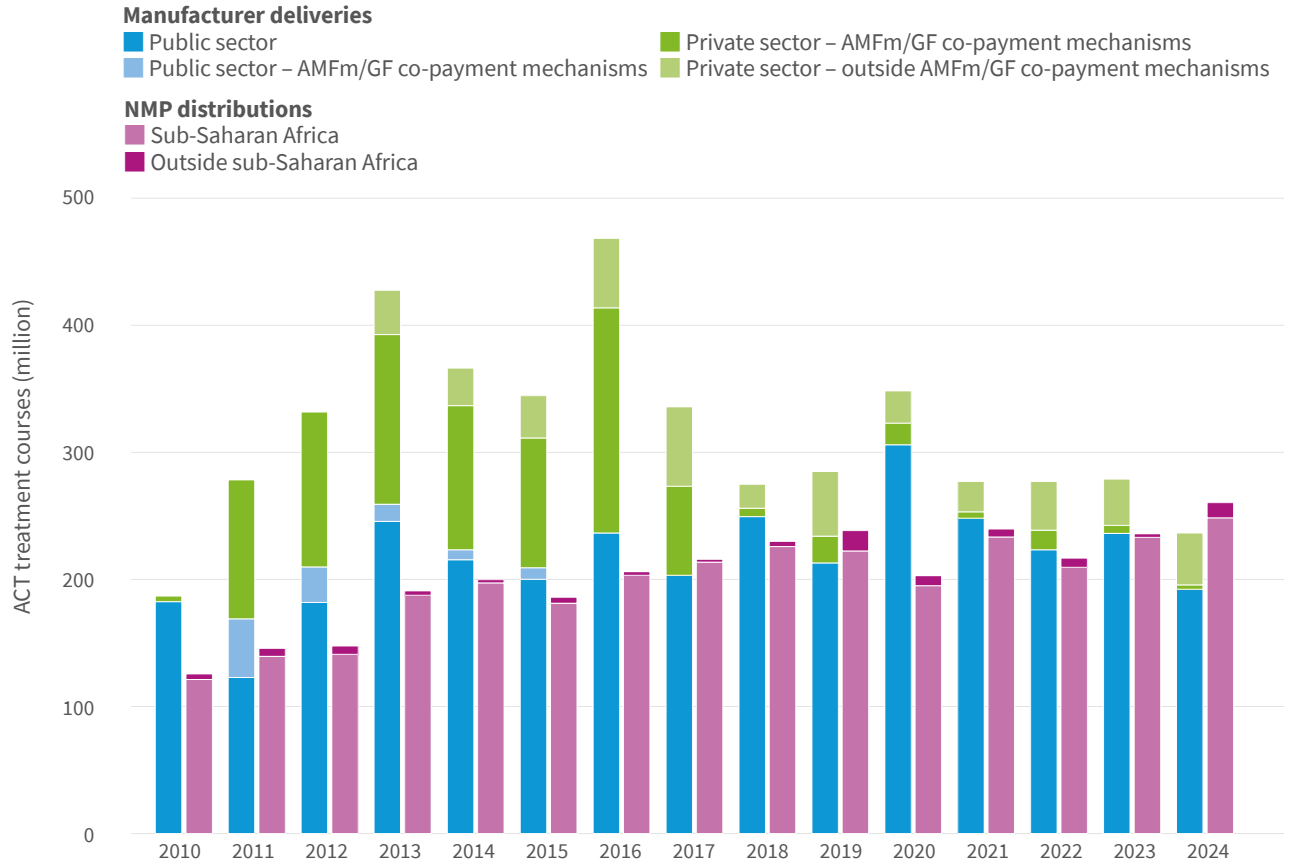
Between 2010 and 2024, more than 4.7 billion treatment courses of ACTs were delivered globally by manufacturers (**Fig. 5.11**). Of the total, about 3.3 billion deliveries (69%) were made to the public sector in malaria endemic countries. The remaining deliveries included 1 billion (22%) supplied to public or private sectors through the Affordable Medicines Facility for malaria or the Global Fund co-payment mechanism, and 450 million (9%) supplied to the private sector outside of the Global Fund co-payment mechanism. National data reported by NMPs show that, over the same period (2010–2024), 2.9 billion ACTs were distributed to health service providers to treat people with malaria in the public health sector.

In 2024, about 192.3 million ACTs were delivered by manufacturers to the public health sector. NMPs distributed 260 million ACTs in 2024, of which 96% were in sub-Saharan Africa. Of the 249 million ACTs distributed in sub-Saharan Africa, more than half were distributed in six countries: Nigeria (36 million), the Democratic Republic of the Congo (30 million), Uganda (28 million), Mozambique (16 million),

[1] This calculation is based on reported data only and does not take into consideration those individuals with malaria who did not seek care and thus were not treated; it is therefore likely to overestimate the true coverage of treatment.

[2] This analysis included all malaria endemic countries in the WHO African Region, except the Sudan, for which the number of cases treated was not available.

Fig. 5.11. Number of ACT treatment courses delivered by manufacturers and distributed by NMPs to people with malaria, 2010–2024[a,b] *Sources: Companies eligible for procurement by WHO/UNICEF and NMP reports.*



ACT: artemisinin-based combination therapy; AMFm: Affordable Medicines Facility – malaria; GF: Global Fund to Fight AIDS, Tuberculosis and Malaria; NMP: national malaria programme; UNICEF: United Nations Children's Fund; WHO: World Health Organization.

[a] NMP distribution to patients reflects consumption reported in the public health sector.

[b] AMFm/GF indicates that the AMFm operated from 2010 to 2013, with the GF co-payment mechanism operating from 2014.

the Sudan (13 million) and Burkina Faso (13 million). It is expected that the total number of ACTs distributed by NMPs may be slightly higher, given that three malaria endemic countries did not provide data on ACT distribution in 2024.[1] No proxy data were used to replace missing data. The number of ACTs distributed by NMPs has steadily increased since 2023 and 2022, when 236 million and 217 million ACTs, respectively, were distributed, representing respective increases of 10% and 20%.

5.6.3 Household surveys of treatment seeking behaviour

Aggregated data from household surveys conducted in sub-Saharan Africa between 2005 and 2024 were used to analyse coverage of treatment seeking, diagnosis and use of ACTs by children aged under 5 years (**Table 5.4**). Data were included from 21 countries[2,3] that undertook surveys – either demographic and health surveys (DHS) or malaria indicator surveys (MIS) – in this period (baseline, 2005–2011 and, most recently, 2017–2024). Data from the most recent household surveys, conducted in 25 countries between 2017 and 2024, were used to analyse coverage of treatment seeking, diagnosis and use of ACTs by children aged under 5 years, by country (**Table 5.5**).

As shown in **Table 5.4**, in the most recent surveys (2017–2024), 64.8% of children aged under 5 years sought care for fever – similar to the 64.3% observed in the baseline surveys (2005–2011). As shown in **Table 5.5**, the estimated percentage of children seeking care among the 25 countries included in the recent surveys ranged from

[1] In 2024, data on ACT distributions were missing from Afghanistan, Djibouti and Peru.

[2] The 21 countries were: Benin (DHS 2006; DHS 2017), Burkina Faso (DHS 2010; DHS 2021), Cameroon (DHS 2011; MIS 2022), Côte d'Ivoire (AIDS Indicator Survey 2005; DHS 2021), the Democratic Republic of the Congo (DHS 2007; DHS 2023), Ghana (DHS 2008; DHS 2022), Guinea (DHS 2005; MIS 2021), Kenya (DHS 2008; DHS 2022), Liberia (MIS 2011; MIS 2022), Madagascar (MIS 2011; DHS 2021), Malawi (DHS 2010; MIS 2017), Mali (DHS 2006; MIS 2021), Mozambique (DHS 2011; DHS 2022), the Niger (DHS 2006; MIS 2021), Nigeria (MIS 2010; MIS 2021), Rwanda (DHS 2010; DHS 2019), Senegal (DHS 2010; DHS 2023), Sierra Leone (DHS 2008; DHS 2019), Uganda (DHS 2011; MIS 2018), the United Republic of Tanzania (DHS 2010; DHS 2022) and Zambia (DHS 2007; DHS 2018).

[3] Although surveys were available from Zimbabwe, data were not included due to low case numbers. In addition, Ethiopia could not be included because the interim mini-survey conducted in 2019 did not include questions on care seeking behaviour or fever.

Table 5.4. Summary of coverage of treatment seeking for fever, diagnosis and use of ACTs for children aged under 5 years, from household surveys in sub-Saharan Africa, at baseline (2005–2011) and most recently (2017–2024) *Source: Household surveys.*

Children aged under 5 years	Baseline (2005–2011)			Recent surveys (2017–2024)		
Indicator	**Median estimate**	**Lower bound**	**Upper bound**	**Median estimate**	**Lower bound**	**Upper bound**
Prevalence of fever						
With fever in past 2 weeks	26.3%	20.3%	33.6%	20.5%	16.6%	27.0%
Treatment seeking for fever						
With fever in past 2 weeks for whom treatment was sought	64.3%	59.2%	71.3%	64.8%	56.4%	69.8%
Source of treatment for fever among those who were treated						
Public sector (health facility)	55.1%	44.9%	76.3%	65.3%	40.8%	76.8%
Public sector (community health worker)	2.0%	0.4%	3.4%	1.3%	0.3%	5.3%
Private sector (formal and informal)	41.8%	21.6%	52.9%	36.2%	22.5%	55.6%
Diagnosis among those with fever and for whom care was sought						
Received a finger or heel prick	29.8%	12.2%	38.4%	47.1%	34.8%	60.3%
Use of ACTs among those for whom care was sought						
Received treatment with ACTs	12.4%	6.7%	30.7%	25.2%	15.0%	39.4%
Use of ACTs among those for whom care was sought and who received a finger or heel prick						
Received ACTs	20.6%	16.3%	41.7%	37.5%	22.7%	53.7%
Use of ACTs among those for whom care was sought and who were treated with an antimalarial drug						
Received ACTs	34.2%	14.1%	66.9%	67.7%	44.1%	84.5%

ACT: artemisinin-based combination therapy.

32.2% (Mauritania) to 86.9% (Uganda). The percentage of children who received care from public health facilities increased from a median of 55.1% at baseline to 65.3% in recent surveys, whereas the proportion of children who sought treatment in the private sector correspondingly decreased from 41.8% at baseline to 36.2% in recent years (**Table 5.4**). This shows an increase in population access to or use of the public health sector and, consequently, access to the associated public surveillance system. Increases in reported cases may occur as more patients use the public sector; this has implications for commodities planning and for the estimation of burden trends using routine data (which are primarily collected from the public sector in all countries).

Table 5.5. Summary of coverage of treatment seeking for fever, diagnosis and use of ACTs for children aged under 5 years from the most recent household survey for countries in sub-Saharan Africa *Source: Household surveys.*

		Treatment seeking for fever	Diagnosis among those with fever and for whom care was sought	Use of ACTs among those for whom care was sought	Use of ACTs among those for whom care was sought and who received a finger or heel prick	Use of ACTs among those for whom care was sought and who were treated with an antimalarial
Country	Latest survey	Median (lower bound–upper bound)	Median (lower bound–upper bound)	Median (lower bound–upper bound)	Median (lower bound–upper bound)	Median (lower bound–upper bound)
Benin	DHS 2017	53.9 (50.7–57.0)	29.3 (26.4–32.4)	10.9 (9.1–12.9)	18.7 (14.7–23.4)	38.3 (32.8–44.0)
Burkina Faso	DHS 2021	75.7 (73.4–78.0)	81.7 (79.1–84.0)	36.2 (33.0–39.6)	39.8 (36.2–43.5)	49.4 (45.5–53.4)
Cameroon	MIS 2022	56.4 (51.2–61.5)	43.1 (37.4–49.0)	37.8 (32.8–43.0)	45.7 (39.4–52.1)	67.7 (61.6–73.2)
Côte d'Ivoire	DHS 2021	65.4 (61.9–68.7)	52.7 (48.3–57.0)	16.9 (13.7–20.7)	22.7 (17.8–28.5)	40.2 (33.7–47.0)
Democratic Republic of the Congo	DHS 2023	53.6 (51.0–56.2)	32.1 (28.6–35.8)	22.4 (19.0–26.1)	35.0 (29–41.6)	44.1 (38.9–49.4)
Gabon	DHS 2019	76.4 (72.8–79.6)	15.9 (11.6–21.4)	18.7 (14.9–23.3)	28.1 (16.7–43.2)	55.5 (46.0–64.7)
Gambia	DHS 2019	64.8 (60.8–68.6)	39.4 (34.7–44.2)	3.0 (1.7–5.2)	5.2 (2.5–10.5)	59.9 (36.2–79.7)
Ghana	DHS 2022	66.3 (62.9–69.5)	57.0 (52.3–61.7)	49.1 (44.1–54.0)	59.0 (52.4–65.2)	78.4 (73.3–82.7)
Guinea	MIS 2021	62.2 (57.3–66.9)	43.1 (38.0–48.3)	25.2 (21.3–29.6)	36.6 (29.6–44.2)	53.1 (46.5–59.6)
Kenya	DHS 2022	69.8 (67.3–72.2)	42.9 (40.0–45.9)	22.8 (20.8–25.0)	38.2 (34.7–41.8)	83.5 (79.2–87.1)
Liberia	MIS 2022	63.7 (59.5–67.8)	53.5 (47.4–59.6)	61.6 (56.8–66.2)	73.2 (67.1–78.5)	84.5 (80.0–88.1)
Madagascar	DHS 2021	45.4 (41.8–49.1)	40.0 (35.8–44.4)	15.0 (12.0–18.6)	26.9 (20.9–33.8)	55.1 (46.9–63.0)
Malawi	MIS 2017	54.1 (49.0–59.2)	64.8 (58.2–70.8)	49.0 (42.4–55.7)	61.0 (53.7–67.9)	97.4 (94.2–98.9)
Mali	MIS 2021	64.8 (61.8–67.7)	34.8 (31.1–38.8)	14.2 (11.9–16.9)	20.8 (16.5–25.8)	30.3 (25.9–35.2)
Mauritania	DHS 2020	32.2 (29.3–35.2)	12.1 (9.2–15.8)	9.6 (6.9–13.3)	9.3 (3.6–22.2)	19.7 (14.3–26.6)
Mozambique	DHS 2022	66.0 (61.8–70.0)	72.9 (69.0–76.4)	29.1 (24.5–34.1)	37.5 (32.3–43.1)	84.5 (78.1–89.3)
Niger	MIS 2021	67.5 (62.3–72.3)	47.1 (41.8–52.5)	43.1 (37.6–48.8)	53.7 (46.9–60.3)	78.3 (72.8–82.9)
Nigeria	MIS 2021	64.0 (61.1–66.7)	31.2 (28.1–34.4)	39.1 (34.8–43.6)	56.1 (47.7–64.2)	74.4 (69.4–78.8)
Rwanda	DHS 2019	62.9 (60.0–65.7)	60.9 (57.2–64.6)	12.2 (9.5–15.7)	18.9 (14.8–23.8)	92.3 (84.7–96.3)
Senegal	DHS 2023	44.3 (40.7–47.9)	28.5 (24.6–32.7)	1.9 (1.0–3.5)	4.1 (2.1–8.0)	–
Sierra Leone	DHS 2019	75.5 (72.7–78.1)	71.9 (68.2–75.3)	22.5 (19.2–26.2)	22.9 (19.2–27.0)	31.7 (27.4–36.4)
Togo	MIS 2017	57.1 (51.4–62.7)	49.4 (43.8–55.1)	39.4 (33.2–45.9)	62.6 (53.4–71.0)	76.4 (68.2–83.0)
Uganda	MIS 2018	86.9 (84.7–88.8)	58.0 (53.8–62.2)	61.8 (56.9–66.5)	64.9 (59.0–70.3)	87.9 (83.9–91.0)
United Republic of Tanzania	DHS 2022	78.5 (73.9–82.4)	60.3 (54.5–65.7)	38.2 (33.4–43.2)	49.7 (43.7–55.7)	94.8 (91.5–96.9)
Zambia	DHS 2018	77.2 (74.2–79.9)	76.9 (72.5–80.7)	42.7 (38.2–47.4)	51.7 (46.8–56.5)	96.9 (94.8–98.2)

ACT: artemisinin-based combination therapy; DHS: demographic and health survey; MIS: malaria indicator survey.

Diagnosis among those with fever and for whom care was sought increased from 29.8% at baseline to 47.1% in the latest surveys (**Table 5.4**), indicating an improvement in case management. Estimates from recent surveys ranged from 12.1% (Mauritania) to 81.7% (Burkina Faso) (**Table 5.5**). This finding highlights the varying levels of adherence to the recommended malaria diagnosis guidelines between countries, and the challenges in adequately identifying all malaria cases among those with fever who seek care.

Use of ACTs among those for whom care was sought increased from a median of 12.4% at baseline to 25.2% in the latest surveys (**Table 5.4**). Recent survey estimates ranged from 1.9% (Senegal) to 61.8% (Uganda) (**Table 5.5**). Use of ACTs among those for whom care was sought and who received a finger or heel prick (independently from the test results) increased from a median of 20.6% at baseline to 37.5% in the latest surveys (**Table 5.4**). Recent household survey results determined a range of 4.1% (Senegal) to 73.2% (Liberia) (**Table 5.5**). These results may reflect either improved treatment rates or higher test positivity among children tested; therefore, this indicator should be interpreted within each country's context, given the lack of information on diagnostic methods or test results. In countries with lower test positivity rates, the proportion of children seeking care (or seeking care, being tested and testing positive) will also be lower, which in turn affects treatment rates. Differences in use of ACTs after testing also reflect varying transmission levels across the countries shown in Table 5.5. By design, the indicator of ACT use among those for whom care was sought and who received a finger or heel prick encompasses factors that cannot be independently assessed from survey data, such as treatment rates among confirmed malaria cases and variation in diagnostic quality.

ACT use among children who sought care and who were treated with an antimalarial drug increased from 34.2% at baseline to 67.7% in the latest surveys (**Table 5.4**), suggesting an increase in the use of the recommended first-line treatment for *P. falciparum* in the countries included in the analysis. Results from the 25 countries included in the most recent household surveys ranged from 19.7% (Mauritania) to 97.4% (Malawi), although this indicator is likely to be affected by recall bias. The differences seen between countries indicate different levels of use of the recommended first-line treatment, and highlight that countries experience challenges in distributing ACTs, depending on the country context. These challenges include stock-outs, inadequate training and supervision of health staff, and alternative markets for antimalarial drugs.

5.7 Malaria vaccine for the prevention of *P. falciparum* malaria in children

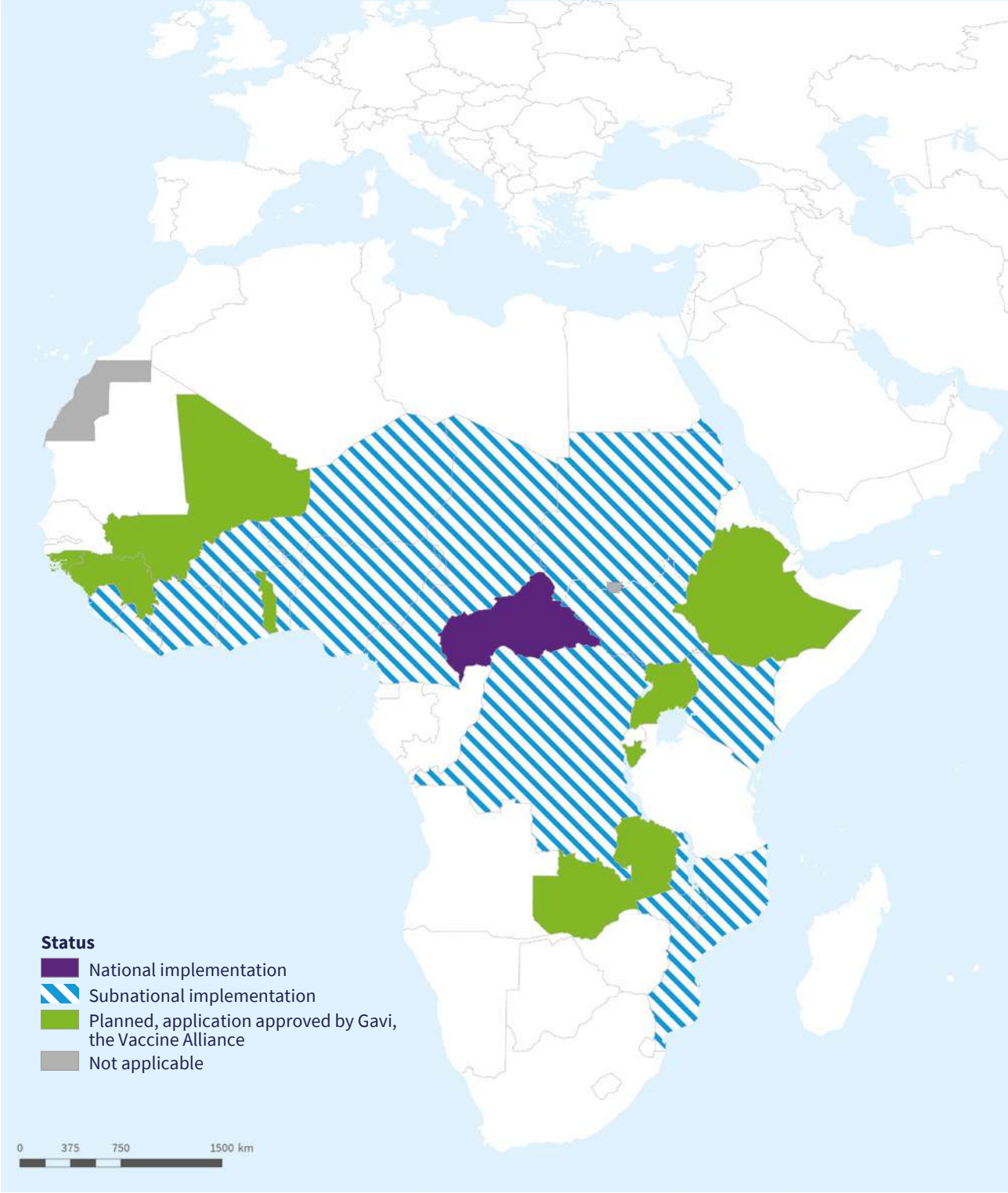
WHO recommends malaria vaccines for the prevention of *P. falciparum* malaria in children living in areas where malaria is endemic, prioritizing areas of moderate to high transmission. Two malaria vaccines are recommended for use: RTS,S and R21/Matrix-M (R21).

The RTS,S malaria vaccine was first introduced into childhood immunization programmes in selected areas of Ghana, Kenya and Malawi in 2019, as part of the WHO-coordinated MVIP. An evaluation demonstrated that vaccine introduction resulted in a statistically significant 13% reduction in all-cause mortality (excluding injury) and a 22% reduction in hospitalization for severe malaria among children age-eligible for vaccination (*62*). These gains in child survival and health were made during vaccine scale-up, when, on average, 63–75% of children had received three doses of malaria vaccine, and uptake of the fourth dose ranged from 33% to 53%. An even higher impact can be anticipated now that coverage has increased; coverage for dose 1 and dose 2 is now 74–86% and 68–82%, respectively (*62*).

Due to initial global supply constraints, early implementation was geographically limited, with priority given to subnational areas with the greatest need, in line with the principles outlined in the *Framework for the allocation of limited malaria vaccine supply* (*63*). In 2024, the implementation of malaria vaccines expanded beyond the MVIP countries, marking a significant milestone in vaccine rollout across Africa. With support from Gavi, the Vaccine Alliance, 14 countries introduced malaria vaccine for the first time during 2024, bringing the total number of implementing countries to 17 (**Fig. 5.12**). In 2024, the United Nations Children's Fund delivered 10 540 398 doses of malaria vaccines to implementing countries (*64*). By the end of the year, the cumulative annual target population across the 17 implementing countries exceeded 4.3 million children. Of these, at least 2.1 million children were reported to have received one or more vaccine doses during the year (*65*).

Although supply is now sufficient – thanks to the availability of two WHO-recommended and prequalified vaccines – funding limitations, including at Gavi, continue to constrain countries' ability to scale up vaccine rollout in line with national plans and ambitions. In January 2024, the WHO Regional Office for Africa established the Accelerating Malaria Vaccine Introduction and Rollout in Africa (AMVIRA) initiative to support Member States in introducing and scaling up malaria vaccines. This initiative is strengthening technical support for countries in their efforts to effectively and efficiently roll out malaria vaccines, while enhancing partners' coordination at national, regional and global levels.

Fig. 5.12. Countries implementing malaria vaccine or planning introduction with approved Gavi support in 2024 *Source: WHO malaria vaccine introduction dashboard.*



Gavi: Gavi, the Vaccine Alliance; WHO: World Health Organization.

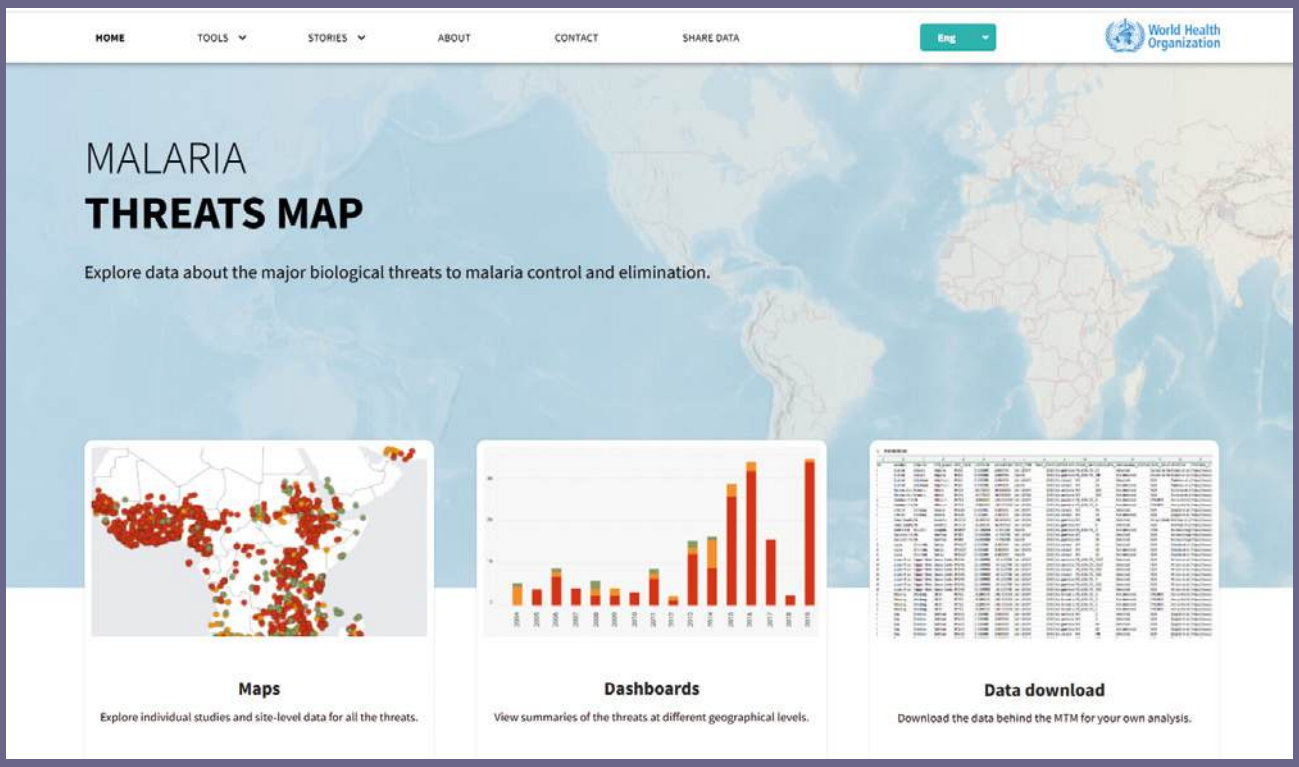
6 Biological threats to malaria interventions

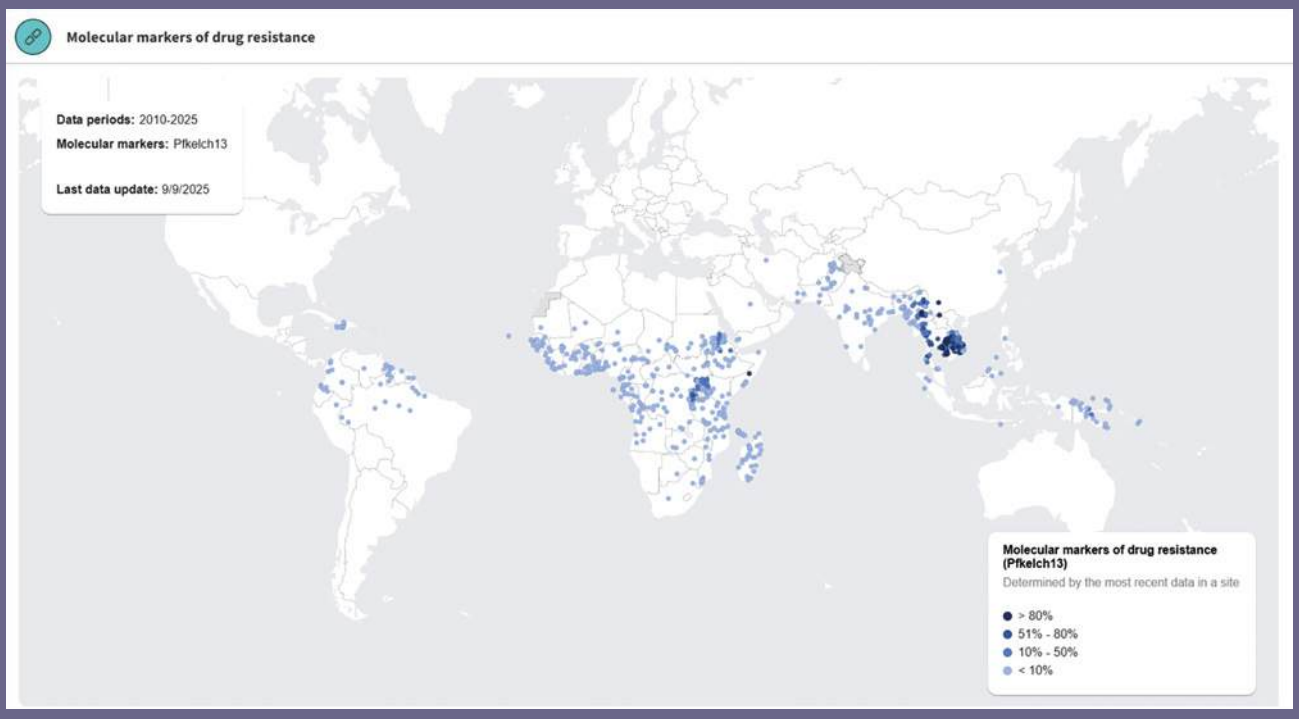
WHO monitors four key biological threats to malaria control and elimination. First, deletions in the *pfhrp2/3* when genes hinder the detection of malaria using RDTs that are based on the detection of HRP2. Second, antimalarial drug resistance impedes successful treatment, increasing the risk of complications for patients and potentially increasing opportunities for malaria transmission. Third, insecticide resistance can render vector control measures less effective. Finally, invasive species, such as *Anopheles stephensi*, known for their unique capacity to establish themselves in new environments, such as urban areas, create the risk of malaria emergence in densely populated areas. Surveillance of these four threats (**Box 6.1**) facilitates their early detection and temporal monitoring, providing the timely and accurate data that NMPs need to inform and adapt control interventions effectively, ensuring effective policies for malaria case management and vector control.

For example, the occurrence of false negative RDT results caused by *pfhrp2/3* gene deletions has led to changes in national diagnostic strategies; when the prevalence of patients carrying *pfhrp2/3* gene deletions causing false negative HRP2-based RDT results exceeds 5%, it is recommended to use non-HRP2 RDTs for diagnosis. The results of therapeutic efficacy studies (TES), considered the gold standard for determining the efficacy of antimalarial treatment, indicate when a change in treatment policy is needed (i.e. when treatment failure exceeds 10%). Surveillance of molecular markers of drug resistance provides an early warning system for the detection of resistance; the discovery of molecular mutations in the *P. falciparum* Kelch13 (*PfKelch13*) gene associated with artemisinin partial resistance in the GMS has led to the development of targeted response strategies. Similarly, entomological surveillance has led to a visible shift in the type of ITNs procured, from pyrethroid-only ITNs to dual active ingredient ITNs, which have an enhanced capacity to protect individuals from pyrethroid-resistant mosquitoes. Entomological surveillance is also being used to detect and track the emergence and spread of the invasive species *An. stephensi*.

Box 6.1. WHO Malaria Threats Map

WHO is tracking published reports of key biological threats to malaria control using the Malaria Threats Map online application tool (*66*). The application, which draws from WHO databases on each of the four biological threats, provides users with both a global overview and details on the locations and features of the studies conducted. In addition to the maps, dashboards provide summary data in the form of tables and charts. A download tool allows users to download data for their own analysis. The maps are regularly updated as data become available.





PfKelch13: *Plasmodium falciparum* Kelch13; WHO: World Health Organization.

6.1 Detection of *pfhrp2/3* gene deletions

RDT kits remain an important and effective tool in malaria control. Rapid diagnosis of malaria infections allows for prompt treatment of infected patients and improved surveillance. Most RDTs target the HRP2 antigen (*67*). According to data provided by manufacturers, at least 295 million such RDTs were sold in 2024. Although HRP2-based RDTs generally have the highest sensitivity among all RDTs for detecting *P. falciparum* malaria (*68*), parasite strains with deletions in the genes encoding the HRP2 or similar HRP3 protein have been identified. Strains with both *pfhrp2* and *pfhrp3* gene deletions are undetectable by HRP2-based RDTs (*69*, *70*). HRP2-based RDTs can sometimes still detect strains with only a *pfhrp2* deletion, particularly in high parasite density infections, due to antibody cross-reactivity with epitopes of HRP3 (*70*, *71*).

In 2010, *pfhrp2/3* gene deletions in *P. falciparum* parasites were reported for the first time in Peru, in the Amazon basin (*72*). The high prevalence of *pfhrp2*-negative parasites in Peru led WHO to recommend using non-HRP2 RDTs for case management in other affected areas in 2021 (*73*). Elsewhere in Central and South America, *pfhrp2* and *pfhrp3* gene deletions have been subsequently observed in the Plurinational State of Bolivia, Brazil, Colombia, Ecuador, Guatemala, Honduras, Nicaragua and Suriname. In Africa, data from Ghindae, Eritrea, in 2015 showed a high prevalence of dual *pfhrp2* and *pfhrp3* deletions (80%), which led to a shift away from HRP2-based testing (*69*). Following similarly high prevalences reported in Djibouti (*74*) and Ethiopia (*75-76-77*), all three countries have since adopted non-HRP2-based RDTs for malaria diagnosis.

WHO has recently published updated guidance on responding to *pfhrp2* gene deletions (*12*). It is recommended that affected countries, as well as countries sharing a common border with affected countries, conduct representative baseline surveys among suspected malaria cases. If the prevalence of false negative RDT results caused by *pfhrp2/3* gene deletions exceeds 5%, it is recommended to switch from exclusively HRP2-based RDTs to RDTs that target *Pf*-LDH (*P. falciparum*-specific lactate dehydrogenase enzyme), with or without HRP2, on the same test. There are no WHO-prequalified RDTs that meet performance requirements for *P. falciparum* detection based on detection of alternatives to HRP2, such as *Pf*-LDH. However, some products in the pipeline have received approval from the Expert Review Panel for Diagnostics and are being used in places with high prevalence of *pfhrp2/3* deletions causing false negative results (*78*). Additionally, there are new products in the WHO prequalification pipeline that include both HRP2 and *Pf*-LDH on the same or separate test lines (*79*). These tests could potentially circumvent the problem of *pfhrp2/3* deletions entirely.

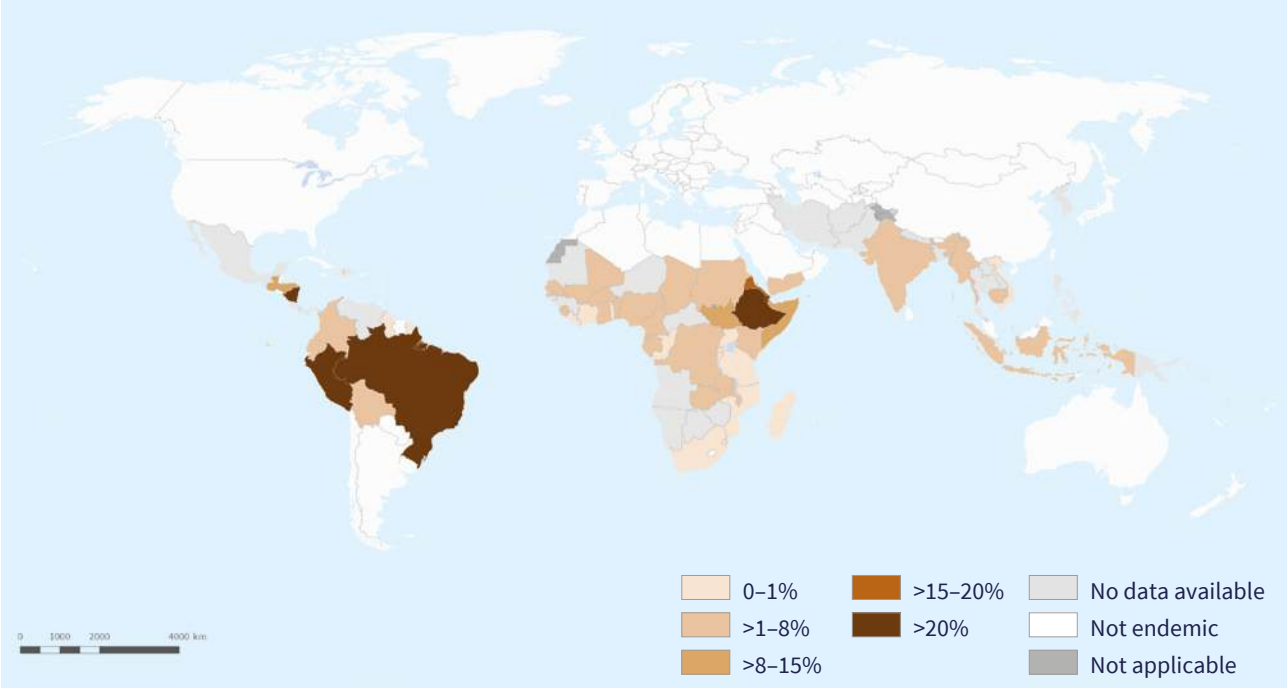
Overall prevalence of *pfhrp2/3* deletions in individual countries is currently estimated by determining the percentage of samples found with *pfhrp2* deletions among all samples positive for *P. falciparum* (**Fig. 6.1**). The results, based on the reporting of samples collected from 1996 to 2024, show that among the 51 malaria endemic countries or areas for which data were available, there were 17 with a prevalence of 1% or less, 24 with a prevalence of more than 1% to 8%, four countries with a prevalence of more than 8% to 15% (Guatemala, Honduras, Somalia and South Sudan) and six countries with a prevalence of more than 15% (Brazil, Djibouti, Eritrea, Ethiopia, Nicaragua and Peru). No data were available for 29 malaria endemic countries.

Surveillance of, and publications pertaining to, *pfhrp2* tend to be more active in areas where *pfhrp2* gene deletions have been detected (**Fig. 6.2**). The number of countries reporting confirmed *pfhrp2* gene deletions continues to grow. Among the 34 malaria endemic countries that have reported a prevalence of more than 1%, four reported detections for the first time between 1996 and 2005, and 21 reported the first detection between 2006 and 2015. Since 2016, a further nine countries have reported a *pfhrp2* gene deletion prevalence of greater than 1%: Benin, Burkina Faso, Cameroon, Chad, Djibouti, Gabon, the Sudan, Somalia and South Sudan, with the last reported detection in 2021. The lack of recent data likely reflects the time lag between research and publication, as well as the tendency to study samples collected several years prior.

Between October 2024 and September 2025, 16 new articles were added to the Malaria Threats Map database of *pfhrp2/3* gene deletions, with reports from 13 countries. In the WHO African Region, new data were available from eight countries: Cameroon (2019–2021), Côte d'Ivoire (2016), Ethiopia (2022), Ghana (2021), Mozambique (2023), South Africa (2021 and 2022), Uganda (2022–2023) and the United Republic of Tanzania (2018–2021). Among these recent publications, reports from Côte d'Ivoire and South Africa were available for the first time. In Côte d'Ivoire, no *pfhrp2* gene deletions were found; *pfhrp3* deletions were detected in a very small percentage (0.6%) of 344 samples (*80*). In South Africa, *pfhrp2/3* gene deletions were detected in a high percentage (95–100%) of 19 discordant samples[1] in 2021 (*81*). In contrast, a study of 600 samples from KwaZulu-Natal and Mpumalanga provinces (2022) failed to detect any gene deletions (*82*). All the remaining

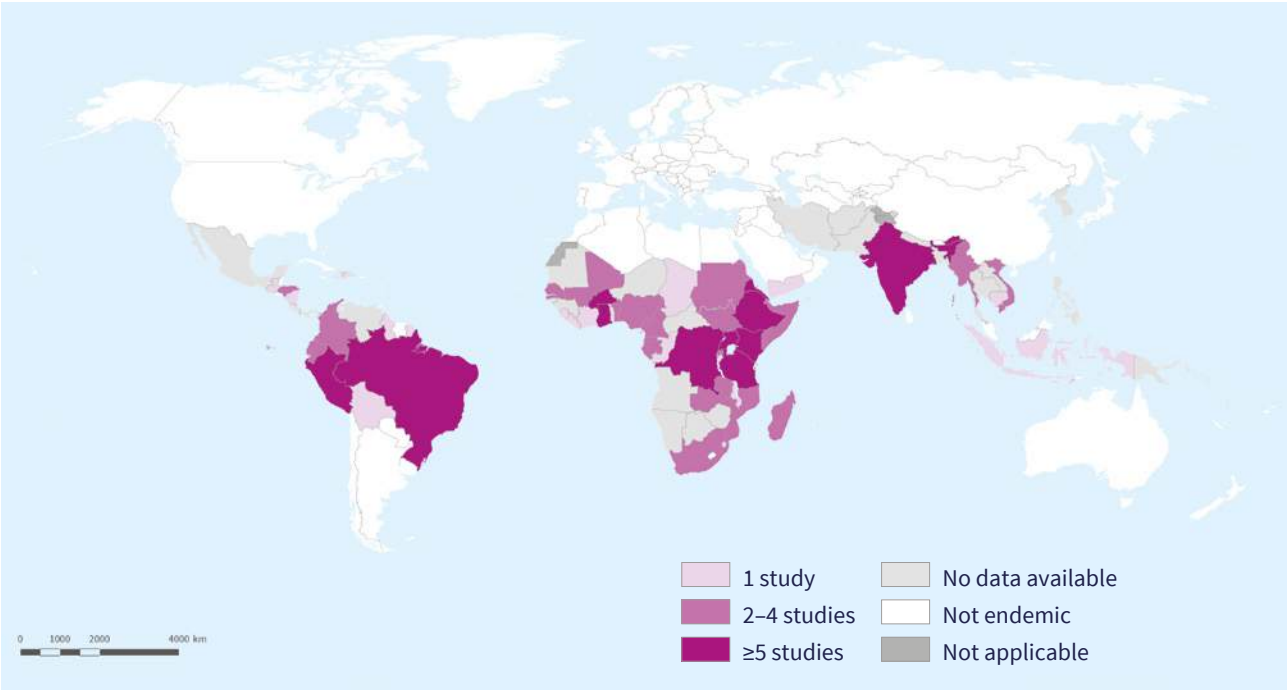
[1] Discordant samples are those samples that have yielded different results across different methods. It is problematic to base prevalence on discordant samples only because the detected prevalence may be artificially inflated, given that the selected sample is small and that these samples are not representative of the whole population.

Fig. 6.1. Estimated prevalence of *pfhrp2* gene deletions (1996–2024)[a] among countries that were malaria endemic in 2024 *Source: Review of published literature included in the Malaria Threats Map (66).*



pfhrp2: *Plasmodium falciparum* histidine-rich protein 2.
[a] Year of sample collection, not year of publication.

Fig. 6.2. Surveillance conducted on *pfhrp2* gene deletions (1996–2024)[a] among countries that were malaria endemic in 2024 *Source: Review of published literature included in the Malaria Threats Map (66).*



pfhrp2: *Plasmodium falciparum* histidine-rich protein 2.
[a] Year of sample collection, not year of publication.

six countries, except Uganda (*83*), reported the detection of *pfhrp2* gene deletions, though *pfhrp2* gene deletions have been reported in Uganda previously. In Mozambique, results of studies from 2023 were reported for six different locations. In five sites, no *pfhrp2* gene deletions were found. In the southern province of Inhambane, *pfhrp2* gene deletions were found in two of six discordant samples, and dual *pfhrp2/3* gene deletions were found for the first time in one of five discordant samples (*84*).

In the WHO Eastern Mediterranean Region, a study of samples collected in the Sudan in 2017 reported prevalences of *pfhrp2* deletions of 4.1% in Gezira State and 6.9% in Al Qadarif State (*85*). In the same study, dual *pfhrp2/3* deletions were detected in these states for the first time, at a prevalence of 3.5% and 6.9%, respectively. Data from Somalia are available for the first time (unpublished data). A study of samples collected in 2021 and 2022 reported a 4% prevalence of *pfhrp2* deletions, while a study from 2023 reported 7.7% of samples with a deletion, rising to 22.6% when samples with multigenomic infections were included.

Outside of the WHO African and Eastern Mediterranean regions, analyses of samples collected in Brazil (2016), India (2014–2020) and Viet Nam (2018–2020) found the prevalence of *pfhrp2* deletions to be low: 3.7% in Brazil (*86*) and 0.2% in India (*87*). *Pfhrp2* deletions in Viet Nam were reported for the first time, albeit in just four of 354 samples (1%) (*88*).

It is challenging to provide a precise assessment of the prevalence of *pfhrp2* gene deletions in malaria endemic countries and to determine how this prevalence has changed over time, due to the limited scope of global surveillance dedicated to this purpose. Very often, investigations of gene deletions are conducted retrospectively, on blood samples that were collected several years prior for other studies. This type of analysis gives a glimpse into the presence of gene deletions at one location and at one point in time, but it is difficult to make extrapolations from these data to determine national or global prevalence and trends. Direct comparisons between studies can also be challenging as some publications conduct molecular analysis on all *P. falciparum*-positive samples, while others focus on discordant samples, which were negative by HRP2-based RDT but positive by another diagnostic method.

Countries and research institutions are encouraged to continue to monitor *pfhrp2/3* deletions, according to WHO protocols, and to share the data with WHO once available. Ideally, studies of *pfhrp2* gene deletions would be conducted at established sentinel sites, according to standard protocols. This would support the early detection of *pfhrp2/3* gene deletions and allow the current extent of their prevalence and trends over time to be determined. Both negative and positive findings are informative. High-quality data will also help to identify where adjustments to the diagnostic protocols are needed to ensure timely treatment of patients. Further, it should be noted that, due to the aggregate nature of the data presented here, these data should not be used to make national policy decisions on the procurement of a specific RDT.

Tracking where surveillance is occurring in real time helps to identify current research gaps. Knowledge of where studies are being planned, are underway or have been recently completed helps to inform where resources for future studies should be directed. Research institutions or organizations that are currently implementing, planning to implement or have recently completed a surveillance activity on *pfhrp2/3* deletions are encouraged to complete the WHO data collection form.[1] Areas where there is ongoing surveillance of *pfhrp2/3* deletions will be shown on the Malaria Threats Map of ongoing studies.

As outlined in the WHO *Response plan to* pfhrp2/3 *gene deletions*, other areas beyond surveillance are also recommended for action. Additional actions include identifying new biomarkers, improving performance of non-HRP2 RDTs, undertaking market forecasting, and strengthening laboratory networks to support the use of molecular characterization to determine the presence or absence of these gene deletions (*12*). WHO continues to coordinate an international laboratory network that supports molecular analysis needs of countries conducting *pfhrp2/3* surveillance. These laboratories participate in an external quality assessment scheme and have extensive experience in identifying and characterizing deletions.

6.2 Antimalarial drug efficacy (2015–2025)

The status of antimalarial drug efficacy in malaria endemic countries is summarized in this section. An overview of the current first-line treatment policies[2] and a review of study results are presented for each WHO region, for TES conducted on *P. falciparum* and *P. vivax* from 2015 to 2025. Further details on the global status of antimalarial drug resistance, with a review of those countries currently classified as having suspected and confirmed artemisinin partial resistance, are given in **Chapter 7**. The results of TES conducted for each region are also presented in **Annex 3**.

According to available data from TES, the antimalarial treatments currently recommended in national treatment policies are effective. Countries are encouraged to continue

[1] The data collection form is available on the World Health Organization *Pfhrp2/3* dashboard: https://extranet.who.int/dataformv6/index.php/341317.

[2] A full list of antimalarial treatment policies in each country is provided in **Annex 4-B**.

to monitor antimalarial therapeutic efficacy according to the established WHO protocol (*89*), to establish clinical efficacy of the recommended treatments. Publication and timely reporting of results support global tracking of trends.

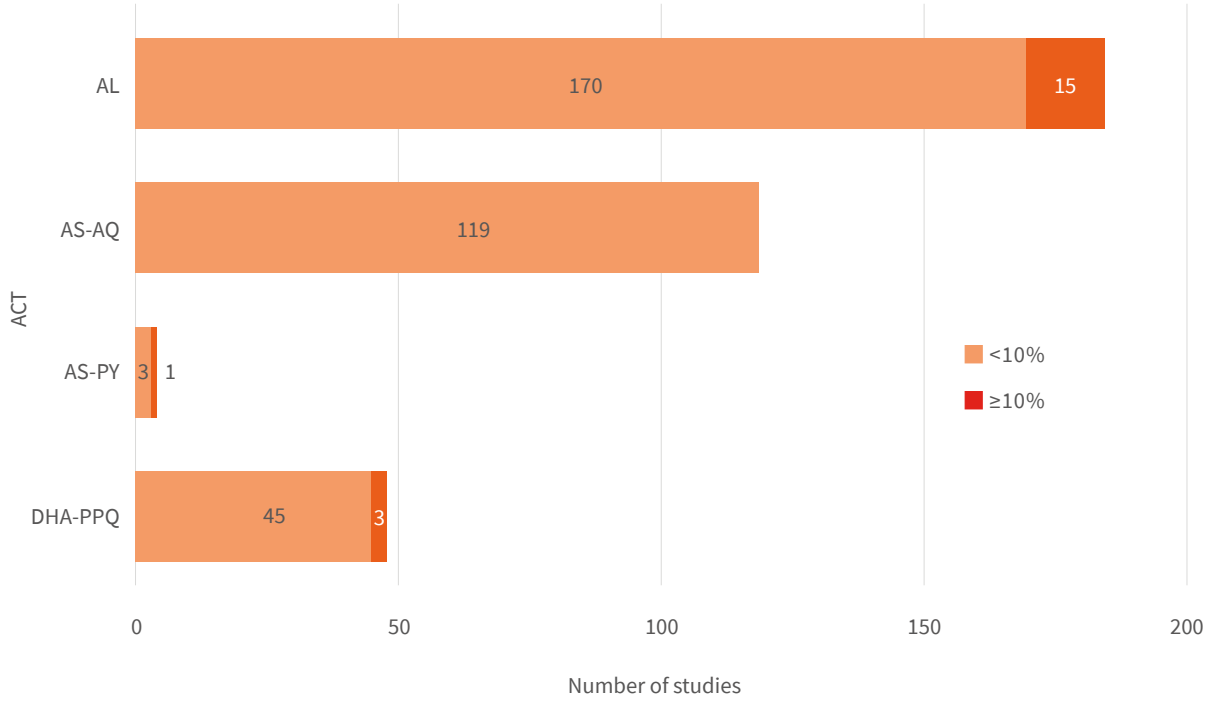
6.2.1 WHO African Region

In the WHO African Region, TES results indicate that, overall, ACTs remain effective (**Fig. 6.3**). Among the 185 studies of the efficacy of artemether–lumefantrine (AL) against *P. falciparum* since 2015, 15 studies (8%) reported treatment failure rates exceeding 10%. These studies were conducted in Angola (three studies: one each in 2015, 2019 and 2021), Burkina Faso (three studies in 2017), the Democratic Republic of the Congo (one study in 2018), Kenya (one study in 2016), Uganda (one study in 2015, three studies in 2018 and two studies in 2022) and the United Republic of Tanzania (one study in 2022). All TES conducted on artesunate plus amodiaquine (AS+AQ) (*n*=119) had treatment failure rates of less than 10%. Among 48 studies of dihydroartemisinin–piperaquine (DHA-PPQ), three studies (two from Burkina Faso in 2017 and one from the Democratic Republic of the Congo in 2018) showed treatment failure rates higher than 10%. Among four studies of artesunate–pyronaridine (AS-PY), one study in Uganda (2022) detected a treatment failure rate of 13% by day 42, among 62 patients in Arua (*90*).

All studies showing treatment failure rates above 10% warrant further investigation and appropriate response. Results should nevertheless be interpreted with caution, due to observed deviations from the WHO standard protocol for monitoring therapeutic efficacy. For example, in three studies of AL from Burkina Faso, only half the intended dose was provided for children in the 5–9 kg weight group (*91*). In three studies of AL from Angola (*92-93-94*) and one study of AL from Kenya (*95*), the evening doses were not supervised. Microsatellites and Bayesian analysis were used to distinguish between reinfection and recrudescence in three AL studies from Angola (*92-93-94*), one study of AL and one study of DHA-PPQ from the Democratic Republic of the Congo (*96*) and four AL studies from Uganda (*97*, *98*). Further, for the studies of AL and DHA-PPQ in Burkina Faso (*91*), concerns have been raised over the quality of the microscopy (*99*).

Fig. 6.3. Number of *P. falciparum* TES finding treatment failure rates of more or less than 10% in the WHO African Region, by ACT (2015–2025), among studies with at least 20 patients

Source: WHO Global database on antimalarial drug efficacy and resistance.



ACT: artemisinin-based combination therapy; AL: artemether–lumefantrine; AQ: amodiaquine; AS: artesunate; DHA-PPQ: dihydroartemisinin–piperaquine; *P. falciparum*: *Plasmodium falciparum*; PY: pyronaridine; TES: therapeutic efficacy studies; WHO: World Health Organization.

TES of *P. vivax* were available only from Ethiopia (2016–2021), where treatment failure was reported as less than 10% in all 12 studies conducted on AS-PY (2021), chloroquine (CQ) (2016–2020) and DHA-PPQ (2017, 2021).

6.2.2 WHO Region of the Americas

In the WHO Region of the Americas, two TES conducted on the efficacy of AL (Brazil in 2015 and Colombia in 2018) against *P. falciparum* indicated less than 10% treatment failure. A small study conducted in French Guiana between 2016 and 2018 identified treatment failures in four of six patients treated with DHA-PPQ. The failures were associated with molecular markers of PPQ resistance in *P. falciparum* (*100*). Four studies of the efficacy of CQ for the treatment of *P. vivax* (Brazil, 2016–2019) all had treatment failure rates of less than 10%.

6.2.3 WHO Eastern Mediterranean Region

In the WHO Eastern Mediterranean Region, among the 34 studies of AL against *P. falciparum*, all had treatment failure rates of less than 10% (**Fig. 6.4a**). For the treatment of *P. vivax*, in one study of AL and two studies of CQ, treatment failure rates were all less than 10%.

6.2.4 WHO South-East Asia Region

In the WHO South-East Asia Region, among a total of 47 studies of AL, AS-PY and DHA-PPQ against *P. falciparum*, all had treatment failure rates of less than 10% (**Fig. 6.4b**). In Thailand, efficacy is monitored through integrated drug efficacy surveillance (iDES) rather than TES; in 2019, high failure rates (up to 50%) in Sisaket Province prompted adoption of AS-PY as first-line treatment in 2020 in Sisaket and Ubon Ratchathani (*101*). Among 23 TES of CQ for treatment of *P. vivax* conducted between 2015 and 2022, all demonstrated a treatment failure rate of less than 10%.

6.2.5 WHO Western Pacific Region

As shown in **Fig. 6.4c**, among 22 studies of AL, two studies reported treatment failures exceeding 10%, from Cambodia (2018) and the Lao People's Democratic Republic (2017). AL is not currently among the first-line treatment policies in Cambodia. The study in the Lao People's Democratic Republic had a small sample size (n=29); subsequent studies found treatment failure with AL to be less than 10%. Of 28 studies of DHA-PPQ, 13 reported treatment failure rates exceeding 10%. These TES were conducted in Cambodia (2015–2017), the Lao People's Democratic Republic (2016) and Viet Nam (2015–2019). In Cambodia, the findings prompted the replacement of DHA-PPQ with artesunate–mefloquine (AS-MQ) as the first-line treatment in 2016. In Viet Nam, AS-PY has replaced DHA-PPQ as the first-line treatment for uncomplicated unconfirmed malaria in provinces where high treatment failure rates were detected; studies conducted in 2022 found the treatment failure rate to be less than 10%. In all 20 studies of AS-MQ and 11 studies of AS-PY in the region, the treatment failure rate was less than 10%.

For *P. vivax*, among six studies of the efficacy of AL, 13 studies of AS-MQ and two studies of DHA-PPQ, all found treatment failure rates of less than 10%.

