Fourth annual global forum of malaria-eliminating countries

Meeting report, Cape Town, South Africa, 24–26 January 2023

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Contents

Abbreviations

COVID-19	coronavirus disease
E-2020	Elimination-2020
E-2025	Elimination-2025
GTS	Global technical strategy for malaria 2016–2030
IRS	indoor residual spraying
ITN	insecticide-treated net
MDA	mass drug administration
TAG-MEC	Technical Advisory Group on Malaria Elimination and Certification
WHO	World Health Organization

Executive summary

The Fourth Annual Global Forum of malaria-eliminating countries was held in Cape Town, South Africa, from 24 to 26 January 2023. The Forum was attended by almost 100 participants from Elimination-2025 (E-2025) countries and territories, observers, and World Health Organization (WHO) personnel from the Global Malaria Programme and regional and country offices. Members of the Technical Advisory Group on Malaria Elimination and Certification were introduced and the functions of this new group were explained. The Forum's goal was to convene E-2025 countries and territories to highlight achievements, report progress, understand and overcome bottlenecks and challenges, share lessons learned, and discuss WHO guidance and strategies. The participants reviewed achievements, challenges and lessons learned from both the E-2020 and E-2025 initiatives. WHO provided an update on the *WHO guidelines for malaria (1)* and WHO interventions for the final phase of elimination and prevention of re-establishment of transmission. The experiences of Cambodia, Sao Tome and Principe, and Thailand with accelerating strategies and subnational verification were presented to participants. Participants were taken through the strategies for prevention of re-establishment, and China and El Salvador shared their experiences, lessons learned and challenges encountered. An awards ceremony was held to recognize countries that had made significant strides towards malaria elimination.

The following key conclusions and actionable insights came out of the Global Forum:

- Country leadership and political will are vital for malaria elimination. WHO has an important role to play in advocating for elimination.
- Acceleration towards elimination is important, and countries need to get back on track. It is important to better document where acceleration has been successful and how this was facilitated.
- Strengthening the capacity of WHO staff at regional and country levels and of national malaria programme staff is equally important.
- Sustained funding for elimination programmes must be ensured.
- Regional/subregional perspectives are important, particularly where the malaria situation in neighbouring countries greatly affects that of eliminating countries.
- Additional effort is needed to disseminate/clearly communicate new WHO guidelines on elimination and provide clear guidance on their implementation.

The purpose of this report is to summarize the key points that were made during the Global Forum.

1. Background and rationale

The World Health Organization's (WHO) *Global technical strategy for malaria 2016–2030* (GTS) *(2)* provides a comprehensive framework to guide malaria-endemic countries in their efforts to accelerate progress towards malaria elimination and attainment of malaria-free status. Adopted by the World Health Assembly in May 2015 and updated in 2021, the GTS targeted the elimination of malaria in at least 10 countries by 2020 and calls for the elimination of malaria in an additional 10 countries by 2025 and at least 15 countries by 2030. In line with the GTS, in 2016, the Global Malaria Programme identified 21 countries, spanning five WHO regions, that could eliminate malaria by 2020 and grouped them into a special initiative called Elimination-2020 (E-2020). As part of this initiative, countries received specialized support to scale up efforts to achieve elimination by 2020. Eight E-2020 countries reached the target of zero indigenous cases, and four countries – Paraguay (2018), Algeria (2019), El Salvador (2021) and China (2021) – were certified as malaria-free by WHO.

Building on the foundation and successes of the E-2020 initiative, WHO launched the Elimination-2025 (E-2025) initiative, which includes nine countries and territories in addition to the 17 E-2020 countries that failed to eliminate malaria by 2020. The E-2025 countries are Belize, Bhutan, Botswana, Cabo Verde, Comoros, Costa Rica, Democratic People's Republic of Korea, Dominican Republic, Ecuador, Eswatini, French Guiana (France), Guatemala, Honduras, Islamic Republic of Iran, Malaysia, Mexico, Nepal, Panama, Republic of Korea, Sao Tome and Principe, Saudi Arabia, South Africa, Suriname, Thailand, Timor-Leste and Vanuatu. WHO continues to provide specialized support and technical guidance to these countries as they work towards the target of zero indigenous cases by 2025.

WHO regularly convenes the Global Forum of malaria-eliminating countries for countries to share their progress towards elimination and the challenges experienced in achieving this goal. In addition to country presentations, technical presentations guide countries on WHO recommendations, policies and certification procedures. The inaugural Global Forum was held in Geneva, Switzerland, in March 2017; the second Global Forum was held in San José, Costa Rica, in June 2018; and the third Global Forum was held in Wuxi, China, in June 2019. Due to the coronavirus disease (COVID-19) pandemic, WHO could not convene the E-2025 countries during the period 2020–2022.

It was then decided to organize a fourth Global Forum, almost four years after the previous one, in Cape Town, South Africa. The African Region is the fourth WHO region to host this annual meeting, following the European Region, the Region of the Americas and the Western Pacific Region in 2017, 2018 and 2019, respectively.

2. Methodology

The meeting was conducted over three days under the theme "Accelerate elimination to achieve GTS milestones". The meeting was divided into four main sessions: the opening, review of progress and challenges, acceleration of malaria elimination, and prevention of re-establishment. In addition, there was an awards ceremony to recognize several country achievements (see Annex 1 for the agenda and Annex 2 for the list of participants). The sessions were conducted through PowerPoint presentations by both country representatives and WHO staff, group work, and plenary and panel discussions on issues of interest. WHO staff members and members of the Technical Advisory Group on Malaria Elimination and Certification (TAG-MEC) led the sessions.

A plenary discussion was held after each session to answer any queries and provide a forum for suggestions and remarks. WHO presentations focused on providing technical updates and clarifications and resolving bottlenecks. The meeting also offered an opportunity for experience-sharing by countries that have successfully eliminated malaria and/or implemented accelerating strategies. Simultaneous interpretation services were provided from and into English, French and Spanish.

Country profiles, attached to this report as Annex 3, have been developed following a standard template covering achievements and challenges.

3. Opening session

Dr Sibongiseni Maxwell Dhlomo, South Africa's Deputy Minister of Health, welcomed meeting participants to South Africa, an E-2025 country. Dr Dhlomo expressed satisfaction at the progressively receding map of malaria, not only in South Africa, but also globally. He pointed out the successes made since the beginning of the 20th century, with 111 countries and territories eliminating malaria and many others making significant progress towards elimination. Dr Dhlomo believed that many countries, especially those in the E-2025 initiative, have the potential to eliminate malaria. He highlighted South Africa's commitment to eliminate malaria by 2025 and its readiness to collaborate with other countries and champion the malaria elimination cause in sub-Saharan Africa.

The WHO Representative for South Africa, Dr Owen Kaluwa, was delighted for the WHO African Region to host the Fourth Annual Global Forum of malaria-eliminating countries. He highlighted that this represented a commitment by WHO to support countries in the WHO African Region to move towards malaria elimination and a message to countries in the Region, where there is the highest burden of malaria globally, that malaria elimination can be achieved. Dr Kaluwa encouraged all E-2025 countries to make elimination a realistic objective, regardless of the challenges and how close to or distant from that goal they may now be. He reiterated WHO's commitment to provide technical support and guidance to E-2025 countries as they move towards the goal of elimination. The remarks were followed by participants introducing themselves with their name, country or organization represented, and role.

3.1 Meeting objectives

Dr Elkhan Gasimov, the Head of the Elimination Unit of the Global Malaria Programme, set the main objective of the Fourth Annual Global Forum of malaria-eliminating countries: to convene E-2025 countries and territories to highlight achievements, report on progress, understand and overcome bottlenecks and challenges, share lessons learned, and discuss WHO guidance and strategies. He highlighted that the specific objectives of the meeting were to review progress towards elimination in each E-2025 country and area; provide updates and clarifications on key WHO guidance on malaria elimination strategies and processes; share experiences and lessons learned by countries with respect to the implementation and impact of malaria elimination strategies and activities; share experiences and challenges in the prevention of re-establishment in countries certified as malaria-free by WHO; update participants on newly recommended accelerating strategies; and celebrate country successes.

3.2 Introduction of the TAG-MEC

Dr Gasimov introduced the TAG-MEC as the new advisory body combining the functions of two former advisory groups on malaria elimination: the Malaria Elimination Certification Panel and the Malaria Elimination Oversight Committee. Dr Gasimov highlighted that the main role of the new body was to advise WHO on whether malaria-free certification should be granted to a country upon the request of its government, based on WHO criteria, and whether a country's malaria-free certification should be revoked. He explained that the TAG-MEC also advises WHO on how to resolve bottlenecks for malaria elimination at the country, regional and global levels, and acts as an advisory body on policy recommendations on malaria elimination and prevention of re-establishment of transmission. All members of the TAG-MEC were introduced: Brian Greenwood (Chair), Frank Richards (Vice Chair), Pedro Alonso, Fred Binka, Keith Carter, Anatoly Kondrashin, Reza Majdzadeh, Kamini Mendis, Rossitza Mintcheva, Martha Quinones, Allan Shapira, Leonardo Simao, Laurence Slutsker and Linhua Tang. Detailed information on TAG-MEC members and their affiliations are included in Annex 2.

4. Session 1: Review of progress and challenges

4.1 Malaria elimination in Africa

Dr Ebenezer Sheshi Baba, malaria elimination advisor for the WHO African Region, gave a presentation on the progress and challenges faced by the E-2025 countries in the Region. Dr Baba revealed that from 2010 to 2021, there was an 82.8% reduction in total malaria cases in the six E-2025 countries in the WHO African Region (Botswana, Cabo Verde, Comoros, Eswatini, Sao Tome and Principe, and South Africa). He disclosed that Cabo Verde had reported zero malaria cases for three consecutive years and submitted an official request for WHO certification of malaria elimination in 2023. Meanwhile, Comoros, Eswatini, and Sao Tome and Principe were still reporting significant caseloads, with an increase in 2021 compared to 2020. (Cabo Verde was certified as malaria-free by WHO in January 2024.)

