

6 December 2021

World malaria report 2021

Briefing kit

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1. Impact of disruptions during the COVID-19 pandemic

During the pandemic, countries and their partners succeeded in averting the worst-case scenario of malaria deaths projected by WHO by mounting an urgent and strenuous response. Still, moderate disruptions in the delivery of malaria services contributed to the considerable increases seen in malaria cases (14 million) and deaths (69 000) between 2019 and 2020.

2. New WHO methodology and global burden of malaria

This year's *World malaria report* applied a new statistical method to calculate the number of malaria deaths among children under 5 years of age since 2000. This new methodology is being used across WHO and provides more precise cause-of-death estimates for young children for all diseases, including malaria. Applying the new methodology reveals higher numbers of estimated malaria deaths across the entire period 2000–2020, compared with previous analyses. In 2020, there were an estimated 627 000 malaria deaths worldwide.

3. A plateau in malaria progress before the pandemic

Even before the emergence of COVID-19, global gains against malaria were levelling off, and the world was not on track to reach the 2020 milestones of WHO's global malaria strategy. To reinvigorate progress, WHO and partners catalysed a new, country-driven approach to malaria control in high burden countries that was beginning to gain momentum when COVID-19 struck.

4. Progress on a global scale remains uneven

On a global scale, progress against malaria remains uneven. According to the report, many countries with a low burden of the disease are moving steadily towards the goal of malaria elimination. Two countries – El Salvador and China – were certified malaria-free by WHO in 2021. However, most countries with a high burden of the disease have suffered setbacks and are losing ground.

5. Significant and growing coverage gaps for WHO-recommended tools

Global progress against malaria over the past two decades was achieved, in large part, through the massive scale-up and use of WHO-recommended tools that prevent, detect and treat the disease. The most recent data demonstrate these gains, while also

highlighting the significant and sometimes widening gaps in access to life-saving tools for people at risk of malaria.

6. A convergence of threats in sub-Saharan Africa

The situation remains precarious – especially in sub-Saharan Africa, where the malaria burden remains unacceptably high and a convergence of threats poses an added challenge to disease control efforts. At the same time, the pandemic is not over, and the pace of economic recovery is uncertain. Without immediate and accelerated action, key 2030 targets of the WHO *Global technical strategy for malaria 2016–2030* will be missed, and additional ground may be lost.

7. What is needed to reach global malaria targets

In 2021, WHO updated its global malaria strategy to reflect lessons learned over the past five years. Meeting the strategy's goals, including a 90% reduction in global malaria incidence and mortality rates by 2030, will require new approaches and greatly intensified efforts aided by new tools and the better implementation of existing ones. Stepped-up investment is also essential.



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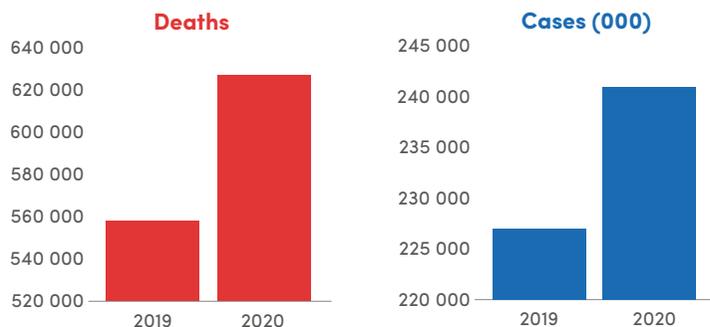
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1. Impact of disruptions during the COVID-19 pandemic

During the pandemic, countries and their partners succeeded in averting the worst-case scenario of malaria deaths projected by WHO by mounting an urgent and strenuous response. Still, moderate disruptions in the delivery of malaria services contributed to the considerable increases seen in malaria cases (14 million) and deaths (69 000) between 2019 and 2020.

» **More cases:** According to the latest *World malaria report*, there were an estimated **14 million more** malaria cases in 2020 compared to 2019 (241 million vs 227 million); most of this increase was reported in the WHO African Region.



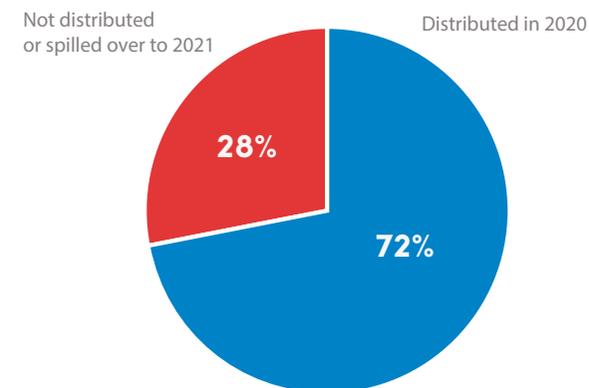
» **More deaths:** An estimated **69 000 more people** died from malaria in 2020 compared to 2019 (627 000 vs. 558 000). About **two thirds (47 000)** of the additional malaria deaths were due to disruptions in the provision of malaria prevention, diagnosis and treatment during the pandemic.

» Early in the COVID-19 pandemic, WHO had projected a **possible doubling of deaths** in 2020 in sub-Saharan Africa. The strenuous efforts of malaria-endemic countries and their partners to maintain malaria services during the pandemic averted this worst-case scenario. However, many countries experienced disruptions to malaria prevention, diagnosis and treatment. In sub-Saharan Africa there was an estimated **12% increase in malaria deaths** in 2020 over 2019. This highlights the consequences of even moderate service disruptions to malaria services in a population at risk.

- **Insecticide-treated nets (ITNs):** in 2020, 31 countries had planned campaigns to distribute insecticide-treated mosquito nets (ITNs) and, of these:
 - **18 countries** (58%) completed their campaigns in 2020, with most experiencing important delays.
 - **13 countries** (42%) had campaigns that spilled over to 2021.
 - Globally, about three quarters (**72%**) of all ITNs planned for distribution had been distributed by the end of 2020.

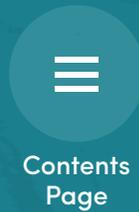
- **Global disruptions to testing:** many countries in sub-Saharan Africa showed a decline in outpatient attendance and malaria testing during the initial phase of the pandemic, and reductions generally coincided with peaks in COVID-19 transmission. In selected health facilities tracked by the Global Fund in 24 high-burden countries, 15 had reductions of more than 20% in April–June 2019 compared to the same period in 2020. Levels of malaria testing improved considerably in the latter part of 2020 through to 2021.

Distribution of insecticide-treated nets in 2020, completed and spilled over to 2021



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• **Global disruptions to malaria treatment:**

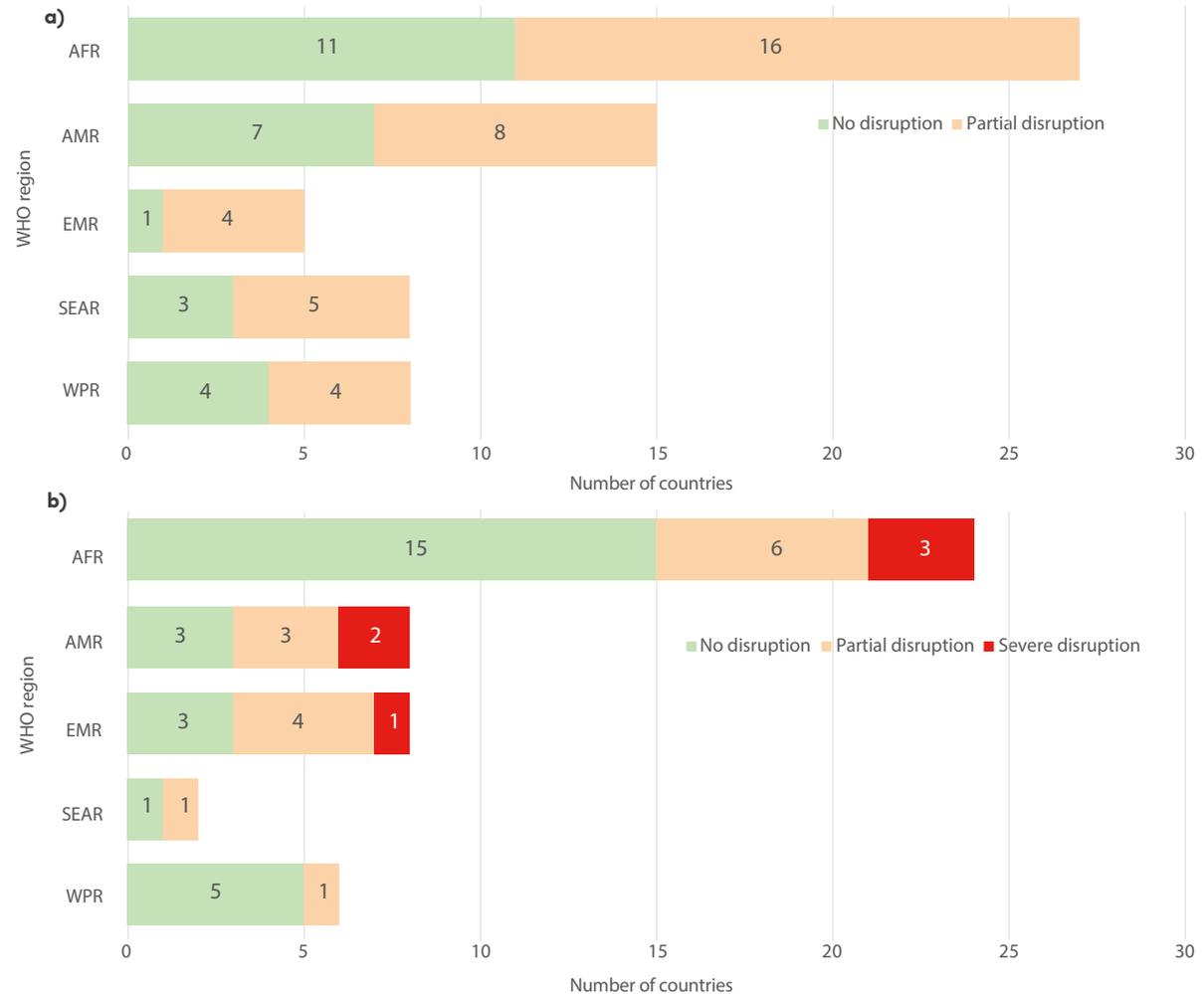
national malaria programmes distributed about **48 million fewer courses** of artemisinin-based combination therapies (ACTs) in 2020 than in 2019. 65 malaria-endemic countries responded to two rounds of WHO surveys to track disruptions in essential health services during 2020 (**Fig. 2.16**).