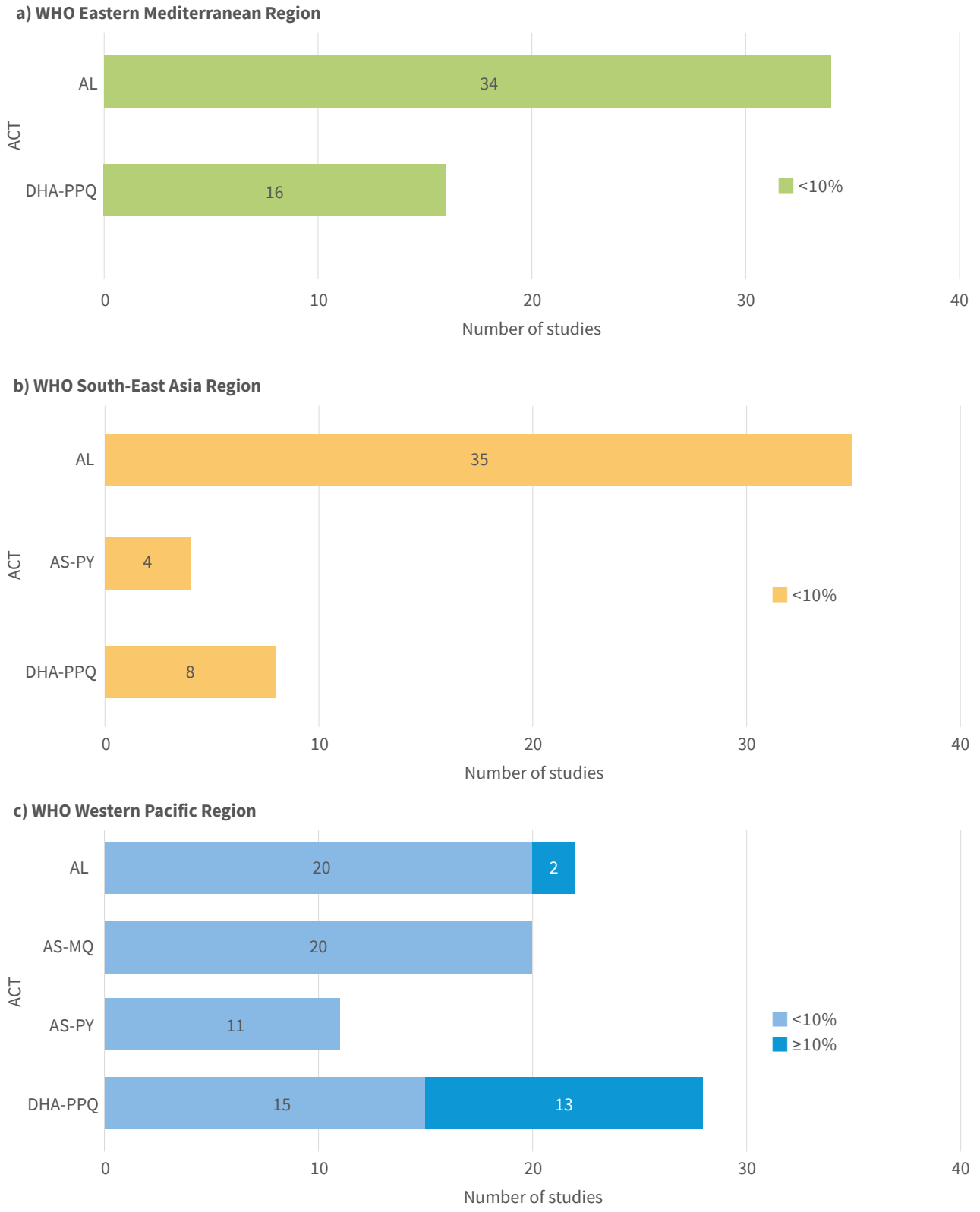
6.3 Insecticide resistance

The emergence and spread of mosquito resistance to insecticides has been a significant challenge in the prevention of malaria. The detection of insecticide resistance through entomological surveillance has led to the use of different classes of insecticides on ITNs and for IRS. For ITNs, a common feature of all prequalified nets is the presence of a pyrethroid insecticide. In response to the development of resistance to pyrethroids, manufacturers have included additional compounds on ITNs to help maintain their effectiveness. The first such compound added to ITNs was the synergist PBO. Although PBO does not kill mosquitoes, it enhances the ability of pyrethroids to kill pyrethroid-resistant mosquitoes. In 2023, WHO recommended two new classes of dual active ingredient ITNs, with different modes of action: pyrethroid–chlorfenapyr nets, which combine a pyrethroid and a pyrrole insecticide to enhance the killing effect of the net; and pyrethroid–pyriproxyfen nets, which combine a pyrethroid with an insect growth regulator that disrupts mosquito growth and reproduction. In recent years, the proportion of ITNs delivered by manufacturers that were dual active ingredient ITNs has increased dramatically, from 8% in 2022 to 47% in 2024. Conversely, the proportion of ITNs delivered that were conventional pyrethroid-only ITNs has decreased from 45% in 2022 to 23% in 2024. For the first time in 2024, the percentage of ITNs delivered that were dual active ingredient ITNs (47%) surpassed the percentage of pyrethroid–PBO ITNs (30%).

The number of insecticides available for IRS has increased in recent years. Prequalified IRS insecticides belong to seven classes: pyrethroids, carbamates, organophosphates, neonicotinoids, isoxazolines, pyrroles and meta-diamides. DDT (an organochlorine) is still used in a limited number of countries but is being phased out, and there is no prequalified DDT product. The availability of insecticides for IRS allows a preventive rotation strategy to avoid the build-up of insecticide resistance; however, the use of IRS has been declining, in large part due to cost.

Given that insecticide resistance monitoring is not usually undertaken every year, the data presented here are from countries and publications over the past 5 years (2020–

Fig. 6.4. Number of *P. falciparum* TES finding treatment failure rates of more or less than 10% in the a) WHO Eastern Mediterranean Region, b) WHO South-East Asia Region and c) WHO Western Pacific Region, by ACT (2015–2025), among studies with at least 20 patients *Source: WHO Global database on antimalarial drug efficacy and resistance.*



ACT: artemisinin-based combination therapy; AL: artemether–lumefantrine; AS: artesunate; DHA-PPQ: dihydroartemisinin–piperaquine; MQ: mefloquine; *P. falciparum*: *Plasmodium falciparum*; PY: pyronaridine; TES: therapeutic efficacy studies; WHO: World Health Organization.

2024). Over the study period, data on insecticide resistance were reported from 58 countries, of which 55 are currently malaria endemic. Resistance to at least one insecticide in one site was confirmed in 48 of the 58 reporting countries (83%).

Among all insecticide classes, pyrethroids continue to represent the largest share of discriminating concentration bioassay results reported to WHO, accounting for 53% of all bioassay results reported since 2020. Among the 53 countries that reported on pyrethroid resistance over the study period, resistance was confirmed in at least one site in 48 countries (91%). Organophosphates made up 20% of all bioassay results reported over this period; resistance was confirmed in nine of the 43 countries (21%) where it was monitored. Carbamates made up 7% of all bioassay results reported, and resistance to this insecticide class was confirmed in 20 of the 34 countries (59%) where it was monitored. Neonicotinoids made up 12% of all bioassay results reported in this period, with resistance confirmed in at least one site in 12 of the 23 countries (52%) where it was monitored.

The number of countries reporting resistance to each insecticide class is summarized for each region in the regional profiles in **Annex 3**. The percentage of sites in which resistance was detected for each insecticide class and region is shown in **Fig. 6.5**.

Fig. 6.5. Reported insecticide resistance status as a proportion of sites where monitoring was conducted, by WHO region (2020–2024), for carbamates, neonicotinoids, organophosphates and pyrethroids *Sources: Reports from NMPs and national health institutes, their implementation partners, research institutions and scientific publications.*

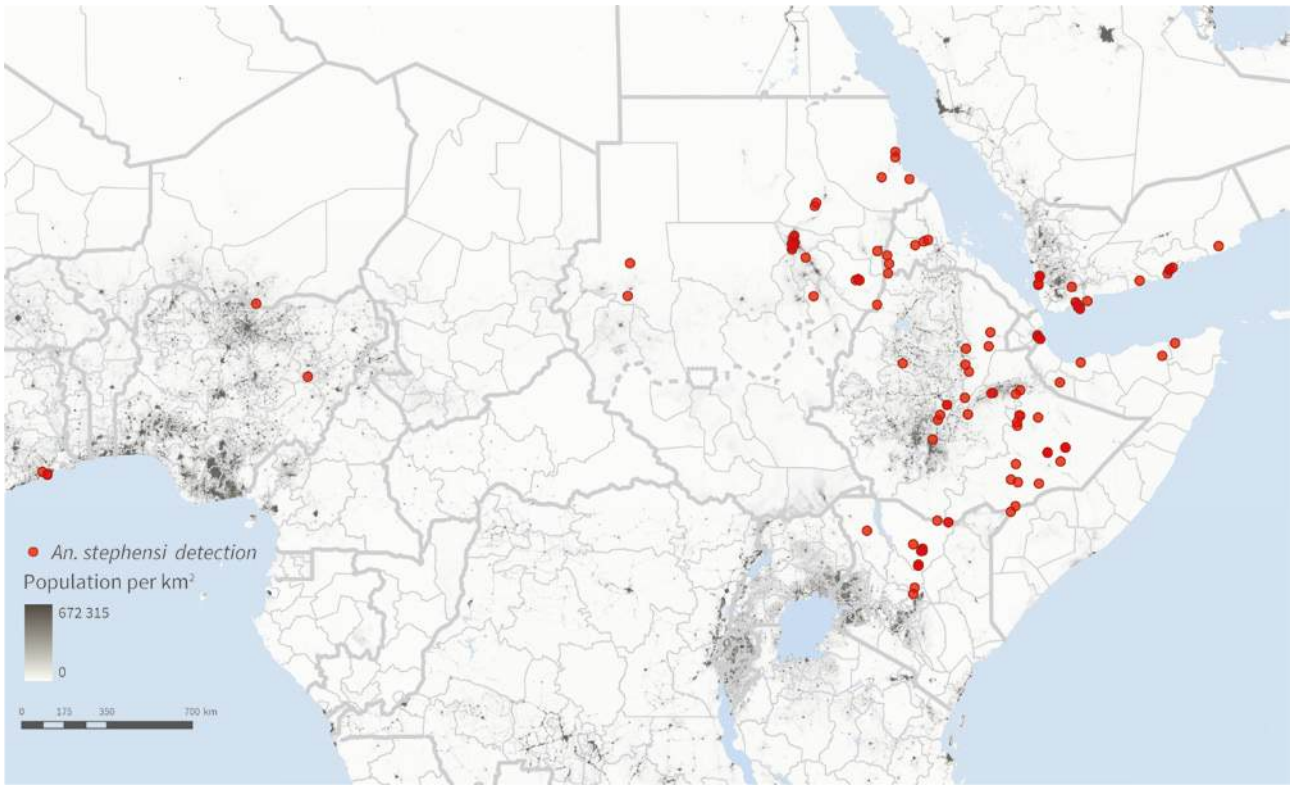
AFR: WHO African Region; AMR: WHO Region of the Americas; EMR: WHO Eastern Mediterranean Region; n: number; NMP: national malaria programme; SEAR: WHO South-East Asia Region; WHO: World Health Organization; WPR: WHO Western Pacific Region.

6.4 Invasive species

Originally native to parts of Asia and the Arabian Peninsula, *An. stephensi* is an efficient vector of both *P. falciparum* and *P. vivax* parasites. The distinct behavioural characteristics of this vector make its control challenging; it can breed in human-made water storage containers in urban areas and quickly adapt to the local environment, including cryptic habitats such as deep wells. It also survives extremely high temperatures during the dry season, when malaria transmission normally reaches a seasonal low. Insecticide resistance data reported to WHO show that *An. stephensi* has exhibited resistance to pyrethroids, organophosphates, carbamates and organochlorines in the Arabian Peninsula and Asia. In the Horn of Africa, it has exhibited resistance to carbamates, pyrethroids and organophosphates. *An. stephensi* has been implicated in malaria outbreaks (*102*).

Since *An. stephensi* was found for the first time in Africa, in Djibouti in 2012, surveillance of this vector has increased, and the number of malaria endemic countries reporting *An. stephensi* has correspondingly increased each year. WHO has received reports of *An. stephensi* from Ethiopia (2016), Sri Lanka (2016), the Sudan (2016), Somalia (2019), Nigeria (2020), Eritrea (2021), Yemen (2021), Ghana (2022) and Kenya (2022). Most recently, and after nearly 2 years with no reports of *An. stephensi* from west Africa, *An. stephensi* was reported in the Niger (2024) (**Fig. 6.6**).

Fig. 6.6. Detections of *An. stephensi* in the WHO African and Eastern Mediterranean regions, as reported to WHO since 2012 *Source: Reports from NMPs and national health institutes, their implementation partners, research institutions, scientific publications. Population data provided by WorldPop (103).*



An. stephensi: *Anopheles stephensi*; NMP: national malaria programme; WHO: World Health Organization.

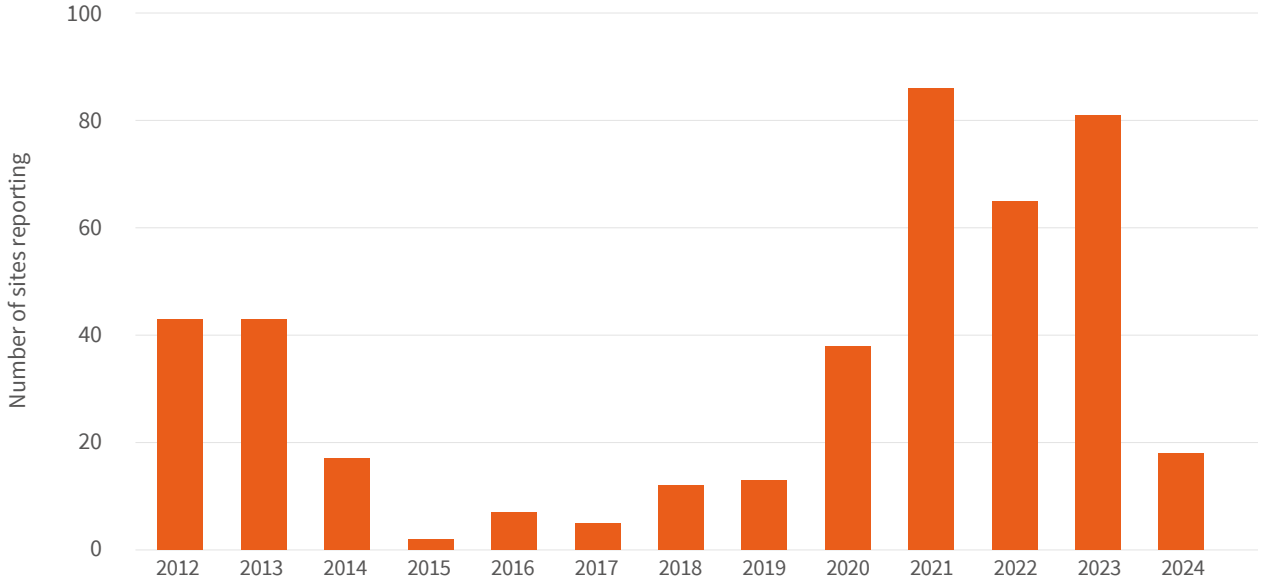
Among other countries where surveillance activities were conducted in the past 5 years, *An. stephensi* was not detected in Cameroon (2022), Senegal (2022), the United Republic of Tanzania (2022) or Liberia (2023). More recently, in 2024, the invasive species was not detected by surveillance conducted in eight sites in Burundi and two sites in Mozambique. Due to the 1–2-year time lag between detection and reporting or publication, the current status of *An. stephensi* detections remains uncertain. To date, results (positive or negative) from 2024 have been reported to WHO from only 18 sites, compared with 81 in 2023 (**Fig. 6.7**) (*104*).

Given the threat that *An. stephensi* poses to malaria control and elimination in Africa, the Arabian Peninsula and southern Asia, WHO recommends that countries conduct vector surveillance to delineate the geographical spread of this vector. This is particularly needed in the areas where little surveillance has been conducted, such as between the Horn of Africa and west Africa, where few to no data are available. Further guidance on how to monitor and control *An. stephensi* is provided in the relevant WHO vector alert (*105*). Results of *An. stephensi* surveillance can be reported to WHO using the standard form to report invasive species.[1] Research institutions and implementation partners are encouraged to immediately report any detection of *An. stephensi* to ministries of health and to WHO, to inform national and global responses. It is recommended that in areas where *An. stephensi* invasion is suspected or has been confirmed, countries take immediate action to prevent its further spread, especially in urban and periurban areas.

[1] The data collection form is available for download from the World Health Organization global database on invasive mosquito vector species: https://www.who.int/teams/global-malaria-programme/prevention/vector-control/global-databases-on-invasive-mosquito-vector-species.

Fig. 6.7. Number of study sites reporting the results of *An. stephensi* surveillance (2012–2024)

Source: Reports from NMPs and national health institutes, their implementation partners, research institutions and scientific publications.



An. stephensi: *Anopheles stephensi*; NMP: national malaria programme

7 Antimalarial drug resistance: progress and challenges ahead

7.1 Introduction

Antimalarial drug resistance stands among the greatest threats to sustaining progress towards malaria elimination. For now, artemisinin-based combination therapies (ACTs) continue to cure most infections across Africa. Yet the warning signs are unmistakable: artemisinin partial resistance is spreading, and growing pressure on partner drugs reveals just how fragile this success may be. History offers a stark reminder – from CQ to sulfadoxine–pyrimethamine (SP) – of how swiftly antimalarial drug resistance can undo decades of progress when it spreads undetected or unaddressed.

The threat of resistance is shaped by an intricate web of biological, ecological and social forces. Parasite mutations, transmission intensity, population immunity and vector dynamics interact with the realities of health systems: how people seek care, whether they receive a confirmed diagnosis, the quality of medicines available and how well adherence is maintained. Gaps in surveillance, treatment coverage and regulation – especially in the private sector – create fertile ground for resistant parasites to persist and spread. As public health resources are stretched, these vulnerabilities take on new urgency.

This chapter explores the current status and trajectory of antimalarial drug resistance, examining where and how it is emerging, what drives its spread and what strategies can contain it. It brings together evidence from Africa and beyond to illuminate the biological and programmatic factors that sustain resistance, with a particular focus on the private sector's expanding role in access to and quality of care. Drawing on lessons from the GMS, the chapter highlights the systems, partnerships and adaptive policies needed to safeguard the efficacy of ACTs and future therapies.

Modelling underscores what is at stake. If antimalarial drug resistance in Africa were to reach levels seen in Cambodia, projections suggest there would be an additional 78 million malaria cases over just 5 years if no specific actions were taken (*106*). Looking further ahead, continued spread of resistance could push treatment failure rates to about 31% by 2060, translating to more than 50 million treatment failures in that year alone (*107*). These figures are not forecasts of inevitability, but a measure of what could be lost if vigilance, investment and innovation falter.

7.1.1 Resistance before the artemisinin era

For more than half a century, antimalarial drug resistance has repeatedly undermined progress in the fight against malaria. CQ, synthesized in the 1930s, was widely deployed by the late 1940s and for decades remained central to malaria treatment. Its initial success contributed to major reductions in malaria mortality and morbidity but also created the conditions for resistance to emerge and spread. Resistance was first detected along the Cambodia–Thailand border (*108*) and in Colombia (*109*, *110*) in the late 1950s. By the late 1970s, reports of treatment failure among non-immune visitors provided the first clinical evidence of CQ resistance in Africa (*111*, *112*), which subsequently spread from east to west across the continent. By the 1970s, the malaria death rate among children in Africa had fallen to nearly half of pre-CQ levels, but the continent-wide spread of resistance led to a sharp increase in hospitalizations and deaths, reversing much of the earlier progress (*113*, *114*).

As CQ failed, SP was introduced as a replacement, but resistance emerged quickly (*115*, *116*). By the early 1980s, SP efficacy was severely compromised, particularly in

South-East Asia, where the drug was widely accessible and movement across conflict-affected borders facilitated spread of resistance (*117*, *118*). The same dynamics later undermined MQ, leading to the adoption of combination therapies (*118*, *119*). Growing recognition of the limits of monotherapy prompted WHO to recommend ACTs in areas of resistance from 2000 onward, and globally by 2006 (**Fig. 7.1**) (*120-121-122*).

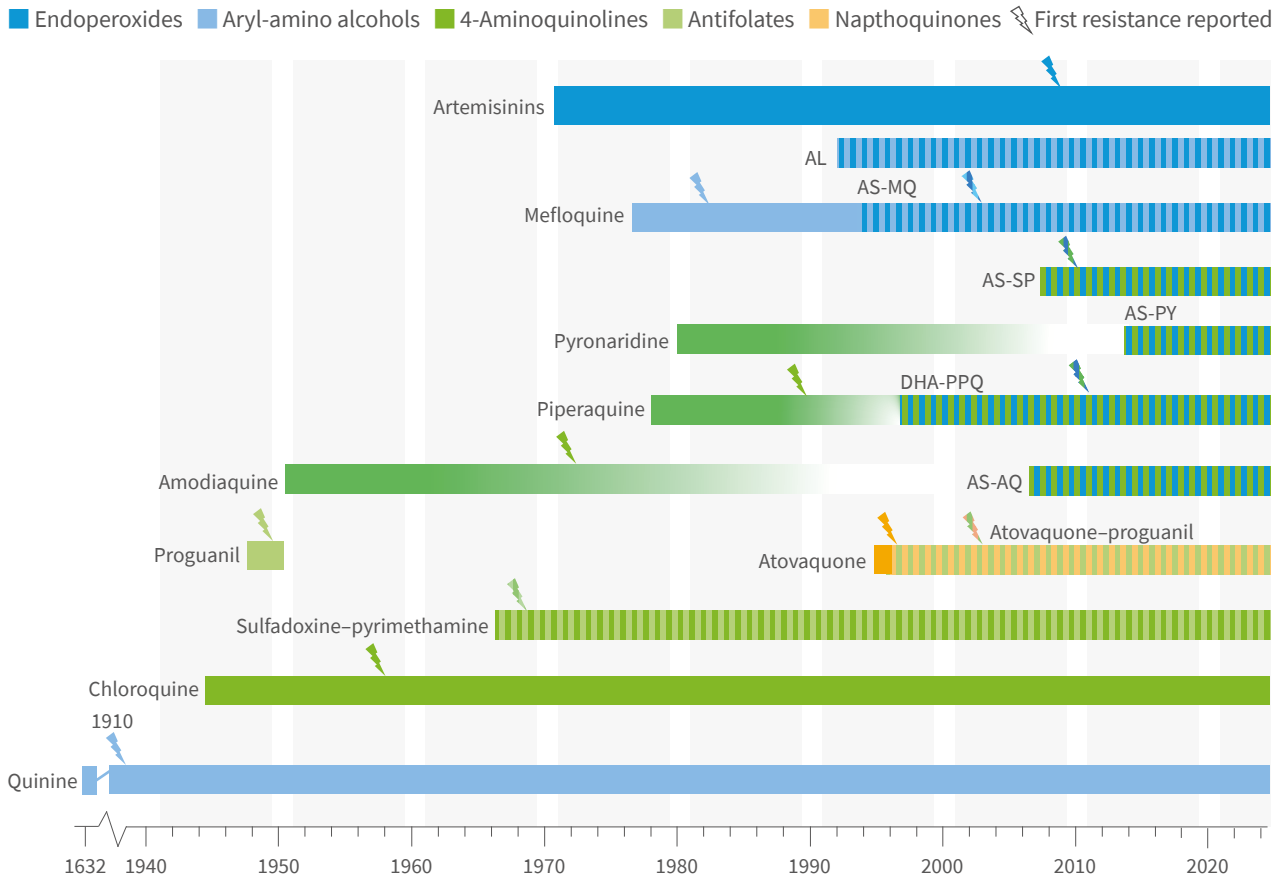
7.1.2 Present: the emergence of artemisinin partial resistance

The introduction of ACTs marked a turning point in the fight against malaria. These regimens combine a fast-acting artemisinin derivative, which rapidly reduces parasite numbers but is cleared from the body quickly, with a longer-acting partner drug that eliminates the remaining parasites and protects against recrudescence. This combination allows for short, 3-day treatment courses that are both highly effective and well tolerated. For more than a decade, ACTs transformed case management and reduced malaria burden worldwide, and resistance was thought unlikely given the rapid elimination of artemisinin compounds.

By the mid-2000s, however, reports from the Cambodia–Thailand border described delayed parasite clearance in patients treated with an artemisinin. TES showed an unexpectedly high proportion of patients were still parasitaemic on day 3 of treatment, raising fears that resistance was emerging once again (*124-125-126*). Molecular studies later confirmed that mutations in *PfKelch13* were associated with this phenotype (*127*), now termed artemisinin partial resistance. Unlike resistance to CQ or SP, which rapidly led to complete treatment failure, artemisinin partial resistance is characterized by slower parasite clearance; ACTs can still cure patients as long as the partner drug remains effective.

However, there is a risk in the dependence on ACT partner drugs. When clearance by artemisinin is delayed, partner drugs must act against a larger parasite population, increasing the chance that resistance to them will emerge and spread. This outcome was observed in Cambodia, where PPQ resistance, combined with artemisinin partial resistance, led to high treatment failure rates; this was likely a consequence of the earlier widespread use of PPQ reducing parasite susceptibility (*128*).

Fig. 7.1. History of introduction of principal antimalarials and of first emergence of resistance in the field *Source: Adapted from Blasco, Leroy and Fidock (123).*



AL: artemether–lumefantrine; AS-AQ: artesunate–amodiaquine; AS-MQ: artesunate–mefloquine; AS-PY: artesunate–pyronaridine; AS-SP: artesunate plus sulfadoxine–pyrimethamine; DHA-PPQ: dihydroartemisinin–piperaquine.

7.1.3 Looking ahead: the challenge beyond South-East Asia

The emergence of resistance in the GMS prompted an unprecedented regional response that united countries and partners around a common goal, yielding impressive results. Countries that were once at the epicentre of resistance, such as Cambodia, the Lao People's Democratic Republic and Viet Nam, are now within reach of eliminating *P. falciparum* malaria. Cambodia reported its last indigenous case in Pursat Province in January 2024, and the Lao People's Democratic Republic reported its last case in April 2025. The GMS experience demonstrates that resistance can be contained when it is detected early and addressed through coordinated surveillance, rapid data sharing and strong policy responses. Beyond South-East Asia, and particularly in sub-Saharan Africa, the challenge is greater: resistance is emerging in high transmission settings with limited surveillance and constrained resources.

7.2 Monitoring antimalarial drug efficacy and resistance

When the effectiveness of antimalarial medicines declines unnoticed, treatment failure rates rise, exposing patients to avoidable complications and creating opportunities for resistant parasites to spread more widely. Robust surveillance is therefore essential to detect early signs of reduced efficacy, guide timely policy changes and safeguard effective case management. High-quality data make it possible to track trends over time, compare performance across regions and ensure that treatment guidelines remain aligned with realities in the field. Achieving this requires a combination of approaches that capture clinical outcomes, parasite behaviour in the laboratory and genetic changes linked to resistance; these insights are most powerful when considered together.

7.2.1 Surveillance methods for drug efficacy and resistance

Following up patients after their antimalarial treatment provides the only direct measure of how well medicines cure infections. In most malaria endemic settings, this surveillance is implemented through TES, while a few low transmission countries use iDES (*129*) embedded in routine case management. In TES, individuals with uncomplicated malaria receive the nationally recommended first-line therapy (or an alternative considered for inclusion) and are followed for 28 or 42 days according to the standard WHO protocol (*89*), with clinical and parasitological outcomes assessed. When conducted at sentinel sites at least every 2 years, TES provide a systematic means of tracking drug performance across time and geography, ensuring that treatments in use remain efficacious. Crucially, results from TES form the primary evidence base for national treatment policy decisions; when high-quality data show that cure rates fall below the 90% efficacy threshold, this should trigger review and revision of treatment guidelines.

Although efficacy surveillance via TES or iDES provides the definitive measure of clinical efficacy, two complementary approaches help to interpret and track changes in parasite susceptibility: in vitro testing of parasite susceptibility under laboratory conditions (*130*), and genotypic analysis of resistance-associated mutations. Each approach has distinct strengths and limitations but, when applied together, they provide a more reliable picture of drug performance and early warning of emerging resistance. Genotypic surveillance has become increasingly important for malaria control, offering valuable insights into emerging drug resistance. The discovery of *PfKelch13* mutations has been critical for detecting and mapping artemisinin partial resistance, serving as a potential early warning system. To support this, WHO maintains a list of candidate and validated mutations associated with artemisinin partial resistance. The first edition of the WHO Compendium of Markers for Antimalarial Drug Resistance will expand this list to include markers for other drugs used in malaria treatment. As knowledge of parasite genetics continues to grow, genetic data will increasingly guide decisions on where and how surveillance can be implemented most effectively (*130*).

7.2.2 Status of antimalarial drug resistance outside Africa

The GMS has historically been the epicentre of antimalarial drug resistance, with new resistant strains repeatedly emerging and spreading from this subregion. Over the past decade, a strong and coordinated regional response has reduced *P. falciparum* malaria case numbers from about 37 000 in 2015 to 152 in 2024 (a 99.6% reduction) across Cambodia, the Lao People's Democratic Republic and Viet Nam. Pailin Province in Cambodia, the source of several initial reports of antimalarial drug resistance in *P. falciparum*, has reported no *P. falciparum* cases since June 2019. In parallel, changes in national treatment policies have reshaped the parasite population, with shifts in resistance profiles reflecting the drugs deployed. Progress towards malaria elimination has been less consistent in the western GMS. Years of impressive gains are being undermined by political unrest and disruption of health services. Rising case numbers in Myanmar have also spilled across the border into western Thailand, threatening to undermine progress in the subregion.

Another region where resistance has repeatedly emerged is the Guianas (French Guiana, Guyana and Suriname) in northern South America. Like the GMS, this area has features that favour the development and spread of resistance, including hard-to-reach populations of miners who often self-medicate with antimalarials obtained

outside formal health services. The *PfKelch13* C580Y mutation, initially identified in Cambodia as a marker of artemisinin partial resistance, was first detected in Guyana in 2010. Its prevalence was 5.1% (5/98) in samples collected in 2010 and 1.6% (14/854) in those collected in 2016–2017, with one region showing a localized prevalence of 8.8% (10/114); genomic analyses confirmed the mutation had emerged independently rather than spreading from South-East Asia (*131*). Actions were undertaken in the Amazon Basin countries to strengthen *PfKelch13* surveillance, compile available data and assess the potential for mutation spread (*132*). Later surveys from 2018 to 2021 have not identified this mutation in Guyana, and it appears to have disappeared (*133*). In contrast, PPQ resistance is now highly prevalent in French Guiana, Guyana and Suriname, where use of DHA-PPQ among forest workers may have driven selection (*100*).

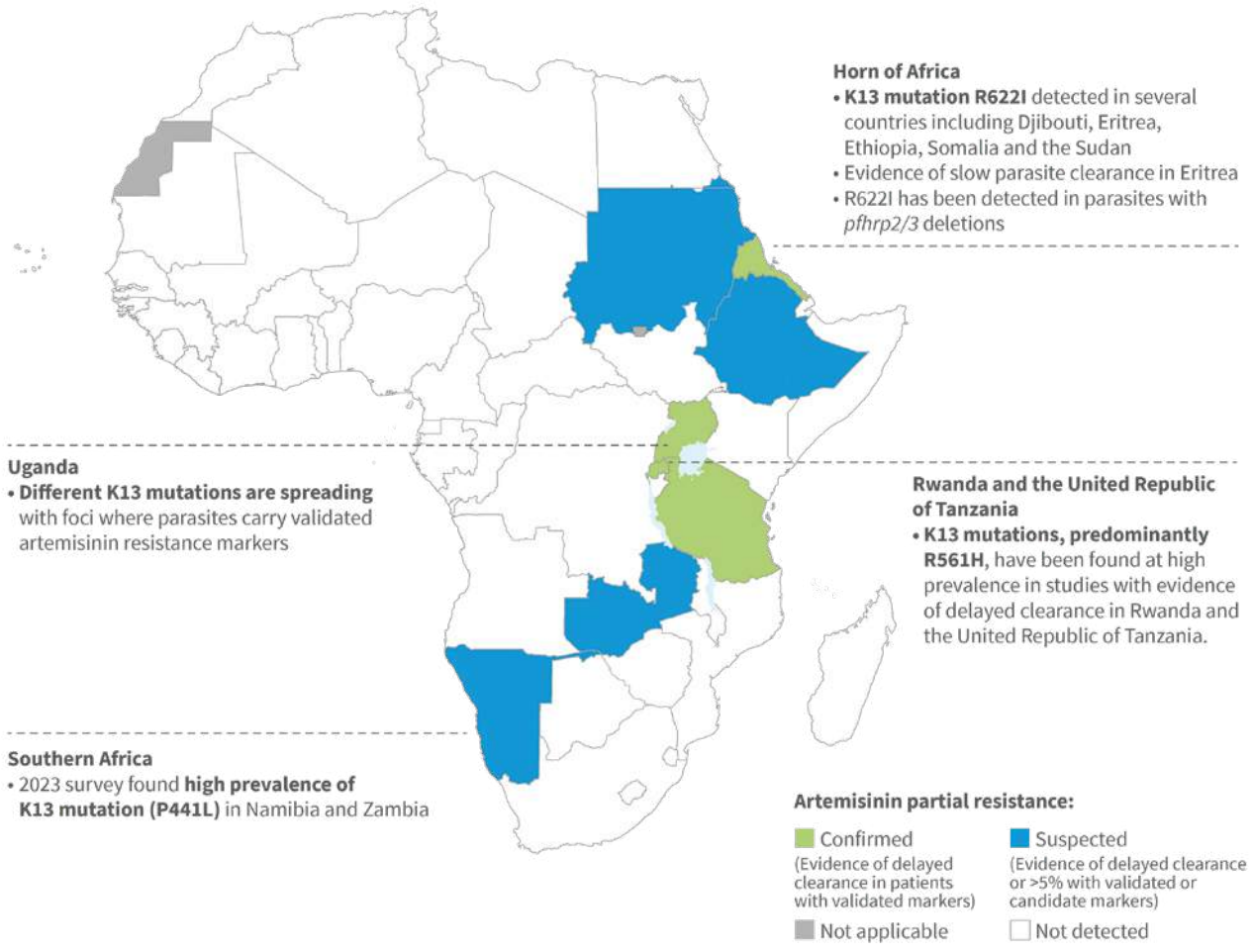
Elsewhere outside Africa, reports from Papua New Guinea point to concerning signals, with the *PfKelch13* C580Y mutation detected at low frequency, though evidence of its spread remains limited (*134*).

7.2.3 Status of antimalarial drug resistance in Africa

Studies in Africa initially reported isolated cases with different *PfKelch13* mutations but without evidence of selection or spread. This changed with reports of the spread of parasites carrying the validated markers of artemisinin partial resistance R561H mutation in Rwanda from studies in 2013 and 2015. Ring-stage survival assays confirmed that the R561H mutation confers reduced susceptibility to DHA, marking the first clear evidence of artemisinin partial resistance on the continent (*135*).

Since then, multiple independent origins of *PfKelch13* mutations have been identified, with growing evidence of selection and spread. Four countries now have confirmed artemisinin partial resistance: Eritrea, Rwanda, Uganda and the United Republic of Tanzania. In these countries, delayed parasite clearance has been documented in patients together with validated molecular markers of resistance. A further four countries – Ethiopia, Namibia, the Sudan and Zambia – show suspected resistance, with sites reporting more than 5% prevalence of validated or candidate mutations (**Fig. 7.2**).

Fig. 7.2. Map of artemisinin partial resistance in Africa *Source:Review of published literature included in the Malaria Threats Map*



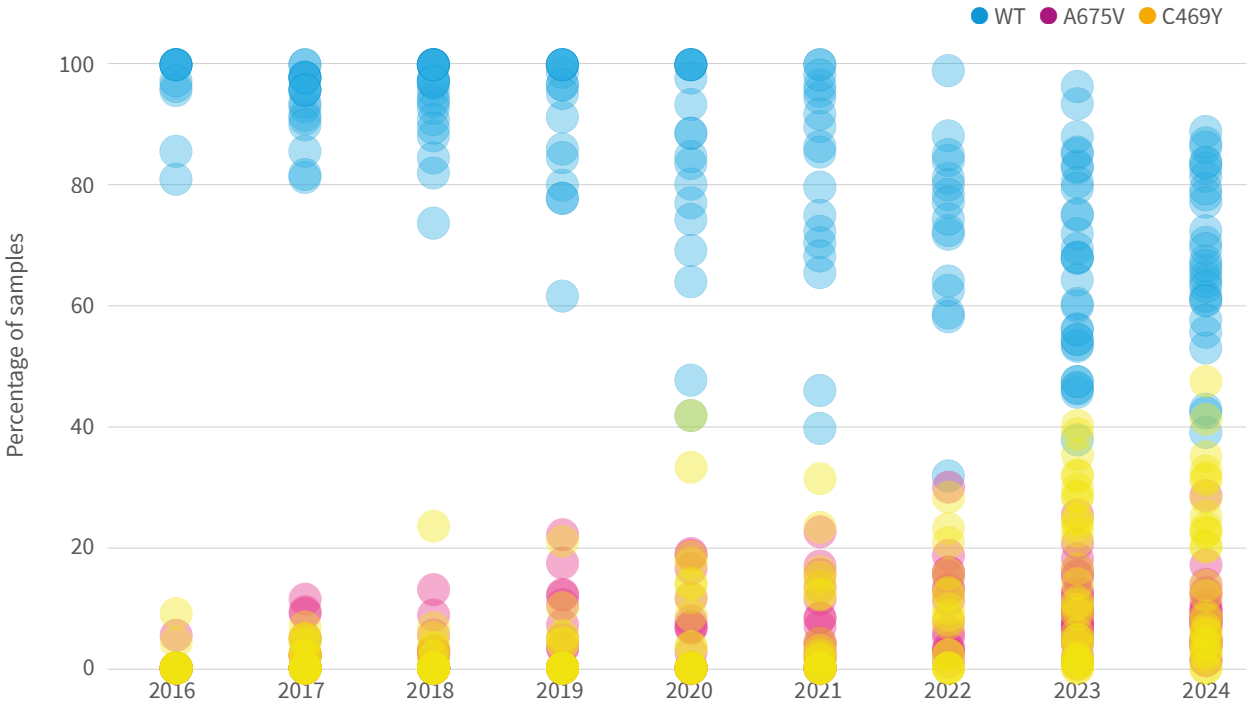
K13: *Plasmodium falciparum* Kelch13; *pfhrp2/3*: *P. falciparum* histidine-rich protein 2/3.

Across Africa, resistance shows distinct regional patterns: in the Horn of Africa, the R622I mutation is spreading, whereas in southern Africa, the P441L mutation is mainly reported. In Uganda, however, resistance appears to be evolving through multiple independent genetic events. Several distinct *PfKelch13* mutations have emerged and expanded concurrently, resulting in a highly diverse and dynamic resistance landscape (*136*). This diversification is accompanied by a decline in wild-type parasites and rapid clonal expansion of resistant lineages, suggesting strong and ongoing selection pressure (**Fig. 7.3**). A similar pattern of multiple cocirculating *PfKelch13* mutations was observed during the early stages of resistance emergence in the eastern GMS, before a few lineages began to dominate. A recent modelling study showed that the selection of *PfKelch13* mutations in Uganda is occurring at a pace comparable to that in South-East Asia (*137*).

In Africa, evidence for the clinical consequences of *PfKelch13* mutations has so far been limited to reports of delayed parasite clearance in some studies. Where such mutations have been detected, treatment efficacy has remained high, as ACTs continue to cure infections provided the partner drug retains effectiveness. Findings from Eritrea (*138*), Ethiopia (*139*) and the Sudan (*85*) show some parasites carrying the *PfKelch13* R622I mutation also harbour deletions of *pfhrp2* and *pfhrp3*. This combination could pose a serious threat. The spread of R622I across the Horn of Africa demonstrates its ability to outcompete other strains under current conditions, and accompanying *pfhrp2/3* gene deletions would further allow it to evade detection by the most widely used HRP2-based RDTs.

Despite the spread of *PfKelch13* mutations and evidence of delayed parasite clearance, TES continue to show that ACTs

Fig. 7.3. Detection of *PfKelch13* molecular mutations in Uganda (2016–2024): decreasing prevalence of wild-type and increasing prevalence of validated markers of artemisinin partial resistance over time *Source: WHO Global database on antimalarial drug efficacy and resistance.*

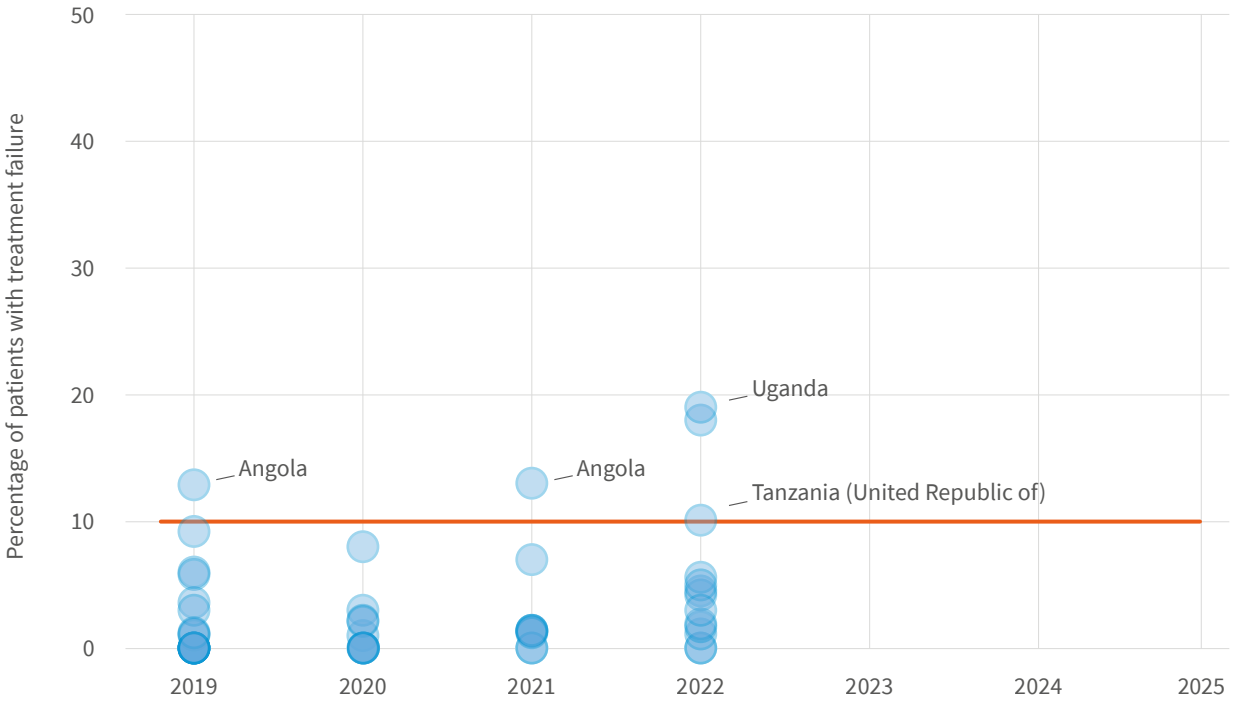


PfKelch13: *Plasmodium falciparum* Kelch13; WHO: World Health Organization; WT: wild-type.

remain highly effective across most of Africa. There have been some reports of treatment failure rates exceeding 10% for AL in Africa. Based on the WHO database (*66*), since 2019, five of 66 studies on AL have reported treatment failure rates of more than 10%, including sites in Angola (*93*, *94*), Uganda (*90*) and the United Republic of Tanzania (*140*) (**Fig. 7.4**), though lumefantrine resistance has not been confirmed. For studies of AS-AQ (*n*=39) and DHA-PPQ (*n*=15), the proportion of patients with treatment failure was less than 10% in all studies.

Interpreting these signals requires careful consideration. The identification of molecular markers of resistance for additional ACT partner drugs would greatly enhance our ability to determine whether observed treatment failures reflect a genuine loss of efficacy, as well as allowing emerging resistance to be tracked. Continued efforts to strengthen the quality and consistency of implementation of TES, through standardized follow-up, accurate drug administration and adherence to WHO protocols, will further increase confidence in future results. Ongoing work to improve methods for distinguishing between recrudescence and reinfection is also essential, as new infections acquired during follow-up can otherwise be misclassified as treatment failures. With these advances, reports of reduced efficacy can be interpreted more accurately, ensuring that true changes in drug performance are detected promptly and that timely responses can be implemented.

Fig. 7.4. Treatment failure rates in TES for treatment of *P. falciparum* with AL (2019–2025), among studies with at least 20 patients in the WHO African region *Source: WHO Global database on antimalarial drug efficacy and resistance.*



AL: artemether–lumefantrine; *P. falciparum*: *Plasmodium falciparum*; TES: therapeutic efficacy studies; WHO: World Health Organization.

7.2.4 Gaps in data and reporting

WHO recommends that TES be conducted in sentinel sites in each country at least every 2 years. However, since 2020, data have been available from only 15 countries in Africa (**Fig. 7.5**).

There are multiple reasons for this, including lack of funding and political attention, interruptions caused by COVID-19, and delays in data analysis and sharing of results from TES. This limited geographical coverage leaves large areas without up-to-date evidence, which reduces the usefulness of TES for guiding new studies and real-time policy decisions. In at least 11 additional countries, studies have been conducted since 2020, but results are not yet widely available. Strengthening both the coverage and timeliness of TES, and ensuring that results are transparently shared, is critical to safeguard ACT efficacy and enable countries to respond before resistance becomes entrenched.

7.3 From conditions to care: how systems shape resistance

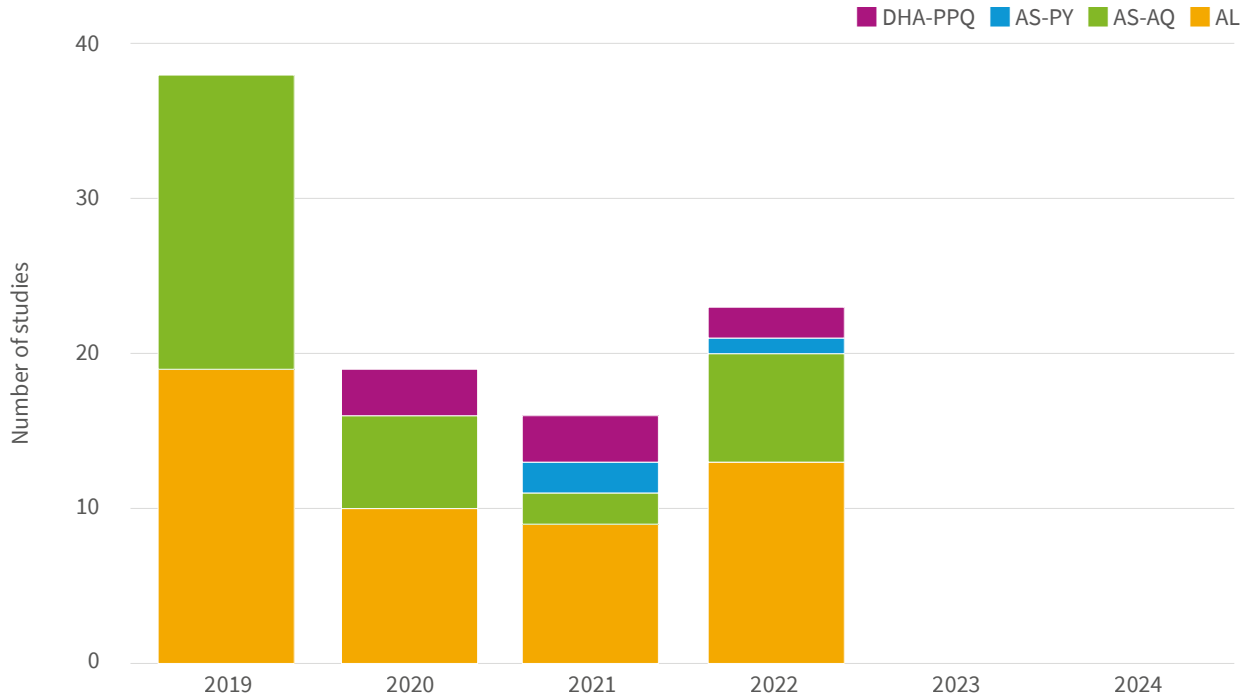
Antimalarial drug resistance does not emerge in isolation. It reflects the interaction between biological adaptation, human behaviour and the systems through which people access prevention and treatment. Genetic mutations may provide the biological foundation for resistance (**Box 7.1**), but whether these mutations spread depends on how health services function, how medicines are regulated and delivered, and how patients seek and use care. Experience from South-East Asia illustrates this interplay. Resistance in this region has often arisen in populations with low immunity and limited competition between parasite strains, which favours the emergence of resistant parasites, while weak access to prevention and timely, high-quality treatment has enabled their spread (*141*).

7.3.1 System, behavioural and market drivers of resistance

Social, economic and health system factors ultimately shape how many parasites are exposed to drug pressure, which medicines they encounter and at what doses. These conditions influence infection levels, treatment patterns and the ability to detect and respond to resistance.

- **Prevention and exposure reduction:** Where vector control or chemoprevention coverage is strong, fewer people are infected and overall drug pressure is lower. When these interventions are interrupted or scaled back, more infections occur, treatment demand rises and resistant parasites have more opportunities to spread, especially in populations with lower immunity. In these

Fig. 7.5. Number of TES of *P. falciparum* in the WHO African Region (2019–2024) *Source: WHO Global database on antimalarial drug efficacy and resistance.*



AL: artemether–lumefantrine; AQ: amodiaquine; AS: artesunate; DHA-PPQ: dihydroartemisinin–piperaquine; *P. falciparum*: *Plasmodium falciparum*; PY: pyronaridine; TES: therapeutic efficacy studies; WHO: World Health Organization.

Box 7.1. How antimalarial resistance develops

Resistance arises when genetic mutations in *Plasmodium* parasites enable them to survive exposure to antimalarial drugs. Under continued drug pressure, these less-susceptible parasites gain a survival advantage and may become dominant within the parasite population (*142-143-144*).

For some medicines, a single mutation is enough to confer high-level resistance; for others, several independent genetic changes are required. The likelihood that resistant parasites emerge and persist depends on several factors:

- **parasite factors** – the degree of resistance conferred by a mutation, the parasite's genetic background and the fitness cost of the resistance mechanism;
- **environmental factors** – the ecological conditions that shape overall transmission intensity, the capacity of local mosquito vectors to transmit resistant strains and their susceptibility to vector control tools; and
- **transmission dynamics** – the intensity of malaria transmission, which affects drug pressure, opportunities for genetic recombination, competition between susceptible and resistant parasites, and the role of host immunity in clearing infections.

Combination therapies, such as artemisinin-based combination therapies, slow the development of resistance by pairing drugs with different mechanisms and durations of action, reducing the chance that parasites resistant to one component will survive treatment.

populations, resistant strains may be more likely to persist.

- **Diagnosis and treatment practices:** Accurate diagnosis and complete treatment with ACT reduce the risk that parasites are exposed to subtherapeutic drug levels. In practice, gaps are common: where RDTs are unavailable, providers often treat presumptively; and when ACTs are out of stock or too costly, patients turn to the private or informal sector, where incomplete, poor-quality or monotherapy treatments may be used. These conditions are ideal for the survival and spread of parasites that are less susceptible to antimalarial drugs.
- **Programme and surveillance capacity:** Detecting resistance early and adapting treatment policy requires TES, pharmacovigilance and monitoring of drug quality. Yet in many settings, these systems remain weak, underfunded or inconsistently regulated. Resistant parasites may therefore circulate unnoticed until treatment failure is widespread.

7.3.2 The role of the private sector in antimalarial drug resistance

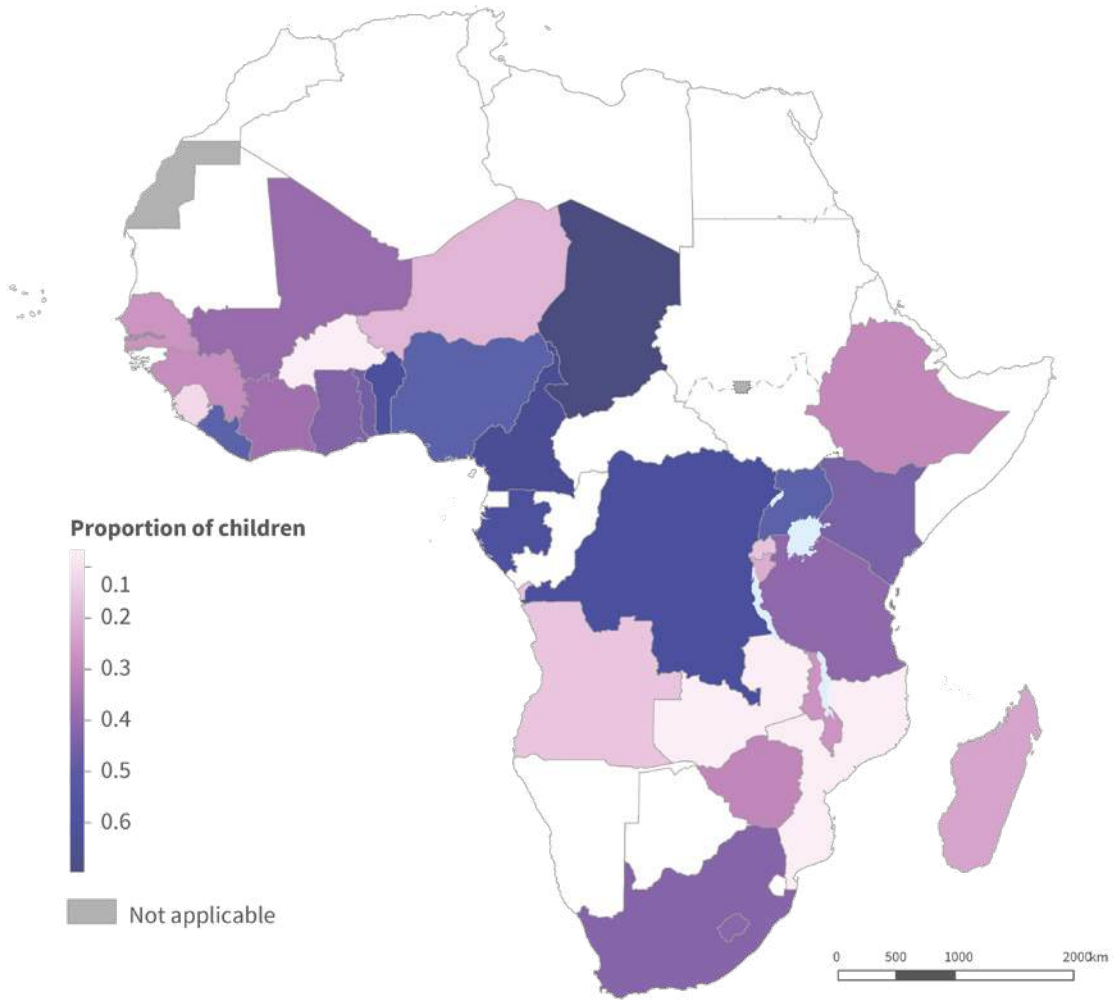
Random mutations may give parasites the ability to survive treatment, but it is the inability of health systems and institutions to prevent, detect and respond to resistance and treatment failures, compounded by weak regulation and uneven quality control in medicine markets, that determines whether those mutations evolve into a public health threat.

In practice, how resistance emerges and is managed is shaped not only by public health systems but also by the private and informal sectors, where much malaria treatment occurs. In many endemic countries, a large proportion of patients first seek care outside public facilities, often from pharmacies, drug shops or other private providers (**Fig. 7.6**). These channels can expand access to life saving medicines, but they also create vulnerabilities when diagnostic testing is limited, treatment is incomplete or unapproved medicines circulate. In many settings, strengthening case management in the private sector is one of the most effective ways to reduce drug pressure and limit the spread of resistant parasites. This section examines the role of the private sector in malaria case management and its implications for resistance.

7.3.2.1 Use of private sector care for fever management

Analysis of nationally representative household surveys conducted between 2015 and 2024 illustrates the extent of reliance on the private sector for childhood fever management. Across 30 malaria endemic countries in sub-Saharan Africa, a large proportion of febrile children sought treatment from private medicine retailers, both formal and informal, or pharmacies. This use of the private sector exceeded 60% in Benin, Cameroon, Chad, the Democratic Republic of the Congo and Gabon (**Fig. 7.6**), while it was below 30% in Burundi, Ethiopia, Guinea, Madagascar, Malawi, Mozambique, the Niger, Rwanda, Sierra Leone, Senegal, Zambia and Zimbabwe. The median estimate at the national level was 36%. These figures highlight significant heterogeneity in use of the private sector, reflecting

Fig. 7.6. Proportion of children seeking care in the private sector (formal, informal or pharmacies)[a] *Source: DHS/MIS 2015–2024.*



DHS: demographic and health surveys; MIS: malaria indicator surveys.

[a] No data were available for countries in white.

differences in national policies, health system reach and household access to care.