Key obstacles faced by E-2025 countries and territories were identified as COVID-19 pandemic disruptions, humanitarian crises, weak health systems, inadequate budgets, and low coverage and poor quality of core malaria interventions. The emergence of *Anopheles stephensi*, insecticide resistance, *Plasmodium falciparum* histidine-rich protein 2/3 (*pfhrp2/3*) gene deletions, and antimalarial drug resistance were recognized as risk factors for the elimination of malaria in the WHO African Region. Dr Baba announced several interventions by WHO to mitigate these risks and support countries to move towards malaria elimination.

Dr Baba highlighted that the WHO Regional Office for Africa is implementing the *Framework for the integrated control, elimination and eradication of tropical and vector-borne diseases in the African Region 2022–2030 (3)*. This framework calls for the enhanced use of epidemiological modelling and scenario planning and the harnessing of existing institutional capacities within Member States to improve the efficiency, quality and coverage of interventions. Dr Baba identified several opportunities to accelerate malaria elimination, including through the adoption and implementation of supplementary strategies to enhance the enabling environment, monitor emerging threats and tailor interventions to specific contexts.

4.2 Malaria elimination in South Africa

Ms Bridget Shandukani, Deputy Director, National Malaria, Other Vector-Borne and Zoonotic Diseases Directorate, shared the progress South Africa has made towards malaria elimination, highlighting that malaria cases have declined significantly over the past few years. She reported that indigenous cases and malaria deaths continue to be recorded in the country, with high transmission rates witnessed in Mpumalanga and Limpopo provinces. The advisory and advocacy functions of the South African Malaria Elimination Committee were discussed.

Ms Shandukani described some challenges faced by the malaria programme, including the current organizational structure and staffing levels that are not in line with the requirements of the elimination agenda. In addition, she underlined that financial support and capacity-building for malaria are directed mainly at three malaria-endemic provinces instead of the whole country, and that there is inadequate tailoring of interventions and suboptimal quality and coverage of vector control interventions. Ms Shandukani revealed that the malaria programme was taking measures to deal with these challenges, including by leveraging partner support, strengthening programme capacity through personnel training, and strengthening advocacy for more sustainable funding and recruitment of more personnel.

4.3 E-2025 initiative: objectives, goals and progress

Dr Gasimov presented the objectives, goals and progress of the E-2025 initiative. He gave some background information and an overview of the E-2020 and E-2025 initiatives, and outlined the objectives of E-2025: to accelerate the elimination of indigenous malaria transmission in E-2025 countries and territories; to certify countries as malaria-free after three years of zero indigenous transmission; and to support malaria-free countries to prevent re-establishment. He described the progress made towards malaria elimination in the E-2025 countries and territories, revealing that, while the overall number of malaria cases increased in E-2025 countries in 2021 – mainly due to epidemics in Comoros, Sao Tome and Principe, and Panama – most countries made significant strides towards achieving zero indigenous cases. Dr Gasimov reported that in 2021–2022, five countries formally applied for WHO certification of malaria elimination: Belize, Cabo Verde, the Islamic Republic of Iran, Azerbaijan and Tajikistan. (The latter two countries are not part of the E-2025 initiative.) Georgia, another country outside of the E-2025 initiative, started preparations for WHO certification in 2023.

4.4 Challenges, experiences and lessons learned under the E-2020 initiative

Dr Li Xiaohong, Technical Officer in the Global Malaria Programme Elimination Unit, gave an overview of the E-2020 initiative. She explained the roles played by the Malaria Elimination Certification Panel and the Malaria Elimination Oversight Committee in the E-2020 initiative and referred to the establishment of the TAG-MEC. She mentioned the key activities conducted during the E-2020 initiative, including the first three Global Forums, the STOP-Malaria programme, elimination trainings, certification missions and the achievements of the E-2020 initiative.

Dr Li listed the main challenges reported by E-2020 countries: inadequate funding; lack of expertise and manpower, especially at peripheral facilities; suboptimal implementation of vector control interventions; failure to maintain vector control interventions after achieving zero indigenous malaria cases; and failure to follow up patients to ensure complete cure. In addition, Dr Li highlighted that E-2020 countries

faced challenges in ensuring timely case detection, investigation and classification. Inadequate cross-border cooperation and failure to deal with border malaria were also mentioned as significant obstacles. She highlighted that the success of the E-2025 initiative hinges on improving reporting, data analysis and use, ensuring high-level political leadership, using accelerating strategies, and strengthening programme capacity at all levels, in addition to resolving the challenges faced under the E-2020 initiative.

4.5 Group discussions on the challenges, experiences and lessons learned under the E-2025 initiative

Countries were split into four groups, each facilitated by an assigned TAG-MEC member. They discussed challenges, experiences and lessons learned in the journey towards malaria elimination and proposed possible solutions to the challenges encountered. Countries identified several interventions that they classified as best practices, including the use of the 1-3-7 strategy for malaria surveillance, the use of community health workers for malaria surveillance activities, mandatory admission of all malaria cases for observed treatment, the establishment of national and provincial malaria committees, and multisectoral collaboration, coupled with domestic resource mobilization.

Countries identified the major challenges faced: lack of sustainable financing, weak health systems, inadequate human resources, lack of cross-border collaboration, ineffective strategies to deal with migrant and mobile populations and border malaria, weak passive surveillance systems, and inaccurate case classification. Other important issues were raised: incomplete follow-up in mobile populations, inaccurate case classification due to falsified travel histories by undocumented migrants, general reduction in risk perception in communities, and hard-to-reach/access geographical locations. In addition, countries listed other challenges, namely ineffective supply chain management; the inability to obtain small quantities of drugs, such as primaquine; lack of political commitment and multisectoral collaboration; the absence of emergency preparedness and response plans; lack of strategies to prevent the re-establishment of malaria at the subnational level; and inadequate coverage and quality of interventions.

The strengthening of advocacy, multisectoral collaboration and integration of malaria with other vector-borne disease programmes were put forward as possible solutions for inadequate sustainable funding. Countries proposed using regional bodies to facilitate the procurement of small orders and the management of stock for emergency preparedness and response. Countries also highlighted the role of regional bodies in facilitating cross-border collaboration to better manage malaria along migration routes and borders and in strengthening data sharing among countries. Establishment of community-based surveillance systems and the use of community health workers were discussed as critical for strengthening passive case detection, observed treatment and patient follow-up.

Countries emphasized the importance of using stratification to tailor interventions and prioritize limited resources. The use of malaria elimination councils/committees was also discussed as a possible way to strengthen case classification. Strengthening community mobilization, including by involving community leaders of migrant populations, was noted as important for strengthening surveillance activities among migrant populations. It was also proposed that countries run effective stock management systems. Countries also proposed that strategic plans incorporate strategies for the prevention of re-establishment in subnational areas that have eliminated malaria.

5. Session 2: accelerate malaria elimination

5.1 Update on the WHO guidelines for malaria

Dr Peter Olumese, Medical Officer for the Diagnostics, Medicines and Resistance Unit of the Global Malaria Programme, presented WHO malaria technical updates. He gave a background on the new consolidated guidelines *(1)* that replaced the *Guidelines for the treatment of malaria, third edition (4)* and the *Guidelines for malaria vector control (5)*. He highlighted that the new consolidated guidelines will be updated on a continuous basis as new evidence becomes available, using WHO's transparent and rigorous guideline development process.

He explained that strong recommendations can be adopted as policy in most situations, while conditional recommendations can be adopted as policy after relevant stakeholders judge their positive consequences to outweigh their negative ones based on a careful assessment of contextual factors.

The WHO-recommended vector control measures for large-scale deployment were listed by Dr Olumese: pyrethroid-only insecticide-treated nets (ITNs), or pyrethroid-piperonyl butoxide (PBO) nets in areas where the principal malaria vector(s) exhibit pyrethroid resistance, and indoor residual spraying (IRS). He added that, in humanitarian emergencies, there is a strong recommendation for the use of ITNs and a conditional recommendation for the use of IRS. Larviciding and house screening were mentioned as supplementary vector control interventions. Regarding preventive chemotherapies, Dr Olumese stated that there are conditional recommendations for the implementation of perennial malaria chemoprevention (PMC), intermittent preventive treatment of malaria in school-aged children (IPTsc) and post-discharge malaria chemoprevention (PDMC). However, there are strong recommendations for the use of malaria vaccines, seasonal malaria chemoprevention (SMC) and intermittent preventive treatment of malaria in pregnancy (IPTp).

Dr Olumese discussed recommendations on the use of artesunate-pyronaridine for the treatment of uncomplicated malaria and the use of artemether-lumefantrine for the treatment of pregnant women with uncomplicated *P. falciparum* malaria during the first trimester. He also highlighted the approval of an additional option of using a short course of primaquine at a dose of 0.5 mg/kg/day for seven days to prevent *P. vivax* and *P. ovale* relapse in both children and adults.

Dr Gasimov presented on the WHO interventions recommended for the final phase of elimination and prevention of re-establishment. He highlighted that countries or areas that have attained very low to low levels of transmission require additional interventions in order to accelerate the decline in malaria transmission to a level at which intensive surveillance can be initiated, to target specific groups at increased risk of infection that may not be reached adequately through routine prevention and treatment services, and to respond to individual cases and foci to interrupt transmission. He described mass drug administration (MDA), targeted drug administration, malaria testing and treatment of organized or identifiable groups arriving or returning from malaria-endemic areas, reactive drug administration, reactive case detection and treatment, and reactive IRS as additional WHO-recommended interventions to reduce transmission during the final phase of elimination and prevention of re-establishment.