- In the first survey, 37 countries reported that they experienced partial disruptions (5–50%) in access to diagnosis and treatment and 26 countries experienced little or no disruption (less than 5%).
- In the second round, 15 countries reported partial disruptions of 5–50%; 27 countries had no disruptions; and six countries reported severe disruptions of more than 50% in malaria treatment.

» **The COVID-19 pandemic is not over.** It has left countries facing a prolonged triple challenge: mitigating the immediate health impact of COVID-19; reducing disruptions to other essential health services, including for malaria; and managing the health of their populations as broader economic disruptions affect societies. Lessons learned from COVID-19 related disruptions in 2020 must continue to inform efforts to control and eliminate malaria.

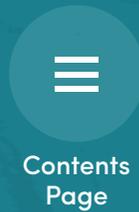
FIG. 2.16.

Results from WHO surveys on the number of countries experiencing disruptions to malaria diagnosis and treatment services during the COVID-19 pandemic: a) Round 1 survey (conducted in May–September 2020) and b) Round 2 survey (conducted December 2020–March 2021)



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New WHO methodology and global burden of malaria

This year's *World malaria report* applied a new statistical method to calculate the number of malaria deaths among children under 5 years of age since 2000. This new methodology is being used across WHO and provides more precise cause-of-death estimates for young children for all diseases, including malaria. Applying the new methodology reveals higher numbers of estimated malaria deaths across the entire period 2000–2020, compared with previous analyses. In 2020, there were an estimated 627 000 malaria deaths worldwide.

Malaria deaths: 7.8%



Deaths from all other causes: **92.2%**

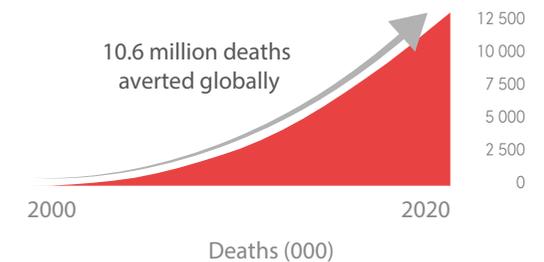
The new WHO methodology is described in detail in a [Lancet article](#) published on 17 November 2021. It shows that malaria accounts for a larger share (**7.8%**) of deaths among children under the age of 5 than previously recognized. The previous WHO methodology found that malaria accounted for 4.8% of deaths among children under 5.

Global malaria deaths

- » The new [cause-of-death methodology](#) was applied to 32 countries in sub-Saharan Africa that shoulder about 93% of all malaria deaths globally. Applying the methodology reveals that malaria has taken a considerably higher toll on African children every year since 2000 than previously thought (**Table 3.1**).
- » According to the report, there were an estimated **627 000 global malaria deaths in 2020** – an increase of 69 000 deaths over the previous year. While about two thirds of these deaths (47 000) were due to disruptions during the COVID-19 pandemic, the remaining one third of deaths (22 000) reflect the change in WHO methodology, irrespective of COVID-19 disruptions.
- » These new estimates underscore the fact that the WHO African Region shoulders the heaviest burden of the disease (96% of all malaria deaths in 2020), and that children under 5 bear the brunt of the disease (80% of all malaria deaths in the WHO African Region are among children under the age of 5).

» Even after applying the new methodology, the malaria death rate maintained an overall downward trend from 2000 to the present day.

- The malaria mortality rate fell from **30.1** deaths per 100 000 population at risk in 2000 to **13.8** in 2019 and **15.3** in 2020 (**Fig 3.2b**).
- An estimated **10.6 million malaria deaths were averted** globally in the period 2000–2020; most of these deaths (95%) were averted in the WHO African Region.



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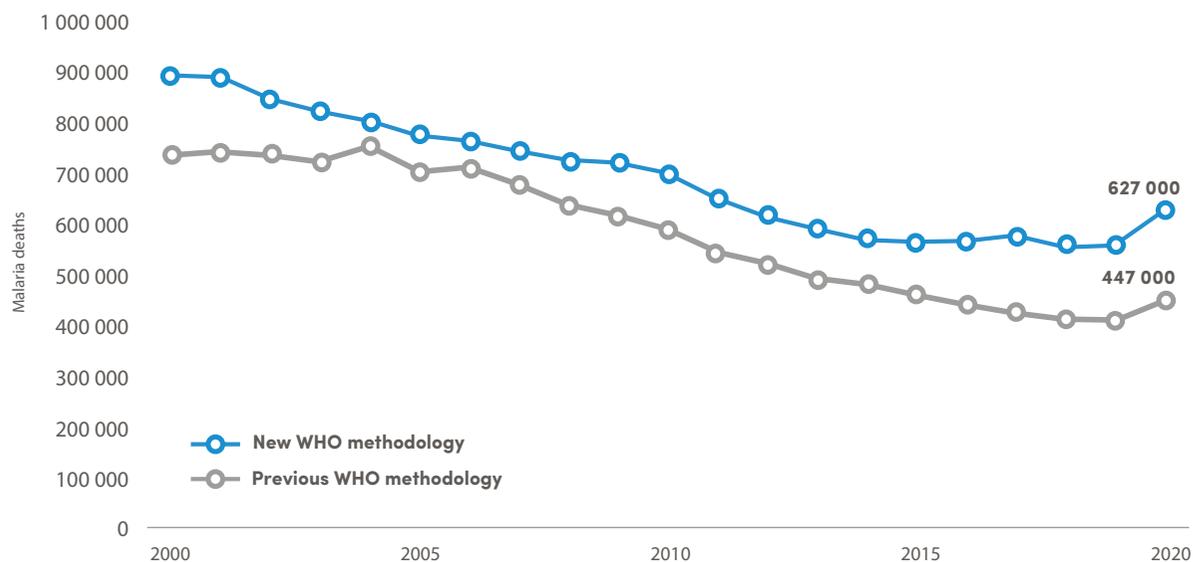
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TABLE 3.1
Global estimated malaria cases and deaths, 2000–2020

Year	Number of cases (000)	Number of deaths
2000	241 000	896 000
2001	246 000	892 000
2002	241 000	848 000
2003	244 000	825 000
2004	247 000	803 000
2005	246 000	778 000
2006	241 000	764 000
2007	238 000	745 000
2008	238 000	725 000
2009	242 000	721 000
2010	244 000	698 000
2011	237 000	651 000
2012	233 000	614 000
2013	227 000	589 000
2014	224 000	569 000
2015	224 000	562 000
2016	226 000	566 000
2017	231 000	574 000
2018	227 000	558 000
2019	227 000	558 000
2020	241 000	627 000

Estimated number of deaths using new WHO methodology (blue) and previous methodology (grey), 2000–2020



The change in cause-of-death methodology affects death estimates in only 32 moderate and high transmission countries. Between 2019 and 2020, estimates are adjusted for the effects of malaria service disruptions during the COVID-19 pandemic.

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Global malaria cases

- » According to the latest report, there were an estimated **241 million malaria cases in 2020** compared to 227 million cases in 2019 – an increase of about 14 million cases. About 95% of all malaria cases were in the WHO African Region.
- » The total number of malaria cases in 2020 is essentially the same as that reported in the year 2000. However, over this 20-year period, the population at risk of malaria in sub-Saharan Africa nearly doubled. Malaria case incidence, which reflects population growth, maintained a downward trend over the last 20 years – from **81.1** cases per 1000 population at risk in 2000 to **56.3** in 2019 and **59** in 2020 (**Fig 3.2a**).
- » An estimated **1.7 billion malaria cases were averted** in the period 2000 to 2020; most of these cases (82%) were averted in the WHO African Region.

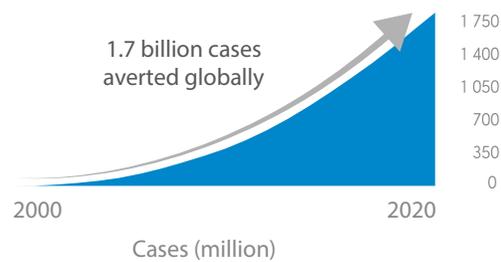
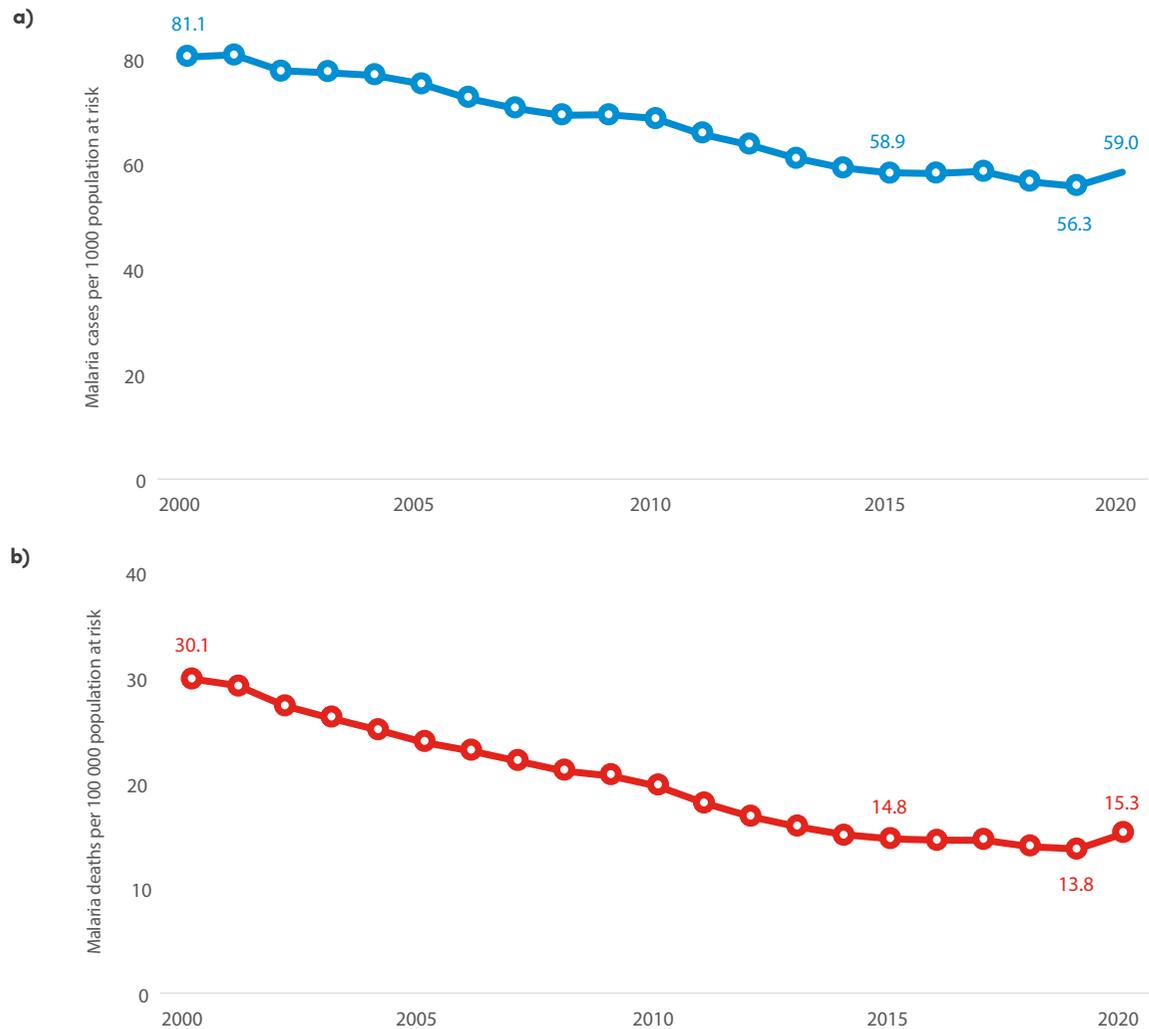
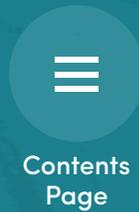