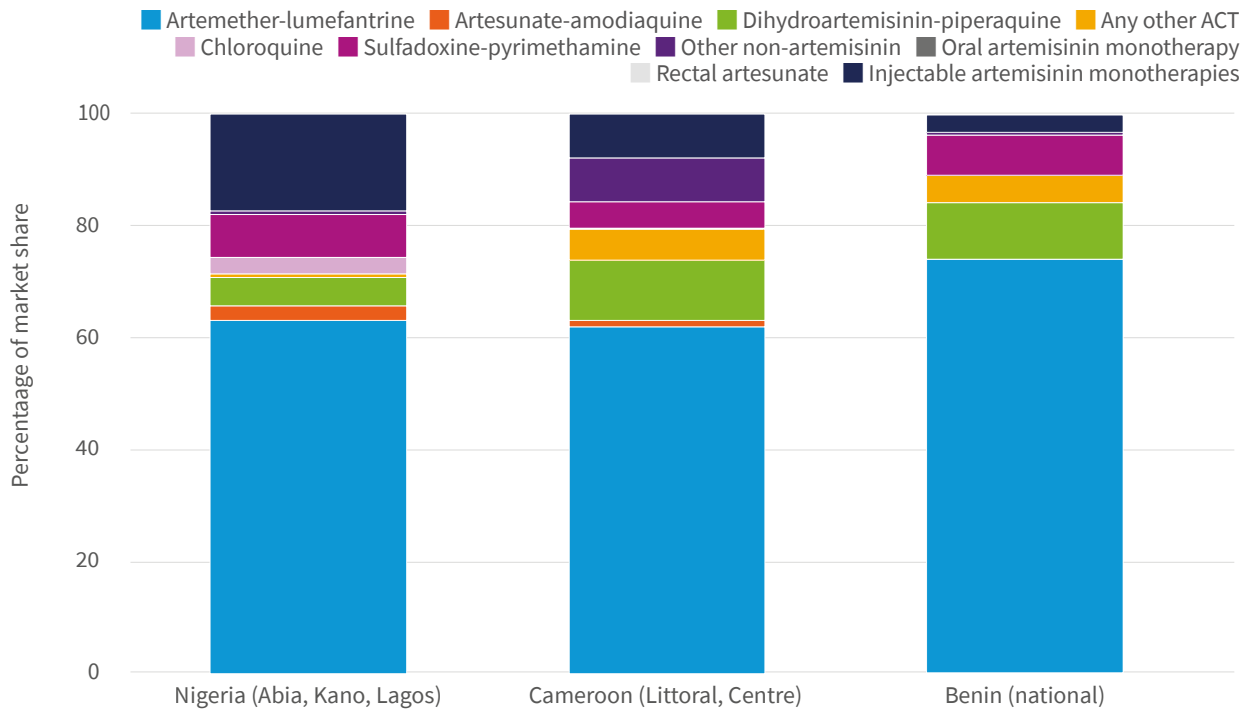
Beyond Africa, data from 10 countries in the WHO South-East Asia and Western Pacific regions show similar variation, from 10% of febrile patients seeking private care in Papua New Guinea to 87% in Bangladesh, underscoring the private sector's central yet diverse role in malaria case management.

7.3.2.2 Quality of care and treatment practices

There are persistent concerns about the quality of malaria case management provided through private outlets. Although the private sector serves as an important source of treatment, diagnostic testing and adherence to treatment guidelines are often inconsistent. In household surveys conducted in the WHO African Region between 2015 and 2024 (see **section 5.6.3**), among those who sought care from any private sector provider (informal, formal or pharmacies) and were treated with an antimalarial drug, only 43% reported having undergone a malaria test. Because treatment is predominantly an out-of-pocket expense (*145*), patients may purchase incomplete or less effective medicines, often for presumed rather than confirmed malaria. These practices heighten the risk that parasites are exposed to subtherapeutic drug levels, favouring the survival and spread of resistant strains.

Recent surveys in Benin, Cameroon and Nigeria, following the ACTwatch Lite methodology developed by PSI (*13*), provided insight into antimalarial and RDT availability, price and sales volumes in the private sector (*146-147-148*). The results of these surveys (**Fig. 7.7**) show that AL had the majority market share in all three countries: 74% in Benin, 62% in Cameroon and 63% in Nigeria, mirroring the widespread use of AL in the public sector (*149*). In Nigeria, injectable artemisinin monotherapies (17%) had the second largest share of the market, followed by SP (8%). In Benin and Cameroon, DHA-PPQ accounted for the second largest market share (11% and 10%, respectively).

Fig. 7.7. Market share of different antimalarial medicines sold in private drug retail outlets (*N*=5186) in Benin, Cameroon and Nigeria (2023–2024) *Source: PSI/ACTwatch Lite surveys.*



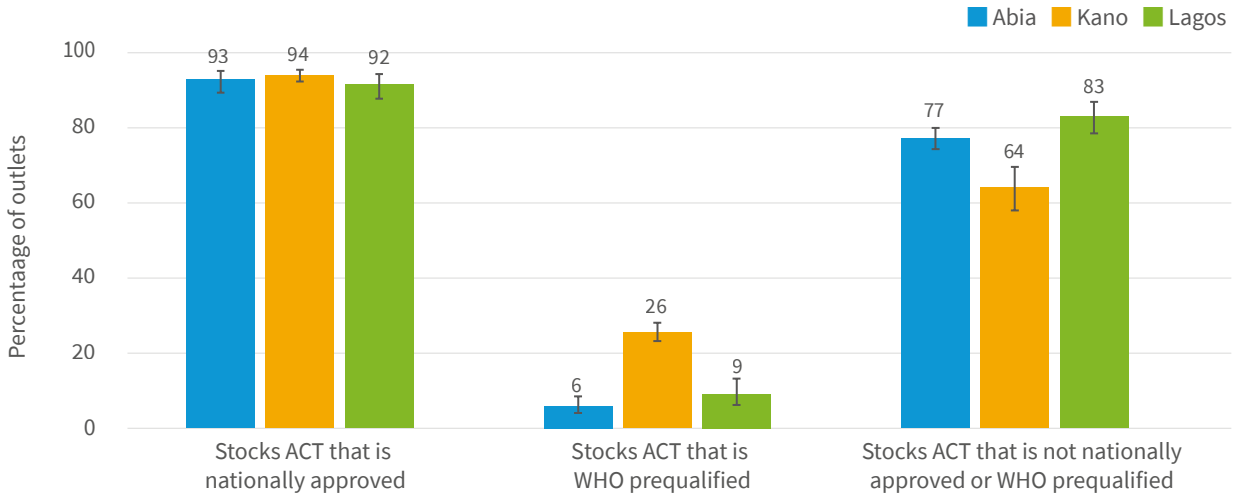
ACT: artemisinin-based combination therapy.

7.3.2.3 Quality assurance of antimalarials

In Nigeria, ACTwatch Lite surveys conducted in 2024 found that, although more than 90% of retailers (patent and proprietary medicine vendors) stocked nationally approved ACTs, the proportion stocking WHO-prequalified ACTs was considerably lower, ranging from 6% in Abia to 26% in Kano (**Fig. 7.8**) (*148*). A substantial number of outlets also carried ACTs that were neither nationally approved nor WHO prequalified, ranging from 64% in Kano to 83% in Lagos. The low prevalence of WHO-prequalified products, coupled with the high availability of unapproved ACTs, highlights significant gaps in quality assurance that may undermine treatment effectiveness.

In Cameroon, oral artemisinin monotherapy was found to be rarely available in the private sector (*147*). However, injectable malaria treatments (primarily injectable artesunate and artemether) were widely available in private sector outlets stocking antimalarials (**Fig. 7.9**). The use of injectable artemisinin formulations for uncomplicated febrile illness is considered incomplete treatment and can expose parasites to subtherapeutic concentrations of artemisinin, promoting resistance and compromising patient outcomes.

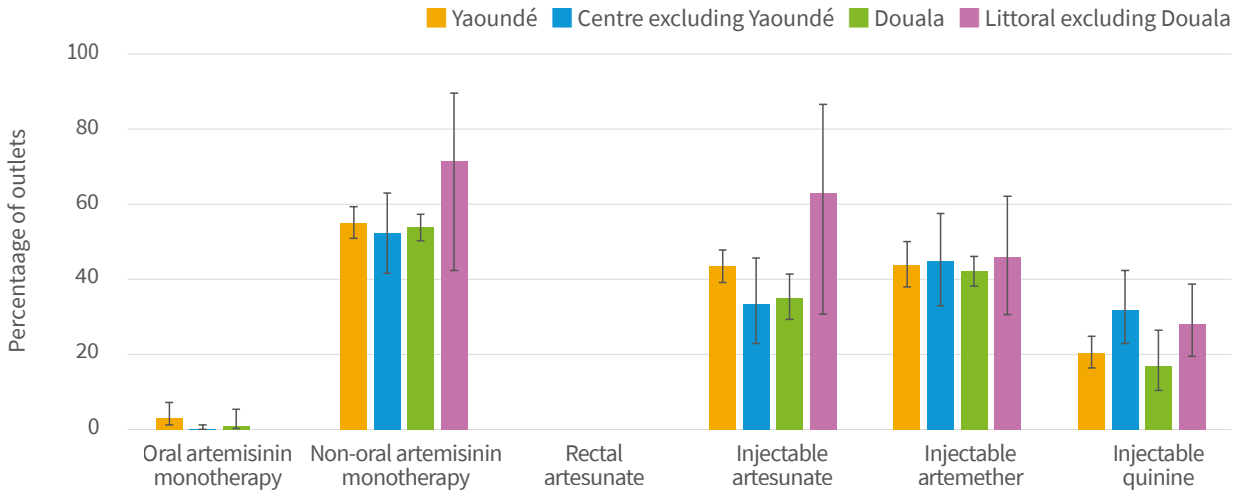
Fig. 7.8. Proportion of drug retail outlets (*N*=3867) in Nigeria (Abia, Kano and Lagos states) that stocked ACTs that are approved by NAFDAC,[a] WHO prequalified, or neither approved by NAFDAC nor WHO prequalified (2024) *Source: PSI/ACTwatch Lite Nigeria surveys.*



ACT: artemisinin-based combination therapy; NAFDAC: National Agency for Food and Drug Administration and Control; PSI: Population Services International; WHO: World Health Organization.

[a] NAFDAC is the national drug regulatory authority in Nigeria.

Fig. 7.9. Proportion of drug retail outlets (*N*=918) in Cameroon (Centre and Littoral regions) that stocked oral, rectal and injectable antimalarial monotherapies (2024) *Source: PSI/ACTwatch Lite Cameroon surveys.*



ACT: artemisinin-based combination therapy; PSI: Population Services International.

7.3.2.4 Interventions to improve quality of care in the private sector

Targeted interventions can improve the quality of private sector care, uptake of RDTs and use of affordable ACTs (*150*). ACT subsidy programmes, implemented through private medicine retailers, have significantly increased the availability and affordability of quality-assured ACTs, including for rural and low-income populations. Initiatives introducing RDTs into private outlets have achieved high uptake and improved dispensing practices, while integrated community case management (iCCM) has improved malaria case management. However, evidence for private medicine retailers' accreditation is limited, and key gaps remain in large-scale RDT and iCCM evaluations, digital interventions and broader strategies related to private medicine retailers.

Despite their importance, private providers are often overlooked in national malaria strategies. A key barrier is the lack of timely data on the products they stock and the practices they follow. This information gap complicates efforts to strengthen case management, as challenges differ across settings and evolve over time, from the prevalence of non-approved drugs to non-compliance with policies and weak integration into national surveillance systems.

7.4 Responding to resistance: lessons and the path forward

7.4.1 Lessons from the GMS and implications for Africa

The emergence of resistance in the GMS became a unifying threat that brought countries and partners together and ultimately strengthened the regional malaria response. Large-scale investment, most notably through the Global Fund's Regional Artemisinin-resistance Initiative (*151*, *152*), supported coordinated action steered by a regional committee and complemented by WHO's MME programme (*153*). Surveillance was reinforced, data were shared more rapidly and treatment policies were adapted as partner drug resistance emerged. Interventions focused on early diagnosis and treatment in hard-to-reach populations through extensive networks of community and mobile malaria workers. Efforts also targeted key drivers of resistance, including the use of artemisinin monotherapies, unregulated private sector treatment and the circulation of substandard or counterfeit medicines (*152*).

These combined actions, backed by political commitment, community engagement and cross-border coordination, made it possible to reorient the regional goal from resistance containment to malaria elimination. Although artemisinin partial resistance persisted, its clinical impact was mitigated, and *P. falciparum* cases fell to historic lows in countries that were once the epicentre of antimalarial drug resistance. Yet progress remains fragile; in conflict-affected areas, the disruption of health services has led to malaria resurgence.

In Africa, resistance is emerging in settings with higher transmission, heavier disease burden and health systems under strain. *PfKelch13* mutations have now been detected in multiple countries, with rapid spread in some areas putting ACT partner drugs under pressure. TES continue to show high cure rates where partner drugs remain effective, offering reassurance but also warning. Africa's reliance on a narrow set of ACT partner drugs, particularly lumefantrine and amodiaquine, leaves treatments vulnerable if resistance spreads undetected. Applying lessons from the GMS, particularly the importance of strong surveillance, rapid data sharing and coordinated response, will be critical in Africa to preserve ACT efficacy and progress towards malaria elimination.

7.4.2 Responding to resistance

Addressing antimalarial drug resistance requires a multifaceted and globally coordinated strategy, with particular urgency in Africa. In 2022, WHO launched the *Strategy to respond to antimalarial drug resistance in Africa* (*10*). The strategy objectives are threefold: 1) improve detection of resistance to enable timely responses; 2) delay the emergence of resistance to artemisinin and ACT partner drugs; and 3) limit the selection and spread of resistant parasites where resistance is confirmed. These priorities align with global frameworks, such as the GTS (*26*). Effective implementation of this strategy depends on understanding and addressing local drivers of resistance, which vary with transmission intensity, the strength of health systems, access to care and the vulnerability of specific populations.

Strengthening surveillance of antimalarial drug efficacy and resistance remains the cornerstone of the response. This includes expanding and improving TES and molecular surveillance to generate timely, high-quality data; increasing coverage and standardization of monitoring; and promoting rapid data sharing through regional and global platforms.

Optimizing the use of diagnostics and therapeutics is essential to limit unnecessary drug pressure. National treatment policies should promote rational use of existing medicines, ensure equitable access to high-quality diagnostics and drugs, and eliminate non-recommended monotherapies and substandard or falsified ACTs. Strengthening adherence and empowering patients, health care workers and communities to make informed decisions are also critical to ensuring effective treatment and preventing the emergence and spread of resistance.

Limiting the spread of antimalarial-resistant parasites requires targeted interventions to reduce transmission. This includes maintaining optimal vector control in priority areas, implementing preventive measures and consolidating cross-border collaboration to address shared risks.

Stimulating research and innovation is vital to sustain progress. Diversifying available treatment options is a key priority, given Africa's reliance on a narrow set of partner drugs. Promising strategies include the use of MFT and exploration of triple combinations, such as artemether–lumefantrine–amodiaquine (AL-AQ), as well as novel non-artemisinin regimens, such as ganaplacide–lumefantrine. Research is also advancing in other areas: identifying populations at higher risk of resistance emergence; modelling the molecular and clinical dynamics of antimalarial drug resistance; and developing new medicines, diagnostics and tools to limit infection and transmission.

Success in combating antimalarial drug resistance depends on strong political commitment, domestic and external financing, regional coordination and community engagement, all supported by effective governance, surveillance and context-specific implementation informed by local evidence and sustained policy action.

7.4.3 Implementation of the WHO strategy to respond to antimalarial drug resistance

Several countries in Africa have begun the process of adapting the WHO strategy to align with their specific contexts and needs. Each is at a different stage of implementation, beginning with a situation analysis to identify the main drivers of antimalarial drug resistance and inform the development of national strategies to prevent or mitigate resistance. Support for these activities has come from key partners, including WHO, the Gates Foundation, the Clinton Health Access Initiative (CHAI) and PATH. Countries at the forefront include Burkina Faso, Eritrea, Malawi, Rwanda and Uganda, with Rwanda already having adopted a national strategy for the deployment of MFT for malaria case management.

In 2024, WHO developed and published operational guidance on the adoption and implementation of MFT as one of the key strategies to contain antimalarial drug resistance (*11*). Complementing this, Unitaid has awarded a grant to Jhpiego under the Scaling the Optimal Use of Multiple ACTs to Prevent Antimalarial Drug Resistance (STOP-AMDR) project to support early-adopter countries in implementing MFT strategies (*154*). Lessons learned from these early implementation experiences will inform future updates to WHO's guidance and facilitate broader adoption of approaches using MFT across endemic countries.

The RBM Partnership to End Malaria, together with WHO, convened a global consultation on antimalarial drug resistance involving malaria partners, stakeholders and malaria endemic countries. A key outcome was the establishment of subregional networks on drug resistance and response, multi-country platforms for data sharing, coordination and policy dialogue. Such networks are being developed across east, west, southern and central Africa, building on earlier models such as the East African Network for Monitoring Antimalarial Treatment (EANMAT) and the Horn of Africa Network for Monitoring Antimalarial Treatment (HANMAT).

7.5 Final outlook

Antimalarial drug resistance remains a critical threat to global malaria control. Although efficacious treatments to cure malaria remain available, the multiple emergences and rapid spread of artemisinin partial resistance indicate growing drug pressure and put ACT partner drugs under increasing threat. The situation is worrying, and history shows how quickly resistance can spread if not detected and contained early.

Timely, high-quality surveillance of drug efficacy and resistance is central to mounting an effective response, yet large gaps in therapeutic efficacy data persist, and available results are often delayed or insufficient to guide policy. The expansion of molecular surveillance offers new opportunities to identify early warning signals and to guide where and when TES should be conducted. Ensuring quality case management across both public and private sectors is vital to preserve antimalarial efficacy. The private sector plays an important role in malaria care, but practices such as presumptive treatment and injectable monotherapies pose risks for resistance. Addressing these risks will require access to quality diagnosis, quality-assured drugs, stronger provider capacity and effective private sector engagement. A decline in financial support risks amplifying the factors that fuel resistance by increasing service delivery gaps, while weakening the systems needed to detect and address them. Increased investment in R&D, alongside mechanisms to ensure equitable access to new medicines, is essential, while preserving the efficacy of existing treatments requires their rational and appropriate use.

Experience from the GMS shows that an effective response to antimalarial drug resistance is possible. Africa's context is more complex, with higher transmission intensity, larger populations and health systems under greater strain, but several countries are already demonstrating tangible progress in applying effective policy to detect and contain resistance. Success will depend on sustained political commitment, sustainable financing and coordinated action across countries and sectors.

8 Conclusion

This year's world malaria report presents the latest updates on the progress against malaria, globally and regionally, covering the period 2000–2024 for most indicators. This chapter summarizes key findings and messages that have emerged from this report.

8.1 Trends in malaria burden

From 2000 to 2015, malaria case incidence declined by 25.6%, from 79.4 to 59.0 cases per 1000 population at risk. However, between 2015 and 2024, the incidence increased by 8.5%. The global malaria burden slightly rose in 2024, with an estimated 282 million cases and 610 000 deaths worldwide, representing 3% and 2% increases, respectively, compared with 2023. From 2023 to 2024, the incidence of malaria rose from 62.7 to 64.0 cases per 1000 population at risk, while the mortality rate remained stable at 13.8 deaths per 100 000 population at risk. Progress towards the GTS targets remains off track, with the current incidence being 3.5 times higher than the GTS target of 18 per 1000 population at risk, and the mortality rate three times higher than the target of 4.5 per 100 000 population at risk.

The WHO African Region accounted for 94% of global malaria cases and 95% of malaria deaths in 2024, with five countries – Nigeria (24.3%), the Democratic Republic of the Congo (12.5%), Uganda (4.7%), Ethiopia (4.4%) and Mozambique (3.6%) – contributing nearly half of all cases. Estimated malaria cases increased by 9 million (3.5%) from 2023 to 2024, partly driven by trends in Ethiopia and Madagascar. The WHO Eastern Mediterranean Region, which accounted for nearly 4% of global cases in 2024, experienced an estimated 6% decrease in malaria case incidence from 2023 to 2024, the first decline since 2020. The WHO Region of the Americas, while accounting for less than 1% of global cases, recorded a 16% increase from 2023 to 2024, largely driven by an increase in cases in Colombia, Haiti, Peru and the Plurinational State of Bolivia. In the WHO Western Pacific Region, where malaria is mostly concentrated in Indonesia and Papua New Guinea, incidence remained stable at 2.3 cases per 1000 population at risk in 2024. The WHO South-East Asia Region continued to make progress and remains on track to achieve the GTS 2025 targets of at least a 75% reduction in malaria case incidence and mortality rate since 2015.

The increase in malaria burden in 2024 was driven by a combination of technical, systemic, environmental and financial challenges and was concentrated in a limited number of countries. Technical challenges included biological threats, such as *pfhrp2* gene deletions, growing antimalarial drug resistance and widespread insecticide resistance, which reduced the effectiveness of RDTs and ITNs. Systemic challenges involved suboptimal delivery of interventions, limited access to quality care, gaps in surveillance and frequent stock-outs of essential commodities. Other challenges, including conflict and insecurity in affected regions, led to widespread disruption of health services, limiting access to care and delaying timely diagnosis and treatment. Environmental changes, such as rising

temperatures, shifting rainfall patterns and extreme weather events, influenced malaria transmission and disrupted health services, housing and livelihoods. Social determinants and persistent health inequities, driven by socioeconomic status, gender, disability, ethnicity, migrant status, discrimination and social exclusion, increased individual risk and barriers to accessing malaria interventions. Financial constraints, including underfunding, and inefficient use of resources, which may not have been effectively directed toward the areas or populations at highest risk, further limited the scale and quality of malaria programmes, contributing to suboptimal implementation.

Despite these challenges, malaria interventions have had a measurable impact. Between 2000 and 2024, an estimated 2.3 billion malaria cases and 14 million deaths were averted globally. In 2024 alone, more than 170 million cases and 1 million deaths were prevented due to malaria control efforts. The WHO African Region accounted for 76% of cases and 93% of deaths averted, followed by the WHO South-East Asia Region, with 16% of cases and 4% of deaths averted. There were also encouraging signs of progress towards malaria elimination. By mid-2025, Georgia, Suriname and Timor-Leste were officially certified malaria free by WHO, joining a growing list of countries that have successfully interrupted local transmission. This brings the total to 47 countries and one territory certified malaria free, with several others sustaining zero indigenous cases for at least 3 consecutive years. In 2024 alone, 46 countries reported fewer than 10 000 cases, demonstrating that elimination is not only possible but increasingly within reach for many low-burden settings. These milestones reflect the impact of sustained political commitment, strategic investments and community engagement. They also highlight the importance of tailored approaches, such as regional action plans and subnational targeting, which have enabled countries to adapt interventions to local contexts and accelerate progress.

8.2 State of malaria interventions

Although the global malaria burden remains high, 2024 also saw progress in the delivery and use of core WHO-recommended malaria control tools. The widespread deployment of ITNs (standard, PBO and dual active ingredient), RDTs, antimalarial medicines (including chemoprevention interventions such as SMC, IPTp and PMC) and, most recently, vaccines, continues to play a pivotal role in reducing both transmission and mortality. These tools not only support malaria elimination efforts but also contribute to broader public health improvements in affected regions. Trends in malaria cases and deaths are closely linked to the coverage and effectiveness of these interventions. For example, expanded access to diagnostic testing may result in more cases being detected, while sustained high coverage of ITNs and vaccines in at-risk populations is expected to drive down malaria morbidity and mortality. The integration of these tools into national strategies, tailored to subnational contexts, reinforces the potential for continued progress.

Vector control remained a central pillar of the global response, with ITNs playing a critical role. According to manufacturer data, 185 million ITNs were shipped worldwide in 2024. Of these, 42 million (23%) were conventional pyrethroid-only nets, 56 million (30%) were PBO nets, and 87 million (47%) were dual active ingredient nets. This represents a substantial shift in net composition compared with previous years, with the more effective nets (PBO or dual active ingredient) increasing from just 9% of the total share in 2019 to 77% 5 years later. This transition reflects a strategic pivot towards more effective tools in areas with high levels of insecticide resistance, and it signals growing adoption of next-generation vector control tools.

However, in 2024, there was a decrease in access to and use of ITNs compared with 2023, with access and coverage returning to levels observed in 2021 and 2022. This is likely due to a reduction in ITNs distributed during mass campaigns in 2024 compared with 2022 and 2023, as fewer countries had planned mass campaigns in 2024 under the 3-year mass campaign cycle.

Malaria diagnosis and treatment continued to improve in 2024, with NMPs reporting that 96% of cases in sub-Saharan Africa were treated. A total of 395 million RDTs were distributed in endemic countries, a 14% increase compared with 2023, reflecting expanded access to diagnostic services. On the treatment side, NMPs distributed 260 million ACTs, an increase of 20% since 2022. Challenges remain for ensuring timely and effective treatment, particularly in remote and underserved areas. Data from household surveys conducted in sub-Saharan Africa between 2017 and 2024 indicate persistent gaps: among children aged under 5 years with fever who sought care, 47% received a diagnostic test (up from 30% in 2005–2011), while 68% of children who received antimalarial treatment were treated with ACTs, a substantial increase from 34% in earlier surveys. Yet coverage remains suboptimal.

Chemoprevention efforts have also expanded. SMC is being implemented in 20 countries, and reached 54 million children in 2024, an increase from about 0.2 million in 2012. Nigeria alone treated more than 28 million children per cycle, accounting for more than half of all SMC coverage. In Mali, the number of children treated increased by 14% compared with 2023. For the first time, PMC was implemented in eight countries in 2024, in some cases being implemented in the same districts as the malaria vaccine.

Nearly 1 million children aged under 2 years received the first dose of PMC. These interventions are increasingly being tailored to local transmission patterns and integrated into broader child health platforms. Among pregnant women and girls, IPTp remained a vital intervention to reduce the burden of malaria and improve birth outcomes. In 2024, coverage of IPTp1 remained at 65%, while coverage of the second and third doses was also similar to coverage in 2023, at 55% and 45%, respectively. Four countries, Burkina Faso, the Democratic Republic of the Congo, Guinea and Sierra Leone, achieved IPTp3 coverage above 75%, demonstrating that high coverage is attainable with strong programmatic support. The impact of IPTp is substantial: it is estimated that low birthweight was averted in 530 000 neonates in 2024 due to current IPTp coverage levels.

The rollout of malaria vaccines marked a major milestone in 2024. With support from Gavi and coordinated efforts through the AMVIRA initiative, 17 countries have now introduced malaria vaccines into their immunization programmes. More than 10.5 million doses were delivered to implementing countries, and over 2.1 million children received at least one dose. The two WHO-recommended vaccines (RTS,S and R21) have demonstrated significant impact, with a pilot evaluation showing a 22% reduction in hospitalization for severe malaria and a 13% reduction in all-cause mortality among vaccinated children. On average, 63–75% of children in this evaluation had received the first three doses of the malaria vaccine, while uptake of the fourth dose ranged from 33% to 53% (*62*). Although initial rollout was limited by supply constraints, the availability of two prequalified vaccines has now opened the door for broader implementation. However, funding limitations continue to constrain scale-up, and many countries remain unable to meet their national vaccine coverage ambitions.

Together, these interventions form a comprehensive and increasingly diversified toolkit for malaria control. Their continued expansion, adaptation to local contexts and integration into broader health systems are essential for reversing the current trends and moving closer to global malaria elimination.

8.3 Risks to progress

Biological threats continue to be a major concern, with antimalarial drug resistance emerging as one of the most pressing and complex challenges. ACTs remain the cornerstone of malaria treatment. However, artemisinin partial resistance has now been confirmed in Eritrea, Rwanda, Uganda and the United Republic of Tanzania, and it is suspected in Ethiopia, Namibia, the Sudan and Zambia. These findings are based on TES and the detection of molecular markers associated with artemisinin partial resistance. Reports of high treatment failure rates in some studies have raised concerns about emerging resistance to ACT partner drugs, but interpretation remains difficult due to limitations in study quality and the absence of relevant molecular markers to confirm resistance.

The ability to confirm and respond to these developments is further constrained by limited surveillance coverage. Since 2020, only 15 countries in Africa have reported data from TES, leaving gaps in understanding the geographical extent and intensity of resistance. This lack of comprehensive data hampers timely policy decisions and weakens the capacity of NMPs to adapt treatment guidelines. Experience from the GMS demonstrates that antimalarial drug resistance can be effectively addressed when data are used rapidly to guide treatment policy and when gaps in access to care and quality-assured medicines are closed.

Building on these lessons, in 2022, WHO launched a regional strategy to respond to antimalarial drug resistance in Africa (*10*), aiming to improve detection, enable timely responses and reduce the impact of resistance through evidence-based measures. One approach to extending the therapeutic lifespan of existing ACTs and reducing selection pressure is the use of MFT. In 2024, WHO published an implementation guide (*11*) to support NMPs in assessing feasibility, policy implications and evidence gaps for future research, and several countries are actively working to adopt a national MFT strategy. In parallel, diagnostic reliability can be compromised by *pfhrp2/3* gene deletions, which render HRP2-based RDTs ineffective. A high prevalence of these deletions (exceeding 15%) has been reported in Brazil, Djibouti, Eritrea, Ethiopia, Nicaragua and Peru. WHO now recommends switching to non-HRP2 RDTs in areas where the prevalence of deletions exceeds 5%. In 2024, WHO released the second edition of its global response plan to *pfhrp2* gene deletions (*12*), providing technical guidance for countries to adapt their diagnostic strategies and transition to alternative RDTs.

Beyond biological determinants, climate change, conflict and population displacement continue to amplify malaria transmission and disrupt health service delivery. In Madagascar, estimated malaria cases have more than doubled since 2022, likely driven by extreme weather events that have impeded health care provision and by the expiration of LLINs, coupled with delays in their replacement, which further compromised vector control efficacy. In the Sudan and Yemen, ongoing conflict has severely restricted access to care and essential commodities, complicating malaria control efforts. Health system fragility remains a persistent barrier, with weak procurement mechanisms, supply chain disruptions and limited access to quality services in remote and conflict-affected areas undermining intervention coverage.

Sustained funding is essential for a resilient malaria response, as historical evidence shows that reductions

in financing have consistently led to increased disease burden and malaria resurgence (*155*). The United States has historically served as the largest donor to global health initiatives and accounted for 37% of all global malaria funding between 2010 and 2024, through both bilateral channels (mainly USAID's PMI) and multilateral initiatives. These investments have driven measurable progress; across low- and middle-income countries, investments through USAID funding have been associated with a 32% decline in under-5 mortality and a 51% reduction in malaria-specific mortality between 2001 and 2021 (*156*). However, in 2024, total malaria funding was estimated at US$ 3.9 billion (a slight decline from US$ 4.0 billion in 2023), representing less than half the funding required to achieve GTS targets. In 2025, the threat of underfunding has been heightened by the significant disruptions to ODA. Global development assistance for health declined significantly from 2024 to 2025, falling 21% overall and driven by a 67% drop in financing from the United States, while several other high-income countries also cut aid budgets, reflecting competing domestic priorities and broader fiscal pressures (*157*). The reorganization of global health programmes funded by the United States has led to notable disruptions in 2025. An executive order mandated a 90-day review of all foreign assistance, followed by a government-wide "stop-work order" that froze payments and services for ongoing projects. These actions coincided with the dissolution of USAID (effective in July 2025), extensive staff and contractor reductions, and the cancellation of most United States Government foreign assistance awards, though some have been reinstated through the Department of State (*158*). There have also been effects on public health agencies and funders, including the Global Fund, which has led a strategic reprioritization of activities within its current grant cycle (*159*). The United Kingdom, the second biggest donor to malaria programmes, announced foreign aid cuts in February 2025, stating that it would reduce its aid spending from 0.5% of gross national income (GNI) to 0.3% of GNI from 2027 (*160*). Other donor countries, such as France and Germany, similarly signalled their intention to reduce funding (*3*, *161*, *162*).

A WHO stocktake in March–April 2025 found that reductions in ODA had led to disruptions in all health system functions, especially for outbreak response, malaria, HIV, tuberculosis, sexually transmitted infections, family planning, and maternal and child health, while a third of countries faced critical shortages of medicines and health products (*163*). Within the malaria response, delays in planned case management commodities created an increasing risk of stock-outs at health facilities, posing critical threats to seasonal campaigns, such as SMC, that needed to begin before the start of the malaria season to have an impact. In several countries, PMI was the primary donor for specific subnational regions, and all prevention and case management services were put at risk across these areas as a result. A survey of 49 NMPs conducted between June and September 2025 (*164*), which received 21 responses (mostly from sub-Saharan Africa), found that ODA disruptions significantly affected routine malaria surveillance, including cancellations or reductions in capacity-building activities (86%), data-quality audits (71%), review meetings (67%), staff positions for data management and health informatics (38% and 25%, respectively), and maintenance or development of health information systems (45%). In addition, DHS and MIS were heavily affected: of the 36 surveys that were active in or planned for 2025, 18 have been completed or are in progress, 11 are paused but seeking resources to continue, and seven have been paused or cancelled with no way forward (unpublished data).[1]

In response, governments and their partners undertook extraordinary efforts to keep life-saving programmes on track. SMC campaigns with critical timing (i.e. occurring before the malaria season) proceeded as planned or were on track, with most countries having already received or had commodities at the time of the disruptions and adjusting their plans. Organizations such as GiveWell have supported planning and, in some cases, implementation costs in collaboration with governments to ensure a smooth transition before United States Government grants were reinstated (personal communication).[2] For ITN distribution, most countries completed their mass campaigns as planned with Global Fund-financed nets; a few countries experienced delays linked to procurement and delivery of PMI-funded nets or securing planned PMI funding for operational costs. This meant some adjustments to campaigns for which the PMI ITN contribution was limited, or more significant postponements for campaigns in which PMI was the lead partner for ITNs and operational costs (personal communication).[3] As United States Government procurement restarts, there is an ongoing risk of ITN gaps or stock-outs due to delays or disruptions in the procurement of PMI-funded nets and operational support. This is a particular concern for essential routine ITN distribution to pregnant women and children, given the historical focus of PMI in this area.

While the full impact of these disruptions is still being assessed, the sharp decline in external financing underscores the need to reduce reliance on external health aid. Domestic public financing is essential for both health and malaria programmes. Despite uncertainties around domestic funding, greater efforts are needed to ensure external funds are complementary and strengthen health systems that are capable of sustainably delivering malaria services.

[1] Data include contributions from the DHS Program at ICF (https://dhsprogram.com), 3 November 2025.
[2] SMC Alliance, personal communication, 21 October 2025.
[3] International Federation of Red Cross and Red Crescent Societies/Alliance for Malaria Prevention, personal communication, 7 October 2025.

8.4 Opportunities and the path forward

Despite the challenges outlined in previous sections, 2024 also brought forward a range of opportunities that can be leveraged to accelerate progress in malaria control and elimination. The deployment of new tools, such as dual active ingredient ITNs, PMC and malaria vaccines, has expanded the arsenal available to countries. These innovations are increasingly being integrated into broader health systems and tailored to local contexts, reflecting a shift towards more strategic and data-driven approaches.

Targeting malaria interventions to areas of greatest need is crucial, particularly in resource-constrained environments. The 2025 publication of the *Subnational tailoring of malaria strategies and interventions: reference manual* (*19*) provides a practical framework for adapting strategies to local epidemiological and operational contexts. Since the scale-up of subnational tailoring, which occurred initially through the HBHI approach, more countries have used it to design cost-effective, evidence-informed plans. Amid growing resource constraints, more than 10 countries are actively applying subnational tailoring to guide funding requests to the Global Fund for 2026. The effectiveness of these approaches relies on robust surveillance systems, which provide the high-quality data needed for planning, analysis, reporting and integration into national health systems. When used together, these tools and frameworks equip countries to optimize their malaria control and elimination strategies.

Momentum towards elimination continues to build. In 2025, Georgia, Suriname and Timor-Leste were certified malaria free, bringing the total to 47 countries and one territory. Bhutan, Malaysia and Saudi Arabia have sustained zero indigenous cases for multiple years. However, the resurgence of malaria cases in Cabo Verde, which was previously malaria free, highlights the fragility of these gains and the need for sustained vigilance. WHO has responded with updated guidance on emergency response and prevention of re-establishment, emphasizing early detection, rapid response and long-term investment.

Political commitment remains essential to driving progress in malaria prevention and elimination. The Yaoundé Declaration (*165*) demonstrates the power of ministers of health in leading the malaria response. This is complemented by the commitment of African heads of state to strengthening continental leadership, national accountability and institutional resilience for health. Its core principles of ensuring equity, transparency and inclusion; establishing sustainable financing from diverse sources; embedding health within economic policies; promoting Africa-led standards, data sovereignty and local manufacturing; and fostering cross-sectoral collaboration guide these efforts. Along with political will, communities play a critical role not only in accessing interventions, but also in calling for accountability and sustaining momentum. With coordinated leadership, robust health systems and active community participation, malaria elimination remains not just a goal, but an achievable reality. Contemporary programmes with improved surveillance, expanded interventions (including vaccines and new vector control tools), and WHO guidance on data-driven programme optimization can maintain impact even under constrained financial conditions. While declining budgets remain a risk to access to cost-effective preventive and treatment tools for the world's most vulnerable populations, the global malaria community must act decisively to mitigate these threats and sustain progress towards elimination. The recent disruption in global financing underscores the need for a new model of governance and financing for malaria prevention and control efforts, one that embraces national government leadership, a whole-of-society response, global solidarity, and the continued provision of global public goods, including R&D, market shaping, normative guidance and, where necessary, international financial support.

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Annexes

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The following annexes with associated data sets and methods are available in excel format online; F. Funding for malaria control, 2022–2024; G. Commodities distribution and coverage for malaria endemic countries and areas, 2022–2024; H. Population denominator for case incidence and mortality rate, and estimated malaria cases and deaths, 2000–2024; I. Reported malaria cases by health sector for malaria endemic countries and areas, 2024; J. Reported malaria cases by method of confirmation, 2015–2024; K. Reported malaria cases by species, 2015–2024; L. Reported malaria deaths, 2015–2024

Annex 1 – Data sources and methods

Fig. 2.1. Estimated number of malaria cases per country and area in 2024

See methods notes for **Table 2.1**.

Table 2.1. Global estimated malaria cases and deaths, 2000–2024

a) Global estimated malaria cases

For each country or area, the number of malaria cases was estimated by one of the three methods described below.

Method 1

Method 1 was used for countries and areas outside the World Health Organization (WHO) African Region and for low transmission countries and areas in the African Region as follows: Afghanistan, Bangladesh, the Bolivarian Republic of Venezuela, Botswana, Brazil, Cambodia (until 2020), Colombia, the Dominican Republic (until 2020), Eritrea, Ethiopia, French Guiana (until 2020), the Gambia, Guatemala (until 2020), Guyana, Haiti, Honduras (until 2020), India, Indonesia, the Lao People's Democratic Republic, Madagascar, Mauritania, Myanmar, Namibia, Nepal (until 2020), Nicaragua, Pakistan, Panama (until 2020), Papua New Guinea, Peru, the Philippines, the Plurinational State of Bolivia, Rwanda, Senegal, Solomon Islands, Timor-Leste (until 2016), Vanuatu, Viet Nam (until 2020), Yemen and Zimbabwe.

Estimates were made by adjusting the number of reported malaria cases for completeness of reporting, the likelihood that presumed cases were parasite positive, and the extent of health service use. The procedure, which is described in the *World malaria report 2008* (*1*), combines national data annually reported by national malaria programmes (NMPs) (i.e. reported cases, reporting completeness and test positivity rates) with data obtained from nationally representative household surveys on health service use among children aged under 5 years, which was assumed to be representative of the service use in all ages. Briefly:

$T = (a + (c \times e)) / d \times (1 + f / g + (1 - g - f) / 2 / g)$

where:

a is malaria cases confirmed in the public sector

c is presumed cases (not tested but treated as malaria)

d is reporting completeness

e is test positivity rate (malaria positive fraction) = a / b, where b is suspected cases tested

f is the fraction seeking treatment in the private sector

g is the fraction seeking treatment in the public sector

Factor to adjust for those not seeking treatment: $(1 - g - f)$

Cases in the public sector: $(a + (c \times e)) / d$

Cases in the private sector: $(a + (c \times e)) / d \times f / g$

To estimate the uncertainty around the number of cases, the test positivity rate was assumed to have a normal distribution centred on the test positivity rate value and standard deviation – defined as $0.244 \times f0.5547$ and truncated to be in the range 0, 1. Reporting completeness (*d*) was assumed to have one of three distributions, depending on the value reported by the NMP. If the value was reported as a range greater than 80%, the distribution was assumed to be triangular, with limits of 0.8 and 1.0, and the peak at 0.95. If the reporting completeness was reported as a value and was more than 80%, a beta distribution was assumed, with a mean value of the reported value (maximum of 95%) and confidence intervals (CIs) of 5% around the mean value. If the value or range was more than 50% but less than or equal to 80%, the distribution was assumed to be rectangular, with limits of 0.5 and 0.8, and the peak at 0.8. Finally, if the value or range was less than or equal to 50%, the distribution was assumed to be triangular, with limits of 0 and 0.5, and the peak at 0.5 (*2*). The fraction of children brought for care in the public sector and in the private sector was assumed to have a beta distribution, with the mean value being the estimated value in the survey and the standard deviation being calculated from the range of the estimated 95% CIs. The fraction of children not brought for care was assumed to have a rectangular distribution, with the lower limit being 0 and the upper limit calculated as 1 minus the proportion that were brought for care in the public and private sectors. The three distributions (fraction seeking treatment in the public sector, fraction seeking treatment in the private sector only and fraction not seeking treatment) were constrained to add up to 1.

Sector-specific care seeking fractions were linearly interpolated between the years that had a survey and were extrapolated for the years before the first or after the last survey. The parameters used to propagate uncertainty around these fractions were also imputed in a similar way or, if there was no value for any year in the country or area, were imputed as a mixture of the distributions of the region for that year. CIs were obtained from 10 000 draws of the convoluted distributions. The data were analysed using R statistical software, using the *convdistr* R package to propagate uncertainty and manage distributions (*3*).

For India, the values were obtained at subnational level using the same methodology after a validation of the reliability of trends per state. The care seeking behaviour estimates from the three available national surveys (2005, 2015 and 2019) were accepted for all states except for Maharashtra (2015) and Gujarat, Jharkhand and Uttar Pradesh (2019) due to unreliable trends. An additional adjustment was applied in several states in India between 2020 and 2022 to control for the reductions in reported testing rates associated with disruptions in health services related to the COVID-19 pandemic. The states with reductions in testing rates below those expected (defined as a change in testing rates of more than 10% observed between 2018 and 2019) in 2020 were Bihar, Chandigarh, Chhattisgarh, Dadra and Nagar Haveli, Delhi, Goa, Jharkhand, Karnataka, Puducherry, Punjab, Uttar Pradesh, Uttarakhand and West Bengal. In 2021, the states with reductions in testing rates were Assam, Chandigarh, Chhattisgarh, Daman and Diu, Delhi, Goa, Himachal Pradesh, Karnataka, Kerala, Manipur, Puducherry, Punjab, Uttar Pradesh, Uttarakhand and West Bengal. In 2022, cases were corrected for the states of Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Manipur, Puducherry, Punjab, Sikkim and West Bengal. In these states, the excess number of indigenous cases expected in the absence of diagnostic disruptions was calculated by estimating the

number of additional tests that would have been conducted if testing rates were similar to those observed in 2019, then applying the test positivity ratio observed in 2019 (or in 2020 for Delhi and Jharkhand, or in 2021 and 2022 for Delhi and Puducherry) to this number.

The malaria burden in countries outside the WHO African Region was affected by the COVID-19 pandemic in different ways. In several countries, the movement disruptions led to transmission reductions; in other cases, testing rates remained unchanged. This made it challenging to apply a single source of data for correction to all countries, considering also that it was difficult to relate the reported data to the essential health services (EHS) response. No adjustment for treatment seeking in the private sector was made for the following countries and areas because they report cases from the private and public sectors together: Bangladesh, the Bolivarian Republic of Venezuela, Botswana, Brazil, Cambodia (since 2018), Colombia, Haiti, Honduras, Indonesia (since 2017), Myanmar (since 2013), Nepal (since 2019), Nicaragua, Peru, the Plurinational State of Bolivia, Rwanda, Senegal (since 2020) and Viet Nam (since 2021). Additionally, the weight of the fraction of care seeking in the private sector for Indonesia's case estimates was modulated according to the increasing reporting of the private health sector to the surveillance system since 2017, starting with 25% of private health facilities in 2017 and rising to 94% in 2024.

Method 2

Method 2 was used for high transmission countries in the WHO African Region and for countries in the WHO Eastern Mediterranean Region in which the quality of surveillance data did not permit a robust estimate from the number of reported cases. These countries were Angola, Benin, Burkina Faso, Burundi, Cameroon, the Central African Republic, Chad, the Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Malawi, Mali, Mozambique, the Niger, Nigeria, Sierra Leone, Somalia, South Sudan, the Sudan, Togo, Uganda, the United Republic of Tanzania and Zambia. In this method, estimates of the number of malaria cases were derived from information on parasite prevalence obtained from household surveys.

First, data on parasite prevalence from almost 60 000 survey records were assembled within a spatiotemporal Bayesian geostatistical model, together with environmental and sociodemographic covariates, and data distribution on interventions such as insecticide-treated mosquito nets (ITNs), antimalarial drugs and indoor residual spraying (IRS) (*4*) that are updated yearly to review the model. The geospatial model enabled predictions of *Plasmodium falciparum* prevalence in children aged 2–10 years, at a resolution of 5×5 km^2, throughout all malaria endemic WHO African Region countries for each year from 2000 to 2020. Second, an ensemble model was developed to predict malaria incidence as a function of parasite prevalence (*5*). The model was then applied to the estimated parasite prevalence to obtain estimates of the malaria case incidence at 5×5 km^2 resolution for each year from 2000 to 2024.[1] Data for each 5×5 km^2 area were then aggregated within country and regional boundaries to obtain both national and regional estimates of malaria cases (*6*).

Between 2020 and 2022, additional cases estimated using this method were added to account for the disruptions in malaria prevention, diagnostic and treatment services as a result of the COVID-19 pandemic and other events that occurred during this period. Disruption information was reported per country and was obtained from the national pulse surveys conducted by WHO on continuity of EHS during the COVID-19 pandemic (first round in May–July 2020, second in January–March 2021 and third in November–December 2021) (*7-8-9*), and extended into 2022. The median, minimum and maximum (with a limit of 50%) values of the ranges provided by countries to define disruptions were used to quantify the percentage of malaria service disruptions. This information was integrated into the estimates by applying an approach previously used for assessing the impacts of interventions on malaria burden through the creation of counterfactual burden estimates for scenarios with varying levels of intervention coverage. It was assumed that COVID-19-related disruptions to health care manifested themselves as reduced treatment seeking for malaria and thus reduced effective treatment with an antimalarial drug. The counterfactual estimates were then aligned, per country, with the estimates from the pulse surveys to produce a set of COVID-19-adjusted estimates for 2020, 2021 and 2022. For countries for which the estimates with the updated spatiotemporal model were considerably different from previous estimates, without addition of new data or evidence that explained the drastic changes estimated by the model (Burkina Faso, Mali, Nigeria and the Niger), the case series published in the *World malaria report 2024* (*10*) were used until 2023. The values for 2024 were estimated by applying the change rate between the incidence estimated using the spatiotemporal model between 2023 and 2024 (Nigeria) or sustaining the same incidence rate as in 2023 (Burkina Faso, Mali and the Niger).

Method 3

For most of the elimination countries and countries at the stage of prevention of reintroduction, the number of indigenous and introduced cases registered by NMPs is reported without further adjustments (*6*). The countries and areas in this category were Algeria, Argentina, Armenia, Azerbaijan, Belize, Bhutan, Cabo Verde, Cambodia (since 2021), China, the Comoros, Costa Rica, the Democratic People's Republic of Korea, Djibouti, the Dominican Republic (since 2021), Ecuador, Egypt, El Salvador, Eswatini, French Guiana (since 2021), Georgia, Guatemala (since 2021), Honduras (since 2021), Iraq, the Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Malaysia, Mexico, Morocco, Nepal (since 2021), Oman, Panama (since 2021), Paraguay, the Republic of Korea, Sao Tome and Principe, Saudi Arabia, South Africa, Sri Lanka, Suriname, the Syrian Arab Republic, Tajikistan, Thailand, Timor-Leste (since 2017), Türkiye, Turkmenistan, the United Arab Emirates, Uzbekistan and Viet Nam (since 2021).

[1] See the Malaria Atlas Project website for methods of development of maps (*6*).

Annex 1 – Data sources and methods

Country-specific adjustments

For some years, information for certain countries was not available or could not be used because it was of poor quality. For countries in this situation, the number of cases was imputed from other years when the quality of the data was better (adjusting for population growth), as follows: for Afghanistan, values for 2000–2001 were imputed from 2002–2003; and for Bangladesh, values for 2001–2005 were imputed from 2006–2008. For Ethiopia, values for 2000–2019 were taken from a mixed distribution between values from Method 1 and Method 2 (50% from each method). For the Gambia, values for 2000–2010 were imputed from 2011–2013; for Haiti, values for 2000–2005, 2009 and 2010 were imputed from 2006–2008; for Indonesia, values for 2000–2003 and 2007–2009 were imputed from 2004–2006; and for Mauritania, values for 2000–2010 were imputed from a mixture of Method 1 and Method 2, starting with 100% values from Method 2 for 2001–2002, with that percentage decreasing to 10% of Method 1 in 2010. For Myanmar, values for 2000–2005 were imputed from 2007–2009; and for Namibia, values for 2000 were imputed from 2001–2003 and values for 2012 were imputed from 2011 and 2013. For Pakistan, values for 2000 were imputed from 2001–2003; and for Papua New Guinea, values for 2012 were imputed from 2009–2011. For Rwanda, values for 2000–2006 were imputed from a mixture of Method 1 and Method 2, starting with 100% values from Method 2 in 2000, with that percentage decreasing to 10% in 2006. For Senegal, values for 2000–2006 were imputed from a mixture of Method 1 and Method 2, with 90% of Method 2 in 2000, decreasing to 10% of Method 2 in 2006. For Thailand, values for 2000 were imputed from 2001–2003; for Timor-Leste, values for 2000–2001 were imputed from 2002–2004; and for Zimbabwe, values for 2000–2006 were imputed from 2007–2009.

Estimation of *P. vivax* cases

The number of malaria cases caused by *P. vivax* in each country was estimated by multiplying the country's reported proportion of *P. vivax* cases (computed as 1 − *P. falciparum* plus other species) by the total number of estimated cases for the country. For countries where the estimated proportion was not 0 or 1, the proportion of *P. falciparum* cases was assumed to have a beta distribution and was estimated from the proportion of *P. falciparum* cases reported by NMPs.

Population at risk

To transform malaria cases into incidence, an estimate of population at risk was used. The proportion of the population at high, low or no risk of malaria was provided by NMPs. Population at risk was estimated as the population at risk in high endemic areas and half of the population at risk in low endemic areas. This proportion was applied to the latest United Nations (UN) population estimates available, to compute the number of people at risk of malaria. The proportion was sustained over time from 2000 to 2024 to ensure comparability of incidence estimates across years in the same cohort of countries that had been endemic since 2000. The population at risk at the regional and global levels was aggregated; it included the population of all endemic countries since 2000, even though some of them achieved elimination during this time.

b) Global estimated malaria deaths

The number of malaria deaths was estimated using methods from Category 1, 2 or 3, as outlined below.

Category 1 method

The Category 1 method was used for low transmission countries and areas, both within and outside the WHO African Region: Afghanistan, Bangladesh, the Bolivarian Republic of Venezuela, Cambodia (until 2020), the Comoros, Djibouti, Eritrea, Ethiopia, French Guiana (until 2020), Guatemala (until 2020), Guyana, Haiti, Honduras (until 2020), India, Indonesia, the Lao People's Democratic Republic, Madagascar, Mauritania (since 2016), Myanmar, Nepal (until 2020), Pakistan, Papua New Guinea, Peru, the Philippines, the Plurinational State of Bolivia, Solomon Islands, Senegal (since 2008), Somalia, the Sudan, Timor-Leste, Vanuatu (until 2012), Viet Nam (until 2017), Yemen and Zimbabwe.

A case fatality rate of 0.256% was applied to the estimated number of *P. falciparum* cases, which represents the average of case fatality rates reported in the literature (*11-12-13-14*) and rates from unpublished data from Indonesia, 2004–2009.[1] The proportion of deaths followed a rectangular distribution of between 0.01% and 0.40% – the minimum and maximum values available that were reported. A case fatality rate of 0.0375% was applied to the estimated number of *P. vivax* cases, representing the midpoint of the range of case fatality rates reported in a study by Douglas et al. (*14*), following a rectangular distribution of between 0.012% and 0.063%. Following the nonlinear association explained for the Category 2 method below, the proportion of deaths in children aged under 5 years was estimated as:

$$\text{Proportion of deaths}_{\text{under 5}} = -0.2288 \times \text{Mortality}_{\text{overall}}^{2} + 0.823 \times \text{Mortality}_{\text{overall}} + 0.2239$$

where $\text{Mortality}_{\text{overall}}$ is the number of estimated all-age deaths over the estimated population at risk per 1000 (see **Annex H** for national estimates of population at risk).

Category 2 method

The Category 2 method was used for countries in the WHO African Region with a high proportion of deaths due to malaria: Angola, Benin, Burkina Faso, Burundi, Cameroon, the Central African Republic, Chad, the Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, the Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Malawi, Mali, Mauritania (until 2015), Mozambique, the Niger, Nigeria, Rwanda, Senegal (until 2007), Sierra Leone, South Sudan, Togo, Uganda, the United Republic of Tanzania and Zambia.

With this method, child malaria deaths were estimated using a multinomial Bayesian least absolute shrinkage and selection operator (LASSO) model that was reviewed by the WHO Child and Adolescent Cause of Death Estimates (CA-CODE, formerly the Maternal and Child Health Epidemiology Estimation [MCEE]) Group in 2021 to produce updated estimates of cause

[1] Dr Ric Price, Menzies School of Health Research, Australia, personal communication, November 2014.

of death (CoD) in children aged 1–59 months between 2000 and 2024 (*15*). Mortality estimates (and 95% CIs) were derived for eight causes of post-neonatal death (pneumonia, diarrhoea, malaria, tuberculosis, meningitis, injuries, pertussis and other disorders), four CoDs arising in the neonatal period (prematurity, birth asphyxia and trauma, sepsis and other conditions of the neonate) and other CoDs (e.g. malnutrition). Deaths due to measles, unknown causes and HIV/AIDS were estimated separately. The resulting cause-specific estimates were adjusted, country by country, to fit the estimated all-cause mortality envelope of 1–59 months (excluding HIV/AIDS and measles deaths) for corresponding years.

The number of malaria deaths among children aged under 5 years for 2006 was calculated by applying the country-specific yearly malaria CoD fraction to the all-cause mortality envelope of 1–59 months estimated by the UN Inter-agency Group for Child Mortality Estimation (*16*). In the absence of validated updated malaria CoD fractions, the same malaria CoD fractions observed in 2021 were used in 2022, 2023 and 2024. The CoD fraction obtained from Mali in 2021 was adjusted to mirror the corrections to the incidence estimates applied in last year's report by applying an inflation factor that compared the prevalence to incidence estimates between 2015 and 2023 published in the *World malaria report 2024* (*10*). The same CoD fraction estimated for 2021 was used in 2024. It was considered that the number of deaths follows a rectangular distribution, with limits being the estimated 95% CI.

The malaria mortality rate in children aged under 5 years estimated with this method was then used to infer malaria-specific mortality in those aged 5 years and over, using the relationship between levels of malaria mortality in a series of age groups and the intensity of malaria transmission (*17*), and assuming a nonlinear association between under-5 mortality and over-5 mortality, as follows:

$$\text{Proportion of deaths}_{\text{over 5}} = -0.293 \times \text{Mortality}_{\text{under 5}}^{2} + 0.8918 \times \text{Mortality}_{\text{under 5}} + 0.2896$$

where $\text{Mortality}_{\text{under 5}}$ is the number of estimated deaths over the estimated population at risk per 1000 in 2006, the year of the data from which the relationship was derived (*17*). The proportion of deaths among those aged 5 years and over, obtained through this relationship, was applied to all years in the time series.

Between 2020 and 2022, additional malaria deaths estimated using this method were included to account for the disruptions in malaria diagnostic and treatment services as a result of the COVID-19 pandemic. Country-specific mortality inflation ratios were calculated by comparing the malaria mortality estimates for 2020–2022, in the presence and absence of diagnosis and treatment disruptions from the malaria mortality estimates of the Malaria Atlas Project (MAP) (results not presented in the report, but derived from the malaria incidence estimates), with both estimates accounting for disruptions to prevention interventions. Inflation ratios were then applied to the number of malaria deaths for 2020, 2021 and 2022 to estimate the number of deaths expected, considering the reported disruptions.

Category 3 method

For the Category 3 method, the number of indigenous malaria deaths registered by NMPs is reported without further adjustments. This Method was used for the following countries and areas: Algeria, Argentina, Armenia, Azerbaijan, Belize, Bhutan, Botswana, Brazil, Cabo Verde, Cambodia (since 2021), China, Colombia, Costa Rica, the Democratic People's Republic of Korea, the Dominican Republic, Ecuador, Egypt, El Salvador, Eswatini, French Guiana (since 2021), Georgia, Guatemala (since 2021), Honduras (since 2021), Iraq, the Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Malaysia, Mexico, Morocco, Namibia, Nepal (since 2021), Nicaragua, Oman, Panama, Paraguay, the Republic of Korea, Sao Tome and Principe, Saudi Arabia, South Africa, Sri Lanka, Suriname, the Syrian Arab Republic, Tajikistan, Thailand, Türkiye, Turkmenistan, the United Arab Emirates, Uzbekistan, Vanuatu (since 2013) and Viet Nam (since 2021).

Fig. 2.2. Countries and areas with indigenous cases in 2000 and their status by 2024

Data on the number of indigenous cases (an indicator of whether countries or areas are endemic for malaria) were as reported to WHO by NMPs. Countries and areas with 3 consecutive years of zero indigenous cases are considered to have eliminated malaria and are no longer considered to be endemic.

Fig. 2.3. Global trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) distribution of malaria cases and d) deaths, by country, 2024

See methods notes for **Table 2.1**.

Table 2.2. Goals, milestones and targets for the GTS

The table presents the *Global technical strategy for malaria 2016–2030* (GTS) milestones for 2020 and 2025, along with the 2030 GTS targets to reduce malaria mortality and incidence, eliminate malaria from affected countries and prevent its re-establishment, all relative to 2015 levels (*18*).