5.2 Sao Tome and Principe's experiences in the use of MDA to accelerate malaria elimination

Dr João Alcântara Veigas D'Abreu, National Malaria Control Programme Coordinator (Ministry of Health, Sao Tome and Principe), shared the country's experiences in implementing MDA using artemisinin-piperaquine and primaquine at 0.25 mg/kg body weight to accelerate towards malaria elimination. He highlighted that the country started with a pilot study in the locality of Bairro da Liberdade, Água Grande district (June–August 2019), during which MDA yielded a 63.44% reduction in malaria cases compared to the same period in 2018.

Dr Alcântara mentioned that before MDA was rolled out, the National Malaria Control Programme had held regular coordination meetings incorporating the Chinese technical team, conducted massive community mobilization, and developed a monitoring and evaluation plan. He indicated that MDA was conducted from May to July 2021 in Aviário, Lobata district, Diogo Nunes, and Bairro da Liberdade, Água Grande district. All inhabitants of the selected localities aged ≥ 6 months who gave consent were included, while those who were allergic to the medicine or to one of its ingredients, pregnant women, infants < 6 months old, and people with severe illnesses that required hospitalization were excluded. He explained that three cycles of MDA were administered over three consecutive months, coupled with ITN distribution, IRS and larval source management. MDA coverage was more than 95%.

Dr Alcântara mentioned that the locality of Bairro da Liberdade recorded a 93.94% reduction compared to the same period in 2018, with no serious adverse reactions. Dr Alcântara described the main constraint as the absence of members of the population during normal working hours, which resulted in MDA teams working beyond their stipulated working hours. He concluded that the use of fast-acting, efficacious and generally well tolerated artemisinin-piperaquine contributed significantly to the success of the MDA in reducing transmission.

5.3 Subnational verification of malaria elimination in Thailand

Dr Rungrawee Tipmontree, Public Health Technical Officer (Ministry of Public Health, Thailand), presented on Thailand's experience with subnational verification of malaria elimination. She mentioned that the Thailand National Malaria Elimination Strategy 2017–2026 targets the elimination of malaria in Thailand by 2024. She added that the strategy promotes operational research, community participation through village health volunteers, and multisectoral and cross-border collaboration, in addition to the implementation of surveillance, diagnosis and treatment, prevention and vector control strategies. She narrated that, as part of new interventions, Thailand has introduced strategies for the prevention of re-establishment in subnational areas that have been verified as malaria-free.

Dr Tipmontree indicated that Thailand started the subnational verification of malaria elimination in 2017 with the objectives of verifying the malaria-free status of provinces that had interrupted local malaria transmission for at least three consecutive years, and preparing for country certification of malaria elimination in 2027. She mentioned that the country had established a national malaria elimination verification committee to advise on technical matters and oversee the implementation of subnational verification, as well as to make final decisions on the malaria-free status of the provinces. Dr Tipmontree explained that the committee is chaired by the Director of the Division of Vector Borne Diseases in Thailand's Ministry of Public Health. Its members include malaria experts in surveillance, diagnosis, entomology and programme management, in addition to representatives from WHO, local administration authorities and the military.

The committee's terms of reference are to conduct desk reviews to verify epidemiological, entomological and laboratory data; conduct facility and field visits; assess the awareness and knowledge of malaria among health care workers; audit laboratory processes and records; review the level of financing; assess multisectoral collaboration; assess programme capacity, management and planning; assess plans for prevention of re-introduction; review the subnational verification reports; and provide recommendations to the Department of Diseases Control. She mentioned that the committee operates using a standard operating procedure that is revised and updated annually. She reported that, as of January 2023, 46 provinces had been verified as malaria-free.

5.4 Acceleration of malaria elimination in Cambodia: WHO perspective on implementation and lessons learned

Dr James Kelley, team lead for malaria and other vector-borne diseases in the WHO Western Pacific Region, shared the experience of accelerating malaria elimination in Cambodia. He described the historical context of Cambodia as the epicentre of *P. falciparum* antimalarial drug resistance with high failure rates of artemisinin-based combination therapies. Monitoring for antimalarial drug resistance in the countries in the Greater Mekong subregion has led to regular updating of antimalarial drugs. Dr Kelley mentioned that eliminating falciparum malaria in this subregion is one strategy that has been identified to stop the spread of drug resistance. He underscored that the WHO Mekong Malaria Elimination (MME) Programme is supporting countries to eliminate all malaria species in the Greater Mekong subregion by 2030.

Dr Kelley introduced Cambodia's intensification plan to reduce the malaria burden and accelerate the country's progress towards malaria elimination, based on the use of epidemiological data to map hotspots, the use of village malaria workers in hotspot areas, the use of mobile malaria workers in high-risk forested areas, the distribution of malaria packs (hammocks, ITNs, boots and backpacks) to forest-goers, and the intensification of active case detection in forests and other hotspots. He mentioned that stratification for the tailoring of interventions was based on receptivity and vulnerability scores, and the recommended interventions employed were ITNs, rigorous case management including weekly house-to-house fever screening, active fever screening, targeted drug administration for adult males aged 15–49, and intermittent preventive treatment for travellers to high-risk areas (forests).

Dr Kelley reported that timely implementation of interventions, strong community leadership, effective supply chain management, comprehensive planning and logistical support for facility and field visits, the use of incentives in rallying communities, tailoring of interventions to epidemiological settings, and the use of multiple teams to conduct observed treatment were essential to the success of Cambodia's intensification plan to accelerate the country's progress towards malaria elimination.

5.5 Building and sustaining capacity to accelerate malaria elimination and prevent re-establishment of transmission

The panel discussion on capacity-building was chaired by Dr Pedro Alonso, TAG-MEC member. Panel members were Dr Kamini Mendis, TAG-MEC member; Dr Josefina Clarinha João, National Director for Diseases Control, Ministry of Public Health, Timor-Leste; Mr Quinton Dlamini, Malaria Programme Manager, Ministry of Health, Eswatini; Mr Gerardo Reyes Cabrera, National Malaria Manager, Ministry of Health, Mexico; Dr Blanca Escribano, Malaria Elimination Focal Point, Regional Office for the Americas; and Dr Fred Binka, TAG-MEC member.

The panel discussion focused on sharing the lessons learned and best practices in building and sustaining capacity to eliminate malaria and prevent re-establishment of transmission; identifying key competencies at different levels of the health system that are needed to eliminate malaria and prevent re-establishment of transmission, and strategies to build and sustain those competencies; and generating ideas on potential solutions to address the capacity-building needs of programmes across the malaria transmission continuum, from high-burden to elimination and prevention of re-establishment.

This discussion was followed by a presentation by Dr Leonard Ortega, Head of the High Burden to High Impact Unit of the Global Malaria Programme. Dr Ortega discussed the progress made in the development of the competency framework for malaria programmes and the strategy to strengthen the human resources capacity of malaria programmes. He discussed the need to strengthen capacity in line with the World Health Assembly resolution WHA68.2 on the GTS 2016–2030, which urged Member States to strengthen their human resources capacity and infrastructure to improve the effectiveness, efficiency and sustainability of malaria responses, while ensuring integration and synergies with the wider health system.

He highlighted that the need for capacity-strengthening has become critical, as most malaria-endemic countries have a chronic shortage of skilled health professionals, outdated clinical practices, inadequate surveillance systems, and weak monitoring and evaluation programmes. He explained that addressing these issues is part of strengthening the enabling environment, which falls under GTS supporting element 2. Dr Ortega mentioned that countries have conducted many training sessions on malaria, despite the very limited financial resources available, the systematic follow-up required, the frequent turnover of key staff and the long duration required for comprehensive malaria training.

Dr Ortega discussed the report findings from the informal consultation on the development of a capacity-building strategy for malaria control and elimination. He highlighted that the recommendations were to develop a competency framework, a capacity-building strategy and a tool for training needs assessment. The competency framework for malaria programmes under development targets ministries of health, specifically national malaria programmes and agencies involved in human resources development for health, academic and training institutes. He explained that this framework is intended to serve as a reference for malaria programmes to develop a strategy for strengthening the human resources capacity of national malaria programmes in the context of universal health coverage and primary health care, and for training needs assessment, development of training curricula, and planning for in-service training courses, among other things.

5.6 Measuring the performance of surveillance systems

Dr Abdisalan Noor, Head of the Strategic Information for Response Unit of the Global Malaria Programme, presented on measuring the performance of surveillance systems. He reported that approximately 65% of cases are not captured by malaria surveillance systems as a result of the many gaps and challenges faced by countries. He introduced the WHO malaria surveillance assessment toolkit *(6)*, which aims to assist countries in identifying and closing gaps in their surveillance systems, while enabling comparison of results between countries and within the same country over time. He listed the four key purposes of surveillance assessments: to measure the performance of surveillance systems; to evaluate contextual and infrastructural aspects of the surveillance system that may influence performance; to describe and evaluate processes and technical aspects of the surveillance system that may influence performance; and to evaluate behavioural aspects of the surveillance system that may influence performance.

Dr Noor highlighted that regular malaria surveillance assessments can be used to inform surveillance-strengthening activities and track progress. He indicated that the key challenges with reporting are the completeness of facility reporting, timeliness of reporting, completeness of core variables, consistency between core variables, internal consistency of core indicators, concordance between reporting systems and case classification. He indicated that select indicators from the toolkit may be assessed routinely every year at minimum cost and with minimum expertise, whereas baseline (comprehensive) assessments can be implemented every 3–5 years at a higher cost and with higher expertise requirements. Dr Noor shared that, to date, an earlier version of the toolkit has been used effectively in Burkina Faso, the Democratic Republic of the Congo and Ghana, and additional pilots are ongoing. Currently, tools are being digitalized on the WHO web platform, with a planned release in September 2022. The toolkit is now available at https://malsurtoolkit.who.int/.