FIG. 3.2.

Global trends in a) malaria case incidence (cases per 1000 population at risk) and b) mortality rate (deaths per 100 000 population at risk), 2000–2020





A plateau in malaria progress before the pandemic

Even before the emergence of COVID-19, global gains against malaria were levelling off, and the world was not on track to reach the 2020 milestones of WHO's global malaria strategy. To reinvigorate progress, WHO and partners catalysed a new, country-driven approach to malaria control in high burden countries that was beginning to gain momentum when COVID-19 struck.

Global gains levelling off

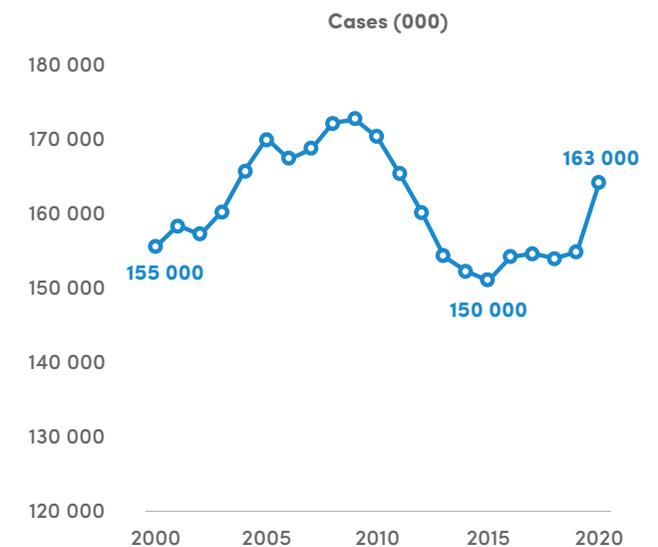
- » Between 2000 and 2015, a substantial expansion of malaria services contributed to a 27% reduction in global malaria case incidence (cases per 1000 population at risk) and a nearly 51% decline in the global malaria mortality rate (deaths per 100 000 population at risk), averting millions of deaths. But by 2017, the case incidence rate ticked upward, and the decline in malaria deaths had stalled.
- » WHO's *World malaria report 2017* warned that the global response had reached a "crossroads", and that progress towards critical targets of WHO's global strategy for reductions in disease and death was off track.

New approaches to jumpstart progress

- » The lagging progress prompted countries and global partners to mount renewed efforts to fight malaria. This included the 2018 launch of the "High burden high impact" (HBHI) approach, which focused on countries that carry the highest burden of malaria.
 - The HBHI approach aims to support the world's 11 highest burden countries in their efforts to get back on track toward controlling and, ultimately, eliminating malaria. These 11 countries (Burkina Faso, Cameroon, the Democratic Republic of the Congo, Ghana, India, Mali, Mozambique, Niger, Nigeria, Uganda and the United Republic of Tanzania) accounted for about 70% of global cases and 71% of global deaths in 2020.
- During the COVID-19 pandemic, all HBHI countries mounted considerable efforts to maintain malaria services. In 2020, seasonal chemoprevention campaigns for children were delivered on time and many countries completed their ITN distributions, despite delays. However, according to WHO surveys, HBHI countries reported moderate levels of disruptions in access to malaria diagnosis and treatment. For example, in the early months of the pandemic, countries reported reductions in the number of malaria diagnostic tests performed ranging from 24% in Nigeria to 60% in the Democratic Republic of the Congo.

- The trajectory of cases and deaths over time in HBHI countries reflects both initial progress and subsequent challenges, capped by the disruptive impacts of the pandemic: malaria cases in all HBHI countries reduced from 155 million to 150 million from 2000 to 2015 before increasing to 163 million in 2020; deaths reduced from 641 000 to 390 000 from 2000 to 2015, before increasing to 444 600 in 2020 (see graph below).

Trends in malaria cases in 11 high burden countries, 2000–2020

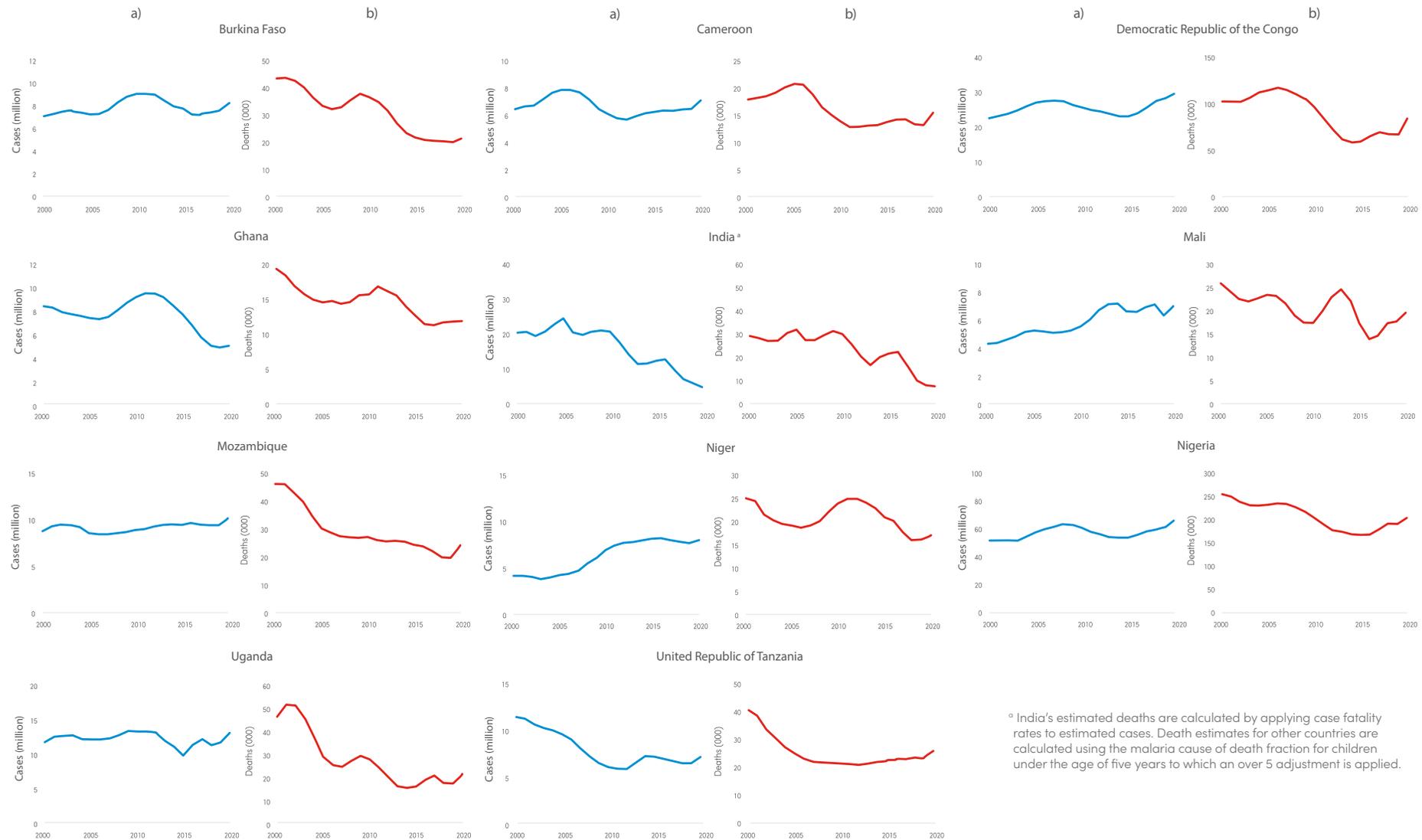


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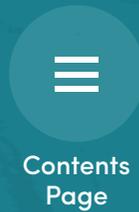
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FIG. 5.2.
Estimated malaria a) cases and b) deaths in HBHI countries, 2000–2020



^a India's estimated deaths are calculated by applying case fatality rates to estimated cases. Death estimates for other countries are calculated using the malaria cause of death fraction for children under the age of five years to which an over 5 adjustment is applied.