Fig. 2.4. Comparison of global progress in malaria a) case incidence and b) mortality rate, considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green)

The GTS target is a 90% reduction of malaria incidence and mortality rate by 2030, with milestones of 40% and 75% reductions in both indicators for the years 2020 and 2025, respectively (*19*). A curve based on a quadratic fit is used for the malaria incidence GTS milestones. For projection of malaria incidence under current estimated trends, the same year-on-year linear trend observed in the previous 10 years (2014–2023) is forecast up to 2030. Predicted cases between 2024 and 2030 that are 20% higher than the maximum number of cases ever observed in the time series are capped at the maximum case value × 1.2 to avoid unreasonably high projections. Regions affected by the cap will experience a decrease in projected incidence starting from the year in which the cap is applied, due to population growth under a stable number of maximum projected cases. The distance between the target and the

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observed or projected incidence or mortality estimate is calculated using the following formula: 1 – (GTS expected value for a given year/observed or projected value for the same year).

Fig. 2.5. Map of malaria endemic countries (including the territory of French Guiana) showing progress towards the GTS 2025 malaria case incidence milestone of at least 70% reduction by 2024 from a 2015 baseline

See methods notes for **Fig. 2.4**.

The milestone of 70% represents the estimated expected reduction for 2024 that lies between the GTS targets of 2020 (40%) and 2025 (75%), based on a quadratic fit of the GTS targets.

Fig. 2.6. Map of malaria endemic countries (including the territory of French Guiana) showing progress towards the GTS 2025 malaria mortality rate milestone of at least 70% reduction by 2024 from a 2015 baseline

See methods notes for **Fig. 2.4** and **Fig. 2.5**.

Table 2.3. a) Progress towards GTS milestone for reduction in malaria incidence by 70% in 2024; b) Progress towards GTS milestone for reduction in malaria mortality by 70% in 2024

The table shows which countries are on track to reach the GTS targets, those where malaria incidence or mortality have remained unchanged between 2015 and 2024, and those that are off track, with increasing incidence or mortality rate. Countries were ranked into eight categories to assess progress towards the GTS targets for malaria case incidence and mortality rate in 2024 from the 2015 baseline:

- on track (zero malaria cases);
- on track (decrease of 70% or more), where 70% represents the estimated reduction from 2015 to 2024 required to be on track, considering the GTS targets of 2020 (40% reduction) and 2025 (75% reduction);
- decrease by between 25% and less than 70%;
- decrease by less than 25%;
- less than 5% increase or decrease;
- increase by less than 25%;
- increase by between 25% and less than 70%; and
- increase by 70% or more.

See methods notes for **Fig. 2.4**.

Table 2.4. Estimated malaria cases and deaths in the WHO African Region, 2000–2024

See methods notes for **Table 2.1**.

Fig. 2.7. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO African Region, 2024

See methods notes for **Table 2.1**.

Fig. 2.8. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO African Region, considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green)

See methods notes for **Fig. 2.4**.

Table 2.5. Estimated malaria cases and deaths in the WHO Region of the Americas, 2000–2024

See methods notes for **Table 2.1**.

Fig. 2.9. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO Region of the Americas, 2024

See methods notes for **Table 2.1**.

Fig. 2.10. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO Region of the Americas, considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green)

See methods notes for **Fig. 2.4**.

Table 2.6. Estimated malaria cases and deaths in the WHO Eastern Mediterranean Region, 2000–2024

See methods notes for **Table 2.1**.

Fig. 2.11. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO Eastern Mediterranean Region, 2024

See methods notes for **Table 2.1**.

Fig. 2.12. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO Eastern Mediterranean Region, considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green)

See methods notes for **Fig. 2.4**.

Table 2.7. Estimated malaria cases and deaths in the WHO South-East Asia Region, 2000–2024

See methods notes for **Table 2.1**.

Fig. 2.13. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO South-East Asia Region, 2024

See methods notes for **Table 2.1**.

Fig. 2.14. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO South-East Asia Region, considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green)

See methods notes for **Fig. 2.4**.

Table 2.8. Estimated malaria cases and deaths in the WHO Western Pacific Region, 2000–2024

See methods notes for **Table 2.1**.

Fig. 2.15. Trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2024; and c) malaria cases by country in the WHO Western Pacific Region, 2024

See methods notes for **Table 2.1**.

Fig. 2.16. Comparison of progress in malaria a) case incidence and b) mortality rate in the WHO Western Pacific Region, considering two scenarios: current trajectory maintained (blue) and GTS targets achieved (green)

See methods notes for **Fig. 2.4**.

Fig. 2.17. Estimated malaria a) cases and b) deaths in the 11 current HBHI countries, 2000–2024

These estimates are for high burden to high impact (HBHI) countries. See methods notes for **Table 2.1**.

Fig. 2.18. Cumulative number of a) malaria cases and b) malaria deaths averted, globally and by WHO region, 2000–2024

See methods notes for **Table 2.1** for information on estimation of cases and deaths. Estimated cases and deaths averted over the period 2000–2024 were computed by comparing current estimates for each year since 2000 with the malaria case incidence and mortality rates from 2000, assuming they remained constant throughout the same period, and adjusting for population growth.

Fig. 2.19. Percentage of a) malaria cases, with absolute number (in thousands) and b) malaria deaths averted, by WHO region, 2000–2024

See methods notes for **Table 2.1** for information on estimation of cases and deaths. See notes for **Fig. 2.18** for methods used to estimate cases and deaths averted. The percentage of cases and deaths averted was estimated using overall global cases and deaths averted as the denominator, and regional cases and deaths averted as the numerator.

Fig. 2.20. Sex-disaggregated malaria cases, by WHO region and country or area, 2024

Data are derived from country-reported national figures for 2024. Each country or area reports malaria cases disaggregated by sex (male and female) and includes a calculated category for cases that are unknown. This calculation is based on subtracting the confirmed and presumed female and male cases from the total confirmed and presumed cases, and the difference is reported as "unknown". Data are presented by country or area within each region.

Fig. 3.1. Number of countries that were malaria endemic in 2000 and had fewer than 10, 100, 1000 and 10 000 indigenous malaria cases, 2000–2024

The figure is based on the countries where malaria was endemic in 2000 that also had cases of malaria reported in 2000 (108 endemic countries, excluding Egypt, Kazakhstan and the United Arab Emirates, which reported zero cases in 2000). *P. knowlesi* cases were not included. The number of estimated cases was tabulated.

Fig. 3.2. Total indigenous malaria and *P. falciparum* cases in endemic countries in the GMS, 2015–2024

Data on the Greater Mekong subregion (GMS) are derived from the WHO database. Total indigenous malaria cases and indigenous *P. falciparum* cases are based on confirmed cases reported as indigenous per country where 100% of malaria cases are investigated and classified. Where not all cases are classified, total confirmed minus imported and introduced cases, and total *P. falciparum* minus imported and introduced *P. falciparum* cases were used to calculate indigenous malaria cases and indigenous *P. falciparum* cases, respectively. Where cases are not classified, all confirmed cases are assumed to be indigenous. The methodology used can vary by year for the same country. *P. knowlesi* cases were excluded from total indigenous cases.

Fig. 3.3. Countries and areas eliminating malaria and certified malaria free since 2000

Countries are positioned on the timeline according to the year in which they achieved 3 consecutive years of zero indigenous malaria cases since 2000. Blue indicates countries that have maintained zero indigenous cases but have not yet been certified malaria free. Green represents countries that have been certified malaria free, with the year of certification shown in parentheses. Maldives, although certified malaria free in 2015, had already achieved malaria free status before 2000.

Table 3.1. Number of indigenous malaria cases in E-2025 countries and areas, 2010–2024

Data are derived from NMP reports. Total indigenous malaria cases are based on confirmed malaria cases reported as indigenous by all countries and one area under the malaria eliminating countries for 2025 (E-2025) initiative between 2010 and 2024. For countries where not all cases are classified, total confirmed cases minus imported and introduced cases were used. For years in which no case classification was carried out, all confirmed cases were considered to be indigenous. Unclassified cases were reclassified as indigenous and added to reported indigenous cases. *P. knowlesi* cases were excluded from countries reporting this species (Cambodia, Indonesia, Malaysia, the Philippines and Thailand).

Table 3.2. Number of introduced and imported malaria cases between 2022 and 2024 in E-2025 countries that reported zero cases over at least a consecutive 3-year period (including those that have been certified malaria free under the initiative)

Data are derived from country reports. The total numbers of introduced and imported malaria cases are based on classified confirmed cases reported by countries that have been part of these initiatives and have achieved 3 consecutive years of zero indigenous malaria cases during the period 2015–2024.

Fig. 3.4. Number of total *P. knowlesi*, indigenous *P. knowlesi* and total malaria cases in countries reporting *P. knowlesi* infection, 2015–2024

Data are derived from NMP reports. Total indigenous malaria cases are based on confirmed malaria cases reported as indigenous, indigenous *P. knowlesi* and total *P. knowlesi*. Brunei Darussalam was certified malaria free in 1987 and resumed reporting data in 2022.

Fig. 3.5. Number of indigenous malaria cases between 2013 and 2024 in Cabo Verde and the Islamic Republic of Iran after reporting zero cases over at least a consecutive 3-year period

The red bars represent the reintroduction of indigenous cases after 3 consecutive years of reporting zero indigenous cases.

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The data on the Islamic Republic of Iran reflect locally acquired cases, which include indigenous and introduced cases, as the country cannot currently distinguish between the two.

Table 3.3. Number of malaria cases and deaths in malaria free countries, 2024

Data are derived from reports submitted by malaria free countries through WHO's *World malaria report 2024* data collection platform. For European Union (EU) Member States, which report routinely to the European Centre for Disease Prevention and Control, 2023 data – the most recent available – were used. The table summarizes the number of malaria free countries expected to report; those that reported; the total number of confirmed, introduced and imported malaria cases; and the total number of malaria deaths.

Fig. 3.6. Top countries of origin of infection for imported cases in the WHO European Region countries with the majority of malaria cases, 2024

The maps present data on imported malaria cases for 2024 in France, Germany, Spain and the United Kingdom of Great Britain and Northern Ireland (United Kingdom), the four European countries accounting for the majority of confirmed malaria cases in the WHO European Region. For each reporting country, the imported malaria cases were analysed by reported country of origin of infection. Countries of origin were presented if 20 or more imported cases were reported from them.

Fig. 4.1. GTS funding targets for 2025 and 2030

The figure compares total malaria control and elimination funding in 2024 with the GTS (*19*) targets for 2025 and the estimated annual investment needs for malaria research and development (R&D) from 2021 to 2030.

The 2024 total reflects combined domestic and international malaria funding, including government-reported contributions and estimated patient care delivery (PCD) costs. R&D values are drawn from Impact Global Health Ltd (G-FINDER) (*20*) and expressed in current US dollar values, consistent with the GTS targets.

Total malaria control and elimination funding for 2000–2024 was compiled from multiple international and domestic sources (**Table 4.1**). The methodology below describes the collection and analysis of all available public sector domestic and international funding used in **Figs. 4.2** to **4.8**.

Table 4.1. Sources of data on funding for malaria

The table summarizes the main data sources and inputs as reported by donors and countries, which were used to generate the financing estimates presented in **Fig. 4.1–4.8**. An additional amount for patient care, based on estimated costs of service delivery at public health facilities, is calculated for each country and added to domestic funding.

Coverage of figures and years

Fig. 4.2 and **Fig. 4.3** present data for 2010–2024, as country-specific unit cost estimates became available in 2010 and Organisation for Economic Co-operation and Development (OECD) reporting on use of the multilateral system began in 2011. OECD-based estimates use 2011 data to represent 2010, and 2023 data to represent 2024. **Fig. 4.4**, **Fig. 4.5** and **Fig. 4.6** cover 2000–2024 where data permit. Except for the use of proxy years for OECD data and limited estimation of missing domestic values explicitly approved by governments, no further imputation was performed. Results therefore reflect reported or directly derived values for each period. Unless otherwise stated, all values are expressed in constant 2024 US$.

Note: the data sources, boundaries, accounting rules and estimation methods used in this analysis differ from those of the System of Health Accounts 2011 (SHA2011). Consequently, the malaria expenditure data reported here – including for domestic and international funding – are not comparable with disease expenditure data, including for malaria, reported in WHO's Global Health Expenditure Database.

Domestic funding

Domestic funding was estimated as the sum of (i) government contributions reported by NMPs for the relevant year and (ii) PCD added to reflect public sector case management costs at health facilities. NMP-reported values were used for 2000–2024 (expenditures where available, or, where unavailable, reported budgets). PCD was calculated annually and added to the NMP totals; household out-of-pocket spending was excluded.

In a small number of cases with missing 2023 data, values were estimated using recent NMP reports (e.g. prior year or 2-year averages), consistent with country preferences. A few countries requested that 2024 remain blank. Where funding was reported in local currency, amounts were converted to constant 2024 US$ using standard deflators and exchange rates.

Quality control included systematic checks for internal consistency across years, review of outliers against programme context, and alignment with the main chapter series. No additional imputation was performed beyond the limited handling of missing 2023 values noted above.

PCD costs were estimated from the public-provider perspective using WHO-CHOosing Interventions that are Cost-Effective (WHO-CHOICE) unit costs (*21*) and adjusted malaria case data reported by NMPs. Country-specific WHO-CHOICE 2010 unit costs (outpatient visit; inpatient bed-day, all facility types) were projected to 2024 values using the World Bank gross domestic product (GDP) deflator (July 2024 release) (*22*) before conversion to constant 2024 US$.

Reported malaria cases in patients attending public facilities were adjusted for diagnosis and reporting completeness. Of adjusted uncomplicated cases, 1–3% were assumed to progress to severe disease; of severe cases, 50–80% were assumed hospitalized, with an average 3-day length of stay. Annual PCD cost per country equals:

> (outpatient unit cost × adjusted uncomplicated cases managed as outpatients) + (inpatient unit cost × 3 × adjusted severe cases hospitalized)

All PCD estimates were generated via a scripted R pipeline to ensure consistent transformations and auditability. The pipeline harmonizes country identifiers and WHO region codes; ingests NMP case data, WHO-CHOICE unit costs, GDP deflators

and official exchange rates; applies uniform adjustment parameters and clinical assumptions; converts all outputs to constant 2024 US$; runs deterministic checks and probabilistic uncertainty (1000 draws) for unit cost and pathway parameters; and exports country–year PCD totals for integration with NMP-reported domestic funding.

Built-in quality assurance flags outliers (e.g. year-on-year swings or cost per case outside interquartile fences), duplicates and currency inconsistencies. Flagged values were cross-checked against programme context and underlying inputs; corrections followed documented rules (e.g. currency fixes and deflator alignment). No ad hoc scaling was applied to force alignment with external totals.

PCD captures public sector case management delivery costs only; household out-of-pocket spending and private sector provider costs are excluded. Assumptions on progression to severity, hospitalization share and length of stay were applied uniformly across countries and years. Where NMP data were missing for a year, PCD was not imputed beyond the clinical-pathway adjustments described above. Uncertainty intervals reflect parameter variation in unit costs, progression to severe disease, hospitalization share and length of stay. The reported mean represents the average of 1000 Monte Carlo simulations, with percentile bounds available on request.

International funding

International bilateral funding data were obtained from several sources.

United States of America

Data from the United States Government were sourced with the technical assistance of KFF (formerly Kaiser Family Foundation) (*23*). For the period 2006–2023, country-level data were available from the United States Agency for International Development (USAID). For 2024, only the total planned bilateral allocation is available (no recipient-level allocations) due to reporting disruptions and uncertainty in disbursement. Funding data from other United States agencies – the United States Centers for Disease Control and Prevention (CDC) and the United States Department of Defense (DoD) – were available only as aggregate annual totals (not by country) for 2001–2023. These were combined with USAID's country-level, global and regional funding to calculate the overall United States bilateral contribution to malaria control. United States Government funding in the report does not include malaria research activities financed by the National Institutes of Health (NIH). Data for 2001–2018 are final, whereas CDC and DoD figures for 2019–2023 are preliminary estimates based on prior year amounts.

In 2024, disruptions to United States global health programming and associated reporting delays meant that recipient-level allocations (such as United States President's Malaria Initiative [PMI] Malaria Operational Plans) were not published. As a result, the 2024 United States bilateral malaria allocation is retained in the analysis as "unspecified" rather than assigned to recipient countries or regions; this affects comparability with prior years, in which a substantial share would have been attributed to the WHO African Region.

United Kingdom

United Kingdom data on malaria funding since 2017 were sourced from *Statistics on international development: final UK ODA spend 2024* (final UK aid spend) (*24*) and used with technical input from the United Kingdom Foreign, Commonwealth and Development Office (FCDO). The final UK aid spend data do not capture all United Kingdom support relevant to malaria outcomes, as the United Kingdom also contributes through broader health systems, R&D and multilateral support not explicitly tagged as malaria specific. For the period 2007–2016, United Kingdom spending data were sourced from the OECD creditor reporting system (CRS) database on aid activity (*25*).

Other bilateral donors

Disbursement data were also obtained from the OECD CRS database on aid activity for the period 2002–2023. The CRS dataset has a 2-year reporting lag, so 2023 data were used as a proxy for 2024. No additional imputation was applied, and results therefore reflect available reporting coverage and timing.

Fig. 4.2. Funding for malaria control and elimination, 2010–2024 (% of total funding), by source of funds (constant 2024 US$)

The figure presents malaria funding by source for 2010–2024, distinguishing between direct bilateral disbursements and contributions channelled through multilateral organizations, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). Because many donor governments provide malaria support indirectly through multilateral channels, proportional allocation methods were used to attribute multilateral spending back to the original financing governments.

Two main data streams were used.

1. Global Fund contributions (*26*) – for each year from 2010 to 2024, the share of total contributions paid by each donor to the Global Fund was applied to the Global Fund's total malaria disbursements for that year. This allowed each donor's proportional share of the Global Fund's malaria spending to be estimated (e.g. if the United Kingdom contributed 10% of Global Fund resources in 2024, 10% of the Global Fund's malaria disbursements in that year were attributed to the United Kingdom).
2. Other multilateral channels for agencies captured in the OECD CRS (*25*) and the Development Assistance Committee "use of the multilateral development system" dashboard, the share of total contributions paid by each donor was applied to the agency's estimated malaria-related investment in the same year.

Contributions from malaria endemic countries to multilateral agencies were reclassified under domestic ("governments of endemic countries") funding.

This proportional method avoids underrepresenting donors that primarily fund malaria control through multilateral mechanisms rather than direct bilateral aid. For example, the United Kingdom's total malaria funding includes both direct

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bilateral disbursements (e.g. from FCDO) and its share of multilateral spending (e.g. its proportion of Global Fund malaria disbursements).

This approach captures all systematically reported bilateral and multilateral flows for malaria control and elimination. Additional contributions from private or philanthropic sources outside these reporting systems (e.g. direct investments or pooled allocations not channelled through the Global Fund or OECD reporting) may exist but are not included here, to maintain a standardized and auditable methodology applied consistently across years and funders. All values are expressed in constant 2024 US$, and each funder's total reflects the sum of its direct and proportionally allocated malaria financing for 2010–2024.

Fig. 4.3. Annual funding for malaria control and elimination, 2010–2024, by source of funds (constant 2024 US$)

See methods notes for **Table 4.1** and **Fig. 4.2** for sources of data on total malaria funding and the allocation method used to attribute multilateral spending to original financing governments. This figure presents the same dataset in absolute terms, showing annual trends in funding levels by source over 2010–2024.

Fig. 4.4. Funding for malaria control and elimination, 2000–2024, by channel (constant 2024 US$)

The figure presents malaria funding by delivery channel (bilateral, multilateral and domestic) for 2000–2024, showing how funds are routed from source to implementation. Bilateral channels refer to direct donor-to-country disbursements; multilateral channels capture pooled or intermediary disbursements through organizations such as the Global Fund; and domestic channels represent national government expenditures and associated PCD costs.

Unlike **Fig. 4.2** and **Fig. 4.3**, which allocate multilateral spending back to the original donor (e.g. the United Kingdom's share of Global Fund disbursements), **Fig. 4.4** and subsequent figures present data by delivery mechanism – that is, whether resources were channelled bilaterally, multilaterally or domestically.

See methods notes for **Table 4.1** for sources of data on government and donor funding.

Fig. 4.5. Funding for malaria control and elimination, 2000–2024, by WHO or unspecified region (constant 2024 US$)

The figure presents malaria funding by WHO region for 2000–2024. The "unspecified" category captures funding for which recipient-level geographical details were unavailable – such as regional or multi-country initiatives, global allocations or disbursements that could not be linked to a specific recipient country. In 2024, this category also includes the unallocated United States bilateral malaria funding, following reporting disruptions.

See methods notes for **Table 4.1** for sources of data on government and donor funding.

Fig. 4.6. Funding for malaria control and elimination, 2000–2024, by World Bank 2025 income group and source of funding (constant 2024 US$)

The figure presents malaria funding by source and by country income group according to the World Bank 2025 classification (*27*) for 2000–2024. See methods notes for **Table 4.1** for sources of information on total funding for malaria control and elimination from governments of malaria endemic countries and international donors.

Fig. 4.7. Malaria R&D funding by product type, 2015–2024 (constant 2024 US$)

Data on funding for malaria-related R&D for 2015–2024 were sourced directly from Impact Global Health through the G-FINDER data portal (*20*).

Fig. 4.8. Top funders for malaria-related R&D, 2024 (constant 2024 US$)

See methods notes for **Fig 4.7**.

Fig. 5.1. Number of ITNs delivered by manufacturers and distributed by NMPs, 2010–2024

Data on the number of ITNs delivered by manufacturers to countries were provided to WHO by Milliner Global Associates; these data were collected by the Alliance for Malaria Prevention (AMP) Net Mapping Project. Data from NMP reports were used for the number of ITNs distributed within countries; these data include nets distributed through antenatal care (ANC) clinics, the Expanded Programme on Immunization (EPI), mass campaigns and other distribution channels. Until the *World malaria report 2023*, if NMP reports on ITN distributions were unavailable, data were provided by the Global Fund. This applied to Botswana (2018, 2019), the Central African Republic (2020), Chad (2021, 2022), the Comoros (2019, 2022), Djibouti (2021), Eritrea (2020), Ethiopia (2021), Haiti (2020), India (2020, 2021), the Sudan (2019) and Yemen (2020). Data collected by the AMP were included in reporting of the number of ITNs delivered through mass campaigns in Nigeria and Zambia. The analysis of NMP reports was limited to countries endemic for malaria in 2024.

Fig. 5.2. Total number of ITNs shipped by manufacturers globally, by net type, 2022–2024

These data come from the manufacturer data provided to WHO by Milliner Global Associates, collected by the AMP Net Mapping Project.

Fig 5.3. ITNs planned and distributed during mass campaigns in endemic countries or areas, 2020–2024

Data from NMP reports on mass campaigns were used to determine the number of ITNs distributed within countries. Data collected by AMP were included in reporting of the number of ITNs delivered through mass campaigns in Nigeria and Zambia.

Fig. 5.4. Indicators of a) population-level access to ITNs, and b) population-level use of ITNs, sub-Saharan Africa, 2000–2024

Estimates of ITN coverage were derived from a model developed by MAP (*28*), using a two-stage process. First, a

mechanism was designed for estimating net crop (i.e. the total number of ITNs in households in a country at a given time), taking into account inputs to the system (e.g. deliveries of ITNs to a country) and outputs (e.g. loss of ITNs from households). Second, empirical modelling was used to translate estimated net crops (i.e. total number of ITNs in a country) into resulting levels of coverage (e.g. access within households, use in all ages and use among children aged under 5 years).

Coverage estimates are made by country, then aggregated to continental level. Years with household surveys are most precise; between survey years, the estimates rely on modelled rates of loss of nets from households, which can be highly variable. The modelling does not currently account for seasonal variation in ITN use, nor does it differentiate by type of net.

The model incorporates data from three sources:

- the number of ITNs delivered by manufacturers to countries, as reported to WHO by Milliner Global Associates;
- the number of ITNs distributed within countries, as reported to WHO by NMPs; and
- data from nationally representative household surveys from 40 countries in sub-Saharan Africa, from 2000 to 2024.

Countries for analysis

The main analysis covered 40 of the 46 malaria endemic countries or areas of sub-Saharan Africa. The island of Mayotte (for which no ITN delivery or distribution data were available) was excluded, as were the low transmission countries of Botswana, Eswatini, Namibia, Sao Tome and Principe, and South Africa, for which ITNs comprise a small proportion of vector control. Analyses were limited to populations categorized by NMPs as being at risk.

Estimating national net crops through time

As described by Flaxman et al. (*29*), national ITN systems were represented using a discrete-time stock-and-flow model. Nets delivered to a country by manufacturers were modelled as first entering a "country stock" compartment (i.e. stored in-country but not yet distributed to households). Nets were then available from this stock for distribution to households by the NMP or through other distribution channels. To accommodate uncertainty in net distribution, the number of nets distributed in a given year was specified as a range, with all available country stock (i.e. the maximum number of nets that could be delivered) as the upper end of the range and the NMP-reported value (i.e. the assumed minimum distribution) as the lower end. The total household net crop comprised new nets reaching households plus older nets remaining from earlier times, with the duration of net retention by households governed by a loss function. However, rather than the loss function being fitted to a small external dataset – as per Flaxman et al. (*29*) – the loss function was fitted directly to the distribution and net crop data within the stock-and-flow model itself. Loss functions were fitted on a country-by-country basis, were allowed to vary through time, and were defined separately for conventional ITNs (cITNs) and long-lasting insecticidal nets (LLINs). The fitted loss functions were compared with existing assumptions about rates of net loss from households. The stock-and-flow model was fitted using Bayesian inference and Markov chain Monte Carlo methods, which provided time-series estimates of national household net crop for cITNs and LLINs in each country and an evaluation of underdistribution, all with posterior credible intervals.

Estimating indicators of national ITN access and use from the net crop

Rates of ITN access within households depend not only on the total number of ITNs in a country (i.e. the net crop), but also on how those nets are distributed among households. One factor that is known to strongly influence the relationship between net crop and net distribution patterns among households is the size of households, which varies among countries, particularly across sub-Saharan Africa. Many recent national surveys report the number of ITNs observed in each household surveyed. Hence, it is possible to both estimate net crop and generate a histogram that summarizes the household net ownership pattern (i.e. the proportion of households with 0, 1, 2, etc. nets). In this way, the size of the net crop was linked to distribution patterns among households while accounting for household size, making it possible to generate ownership distributions for each stratum of household size. The bivariate histogram of net crop to distribution of nets among households by household size made it possible to calculate the proportion of households with at least one ITN. Also, because the numbers of both ITNs and people in each household were available, it was possible to directly calculate two additional indicators: the proportion of households with at least one ITN for every two people, and the proportion of the population with access to an ITN within their household. For the final ITN indicator – the proportion of the population who slept under an ITN the previous night – the relationship between ITN use and access was defined using 62 surveys in which both these indicators were available (ITN use all ages = 0.8133 × ITN access all ages + 0.0026, $R^2 = 0.773$). This relationship was applied to MAP's country–year estimates of household access, to obtain ITN use among all ages. The same method was used to obtain the country–year estimates of ITN use in children aged under 5 years ($\text{ITN use}_{\text{children under 5}} = 0.9327 \times \text{ITN access}_{\text{children under 5}} + 0.0282$, $R^2 = 0.754$).

Fig. 5.5. Percentage of the population at risk protected by IRS, by WHO region, 2010–2024

The number of people protected by IRS was reported to WHO by NMPs. The total population of each country was taken from the 2024 revision of the *World population prospects* (*30*); the population at risk of malaria was calculated using the methods previously described for **Table 2.1**.

The 42 countries and one territory that implemented IRS nationally in 2024, and provided data, were: Botswana, Brazil, Burkina Faso, Burundi, the Comoros, Costa Rica, Djibouti, the Dominican Republic, Ecuador, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, French Guiana, Ghana, Guatemala, Honduras, India, the Islamic Republic of Iran, Kenya, the Lao People's Democratic Republic, Madagascar, Mexico, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Pakistan, Panama, Peru, the Philippines, Rwanda, Sao Tome and Principe, Sierra Leone, South Africa, Thailand, Uganda, the United Republic of Tanzania (Zanzibar), Viet Nam, Yemen, Zambia and Zimbabwe. In Eswatini (2007 and 2008) and South

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Africa (2014), the population at risk was replaced with the target population. Only malaria endemic countries were included in the analysis of IRS.

Fig. 5.6. Subnational areas where SMC was delivered, and number of treatment cycles per district, in implementing countries in sub-Saharan Africa, 2024

Data were provided by Medicines for Malaria Venture (MMV) and assembled through the seasonal malaria chemoprevention (SMC) Alliance. Subnational data on the implementation of SMC in Madagascar were not available.

Table 5.1. Average number of children treated with at least one dose of SMC, by year, in countries implementing SMC, 2012–2024

For all countries except Madagascar, data were collected by NMPs and shared with the London School of Hygiene & Tropical Medicine (LSHTM) and MMV. For Madagascar, the NMP provided data directly to WHO. The table shows the average number of children receiving SMC for each district, regardless of the number of cycles (the average is based on three, four or five cycles in a district where three, four or five cycles have been done, respectively). The sum of the district averages is used to obtain the average for each country.

Until and including the *World malaria report 2021* (*31*), the total number of children who received SMC at the country level was divided by four. The rationale for this approach was twofold. First, most countries performed four cycles in all districts up until 2021. Second, it was assumed that children receiving a fifth cycle had already received the first four cycles and were therefore de facto counted. The limitation of this approach was that it underestimated the average number of children covered by SMC in countries that performed fewer than four cycles.

Table 5.2. Number of treatment doses delivered, by year, in countries implementing SMC, 2012–2024

As for **Table 5.1**, data were collected by NMPs and shared with LSHTM and MMV. The number of treatments delivered is the sum of all the children who received SMC at each cycle. Previously, in the *World malaria report 2021* (*31*), the number of treatments delivered was calculated by multiplying the average number of children treated by four. This assumed that each country conducted four cycles in each district, which is not the case.

Table 5.3. PMC delivery in countries implementing PMC through a national strategy and/or research pilot, 2024

Data were collected from the NMPs of the countries implementing perennial malaria chemoprevention (PMC) by the PMC Community of Practice, with contributions from their technical partners, led by Population Services International (PSI), PATH, Malaria Consortium and the Barcelona Institute for Global Health (ISGlobal).

Fig. 5.7. Estimated prevalence of exposure to malaria infection during pregnancy, overall and by subregion in 2024, in moderate to high transmission countries in the WHO African Region

Estimates of malaria-exposed pregnancies and neonates born with preventable malaria-attributable low birthweight (LBW) in the absence of pregnancy-specific malaria prevention (i.e. ANC, LLINs or intermittent preventive treatment of malaria in pregnancy [IPTp]) were obtained using a model of the relationship between these outcomes, slide microscopy prevalence in the general population, and age- and gravidity-specific fertility patterns. This model was developed by fitting an established model of the relationship between malaria transmission and malaria infection by age (*32*) to patterns of infection in placental histology (*33*) and attributable LBW risk by gravidity, in the absence of IPTp or other effective chemoprevention (*34*). The model was run across a 0.2-degree (5 km^2) longitude/latitude grid for 100 realizations of the MAP (*6*) joint posterior estimated slide prevalence in children aged 2–10 years in 2024 (*35*). Country-specific, age-specific or gravidity-specific fertility rates, stratified by urban rural status, were obtained from the latest demographic and health surveys (DHS) and malaria indicator surveys (MIS), where such surveys have been carried out since 2014 and were available from the DHS programme website (*36*). Countries where surveys were not available were allocated fertility patterns from a survey undertaken in another country, matched on the basis of total fertility rate (*30*) and geography. Fertility patterns of individual women and girls within simulations at each grid-point were simulated based on the proportion of women and girls estimated to be living in urban or rural locations. Urban or rural attribution at a 1 km^2 scale was conducted based on WorldPop 1 km^2 population estimates from 2018 (*37*) and an urban/rural threshold of 386 people/km^2 (*38*); the estimates were then aggregated to the 0.2-degree (5 km^2) resolution of the MAP surfaces. This provided a risk of malaria infection and malaria-attributable LBW in the absence of prevention during pregnancy, along with a modelled per capita pregnancy rate for each grid-point, which was aggregated to country level (using WorldPop population estimates) to provide a per-pregnancy risk of malaria infection and a per-live-birth estimate of malaria-attributable LBW in the absence of prevention. These were then multiplied by country-level estimates of pregnancies and malaria-attributable estimates of neonates with LBW in 2024.

Fig. 5.8. Percentage of pregnant women and girls attending an ANC clinic at least once and receiving IPTp, by number of SP doses, sub-Saharan Africa, 2010–2024

The total number of pregnant women and girls eligible for IPTp was calculated by adding total live births calculated from UN population data and spontaneous pregnancy loss (specifically, miscarriages and stillbirths) after the first trimester (*39*). Spontaneous pregnancy loss has previously been calculated by Dellicour et al. (*40*). Country-specific estimates of IPTp coverage were calculated as the ratio of pregnant women and girls receiving IPTp during ANC visits to the estimated number of pregnant women and girls eligible for IPTp in a given year. ANC attendance rates were derived in the same way, using the number of initial ANC clinic visits reported through routine information systems. Linear interpolation of information for national representative surveys was used to compute missing values. Due to missing data, the same first to third IPTp dose (IPTp1 to IPTp3) and ANC coverage estimates observed in 2023 were assumed for 2024 for Malawi, Sierra Leone and Zimbabwe; the same IPTp1 and IPTp2 coverages from 2023 were assumed for

Burkina Faso in 2024; the same IPTp1 coverage estimates from 2023 was assumed for the Democratic Republic of the Congo in 2024; and the same IPTp2 coverage estimates from 2023 were assumed for South Sudan in 2024. IPTp3 coverage was corrected to be equal to IPTp2 in all countries that reported higher IPTp3 coverage than IPTp2 coverage in 2024 (Burkina Faso, Equatorial Guinea and Guinea). Due to inconsistent reporting in recent years, the IPTp and ANC values from 2021 were applied to Côte d'Ivoire in 2024. Data from the 2022 household surveys were used to inform the IPTp and ANC coverage estimates in Mozambique and the United Republic of Tanzania.

Dose coverage was calculated for 33 of the 34 countries with an IPTp policy (Sao Tome and Principe was excluded because of the low malaria burden). The coverages of at least one ANC visit were corrected in 2020 and 2021 based on the country-specific disruptions to ANC services reported per country and obtained from the national pulse surveys conducted by WHO on continuity of EHS during the COVID-19 pandemic (first round in May–July 2020, second in January–March 2021 and third in November–December 2021) (*7-8-9*). Disruptions were quantified by using the middle value of the disruption ranges reported by countries.

A 5% reduction in ANC attendance was assumed in all countries that did not provide information on ANC service disruptions in the pulse surveys (*41-42-43-44-45*). The corrected number of women and girls who attended at least one ANC visit, after adjusting for disruptions, multiplied by the operational coverage of IPTp1 dose reported in 2020 or 2021 (calculated as the number of women and girls who received IPTp1 divided by the corrected number of women and girls who attended the first ANC visit [ANC1]) made it possible to re-estimate the expected number of pregnant women and girls who took IPTp1, which in turn made it possible to re-estimate the population coverage of IPTp1. The ratio observed among IPTp1, IPTp2 and IPTp3 was used to calculate the corrected coverage for IPTp2 and IPTp3, assuming no disruptions in IPTp dose follow-up.

Fig. 5.9. Estimated number of neonates with low birthweight attributable to malaria in pregnancy under three scenarios: 1) in the absence of IPTp; 2) at current estimated levels of IPTp coverage; and 3) if IPTp1–3 coverage matched ANC1 coverage, overall and by subregion in 2024

Methods for estimating malaria infection in pregnancy and malaria-attributable LBWs are described in Walker et al. (2014) (*34*), as referenced in the methods notes for **Figure 5.7**. Numbers of pregnancies were estimated from the latest UN population-estimated number of births and were adjusted for the rate of abortion, miscarriage and stillbirth (*39*, *40*). The underlying *P. falciparum* parasite prevalence estimates were from the *Pf*$PR_{2–10}$ estimates described in the methods notes for **Table 2.1**, using methods described in Bhatt et al. (2015) (*35*).

Fig. 5.10. Number of RDTs sold by manufacturers and distributed by NMPs for use in testing suspected malaria cases, 2010–2024

The number of rapid diagnostic tests (RDTs) distributed by WHO region is the sum of the total distributions reported by NMPs. In previous years, where data on RDT distributions were missing, the reported number of tests using RDTs was used as a proxy, given that the number of tests using RDTs normally approximates RDT distributions. In 2024, no proxy data were used. Data on RDT distributions were unavailable from Peru and the Republic of Korea in 2024.

Numbers of RDTs sold between 2010 and 2024 reflect sales by companies eligible for procurement. From 2010 to 2017, WHO received reports from up to 44 manufacturers (cumulative number; the number of eligible manufacturers and responders differed from year to year) that participated in the RDT Product Testing Programme by WHO, the Foundation for Innovative New Diagnostics (FIND), the United States CDC and the Special Programme for Research and Training in Tropical Diseases. Since WHO prequalification became a selection criterion for procurement, sales data from 2018 onwards were provided by a limited number of eligible manufacturers. Data from 2024 were reported to WHO from nine of the 10 eligible companies.

Fig. 5.11. Number of ACT treatment courses delivered by manufacturers and distributed by NMPs to people with malaria, 2010–2024

Data on artemisinin-based combination therapy (ACT) deliveries from 2024 were provided by 13 manufacturers eligible for procurement by WHO and the UN Children's Fund (UNICEF). ACT deliveries were categorized as being to either the public sector or the private sector, also taking into account the Affordable Medicines Facility – for malaria (AMFm) initiative and the Global Fund co-payment mechanism for the relevant years.

Data on ACTs distributed within countries through the public sector were taken from NMP reports. Between 2019 and 2022, missing data from NMP reports for ACT distributions were calculated based on the rate of ACT distributions to the number of patients treated with ACTs from the previous year, multiplied by the number of patients treated with ACTs in the current year. If these data were not available, the number of patients treated with ACTs was used as a proxy for ACT distributions. Please also refer to the methods described for **Annex G**. In 2024, data on ACT distributions were missing from Afghanistan, Djibouti and Peru. No proxy data for ACT distributions were used in 2024.

Table 5.4. Summary of coverage of treatment seeking for fever, diagnosis and use of ACTs for children aged under 5 years, from household surveys in sub-Saharan Africa, at baseline (2005–2011) and most recently (2017–2024)

The analysis is based on the latest nationally representative household surveys (DHS and MIS) conducted between 2017 and 2024; surveys from 2005–2011 were considered as baseline surveys from sub-Saharan African countries where data on malaria case management were available. The data are only available for children aged under 5 years because DHS and MIS focus on the population groups living in vulnerability. Interviewers ask caregivers whether the child has had fever in the 2 weeks preceding the interview and, if so, where care was sought; whether the child received a finger or heel prick as part of the care; what treatment was received for the fever and when; and, in particular, whether the child received an ACT or other antimalarial medicine. In addition to self-reported data, DHS and MIS also include biomarker testing for malaria, using

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RDTs that detect *P. falciparum* by targeting the histidine-rich protein 2 (HRP2) antigen. Percentages and 95% CIs were calculated for each country each year, taking into account the survey design. Median values and interquartile ranges were calculated using country percentages for the latest and baseline surveys. The indicators outlined in the table below are presented.

The use of household survey data (**Table 5.4)** has several limitations. Respondents may not provide reliable information, especially on episodes of fever and the identity of prescribed medicines, resulting in a misclassification of drugs. Respondents can report more than one source of care after a fever; thus, sources of care cannot be understood as mutually exclusive, as respondents may seek care from more than one sector for a single fever episode. However, only a low proportion (<5%) of febrile children were brought to more than one source of care to receive care. Similarly, diagnostic and treatment practices cannot be linked to specific sectors, given the way the questions were formulated in the survey. Data may also be biased by the seasonality of survey data collection – DHS are carried out at various times during the year and MIS are usually timed to correspond with the high malaria transmission season. In addition, depending on the sample size of the survey, the denominator for some indicators can be small – countries where the number of children in the denominator was less than 30 were excluded from the calculation.

Table 5.5. Summary of coverage of treatment seeking for fever, diagnosis and use of ACTs for children aged under 5 years from the most recent household survey for countries in sub-Saharan Africa

See the information provided for **Table 5.4**.

Fig. 5.12. Countries implementing malaria vaccine or planning introduction with approved Gavi support in 2024

The map represents the countries that have been approved to receive support for malaria vaccine implementation from Gavi, the Vaccine Alliance (Gavi), including those implementing the vaccine as of 2024. It was developed by WHO based on the outcomes of the review of malaria vaccine applications by Gavi.

Fig. 6.1. Estimated prevalence of *pfhrp2* gene deletions (1996–2024) among countries that were malaria endemic in 2024

The map of the estimated prevalence of *P. falciparum* histidine-rich protein 2 (*pfhrp2*) gene deletions was based on published data included in the WHO Malaria Threats Map (*46*). Data were extracted from articles published between 2010 and 2025, in

Indicator	Numerator	Denominator
Median prevalence of fever in the past 2 weeks	Children aged under 5 years with a history of fever in the past 2 weeks	Children aged under 5 years
Median prevalence of fever in the past 2 weeks in children for whom treatment was sought	Children aged under 5 years with a history of fever in the past 2 weeks for whom treatment was sought	Children aged under 5 years with fever in the past 2 weeks
Median prevalence of treatment seeking by source of treatment for fever in the public sector (health facility)	Children aged under 5 years with a history of fever in the past 2 weeks for whom treatment was sought in the public sector (health facility)	Children aged under 5 years with fever in the past 2 weeks for whom treatment was sought
Median prevalence of treatment seeking by source of treatment for fever in the public sector (community health worker)	Children aged under 5 years with a history of fever in the past 2 weeks for whom treatment was sought in the public sector (community health worker)	Children aged under 5 years with fever in the past 2 weeks for whom treatment was sought
Median prevalence of treatment seeking by source of treatment for fever in the private sector (formal and informal)	Children aged under 5 years with a history of fever in the past 2 weeks for whom treatment was sought in the private sector (formal and informal)	Children aged under 5 years with fever in the past 2 weeks for whom treatment was sought
Median prevalence of receiving finger or heel prick	Children aged under 5 years with a history of fever in the past 2 weeks for whom treatment was sought and who received a finger or heel prick	Children aged under 5 years with fever in the past 2 weeks for whom treatment was sought
Median prevalence of treatment with ACTs	Children aged under 5 years with a history of fever in the past 2 weeks for whom treatment was sought and who were treated with ACTs	Children aged under 5 years with fever in the past 2 weeks for whom treatment was sought
Median prevalence of treatment with ACTs among those who received a finger or heel prick	Children aged under 5 years with a history of fever in the past 2 weeks who received ACT treatment	Children aged under 5 years with fever in the past 2 weeks for whom treatment was sought and who received a finger or heel prick
Median prevalence of treatment with ACTs	Children aged under 5 years with a history of fever in the past 2 weeks for whom treatment was sought and who were treated with ACTs	Children aged under 5 years with fever in the past 2 weeks for whom treatment was sought and who were treated with antimalarials

which results of studies conducted between 1996 and 2024 are presented. Studies included symptomatic and asymptomatic patients. Prevalence was determined for each country by dividing the number of samples with *pfhrp2* deletions in the country by the total number of samples positive for *P. falciparum* in that country. Countries where only one sample was tested were excluded. The year refers to the year that samples were collected, not the year of publication.

Fig. 6.2. Surveillance conducted on *pfhrp2* gene deletions (1996–2024) among countries that were malaria endemic in 2024

The map of surveillance of *pfhrp2* gene deletions was based on published data included in the WHO Malaria Threats Map (*46*). Data were extracted from articles published between 2010 and 2025, in which results of studies conducted between 1996 and 2024 are presented. The year refers to the year that samples were collected, not the year of publication.

Fig. 6.3. Number of *P. falciparum* TES finding treatment failures rates of more or less than 10% in the WHO African Region, by ACT (2015–2025), among studies with at least 20 patients

The bars show the total number of therapeutic efficacy studies (TES) from 2015 to 2025, and the number of studies that found treatment failure rates of more or less than 10% for each ACT tested for the WHO African Region. Only studies with at least 20 patients were included. The data were obtained from the WHO *Global database on antimalarial drug efficacy and resistance* (*47*); all data shown are included in the WHO Malaria Threats Map (*46*).

Fig. 6.4. Number of *P. falciparum* TES finding treatment failure rates of more or less than 10% in the a) WHO Eastern Mediterranean Region, b) WHO South-East Asia Region and c) WHO Western Pacific Region, by ACT (2015–2025), among studies with at least 20 patients

The bars show the total number of TES from 2015 to 2025, and the number of studies that found treatment failure rates of more or less than 10% for each ACT tested for the WHO Eastern Mediterranean Region, the WHO South-East Asia Region and the WHO Western Pacific Region. Only studies with at least 20 patients were included. The data were obtained from the *WHO Global database on antimalarial drug efficacy and resistance* (*47*); all data shown are included in the WHO Malaria Threats Map (*46*).

Fig. 6.5. Reported insecticide resistance status as a proportion of sites where monitoring was conducted, by WHO region (2020–2024), for carbamates, neonicotinoids, organophosphates and pyrethroids

The status of resistance at each mosquito collection site for each insecticide class was assessed using WHO tube tests or United States CDC bottle bioassays conducted at the site during 2020–2024, with validated discriminating concentrations of the insecticides in the class. If multiple insecticides and mosquito species were tested between 2020 and 2024 at the collection site, the lowest mosquito mortality was considered. If the lowest mosquito mortality was below 90%, resistance was considered to be confirmed at the site; if the lowest mosquito mortality was at least 90% but less than 98%, resistance was considered to be possible at the site; if the lowest mortality was 98% or more, vectors at the site were considered to be susceptible to the insecticide class.

Note that, to date, WHO has not received any test results that indicated resistance and met all the published criteria for chlorfenapyr resistance (*48*). Where results were inconclusive, the resistance status is listed as "undetermined". However, the definition for susceptibility was recently revised following a technical consultation (*49*), and the susceptible sites can now be seen. Similarly, since the update in the pirimiphos-methyl discriminating concentration (*48*), WHO has not received data using the new concentration, and previous submissions have been reclassified as "undetermined".

These data were reported to WHO by NMPs, national public health institutes, universities and research centres, the African Network on Vector Resistance, MAP (*6*), VectorBase and PMI, or were extracted from scientific publications. All data shown are included in the WHO Malaria Threats Map (*46*).

Fig. 6.6. Detections of *An. stephensi* in the WHO African and Eastern Mediterranean regions, as reported to WHO since 2012

These data were reported to WHO by NMPs and national public health institutes, their implementation partners or research institutions or extracted from scientific publications. Population data were provided by WorldPop (*37*). All data are also shown on the WHO Malaria Threats Map (*46*).

Fig. 6.7. Number of study sites reporting the results of *An. stephensi* surveillance (2012–2024)

These data were reported to WHO by NMPs and national public health institutes, their implementation partners or research institutions or extracted from scientific publications. All data are also shown on the WHO Malaria Threats Map (*46*).

Fig. 7.1. History of introduction of principal antimalarials and of first emergence of resistance in the field

This chart shows the timeline of the introduction of the main antimalarial drugs and the first documented emergence of resistance in the field, updated from Blasco et al. (*50*).

Fig. 7.2. Map of artemisinin partial resistance in Africa

The maps show countries in Africa with confirmed and suspected artemisinin partial resistance from the published data included in the WHO Malaria Threats Map (*46*).

Fig. 7.3. Detection of *PfKelch13* molecular mutations in Uganda (2016–2024): decreasing prevalence of wild-type and increasing prevalence of validated markers of artemisinin partial resistance over time

The circles represent the percentage of samples that were wild-type, and the molecular markers A675V and C469Y, among all samples analysed in molecular marker studies of *Plasmodium falciparum* Kelch13 (*Pf*Kelch13). The data were obtained from

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the WHO *Global database on antimalarial drug efficacy and resistance* (*47*).

Fig. 7.4. Treatment failure rates in TES for treatment of *P. falciparum* with AL (2019–2025), among studies with at least 20 patients in the WHO African region

The circles represent the percentage of patients with treatment failure, determined in TES. Only studies with at least 20 patients were included. The data were obtained from the WHO *Global database on antimalarial drug efficacy and resistance* (*47*).

Fig. 7.5. Number of TES of *P. falciparum* in the WHO African Region (2019–2024)

This chart indicates the data available on TES from countries in the WHO African Region. Data were obtained from the WHO *Global database on antimalarial drug efficacy and resistance* (*47*).

Fig. 7.6. Proportion of children seeking care in the private sector (formal, informal or pharmacies)

See the information provided for **Table 5.4**.

Fig. 7.7. Market share of different antimalarial medicines sold in drug retail outlets (*N*=5186) in Benin, Cameroon and Nigeria (2023–2024)

The chart displays the availability of antimalarials at all surveyed outlets, estimated as the proportion of adult equivalent treatment dose (AETD) reportedly sold or distributed in the previous week by antimalarial type, among all AETDs sold or distributed in the previous week.

Data source and methods are detailed in each respective country report (*51-52--53*).

Fig. 7.8. Proportion of drug retail outlets (*N*=3867) in Nigeria (Abia, Kano and Lagos states) that stocked ACTs that are approved by NAFDAC, WHO prequalified, or neither approved by NAFDAC nor WHO prequalified (2024)

The graph was produced by PSI/ACTwatch Lite and PSI Nigeria. Data source and methods can be found in the ACTwatch Lite Nigeria 2024 final report (*53*).

Fig. 7.9. Proportion of drug retail outlets (*N*=918) in Cameroon (Centre and Littoral regions) that stocked oral, rectal and injectable antimalarial monotherapies (2024)

The graph was produced by PSI/ACTwatch Lite and Association Camerounaise pour le Marketing Social (ACMS). Data source and methods can be found in the ACTwatch Lite Cameroon 2024 final report (*52*).

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Annex 2 – Number of ITNs distributed through campaigns in malaria endemic countries, 2022–2024

Country	2022				2023		
	ITNs planned for distribution in 2022 (including carry-over from 2021)	ITNs distributed in 2022 (including carry-over from 2021)	ITNs remaining for distribution in 2023	Percentage of ITNs planned for distribution in 2022 and distributed in 2022	ITNs distributed in 2023 from 2022 campaigns	Percentage of remaining ITNs from 2022 distributed in 2023 (including carry-over from 2022)	ITNs remaining in 2023 from 2022 campaigns
Afghanistan[1,2,3]	2 195 198	1 950 586	244 612	88.9	244 612	100	0
Angola[4]	6 927 274	6 927 274	0	100	0	NA	0
Bangladesh[1]	900 047	600 813	299 234	66.8	299 234	100	0
Benin	0	0	0	NA	0	NA	0
Burkina Faso	16 051 515	14 446 364	1 605 151	90.0	0	NA	1 605 151
Burundi	6 611 501	6 548 442	63 059	99.0	0	NA	63 059
Cambodia[3,5]	307 572	307 572	0	100	0	NA	0
Cameroon[1]	16 756 200	11 193 768	5 562 432	66.8	1 429 330	25.7	4 133 102
Central African Republic[1]	1 626 470	1 371 125	255 345	84.3	255 345	100	0
Chad	0	0	0	NA	0	NA	0
Comoros	0	0	0	NA	0	NA	0
Congo[1,6]	3 502 800	3 355 112	147 688	95.8	147 688	100	0
Côte d'Ivoire	0	0	0	NA	0	NA	0
Democratic Republic of the Congo[1]	37 294 622	28 131 033	9 163 589	75.4	9 163 589	100	0
Djibouti[1]	236 469	215 839	20 630	91.3	20 000	96.9	630
Eritrea	0	0	0	NA	0	NA	0
Ethiopia[1,2,3]	10 398 413	8 595 938	1 802 475	82.7	1 802 475	100	0
Gambia[4]	1 594 136	1 594 136	0	100	0	NA	0
Ghana	0	0	0	NA	0	NA	0
Guinea	9 419 350	8 927 578	491 772	94.8	0	NA	491 772
Guinea-Bissau	0	0	0	NA	0	NA	0
Haiti	0	0	0	NA	0	NA	0
India[7]	11 345 797	1 259 541	5 141 343	11.1	0	NA	5 141 343
Indonesia[8]	2 485 716	2 485 716	0	100	0	NA	0
Kenya[3]	0	0	0	NA	0	NA	0
Lao People's Democratic Republic	972 310	915 981	56 329	94.2	0	NA	0
Liberia[2]	0	0	0	NA	0	NA	0
Madagascar[3]	2 106 406	1 729 231	377 175	82.1	0	NA	0
Malawi[3]	1 896 849	0	0	NA	0	NA	0
Mali	0	0	0	NA	0	NA	0
Mauritania	0	0	0	NA	0	NA	0
Mozambique[1]	5 198 450	5 173 420	25 030	99.5	25 030	100	0
Myanmar[1,3]	541 200	464 780	76 420	85.9	76 420	100	0
Nepal[1,3]	344 006	101 097	242 909	29.4	84 853	34.9	158 056
Niger	9 367 018	9 267 397	99 621	98.9	0	NA	0
Nigeria[1]	46 131 125	43 088 675	3 042 450	93.4	3 042 450	100	0
Pakistan[1]	3 002 590	2 415 672	586 918	80.5	586 918	100	0

2023				2024				
ITNs planned for distribution in 2023 (including carry-over from 2022)	ITNs distributed in 2023 (including carry-over from 2022)	ITNs remaining for distribution in 2024	Percentage of ITNs planned for distribution in 2023 and distributed in 2023	ITNs distributed in 2024 from 2023 campaigns	Percentage of remaining ITNs from 2023 distributed in 2024 (including carry-over from 2023)	ITNs planned for distribution in 2024 (including carry-over from 2023)	ITNs distributed in 2024 (including carry-over from 2023)	Percentage of ITNs planned for distribution in 2024 and distributed in 2024
414 267	414 267	0	100	0	NA	311 962	311 962	100
0	0	0	NA	0	NA	0	0	NA
1 375 518	1 375 518	0	100	0	NA	0	0	NA
9 838 316	7 748 415	2 089 901	78.8	0	NA	0	0	NA
0	0	1 605 151	NA	0	NA	0	0	NA
0	0	63 059	NA	0	NA	0	0	NA
253 507	103 075	150 432	40.7	150 432	100	416 821	416 821	100
6 726 695	1 429 330	5 297 365	21.2	379 702	7.2	388 750	379 702	97.7
3 172 817	2 979 554	193 263	93.9	0	NA	0	0	NA
12 038 378	9 713 825	2 324 553	80.7	0	NA	0	0	NA
199 769	70 979	128 790	35.5	63 737	49.5	108 000	63 737	59
558 205	558 205	0	100	0	NA	0	0	NA
0	0	0	NA	0	NA	0	0	NA
38 918 649	38 918 649	0	100	0	NA	17 534 865	8 057 733	46.0
0	0	0	NA	0	NA	0	0	NA
0	0	0	NA	0	NA	1 518 826	1 343 575	88.5
19 799 526	19 799 526	0	100	0	NA	2 223 000	2 223 000	100
0	0	0	NA	0	NA	0	0	NA
0	0	0	NA	0	NA	13 243 000	12 671 101	95.7
0	0	0	NA	0	NA	0	0	NA
1 654 098	1 344 960	309 138	81.3	0	NA	0	0	NA
1 100 892	663 412	437 480	60.3	0	NA	0	0	NA
0	0	5 141 343	NA	4 617 780	89.8	4 617 780	4 617 780	100
0	0	0	NA	0	NA	0	0	NA
0	0	0	NA	0	NA	14 273 153	14 273 153	100
0	0	0	NA	0	NA	0	0	NA
3 200 000	3 200 000	0	100	0	NA	3 318 730	2 985 593	89.96
0	0	0	NA	0	NA	14 663 522	14 663 522	100
0	0	0	NA	0	NA	11 758 607	11 758 607	100
12 568 419	10 845 716	1 722 703	86.3	0	NA	0	0	NA
1 641 609	1 563 181	78 428	95.2	0	NA	0	0	NA
13 809 532	11 400 648	2 408 884	82.6	0	NA	0	0	NA
2 250 189	723 179	1 527 010	32.1	99 750	6.5	99 750	99 750	100
84 853	84 853	158 056	100	78 598	100	78 598	78 598	100
0	0	99 621	NA	0	NA	15 357 456	15 041 339	97.9
29 778 331	22 813 900	6 964 431	76.6	6 964 431	100	11 329 891	10 733 057	94.7
6 136 700	2 019 054	4 117 646	32.9	4 117 646	100	8 221 276	7 727 198	94.0

Annex 2 – Number of ITNs distributed through campaigns in malaria endemic countries, 2022–2024

Country	2022				2023		
	ITNs planned for distribution in 2022 (including carry-over from 2021)	ITNs distributed in 2022 (including carry-over from 2021)	ITNs remaining for distribution in 2023	Percentage of ITNs planned for distribution in 2022 and distributed in 2022	ITNs distributed in 2023 from 2022 campaigns	Percentage of remaining ITNs from 2022 distributed in 2023 (including carry-over from 2022)	ITNs remaining in 2023 from 2022 campaigns
Papua New Guinea[1,3]	1 332 559	973 828	358 731	73.1	358 731	100	0
Rwanda[3,4,6]	4 437 461	4 437 461	0	100	0	NA	0
Senegal[2]	6 976 498	6 935 681	40 817	99.4	0	NA	0
Sierra Leone[2]	0	0	0	NA	0	NA	0
Solomon Islands	0	0	0	NA	0	NA	0
Somalia	2 707 067	2 707 067	0	100	0	NA	0
South Sudan[1,2,3]	2 468 144	969 822	1 498 322	39.3	1 498 322	100	0
Sudan[5]	18 758 082	18 758 082	0	100	0	NA	0
Togo	0	0	0	NA	0	NA	0
Uganda	0	0	0	NA	0	NA	0
United Republic of Tanzania							
Mainland[5,6]	818 644	818 644	0	100	0	NA	0
Zanzibar[2,5]	0	0	0	NA	0	NA	0
Vanuatu	70 865	62 359	8 505	88	8 506	100	0
Viet Nam	151 093	151 093	0	100	0	NA	0
Yemen[1,6]	2 527 322	900 955	1 626 367	35.6	952 000	58.5	952 000
Zambia[5]	0	0	0	NA	0	NA	0
Zimbabwe[1,3]	2 586 904	2 538 878	48 026	98.1	48 026	100	0
Total	**240 047 673**	**200 320 960**	**32 884 950**	**83.5**	**20 043 529**	**61.0**	**12 545 113**

ITN: insecticide-treated mosquito net; NA: not applicable.