5.7 Verification of the absence of transmission or underreporting of indigenous malaria cases in Ecuador

Dr Blanca Escribano Ferrer, Malaria Elimination Advisor for the WHO Region of the Americas, presented the tools used for the verification of the absence of transmission or underreporting of indigenous malaria cases, using Ecuador as a case study. She highlighted that all Member States in the Region have adopted the tools, and only two of the 10 E-2025 countries and territories are still in the process of conducting this exercise. She added that the process includes a monthly analysis of monitoring indicators to detect deficiencies, guide the selection of sites to investigate, and schedule verification visits at the national and subnational levels.

Dr Escribano Ferrer discussed the key criteria evaluated: whether there are adequate passive surveillance measures in place; access to and geographical coverage of diagnostic tools; the existence of other barriers to access to diagnosis; the presence of a good quality assurance system for diagnostics; the existence of active detection measures to complement passive detection; reactive surveillance in a timely and targeted manner; the notification of all identified cases via the surveillance system; and the correct investigation and classification of cases. In Ecuador, the evaluation team found adequate coverage of diagnosis and treatment services, and trained and competent personnel in active foci. However, the team also found limited access to health care associated with location, culture, insecurity and human mobility; reduced competency in areas with low or no transmission; stockouts of rapid diagnostic tests; and huge population movement from endemic areas of Colombia and Peru.

According to Dr Escribano Ferrer, the teams consider the tools to be beneficial, as they enable identification of existing gaps in malaria surveillance at the local level; make it possible to identify priority needs; encourage thorough data review and analysis; permit collaboration with other community actors and public and private institutions at the local level; and make it possible to carry out a comprehensive analysis of malaria case management and propose recommendations for process improvement.

5.8 Experiences in maintaining surveillance among other health crises: Malaysia

Dr Tam Jenn Zhueng, Senior Principal Assistant Director of the Disease Control Division (Ministry of Health, Malaysia), shared the experiences of Malaysia in maintaining an effective malaria surveillance system in the presence of other health crises. He provided the epidemiological background of malaria in the country, which has seen significant decline in human malaria cases over the past few years but a huge burden of zoonotic malaria (3575 zoonotic malaria cases in 2021). He highlighted that stratification to tailor interventions in Malaysia is based on transmission intensity, malaria foci and malariogenic potential.

Dr Zhueng described the challenges emanating from the COVID-19 pandemic, which included restricted movement of malaria programme personnel to deliver malaria services and limited movement of the general population to access malaria services; interruption of service delivery (IRS and ITN distribution) in the community; reassignment of malaria programme personnel to COVID-19 activities; and reduced malaria budgets due to competing COVID-19 demands. He explained that the malaria programme had developed innovative ways to deal with these challenges, including the harmonization of malaria risk and COVID-19 risk stratification, switching from IRS to ITNs for vector control and modifying ITN distribution from mass distribution to house-to-house distribution.

6. Session 3: Prevention of re-establishment of transmission

6.1 Launch of the technical consultation on prevention of re-establishment of transmission

Dr Li presented the planned technical consultation on prevention of re-establishment. She started by underscoring that prevention of re-establishment of malaria in all countries that are malaria-free is one of the GTS goals. Dr Li noted that the main obstacles to prevention of re-establishment are the constant risk of importation and the inability to maintain important malaria activities after elimination. The main objective of the technical consultation is to review and update the current WHO guidance on prevention of re-establishment to support country efforts to maintain malaria-free status at national and subnational levels. She highlighted that this consultation will be done through virtual and physical meetings over the year.

6.2 Prevention of re-establishment in China

Dr Zhigui Xia, Chief of Malaria Department, National Institute of Parasitic Diseases (Chinese Center for Disease Control and Prevention), presented China's experience with the prevention of re-establishment of malaria. Dr Xia provided the epidemiological and entomological background of malaria in China, indicating that China had gone through different phases, with each phase presenting unique challenges that required coping strategies. He highlighted the importation of *P. falciparum* malaria from African countries and Myanmar as the major challenge post-elimination. According to Dr Xia, stratification to tailor interventions, health promotion, multisectoral collaboration, and surveillance activities targeting mobile populations are critical to the prevention of re-establishment. He also highlighted that China employs regular entomological

surveillance to assess the risk of transmission, determine the types of foci and determine applicable vector control interventions. He reported that IRS and ITNs are still being deployed in foci response, emergencies and high-risk border villages.

Dr Xia mentioned that China still maintains its National Technical Expert Group on Malaria Elimination to advise on policy, strategy and technical guidelines, and the National Expert Group on Severe Malaria Treatment to guide case management and provide technical training, supervision and evaluation on malaria diagnosis and treatment in medical institutions. Dr Xia reported that China has generally managed to sustain the malaria programme, even though there have been some personnel changes, the integration of some activities, inadequate funding and human resources, and decreasing malaria awareness among both health care workers and the general population.

6.3 Prevention of re-establishment in El Salvador

Dr José Eduardo Romero Chévez, Coordinator of the National Malaria Programme (Ministry of Health, El Salvador), presented on the experience of El Salvador in preventing the re-establishment of malaria. He outlined the historical background of the malaria control programme in El Salvador from 1930 to 2010 and the elimination programme from 2011 to 2016. Dr Chévez reported that El Salvador had achieved zero malaria cases in 2017 and immediately implemented strategies for the prevention of re-establishment. The programme for the prevention of re-establishment is based on a strong surveillance system supported by volunteer collaborators, a network of diagnostic and entomology laboratories, and effective leadership.

Dr Chévez underscored that El Salvador has maintained a strong workforce at all levels, comprising department supervisors, sector heads, crew leaders, microscopists, entomologists, health promoters, spray operators and volunteer collaborators. He mentioned that these personnel implement several strategies focusing on maintaining political commitment, health promotion, epidemiological and entomological surveillance, case management and multisectoral collaboration. Dr Chévez mentioned the threat of importation from high-burden neighbouring countries and the lack of interest and investment from donors and partners as the major challenges and obstacles to preventing the re-establishment of malaria in El Salvador.

6.4 Panel discussions on prevention of re-establishment

The panel discussions were led by Kamini Mendis, a TAG-MEC member, and were divided into four sessions. The sessions covered entomological surveillance and integrated vector control, maintaining case surveillance, human and financial resources, and outbreak preparedness and response. The panellists highlighted inadequate personnel, especially at the subnational level, loss of competency, reduction in funding, low index of suspicion, lack of systems for outbreak preparedness and response, and failure to maintain adequate stock at all levels as major challenges to the prevention of re-establishment. The pulling out of donors once elimination has been achieved creates gaps in both human and financial resources.

The panellists highlighted the importance of in-house training to build capacity in key specialties, such as entomology. Regional and multisectoral collaborations were put forward as possible entry points to strengthen human resources capacity. To ensure sustainability of both human and financial resources, the panellists proposed the integration of malaria with other vector-borne diseases such as dengue as a potential

solution. The panellists outlined the use of community health workers for strengthening passive case surveillance. Regular training to maintain the competency of health workers has been found to be key to dealing with a low index of suspicion. All countries should have emergency preparedness and response plans in place, backed by the associated stock. The importance of regional hubs in keeping emergency stock was also highlighted.

6.5 Certification of malaria elimination and subnational verification

Dr Li presented on certification of malaria elimination and subnational verification. She reported that WHO maintains a register of malaria-free countries as per the World Health Assembly Resolution of 1960 (WHA 13.55). She described the criteria for certification as based on the interruption of local malaria transmission, resulting in zero indigenous malaria cases for at least the past three consecutive years (36 months), and a fully functional national programme for the prevention of re-establishment of indigenous transmission. However, she reiterated that the preparation for certification should start years before elimination is achieved.

Dr Li explained that WHO first introduced subnational verification in 2017, primarily for large countries and those with subnational elimination objectives. She added that verification should be (i) a country-led process; (ii) based on documented and standardized criteria and processes; and (iii) conducted by independent national evaluation teams. She underlined that subnational verification is not a prerequisite for national certification but advances the elimination agenda within a country, promotes ownership of malaria elimination in subnational areas, strengthens the programme to prevent re-establishment at the subnational level, and prepares the country for national certification. She concluded by stating that WHO has guiding documents and tools to help countries prepare for certification, including WHO's *A framework for malaria elimination (7)* and *Preparing for certification of malaria elimination (8).*

7. Awards ceremony

Master of ceremony Mr Peter Ndoro welcomed all participants, emphasizing that one of the objectives of the Global Forum of malaria-eliminating countries is for countries to connect, share, learn and celebrate their successes on the way to elimination. Dr Ramphelane Morewane, Chief Director, District Health Systems (National Department of Health, South Africa), gave the opening remarks, highlighting the role of WHO in setting norms, standards and technical guidelines and coordinating multiple actors towards achieving a common goal.

Dr Gasimov highlighted that elimination is a significant achievement in public health that is worth celebrating. With assistance from TAG-MEC members, several countries were awarded in recognition of their achievements. El Salvador and China were recognized for achieving certification of malaria-free status. Belize, Cabo Verde, the Islamic Republic of Iran and Malaysia received awards for achieving zero indigenous cases for at least the past three years (as of the end of 2021). Saudi Arabia and Timor-Leste were recognized for taking the initial steps towards elimination by achieving zero indigenous cases in 2021. Dominican Republic, Mexico, Nepal and Suriname were recognized for achieving at least a 50% reduction in the number of cases in 2021 compared to 2019. South Africa received a special award for its outstanding efforts in domestic resource mobilization.