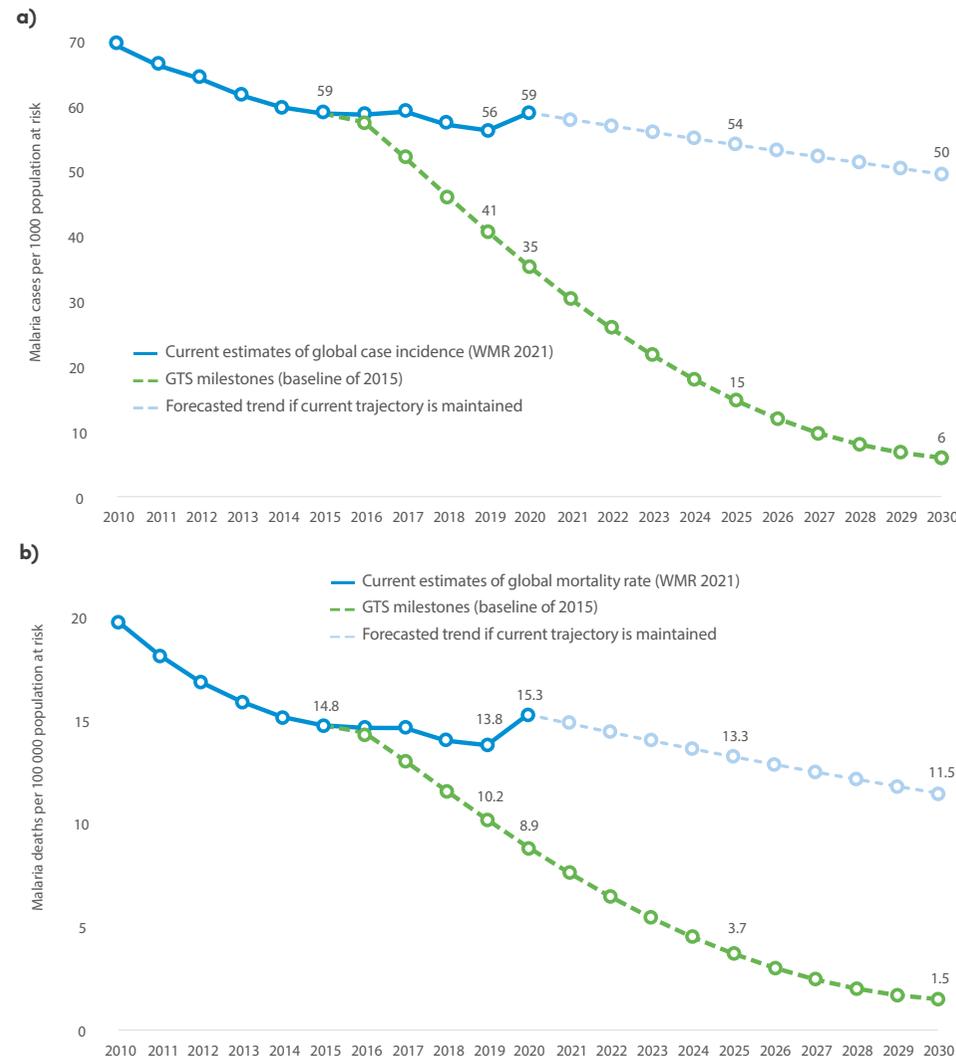
GTS 2020 milestones missed

» The WHO *Global technical strategy for malaria 2016–2030* (GTS) aimed to reduce malaria case incidence and mortality rates by at least 40% by 2020. According to the latest *World malaria report*, progress towards these 2020 milestones was substantially off track.

- In 2020, the **global malaria case incidence** rate was **59** cases per 1000 people at risk, against a target of **35** —putting it off track by 40% (**Fig. 8.1a**).
- In 2020, the **global mortality rate** was **15.3** deaths per 100 000 people at risk, against a target of **8.9** — putting it off track by 42% (**Fig. 8.1b**).

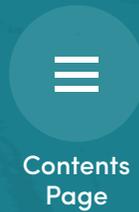
FIG. 8.1

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)



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4. Progress on a global scale remains uneven

On a global scale, progress against malaria remains uneven. According to the report, many countries with a low burden of the disease are moving steadily towards the goal of malaria elimination. Two countries – El Salvador and China – were certified malaria-free by WHO in 2021. However, most countries with a high burden of the disease have suffered setbacks and are losing ground.

» **Malaria case incidence:** of the **93** countries and territories that had ongoing malaria transmission in 2015, the baseline of the WHO global malaria strategy:

- **30** achieved the strategy's target of a 40% reduction in malaria case incidence by 2020.
- **24** countries achieved reductions in malaria case incidence of less than 40%.
- **7** countries remained at similar levels of malaria case incidence.
- **32** countries have registered increases in malaria case incidence since 2015.

» **Malaria mortality rate:** of those same **93** countries:

- **40** countries achieved the strategy's 2020 target of a 40% reduction in malaria mortality rate by 2020.
- **15** countries achieved reductions in the malaria mortality rate of less than 40% by 2020.
- **14** countries – all of them in the WHO African Region – remained at similar levels of malaria mortality.
- **24** countries have registered increases in their malaria mortality rate since 2015.¹

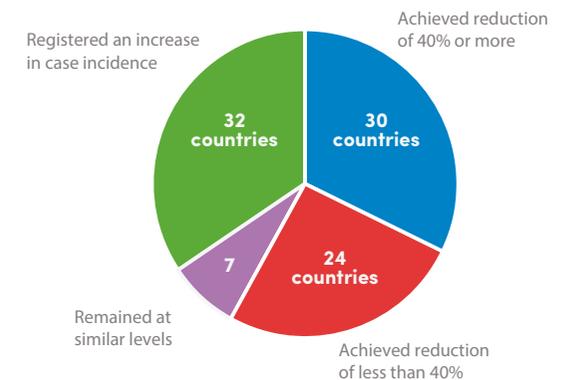
Progress in countries with a low burden of malaria

» Between 2000 and 2020, 23 countries had achieved three consecutive years of zero indigenous malaria cases; 12 of these countries have been certified malaria free by WHO.

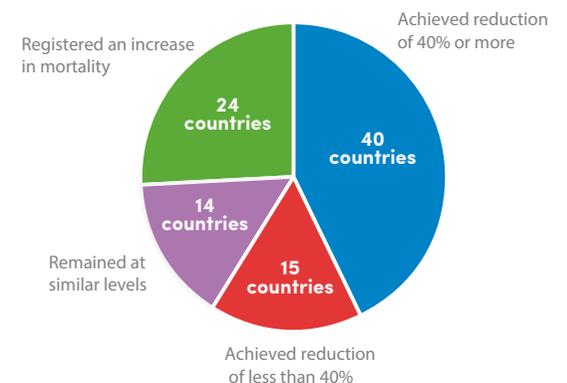
- In the midst of the COVID-19 pandemic, China and El Salvador were certified as malaria-free in 2021.
- The Islamic Republic of Iran attained three consecutive years of zero indigenous cases in 2020.
- Belize reported zero malaria cases for the second consecutive year in 2020.

Malaria case incidence and mortality rate: progress towards the GTS 2020 milestones in 93 malaria-endemic countries

Case incidence



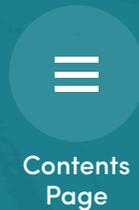
Mortality rate



¹ Angola, Bolivia (Plurinational State of), Botswana, Brazil, Comoros, Democratic Republic of the Congo, Djibouti, Ecuador, Eritrea, Guinea-Bissau, Guyana, Haiti, Liberia, Madagascar, Namibia, Nigeria, Papua New Guinea, Philippines, Solomon Islands, South Sudan, Sudan, Uganda, Venezuela (Bolivarian Republic of), Yemen.

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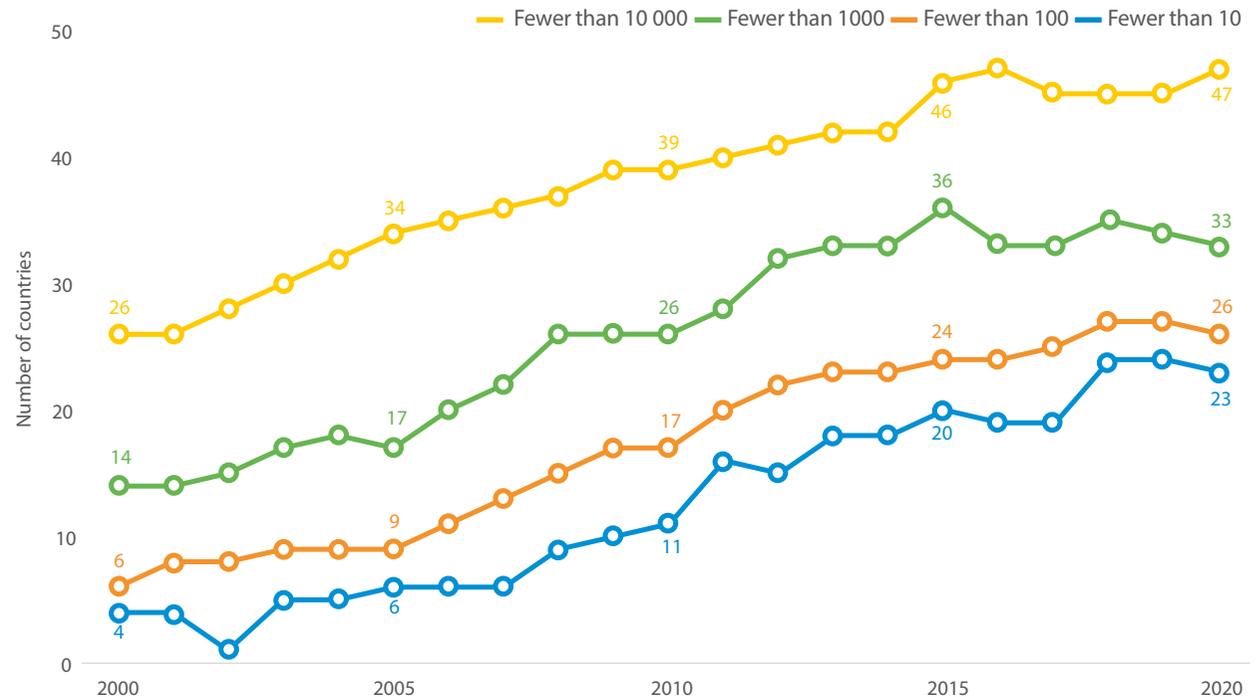
» A number of other countries are progressing steadily toward malaria elimination.