[1] The 2022 mass campaign resulted in carry-over of ITNs that were distributed in 2023.

[2] No data on planned distribution in 2023 were reported; therefore, an adjustment was made that the planned distribution was equal to ITNs distributed.

[3] No data on planned distribution in 2024 were reported; therefore, an adjustment was made that the planned distribution was equal to ITNs distributed.

[4] No data on planned distribution in 2022 were reported; therefore, an adjustment was made that the planned distribution was equal to ITNs distributed.

[5] Planned distribution was adjusted based on ITNs distributed; where ITN distribution was more than planned in 2022, planned distribution in 2022 was made equal to ITNs distributed in 2022.

[6] Planned distribution was adjusted based on ITNs distributed; where ITN distribution was more than planned in 2023, planned distribution in 2023 was made equal to ITNs distributed in 2023.

[7] India provided information on its mass campaign distributions between 2020 and 2022 based on the initial ITNs planned for 2020. Adjustments were made for 2022 to determine the proportion of ITNs distributed by the end of 2022 out of the initial number of ITNs planned to be distributed in 2020. ITNs remaining in 2022 were distributed in 2024.

[8] In accordance with resolution WHA78.25 (2025), Indonesia has been reassigned to the WHO Western Pacific Region as of 27 May 2025.

Note: Remaining ITNs not distributed through mass campaigns may be distributed through other channels (e.g. antenatal care).

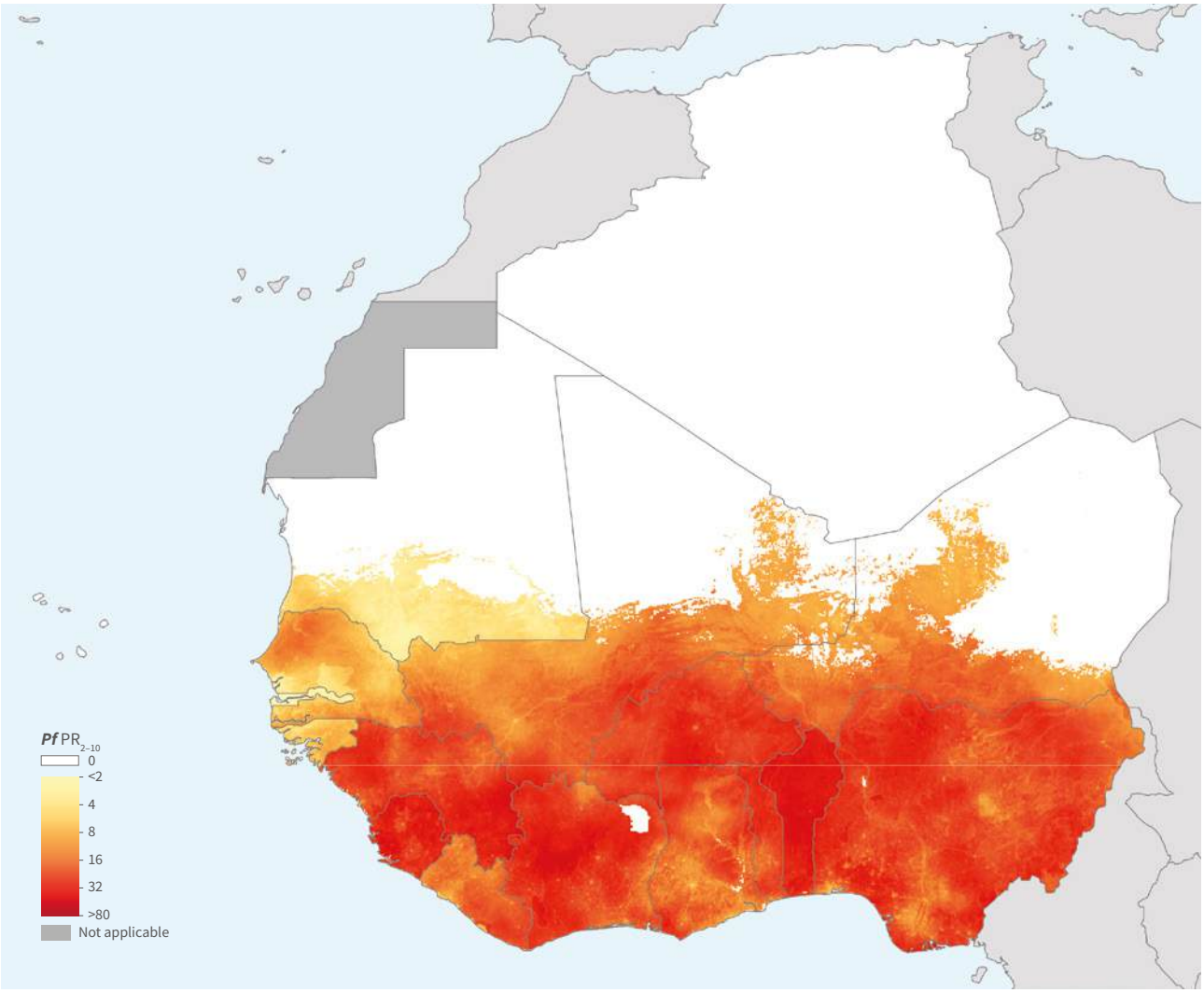
Source: Reports from national malaria programmes and other sources collected by the Alliance for Malaria Prevention, RBM Partnership to End Malaria and the Global Fund to Fight AIDS, Tuberculosis and Malaria.

2023				2024				
ITNs planned for distribution in 2023 (including carry-over from 2022)	ITNs distributed in 2023 (including carry-over from 2022)	ITNs remaining for distribution in 2024	Percentage of ITNs planned for distribution in 2023 and distributed in 2023	ITNs distributed in 2024 from 2023 campaigns	Percentage of remaining ITNs from 2023 distributed in 2024 (including carry-over from 2023)	ITNs planned for distribution in 2024 (including carry-over from 2023)	ITNs distributed in 2024 (including carry-over from 2023)	Percentage of ITNs planned for distribution in 2024 and distributed in 2024
1 345 966	1 218 918	127 048	90.6	127 048	100	1 277 722	1 277 722	100
1 981 118	1 981 118	0	100	0	NA	1 054 995	1 054 995	100
0	0	0	NA	0	NA	0	0	NA
4 905 695	4 905 695	0	100	0	NA	5 345 232	4 868 107	91.1
123 385	29 941	93 444	24.3	0	NA	0	0	NA
188 890	25 689	163 201	13.6	163 201	100	643 328	643 328	100
6 227 626	6 227 626	439 596	93.4	144 632	67.1	294 964	294 964	100
0	0	0	NA	0	NA	0	0	NA
6 993 848	6 074 033	919 815	86.8	0	NA	0	0	NA
27 770 070	27 770 070	0	100	0	NA	0	0	NA
3 045 176	3 045 176	0	100	0	NA	4 443 931	4 443 931	100
252 155	252 155	0	100	0	NA	865 186	857 325	99.1
70 985	52 907	18 078	74.5	18 078	100	28 016	28 016	100
293 435	167 164	126 271	57.0	0	NA	0	0	NA
952 000	952 000	0	100	0	NA	2 325 568	2 232 818	96
11 628 535	2 792 050	8 836 485	24.01	8 836 485	100	8 836 485	8 836 485	100
1 146 204	428 037	718 167	37.3	718 167	100	881 676	881 676	100
232 445 358	**193 692 825**	**38 752 533**	**83.3**	**26 479 687**	**57.2**	**145 461 090**	**132 865 595**	**91.3**

Annex 3 – A. WHO African Region, a. West Africa

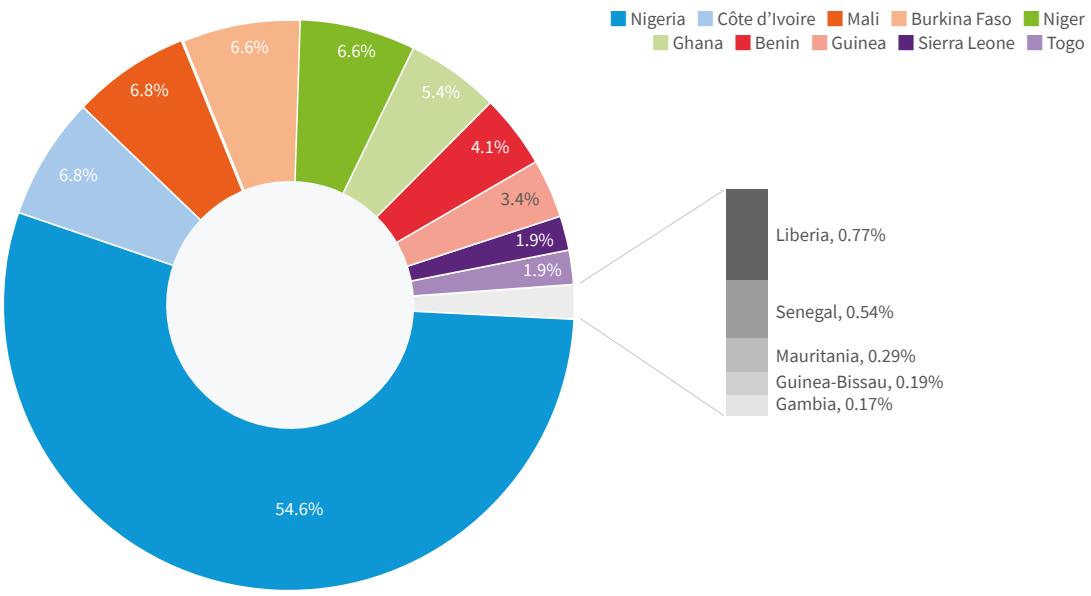
Epidemiology

A. *Plasmodium falciparum* parasite rate (*Pf* PR), 2024



Malaria endemic countries: Benin, Burkina Faso, Côte d'Ivoire, the Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, the Niger, Nigeria, Senegal, Sierra Leone and Togo

B. Share of estimated malaria cases, 2024



Reported cases and deaths

Cases	2015	2024
Total (presumed and confirmed) cases	56.8 million	71.8 million
Confirmed cases (%)	36.4 million (64.1%)	68.8 million (95.8%)
Total cases in children aged under 5 years (%)	21.0 million (37%)	24.9 million (34.7%)
Female, percentage of total cases[a]	NA	56.2%

NA: not available.
[a] The percentage of malaria cases in females is calculated only for countries that have disaggregated data by sex.

Deaths	2015	2024
Total deaths	30 900	26 600
Total deaths of children aged under 5 years (%)	22 100 (71.6%)	16 700 (62.7%)
Female, percentage of total deaths[a]	NA	13%

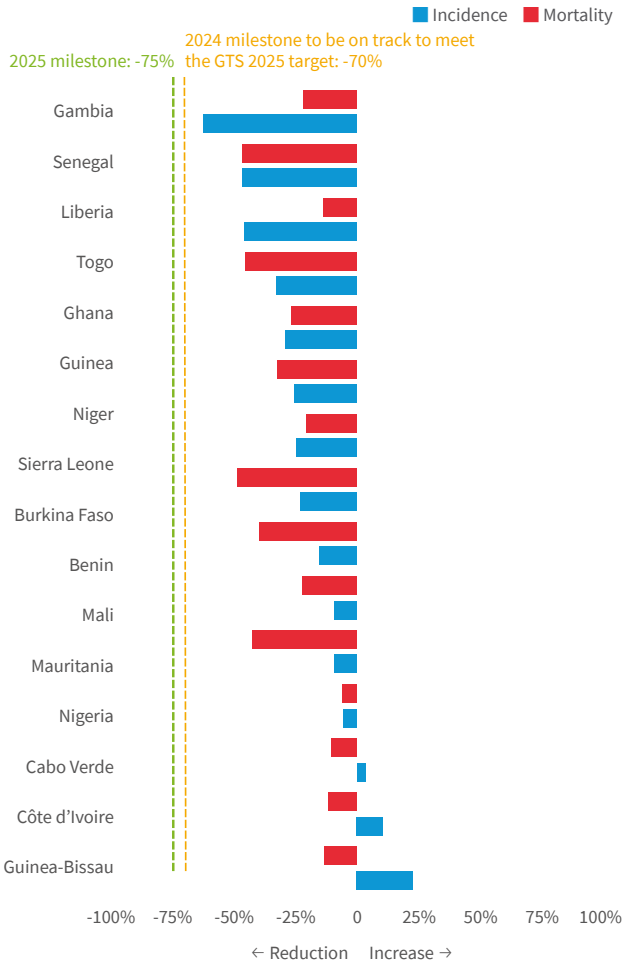
NA: not available.
[a] The percentage of malaria deaths in females is calculated only for countries that have disaggregated data by sex.

Reporting completeness	2015	2024
Countries with reporting completeness >80%	12	14
Countries with reporting completeness between 50% and 80%	3	1
Countries with reporting completeness <50%	0	0

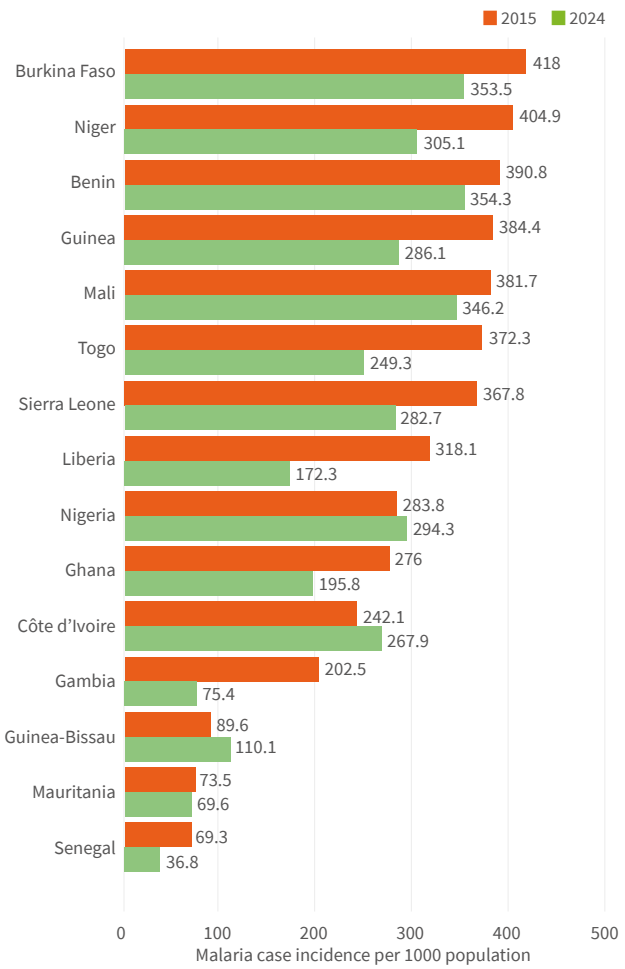
Estimated cases and deaths	2015	2024
Cases	109.0 million	125.4 million
Deaths	311 426	311 374
Population denominator used to compute incidence and mortality rate	367.0 million	455.7 million

Parasites: *P. falciparum* (100%)

C. Change in estimated malaria incidence and mortality rate, 2015–2024



D. Estimated malaria case incidence in 2015 compared with 2024



GTS: *Global technical strategy for malaria 2016–2030*.

Annex 3 – A. WHO African Region, a. West Africa

Acceleration to elimination

Countries with a subnational/territorial elimination programme: the Gambia, Ghana, Liberia, Mali and Senegal

Countries certified as malaria free since 2015: Algeria (2019) and Cabo Verde (2023)

Interventions

Countries that carried out ITN mass campaigns in 2024: Ghana, Liberia, the Niger, Nigeria and Sierra Leone

Countries that implemented IPTp in 2024: Benin, Burkina Faso, Côte d'Ivoire, the Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, the Niger, Nigeria, Senegal, Sierra Leone and Togo

Countries with >50% IPTp3+ coverage in 2024: Burkina Faso, the Gambia, Ghana, Guinea, Liberia, the Niger, Senegal, Sierra Leone and Togo

Countries that implemented SMC in 2024: Benin, Burkina Faso, Côte d'Ivoire, the Gambia, Ghana, Guinea, Guinea-Bissau, Mali, Mauritania, the Niger, Nigeria, Senegal and Togo

Countries that implemented PMC in 2024: Benin, Côte d'Ivoire, Nigeria, Sierra Leone and Togo

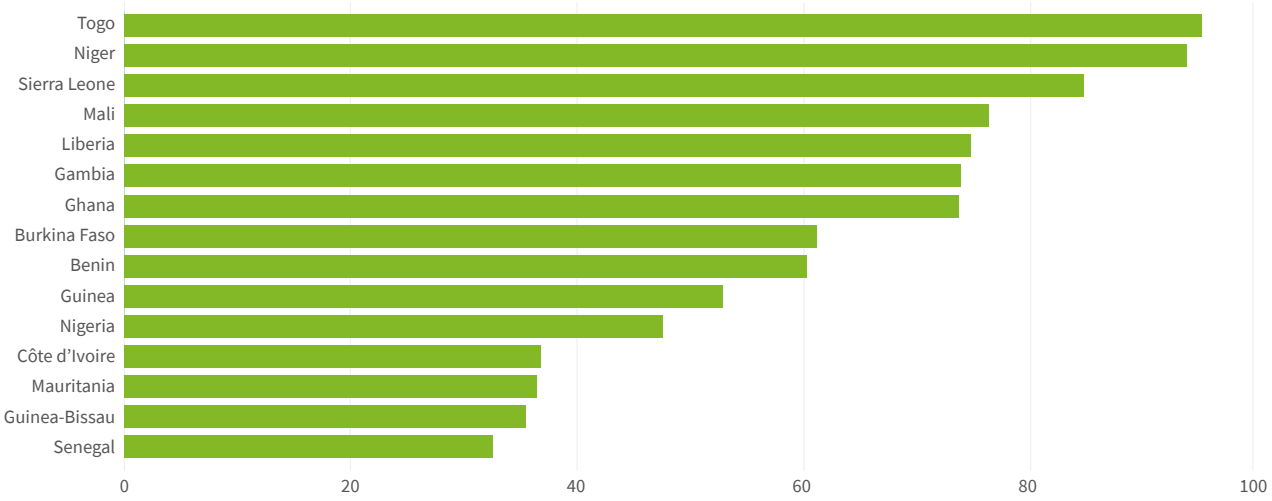
Countries that have introduced malaria vaccine as of 2024: Benin, Burkina Faso, Côte d'Ivoire, Ghana, Liberia, the Niger, Nigeria and Sierra Leone

Countries that introduced malaria vaccine in 2025, as of October 2025: Guinea, Mali and Togo

Treatment	2015	2024
Number of ACT courses distributed	47.4 million	88.4 million
Number of any antimalarial treatment courses (including ACT) distributed	49.4 million	90.9 million
Treatment coverage	NA	98.5%
Average number of children treated per cycle of SMC	5.4 million	48.4 million

NA: not available.
ACT: artemisinin-based combination therapy; SMC: seasonal malaria chemoprevention.

E. Estimated percentage of population with access to an ITN, 2024



ITN: insecticide-treated mosquito net; MAP: Malaria Atlas Project.
Source: ITN coverage model from MAP.

F. Therapeutic efficacy studies (clinical and parasitological failure among patients with *Plasmodium falciparum* malaria, %)

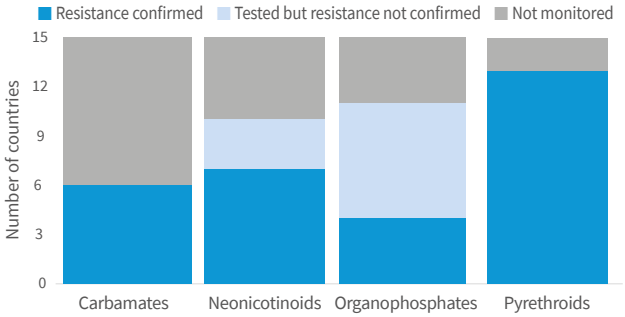
Medicine	Study years	No. of studies	Min.	Median	Max.	Percentile 25	Percentile 75
AL	2015–2023	64	0	1.2	42.6	0	3.4
AS-AQ	2015–2019	46	0	0.0	9.8	0	2.0
DHA-PPQ	2016–2023	14	0	0.6	18.7	0	2.8

AL: artemether–lumefantrine; AS-AQ: artesunate–amodiaquine; DHA-PPQ: dihydroartemisinin–piperaquine.

Countries where at least one TES showed ≥10% of patients had treatment failure with AL: Burkina Faso

Countries where at least one TES showed ≥10% of patients had treatment failure with DHA-PPQ: Burkina Faso

G. Status of insecticide resistance[a] per insecticide class (2020–2024)

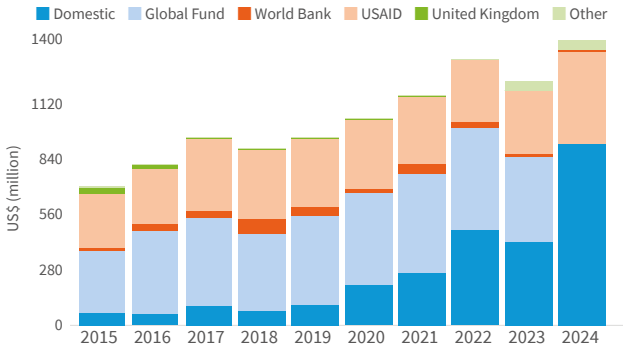


[a] Resistance is considered confirmed when it is detected to one insecticide in the class, in at least one malaria vector from one collection site.

Countries with confirmed resistance to at least one insecticide class: Benin, Burkina Faso, Côte d'Ivoire, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, the Niger, Nigeria, Senegal, Sierra Leone and Togo

Funding

H. Malaria funding[a,b] by source, 2015–2024



Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; UK: United Kingdom of Great Britain and Northern Ireland; USAID: United States Agency for International Development.
[a] Excludes patient service delivery costs and out-of-pocket expenditure.
[b] Although USAID funding was provided in 2024, recipient-level allocations were not available due to reporting disruptions. As a result, these amounts are not reflected in regional profiles.

Funding (US$)	2015	2024
Total funding	676.6 million	1.388 billion
Proportion from domestic sources	9.1%	63.8%

Change in funding 2015–2024: 105% increase

Key highlights

Epidemiology: In the World Health Organization (WHO) African subregion of west Africa, there was a 7% reduction in malaria incidence and 20% reduction in mortality rate in 2024 compared with 2015. Despite most countries showing reductions in incidence and mortality, none of them achieved the *Global technical strategy for malaria 2016–2030* (GTS) 2024 milestone of 70% reductions, and the subregion is therefore not on track to meet the GTS 2025 targets. The west Africa subregion continues to bear the heaviest malaria burden in Africa. In 2024, a total of 71.8 million malaria cases (presumed and confirmed) were reported, of which 95.8% were confirmed – an increase from 64.1% in 2015. There were about 26 600 reported malaria deaths. Females accounted for 56.2% of reported cases and 13% of reported deaths, while children aged under 5 years accounted for 34.7% of all reported cases and 62.7% of reported deaths. The subregion accounted for an estimated 125.4 million cases and 311 374 estimated deaths. The highest burden of estimated cases was concentrated in Nigeria (54.6%), followed by Côte d'Ivoire and Mali (6.8% each), and Burkina Faso and the Niger (6.6% each), which together accounted for more than 80% of cases. Algeria and Cabo Verde have been certified malaria free, in 2019 and 2024, respectively.

Interventions and biological threats: In 2024, insecticide-treated mosquito net (ITN) mass campaigns were rolled out in five countries, seasonal malaria chemoprevention (SMC) was implemented in 13 of the 15 eligible countries, perennial malaria chemoprevention (PMC) was introduced in five countries and at least 50% coverage of intermittent preventive treatment of malaria in pregnancy (IPTp) was achieved in nine countries. Malaria vaccines have been introduced in Benin, Burkina Faso, Côte d'Ivoire, Ghana, Guinea, Liberia, Mali, the Niger, Nigeria, Sierra Leone and Togo. Treatment coverage with antimalarials was high, at 98.5%. However, biological and insecticide resistance threats persist. These include *Plasmodium falciparum* histidine-rich protein 2 and 3 (*pfhrp2/3*) gene deletions, detected at low prevalences in Benin, Burkina Faso, Ghana, Mali, Nigeria, Senegal, Sierra Leone and Togo; confirmed resistance to at least one insecticide class from at least one site in 13 countries; and, in Burkina Faso, therapeutic efficacy studies (TES) in 2017 indicating reduced efficacy of artemether–lumefantrine (AL) and dihydroartemisinin–piperaquine (DHA-PPQ). The invasive species *Anopheles stephensi* has been reported in Ghana (2022), the Niger (2024) and Nigeria (2020). More recent surveillance data are needed to determine the current status of biological threats.

Funding: Total malaria funding more than doubled between 2015 and 2024, rising from US$ 677 million to US$ 1.4 billion. The share from domestic sources increased from about 9% to 64%; this sharp rise largely reflects reported increases in a few countries, including unusually high domestic figures from the Niger, as well as the absence of country-level allocations from the United States of America in 2024. Continued political commitment and sustainable domestic financing will be key to preserving these gains.

Key challenges

Malaria control in west Africa faces several interrelated challenges. Insecurity in parts of Burkina Faso, Mali and Nigeria continues to limit access to affected populations, disrupt service delivery and displace communities into areas with higher malaria transmission. Frequent political transitions in parts of the subregion affect the continuity of malaria programming and policy implementation. Extreme climate events, including flooding in Chad, Nigeria and Senegal, can create new mosquito breeding sites, while recurrent droughts in the Sahel region drive population movements towards irrigated zones, where transmission risk is higher. Outbreaks in Chad, the Niger and northern Nigeria highlight the need for stronger early warning and preparedness systems. Weak health systems, characterized by limited workforce capacity, poor supply chains and incomplete data systems, especially with private sector providers, hinder effective case management and response. Socioeconomic disparities and competing priorities during complex emergencies further constrain resource mobilization and equitable access to interventions.

Key successes

Many countries, including Burkina Faso, Côte d'Ivoire, the Gambia, Ghana, Liberia, Nigeria, Senegal and Togo, have reported significant reductions in malaria mortality over the past 10 years. Regional initiatives, such as the Sahel Malaria Elimination Initiative, and cross-border collaborations have strengthened political commitment, built technical capacity and supported synchronized SMC and long-lasting insecticidal net campaigns across Benin, Burkina Faso, the Gambia, the Niger, Senegal and Togo. The growing digitalization of health information systems has enhanced data use and informed innovative strategies, including integrated SMC, nutrition and immunization campaigns, as well as the introduction of perennial and post-discharge malaria chemoprevention in selected countries. Malaria vaccines are now being deployed in 11 countries, and improved surveillance, such as case-based systems in the Gambia and Senegal, has strengthened timely response and data-driven decision-making.

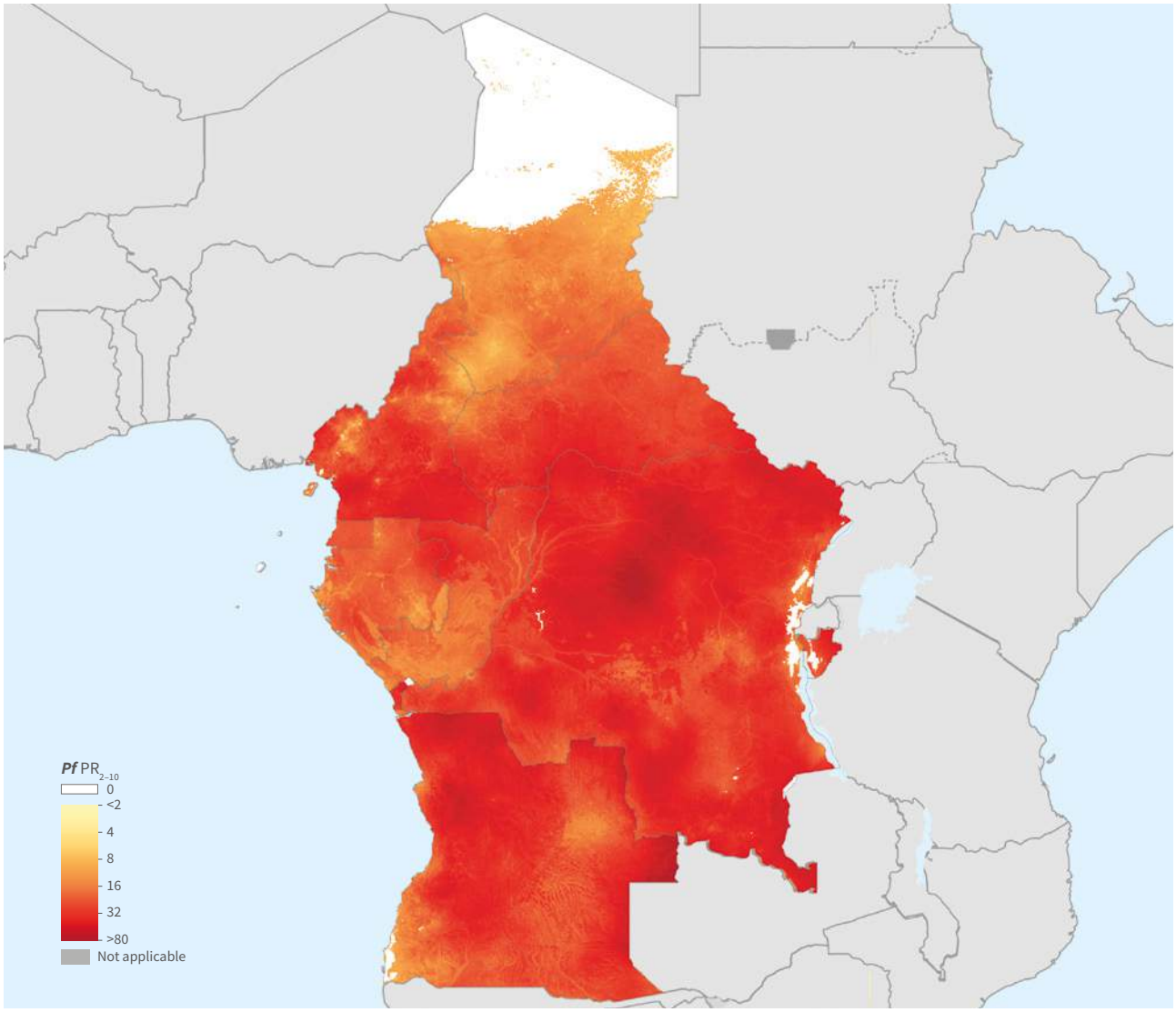
Lessons learned

Lessons from these experiences underscore the importance of strong political commitment, sustainable financing and coordinated regional efforts. Cabo Verde's certification of malaria free status in 2024 exemplifies what can be achieved, while highlighting the importance of preventing malaria re-establishment and continuously monitoring the epidemiological situation amid ongoing risks of importation and transmission. Cross-border and regional collaboration remains essential to maintaining low transmission and ensuring mutual accountability. Enhancing community engagement and integrating gender-sensitive approaches have improved the reach and impact of interventions. Tailored strategies have yielded substantial reductions in malaria burden in the subregion. Finally, strengthening surveillance, addressing resistance, and integrating epidemic response planning and climate adaptation into malaria programmes are key to building resilience against environmental disruptions.

Annex 3 – A. WHO African Region, b. Central Africa

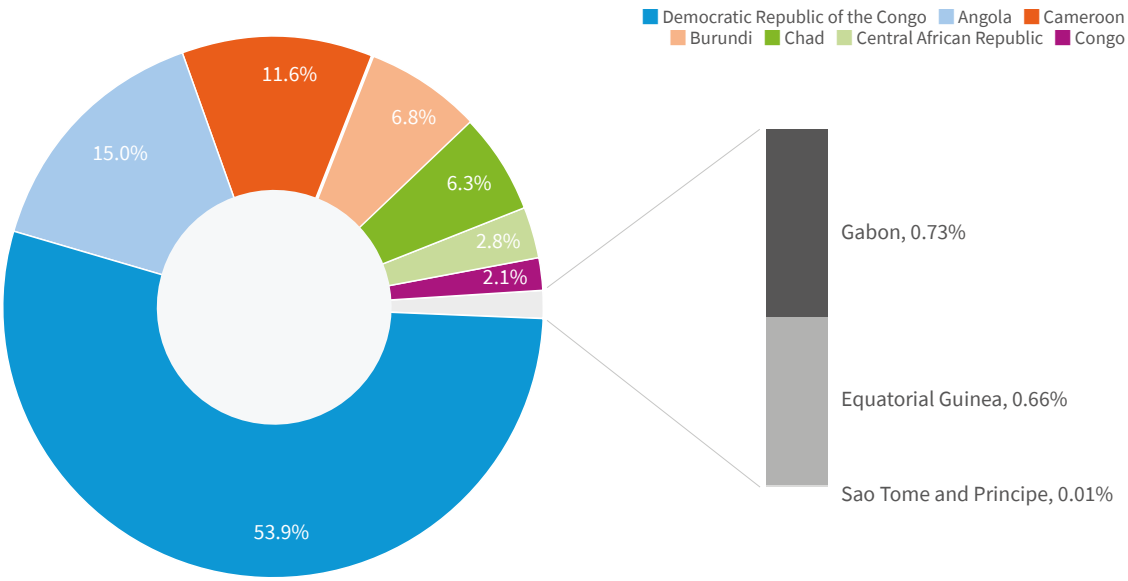
Epidemiology

A. *Plasmodium falciparum* parasite rate (*Pf* PR), 2024



Malaria endemic countries: Angola, Burundi, Cameroon, the Central African Republic, Chad, the Congo, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, and Sao Tome and Principe

B. Share of estimated malaria cases, 2024



Reported cases and deaths

Cases	2015	2024
Total (presumed and confirmed) cases	26.6 million	60.3 million
Confirmed cases (%)	23.4 million (87.9%)	55.2 million (91.5%)
Total cases in children aged under 5 years (%)	11.3 million (42.6%)	26.2 million (43.5%)
Female, percentage of total cases[a]	NA	53.5%

NA: not available.
[a] The percentage of malaria cases in females is calculated only for countries that have disaggregated data by sex.

Deaths	2015	2024
Total deaths	58 200	45 400
Total deaths of children aged under 5 years (%)	37 100 (63.7%)	27 400 (60.2%)
Female, percentage of total deaths[a]	NA	47.8%

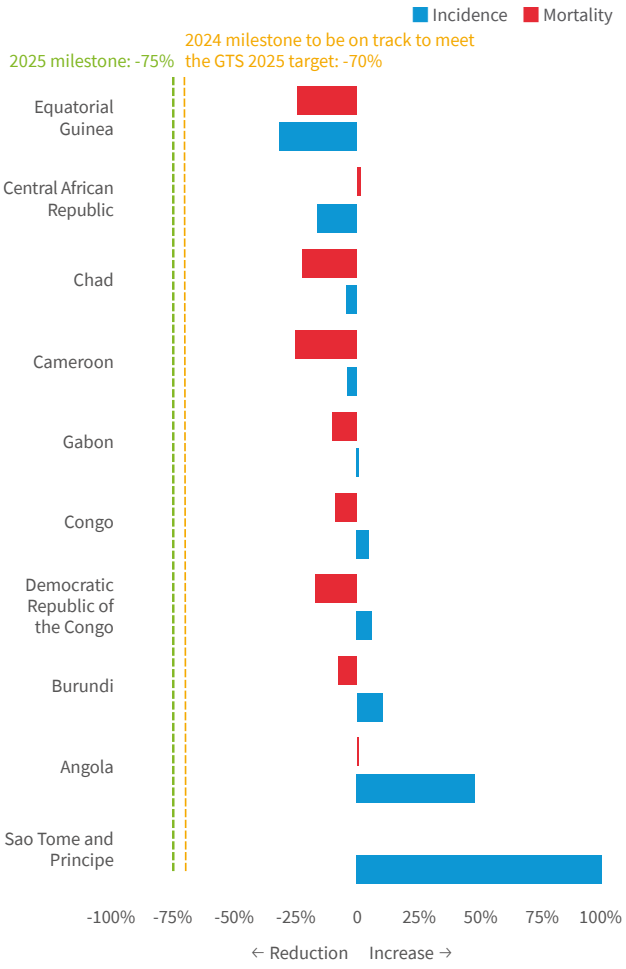
NA: not available.
[a] The percentage of malaria deaths in females is calculated only for countries that have disaggregated data by sex.

Reporting completeness	2015	2024
Countries with reporting completeness >80%	6	10
Countries with reporting completeness between 50% and 80%	3	0
Countries with reporting completeness <50%	1	0

Estimated cases and deaths	2015	2024
Cases	45.7 million	65.3 million
Deaths	110 608	124 568
Population denominator used to compute incidence and mortality rate	170.9 million	226.7 million

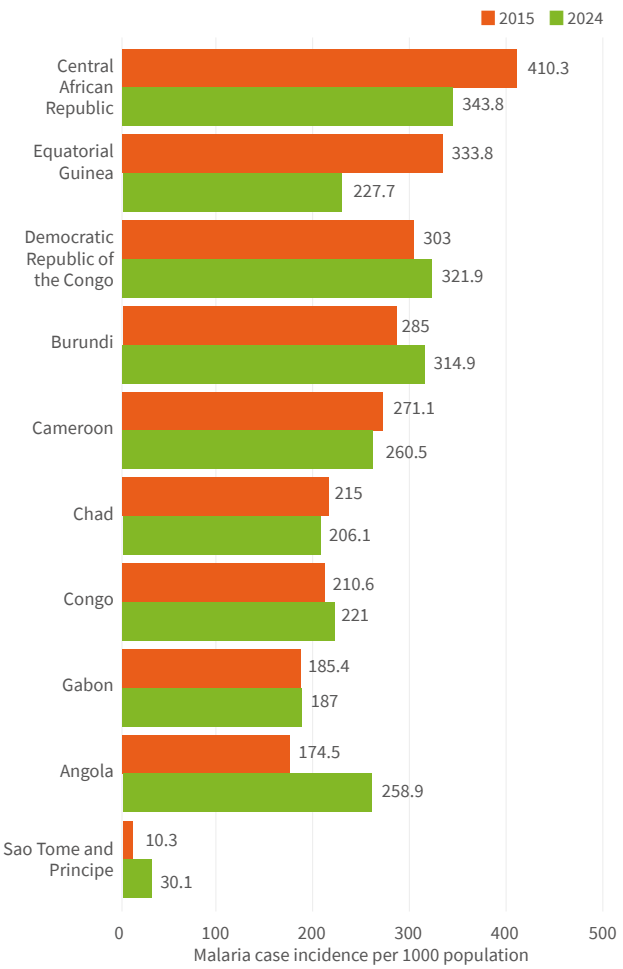
Parasites: *P. falciparum* and mixed (100%)

C. Change in estimated malaria incidence and mortality rate, 2015–2024[a]



GTS: *Global technical strategy for malaria 2016–2030*.
[a] In Sao Tome and Principe, the change in incidence is more than 100%, and there were zero indigenous deaths in 2015 and 2024.

D. Estimated malaria case incidence in 2015 compared with 2024



Annex 3 – A. WHO African Region, b. Central Africa

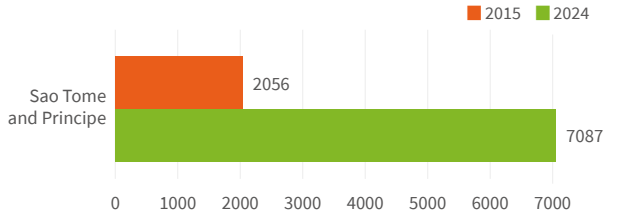
Acceleration to elimination

Countries with a subnational/territorial elimination programme: Angola and Gabon

Countries with a nationwide elimination programme: Sao Tome and Principe

Countries that are part of the E-2025 initiative: Sao Tome and Principe

E. Reported indigenous cases in countries with national elimination activities, 2015 compared with 2024



Interventions

Countries that carried out ITN mass campaigns in 2024: Cameroon and the Democratic Republic of the Congo

Countries with <80% treatment coverage in 2024:[a] the Central African Republic, the Congo and Equatorial Guinea

Countries that implemented IPTp in 2024: Angola, Burundi, Cameroon, the Central African Republic, Chad, the Congo, the Democratic Republic of the Congo, Equatorial Guinea and Gabon

Countries with >50% IPTp3+ coverage in 2024: Burundi, the Central African Republic and the Democratic Republic of the Congo

Countries that implemented SMC in 2024: Cameroon and Chad

Treatment	2015	2024
Number of ACT courses distributed	22.4 million	58.1 million
Number of any antimalarial treatment courses (including ACT) distributed	22.4 million	59.0 million
Treatment coverage	NA	91.9%
Average number of children treated per cycle of SMC	500 153	5.2 million

ACT: artemisinin-based combination therapy; SMC: seasonal malaria chemoprevention.
NA: not available.

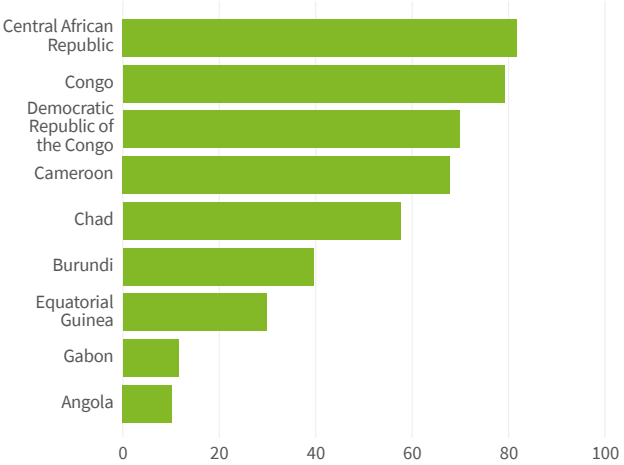
Countries that implemented PMC in 2024: Cameroon and the Democratic Republic of the Congo

Countries that have introduced malaria vaccine as of 2024: Cameroon, the Central African Republic, Chad and the Democratic Republic of the Congo

Countries that introduced malaria vaccine in 2025, as of October 2025: Burundi

[a] Low rates of treatment coverage were due to a combination of poor reporting and stock-out of medicines in the Central African Republic, and due to poor reporting in the Congo and Equatorial Guinea.

F. Estimated percentage of population with access to an ITN, 2024



ITN: insecticide-treated mosquito net; MAP: Malaria Atlas Project.
Source: ITN coverage model from MAP.

G. Therapeutic efficacy studies (clinical and parasitological failure among patients with *Plasmodium falciparum* malaria, %)

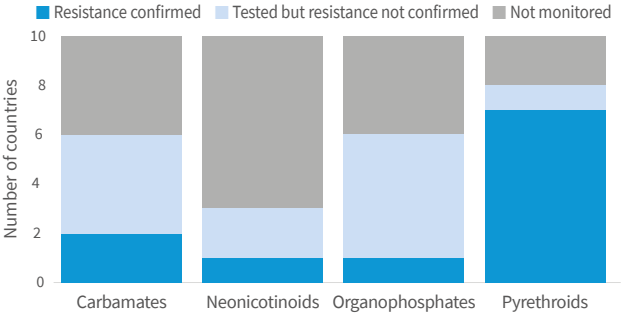
Medicine	Study years	No. of studies	Min.	Median	Max.	Percentile 25	Percentile 75
AL	2015–2021	39	0	1.8	18	0	4.2
AS-AQ	2015–2021	39	0	0.0	9	0	4.8
AS-PY	2021	1	0	0.0	0	0	0.0
DHA-PPQ	2015–2021	16	0	0.0	12	0	1.5

AL: artemether–lumefantrine; AS-AQ: artesunate–amodiaquine; AS-PY: artesunate–pyronaridine; DHA-PPQ: dihydroartemisinin–piperaquine.

Countries where at least one TES showed ≥10% of patients had treatment failure with AL: Angola and the Democratic Republic of the Congo

Countries where at least one TES showed ≥10% of patients had treatment failure with DHA-PPQ: the Democratic Republic of the Congo

H. Status of insecticide resistance[a] per insecticide class (2020–2024)

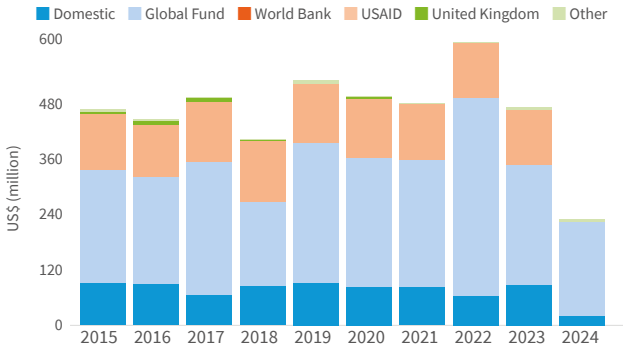


[a] Resistance is considered confirmed when it is detected to one insecticide in the class, in at least one malaria vector from one collection site.

Countries with confirmed resistance to at least one insecticide class: Angola, Burundi, Cameroon, Chad, the Democratic Republic of the Congo, Equatorial Guinea and Gabon

Funding

I. Malaria funding[a,b] by source, 2015–2024



Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; UK: United Kingdom of Great Britain and Northern Ireland; USAID: United States Agency for International Development.
[a] Excludes patient service delivery costs and out-of-pocket expenditure.
[b] Although USAID funding was provided in 2024, recipient-level allocations were not available due to reporting disruptions. As a result, these amounts are not reflected in regional profiles.

Funding (US$)	2015	2024
Total funding	450.7 million	220.3 million
Proportion from domestic sources	19.8%	8.8%

Change in funding 2015–2024: 51% decrease

Key highlights

Epidemiology: Between 2015 and 2024, the central Africa subregion had an 8% increase in malaria incidence, while the mortality rate declined by 15%. None of the countries met the GTS 2024 milestone of 70% in incidence or mortality compared with 2015, which means that the subregion is not on track to meet the GTS 2025 target of 75% reductions. In 2024, a total of 60.3 million malaria cases (presumed and confirmed) were reported, of which 91.5% were confirmed, 53.5% were in females and 43.5% were in children aged under 5 years. In 2024, there were about 45 400 reported malaria deaths, of which 47.8% were of females and 60.2% were of children aged under 5 years. All countries had a reporting rate of more than 80%. The subregion accounted for 65.3 million estimated cases and 124 568 estimated deaths. The highest burden of estimated cases was concentrated in the Democratic Republic of the Congo (53.9%), Angola (15.0%) and Cameroon (11.6%), jointly accounting for more than 80% of the burden. Although no country in the subregion has been certified malaria free, Sao Tome and Principe, which is part of the malaria eliminating countries for 2025 (E-2025) initiative, continues to implement a nationwide elimination programme; however, numbers of malaria cases have more than tripled in the country since 2015.

Interventions and biological threats: In 2024, coverage of malaria interventions improved across the subregion compared with 2015, with improvements in diagnosis confirmation rates and a high overall rate of treatment coverage of 91.9%. Low treatment coverage was observed in the Central African Republic due to a combination of poor reporting and stock-out of medicines. Similarly, poor reporting led to low treatment coverage in the Congo and Equatorial Guinea. ITN mass campaigns were implemented in Cameroon and the Democratic Republic of the Congo, and the malaria vaccine has now been introduced in Burundi, Cameroon, the Central African Republic, Chad and the Democratic Republic of the Congo. However, only three of the nine countries implementing IPTp achieved more than 50% coverage, and in half of the subregion's countries, less than 60% of the population had access to an ITN. *Pfhrp2/3* gene deletions have been detected at low prevalences in Cameroon, Democratic Republic of the Congo, Gabon, Equatorial Guinea and Chad. Although most of the available results of TES indicate that artemisinin-based combination therapies (ACTs) remain effective across the subregion, more recent data are needed to confirm this. TES conducted between 2015 and 2021 found treatment failure rates exceeding 10% following treatment with AL in Angola (2015, 2019 and 2021) and the Democratic Republic of the Congo (2018), and with DHA-PPQ in the Democratic Republic of the Congo (2018). Since 2020, resistance to at least one insecticide class from at least one site has been confirmed in seven countries. Regular monitoring of biological threats will help to inform their extent and magnitude.

Funding: Total malaria funding fell by about 50% between 2015 and 2024, from US$ 451 million to US$ 220 million. The share from domestic sources also declined, from roughly 20% to 9%. Both the decline in total funding and the apparent change in funding composition are partly influenced by the absence of United States Agency for International Development (USAID) country-level allocations in 2024.

Key challenges

Key challenges in malaria control in central Africa include ongoing conflicts, political instability, health system limitations and modest community engagement. In the Central African Republic and parts of eastern Democratic Republic of the Congo, conflicts have disrupted health infrastructure, limited access to care and displaced populations into areas with higher transmission risk. Frequent political transitions can slow policy implementation, affect accountability and influence domestic health funding. In some countries, such as Cameroon and the Democratic Republic of the Congo, a notable proportion of malaria treatment occurs through unregulated private pharmacies or informal outlets. Health worker shortages, supply chain issues and underresourced primary care services can restrict effective case management and surveillance. Limited community involvement may affect the uptake and sustainability of interventions, and cross-border activities are often not fully coordinated, which can reduce the overall effectiveness of regional malaria control efforts.

Key successes

Several central African countries have made notable progress in malaria control. Cameroon, the Central African Republic, the Congo and the Democratic Republic of the Congo have expanded access to malaria prevention tools and treatment, achieving large-scale coverage with ITNs, and five countries have introduced the malaria vaccine. Targeted use of data and innovation has supported decision-making, as demonstrated by Equatorial Guinea's Bioko Island Malaria Control Project, which has reduced malaria prevalence by more than 75% since 2004. Data-driven approaches are also used in the Democratic Republic of the Congo to focus interventions in high-priority subnational areas. The Yaoundé Declaration, endorsed in March 2024, revitalized the high burden to high impact (HBHI) approach in Cameroon and the Democratic Republic of the Congo, strengthening regional collaboration.

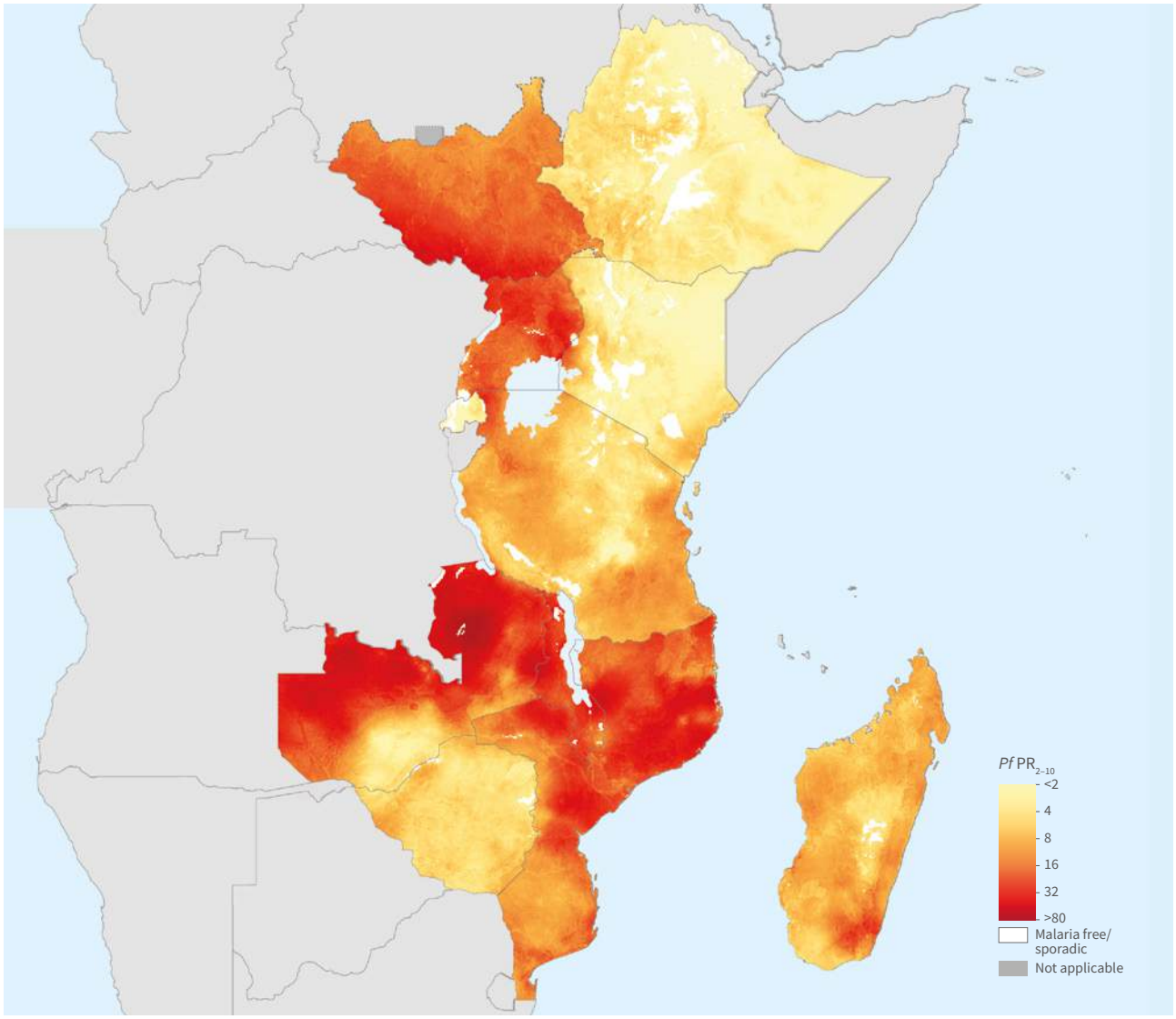
Lessons learned

Key lessons from these efforts highlight the importance of strong political leadership and partner coordination, even in fragile settings. Community health workers have played a central role in maintaining access to services in hard-to-reach and conflict-affected areas, particularly in the Central African Republic, Chad and the Democratic Republic of the Congo. Reliable surveillance and data systems, including strengthened DHIS2-based reporting, have supported timely monitoring and early detection of outbreaks. Addressing funding gaps and ensuring equitable access to prevention and treatment remain essential for reducing malaria as a public health concern. Experiences in conflict-affected regions also underscore the need to integrate malaria control with climate adaptation and emergency preparedness strategies.

Annex 3 – A. WHO African Region, c. Countries with high transmission in east and southern Africa

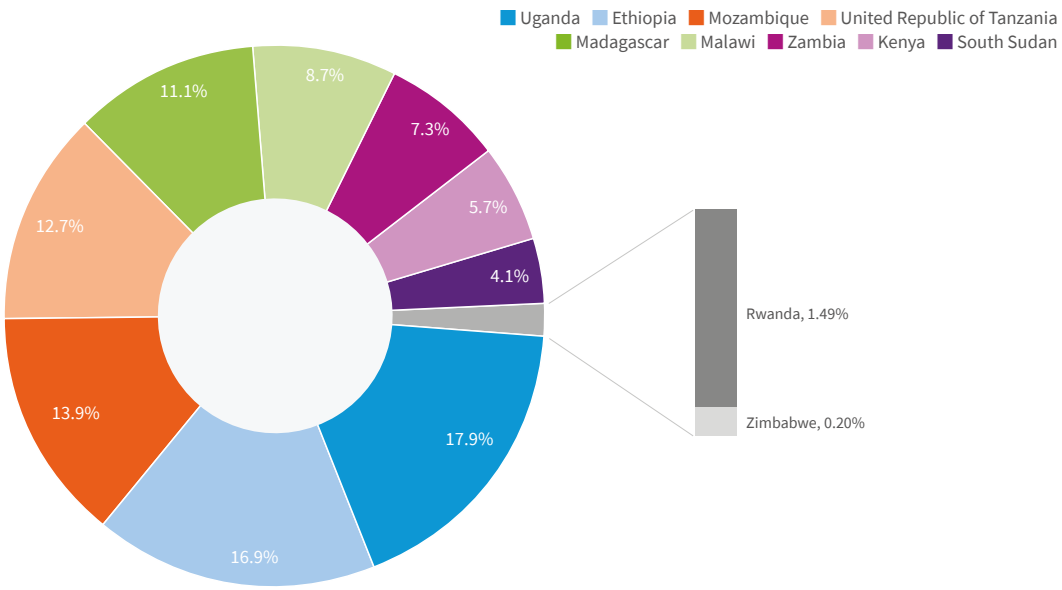
Epidemiology

A. *Plasmodium falciparum* parasite rate (*Pf* PR), 2024



Malaria endemic countries: Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Rwanda, South Sudan, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe

B. Share of estimated malaria cases, 2024



Reported cases and deaths

Cases	2015	2024
Total (presumed and confirmed) cases	59.0 million	68.1 million
Confirmed cases (%)	36.2 million (61.5%)	64.3 million (94.4%)
Total cases in children aged under 5 years (%)	17.6 million (29.9%)	22.6 million (33.2%)
Female, percentage of total cases[a]	NA	57.8%

NA: not available.
[a] The percentage of malaria cases in females is calculated only for countries that have disaggregated data by sex.