8. Conclusion

In the pursuit of a malaria-free world, the Fourth Annual Global Forum of malaria-eliminating countries offered a platform for dialogue and strategic collaboration. Through group discussions, countries identified key challenges they are facing in eliminating malaria:

- **Political commitment and awareness:** Across nations, the urgency of malaria elimination struggled to reach local authorities and key stakeholders. Without robust political commitment and heightened awareness, the progress towards eliminating malaria stagnates.
- **Human resources and financial shortages**: The scarcity of both human resources – in terms of both quantity and quality – and financial support hampers malaria elimination efforts. Sufficient manpower and resources are required to eliminate malaria.
- **Health system resilience:** The resilience of health systems to meet the many challenges they are facing, particularly in the last several years, is inadequate. Strengthening the foundations of health care infrastructure is paramount to protecting against the disease.
- **Multisectoral collaboration:** Collaboration across sectors has emerged as a critical need, yet it remains insufficient. To eliminate malaria, a cohesive approach, integrating health care, education and beyond, is imperative.
- **Cross-border collaboration:** The lack of cross-border collaborative activities exacerbates the complexity of malaria elimination. In regions where borders blur and populations move freely, concerted efforts across boundaries are essential.
- **Population movement and risk perception:** The dynamics of population movement, both within and between countries, pose significant challenges to malaria control. The fight against malaria is further complicated by reduced risk perception and delayed health-seeking behaviours.

Considering these challenges, as well as the discussions and information presented, the Global Forum yielded the following important conclusions and actionable insights:

- **Country leadership and political will**: The Global Forum underscored the indispensable role of country leadership and political will in the journey towards malaria elimination. Advocacy efforts led by WHO have a pivotal role to play in rallying support and fostering commitment.
- **Acceleration towards elimination**: Acceleration towards elimination is essential to regain lost ground. Documenting successful acceleration strategies will guide countries towards effective action.
- **Capacity-building**: Strengthening the capacity of both national malaria programmes and WHO staff at regional and country levels is paramount. A robust foundation of expertise and resources is essential for sustained progress.
- **Sustained funding**: The Forum emphasized that sustained funding for elimination programmes is imperative. Without consistent financial support, there is a risk that the momentum towards a malaria-free future will falter.

- **Regional perspective:** Adopting a regional/subregional perspective is essential, particularly in areas where the malaria situation in neighbouring countries has a significant impact on elimination efforts. Collective action across borders is indispensable.

- **Guideline dissemination and implementation:** Efforts to disseminate new WHO guidelines on elimination, coupled with clear implementation guidance, are essential to catalyse action at the national level. Clear communication is key to translating guidelines into effective interventions.

Through collective action, unwavering commitment and strategic innovation, the vision of a malaria-free world draws closer to fruition.

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Annex 1. Agenda

24 January, Opening session **Chair: Ramphelane Morewane, Chief Director, District Health Systems, National Department of Health, South Africa**	
09.15–10.00	• Welcome by the Chair, Dr Ramphelane Morewane, Chief Director, District Health Systems, National Department of Health, South Africa National Department of Health of South Africa • Remarks by Dr Owen Kaluwa, WHO Representative, South Africa • Opening Remarks by the Minister of Health South Africa • Self-introductions of participants
10.30–10.45	**Meeting objectives and review of conflict of interests** Elkhan Gasimov, Unit Head, Elimination Unit, Global Malaria Programme
24 January, Session 1: Review progress and challenges **Chair: Brian Greenwood, Chair of the TAG-MEC**	
10.45–11.45	**Malaria elimination in the WHO African Region** • Malaria elimination in the WHO African Region Ebenezer Sheshi Baba, Medical Officer, Malaria Elimination Advisor, WHO African Region • Malaria elimination in South Africa Bridget Shandukani, Deputy Director, Malaria and Other Vector Borne Diseases Directorate, National Department of Health • Discussion
11.45–12.15	**Presentation** • E-2025 initiative: objectives, goals, progress • Introduction of the Technical Advisory Group on Malaria Elimination and Certification Elkhan Gasimov, Unit Head, Elimination Unit, Global Malaria Programme
13:30–14:10	**Presentation** • Challenges, experiences, and lessons learnt from E-2020 initiative • Q & A Li Xiaohong, Technical Officer, Elimination Unit, Global Malaria Programme
14:10–14:20	**Group work assignments** Li Xiaohong, Technical Officer, Elimination Unit, Global Malaria Programme
14:30–17:30	**Agenda of breakout session (four groups): chaired by TAG-MEC members** • Select rapporteur and a presenter from country representatives • Presentation by each country representatives • Clarifications and discussions • Summary of the major challenges of the group and propose solutions by the Group

19.30–22.00	**Award ceremony**
	• Welcome by the Master of Ceremonies
	• Remarks by Elkhan Gasimov, Unit Head, Elimination Unit, Global Malaria Programme
	• Recognition of certification of malaria elimination: El Salvador and China
	• Recognition of countries achieving important milestones
	  • Achieving zero indigenous cases for at least the past 12 months
	  • Countries achieving significant reductions in number of cases from 2019
	• Ceremony closure

25 January, Session 2: Accelerate malaria elimination Chair: Frank Richards, vice chair of the TAG-MEC (morning) Pedro Alonso, TAG-MEC member (afternoon)	
08.30–09.30	Report back from group discussions Q & A
09.30–10.30	**Technical updates from WHO** • Update on WHO guidelines for malaria • Q & A Peter Olumese, Medical Office, Diagnostics, Medicines & Resistance Unit, Global Malaria Programme Elkhan Gasimov, Unit Head, Elimination Unit, Global Malaria Programme
10:45–11:30	**Presentation** • Experiences in the use of MDA to accelerate malaria elimination João Alcântara Veigas D'Abreu, National Malaria Control Programme Coordinator, Ministry of Health, Sao Tome and Principe
11:30–12:00	**Presentation** • Subnational verification of malaria elimination Rungrawee Tipmontree, Public Health Technical Officer, Ministry of Public Health, Thailand
12:00–12:30	**Presentation** • Acceleration of malaria elimination: experiences from Cambodia James Kelly, Team Lead, Malaria and other vector borne diseases, WHO Western Pacific Region
13:30–15:30	**Panel discussion** • Building and sustaining capacity to accelerate malaria elimination and prevent re-establishment of transmission **Presentation** • Draft capacity building strategy Leonard Ortega, Unit head, High burden to high impact, WHO Global Malaria Programme
16:00–16:30	**Technical update from WHO** • Monitoring of surveillance systems Abdisalan Noor, Unit Head, Information for Response Unit, Global Malaria Programme

16.30–17.15	**Presentation** • Verification of the absence or under-reporting of indigenous malaria transmission Blanca Escribano Ferrer, Advisor, Malaria Elimination, Pan American Health Organization Julio Rafael Rivera Bonilla, National Malaria Strategy Officer, Ministry of Public Health, Ecuador
17:15–17:45	**Presentation** • Experiences in maintaining surveillance among other health crisis in Malaysia Jen Zhueng Tam, Senior Principal Assistant Director, Ministry of Health, Malaysia
26 January, Session 3: Prevention of re-establishment Chair: Kamini Mendis, TAG-MEC member	
08.30–08.45	**Launch the technical consultation on prevention of re-establishment** • Background and objectives Li Xiaohong, Technical Officer, Elimination Unit, Global Malaria Programme
08.45–10.00	**Presentations** • Prevention of re-establishment of transmission – China Zhigui Xia, Chief of Malaria Department, National Institute of Parasitic Diseases, China CDC • Prevention of re-establishment of transmission – El Salvador José Eduardo Romero Chévez, coordinator of the National Malaria Programme, Ministry of Health, El Salvador
10.30–12.05	**Panel discussions** • Panel 1: Entomological surveillance and integrated vector control Malaysia and Cabo Verde • Panel 2: Maintain case surveillance Paraguay and El Salvador • Panel 3: Human and financial resources Timor-Leste and Vanuatu • Panel 4: Outbreak preparedness and response Saudi Arabia and Islamic Republic of Iran • Questions from audience and wrap up
12:00–12:45	**Technical updates from WHO** • Certification of malaria elimination and subnational verification • Q & A Li Xiaohong, Technical Officer, Elimination Unit, Global Malaria Programme
Meeting closure	
12:45–13.00	• Elkhan Gasimov • Representative from WHO AFRO
26 January, Closed session Only TAG-MEC members and WHO staff	
15:00–17:00	Discussions on accelerating the progress towards malaria elimination in E-2025 countries and improvements on WHO guidance related to malaria elimination and prevention of re-establishment

Annex 2. List of participants

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Annex 3. Country profiles

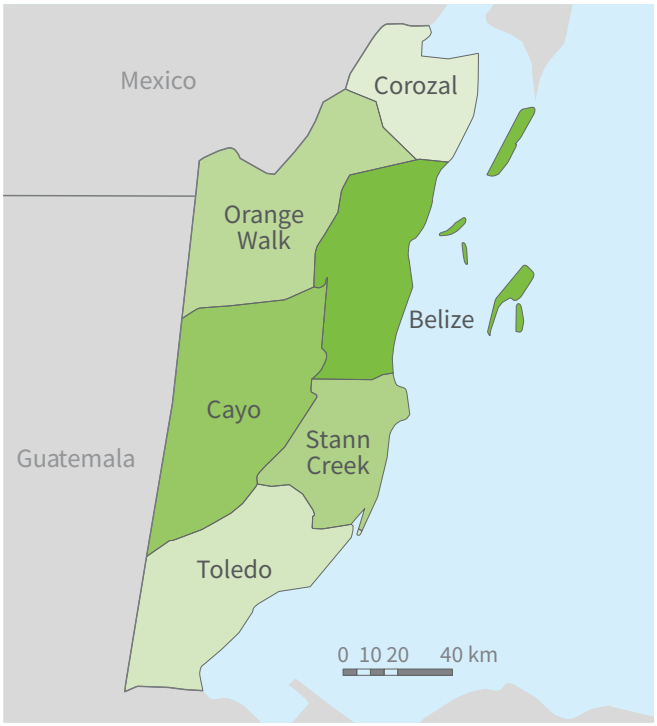
The statistics presented in the country profiles may not represent WHO official statistics.

Belize

Belize is a country on the north-eastern coast of Central America. It is bordered by Mexico to the north, the Caribbean Sea to the east, and Guatemala to the west and south. It also shares a water boundary with Honduras to the south-east. Its mainland is about 290 km long and 110 km wide for a total area of 22 970 km^2.