- Between 2000 and 2020, the number of malaria-endemic countries with fewer than 10 indigenous cases increased from **4 to 23**; the number with fewer than 100 cases increased from **6 to 26**; and the number with fewer than 1000 increased from **14 to 33** (Fig. 4.1).
- The [E-2025 initiative](#) was launched in April 2021 to support 25 countries in their efforts to halt malaria transmission by the year 2025.

» Countries of the Greater Mekong subregion continue to zero in on malaria elimination.

- Between 2000 and 2020, the number of *P. falciparum* malaria cases in the Greater Mekong subregion fell by **93%**, while all malaria cases fell by 78% (Fig. 4.2).
- The accelerated decrease in *P. falciparum* cases is notable in view of the threat posed by antimalarial drug resistance in the subregion. In recent years, *P. falciparum* parasites have developed partial resistance to artemisinin – the core compound of artemisinin-based combination therapies (ACTs). In some areas, parasites have also developed resistance to the partner drugs within ACTs.

FIG. 4.1. Number of countries that were malaria endemic in 2000, with fewer than 10, 100, 1000 and 10 000 indigenous malaria cases between 2000 and 2020



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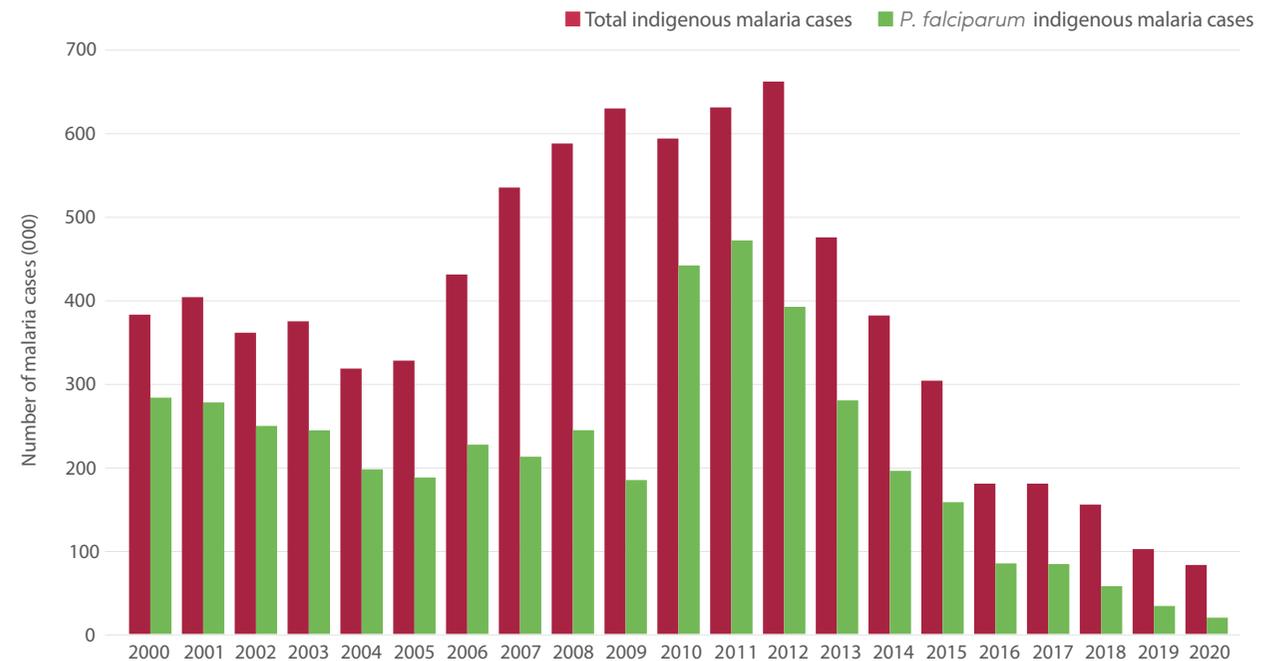
- Following the emergence of multidrug resistance, the six countries of the [Greater Mekong](#) (Cambodia, China, the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam) reported a peak of 650 000 malaria cases in 2012. This prompted the launch of a focused effort to fight drug-resistant malaria in the subregion, resulting in a dramatic decline in cases.
 - By 2020, there were about **82 000** malaria cases in the subregion, including some 19 000 cases of *P. falciparum* malaria. Most of the remaining cases are in Myanmar and Cambodia.

High burden countries are losing ground

- The world's 11 highest burden countries have suffered setbacks.
 - Malaria cases in HBHI countries reduced from 155 million to 150 million between 2000 and 2015 but increased to **163 million** cases in 2020.
 - Malaria deaths reduced from 641 000 to 390 000 between 2000 and 2015, then increased to **444 600 deaths** in 2020.
 - Between 2019 and 2020, all 10 HBHI African countries reported increases in cases and deaths.

FIG. 4.2.

Total indigenous malaria and *P. falciparum* indigenous cases in the GMS, 2000–2019





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Exceptions and outliers

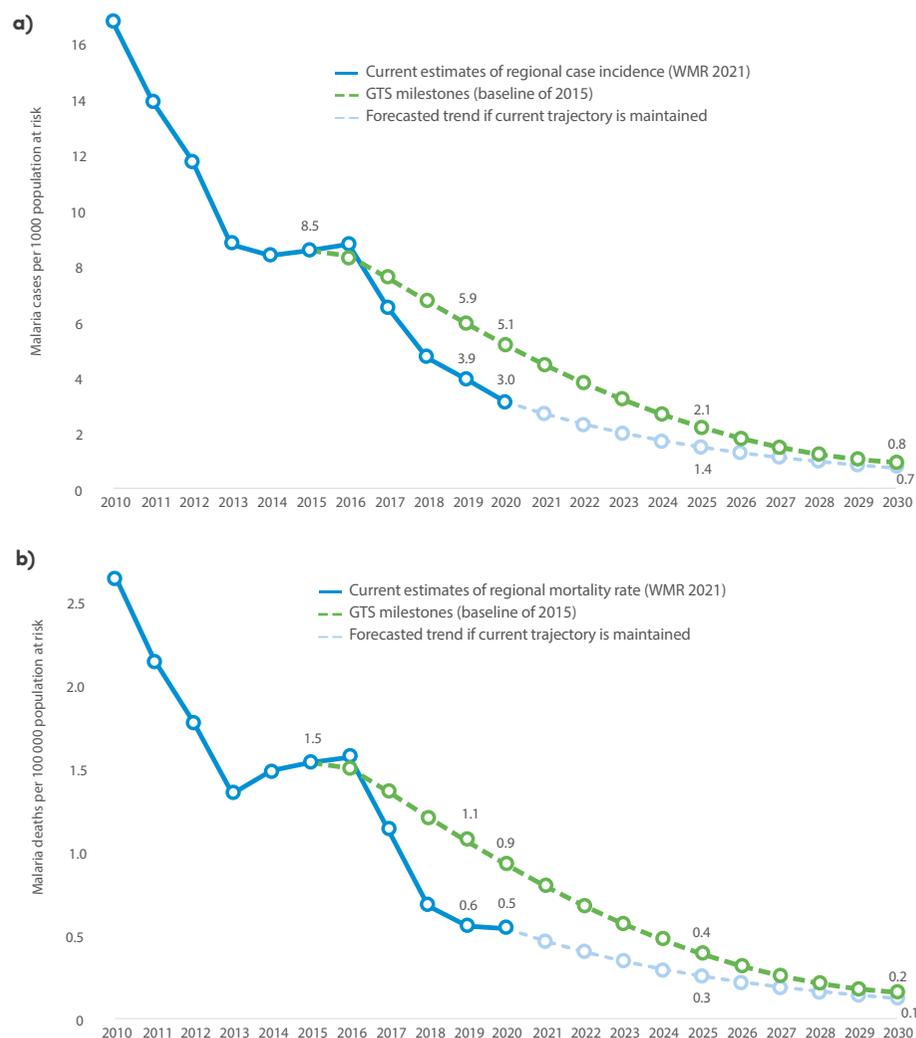
- Between 2019 and 2020, India, the country that carries the highest burden of malaria in the WHO South-East Asia Region, reported a reduction in malaria cases and deaths; however, the rate of reduction decreased compared with pre-pandemic years.
- Although the WHO Eastern Mediterranean Region experienced a 20% increase in case incidence between 2015 and 2020, the Islamic Republic of Iran and Pakistan bucked this trend. In 2020, Iran reported zero malaria cases for the third consecutive year and Pakistan reduced its malaria case incidence by more than 40%.
- South-East Asia is the one WHO Region that met the mortality and morbidity GTS 2020 milestones (**Fig. 8.7**). Most countries in the Region reduced malaria case incidence by 40% or more since 2015 and reported either zero malaria deaths or had reductions in mortality rate of 40% or more. Sri Lanka has remained malaria-free since 2016.²

For more on the latest malaria trends at the regional level, please see our regional briefing kit.

² Maldives has remained malaria-free since 1984 but has not received an official certification of malaria elimination from WHO.