Deaths	2015	2024
Total deaths	38 400	13 700
Total deaths of children aged under 5 years (%)	10 400 (27.2%)	6040 (44.1%)
Female, percentage of total deaths[a]	NA	39.1%

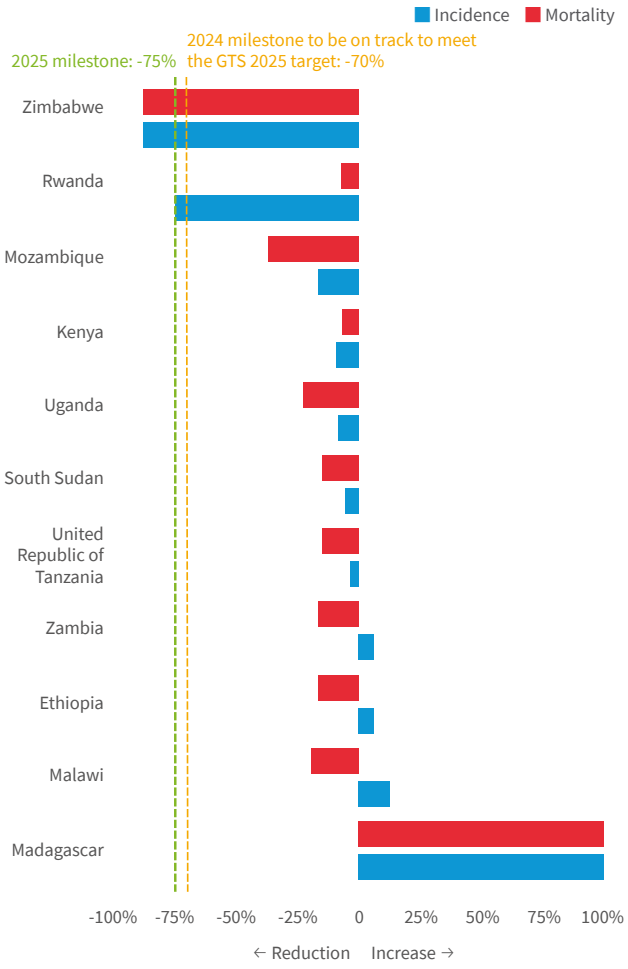
NA: not available.
[a] The percentage of malaria deaths in females is calculated only for countries that have disaggregated data by sex.

Reporting completeness	2015	2024
Countries with reporting completeness >80%	9	10
Countries with reporting completeness between 50% and 80%	2	1
Countries with reporting completeness <50%	0	0

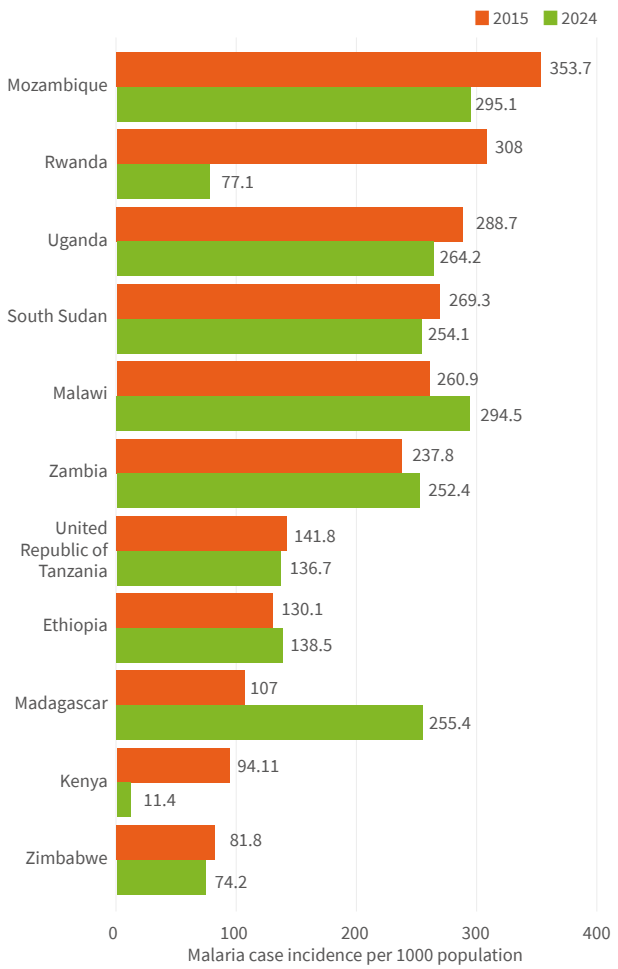
Estimated cases and deaths	2015	2024
Cases	59.4 million	73.6 million
Deaths	127 541	141 854
Population denominator used to compute incidence and mortality rate	326.8 million	413.7 million

Parasites: *P. falciparum* and mixed (98%), *P. vivax* (2%)

C. Change in estimated malaria incidence and mortality rate, 2015–2024[a]



D. Estimated malaria case incidence in 2015 compared with 2024



GTS: *Global technical strategy for malaria 2016–2030*.
[a] In Madagascar, the change in both incidence and mortality is more than 100%.

Annex 3 – A. WHO African Region, c. Countries with high transmission in east and southern Africa

Acceleration to elimination

Countries with a subnational/territorial elimination programme: Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Uganda, Zambia and the United Republic of Tanzania (Mainland and Zanzibar)

Interventions

Countries that carried out ITN mass campaigns in 2024: Ethiopia, Kenya, Madagascar, Malawi, Rwanda, South Sudan, the United Republic of Tanzania, Zambia and Zimbabwe

Countries that implemented IPTp in 2024: Kenya, Madagascar, Malawi, Mozambique, South Sudan, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe

Countries with >50% IPTp3+ coverage in 2024: Malawi, Uganda and Zambia

Countries that implemented SMC in 2024: Kenya, Madagascar, Mozambique, South Sudan and Uganda

Countries that implemented PMC in 2024: Mozambique

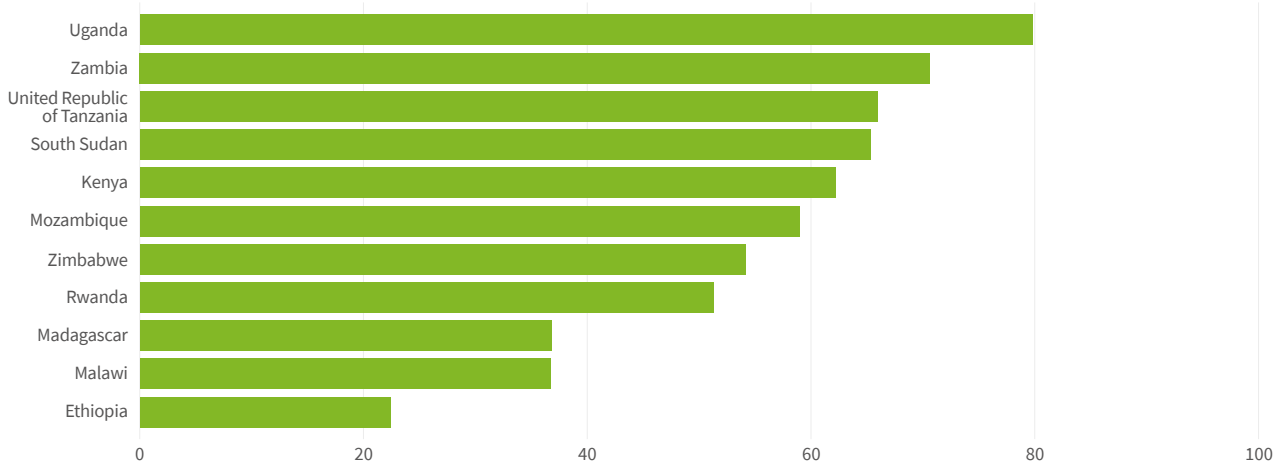
Countries that have introduced malaria vaccine as of 2024: Kenya, Malawi, Mozambique and South Sudan

Countries that introduced malaria vaccine in 2025, as of October 2025: Ethiopia, Uganda and Zambia

Treatment	2015	2024
Number of ACT courses distributed	108.2 million	88.5 million
Number of any antimalarial treatment courses (including ACT) distributed	109.9 million	90.9 million
Treatment coverage	NA	97.6%
Average number of children treated per cycle of SMC	0	817 000

ACT: artemisinin-based combination therapy; SMC: seasonal malaria chemoprevention.
NA: not available.

E. Estimated percentage of population with access to an ITN, 2024



ITN: insecticide-treated mosquito net; MAP: Malaria Atlas Project.
Source: ITN coverage model from MAP.

F. Therapeutic efficacy studies (clinical and parasitological failure among patients with *Plasmodium falciparum* malaria, %)

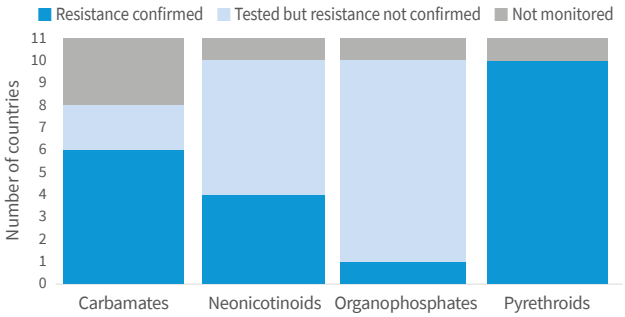
Medicine	Study years	No. of studies	Min.	Median	Max.	Percentile 25	Percentile 75
AL	2015–2023	77	0.0	1.6	19.0	0.0	4.0
AS-AQ	2016–2023	22	0.0	0.0	2.0	0.0	0.0
AS-PY	2015–2023	3	1.1	5.6	13.0	3.3	9.3
DHA-PPQ	2015–2023	18	0.0	1.2	9.2	0.0	2.4

AL: artemether–lumefantrine; AS-AQ: artesunate–amodiaquine; AS-PY: artesunate–pyronaridine; DHA-PPQ: dihydroartemisinin–piperaquine.

Countries where at least one TES showed ≥10% of patients had treatment failure with AL: Kenya, Uganda and the United Republic of Tanzania

Countries where at least one TES showed ≥10% of patients had treatment failure with AS-PY: Uganda

G. Status of insecticide resistance[a] per insecticide class (2020–2024)

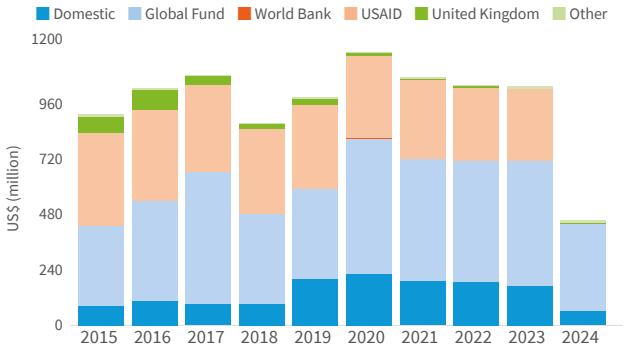


[a] Resistance is considered confirmed when it is detected to one insecticide in the class, in at least one malaria vector from one collection site.

Countries with confirmed resistance to at least one insecticide class: Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Rwanda, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe

Funding

H. Malaria funding[a,b] by source, 2015–2024



Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; UK: United Kingdom of Great Britain and Northern Ireland; USAID: United States Agency for International Development.
[a] Excludes patient service delivery costs and out-of-pocket expenditure.
[b] Although USAID funding was provided in 2024, recipient-level allocations were not available due to reporting disruptions. As a result, these amounts are not reflected in regional profiles.

Funding (US$)	2015	2024
Total funding	878.5 million	439.1 million
Proportion from domestic sources	9.5%	14.1%

Change in funding 2015–2024: 50% decrease

Key highlights

Epidemiology: The malaria landscape in east and southern Africa highlights an overall stagnation in malaria transmission, with a modest reduction in malaria incidence of 2% in 2024 compared with 2015. The mortality rate, however, declined by 12% over the same period. Although Rwanda and Zimbabwe have met the GTS 2025 target of a 75% reduction in incidence, most countries have made slow progress, and the subregion is not on track to meet the GTS targets for either incidence or mortality. No country in the subregion has been certified as malaria free. In 2024, a total of 68.1 million malaria cases (presumed and confirmed) were reported, of which 94.4% were confirmed – an increase from 61.5% in 2015. Females and children aged under 5 years accounted for 57.8% and 33.2%, respectively, of reported cases. There were about 13 700 reported malaria deaths, of which 39.1% were of females and 44.1% were of children aged under 5 years. The subregion accounted for an estimated 73.6 million cases and 141 854 deaths. The malaria burden was concentrated in Uganda (17.9%), Ethiopia (16.9%), Mozambique (13.9%), the United Republic of Tanzania (12.7%) and Madagascar (11.1%), which jointly contributed more than 70% of all reported cases.

Interventions and biological threats: Coverage of malaria interventions continued to expand across the subregion. As of 2025, the malaria vaccine has been introduced in Ethiopia, Kenya, Malawi, Mozambique, South Sudan, Uganda and Zambia. This complements ongoing ITN campaigns and IPTp, which were both implemented in nine of the 11 countries, although more than 50% coverage of IPTp was achieved only in Malawi, Uganda and Zambia. SMC was also implemented in Kenya, Madagascar, Mozambique, South Sudan and Uganda. However, the subregion faces biological threats. The estimated prevalence of *pfhrp2/3* gene deletions in Ethiopia exceeds 20%, and *pfhrp2/3* gene deletions have also been detected in Kenya, Madagascar, Mozambique, Malawi, Rwanda, United Republic of Tanzania, Uganda and Zambia. Resistance to at least one insecticide class exists in 10 countries. Artemisinin partial resistance is confirmed in Rwanda, Uganda and the United Republic of Tanzania and suspected in Ethiopia and Zambia, posing risks to antimalarial treatment efficacy. The spread of *An. stephensi* in Ethiopia and Kenya may also be contributing to increases in malaria transmission and upsurges in urban settings.

Funding: Total malaria funding decreased by about 50% between 2015 and 2024, from US$ 879 million to US$ 439 million. The share from domestic sources has increased from roughly 10% to 14%, although this change likely reflects the absence of United States country-level allocations in 2024. Sustained and increased domestic investment will be critical to ensure long-term programme stability and scale-up of interventions.

Key challenges

Malaria control in east and southern Africa faces several challenges, including the effects of climate change, extreme weather events and insecurity. Climate change is potentially expanding malaria transmission into previously low-risk highland areas in Ethiopia, Kenya and the United Republic of Tanzania. Cyclones and floods in Madagascar, Malawi and Mozambique have repeatedly damaged health facilities, displaced populations and disrupted prevention campaigns, such as ITN distribution and indoor residual spraying (IRS). Insecurity and ongoing conflicts in South Sudan and parts of Ethiopia have further limited access to health care, causing mass displacement and reducing intervention coverage. Programme performance is also constrained by inadequate human resources, health system weaknesses and persistent funding gaps, with heavy reliance on external financing.

Key successes

Despite these challenges, several countries have achieved notable successes. Significant reductions in malaria burden were observed in Rwanda and Zimbabwe in 2024 compared with 2015. Governments have maintained strong political commitment through regional platforms, such as the East African Community (EAC) and South African Development Community (SADC) ministers of health meetings, fostering regional collaboration for malaria elimination. Initiatives such as Elimination 8 and MOSASWA have strengthened technical capacity and cross-border coordination. Following the introduction of malaria vaccine in Kenya, Malawi, Mozambique and South Sudan, in 2025 malaria vaccine was introduced in Ethiopia, Uganda and Zambia. New vector control tools are being deployed in Mozambique and the United Republic of Tanzania. Partnerships with academic and research institutions have also enhanced surveillance capacity for biological threats.

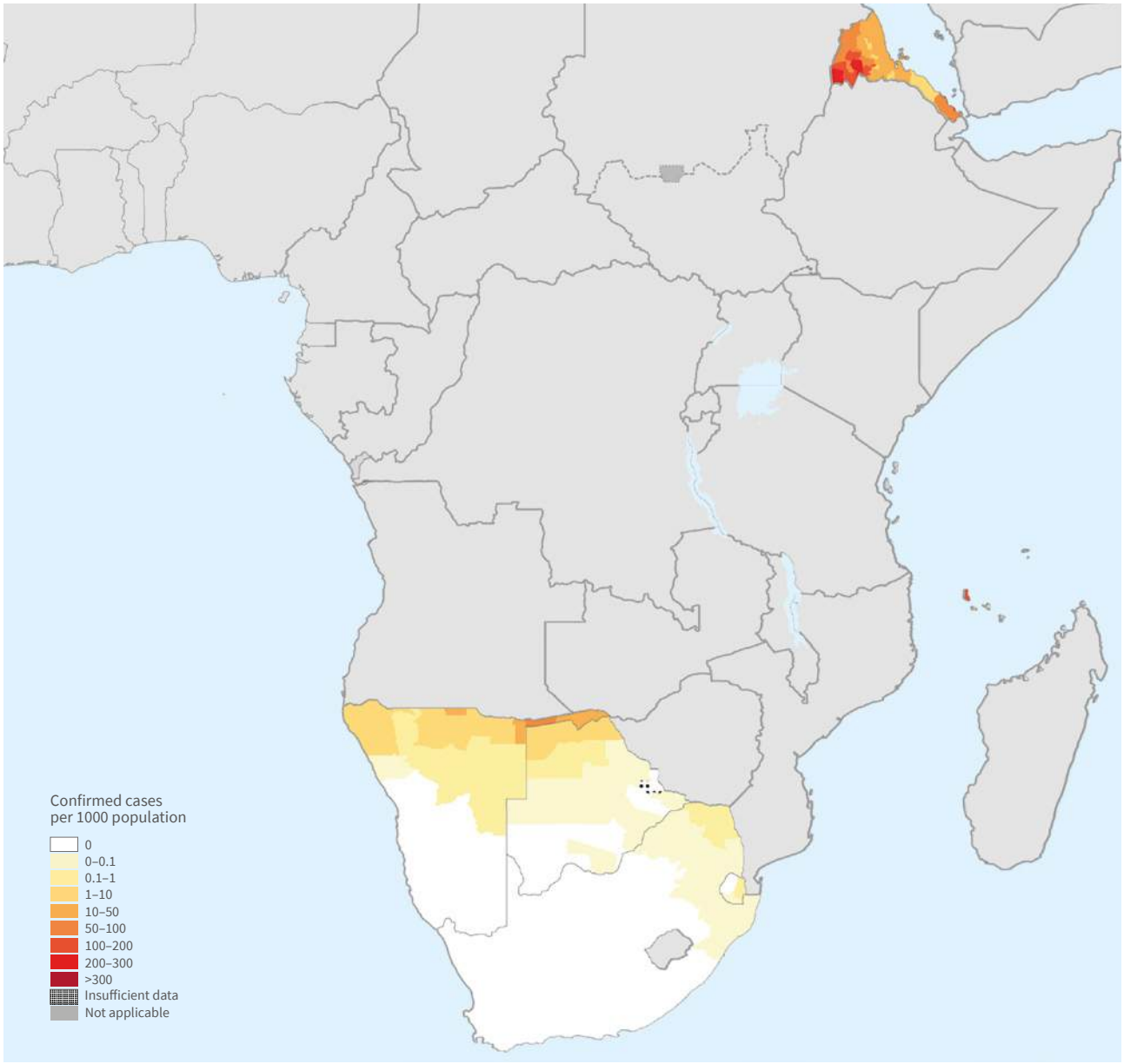
Lessons learned

Key lessons from these efforts highlight the importance of political commitment, innovation and adaptive planning. Regional economic communities, such as SADC and EAC, provide platforms for coordination, accountability and shared progress tracking. Data-driven approaches, including geospatial mapping, predictive modelling and real-time dashboards in Kenya, Mozambique and Zambia have improved targeting and efficiency of interventions. Strengthening surveillance systems and addressing resistance are essential to optimize the use of existing malaria tools, while integrating climate and environmental data into planning will support early warning and adaptive interventions for more resilient malaria control.

Annex 3 – A. WHO African Region, d. Countries with low transmission in east and southern Africa

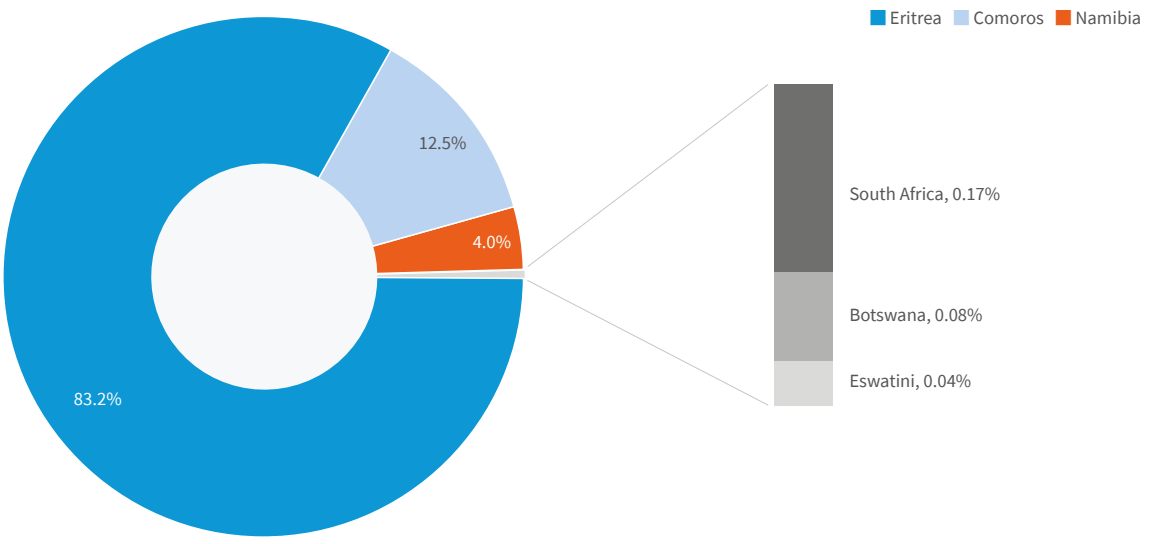
Epidemiology

A. Confirmed malaria cases per 1000 population, 2024



Malaria endemic countries: Botswana, the Comoros, Eritrea, Eswatini, Namibia and South Africa

B. Share of estimated malaria cases, 2024



Reported cases and deaths

Cases	2015	2024
Total (presumed and confirmed) cases	52 905	245 841
Confirmed cases (%)	47 736 (90.2%)	243 829 (99.2%)
Total cases in children aged under 5 years (%)	7260 (13.7%)	24 000 (9.8%)
Female, percentage of total cases[a]	NA	41.5%

NA: not available.
[a] The percentage of malaria cases in females is calculated only for countries that have disaggregated data by sex.

Deaths	2015	2024
Total deaths	176	87
Total deaths of children aged under 5 years (%)	16 (9.1%)	10 (11.5%)
Female, percentage of total deaths[a]	NA	20.2%

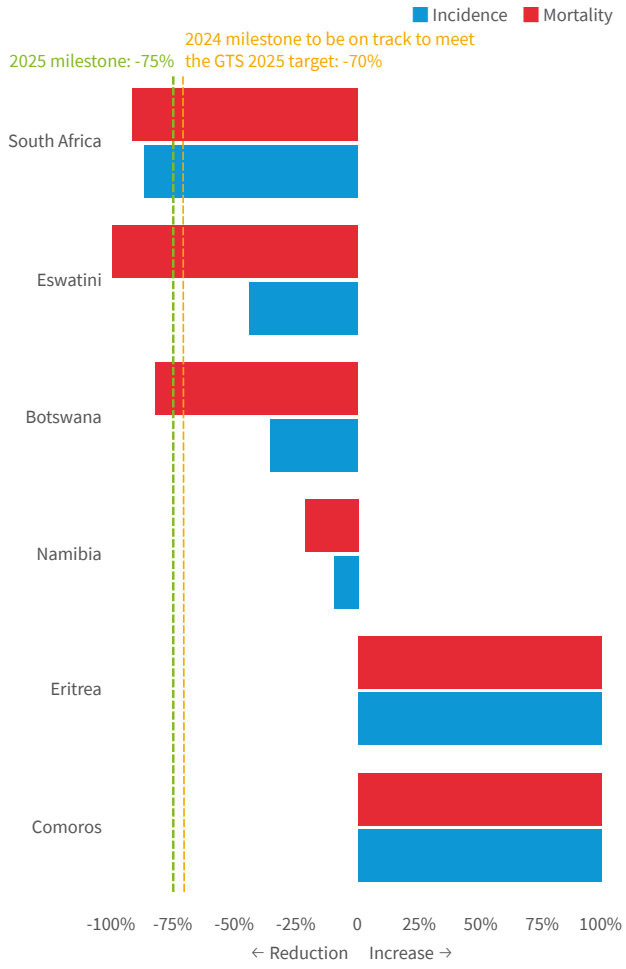
NA: not available.
[a] The percentage of malaria deaths in females is calculated only for countries that have disaggregated data by sex.

Reporting completeness	2015	2024
Countries with reporting completeness >80%	6	6
Countries with reporting completeness between 50% and 80%	0	0
Countries with reporting completeness <50%	0	0

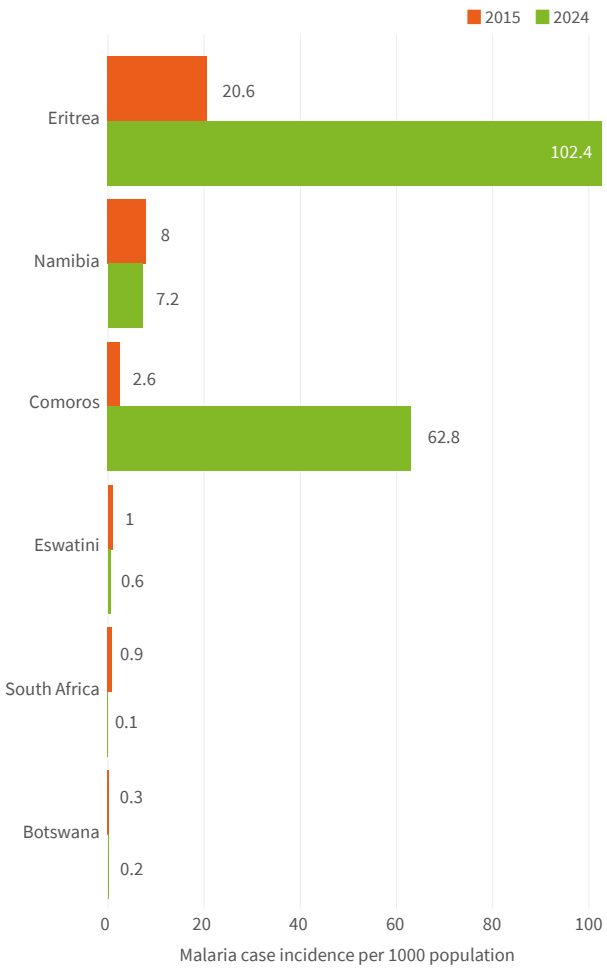
Estimated cases and deaths	2015	2024
Cases	86 700	435 100
Deaths	284	968
Population denominator used to compute incidence and mortality rate	13.2 million	15.2 million

Parasites: *P. falciparum* and mixed (87%), *P. vivax* (13%)

C. Change in estimated malaria incidence and mortality rate, 2015–2024[a]



D. Estimated malaria case incidence in 2015 compared with 2024



GTS: *Global technical strategy for malaria 2016–2030*.
[a] In the Comoros and Eritrea, the change in both incidence and mortality is more than 100%.

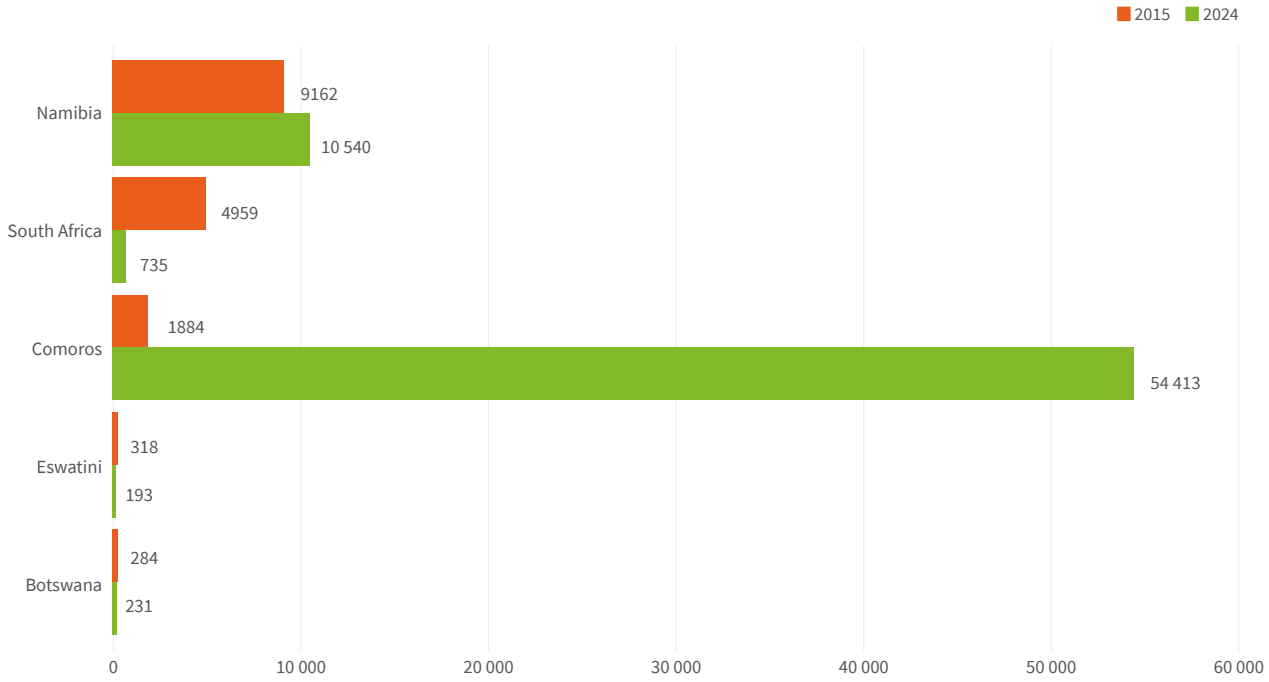
Annex 3 – A. WHO African Region, d. Countries with low transmission in east and southern Africa

Acceleration to elimination

Countries with a nationwide elimination programme: Botswana, the Comoros, Eswatini, Namibia and South Africa

Countries that are part of the E-2025 initiative: Botswana, the Comoros, Eswatini and South Africa

E. Reported indigenous cases in countries with national elimination activities, 2015 compared with 2024



Interventions

Countries that carried out ITN mass campaigns in 2024: the Comoros and Eritrea

Countries that carried out IRS in 2024: Botswana, the Comoros, Eritrea, Eswatini, Namibia and South Africa

Treatment	2015	2024
Number of ACT courses distributed	365 900	363 900
Number of any antimalarial treatment courses (including ACT) distributed	366 000	373 000
Treatment coverage	NA	96.4%

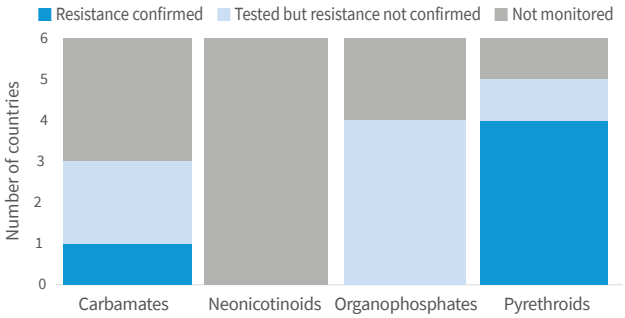
ACT: artemisinin-based combination therapy.
NA: not available.

F. Therapeutic efficacy studies (clinical and parasitological failure among patients with *Plasmodium falciparum* malaria, %)

Medicine	Study years	No. of studies	Min.	Median	Max.	Percentile 25	Percentile 75
AL	2017–2020	5	0	0.0	1.0	0	0.0
AS-AQ	2016–2023	12	0	2.2	4.7	0	3.8

AL: artemether–lumefantrine; AS-AQ: artesunate–amodiaquine.

G. Status of insecticide resistance[a] per insecticide class (2020–2024)

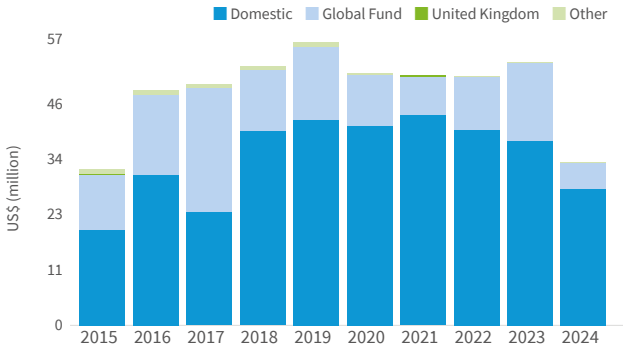


[a] Resistance is considered confirmed when it is detected to one insecticide in the class, in at least one malaria vector from one collection site.

Countries with confirmed resistance to at least one insecticide class: Botswana, the Comoros, Namibia and South Africa

Funding

H. Malaria funding[a] by source, 2015–2024



Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; UK: United Kingdom of Great Britain and Northern Ireland; USAID: United States Agency for International Development.
[a] Excludes patient service delivery costs and out-of-pocket expenditure.

Funding (US$)	2015	2024
Total funding	31.1 million	32.5 million
Proportion from domestic sources	61.1%	83.5%

Change in funding 2015–2024: 5% increase

Key highlights

Epidemiology: The malaria landscape in low transmission settings in east and southern Africa highlights a more than fourfold increase in malaria incidence and more than threefold increase in mortality rate in 2024 compared with 2015. Despite the setback, South Africa (for both incidence and mortality rate), Botswana and Eswatini (for mortality rate) are on track to meet the GTS 2025 targets of a 75% reduction in incidence and mortality. In 2024, a total of 245 841 malaria cases (presumed and confirmed) were reported, of which 99.2% were confirmed. There were 87 reported malaria deaths. Females accounted for 41.5% of reported cases and 20.2% of reported deaths, while children aged under 5 years accounted for 9.8% of reported cases and 11.5% of reported deaths. However, progress has reversed in the Comoros and Eritrea, which reported increases in cases and deaths in 2024 compared with 2015. The subregion accounted for an estimated 435 100 cases and 968 estimated deaths, with the highest burden of estimated cases in Eritrea (83.2%), followed by the Comoros (12.5%) and Namibia (4.0%). No country in the subregion has been certified as malaria free, but all countries have either nationwide or subnational elimination goals.

Interventions and biological threats: ITN mass campaigns were carried out in the Comoros and Eritrea, and treatment coverage in the subregion was high in 2024, at 96.4%. Resistance to at least one insecticide class has been confirmed in Botswana, the Comoros, Namibia and South Africa. Eritrea has emerged as the epicentre of multiple biological threats, including a high prevalence of *pfhrp2/3* gene deletions and confirmed artemisinin partial resistance, which pose risks to effective case detection and management, and *An. stephensi* invasion. In addition, artemisinin partial resistance is suspected in Namibia.

Funding: Total malaria funding increased slightly between 2015 and 2024, from US$ 31 million to US$ 33 million. The share from domestic sources rose from 61% to 84%, although this change may be partly explained by the absence of United States country-level allocations in 2024. Maintaining predictable and efficiently allocated financing will be critical to sustain progress in these low transmission settings.

Key challenges

Malaria control and elimination efforts in east and southern Africa continue to face several challenges. These include climate change, ranging from its effects on transmission patterns to extreme weather events, such as floods and cyclones, which disrupt prevention and treatment services and present biological threats. Conflicts and insecurity further limit access to health care and intervention coverage. Population movements, particularly of seasonal migrant workers engaged in informal work or in hard-to-reach agricultural areas, contribute to transmission that requires a response of targeted surveillance and tailored intervention strategies. Inadequate community engagement, often driven by low levels of perception of malaria risk, further limits the reach of interventions. Health system weaknesses – including shortages of trained personnel and limited surveillance capacity – constrain programme performance, while persistent funding gaps and reduced external support as countries near elimination threaten long-term sustainability.

Key successes

The subregion has achieved significant successes. Botswana, Eswatini and South Africa have recorded notable reductions in malaria burden, reflecting strong political commitment and coordinated regional action. Governments continue to demonstrate leadership through platforms such as the SADC and EAC ministers of health meetings, which foster collaboration on elimination initiatives. Regional and cross-border efforts, including the Elimination 8 and MOSASWA initiatives, have strengthened technical capacity and promoted coordinated approaches to malaria control. Partnerships with academic and research institutions have enhanced surveillance of biological threats, while innovative strategies – such as malaria elimination accelerators, microstratification, foci clearance programmes and active case detection during reactive IRS – have been introduced.

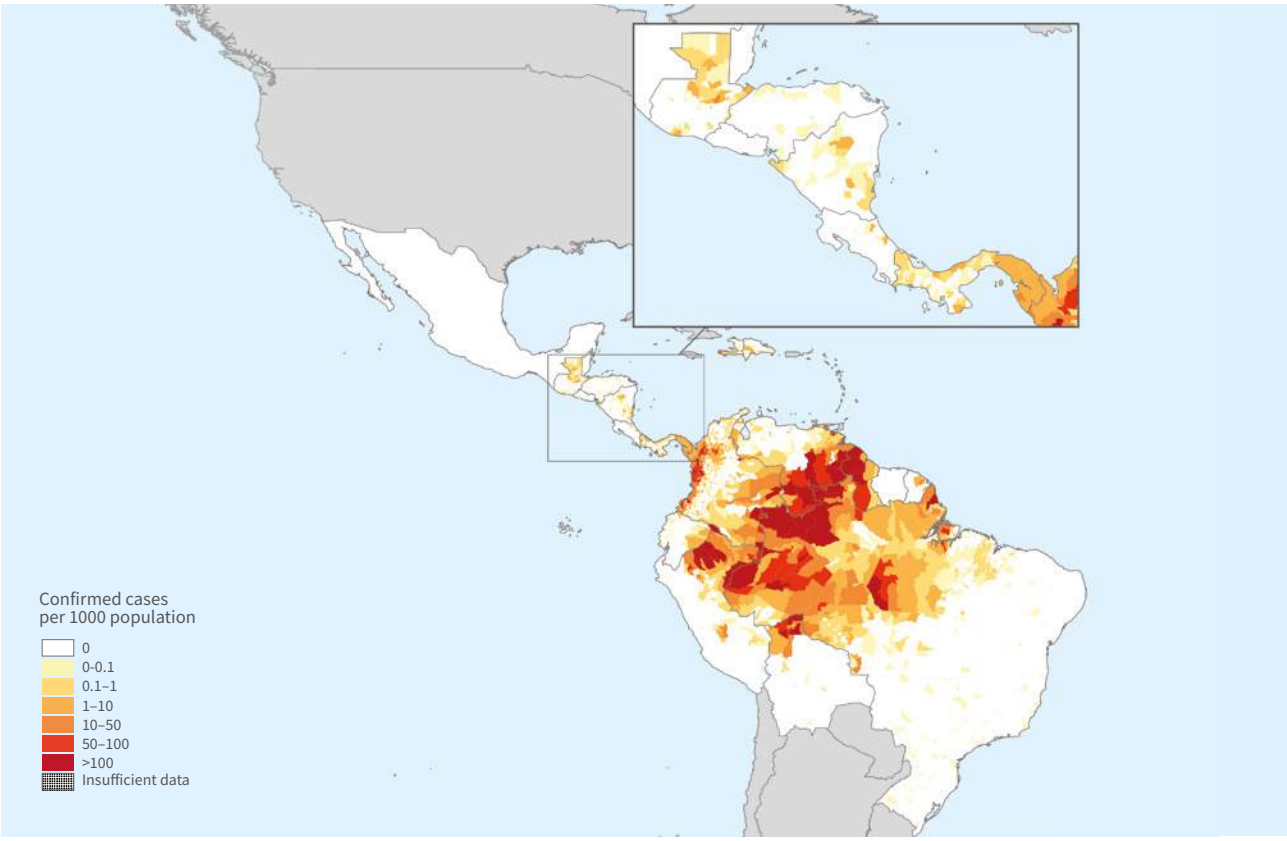
Lessons learned

Regional economic communities, such as the SADC and EAC, provide important platforms for regional coordination and accountability in malaria control. Maintaining strong political commitment, strengthening surveillance systems, improving microstratification and addressing emerging resistance are critical for optimizing the effectiveness of existing malaria interventions. Furthermore, the integration of climate and environmental data into malaria planning enhances early warning capabilities and supports the implementation of adaptive, evidence-based interventions.

Annex 3 – B. WHO Region of the Americas

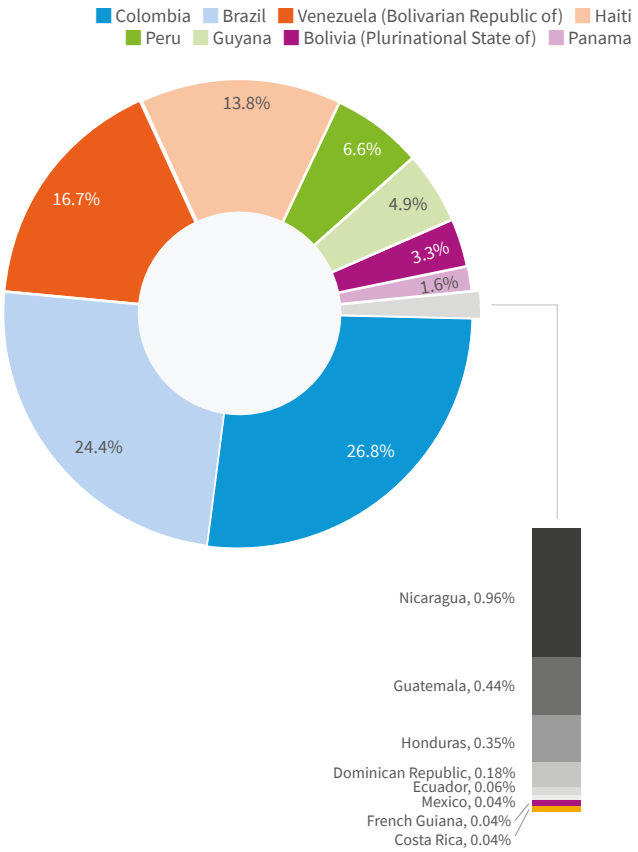
Epidemiology

A. Confirmed malaria cases per 1000 population, 2024

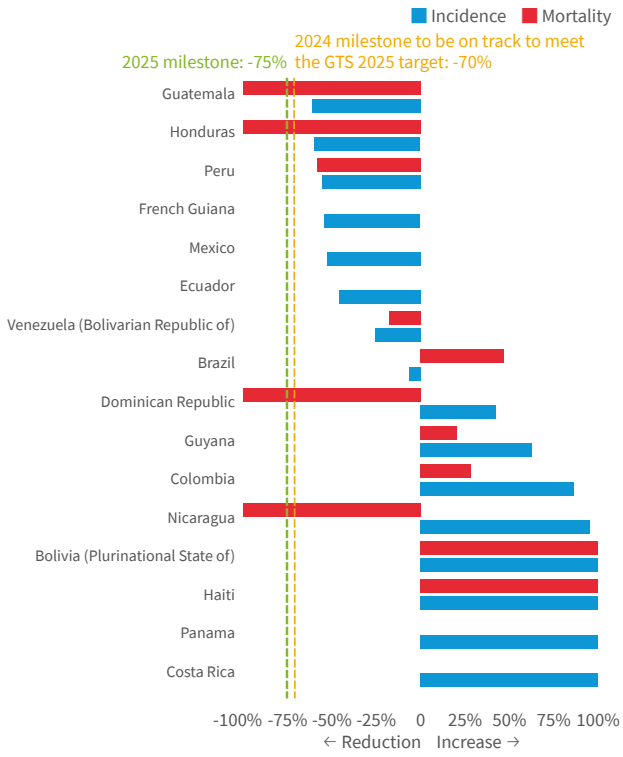


Malaria endemic countries: Bolivia (Plurinational State of), Brazil, Colombia, Costa Rica, the Dominican Republic, Ecuador, French Guiana, Guatemala, Guyana, Haiti, Honduras, Mexico, Nicaragua, Panama, Peru and Venezuela (Bolivarian Republic of)

B. Share of estimated malaria cases, 2024



C. Change in estimated malaria incidence and mortality rate, 2015–2024[a,b,c,d]



GTS: *Global technical strategy for malaria 2016–2030.*

[a] In Costa Rica, Ecuador, French Guiana and Panama, there were zero indigenous deaths in 2015 and 2024.

[b] Mexico reported zero indigenous deaths in 2015 and one in 2024.

[c] In Costa Rica, Haiti, Panama and the Plurinational State of Bolivia, the change in incidence is more than 100%.

[d] In Haiti and the Plurinational State of Bolivia, the change in mortality is more than 100%.

Reported cases and deaths

Cases	2015	2024
Total (presumed and confirmed) cases	488 200	536 700
Confirmed cases (%)	488 200 (100%)	536 700 (100%)
Total cases in children aged under 5 years (%)	NA	52 700 (9.8%)
Female, percentage of total cases[a]	NA	39.1%
Indigenous cases	443 338	489 568
Introduced cases	0	3459
Imported cases	14 582	7117
Relapses	25 563	35 876

NA: not available.
[a] The percentage of malaria cases in females is calculated only for countries that have disaggregated data by sex.

Deaths	2015	2024
Total deaths	169	136
Total deaths of children aged under 5 years (%)	NA	24 (17.6%)
Female, percentage of total deaths[a]	NA	36.8%

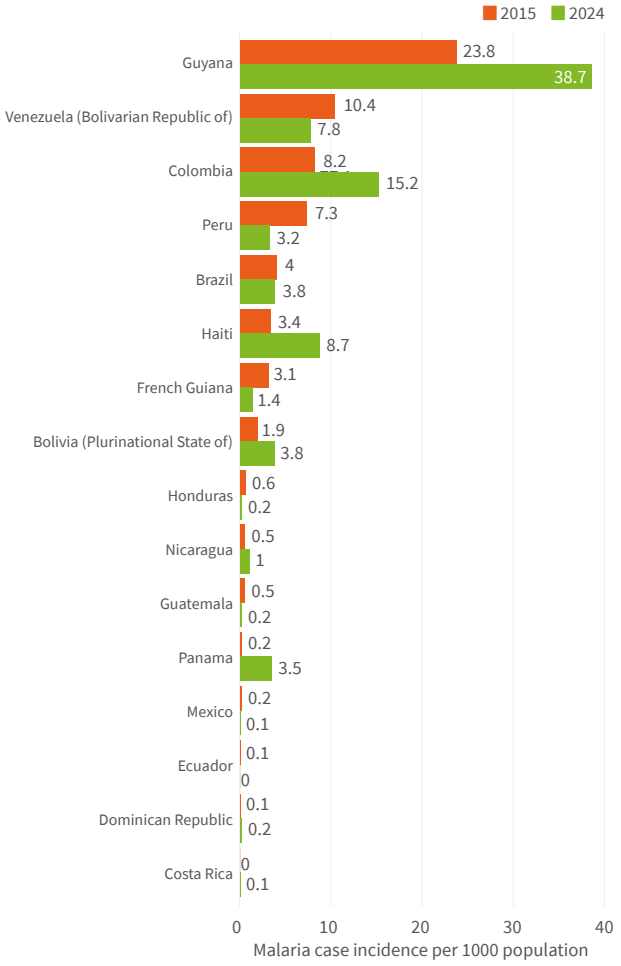
NA: not available.
[a] The percentage of malaria deaths in females is calculated only for countries that have disaggregated data by sex.

Reporting completeness	2015	2024
Countries and areas with reporting completeness >80%	15	14
Countries and areas with reporting completeness between 50% and 80%	1	1
Countries and areas with reporting completeness <50%	0	1

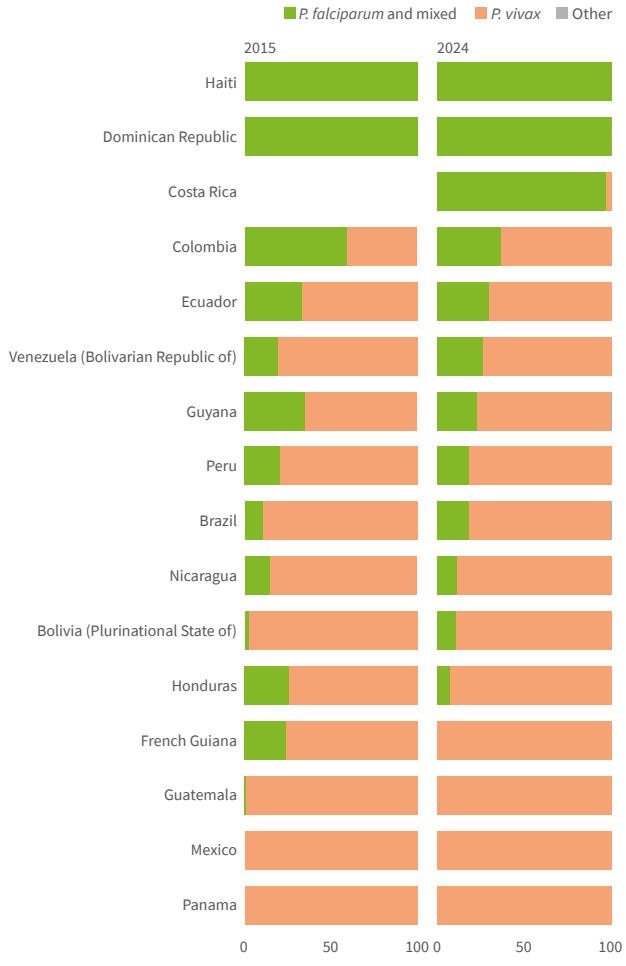
Estimated cases and deaths	2015	2024
Cases	572 700	663 400
Deaths	390	504
Population denominator used to compute incidence and mortality rate	141.6 million	153.5 million

Parasites: *P. falciparum* and mixed (30%), *P. vivax* (69%), other species (1%)

D. Estimated malaria case incidence in 2015 compared with 2024



E. Percentage of *Plasmodium* species from indigenous cases in 2015 compared with 2024[a]



P.: *Plasmodium*.
[a] Costa Rica reported zero indigenous cases in 2015.

Annex 3 – B. WHO Region of the Americas

Acceleration to elimination

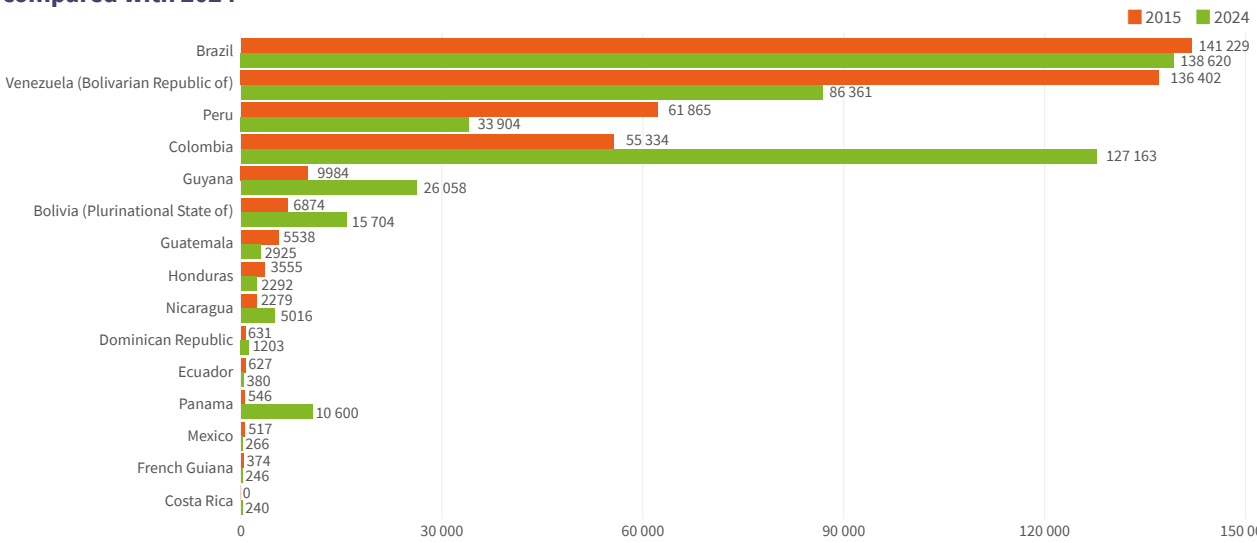
Countries and areas with a nationwide elimination programme: Bolivia (Plurinational State of), Brazil, Colombia, Costa Rica, the Dominican Republic, Ecuador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Peru and Venezuela (Bolivarian Republic of)

Countries and areas that are part of the E-2025 initiative: Costa Rica, the Dominican Republic, Ecuador, French Guiana, Guatemala, Honduras, Mexico and Panama

Countries certified as malaria free since 2015: Paraguay (2018), Argentina (2019), El Salvador (2021), Belize (2023) and Suriname (2025)

Cases investigated/tested	2015	2024
Percentage of confirmed cases investigated and classified	93%	92.6%
Percentage of suspected cases tested	100%	100%

F. Number of reported indigenous cases in countries and areas with nationwide elimination activities, 2015 compared with 2024



Interventions

Intervention	2015	2024
Number of ITNs distributed	1.1 million	1.4 million
Number of people protected by IRS	3.9 million	844 000
Number of RDTs distributed	516 200	2.3 million
Number of ACT courses distributed	209 400	507 100
Number of first-line treatment courses (including ACT) delivered	652 400	1.4 million
Treatment coverage	NA	99.7%

ACT: artemisinin-based combination therapy; IRS: indoor residual spraying; ITN: insecticide-treated mosquito net; RDT: rapid diagnostic test.
NA: not available.

G. Therapeutic efficacy studies (clinical and parasitological failure among patients with *Plasmodium falciparum* malaria, %)

Medicine	Study years	No. of studies	Min.	Median	Max.	Percentile 25	Percentile 75
AL	2015–2019	2	0	0	0	0	0

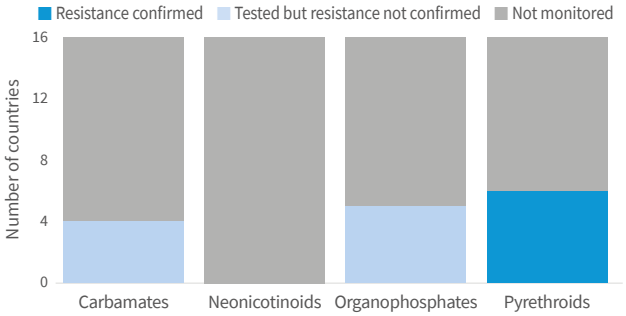
AL: artemether–lumefantrine.

H. Therapeutic efficacy studies (clinical and parasitological failure among patients with *Plasmodium vivax* malaria, %)

Medicine	Study years	No. of studies	Min.	Median	Max.	Percentile 25	Percentile 75
CQ+PQ	2016–2020	3	0	0	1.2	0	0.6

CQ+PQ: chloroquine plus primaquine.

I. Status of insecticide resistance[a] per insecticide class (2020–2024)

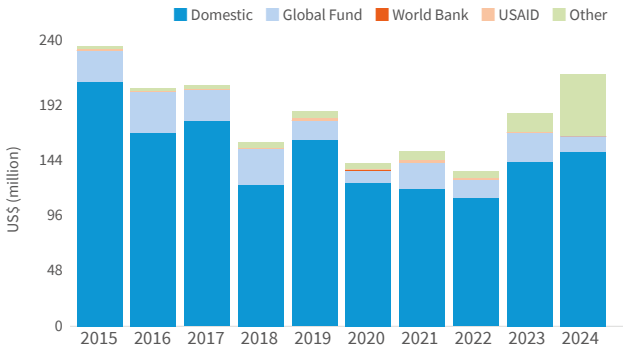


[a] Resistance is considered confirmed when it is detected to one insecticide in the class, in at least one malaria vector from one collection site.

Countries with confirmed resistance to at least one insecticide class: Brazil, Colombia, the Dominican Republic, Honduras, Mexico and Nicaragua

Funding

J. Malaria funding[a,b,c] by source, 2015–2024



Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; USAID: United States Agency for International Development.
[a] Excludes patient service delivery costs and out-of-pocket expenditure.
[b] Although USAID funding was provided in 2024, recipient-level allocations were not available due to reporting disruptions. As a result, these amounts are not reflected in regional profiles.
[c] International (donor) funding is based on data reported by countries through national malaria programmes rather than donor-reported datasets.

Funding (US$)	2015	2024
Total funding	233.3 million	210.4 million
Proportion from domestic sources	87.5%	69.4%

Change in funding 2015–2024: 10% decrease

Key highlights

Epidemiology: In 2024, a total of 536 700 confirmed malaria cases (including relapses) was reported in the WHO Region of the Americas, of which 39.1% were in females, 9.8% were in children aged under 5 years and 91.2% were classified as indigenous. There were 136 reported malaria deaths, of which 36.8% were of females and 17.6% were of children aged under 5 years. There were 663 400 estimated malaria cases and 504 estimated deaths. Estimated cases were concentrated in four countries – Colombia (26.8%), Brazil (24.4%), the Bolivarian Republic of Venezuela (16.7%) and Haiti (13.8%) – which together accounted for more than 80% of all cases in the region. The Dominican Republic, Guatemala, Honduras and Nicaragua have already met the GTS 2025 target of a 75% reduction in malaria mortality compared with 2015. None of the countries are on track to meet the GTS 2025 target for a 75% reduction in incidence, with significant increases observed in Colombia, the Dominican Republic, Guyana, Haiti, Nicaragua, Panama and the Plurinational State of Bolivia. Five countries have been certified as malaria free: Argentina (2018), Paraguay (2018), El Salvador (2019), Belize (2021) and Suriname (2025). All the endemic countries in the region except Haiti have national elimination programmes. More than two thirds of reported malaria cases in the region are caused by *P. vivax*. Transmission in the Dominican Republic and Haiti was exclusively due to *P. falciparum*, whereas transmission in French Guiana, Guatemala, Mexico and Panama was exclusively due to *P. vivax*. Other countries, including Guyana, Honduras and Nicaragua, reported a reduction in *P. falciparum* transmission in 2024 compared with 2015.