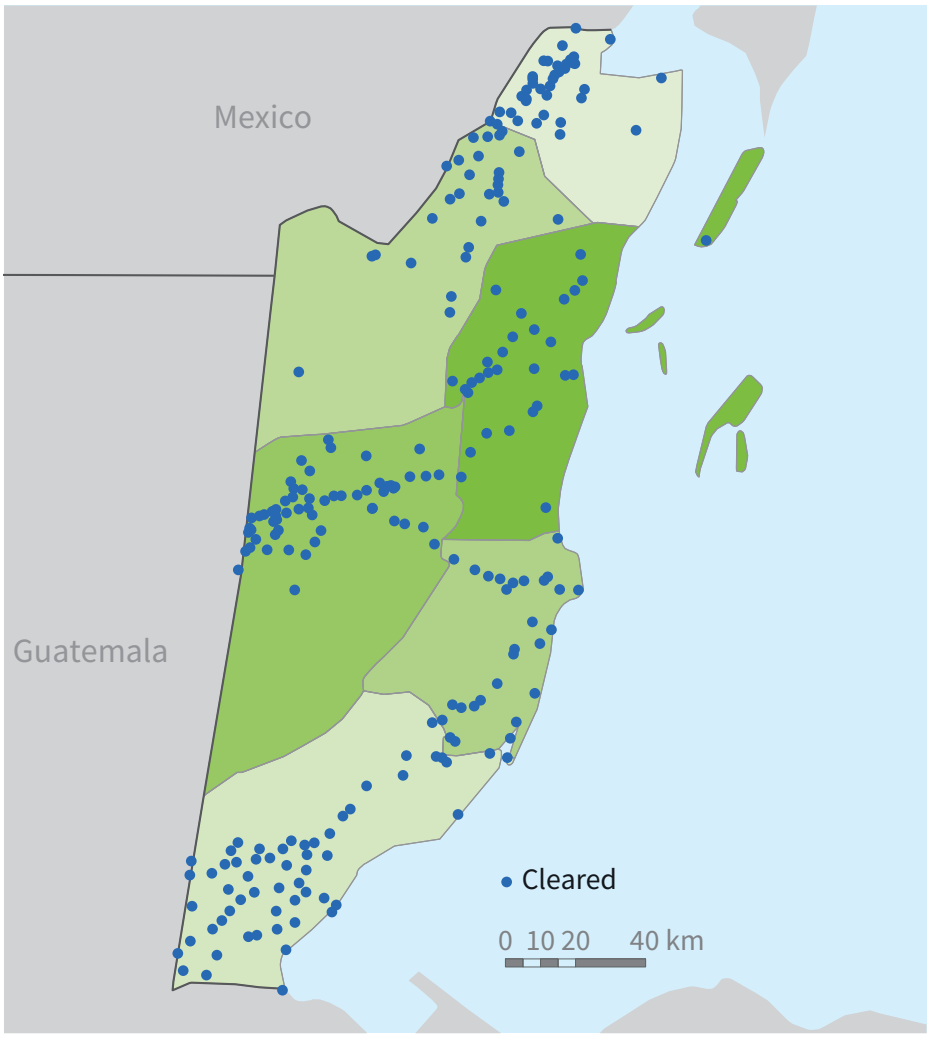
- Belize has an estimated population of 441 000; it is the least populated and least densely populated country in Central America.
- The malaria transmission seasons run from February to April and from August to October.
- The national malaria elimination goal was achieved in 2019.
- The last indigenous malaria case was reported in December 2018. The country requested WHO certification of malaria-free status in April 2022 and the country was certified malaria-free by WHO in June 2023.

Figure 1. Map of Belize showing primary administrative divisions and bordering countries



Malaria cases and foci

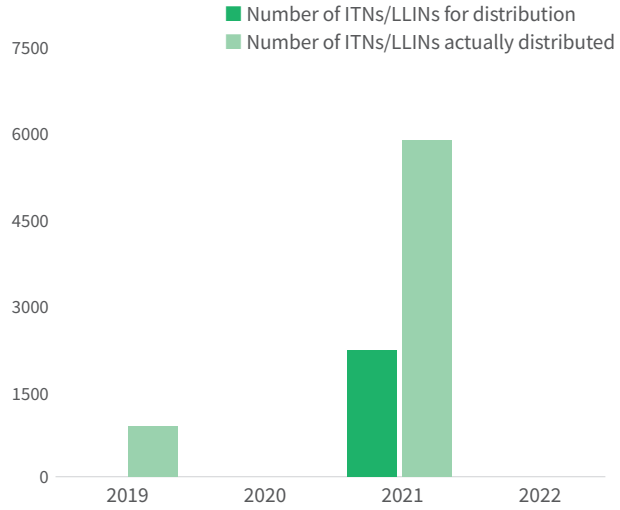
Figure 2. Map of current malaria transmission foci



Implementation

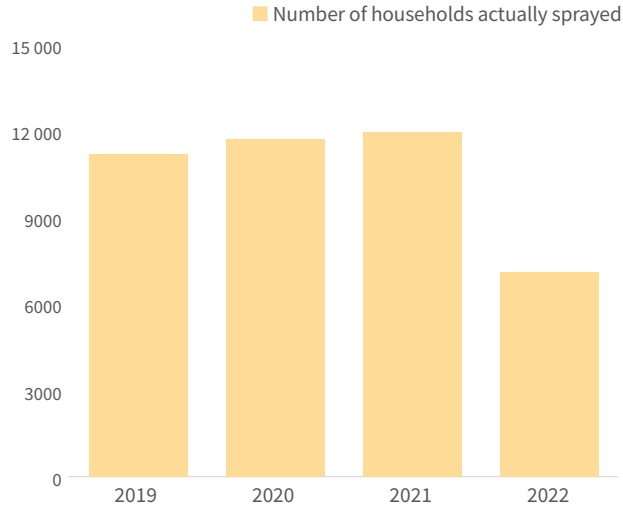
Vector control

Figure 3. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - monthly cross-checking of slides, or more frequently if needed
  - external performance assessment: the national level receives a panel of 20 slides from Honduras once a year for quality performance assessment
  - on-site supportive supervision of microscopists at district level
  - two rounds of panel slides read in 2022
  - one-week refresher training for all microscopists (August 2022).
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

Due to some economic activities (mainly agriculture and tourism) and its porous borders, Belize is a vulnerable country. It receives seasonal migrants who come to work in the banana farms in the south, the citrus farms in the west and, to a lesser extent, the sugarcane farms in the north. The migrant workers come from the neighbouring endemic countries of Central America, mainly Guatemala, Honduras and Nicaragua.

In the Cayo District, the Santander Sugar Group imports a considerable number of workers from Central America, with the majority coming from Guatemala during the first quarter each year. In workplaces such as Santander and at various banana farms in the south, the approach has been to place RDT kits on-site and to train volunteers to screen workers. Vector control personnel also visit these farms on a regular basis to screen migrant workers with fever or any atypical signs and symptoms for malaria. Plans are under way to work with immigration officials to screen workers from specific countries upon entry or as a requirement for a work permit, and to distribute health information leaflets on malaria to these workers and visitors alike.

In the northern districts, illegal border crossings into Mexico contributed to transmission on both sides of the border in previous years. However, with the successful reduction of cases in the neighbouring Mexican state of Quintana Roo and in the Belizean communities along the Belize–Mexico border, the risk is relatively minimal. In the western district of Cayo and southern district of Toledo, both of which border Guatemala and are usually the main entry points for migrants, malaria control is more challenging because of illegal crossings.

Furthermore, tourists from other endemic countries in Africa and South America visit Belize on a regular basis. The most vulnerable communities in Belize are those along the "banana belt" in the south, due to the high influx of migrant workers coming from endemic countries, and the islands, due to tourists who regularly visit the country. In 2021, the country expanded its diagnostic services for malaria through the deployment of malaria RDTs in the entire country. Currently, there are over 150 diagnostic posts nationwide.

Agricultural industries and seasonality in Belize

Industry	Season start	Season end
Sugar	For harvesting in November	End of harvesting in May
Banana	All year round. After harvesting, planting season continues	Workers may go home in December
Citrus	October	July
Rice	Harvesting cycle in August and February	Planting season in June indicates close of the season

Strategies to prevent re-establishment of malaria transmission

- Enhance the capability of the surveillance system to detect, immediately report, and respond to 100% of malaria cases and malaria foci with a targeted set of interventions.
- Ensure diagnosis of all malaria cases within 48 hours from onset of symptoms according to national guidelines.
- Ensure quality management of malaria cases according to national guidelines.
- Implement appropriate vector control interventions in priority locations, ensuring more than 80% coverage with IRS in semi-annual spraying cycles or a combination of IRS and LLIN distribution, timed according to transmission seasons.
- Provide efficacious prophylactic treatment to Belizean travelers to malaria endemic countries.
- Participate in the Regional Malaria Elimination Initiative (RMEI), a results-based aid program seeking to accelerate progress toward malaria elimination in Mesoamerica and the Dominican Republic.
- Reinforce public health education campaigns to sensitize persons at risk and special target groups on malaria importation/re-introduction, symptoms and access to diagnosis and treatment.
- Strengthen cross-border collaboration and coordination to ensure a holistic approach to the prevention of malaria re-establishment.

Bhutan

Bhutan is a landlocked and mountainous country in the WHO South-East Asia Region. It is situated in the eastern Himalayas between China to the north and India to the south. The country has a territory of 38 394 km^2.