FIG. 8.7

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)





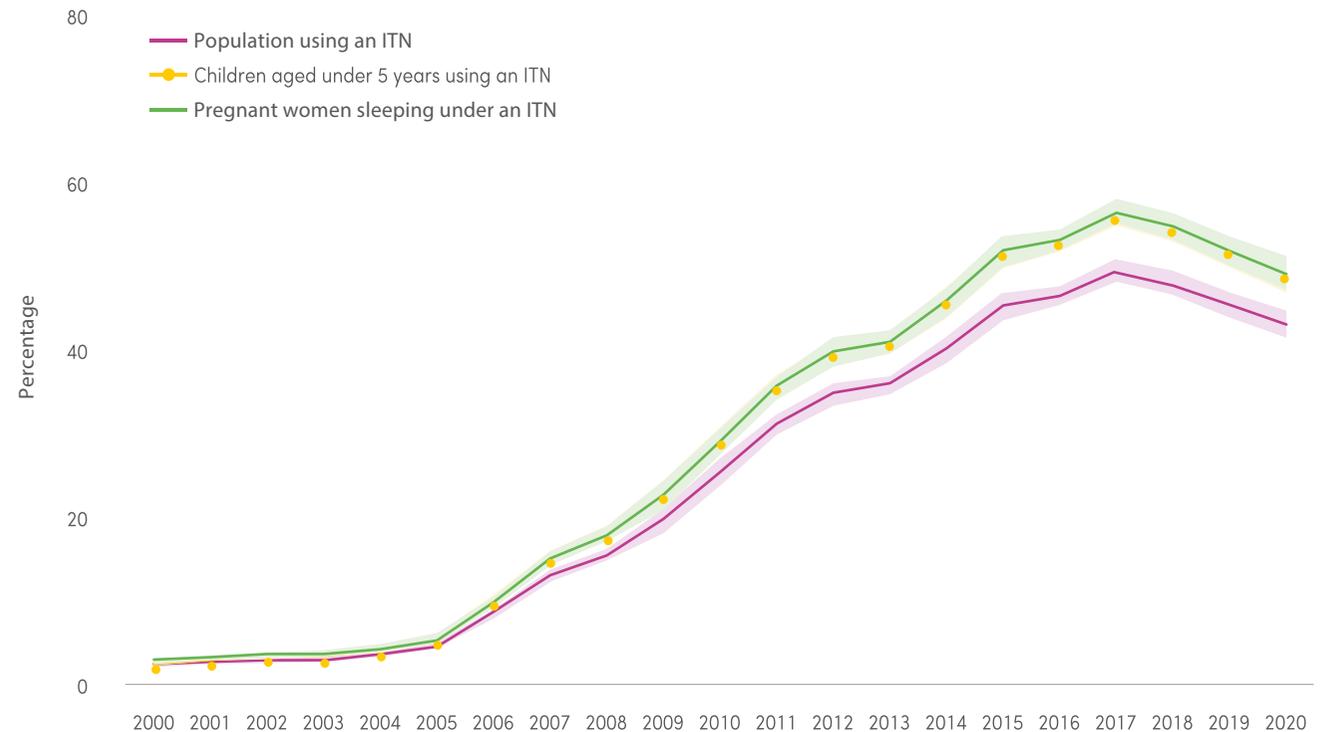
5. Significant and growing coverage gaps for WHO-recommended tools

Global progress against malaria over the past two decades was achieved, in large part, through the massive scale-up and use of WHO-recommended tools that prevent, detect and treat the disease. The most recent data demonstrate these gains while also highlighting the significant and sometimes widening gaps in access to life-saving tools for people at risk of malaria.

» **Prevention: 2.3 billion insecticide-treated nets (ITNs) were delivered between 2004 and 2020.**

- **ITNs and indoor residual spraying (IRS)** are the two main tools for controlling mosquito populations that spread malaria. Since 2000, ITN use has increased exponentially, while the use of IRS has declined.
 - ITNs are the foundation of malaria prevention efforts in sub-Saharan Africa. Between 2000 and 2020, the percentage of children under 5 and of pregnant women sleeping under an ITN increased from 3% to 49%. The percentage of the entire at-risk population sleeping under an ITN increased from 2% in 2000 to 43% in 2020. Since 2017, there has been a slight decline in the overall use of ITNs in sub-Saharan Africa (**Fig. 7.2 b**).

FIG. 7.2 b.
Indicators of population-level use of ITNs, sub-Saharan Africa, 2000–2020



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- **IRS** is the spraying of insecticides on the indoor walls and ceilings of housing to kill mosquitoes that touch these surfaces. Globally, the percentage of the population protected by IRS declined from 5.8% in 2010 to 2.6% in 2020. The percentage protected in Africa declined from 11.2% to 5.3% over the same period. In absolute numbers, those protected by IRS globally fell from 161 million in 2010 to 127 million in 2015, and to 87 million in 2020.

» **Prevention: antimalarial drugs can protect pregnant women, infants and children under 5 years of age against malaria.**

- **The number of children protected with seasonal malaria chemoprevention (SMC) in sub-Saharan Africa increased from 0.2 million in 2012 to 33.5 million in 2020.**

- SMC is recommended for children in high burden and highly seasonal malaria transmission areas. In 13 countries in Africa’s Sahel region, the number of children reached with at least one dose of SMC has increased rapidly: from less than 0.2 million in 2012 to 21.7 million in 2019 and about 33.5 million in 2020 (**Table 7.1**).

- **The percentage of women receiving three or more doses of intermittent preventive treatment in pregnancy (IPTp) increased from 1% in 2010 to 32% in 2020.**

- WHO recommends three or more doses of IPTp for pregnant women living in areas of moderate-to-high malaria transmission in Africa. To date, 38 African countries have adopted IPTp to reduce the burden of malaria during pregnancy. Coverage of three doses of IPTp increased from 1% in 2010 to 16% in 2015 and 32% in 2020 but remains well below the target of at least 80% (**Fig. 7.5**).

» **Testing: 2.2 billion rapid diagnostic tests (RDTs) were distributed by national malaria programmes between 2010 and 2020 – 88% in sub-Saharan Africa.**

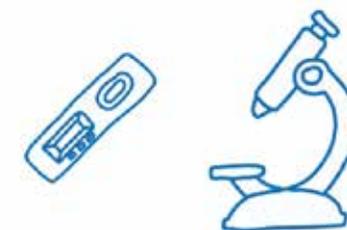
- Malaria diagnosis through microscopy or rapid diagnostic testing is crucial for timely treatment and for the prevention of severe disease and death. Most countries rely on the use of RDTs to diagnose malaria caused by the *P. falciparum* parasite, which is responsible for 98% of malaria cases globally.

- Based on household surveys, the proportion of febrile children in sub-Saharan Africa who were taken to a health provider and tested for malaria increased considerably between the period 2005–2011 and the period 2015–2019, rising from a median of **21% to 39%**. Median diagnosis rates in 20 African countries ranged from 13.8% in Nigeria to 66.4% in Burundi between 2015 and 2019.

TABLE 7.1

Number of children treated with at least one dose of SMC in countries implementing SMC, 2019–2020

Country	2019	2020
Benin	114 165	214 123
Burkina Faso	3 298 397	4 136 042
Cameroon	1 681 737	1 780 742
Chad	1 491 905	2 259 851
Gambia	110 870	121 834
Ghana	964 956	1 033 812
Guinea	750 903	1 088 194
Guinea-Bissau	86 107	86 107
Mali	3 767 205	3 739 238
Niger	4 151 103	4 516 729
Nigeria	4 110 152	13 359 530
Senegal	879 220	687 635
Togo	296 332	486 716
Total	21 703 052	33 510 553



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- Globally, manufacturers sold 3.1 billion RDTs between 2010 and 2020, with more than 81% of sales in sub-Saharan Africa. In the same period, national malaria programmes distributed 2.2 billion RDTs, with 88% in sub-Saharan Africa.

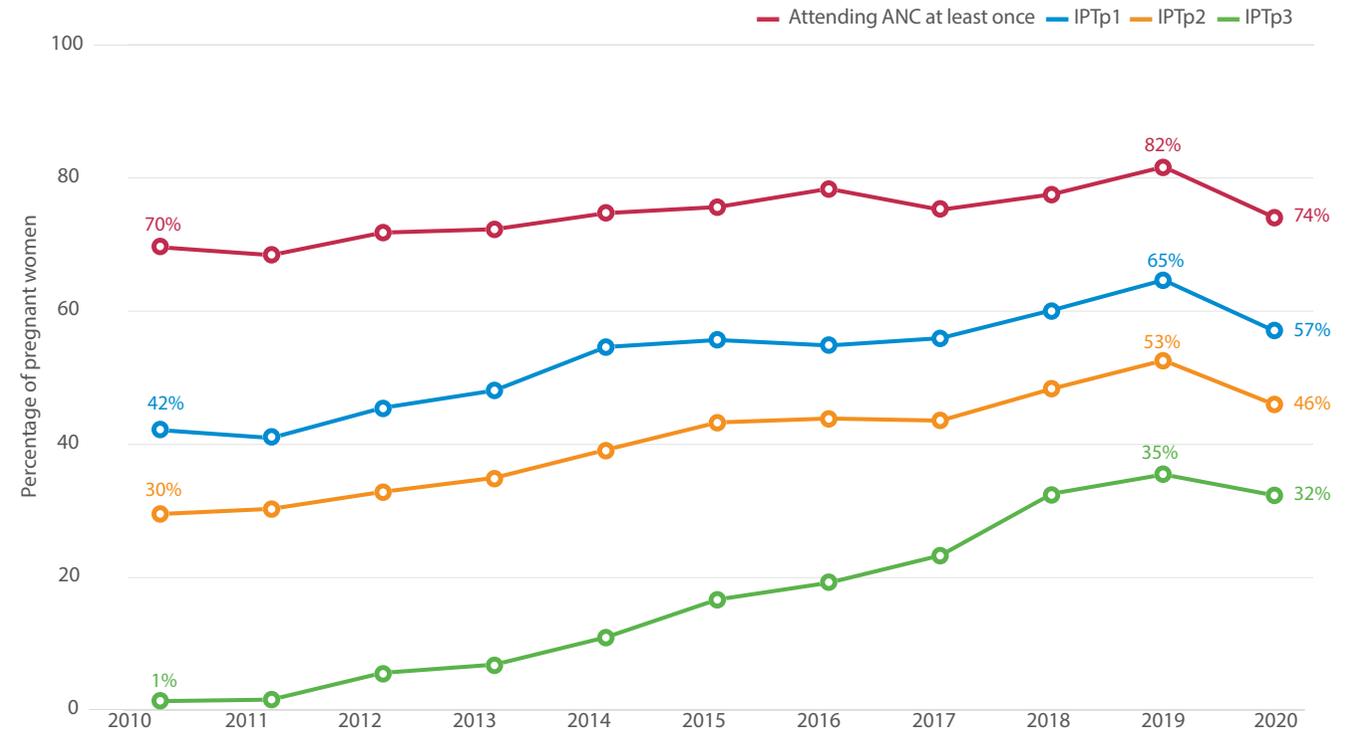
» Treatment: 2.1 billion treatment courses were delivered by national malaria programmes to health service providers between 2010 and 2020

- The best available treatment for *P. falciparum* malaria is artemisinin-based combination therapy (ACT). Between the period 2005–2011 and the period 2015–2019 in sub-Saharan Africa, the use of ACTs among young children for whom care was sought increased from a median of 39% to 76%.



FIG. 7.5.