Interventions and biological threats: The number of rapid diagnostic tests (RDTs) distributed increased from 516 200 in 2015 to 2.3 million in 2024, and treatment coverage was high, at 99.7%. *Pfhrp2* and *pfhrp3* gene deletions have been observed throughout Central and South America. Available data from 2020 show insecticide resistance to pyrethroids in six countries; however, insecticide resistance data were not available from all countries. TES from 2015 to 2020 indicate high treatment efficacy of AL against *P. falciparum* and chloroquine plus primaquine against *P. vivax*. More recent data are needed to evaluate the current status of biological threats in the region.

Funding: Total malaria funding decreased by about 10% between 2015 and 2024, from US$ 233 million to US$ 210 million. The share from domestic sources fell from 88% to 69%. Reported values reflect country-reported funding (from national programmes), not donor-reported datasets, which differs from the approach used in **Chapter 4**.

Key challenges

From 2023 to 2024, Colombia, Haiti, Panama, Peru and the Plurinational State of Bolivia reported significant increases in cases, driven by factors such as population movements linked to internal migration and economic activities (e.g. gold mining); limited access to health services in remote areas and Indigenous communities; and climate-related factors, including the El Niño phenomenon. Sociopolitical instability also contributed to disruptions in health infrastructure and service delivery, particularly in Haiti, while increased human mobility in border and jungle regions, such as the Darién area of Panama, further complicated malaria control efforts.

Financial constraints continued to pose a major challenge. Between 2015 and 2024, total resources allocated to malaria control and elimination in the region declined by 9.8%, with domestic financing decreasing by 21%. This reduction underscores growing reliance on external funding and highlights the urgent need to strengthen sustainable national investments.

A fundamental challenge is that there are still high-burden areas with limited geographic access to health services and therefore malaria diagnostics and treatment. It is necessary to develop tailored strategies to reach geographically isolated Indigenous communities and populations in gold-mining areas, who are at high risk of malaria exposure.

Despite the important increase in the use of RDTs in the region in recent years, further expansion of implementation is needed. In many malaria endemic countries, community health workers and RDTs remain underutilized in passive case detection.

Key successes

In June 2025, Suriname became the first country in the Amazon subregion to be certified as malaria free by WHO. This achievement follows the certification of Argentina (2018), Paraguay (2018), El Salvador (2019) and Belize (2021).

Between 2015 and 2024, six countries and one territory experienced reductions in the number of reported cases: Peru (49%), Guatemala (46%), Honduras (34%), Ecuador (33%), the Bolivarian Republic of Venezuela (26%), Brazil (3%) and French Guiana (2%). In Mesoamerica, over the same period, Honduras and Nicaragua reported a significant reduction in *P. falciparum* cases (70% and 52%, respectively).

Despite the decrease in funding for malaria control interventions, and the fact that work remains to be done to expand malaria diagnosis and treatment, the region showed an increase in the use of RDTs (346%), treatment with ACT (114%) and distribution of ITNs (27%).

Lessons learned

The reduction in *P. falciparum* cases in Honduras is attributed to the commitment and intensification of actions to accelerate the elimination of this parasite. It also reflects the importance of continued and sustained efforts to expand access to diagnosis and treatment using community health workers and the introduction of reactive drug administration in areas of very low transmission.

The use of RDTs by Indigenous community volunteers in hard-to-reach areas has resulted in significant positive lessons being learned in Peru and, more recently, the Bolivarian Republic of Venezuela and Colombia. Similarly, the marked increase in RDT use in Colombia and Peru during 2024 is linked to the engagement of Indigenous volunteers in case detection, underscoring the critical role of community participation in extending diagnostic and treatment coverage to hard-to-reach populations.

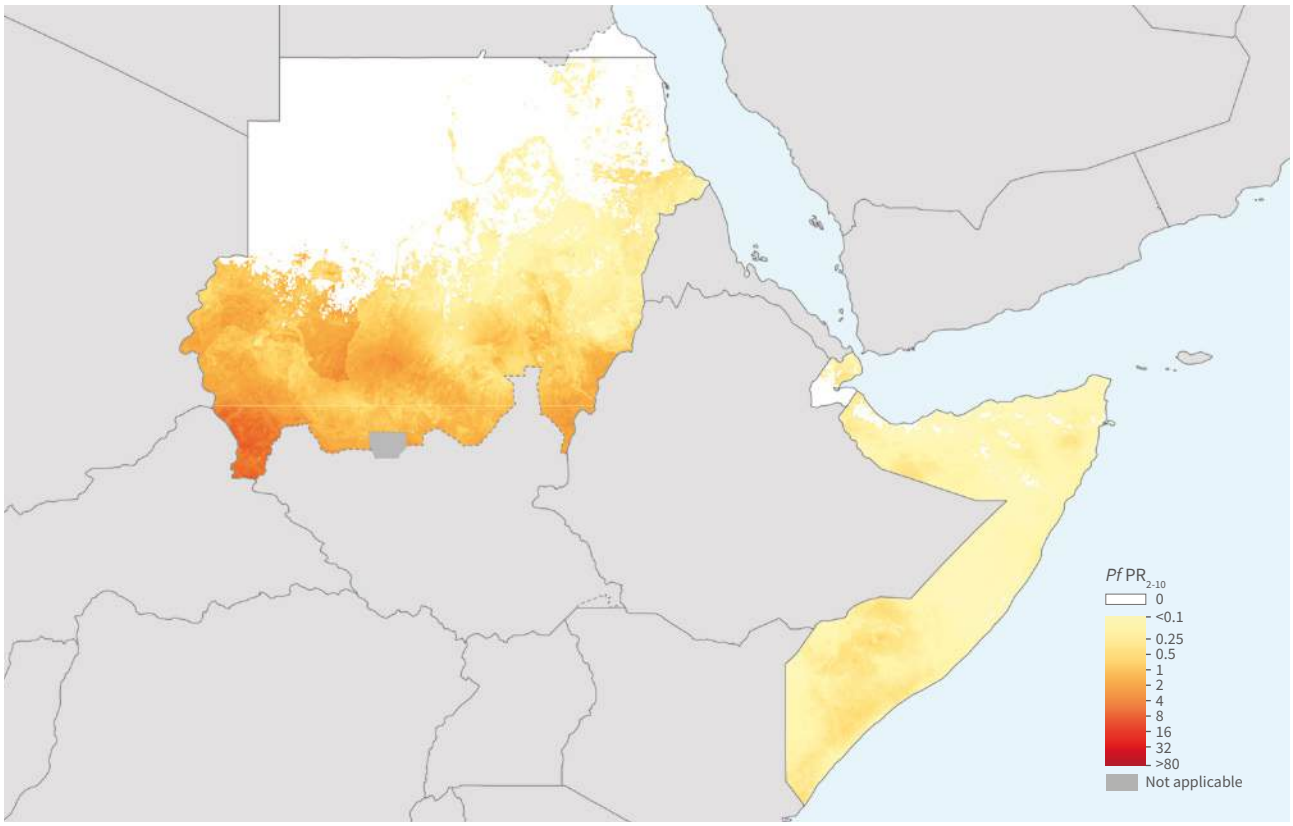
The challenges posed by the decrease in funding for malaria control interventions in the region demand additional efforts to increase domestic funding and to strengthen relationships and collaboration between countries and partners that provide technical, logistical and operational support.

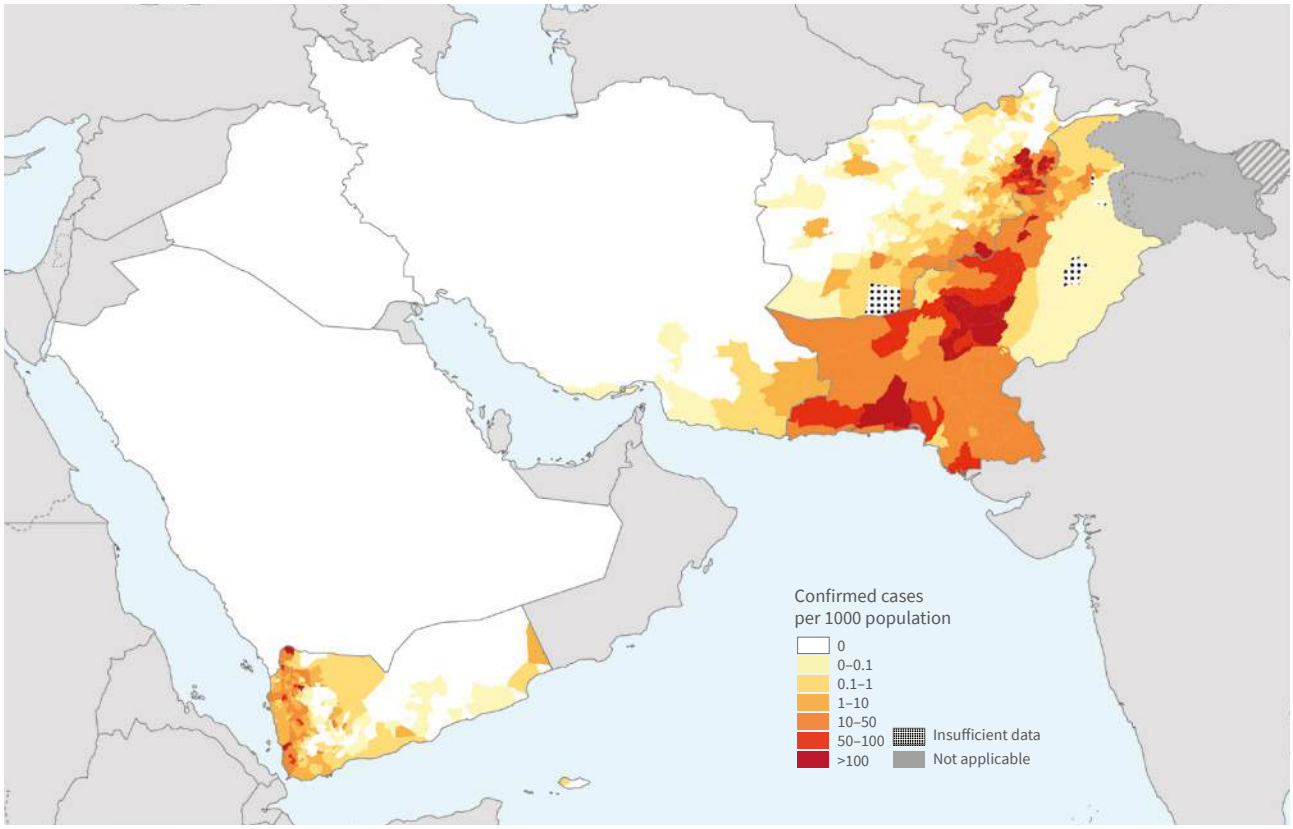
National strategies should continue to prioritize the expansion of malaria diagnosis and treatment, particularly among Indigenous communities and other vulnerable groups – such as populations involved in agriculture, gold mining and other extractive activities – who live in remote areas with limited access to diagnostic and treatment services.

Annex 3 – C. WHO Eastern Mediterranean Region

Epidemiology

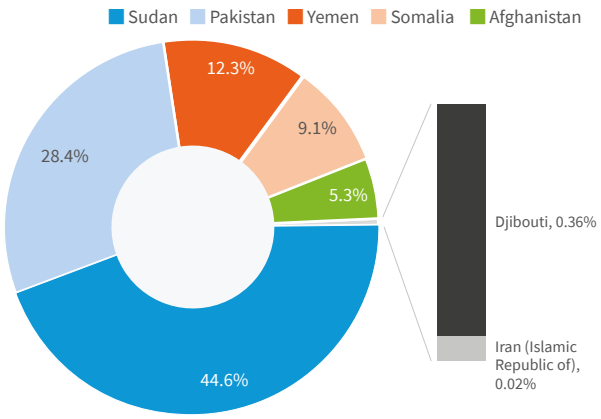
A. *Plasmodium falciparum* parasite rate (*Pf* PR) and confirmed malaria cases per 1000 population, 2024



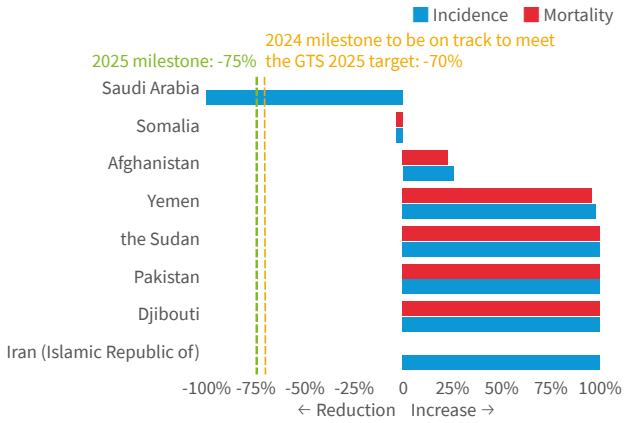


Malaria endemic countries: Afghanistan, Djibouti, Iran (Islamic Republic of), Pakistan, Somalia, the Sudan and Yemen

B. Share of estimated malaria cases, 2024



C. Change in estimated malaria incidence and mortality rate, 2015–2024[a,b,c]



GTS: *Global technical strategy for malaria 2016–2030*.
[a] In the Islamic Republic of Iran and Saudi Arabia, there were zero indigenous deaths in 2015 and 2024.
[b] In Djibouti, the Islamic Republic of Iran, Pakistan, the Sudan and Yemen, the change in incidence is more than 100%.
[c] In Djibouti, Pakistan and the Sudan, the change in mortality is more than 100%.

Reported cases and deaths

Cases	2015	2024
Total (presumed and confirmed) cases	5.4 million	4.6 million
Confirmed cases (%)	1.0 million (18.8%)	3.2 million (69.9%)
Total cases in children aged under 5 years (%)	NA	796 000 (17.3%)
Female, percentage of total cases[a]	NA	46.3%

NA: not available.
[a] The percentage of malaria cases in females is calculated only for countries that have disaggregated data by sex.

Deaths	2015	2024
Total deaths	1020	772
Total deaths of children aged under 5 years (%)	NA	140 (18.1%)
Female, percentage of total deaths[a]	NA	55.1%

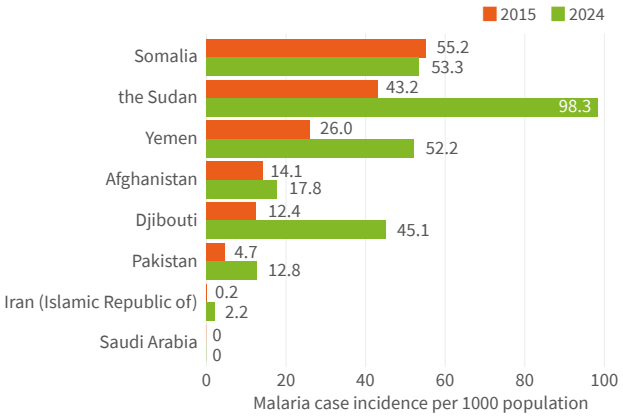
NA: not available.
[a] The percentage of malaria deaths in females is calculated only for countries that have disaggregated data by sex.

Reporting completeness	2015	2024
Countries with reporting completeness >80%	3	5
Countries with reporting completeness between 50% and 80%	2	1
Countries with reporting completeness <50%	2	1

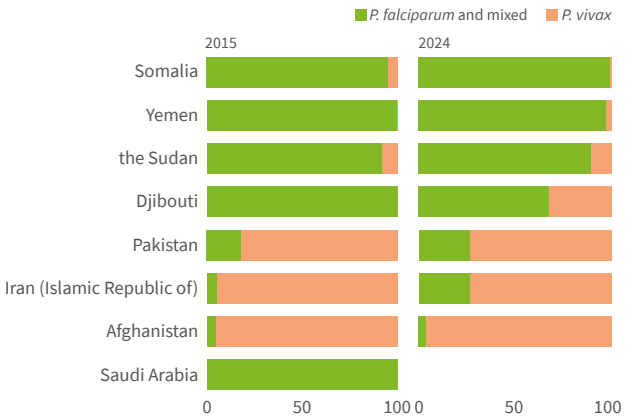
Estimated cases and deaths	2015	2024
Cases	4.4 million	11.1 million
Deaths	8680	22 100
Population denominator used to compute incidence and mortality rate	315.2 million	377.3 million

Parasites: *P. falciparum* and mixed (39%), *P. vivax* (61%)

D. Estimated malaria case incidence in 2015 compared with 2024



E. Percentage of *Plasmodium* species from indigenous cases in 2015 compared with 2024[a]



P.: *Plasmodium*.
[a] Saudi Arabia reported zero indigenous cases in 2024.

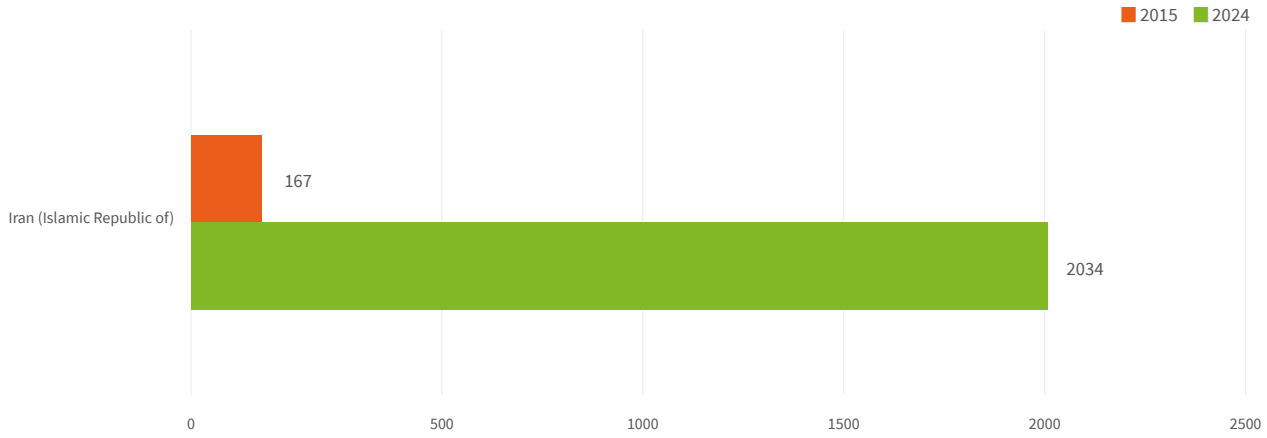
Annex 3 – C. WHO Eastern Mediterranean Region

Acceleration to elimination

Countries with a subnational/territorial elimination programme: Somalia
Countries with a nationwide elimination programme: Iran (Islamic Republic of) and Saudi Arabia
Countries that are part of the E-2025 initiative: Iran (Islamic Republic of) and Saudi Arabia

Countries reporting zero indigenous cases for 3 or more consecutive years: Saudi Arabia
Countries certified as malaria free since 2015: Egypt (2024)

F. Number of reported local indigenous and introduced cases in endemic E-2025 countries, 2015 compared with 2024



E-2025: malaria eliminating countries for 2025.

Interventions

Countries that carried out ITN mass campaigns in 2024: Afghanistan, Pakistan, Somalia and Yemen

Countries that carried out IRS in 2024: Djibouti, Iran (Islamic Republic of), Pakistan and Yemen

Intervention	2015	2024
Number of ITNs distributed	5.8 million	11.6 million
Number of people protected by IRS	5.0 million	4.4 million
Number of RDTs distributed	6.1 million	15.5 million
Number of ACT courses distributed	3.2 million	15.1 million
Number of first-line treatment courses (including ACT) delivered	4.0 million	15.6 million
Treatment coverage	NA	98.6%

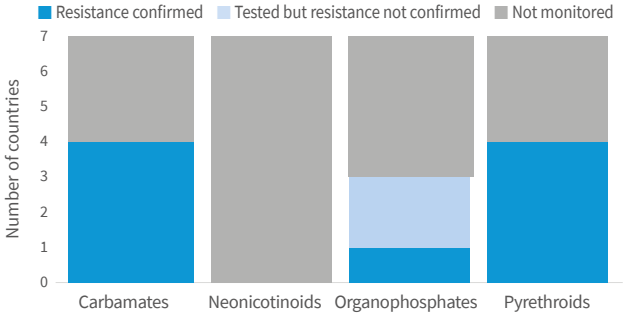
ACT: artemisinin-based combination therapy; IRS: indoor residual spraying; ITN: insecticide-treated mosquito net; RDT: rapid diagnostic test.
NA: not available.

G. Therapeutic efficacy studies (clinical and parasitological failure among patients with *Plasmodium falciparum* malaria, %)

Medicine	Study years	No. of studies	Min.	Median	Max.	Percentile 25	Percentile 75
AL	2015–2024	34	0	0	8.0	0	0.8
DHA-PPQ	2015–2020	16	0	0	2.5	0	0.0

AL: artemether–lumefantrine; DHA-PPQ: dihydroartemisinin–piperaquine.

H. Status of insecticide resistance[a] per insecticide class (2020–2024)

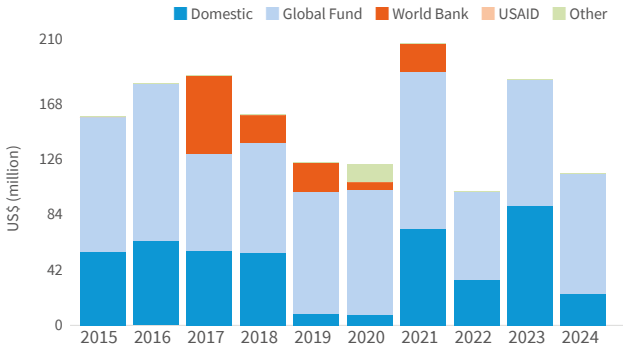


[a] Resistance is considered confirmed when it is detected to one insecticide in the class, in at least one malaria vector from one collection site.

Countries with confirmed resistance to at least one insecticide class: Afghanistan, Iran (Islamic Republic of), Somalia and Yemen

Funding

I. Malaria funding[a,b] by source, 2015–2024



Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; USAID: United States Agency for International Development.
[a] Excludes patient service delivery costs and out-of-pocket expenditure.
[b] Although USAID funding was provided in 2024, recipient-level allocations were not available due to reporting disruptions. As a result, these amounts are not reflected in regional profiles.

Funding (US$)	2015	2024
Total funding	152.1 million	110.8 million
Proportion from domestic sources	35.5%	20.8%

Change in funding 2015–2024: 27% decrease

Key highlights

Epidemiology: In 2024, the WHO Eastern Mediterranean Region reported 4.6 million malaria cases (presumed and confirmed), of which 69.9% were confirmed, an increase from 18.8% in 2015. A total of 772 malaria deaths were reported. Children aged under 5 years accounted for 17.3% of reported cases and 18.1% of deaths. Females accounted for 46.3% of cases and 55.1% of deaths. Almost two thirds of cases were due to *P. vivax*. In 2024, there were 11.1 million estimated malaria cases and 22 100 estimated malaria deaths. The malaria burden was mainly concentrated in the Sudan (44.6%) and Pakistan (28.4%), which together accounted for almost three quarters of the region's malaria burden, followed by Yemen (12.3%). Saudi Arabia has continued its progress towards elimination, reporting 4 consecutive years of zero indigenous malaria cases. Egypt was certified malaria free in 2024. However, none of the remaining seven endemic countries in the region are on track to meet the GTS 2025 targets for incidence and mortality, with significant increases seen in six of them.

Interventions and biological threats: In 2024, ITN mass campaigns were implemented in Afghanistan, Pakistan, Somalia and Yemen. However, in Afghanistan, the Islamic Republic of Iran, Somalia and Yemen, there has been confirmed resistance to at least one insecticide class from one site since 2020.

Funding: Total malaria funding decreased by 27% between 2015 and 2024, from US$ 152 million to US$ 111 million; the domestic funding share declined from 36% to 21%.

Key challenges

Countries in the WHO Eastern Mediterranean Region continue to face complex challenges that undermine malaria control, surveillance continuity and elimination efforts. Ongoing conflict, large-scale population displacement and recurrent climate-related disasters disrupt health service delivery, weaken surveillance systems and increase vulnerability to malaria transmission. The 2025 ITN mass campaign in the Sudan exemplifies these difficulties: mass displacement due to conflict complicated microplanning, while continued insecurity hindered accessibility and overall campaign operations, leaving 32 localities across three states still to be reached. Stagnant or declining funding, particularly from domestic sources, further threatens programme sustainability and innovation – a concern compounded by the global reduction in malaria financing in 2025. The resurgence of local malaria transmission in the Islamic Republic of Iran since 2022 demonstrates the fragility of elimination progress, especially in countries bordering endemic areas where population movement and constraints such as economic sanctions limit access to essential interventions. At the same time, the rising burden of other vector-borne diseases, particularly dengue, has placed additional pressure on health systems and diverted already limited resources away from malaria control.

Key successes

Despite the region's challenges, Egypt was certified as malaria free in 2024, becoming the first country in the region to do so since Morocco in 2010 and the United Arab Emirates in 2007. Oman and Qatar are preparing for certification. In the Sudan, more than 12.5 million ITNs – representing 81.2% of the total planned distribution for 2025 – were delivered across 11 states and partially in the eastern sector of South Kordofan, reaching 109 of 141 targeted localities despite a highly challenging operating environment. In November 2024, the Sudan also became the first country in the WHO Eastern Mediterranean region to introduce the malaria vaccine. To the end of October 2025, the vaccine had been administered to more than 930 000 children in 15 localities in Gedaref and Blue Nile states, with expansion to an additional 20 localities planned for December 2025. These achievements were supported by strong political commitment, domestic resource mobilization and contributions from local communities. Regionally, countries have introduced and and scaled-up the malaria vaccine, enhanced surveillance for *pfhrp2* gene deletions and advanced the integration of malaria and other vector-borne disease programmes, leading to improved efficiency in coordinated responses.

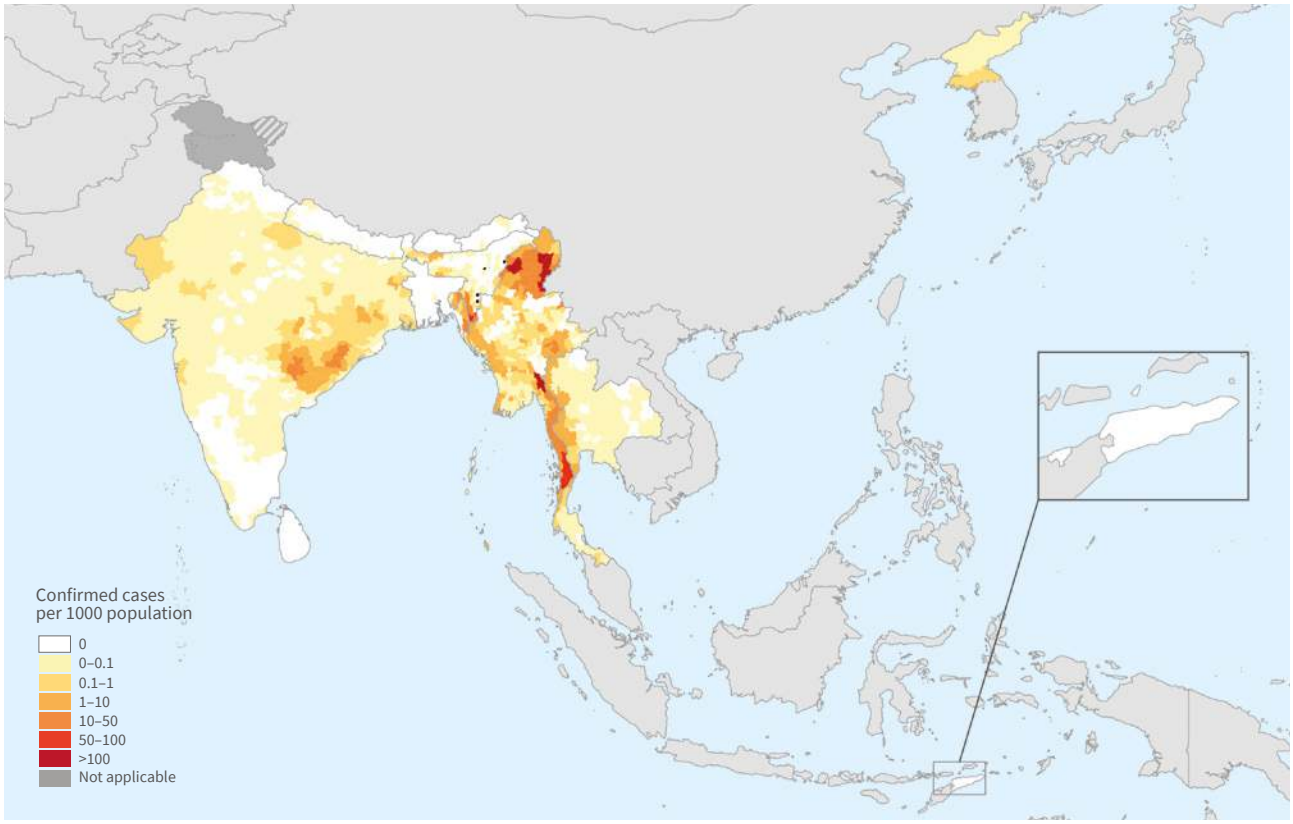
Lessons learned

The region's experience emphasizes that reintroduction and re-establishment of malaria transmission remain a real risk, even after years without indigenous cases. Sustained vigilance, robust cross-border collaboration and locally tailored interventions are essential to prevent re-establishment. Stable and predictable domestic financing, coupled with high-level political commitment, forms the foundation for long-term success – when funding stagnates, progress slows. The 2025 ITN campaign in the Sudan also highlights that strong political leadership, coordinated partner support and engagement of local communities are critical for maintaining operations under crisis conditions. Furthermore, regional inequities require tailored approaches: malaria free countries need to prioritize prevention of reintroduction through sustained surveillance and cross-border cooperation, while high-burden and crisis-affected countries require humanitarian and climate-resilient health systems, strengthened preparedness and adaptable interventions to sustain gains and advance towards elimination.

Annex 3 – D. WHO South-East Asia Region

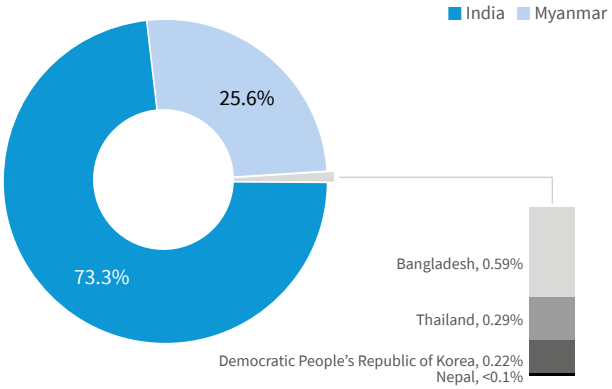
Epidemiology

A. Confirmed malaria cases per 1000 population, 2024

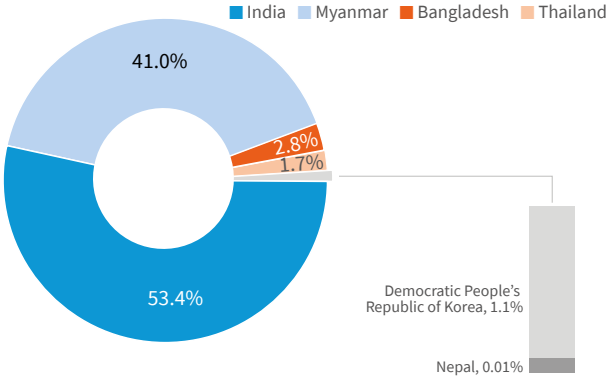


Malaria endemic countries: Bangladesh, the Democratic People's Republic of Korea, India, Myanmar, Nepal and Thailand

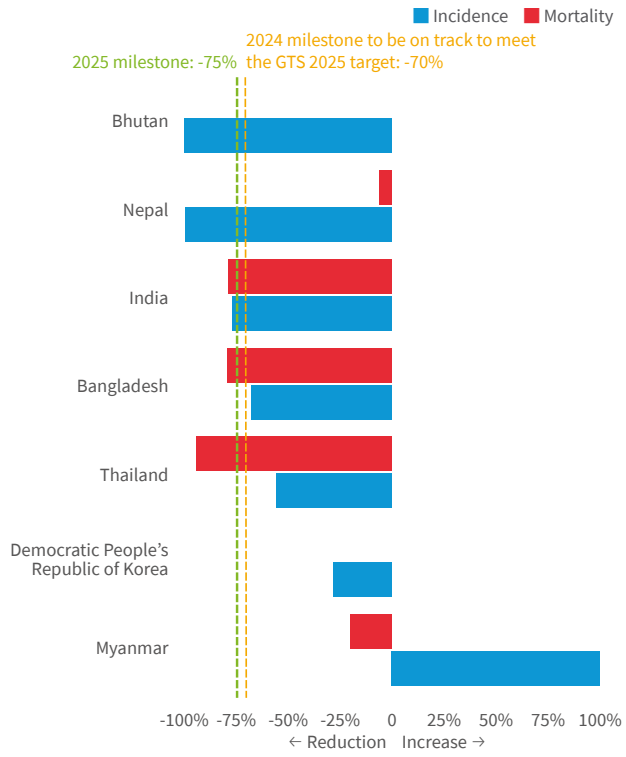
B. Share of estimated malaria cases, 2024



C. Share of reported confirmed cases, 2024



D. Change in estimated malaria incidence and mortality rate, 2015–2024[a,b]



GTS: *Global technical strategy for malaria 2016–2030.*

[a] In Bhutan and the Democratic People's Republic of Korea, there were zero indigenous deaths in 2015 and 2024.

[b] In Myanmar, the change in incidence is more than 100%.

Reported cases and deaths

Cases	2015	2024
Total (presumed and confirmed) cases	1.45 million	478 900
Confirmed cases (%)	1.43 million (98.6%)	478 900 (100%)
Total cases in children aged under 5 years (%)	NA	41 800 (8.7%)
Female, percentage of total cases[a]	NA	39.1%
Indigenous cases	1.4 million	462 218
Imported cases	10 540	16 622

NA: not available.
[a] The percentage of malaria cases in females is calculated only for countries that have disaggregated data by sex.

Deaths	2015	2024
Total deaths	463	99
Total deaths of children aged under 5 years (%)	NA	18 (18.2%)
Female, percentage of total deaths[a]	NA	50%

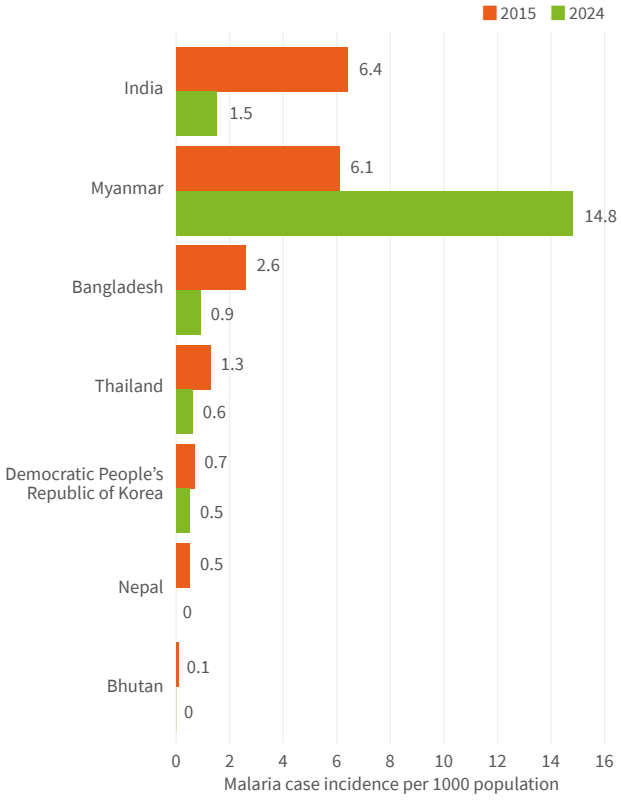
NA: not available.
[a] The percentage of malaria deaths in females is calculated only for countries that have disaggregated data by sex.

Reporting completeness	2015	2024
Countries with reporting completeness >80%	5	5
Countries with reporting completeness between 50% and 80%	1	1
Countries with reporting completeness <50%	0	0

Parasites: *P. falciparum* and mixed (37%), *P. vivax* (63%)

Estimated cases and deaths 2024	2015	2024
Cases	8.3 million	2.7 million
Deaths	15 241	3869
Population denominator used to compute incidence and mortality rate	1.33 billion	1.45 billion

E. Estimated malaria case incidence in 2015 compared with 2024



F. Percentage of *Plasmodium* species from indigenous cases in 2015 compared with 2024

P.: Plasmodium.

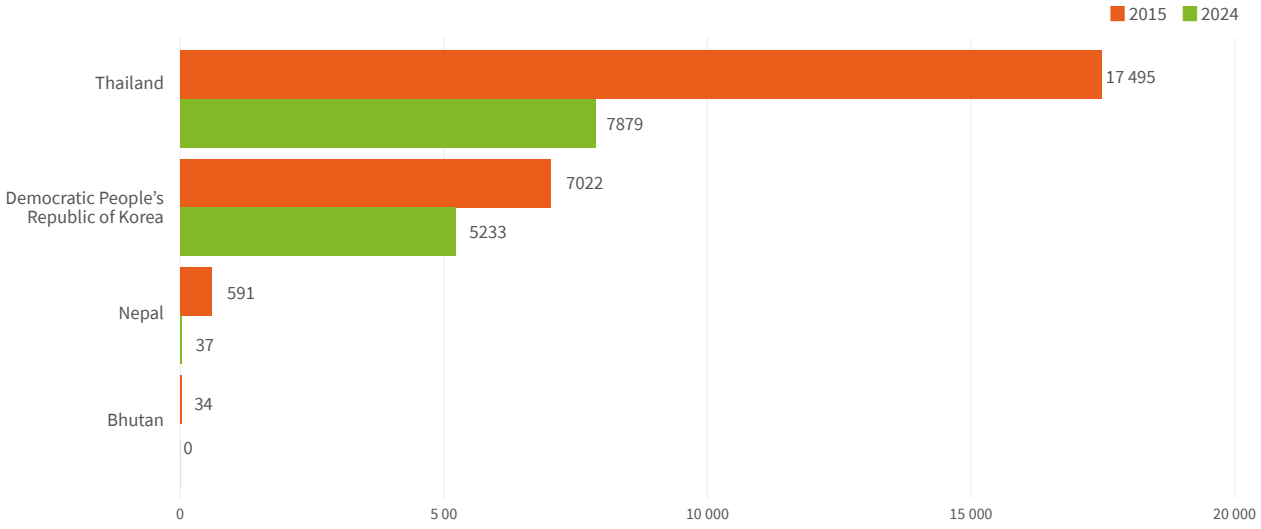
Annex 3 – D. WHO South-East Asia Region

Acceleration to elimination

Countries with a subnational/territorial elimination programme: Bangladesh, India and Myanmar
Countries with a nationwide elimination programme: Bhutan, the Democratic People's Republic of Korea, Nepal and Thailand
Countries that are part of the E-2025 initiative: Bhutan, the Democratic People's Republic of Korea, Nepal and Thailand

Countries reporting zero indigenous cases for 3 or more consecutive years: Bhutan
Countries certified as malaria free since 2015: Maldives (2015), Sri Lanka (2016) and Timor-Leste (2025)

G. Number of reported indigenous cases in E-2025 countries and areas, 2015 compared with 2024



E-2025: malaria eliminating countries for 2025.

Interventions

Countries that carried out ITN mass campaigns in 2024: India, Myanmar and Nepal

Countries that carried out IRS in 2024: India, Myanmar, Nepal and Thailand

Intervention	2015	2024
Number of ITNs distributed	14.4 million	5.1 million
Number of people protected by IRS	43.8 million	7.1 million
Number of RDTs distributed	23.1 million	56.3 million
Number of ACT courses distributed	2.4 million	255 000
Number of first-line treatment courses (including ACT) delivered	2.5 million	3.3 million
Treatment coverage	NA	100%

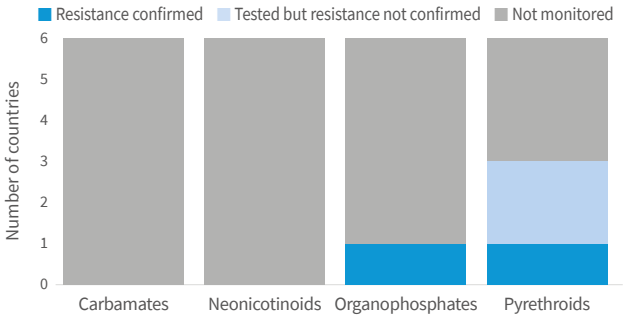
ACT: artemisinin-based combination therapy; IRS: indoor residual spraying; ITN: insecticide-treated mosquito net; RDT: rapid diagnostic test.
NA: not available.

H. Therapeutic efficacy studies (clinical and parasitological failure among patients with *Plasmodium falciparum* malaria, %)

Medicine	Study years	No. of studies	Min.	Median	Max.	Percentile 25	Percentile 75
AL	2015–2020	35	0	0	3.8	0	1.9
AS-PY	2017–2018	4	0	0	0.0	0	0.0
DHA-PPQ	2015–2020	8	0	0	2.0	0	0.5

AL: artemether–lumefantrine; AS-PY: artesunate–pyronaridine; DHA-PPQ: dihydroartemisinin–piperaquine.

I. Status of insecticide resistance[a] per insecticide class (2020–2024)

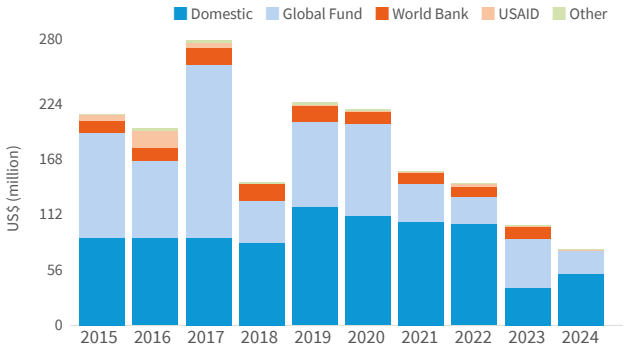


[a] Resistance is considered confirmed when it is detected to one insecticide in the class, in at least one malaria vector from one collection site.

Countries with confirmed resistance to at least one insecticide class: India

Funding

J. Malaria funding[a,b] by source, 2015–2024



Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; USAID: United States Agency for International Development.
[a] Excludes patient service delivery costs and out-of-pocket expenditure.
[b] Although USAID funding was provided in 2024, recipient-level allocations were not available due to reporting disruptions. As a result, these amounts are not reflected in regional profiles.

Funding (US$)	2015	2024
Total funding	206.0 million	73.7 million
Proportion from domestic sources	41.7%	67.4%

Change in funding 2015–2024: 64% decrease

Key highlights

Epidemiology: In 2024, the WHO South-East Asia Region reported 478 900 malaria cases, a decline of 65.7% since 2015. A total of 99 malaria deaths were reported. Children aged under 5 years accounted for 8.7% of cases and 18.2% of deaths, while females accounted for 39.1% of cases and 50% of deaths. In 2024, there were 2.7 million estimated malaria cases and 3869 estimated malaria deaths. Almost two thirds of cases in the region were due to *P. vivax*. The burden of estimated malaria cases was concentrated in India (73.3%) and Myanmar (25.6%). Steady progress toward elimination continues across the region. Bhutan, India and Nepal met the GTS 2024 milestone of 70% reduction in incidence compared with 2015, while Myanmar saw a significant increase in cases. Bhutan has reported 3 consecutive years of zero indigenous cases. Three countries in the region are certified as malaria free: Maldives (2015), Sri Lanka (2016) and Timor-Leste (2025).

Interventions and biological threats: In 2024, ITN mass campaigns were conducted in India, Myanmar and Nepal. RDT distributions increased by 143% between 2015 and 2024, and treatment coverage in 2024 was 100%. *Pfhrp2/3* gene deletions have been detected at low prevalences in India and Myanmar. Recent insecticide resistance data were unavailable from several countries; between 2020 and 2024, insecticide resistance was confirmed only in India. Treatment failure rates observed among patients in TES of AL, artesunate–pyronaridine (AS-PY) and DHA-PPQ against *P. falciparum* were all less than 5%.

Funding: Total malaria funding declined by 64% between 2015 and 2024, from US$ 206 million to US$ 74 million, reflecting both reduced programmatic needs as countries advance towards elimination and an overall contraction in available resources. Domestic contributions increased from 42% to 67%.

Key challenges

Malaria transmission remains localized across India and Nepal, where outbreaks and cross-border population movement have continued to challenge elimination efforts. In India, most districts reported reductions in malaria burden, but some continued to experience persistent transmission due to localized outbreaks. In Nepal, ongoing population movement across the porous border with India sustained residual transmission and complicated control measures. These patterns highlight the importance of enhanced cross-border collaboration, targeted subnational responses and strengthened surveillance systems to address remaining transmission foci and sustain progress towards elimination. Malaria transmission in Myanmar increased substantially, primarily due to political and social instability. Across the region, *P. vivax* continued to account for more than half of all malaria cases. Bhutan and Malaysia continued to report imported and introduced malaria cases, indicating persistent vulnerability to reintroduction from cross-border population movement.

Key successes

Malaria cases declined by 64.8% between 2000 and 2015 (from 23.6 million to 8.3 million) and by a further 65.7% between 2015 and 2024, marking decades of sustained gains in malaria control and elimination. The WHO South-East Asia Region met the GTS 2020 milestones for both malaria morbidity and mortality and remains on track to achieve the GTS 2025 targets, as well as the 2030 target for mortality reduction.

At the country level, Sri Lanka was certified malaria free in 2016, followed by Timor-Leste in 2025, while Bhutan has reported zero indigenous malaria cases since 2022. In 2024, zero malaria deaths were reported in both Bhutan and the Democratic People's Republic of Korea.

Several countries continue to make strong progress towards elimination. India and Nepal are on track to achieve the GTS target of at least a 75% reduction in incidence by 2025, having already achieved reductions exceeding 70% by 2024. Bangladesh, the Democratic People's Republic of Korea and Thailand achieved reductions in incidence ranging between 25% and 70%, while Bangladesh, India and Thailand are on track to meet the GTS mortality target, with a reduction of 70% or more in mortality rate by 2024. Myanmar and Nepal have also made notable progress, reducing malaria mortality by between 25% and 70% since 2015.

Lessons learned

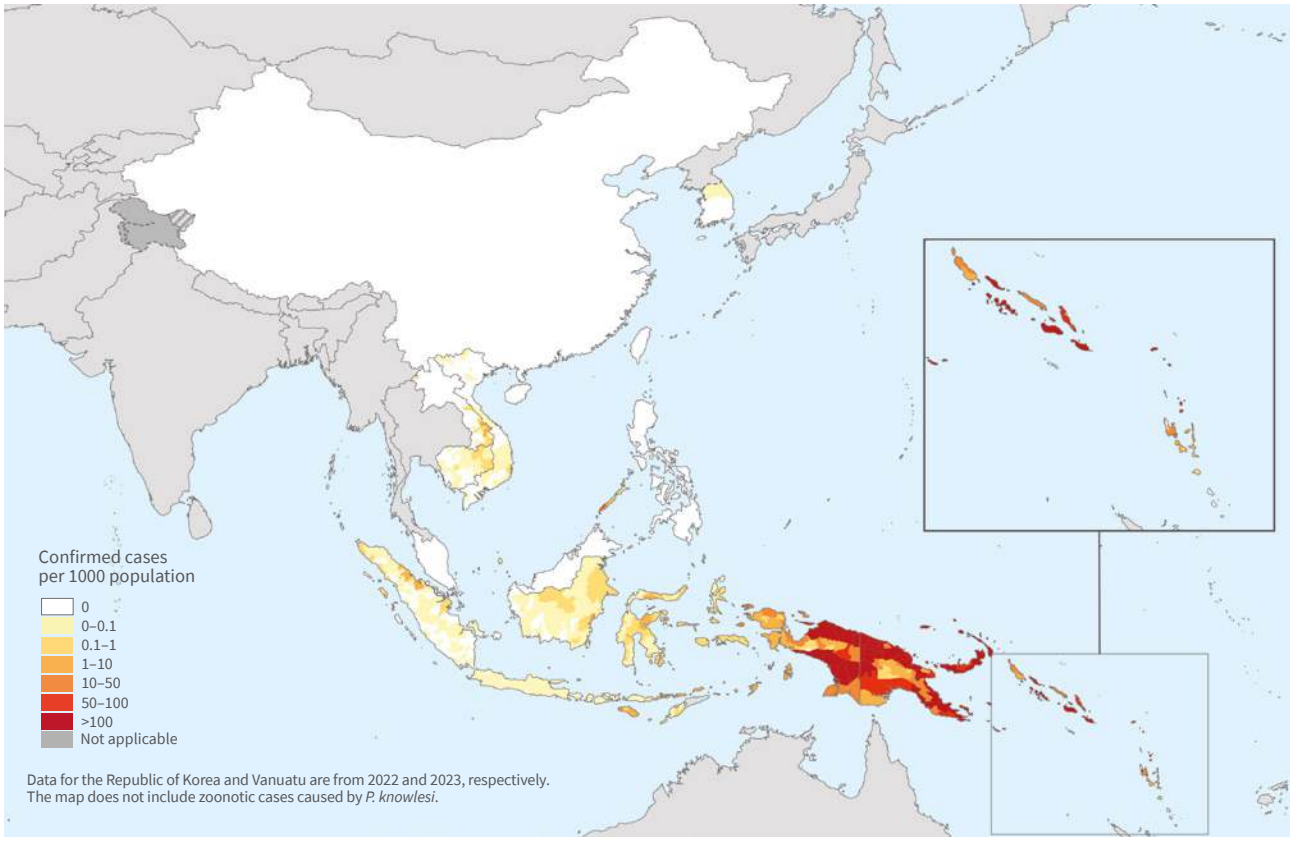
The WHO South-East Asia Region has made major progress towards malaria elimination, achieving reductions in both incidence and mortality over the past 2 decades. Strong national commitment, increased domestic financing and expansion of diagnostic and treatment services have been key to this success, although emerging insecticide resistance highlights the need to strengthen entomological surveillance. The region met the GTS 2020 milestones and remains on track to achieve the 2025 and 2030 targets, with several countries – Bhutan, Sri Lanka and Timor-Leste – reaching malaria free status or certification.

However, significant challenges remain. Persistent *P. vivax* transmission, accounting for nearly two thirds of regional cases, continues to complicate elimination efforts. Localized transmission in India and Nepal, driven by population movement and cross-border importation, points to the need for targeted subnational and regional coordination, while the resurgence of malaria in Myanmar illustrates the fragility of progress in settings affected by political and social instability. Overall, the region's achievement of GTS milestones reaffirms that consistent investment and adaptive strategies are essential to sustain gains and move closer to elimination.

Annex 3 – E. WHO Western Pacific Region

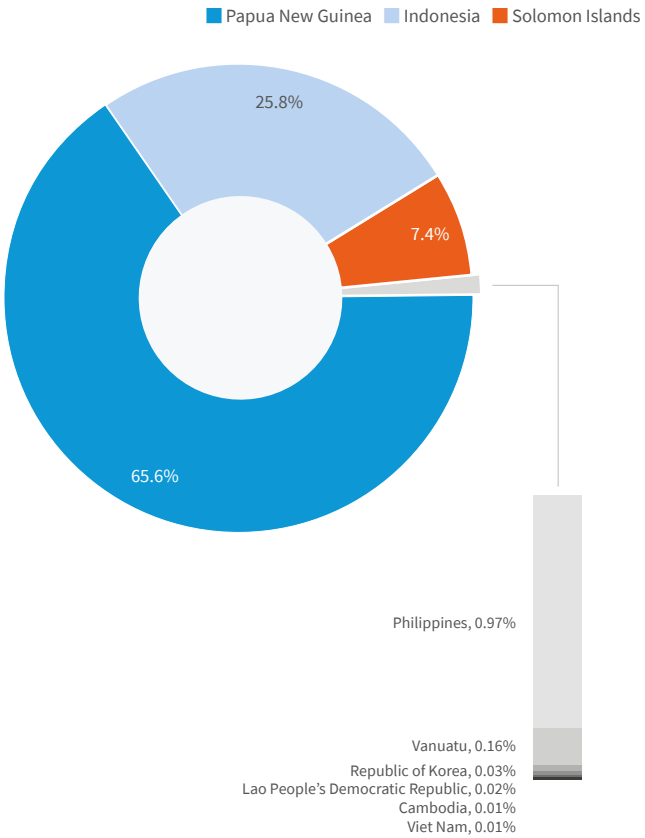
Epidemiology

A. Confirmed malaria cases per 1000 population, 2024

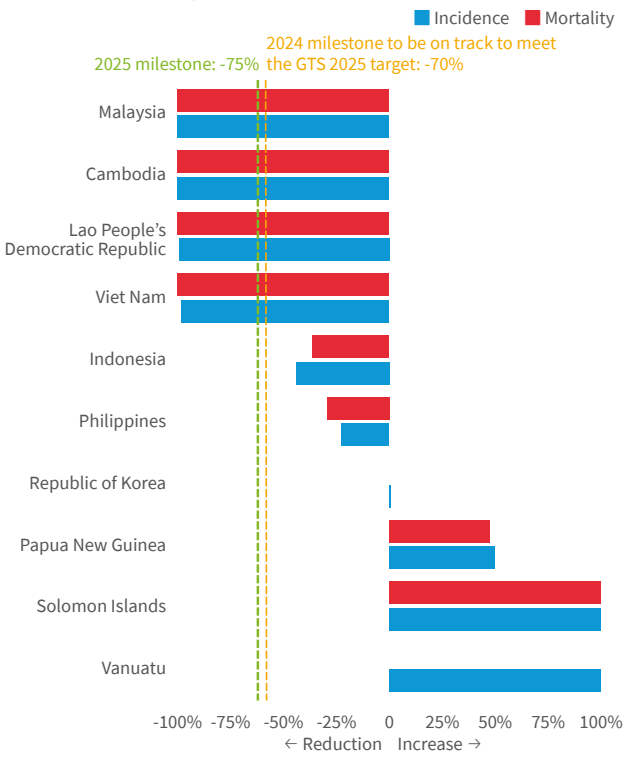


Malaria endemic countries: Cambodia, Indonesia, the Lao People's Democratic Republic, Papua New Guinea, the Philippines, the Republic of Korea, Solomon Islands, Vanuatu and Viet Nam

B. Share of estimated malaria cases, 2024



C. Change in estimated malaria incidence and mortality rate, 2015–2024[a,b,c]



GTS: *Global technical strategy for malaria 2016–2030.*
[a] In the Republic of Korea and Vanuatu, there were zero indigenous deaths in 2015 and 2024.
[b] In Solomon Islands and Vanuatu, the change in incidence is more than 100%.
[c] In Solomon Islands, the change in mortality is more than 100%.

Reported cases and deaths

Cases	2015	2024
Total (presumed and confirmed) cases	1.0 million	1.7 million
Confirmed cases (%)	713 600 (69.6%)	1.6 million (93.8%)
Total cases in children aged under 5 years (%)	NA	98 100 (5.9%)
Female, percentage of total cases[a]	NA	44.3%
Indigenous cases	713 500	1.6 million
Introduced cases	0	6
Imported cases	164	391
Relapses	11	134

NA: not available.
[a] The percentage of malaria cases in females is calculated only for countries that have disaggregated data by sex.

Deaths	2015	2024
Total deaths	368	346
Total deaths (indigenous)	368	345
Total deaths of children aged under 5 years (%)	NA	25 (7.2%)
Female, percentage of total deaths[a]	NA	32.5%

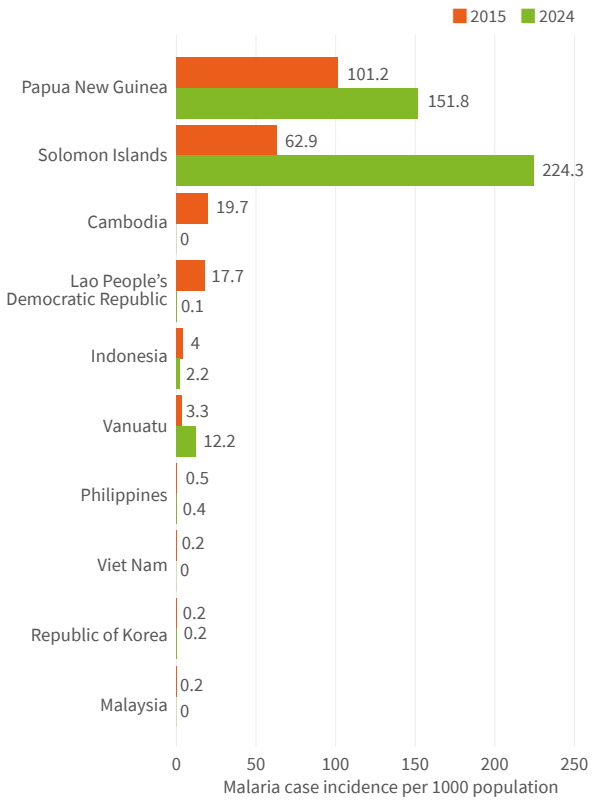
NA: not available.
[a] The percentage of malaria deaths in females is calculated only for countries that have disaggregated data by sex.