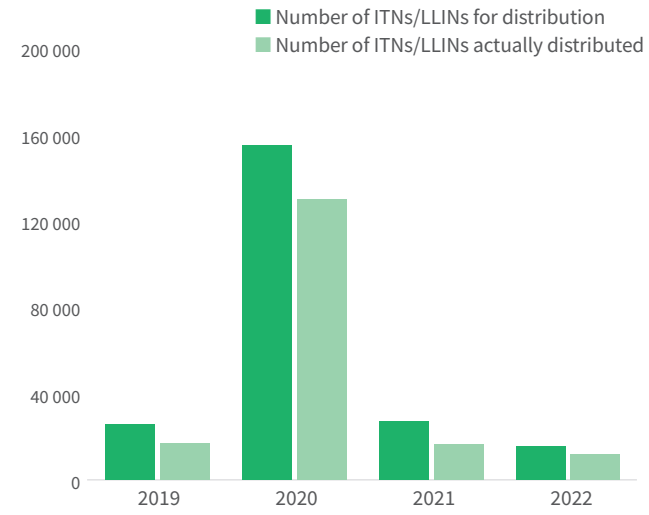
- Bhutan has a population of about 772 000.
- The malaria transmission seasons run from April to May and from August to September.
- The national elimination goal was set for 2022, as per the national strategic plan.
- In 2022, the country reported zero indigenous cases.

Figure 1. Map of Bhutan showing primary administrative divisions and bordering countries

Implementation

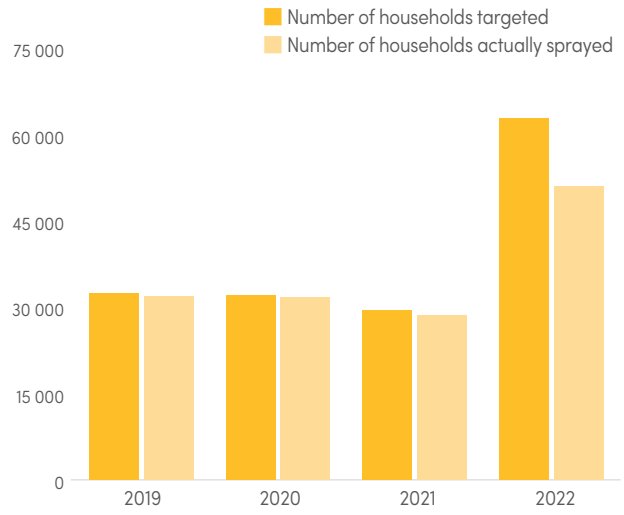
Vector control

Figure 2. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 3. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis, supported by a QA programme.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
    - re-checking of all positive slides and blinded rechecking of 10% of negative slides at the reference laboratory on a monthly basis;
    - on-site supportive supervision, including comprehensive assessment of the laboratory's organization, equipment, adequacy and storage of supplies, reagent quality, availability and use of standard operating procedures;
    - panel testing: malaria slides with undisclosed results sent to participating laboratories for identification; inter-laboratory comparison of participating laboratories and feedback report provided; panel testing conducted biannually;
    - in 2022, the national malaria reference laboratory conducted numerous training sessions relating to malaria diagnosis in order to improve competency in malaria microscopy of district laboratory staff, including both laboratory technicians and malaria technicians.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

At the national level, Bhutan is stratified into three categories: low risk, potential risk and no risk. Seven out of the 20 districts in the country fall into the low-risk category of areas that are climatically and ecologically favourable for the transmission of malaria throughout the seasons, while nine other districts are at potential risk of malaria. The remaining four districts in the country are categorized as having no malaria risk. Accordingly, the interventions are tailored as shown in the table.

Tailoring of interventions based on risk categorization of districts in Bhutan

Interventions	Low risk	Potential risk	No risk
Mass LLIN campaign and continuous distribution	Yes	No	No
IRS	Yes	No	No
Vector surveillance	Yes (case-based & sentinel sites)	Yes (cased-based/ mega projects)	No
Insecticide resistance monitoring	Yes (sentinel sites)	No	No
Case investigation and response	Yes	Yes	No
Passive surveillance	Yes	Yes	Yes
Active surveillance	Yes	Yes	No
Information, education and communication/behaviour change communication	Yes (more frequent & intense)	Yes	Yes
Community activity group activities	Yes	No	No
Malaria case reporting (web-based reporting system)	Yes	Yes	Yes
Antimalarial drugs and test kit supplies	Yes	Yes	Yes

Strategies to accelerate malaria elimination

To achieve the malaria elimination goal, Bhutan has adopted two main surveillance approaches for early diagnosis and prompt treatment to interrupt/reduce the risk of further transmission. These are:

- Passive surveillance: This involves case detection at the health facility. All visiting patients who reside in malaria low-risk areas, have a travel history to malaria risk areas or are coming from malaria risk areas/countries should be screened for malaria.
- Active surveillance: This comprises proactive case detection and reactive case detection. Proactive case detection is conducted in high-risk and hard-to-reach areas, and also among higher risk populations, such as migrant workers and mobile populations. Reactive case detection is conducted upon detection of a positive case in the focus within a 500 m to 1 km radius of the index case. For positive cases, Bhutan follows the 1-3-7 strategy whereby a positive case is notified within 24 hours/one day of detection; within three days, the case should be fully investigated and classified, and focus investigations and response should be completed within seven days.

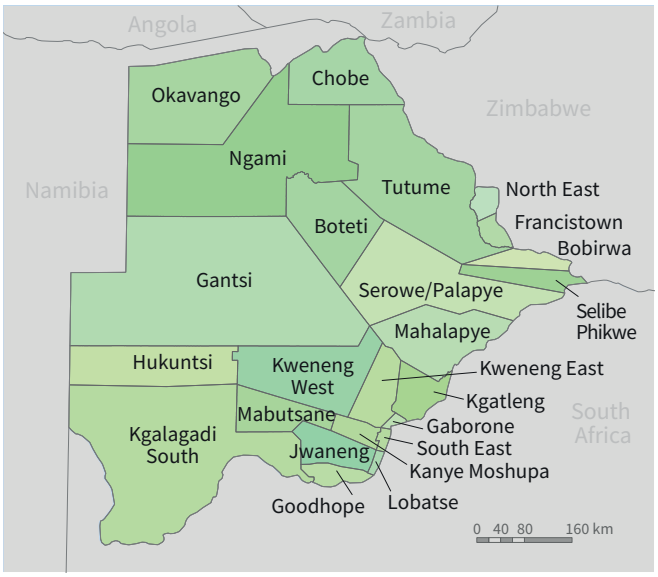
  By policy, malaria is a notifiable disease and a single malaria case is considered to be an outbreak leading to a series of activities. The positive case should be admitted to the hospital/diagnosing health centre for three days to provide directly observed treatment (DOT). When the patient is discharged, a DOT provider is identified to ensure complete treatment of the patient for *P. vivax*. All positive cases are followed up on days 3 and 28 for *P. falciparum* cases and on days 3, 14 and 28, at three months and up to one year for *P. vivax* cases.
- In 2022, although no new strategies were introduced, Bhutan stepped up its malaria surveillance, especially in the Sarpang District, which is the only district with indigenous malaria cases. More importantly, Bhutan and India embarked on cross-border collaboration and coordination to address cross-border malaria transmission, which is and has been the main impediment to Bhutan's pursuit of malaria elimination. A few rounds of bilateral meetings between the two counterparts were organized by the South-East Asia Regional Coordination Mechanism Forum. In addition, informal field-level meetings were conducted among the field workers and programme managers to strengthen the collaboration between the two countries.

Botswana

Botswana is a landlocked country in southern Africa. It is topographically flat, with approximately 70% of its territory in the Kalahari Desert. It is bordered by South Africa to the south and south-east, Namibia to the west and north, and Zimbabwe to the north-east. It is connected to Zambia by the Kazungula Bridge at the world's shortest border between two countries.

- Botswana has an estimated population of over 2.3 million and is one of the most sparsely populated countries in the world.
- There are two malaria transmission seasons in the country.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported 397 indigenous (*P. falciparum*) malaria cases and seven malaria deaths.

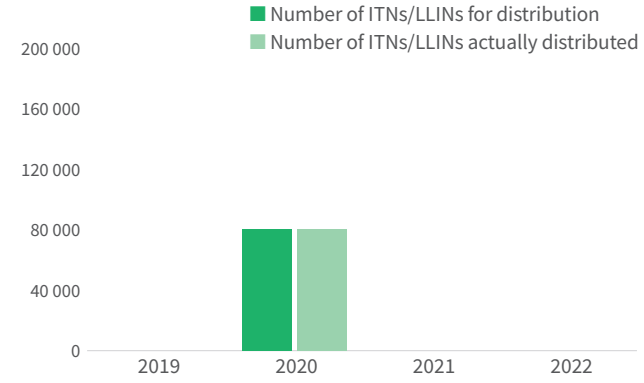
Figure 1. Map of Botswana showing primary administrative divisions and bordering countries



Implementation

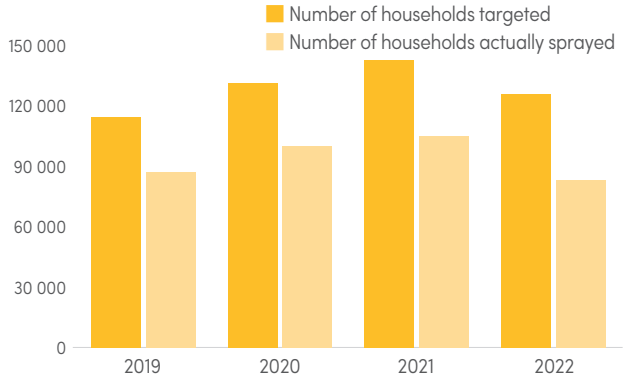
Vector control

Figure 2. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 3. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - cross-checking of slides
  - on-site supportive supervision
  - panel slide reading
  - training and refresher training.
- Stockouts of rapid diagnostic tests were experienced in 2022.
- Stockouts of antimalarials were experienced in 2022.