Percentage of pregnant women attending an ANC clinic at least once and receiving IPTp, by dose, sub-Saharan Africa, 2010–2020





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A convergence of threats in sub-Saharan Africa

The situation remains precarious – especially in sub-Saharan Africa, where the malaria burden remains unacceptably high and a convergence of threats poses an added challenge to disease control efforts. At the same time, the pandemic is not over, and the pace of economic recovery is uncertain. Without immediate and accelerated action, key 2030 targets of the WHO Global technical strategy for malaria will be missed, and additional ground may be lost.

» Other humanitarian emergencies, beyond COVID:

in 2020 and 2021, about 122 million people in 21 malaria-endemic countries needed assistance due to health and humanitarian emergencies, not including the COVID-19 pandemic – from Ebola outbreaks to conflicts and flooding. While such emergencies disrupt malaria services, their impact is difficult to quantify.

» Other threats converging in African countries

include the emergence of partial resistance to the most commonly used drug treatment; the spread of *P. falciparum* parasite mutations that are undermining the effectiveness of RDTs; mosquitoes that are resistant to the insecticides used in key vector control tools; and the emergence of an

invasive malaria vector that thrives in urban and rural areas. The latest data on these four biological threats can be found in WHO's [Malaria Threats Map](#).

- **Drug resistance:** ACTs are the treatment of choice for malaria caused by the *P. falciparum* parasite. Now, parasites that are partially resistant to artemisinin – the drug's core compound – have emerged in Rwanda, Uganda and elsewhere in the Horn of Africa.
 - WHO is working with countries to map the extent of ACT failure rates in Africa, in order to adjust treatment recommendations if and when needed.
 - ACTs are still the best available treatment for *P. falciparum* malaria in African countries. The partner drugs within ACT combinations remain effective, and treatment failure rates in Rwanda and Uganda remain below 10%. It is imperative that health care providers continue to test patients showing signs of a fever, and that patients continue to use ACTs to treat confirmed malaria.
 - Artemisinin resistance evolved earlier in the Greater Mekong subregion (GMS), and health experts feared that resistant parasites would spread to Africa. This has not happened (the resistant parasites in Africa emerged independently), and the GMS has succeeded

in significantly reducing the threat of antimalarial drug resistance by driving down cases of *P. falciparum* malaria. Since 2012, the region has reduced the number of *P. falciparum* cases by 95%.

- **Effectiveness of RDTs:** the hundreds of millions of RDTs sold each year are designed to detect a specific protein produced by the *P. falciparum* malaria parasite. Parasites that have mutated to no longer express that protein cannot be detected by these RDTs. Such mutated parasites have now been found in South America, Asia, the Middle East, and central, eastern, southern and western Africa. The Horn of Africa is disproportionately affected.
 - In May 2021, WHO's Malaria Policy Advisory Group [called for urgent action](#) to address the increased prevalence of these evasive parasites in all malaria endemic countries, particularly in the Horn of Africa. WHO urges increased surveillance and recommends that when local prevalence of the mutated parasites causing false negative test results reaches 5%, an immediate change in testing strategy is needed.



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- **Insecticide resistance:** current vector control interventions recommended by WHO for large-scale deployment – ITNs and IRS – rely on insecticides. All ITNs contain pyrethroids as the active ingredient, while most IRS is now conducted with organophosphate and neonicotinoid insecticides. Insecticide resistance in malaria vectors is a recognized threat to global malaria control and elimination efforts, and urgent action is needed to prevent or slow its further spread.
 - To prevent an erosion of the impact of key vector control tools, WHO highlights the need for all countries with ongoing malaria transmission to develop and apply effective insecticide resistance management strategies. WHO has also called for the development and evaluation of new insecticides and interventions that aim to maintain effective vector control.
- **Invasive vector species:** the *Anopheles stephensi* mosquito was originally native to parts of Asia and the Arabian Peninsula, but has been expanding its range since at least 2012, when it was detected in Djibouti. It has continued to spread in the Horn of Africa, with detections reported across Djibouti, Ethiopia, Somalia and the Sudan. Because it adapts easily to urban

environments, it may increase the risk of malaria outbreaks in African cities.

- In areas where *An. stephensi* invasion is suspected or confirmed, WHO recommends the use of vector surveillance to delineate its geographical spread. Countries are encouraged to evaluate existing and new interventions against *An. stephensi* in these settings, to start building an evidence base for the control of this vector in Africa. Countries and partners are also encouraged to immediately report any detection of *An. stephensi* to ministries of health and WHO.



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7. What is needed to reach global malaria targets

In 2021, WHO updated its global malaria strategy to reflect lessons learned over the past five years. Meeting the strategy's goals, including a 90% reduction in global malaria incidence and mortality rates by 2030, will require new approaches and greatly intensified efforts aided by new tools and the better implementation of existing ones. Stepped-up investment is also essential.

» The updated strategy reflects lessons learned from the global malaria response over the period 2016 to 2020, including a stalling of progress and the COVID-19 pandemic. While the strategy retains the goals and milestones endorsed by the Assembly in 2015, it is more closely aligned with WHO's Thirteenth Global Programme of Work (2019–2023) as well as the global universal health coverage agenda, a key driver of the Organization's work worldwide.

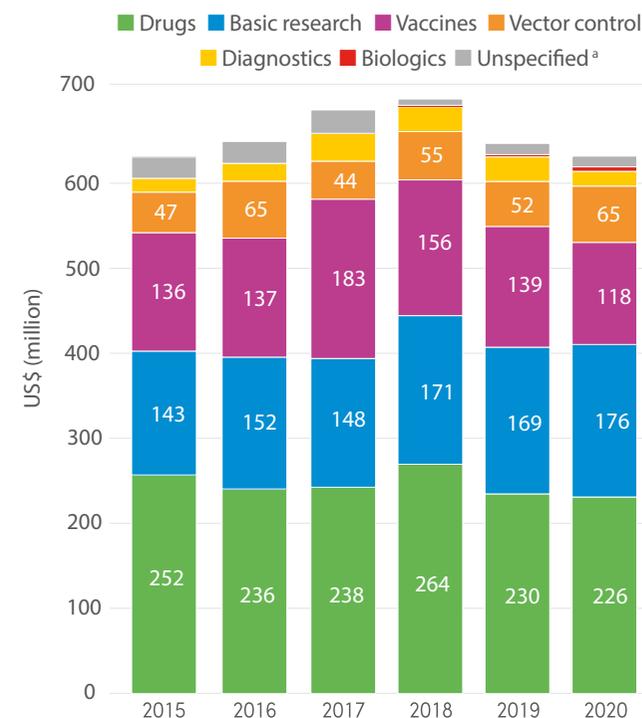
- The strategy's guiding principles have been reordered to place a greater emphasis on the importance of country leadership of malaria responses, and there is a stronger focus on the need for equitable and resilient health systems, innovation in tools and approaches, and data-driven strategies tailored to local conditions.

» **Tailor malaria responses to local settings.** The strategy advises countries to move away from a "one-size-fits-all" approach to malaria control – applying, instead, an optimal mix of tools tailored to local settings for maximum benefit. By adopting this more targeted, data-driven approach, countries can maximize available resources while ensuring efficiency and equity in their malaria responses.

» **Harness innovation: Invest in accelerated research and development.** No single tool that is available today will solve the problem of malaria. Investments that will bring new diagnostics, vector control approaches, antimalarial medicines and vaccines will be needed to speed the pace of progress against malaria and attain global targets.

- According to the latest *World malaria report*, an estimated US\$ 8.5 billion will be needed for research and development (R&D) between 2021–2030, an average annual investment of US\$ 851 million.
- In 2020, over a third of R&D funding went to drugs (US\$ 226 million, 37%), followed by US\$ 176 million to basic research (28%), about a fifth (US\$ 118 million, 19%) to vaccine R&D and a further 10% to vector control products (US\$ 65 million). All other products including diagnostics (US\$ 17 million, 2.7%), biologics (US\$ 5.3 million, 0.9%) and unspecified products (US\$ 12 million, 1.9%) saw investments under US\$ 20 million each (**Fig. 6.8**).

FIG. 6.8. Funding for malaria-related R&D, 2015–2020, by product type (constant 2020 US\$)



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» **Harness innovation: Expand the use of RTS,S, the world's first WHO-recommended malaria vaccine**

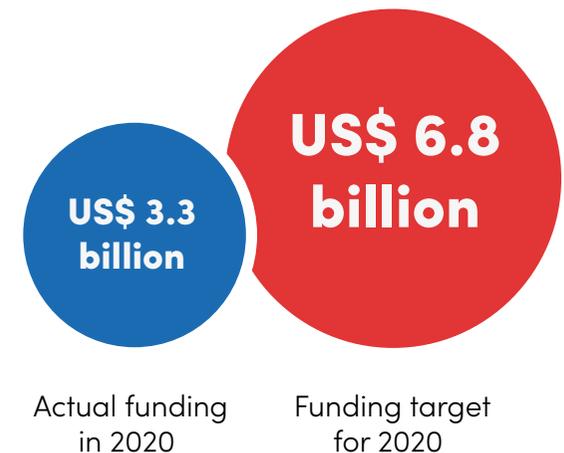
- On 6 October 2021, WHO recommended the RTS,S malaria vaccine for children in sub-Saharan Africa and in other regions with moderate to high *P. falciparum* malaria transmission. The recommendation was based on a review of the full package of evidence on RTS,S, including the results of a [pilot programme](#) in Ghana, Kenya and Malawi that has reached more than 830 000 children since 2019.
- **RTS,S is an example of innovation at work and is a scientific breakthrough.** This is the first vaccine recommended for use against a human parasitic disease of any kind. RTS,S is a recombinant protein-based malaria vaccine that triggers the immune system when *P. falciparum* enters a person's bloodstream through a mosquito bite. It is designed to prevent the parasite from infecting the liver, where it can mature, multiply, re-enter the bloodstream, and infect red blood cells, which can lead to disease symptoms.
- **RTS,S is an important addition to the currently recommended interventions to prevent malaria.** If introduced widely, the vaccine could save tens of thousands of lives of young children each year. WHO advises countries to consider the vaccine as part of the package of tools to apply as they tailor malaria interventions to local disease settings for maximum impact.