Reporting completeness	2015	2024
Countries with reporting completeness >80%	9	8
Countries with reporting completeness between 50% and 80%	0	1
Countries with reporting completeness <50%	0	0

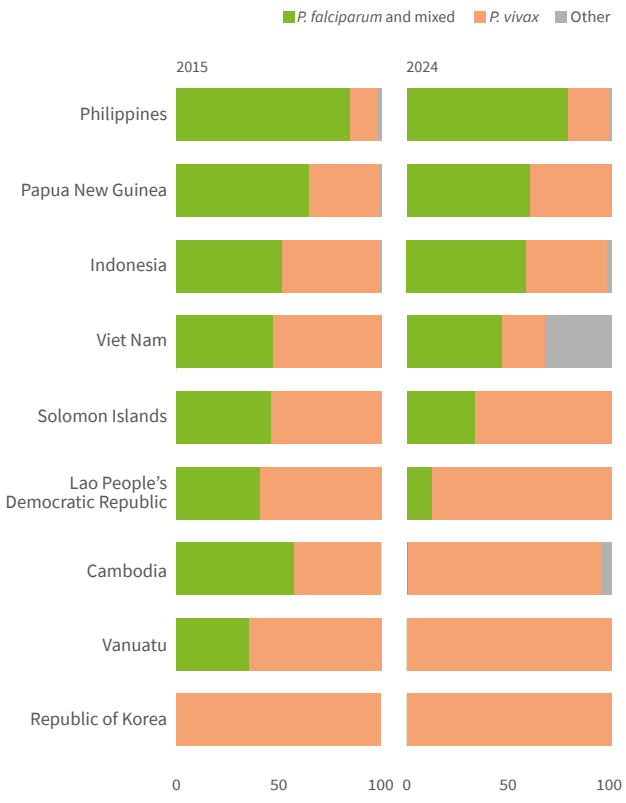
Estimated cases and deaths	2015	2024
Cases	2.3 million	2.4 million
Deaths	4101	4725
Population denominator used to compute incidence and mortality rate	419.2 million	457.1 million

Parasites: *P. falciparum* and mixed (57%), *P. vivax* (42%), other species (1%)

D. Estimated malaria case incidence in 2015 compared with 2024



E. Percentage of *Plasmodium* species from indigenous cases in 2015 compared with 2024



P.: *Plasmodium*.

Annex 3 – E. WHO Western Pacific Region

Acceleration to elimination

Countries with a subnational/territorial elimination programme: Indonesia and the Philippines

Countries with a nationwide elimination programme: Cambodia, the Lao People's Democratic Republic, Malaysia, the Republic of Korea, Vanuatu and Viet Nam

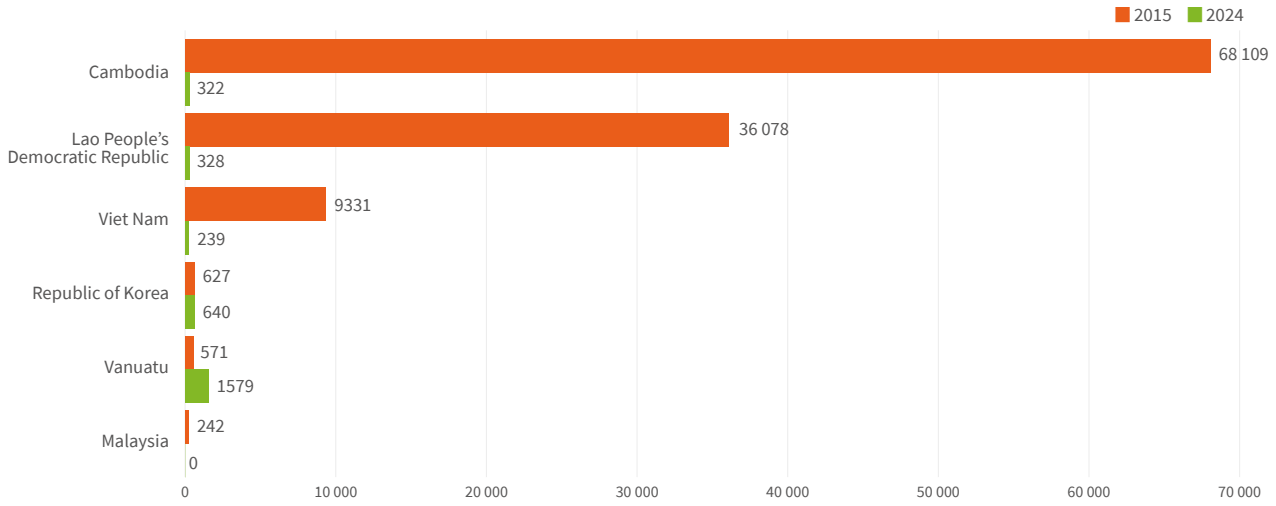
Countries that are part of the E-2025 initiative: Malaysia, the Republic of Korea and Vanuatu

Countries reporting zero indigenous cases for 3 or more consecutive years: Malaysia

Countries certified as malaria free since 2015: China (2021)

Cases investigated/tested	2015	2024
Percentage of confirmed cases investigated and classified	0.1%	34.7%
Percentage of suspected cases tested	95.1%	89.2%

F. Reported indigenous cases in countries with national elimination activities, 2015 compared with 2024



Interventions

Countries that carried out ITN mass campaigns in 2024: Cambodia, Papua New Guinea and Vanuatu

Countries that carried out IRS in 2024: the Lao People's Democratic Republic, the Philippines and Viet Nam

Intervention	2015	2024
Number of ITNs distributed	4.4 million	2.6 million
Number of people protected by IRS	1.7 million	424 900
Number of RDTs distributed	2.8 million	6.2 million
Number of ACT courses distributed	1.72 million	9.34 million
Number of any antimalarial treatment courses (including ACT) distributed	1.67 million	9.30 million
Treatment coverage	NA	99.2%

ACT: artemisinin-based combination therapy; IRS: indoor residual spraying; ITN: insecticide-treated mosquito net; NA: not available; RDT: rapid diagnostic test.

G. Therapeutic efficacy studies (clinical and parasitological failure among patients with *Plasmodium falciparum* malaria, %)

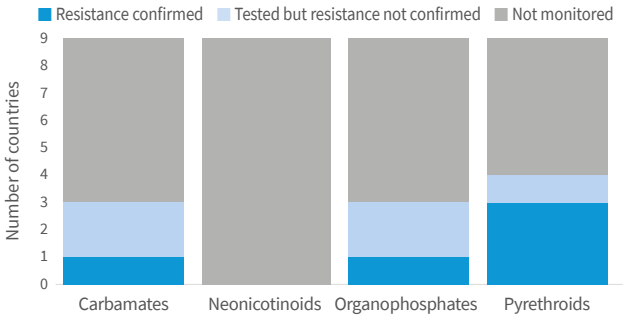
Medicine	Study years	No. of studies	Min.	Median	Max.	Percentile 25	Percentile 75
AL	2015–2023	18	0.0	0.6	17.2	0	4.9
AS-MQ	2015–2022	20	0.0	0.0	1.9	0	0.0
AS-PY	2017–2023	11	0.0	1.7	7.1	0	4.0
DHA-PPQ	2015–2019	28	0.0	6.4	68.1	0	29.3

AL: artemether–lumefantrine; AS-MQ: artesunate–mefloquine; AS-PY: artesunate–pyronaridine; DHA-PPQ: dihydroartemisinin–piperaquine.

Countries where at least one TES showed ≥10% of patients had treatment failure with AL: Cambodia and the Lao People's Democratic Republic

Countries where at least one TES showed ≥10% of patients had treatment failure with DHA-PPQ: Cambodia, the Lao People's Democratic Republic and Viet Nam

H. Status of insecticide resistance[a] per insecticide class (2020–2024)

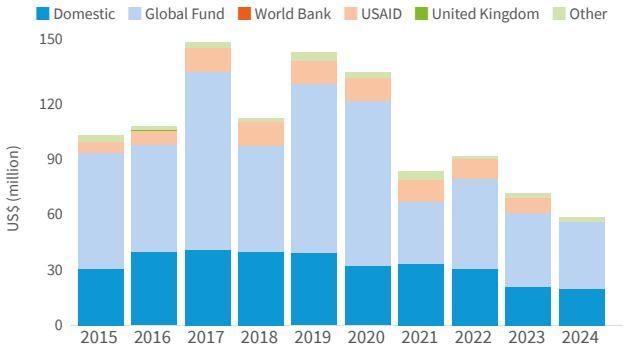


[a] Resistance is considered confirmed when it is detected to one insecticide in the class, in at least one malaria vector from one collection site.

Countries with confirmed resistance to at least one insecticide class: Cambodia, Indonesia and Papua New Guinea

Funding

I. Malaria funding[a,b] by source, 2015–2024



Global Fund: Global Fund to Fight AIDS, Tuberculosis and Malaria; United Kingdom: United Kingdom of Great Britain and Northern Ireland; USAID: United States Agency for International Development.
[a] Excludes patient service delivery costs and out-of-pocket expenditure.
[b] Although USAID funding was provided in 2024, recipient-level allocations were not available due to reporting disruptions. As a result, these amounts are not reflected in regional profiles.

Funding (US$)	2015	2024
Total funding	99.4 million	53.7 million
Proportion from domestic sources	30.1%	30.5%

Change in funding 2015–2024: 46% decrease

Key highlights

Epidemiology: In 2024, a total of 1.7 million malaria cases (presumed and confirmed) were reported in the WHO Western Pacific Region, of which 93.8% were confirmed – an increase from 69.6% in 2015. There were 346 reported malaria deaths. Females accounted for 44.3% of reported cases and 32.5% of reported deaths, while children aged under 5 years accounted for 5.9% of reported cases and 7.2% of reported deaths. There were 2.4 million estimated cases and 4725 estimated deaths. Estimated cases were concentrated in three countries – Papua New Guinea (65.6%), Indonesia (25.8%) and Solomon Islands (7.4%) – which together accounted for more than 98% of all regional cases. Cambodia, the Lao People's Democratic Republic and Viet Nam have already met the GTS 2025 targets of a 75% reduction in malaria incidence and mortality. There have been significant increases in both cases and deaths in Papua New Guinea, Solomon Islands and Vanuatu. China was certified as malaria free in 2021, and Malaysia has maintained zero indigenous cases for 7 consecutive years. As *P. falciparum* elimination accelerates in the Greater Mekong subregion, *P. vivax* represents a growing share of infections (42%).

Interventions and biological threats: Malaria interventions continued in the region, with ITN mass campaigns conducted in Cambodia, Papua New Guinea and Vanuatu in 2024. Treatment coverage was high, at 99.2%. However, the region faces ongoing biological and insecticide resistance threats. *Pfhrp2/3* gene deletions have been detected at low prevalences in Cambodia, Indonesia and, most recently, in Viet Nam. Insecticide resistance data from 2020 to 2024 show that in Cambodia, Indonesia and Papua New Guinea, resistance to at least one insecticide from one site has been confirmed. Before 2020, treatment failure rates exceeding 10% were found following treatment in Cambodia (AL and DHA-PPQ), the Lao People's Democratic Republic (AL and DHA-PPQ) and Viet Nam (DHA-PPQ). Since 2020, TES of treatment against *P. falciparum* conducted in Cambodia artesunate–mefloquine (AS-MQ), the Lao People's Democratic Republic (AL), Papua New Guinea (AL) and Viet Nam (AS-MQ and AS-PY) all reported treatment failure rates of less than 10%.

Funding: Between 2015 and 2024, total malaria funding decreased by about 46%, from US$ 99 million to US$ 54 million. The share from domestic sources remained relatively stable at about 30% in 2024. Sustained external and domestic investments will be essential to preserve recent gains and support elimination efforts in the region.

Key challenges

Persistent malaria transmission continues in high-burden island countries, such as Papua New Guinea, Solomon Islands and parts of Vanuatu, where fragmented health systems, procurement delays and geographical barriers hinder progress. Funding sustainability remains a major concern as external donor support declines, threatening the continuity of vector control and surveillance activities, particularly where domestic resources are limited. Drug resistance to artemisinin derivatives persists in several countries, reinforcing the need for expanded integrated drug efficacy surveillance. Additionally, malaria transmission remains highly localized, requiring targeted, subnational approaches and enhanced cross-border coordination, particularly along the Papua New Guinea–Indonesia border and the Lao People's Democratic Republic–Viet Nam–Cambodia border.

Key successes

Notable progress has been achieved in several countries, with Cambodia, the Lao People's Democratic Republic and Viet Nam surpassing GTS 2025 milestones by reducing malaria incidence and deaths by more than 75%. Malaysia has successfully maintained malaria free status for non-zoonotic malaria. Diagnosis and treatment coverage have improved substantially – RDT distribution more than doubled, from 2.8 million to 6.2 million, and access to ACTs increased fivefold, from 1.7 million to 9.3 million treatment courses. Multiple countries, including the Lao People's Democratic Republic, the Philippines, Viet Nam and Vanuatu, are accelerating progress towards subnational verification of malaria free areas, further strengthening regional elimination momentum.

Lessons learned

Regional progress continues to depend on overcoming systemic and logistical barriers in the high-burden countries of Indonesia, Papua New Guinea and Solomon Islands. Improvements in data quality have clarified the true malaria burden, with apparent case increases often reflecting stronger testing and reporting rather than resurgence. Targeted, species-specific strategies, such as reactive surveillance and focal interventions against *P. falciparum*, have proven effective and highlight the importance of tailored approaches for *P. vivax* elimination. Sustaining these gains will require continued political commitment, adequate funding, community engagement and vigilance to prevent re-establishment, particularly in the context of zoonotic and imported malaria.

Annex 4 – A. Policy adoption, 2024

WHO region Country/area	Testing	Treatment				Chemoprevention		
	Malaria diagnosis with microscopy or RDT is free in public sector	ACT for treatment of malaria is free in public sector	ACT is delivered in the community	Single low dose of PQ with ACT to reduce transmissibility of *P. falciparum*[1]	Pre-referral treatment with rectal artesunate suppositories at community level	IPTp is used	c-IPTp is used (aligned with WHO recommendation)	IPTsc is used
AFRICAN								
Angola	●	●	●	●	●	●	●	●
Benin	●	●	●	●	●	●	●	●
Botswana	●	●	●	●	●	NA	NA	NA
Burkina Faso	●	●	●	●	●	●	●	●
Burundi	●	●	●	●	●	●	●	●
Cameroon	●	●	●	●	●	●	●	●
Central African Republic	●	●	●	●	●	●	●	●
Chad	●	●	●	●	●	●	●	●
Comoros	●	●	●	●	●	●	●	●
Congo	●	●	●	●	●	●	●	●
Côte d'Ivoire	●	–	–	●	●	●	●	●
Democratic Republic of the Congo	●	●	●	●	●	●	●	●
Equatorial Guinea	●	●	●	●	●	●	●	●
Eritrea	●	●	●	●	●	●	●	●
Eswatini	●	●	●	●	●	NA	NA	NA
Ethiopia	●	●	●	●	●	●	●	●
Gabon	●	●	●	●	●	●	●	●
Gambia	●	●	●	●	●	●	●	●
Ghana	●	●	●	●	●	●	●	●
Guinea	●	●	●	●	●	●	●	●
Guinea-Bissau	●	●	●	●	●	●	●	●
Kenya	●	●	●	●	●	●	●	●
Liberia	●	●	●	●	●	●	●	●
Madagascar	●	●	●	●	●	●	●	●
Malawi	●	●	●	●	●	●	●	●
Mali	●	●	●	●	●	●	●	●
Mauritania	●	–	–	●	●	●	●	●
Mozambique	●	●	●	●	●	●	●	●
Namibia	●	●	●	●	●	NA	NA	NA
Niger	●	–	–	●	●	●	●	●
Nigeria[3]	●	●	●	●	●	●	●	●
Rwanda	●	–	–	●	●	NA	NA	NA
Sao Tome and Principe	●	●	●	●	●	●	●	●
Senegal	●	●	●	●	●	●	●	●
Sierra Leone	●	●	●	●	●	●	●	●
South Africa	●	●	●	●	●	NA	NA	NA
South Sudan[4]	●	●	●	●	●	●	●	●
Togo	●	●	●	●	●	●	●	●
Uganda	●	●	●	●	●	●	●	●
United Republic of Tanzania[5]								
Mainland	●	●	●	●	●	●	●	●
Zanzibar	●	●	●	●	●	NA	NA	NA
Zambia[3]	●	●	●	●	●	●	●	●
Zimbabwe	●	●	●	●	●	●	●	●
AMERICAS								
Bolivia (Plurinational State of)	●	●	●	●	●	NA	NA	NA
Brazil	●	●	●	●	●	NA	NA	NA
Colombia	●	●	●	●	●	NA	NA	NA
Costa Rica	●	●	●	●	●	NA	NA	NA
Dominican Republic	●	●	●	●	●	NA	NA	NA
Ecuador	●	●	●	●	●	NA	NA	NA
French Guiana	●	●	●	●	●	NA	NA	NA
Guatemala	●	●	–	NA	NA	NA	NA	NA
Guyana	●	–	–	●	●	NA	NA	NA
Haiti	●	●	●	●	●	NA	NA	NA
Honduras	●	●	●	●	●	NA	NA	NA
Mexico	●	●	●	●	●	NA	NA	NA
Nicaragua	●	●	●	●	●	NA	NA	NA
Panama	●	●	●	●	●	NA	NA	NA
Peru	●	●	●	●	●	NA	NA	NA
Venezuela (Bolivarian Republic of)	●	–	–	●	●	NA	NA	NA

Chemoprevention		Surveillance		Vector control					
SMC is used	PMC is used	Malaria is a notifiable disease	Case reporting from the private sector is mandatory	WHO-recommended ITNs are distributed	ITNs are distributed free of charge to all age groups through mass campaigns[2]	ITNs are distributed free of charge to all age groups through routine channels	Durability of ITNs is monitored	IRS is used by the NMP	Insecticide resistance is monitored and reported to WHO
●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
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NA	●	●	●	●	●	●	●	●	●
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NA	●	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	●	●	●	●	●	●	●	●	●
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●	●	●	●	●	●	●	●	●	●
●	●	–	–	●	–	●	–	●	–
●	●	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	–	●	●
●	●	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	–	●	●
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●	●	●	●	●	●	●	●	●	●
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NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
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NA	NA	●	●	●	●	●	–	●	–
NA	NA	●	●	●	●	●	–	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	–	●	–

Annex 4 – A. Policy adoption, 2024

WHO region Country/area	Testing	Treatment				Chemoprevention		
	Malaria diagnosis with microscopy or RDT is free in public sector	ACT for treatment of malaria is free in public sector	ACT is delivered in the community	Single low dose of PQ with ACT to reduce transmissibility of *P. falciparum*[1]	Pre-referral treatment with rectal artesunate suppositories at community level	IPTp is used	c-IPTp is used (aligned with WHO recommendation)	IPTsc is used
EASTERN MEDITERRANEAN								
Afghanistan	●	●	●	●	●	NA	NA	NA
Djibouti	●	●	●	●	●	NA	NA	NA
Iran (Islamic Republic of)	●	●	●	●	●	NA	NA	NA
Pakistan	●	●	●	●	●	NA	NA	NA
Somalia	●	●	●	●	●	●	●	●
Sudan	●	●	●	●	●	●	●	●
Yemen	●	●	●	●	●	NA	NA	NA
SOUTH-EAST ASIA								
Bangladesh	●	●	●	●	●	NA	NA	NA
Democratic People's Republic of Korea	●	NA	NA	NA	NA	NA	NA	NA
India	●	●	●	●	●	NA	NA	NA
Myanmar	●	●	●	●	●	NA	NA	NA
Nepal	●	●	●	●	●	NA	NA	NA
Thailand	●	●	●	●	●	NA	NA	NA
WESTERN PACIFIC								
Cambodia	●	●	●	●	●	NA	NA	NA
Indonesia[6]	●	●	●	●	●	NA	NA	NA
Lao People's Democratic Republic	●	●	●	●	●	NA	NA	NA
Papua New Guinea	●	●	●	●	●	●	●	●
Philippines	●	●	●	●	●	NA	NA	NA
Republic of Korea	●	NA	NA	NA	NA	NA	NA	NA
Solomon Islands	●	–	–	●	●	●	●	●
Vanuatu	●	●	●	●	●	NA	NA	NA
Viet Nam	●	●	●	●	●	NA	NA	NA

ACT: artemisinin-based combination therapy; c-IPTp: community-based delivery of IPTp; IPTp: intermittent preventive treatment of malaria in pregnancy; IPTsc: intermittent preventive treatment of malaria in school-aged children; IRS: indoor residual spraying; ITN: insecticide-treated mosquito net; NMP: national malaria programme; *P.: Plasmodium*; PMC: perennial malaria chemoprevention; PQ: primaquine; RDT: rapid diagnostic test; SMC: seasonal malaria chemoprevention; WHO: World Health Organization.

[1] Single dose of PQ (0.75 mg base/kg) for countries in the WHO Region of the Americas.

[2] Mass campaigns do not include targeted campaigns directed towards specific sub-groups in the population.

[3] Data reported to the Alliance for Malaria Prevention were used where data reported to WHO were missing or incomplete.

[4] In May 2013, South Sudan was reassigned to the WHO African Region (resolution WHA66.21, https://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R21-en.pdf).

[5] Where national data for the United Republic of Tanzania are unavailable, refer to Mainland and Zanzibar.

[6] As of 27 May 2025, Indonesia has been reassigned to the WHO Western Pacific Region (resolution WHA78.25, https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R25-en.pdf).

Method: Information on existing policies and whether they were implemented in 2024 was reported by NMPs. Policy implementation in 2024 was adjusted for the following variables, based on whether supporting data were available and reported by NMPs to the world malaria report database: distribution of ITNs; IPTp; IPTsc; SMC; PMC; RDTs used at community level and ACTs used for the treatment of *Plasmodium falciparum* infection. A setting of "not applicable" was automatically assigned to countries where the following interventions did not apply; IPTp, IPTpsc, SMC and PMC.

Chemoprevention		Surveillance		Vector control					
SMC is used	PMC is used	Malaria is a notifiable disease	Case reporting from the private sector is mandatory	WHO-recommended ITNs are distributed	ITNs are distributed free of charge to all age groups through mass campaigns[2]	ITNs are distributed free of charge to all age groups through routine channels	Durability of ITNs is monitored	IRS is used by the NMP	Insecticide resistance is monitored and reported to WHO
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	NA	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	●	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	–
NA	●	●	–	●	●	●	–	●	–
NA	NA	●	●	●	●	●	●	●	●
NA	NA	●	●	●	●	●	●	●	●

Data as of 7 November 2025

● = Policy exists and has been implemented this year.

● = Policy exists but was not implemented this year or no data exist to support implementation.

● = Policy does not exist or policy has been discontinued.

NA = Policy does not apply.

– = Question not answered, and there is no information from previous years.

Annex 4 – B. Antimalarial drug policy in malaria endemic countries and areas, 2024

WHO region Country/area	*P. falciparum*				*P. vivax*
	Uncomplicated unconfirmed	Uncomplicated confirmed	Severe	Prevention during pregnancy	Treatment
AFRICAN					
Angola	AL; DHA-PPQ; AS+AQ	AL; DHA-PPQ; AS+AQ	AS	SP(IPT)	AL; DHA-PPQ; AS+AQ
Benin	NA	AL	AS	SP(IPT)	NA
Botswana	NA	AL-PQ	AS	NA	AL-PQ
Burkina Faso	AL; AS+AQ	AL; AS-PY; AS+AQ; DHA-PPQ	AS	SP(IPT)	NA
Burundi	AL	AL	ART; AS	SP(IPT)	NA
Cameroon	NA	AL; AS-PY; AS+AQ; DHA-PPQ	AS; AM	SP(IPT)	NA
Central African Republic	AL	AL	AS	SP(IPT)	NA
Chad	AL; AS+AQ	AL; AS+AQ	ART; AS; QN	SP(IPT)	NA
Comoros	AL	AL; AL+PQ	AS	SP(IPT)	NA
Congo	AL	AL	AS	SP(IPT)	NA
Côte d'Ivoire	AL; AS+AQ	AL; AS+AQ	QN	SP(IPT)	NA
Democratic Republic of the Congo	AL; AS+AQ	AL; AS-PY; AS+AQ	AS	SP(IPT)	NA
Equatorial Guinea	AL	AL	AS	SP(IPT)	NA
Eritrea	AS+AQ	AS+AQ	AS	NA	AS+AQ
Eswatini	NA	AL-PQ	AS	NA	PQ
Ethiopia	AL+PQ	AL-PQ	AS; AL+PQ	NA	CQ+PQ
Gabon	AL; DHA-PPQ; AS+MQ; AS+AQ	AL; DHA-PPQ; AS+MQ; AS+AQ	AS	SP(IPT)	NA
Gambia	AL	AL+PQ	AS	SP(IPT)	NA
Ghana	AL; AS+AQ; DHA-PPQ	AL; AS+AQ	AM; AS; QN	SP(IPT)	AL+PQ; DHA-PPQ+PQ
Guinea	AL	AL	ART+AL	SP(IPT)	NA
Guinea-Bissau	NA	AL	AS	SP(IPT)	NA
Kenya	AL	AL	AS	SP(IPT)	AL-PQ
Liberia	AS+AQ	AL; AS+AQ	AM; AS; QN	SP(IPT)	NA
Madagascar	AS+AQ	AS+AQ	AS	SP(IPT)	AS+AQ
Malawi	AL	AL	AS	SP(IPT)	NA
Mali	AL	AL	AS	SP(IPT)	NA
Mauritania	AS+AQ	AS+AQ	AS	SP(IPT)	NA
Mozambique	AL	AS+AQ	AS	SP(IPT)	NA
Namibia	NA	AL+PQ	AS	NA	AL+PQ
Niger	AL	AL	AS	SP(IPT)	AL
Nigeria	AL; AS+AQ	AL; AS-PY; AS+AQ; DHA-PPQ	AS	SP(IPT)	NA
Rwanda	AL	AL	AS; QN	NA	NA
Sao Tome and Principe	NA	AS+MQ+PQ	AS	SP(IPT)	NA
Senegal	NA	AL; AS+AQ+PQ	AS	SP(IPT)	NA
Sierra Leone	AL	AL	AS	SP(IPT)	NA
South Africa	AL	AL-PQ	AS; QN	NA	AL
South Sudan[1]	AS+AQ	AS+AQ	AS	SP(IPT)	AS-PY
Togo	NA	AL	AS; AM; QN	SP(IPT)	NA
Uganda	NA	AL	AS	SP(IPT)	AL
United Republic of Tanzania					
Mainland	AL; AS+AQ; DHA-PPQ	AL; AS+AQ; DHA-PPQ	AS; AL	SP(IPT)	NA
Zanzibar	NA	AS+AQ+PQ	AS	NA	PQ
Zambia	AL	AL	AS	SP(IPT)	NA
Zimbabwe	NA	AL	AS	SP(IPT)	NA
AMERICAS					
Bolivia (Plurinational State of)	NA	AL+PQ	AS	NA	CQ+PQ
Brazil	NA	AL+PQ; AS+MQ+PQ	AS	CQ	CQ+PQ; CQ+TQ
Colombia	AL+PQ	AL; AL-PQ	AS	CQ	CQ+PQ
Costa Rica	CQ+PQ	CQ+PQ	AS	NA	CQ+PQ

WHO region Country/area	*P. falciparum*				*P. vivax*
	Uncomplicated unconfirmed	Uncomplicated confirmed	Severe	Prevention during pregnancy	Treatment
AMERICAS					
Dominican Republic	NA	CQ+PQ	AS	NA	CQ+PQ
Ecuador	NA	AL+AM+PQ	AS	NA	CQ+PQ
French Guiana	NA	AL; DHA-PPQ	AS	NA	CQ+PQ
Guatemala	CQ+PQ	AL	AS	NA	CQ+PQ
Guyana	NA	AL+PQ	AM; AS-QN; QN+CL	NA	CQ+PQ
Haiti	NA	CQ+PQ	AS	NA	CQ+PQ
Honduras	NA	CQ+PQ	AS	NA	CQ+PQ
Mexico	NA	AL; AL-PQ	AL; AL+PQ; AS	NA	CQ+PQ
Nicaragua	CQ+PQ	CQ+PQ	AS	CQ	CQ+PQ
Panama	AL-PQ	AL+PQ	AS	NA	CQ+PQ
Peru	AS+MQ+PQ	AS+MQ+PQ	AS+PQ+CL	NA	CQ+PQ
Venezuela (Bolivarian Republic of)	NA	AL+PQ	AS	NA	CQ+PQ
EASTERN MEDITERRANEAN					
Afghanistan	CQ	AL+PQ	AM; AS; QN	NA	CQ+PQ
Djibouti	NA	AL+PQ	AS	NA	AL+PQ
Iran (Islamic Republic of)	NA	AL-PQ	AS	NA	CQ+PQ
Pakistan	CQ	AL-PQ	AS	NA	CQ+PQ
Somalia	AL	AL-PQ	AS	SP(IPT)	AL+PQ
Sudan	NA	AL	AS; QN	SP(IPT)	AL+PQ
Yemen	AL	AL+PQ	AS	NA	AL-PQ
SOUTH-EAST ASIA					
Bangladesh	NA	AL+PQ	AS; AL+PQ	NA	CQ+PQ
Democratic People's Republic of Korea	NA	NA	NA	NA	CQ+PQ
India	NA	AL+PQ; AS+SP+PQ	AS	NA	CQ+PQ
Myanmar	NA	AL+PQ	ART+AL	NA	CQ+PQ
Nepal	CQ+PQ; AL+PQ	AL-PQ	AS	NA	CQ+PQ
Thailand	NA	DHA-PPQ+PQ; AS-PY	CQ+PQ	NA	CQ+PQ
WESTERN PACIFIC					
Cambodia	AS+MQ	AS+MQ+PQ	AS	NA	AS+MQ+PQ
Indonesia[2]	NA	DHA-PPQ+PQ	AS	NA	DHA-PPQ+PQ
Lao People's Democratic Republic	NA	AL+PQ	AS	NA	AL-PQ
Papua New Guinea	AL+PQ	AL+PQ	DHA-PPQ	SP(IPT)	AL-PQ
Philippines	NA	AL+PQ	AS	NA	AL+PQ
Republic of Korea	AT-PG; PY-AS; MQ	PY; MQ	AS; MQ; AT-PG	NA	CQ+PQ
Solomon Islands	AL+PQ	AL+PQ	AS	CQ	AL+PQ
Vanuatu	AL+PQ	AL+PQ	AS	CQ	AL+PQ
Viet Nam	AS-PY; DHA-PPQ+PQ	DHA-PPQ+PQ	AS	AL	CQ+PQ

Data as of 29 September 2025

AL: artemether–lumefantrine; AM: artemether; AQ: amodiaquine; ART: artemisinin; AS: artesunate; AT-PG: atovaquone–proguanil; CL: clindamycin; CQ: chloroquine; DHA-PPQ: dihydroartemisinin–piperaquine; IPT: intermittent preventive treatment of malaria; MQ: mefloquine; NA: not applicable; *P*: *Plasmodium*; PQ: primaquine; PY: pyronaridine; QN: quinine; SP: sulfadoxine–pyrimethamine; TQ: tafenoquine; WHO: World Health Organization.

[1] In May 2013, South Sudan was reassigned to the WHO African Region (resolution WHA66.21, https://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R21-en.pdf).

[2] As of 27 May 2025, Indonesia has been reassigned to the WHO Western Pacific Region (resolution WHA78.25, https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R25-en.pdf).

Notes:
Co-blistered products are denoted by "+" (e.g. artesunate + amodiaquine).
Co-formulated products are denoted by "–" (e.g. artemether–lumefantrine).

Annex 4 – C. Household survey results, 2017–2024, a. Compiled through STATcompiler for the WHO African Region

WHO region Country	Survey	% of households					% of population	
		with at least one ITN	with at least one ITN for every two persons who stayed in the household the previous night	with IRS in the past 12 months	with at least one ITN and/or IRS in the past 12 months	with at least one ITN for every two persons and/or IRS in the past 12 months	with access to an ITN	who slept under an ITN last night
AFRICAN								
Benin	2017/2018 DHS	91.5	60.5	8.7	92.0	63.8	77.2	71.1
Burkina Faso	2021 DHS	82.8	41.4	–	–	–	64.1	61.3
Cameroon	2022 MIS	72.3	48.5	–	–	–	64.2	53.6
Côte d'Ivoire	2021 DHS	72.1	51.2	–	–	–	65.0	51.8
Democratic Republic of the Congo	2023/2024 DHS	69.4	36.8	–	–	–	54.4	52.5
Gambia	2019/2020 DHS	77.3	36.3	–	–	–	60.8	37.8
Ghana	2022 DHS	66.7	47.4	6.7	69.0	51.4	61.1	39.7
Guinea	2021 MIS	63.3	22.0	–	–	–	41.9	33.4
Kenya	2022 DHS	54.2	37.1	–	–	–	49.6	42.7
Liberia	2022 MIS	72.3	32.8	–	–	–	52.4	43.9
Madagascar	2021 DHS	69.1	30.1	–	–	–	48.4	48.8
Mali	2021 MIS	90.9	44.0	–	–	–	72.2	67.7
Mauritania	2019/2021 DHS	32.2	8.0	–	–	–	19.5	10.9
Mozambique	2022/2023 DHS	56.5	32.0	–	–	–	44.8	38.6
Niger	2021 MIS	96.0	58.1	–	–	–	80.2	78.2
Nigeria	2021 MIS	56.0	25.4	–	–	–	43.1	36.4
Rwanda	2019/2020 DHS	66.4	34.3	–	–	–	50.8	47.7
Senegal	2020/2021 MIS	75.3	33.8	3.3	76.3	36.1	57.8	46.4
Sierra Leone	2019 DHS	67.9	25.0	–	–	–	46.8	50.6
Uganda	2018/2019 MIS	83.0	53.9	10.1	84.2	58.7	71.5	59.2
United Republic of Tanzania	2022 DHS	67.4	35.0	–	–	–	53.4	53.4
Zambia	2018 DHS	78.3	40.9	35.3	83.3	60.4	59.9	46.4

ACT: artemisinin-based combination therapy; DHS: demographic and health surveys; IPTp: intermittent preventive treatment of malaria in pregnancy; IRS: indoor residual spraying; ITN: insecticide-treated mosquito net; MIS: malaria indicator surveys; RDT: rapid diagnostic test; WHO: World Health Organization.

"–" refers to not applicable or data not available.

Sources: Nationally representative household survey data from DHS and MIS, compiled through STATcompiler (https://www.statcompiler.com/).

% of ITNs	% of pregnant women		% of children aged <5 years				% of children aged <5 years with fever in the past 2 weeks			
that were used last night	who slept under an ITN	who took 3+ doses of IPTp	who slept under an ITN	with moderate or severe anaemia	with a positive RDT	with a positive microscopy blood smear	for whom advice or treatment was sought	who had blood taken from a finger or heel for testing	who took antimalarial drugs	who took an ACT among those who received any antimalarial
73.4	79.3	13.7	76.3	43.8	36.3	39.1	53.1	17.7	17.5	37.0
90.7	71.0	56.8	67.4	42.8	28.0	14.0	74.9	65.0	–	26.9
63.3	62.8	45.8	57.5	32.6	26.2	–	55.6	26.5	–	19.3
58.4	64.2	34.6	58.5	42.0	37.3	26.0	59.1	38.4	–	38.6
73.2	60.4	21.9	57.0	36.2	32.8	–	50.7	21.5	–	41.9
55.0	44.2	52.2	44.0	20.7	0.4	–	64.2	27.3	3.5	46.7
49.0	47.7	60.2	49.0	21.1	16.5	8.6	57.1	40.0	–	35.0
72.0	39.4	50.3	38.2	45.5	33.7	17.4	61.1	28.0	31.4	11.9
71.4	44.9	12.5	51.2	–	–	–	69.5	33.4	–	84.0
65.4	52.6	62.6	50.3	23.9	17.7	10.2	60.4	44.8	–	50.1
77.3	54.9	31.0	55.6	20.2	7.5	–	44.6	19.9	15.3	54.7
90.6	75.9	34.4	73.4	48.7	19.4	–	60.0	23.3	31.2	14.8
42.0	11.7	10.2	11.9	54.9	1.1	–	31.4	5.8	15.3	19.0
72.3	46.5	25.3	42.5	44.4	32.3	–	63.6	51.2	–	18.5
81.1	90.1	25.0	85.7	49.2	28.9	–	67.0	31.9	39.2	77.0
75.1	49.6	31.0	41.2	43.1	39.6	22.3	62.8	24.3	20.3	73.9
78.0	56.1	–	55.6	15.2	2.7	0.9	62.3	40.7	8.1	92.4
81.4	52.5	37.7	46.5	67.3	–	–	63.0	21.7	2.7	1.7
89.5	63.8	35.7	59.1	37.9	–	–	75.4	61.3	55.9	31.9
74.3	65.4	41.0	60.3	25.0	18.2	9.8	87.0	50.7	62.5	87.7
81.7	58.4	31.7	58.9	33.4	7.9	–	77.6	50.4	–	31.4
64.2	48.9	58.7	51.6	29.5	–	–	77.2	63.0	34.9	96.9

Data as of 15 November 2025

Annex 4 – C. Household survey results, 2017–2024, b. Compiled through WHO calculations for the WHO African Region

WHO region Country	Survey	Fever prevalence in children aged <5 years	Health sector where treatment was sought for children aged <5 years							Diagnostic testing coverage for children aged <5 years in each health sector	
		Overall	Public excluding community health workers	Community health workers	Formal medical private excluding pharmacies	Pharmacies or accredited drug stores	Informal private	No treatment seeking	Trained provider	Public excluding community health workers	Community health workers
AFRICAN											
Benin	2017 DHS	20 (18–21)	22 (20–24)	0 (0–0)	9 (8–11)	9 (8–11)	14 (12–16)	46 (43–49)	40 (37–43)	52 (47–57)	–
Burkina Faso	2021 DHS	22 (21–24)	71 (68–73)	0 (0–0)	2 (1–3)	0 (0–0)	3 (2–4)	24 (22–27)	73 (71–75)	85 (83–87)	–
Cameroon	2022 MIS	31 (29–34)	21 (18–25)	0 (0–0)	20 (16–24)	7 (5–10)	11 (9–13)	44 (38–49)	46 (41–52)	66 (57–74)	–
Côte d'Ivoire	2021 DHS	17 (16–19)	43 (39–46)	1 (0–2)	4 (3–5)	10 (8–13)	11 (9–13)	35 (31–38)	56 (52–60)	71 (67–76)	36 (15–65)
Democratic Republic of the Congo	2023 DHS	20 (19–22)	20 (18–22)	1 (0–1)	8 (7–10)	21 (19–24)	5 (4–6)	46 (44–49)	50 (47–52)	56 (50–62)	34 (17–57)
Gabon	2019 DHS	23 (21–25)	31 (26–36)	0 (0–0)	6 (4–8)	38 (33–44)	4 (3–7)	24 (20–27)	72 (69–76)	29 (22–39)	–
Gambia	2019 DHS	15 (14–17)	45 (41–49)	0 (0–1)	7 (5–10)	13 (10–16)	1 (0–2)	35 (31–39)	64 (60–68)	42 (37–48)	–
Ghana	2022 DHS	15 (14–16)	38 (34–42)	1 (0–2)	12 (10–15)	8 (6–10)	8 (6–11)	34 (31–37)	58 (54–62)	85 (81–89)	–
Guinea	2021 MIS	23 (21–25)	43 (37–48)	4 (3–6)	6 (4–10)	5 (3–7)	7 (5–10)	38 (33–43)	56 (51–61)	54 (48–60)	42 (26–61)
Kenya	2022 DHS	17 (16–18)	41 (38–43)	0 (0–1)	17 (15–19)	12 (11–14)	1 (1–2)	30 (28–33)	69 (66–71)	50 (46–53)	–
Liberia	2022 MIS	37 (34–40)	26 (21–31)	3 (2–5)	16 (13–20)	12 (9–15)	8 (5–12)	36 (32–41)	56 (51–61)	81 (75–87)	57 (29–81)
Madagascar	2021 DHS	12 (11–13)	35 (32–38)	0 (0–0)	8 (6–10)	1 (0–1)	2 (2–3)	55 (51–58)	43 (40–47)	46 (41–51)	–
Malawi	2017 MIS	40 (38–43)	38 (34–43)	3 (2–5)	6 (4–8)	2 (1–4)	7 (5–10)	46 (41–51)	48 (43–52)	76 (70–82)	73 (37–93)
Mali	2021 MIS	27 (25–30)	36 (32–39)	5 (3–8)	7 (5–9)	5 (4–7)	13 (11–16)	35 (32–38)	52 (49–56)	54 (50–59)	25 (15–38)
Mauritania	2020 DHS	17 (16–18)	25 (22–28)	0 (0–1)	2 (1–3)	4 (3–5)	2 (1–2)	68 (65–71)	31 (28–34)	11 (8–15)	–
Mozambique	2022 DHS	10 (9–11)	60 (56–64)	2 (1–4)	3 (2–4)	1 (0–2)	1 (0–3)	34 (30–38)	65 (61–69)	77 (74–81)	63 (30–87)
Niger	2021 MIS	36 (33–38)	53 (49–58)	1 (1–2)	1 (0–1)	1 (1–2)	11 (8–15)	33 (28–38)	56 (52–61)	59 (53–64)	13 (3–46)
Nigeria	2021 MIS	37 (35–38)	26 (24–28)	3 (2–4)	6 (5–7)	13 (12–15)	16 (14–19)	36 (33–39)	48 (45–51)	54 (49–58)	28 (19–39)
Rwanda	2019 DHS	19 (18–20)	44 (41–46)	11 (9–13)	5 (3–6)	5 (4–6)	1 (1–2)	37 (34–40)	62 (59–65)	64 (59–68)	68 (61–75)
Senegal	2023 DHS	22 (20–23)	33 (30–37)	0 (0–1)	3 (2–4)	0 (0–0)	9 (7–11)	56 (52–59)	36 (32–39)	34 (29–39)	–
Sierra Leone	2019 DHS	17 (16–18)	66 (62–69)	1 (1–3)	2 (1–3)	6 (5–8)	1 (1–2)	25 (22–27)	74 (71–77)	78 (74–82)	31 (13–58)
Togo	2017 MIS	24 (22–27)	26 (22–31)	5 (4–8)	7 (5–9)	3 (2–5)	16 (12–21)	43 (37–49)	42 (37–47)	78 (71–84)	76 (60–87)
Uganda	2018 MIS	27 (24–30)	33 (29–37)	7 (5–9)	38 (34–41)	12 (10–15)	1 (1–1)	13 (11–15)	86 (84–88)	84 (79–88)	77 (68–83)
United Republic of Tanzania	2022 DHS	11 (10–12)	49 (45–53)	0 (0–0)	11 (8–15)	12 (9–15)	9 (7–12)	22 (18–26)	70 (65–75)	69 (63–74)	–
Zambia	2018 DHS	16 (15–17)	69 (66–72)	3 (2–5)	4 (3–6)	0 (0–1)	1 (0–2)	23 (20–26)	76 (73–79)	78 (73–82)	83 (64–93)

ACT: artemisinin-based combination therapy; DHS: demographic and health survey; MIS: malaria indicator survey; WHO: World Health Organization.

"–" refers to not applicable or data not available.

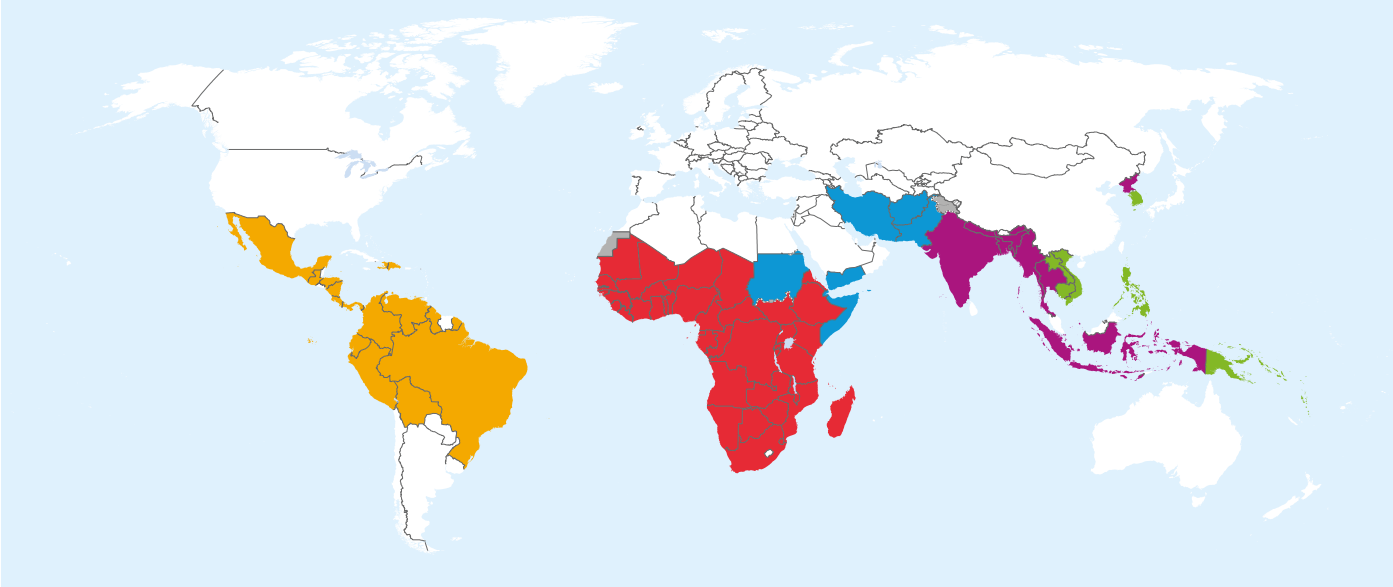
Diagnostic testing coverage for children aged <5 years in each health sector				Antimalarial treatment coverage for children aged <5 years in each health sector							ACT use among antimalarial treatment for children aged <5 years in each health sector		
Formal medical private excluding pharmacies	Pharmacies or accredited drug stores	Informal private	Trained provider	Public excluding community health workers	Community health workers	Formal medical private excluding pharmacies	Pharmacies or accredited drug stores	Self-treatment	No treatment seeking	Trained provider	Public	Private	Informal private
30 (23–38)	9 (6–14)	8 (5–12)	37 (33–40)	38 (34–44)	–	34 (27–41)	23 (17–30)	12 (9–17)	7 (5–9)	34 (30–37)	44 (36–52)	31 (24–39)	40 (26–55)
56 (33–77)	–	19 (12–30)	84 (82–86)	76 (73–78)	–	50 (34–67)	–	20 (11–33)	11 (8–14)	75 (72–77)	49 (45–53)	63 (46–78)	46 (18–77)
51 (41–61)	15 (9–24)	11 (7–18)	51 (44–57)	65 (57–73)	–	61 (53–69)	37 (26–49)	46 (36–56)	29 (23–36)	58 (52–64)	67 (56–77)	70 (62–77)	59 (43–74)
69 (52–82)	16 (8–27)	14 (8–25)	60 (56–65)	51 (46–56)	59 (25–86)	70 (48–85)	18 (11–27)	14 (8–24)	7 (5–11)	46 (42–51)	39 (32–47)	44 (30–59)	21 (4–62)
52 (43–61)	7 (5–11)	8 (4–13)	34 (30–38)	66 (60–71)	56 (36–75)	73 (63–80)	32 (26–38)	25 (18–34)	16 (13–18)	53 (48–57)	47 (41–54)	41 (35–47)	37 (21–57)
24 (8–53)	5 (3–10)	3 (1–14)	17 (12–22)	42 (34–51)	–	35 (14–64)	30 (24–36)	15 (3–48)	12 (7–20)	35 (30–40)	60 (46–73)	50 (37–62)	–
54 (33–73)	27 (19–36)	5 (0–47)	40 (35–45)	5 (3–8)	–	5 (1–18)	6 (3–14)	0 (0–0)	1 (0–4)	5 (3–7)	71 (51–85)	42 (13–77)	–
29 (21–39)	16 (9–27)	8 (5–14)	64 (59–68)	68 (62–74)	–	57 (45–69)	50 (39–62)	53 (38–68)	15 (11–20)	64 (59–68)	78 (72–84)	78 (69–84)	76 (51–90)
35 (21–52)	7 (2–19)	7 (3–18)	47 (42–53)	55 (48–61)	70 (49–85)	26 (15–42)	23 (12–40)	24 (14–38)	9 (6–13)	50 (44–56)	53 (46–60)	53 (36–70)	29 (11–57)
53 (47–59)	15 (11–19)	10 (4–22)	44 (41–47)	29 (26–32)	–	30 (25–35)	21 (17–26)	17 (7–36)	5 (4–7)	28 (25–30)	89 (85–92)	76 (67–83)	–
55 (44–66)	19 (11–31)	6 (2–13)	60 (54–66)	77 (71–83)	84 (60–95)	79 (70–86)	66 (54–76)	55 (38–70)	47 (39–54)	75 (71–79)	88 (80–93)	80 (73–86)	89 (73–96)
26 (17–37)	8 (0–71)	4 (1–11)	42 (38–46)	32 (27–37)	–	13 (7–22)	8 (0–71)	10 (7–14)	6 (4–9)	28 (24–32)	55 (46–63)	57 (25–84)	–
76 (61–86)	10 (2–38)	4 (1–14)	73 (67–78)	55 (48–62)	72 (46–89)	55 (39–69)	22 (4–64)	21 (9–41)	7 (5–11)	54 (48–61)	98 (94–99)	97 (81–99)	100 (100–100)
26 (18–35)	7 (3–14)	2 (1–4)	43 (39–47)	60 (55–64)	61 (51–69)	56 (46–66)	21 (14–32)	8 (5–12)	5 (4–7)	55 (51–59)	29 (24–34)	38 (29–48)	51 (30–71)
25 (11–49)	16 (7–34)	2 (0–14)	13 (10–17)	48 (42–54)	–	60 (22–89)	51 (35–66)	44 (18–74)	2 (2–4)	49 (43–55)	21 (15–29)	15 (6–35)	–
18 (6–43)	11 (1–67)	–	74 (70–77)	35 (29–40)	78 (50–93)	3 (0–24)	9 (1–61)	–	3 (1–6)	35 (30–40)	85 (79–90)	–	–
58 (21–87)	7 (2–25)	1 (0–2)	56 (51–62)	61 (55–67)	62 (38–82)	64 (24–91)	35 (18–55)	26 (17–37)	9 (6–12)	61 (55–66)	80 (74–84)	68 (48–82)	66 (43–83)
40 (33–47)	14 (9–21)	8 (6–11)	39 (35–43)	65 (59–70)	56 (40–71)	62 (53–70)	57 (49–65)	28 (23–34)	10 (8–12)	61 (57–66)	73 (66–79)	75 (69–80)	76 (66–83)
67 (54–78)	31 (21–42)	19 (4–56)	62 (58–66)	9 (6–12)	40 (32–49)	10 (5–20)	7 (3–16)	0 (0–0)	1 (0–2)	13 (11–17)	92 (84–97)	91 (30–100)	–
33 (18–54)	–	9 (5–15)	33 (29–38)	13 (10–17)	–	3 (1–12)	–	2 (0–13)	2 (1–3)	12 (10–16)	–	–	–
78 (50–93)	23 (13–36)	18 (6–44)	73 (69–76)	73 (68–77)	71 (39–91)	81 (59–92)	57 (44–69)	46 (17–77)	23 (18–30)	72 (67–76)	31 (27–36)	33 (23–45)	16 (1–80)
45 (31–60)	5 (1–25)	4 (2–11)	66 (60–72)	70 (60–79)	83 (69–91)	54 (37–70)	32 (14–57)	10 (5–17)	7 (4–10)	66 (59–73)	82 (74–88)	56 (38–73)	47 (18–78)
48 (43–53)	20 (15–28)	34 (15–60)	58 (54–62)	72 (66–76)	90 (84–93)	72 (67–77)	54 (42–66)	62 (34–84)	30 (23–37)	70 (66–74)	89 (84–93)	87 (82–91)	76 (17–98)
81 (70–89)	31 (20–45)	24 (15–36)	65 (59–70)	42 (36–48)	–	41 (27–56)	33 (21–48)	44 (33–55)	12 (8–18)	40 (35–45)	96 (92–98)	92 (85–96)	97 (78–100)
79 (65–89)	–	5 (0–39)	78 (73–82)	42 (37–47)	86 (72–93)	54 (41–67)	–	27 (5–70)	10 (7–13)	44 (40–49)	97 (95–98)	94 (76–99)	–

Notes:
The analysis is presented as point estimate (95% confidence interval).
Figures with fewer than 30 children in the denominator were removed.

Data as of 15 November 2025

Sources: Nationally representative household survey data from DHS and MIS, compiled through WHO calculations.

Annex 4 – D. Malaria endemic countries and areas[1]



WHO AFRICAN REGION

Angola
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Equatorial Guinea
Eritrea
Eswatini
Ethiopia
Gabon
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Liberia
Madagascar
Malawi
Mali
Mauritania
Mozambique
Namibia
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Sierra Leone
South Africa
South Sudan[2]
Togo
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

WHO REGION OF THE AMERICAS

Bolivia (Plurinational State of)
Brazil
Colombia
Costa Rica
Dominican Republic
Ecuador
French Guiana
Guatemala
Guyana
Haiti
Honduras
Mexico
Nicaragua
Panama
Peru
Venezuela (Bolivarian Republic of)

WHO EASTERN MEDITERRANEAN REGION

Afghanistan
Djibouti
Iran (Islamic Republic of)
Pakistan
Somalia
Sudan
Yemen

WHO SOUTH-EAST ASIA REGION

Bangladesh
Democratic People's Republic of Korea
India
Myanmar
Nepal
Thailand

WHO WESTERN PACIFIC REGION

Cambodia
Indonesia[3]
Lao People's Democratic Republic
Papua New Guinea
Philippines
Republic of Korea
Solomon Islands
Vanuatu
Viet Nam

WHO: World Health Organization.

[1] In the *World malaria report 2025*, a country or area is considered endemic when it has reported at least one indigenous case since 2022.

[2] In May 2013, South Sudan was reassigned to the WHO African Region (resolution WHA66.21, https://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R21-en.pdf).

[3] As of 27 May 2025, Indonesia has been reassigned to the WHO Western Pacific Region (resolution WHA78.25, https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R25-en.pdf).

Annex 4 – E. Countries and areas certified malaria free by WHO (1955–2025) and countries where malaria never existed or disappeared without specific measures

Countries that have achieved at least 3 consecutive years of zero indigenous cases are eligible to apply for a WHO certification of malaria free status.

WHO region	Country/area	Countries certified malaria free[1,2,3]	Countries where malaria never existed or disappeared without specific measures[4]
AFRICAN	Algeria	2019	
	Cabo Verde	2024	
	Lesotho		2012
	Mauritius	1973	
	Seychelles		2012
AMERICAS	Antigua and Barbuda		2012
	Argentina	2019	
	Bahamas		2012
	Barbados		1968
	Belize	2023	
	Canada		1965
	Chile		1968
	Cuba	1973	
	Dominica	1966	
	El Salvador	2021	
	Grenada	1962	
	Jamaica	1966	
	Paraguay	2018	
	Saint Kitts and Nevis		2012
	Saint Lucia	1962	
	Saint Vincent and the Grenadines		2012
	Suriname	2025	
	Trinidad and Tobago	1965	
	United States of America	1970	
	Uruguay		2012
EASTERN MEDITERRANEAN	Bahrain		2012
	Egypt	2024	
	Jordan		2012
	Kuwait		1963
	Lebanon		2012
	Libya		2012
	Morocco	2010	
	Qatar		2012
	Tunisia		2012
	United Arab Emirates	2007	

Annex 4 – E. Countries and areas certified malaria free by WHO (1955–2024) and countries where malaria never existed or disappeared without specific measures

Countries that have achieved at least 3 consecutive years of zero indigenous cases are eligible to apply for a WHO certification of malaria free status.

WHO region	Country/area	Countries certified malaria free[1,2,3]	Countries where malaria never existed or disappeared without specific measures[4]
	Albania		2012
	Andorra		2012
	Armenia	2011	
	Austria		1963
	Azerbaijan	2023	
	Belarus		2012
	Belgium		1963
	Bosnia and Herzegovina	1973	
	Bulgaria	1965	
	Croatia	1973	
	Cyprus	1967	
	Czechia		1963
	Denmark		1963
	Estonia		2012
	Finland		1963
	France		
	Metropolitan		2012
	La Réunion	1979	
	Georgia	2025	
	Germany		1964
	Greece		2012
	Hungary	1964	
	Iceland		1963
EUROPEAN	Ireland		1963
	Israel		2012
	Italy	1970	
	Kazakhstan		2012
	Kyrgyzstan	2016	
	Latvia		2012
	Lithuania		2012
	Luxembourg		2012
	Malta		1963
	Monaco		1963
	Montenegro	1973	
	Netherlands (Kingdom of the)	1970	
	Norway		1963
	Poland	1967	
	Portugal	1973	
	Moldova (the Republic of)		2012
	North Macedonia	1973	
	Romania	1967	
	Russian Federation		2012
	San Marino		1963
	Serbia	1973	
	Slovakia		1963
	Slovenia	1973	
	Spain	1964	

WHO region	Country/area	Countries certified malaria free[1,2,3]	Countries where malaria never existed or disappeared without specific measures[4]
EUROPEAN	Sweden		1963
	Switzerland		1963
	Tajikistan	2023	
	Turkmenistan	2010	
	Ukraine		2012
	United Kingdom of Great Britain and Northern Ireland		1963
	Uzbekistan	2018	
SOUTH-EAST ASIA	Maldives	2015	
	Sri Lanka	2016	
	Timor-Leste	2025	
WESTERN PACIFIC	Australia	1981	
	Brunei Darussalam	1987	
	China	2021	
	Cook Islands		1963
	Fiji		1963
	Japan		2012
	Kiribati		2012
	Marshall Islands		1963
	Micronesia (Federated States of)		1963
	Mongolia		1963
	Nauru		1963
	New Zealand		1963
	Niue		1963
	Palau		1963
	Samoa		1963
	Singapore	1982	
	Tonga		1963
	Tuvalu		2012

WHO: World Health Organization.

[1] Until 1987, the register was known as the “WHO official register of areas where malaria eradication has been achieved”.

[2] For the purpose of this publication, reference is made to the official name of WHO Member States as of 11 June 2018.

[3] La Réunion is a French overseas region which was certified malaria free independently from Metropolitan France.

[4] These countries are added to the Supplementary list (to the WHO official register of areas) where malaria never existed or disappeared years or decades ago and where full WHO certification of malaria elimination is not needed.

Notes

For further information please contact:

Malaria and Neglected Tropical Diseases
World Health Organization
20, avenue Appia
CH-1211 Geneva 27
Web: www.who.int/teams/global-malaria-programme
Email: GMPinfo@who.int