» **Strengthen health systems:** continued progress against malaria, a disease that places nearly half the world's population at risk, depends on an accelerated response in the face of a global pandemic and other growing threats. That response must be anchored in strong health systems, funded and equipped to deliver quality health care to all. The control and elimination of malaria depends on resolute political commitment to universal health care, inclusive of malaria prevention, diagnosis and treatment as part of both primary health care systems and broader development initiatives.

» **Ensure robust global malaria funding.** According to the report, 2020 funding for malaria control and elimination was estimated at US\$ 3.3 billion against a target of US\$ 6.8 billion. To reach the 2030 global malaria targets, current funding levels will need to more than triple to US\$ 10.3 billion per year.

- Sources of funding for malaria control and elimination have remained relatively constant in the past 10 years. In both 2020, and in the period 2010–2020, domestic funding by malaria-endemic countries accounted for nearly one third of all funding, and international sources accounted for a little more than two-thirds.

Funding gap in 2020



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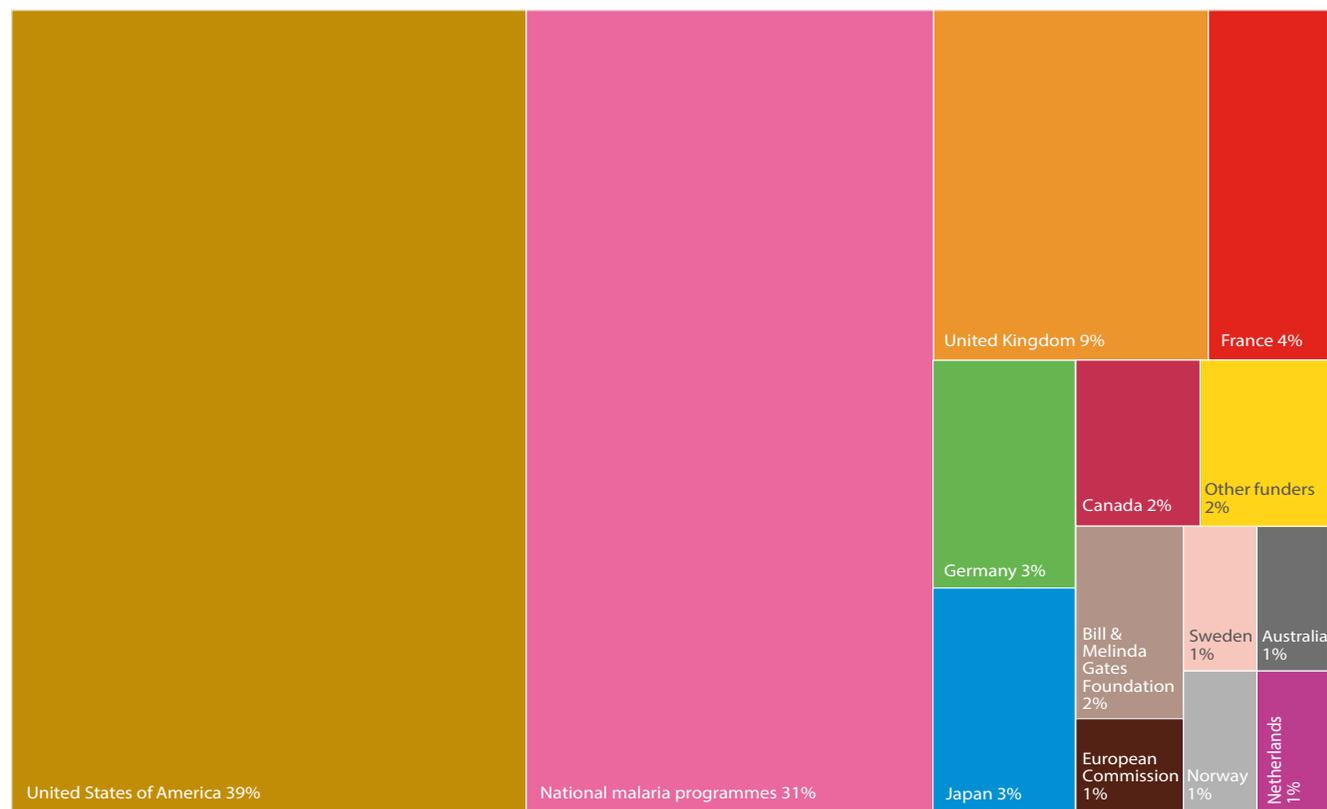
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- The United States contributed the highest share of international funding, followed by the United Kingdom, France, Germany and Japan (**Fig 6.1**). In 2020, about US\$ 1.4 billion was channelled through the Global Fund to Fight AIDS, Tuberculosis and Malaria, representing about 42% of total malaria investments that year.
- The world's 26 low-income malaria-endemic countries, which together account for 90% of malaria cases and deaths, received 44% of total malaria funding in 2020, up from 41% in 2019. In this low-income group, 80% of the funding stemmed from international sources and 20% from domestic sources (**Fig. 6.4**).
- Many malaria-endemic, low- and middle-income countries (LMICs) saw their real gross domestic product (GDP) shrink in 2020, reflecting the effects of COVID-19 on national economic activity. Among the 61 malaria-endemic countries categorized as LMIC, 43 experienced a shock in their annual real GDP in 2020; of these, 34 countries (half of them in Africa) saw their real GDP shrink by more than 1%. Although the deepest recessions may be over, the severity of the economic impact will largely depend on the duration of the COVID-19 restrictions and the fiscal response and monetary interventions from governments.

FIG. 6.1.

Funding for malaria control and elimination, 2010–2020 (% of total funding), by source of funds (constant 2020 US\$)



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FIG. 6.4.
Funding for malaria control and elimination, 2000–2020, (constant 2020 US\$)

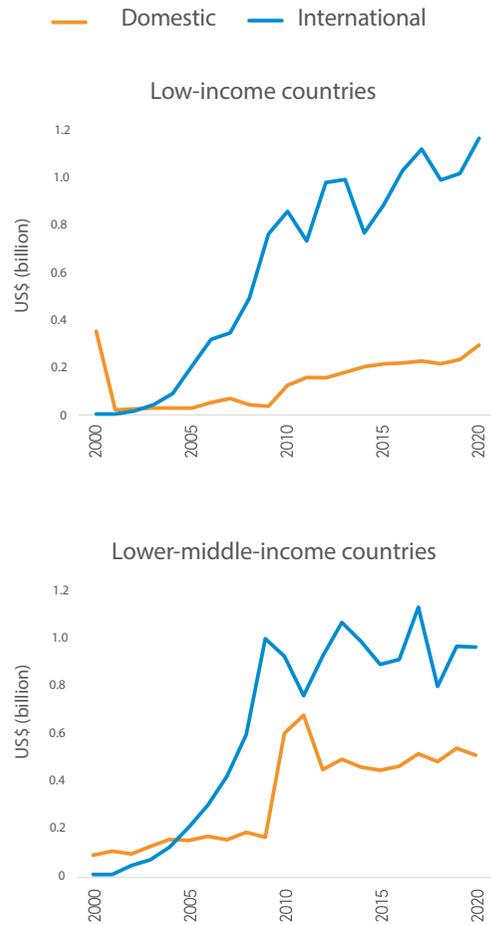
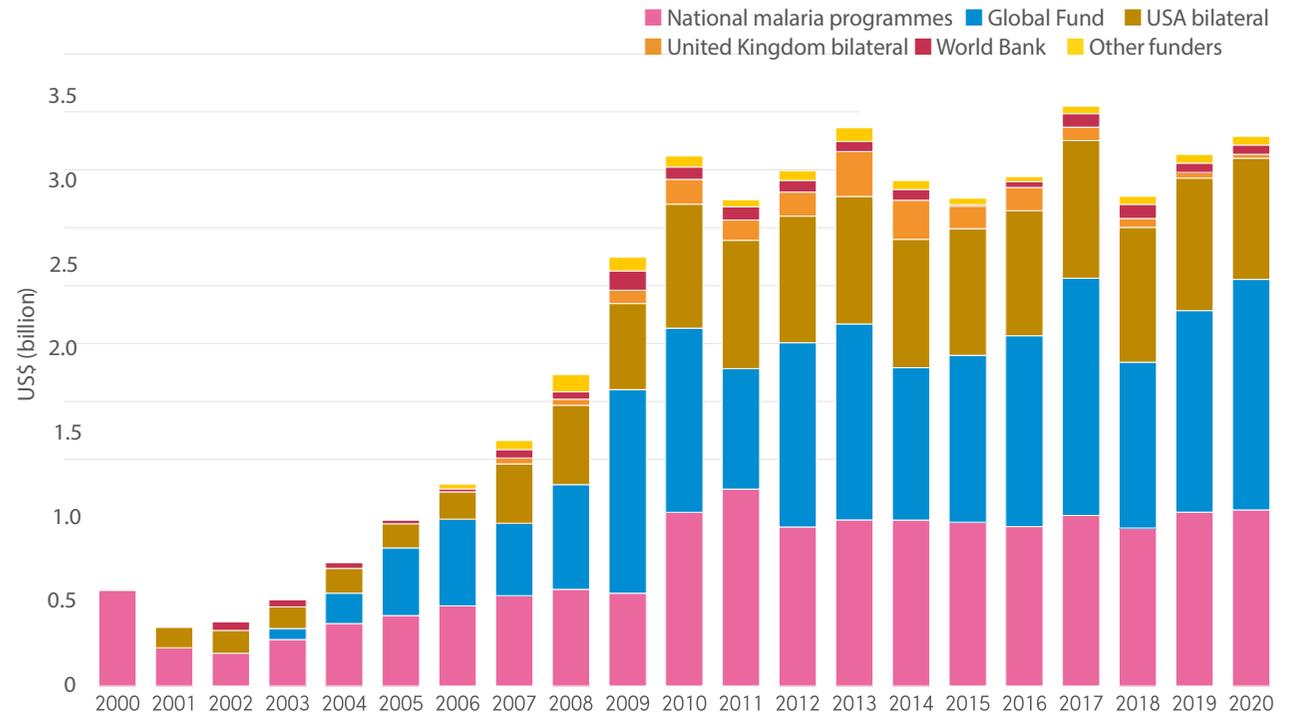


FIG. 6.3.
Funding for malaria control and elimination, 2000–2020, by channel (constant 2020 US\$)



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Graphs drawn from the *World malaria report 2021*. For more information on sources, please see the report.

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