Strategies to accelerate malaria elimination

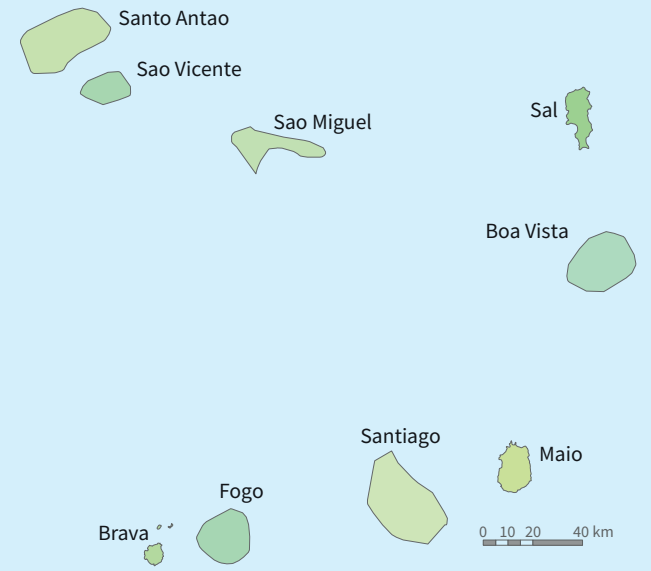
- Technical working groups have been established in the areas of surveillance, monitoring and evaluation, case management, vector control, and social and behaviour change communication.
- Subnational supportive visits have been strengthened.
- More training has been conducted.
- Indoor residual spraying has been introduced in other districts, such as Kweneng.

Cabo Verde

Cabo Verde is an archipelago and island country in the central Atlantic Ocean. It consists of 10 volcanic islands with a combined land area of about 4033 km^2. These islands lie between 600 km and 850 km west of Cap-Vert, Senegal, the westernmost point of continental Africa.

- Cabo Verde has a population of over 491 000.
- The national elimination goal was set for 2022, as per the national strategic plan.
- The last indigenous malaria case was reported in the country in 2018.
- In January 2024, Cabo Verde was certified malaria-free by WHO.

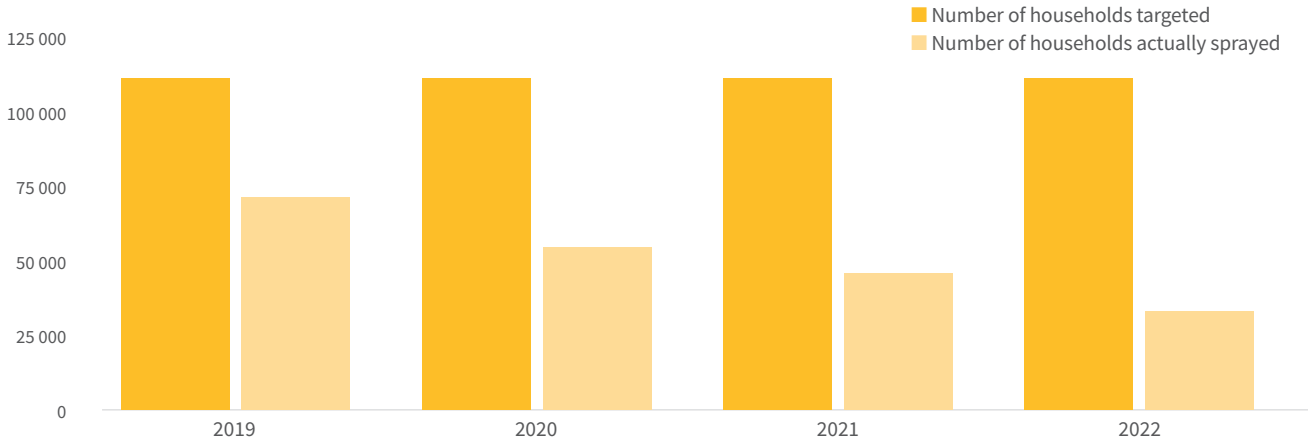
Figure 1. Map of Cabo Verde showing primary administrative divisions and bordering countries



Implementation

Vector control

Figure 2. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - slide reading from November 2022 to January 2023
  - external competency assessment of malaria microscopists
  - official start-up of the national malaria quality control reference laboratory on 26 December 2022
  - weekly cross-checking of slides
  - on-site supportive supervision in Fogo and the Santiago Norte Health District
  - training of 56 public and private laboratory technicians.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

Four risk strata have been defined based on entomological data, imported cases of malaria and the tourism potential (and therefore risk of importation) of islands such as Sal, São Vicente, Fogo and Boa Vista:

- Stratum I – very high risk (Santiago and Boa Vista)
- Stratum II – high risk (São Vicente, Sal and Fogo);
- Stratum III – low risk (São Nicolau)
- Stratum IV – very low risk (Brava, Maio and Santo Antão).

Potential risk of reintroduction of malaria in Cabo Verde islands

Island	Receptivity (Alves)	Receptivity (INSP)	Vulnerability	Potential risk of reintroduction	Stratum
Santiago	+	+	+++	Very high	I
Boa Vista	+	+	++	Very high	I
São Vicente	-	+	++	High	II
Sal	+	-	++	High	II
Fogo	+	-	+	High	II
São Nicolau	+	-	+/-	Low	III
Brava	+	-	-	Very low	IV
Maio	+	+	-	Very low	IV
Santa Antão	-	-	+/-	Very low	IV

The entire Cabo Verdean population is exposed to malaria. In addition to low population immunity, the dynamics of internal mobility in Cabo Verde and the movement of people from other endemic countries, among other factors, mean that the entire population is considered at risk of malaria transmission.

Strategies to prevent re-establishment of malaria transmission

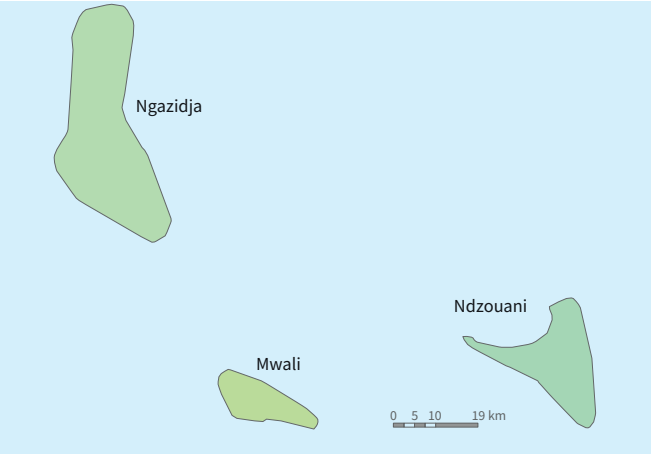
- Maintain and strengthen an efficient epidemiological surveillance system to ensure early detection and response to all malaria cases adjusted to the different epidemiological strata.
- Maintain and strengthen an efficient entomological surveillance system in accordance with international standards and adjusted to the different epidemiological strata and strengthen the quality of vector control interventions.
- Maintain quality diagnostic testing and ensure prompt and high-quality case management throughout the health services network.
- Strengthen multisectoral collaboration to support and synergize the efforts to prevent re-establishment of malaria transmission.

Comoros

The Comoros is made up of three islands in south-east Africa, located at the northern end of the Mozambique Channel in the Indian Ocean. Its capital and largest city is Moroni. At 1861 km^2, the Comoros is the fourth smallest African country by area.

- The Comoros has an estimated population of over 837 000.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- There are two malaria transmission seasons in the country.
- In 2022, the country reported 20 675 indigenous (*P. falciparum*) malaria cases (at the time of profile development).

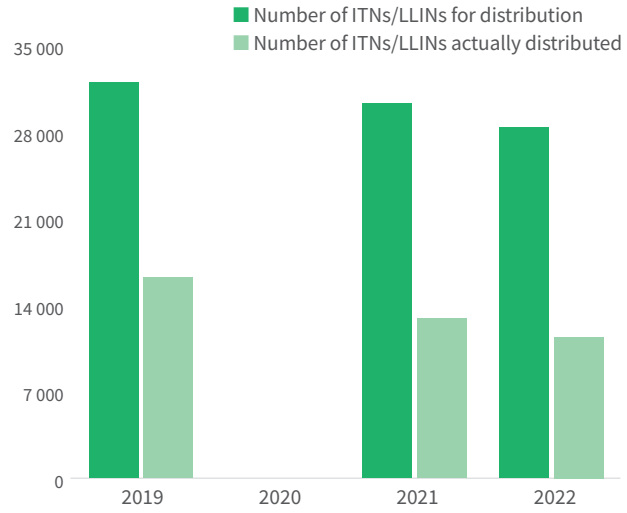
Figure 1. Map of Comoros showing primary administrative divisions and bordering countries



Implementation

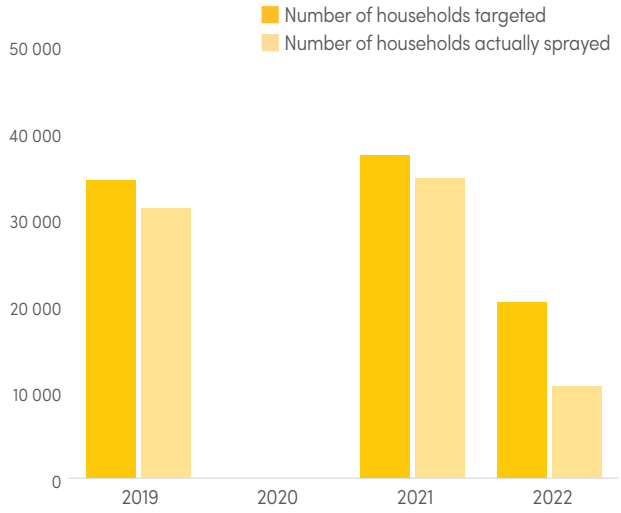
Vector control

Figure 2. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 3. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - monthly cross-checking of slides
  - biannual on-site supportive supervision of microscopists and laboratory technicians in selected health facilities
  - request by the national malaria control programme to resume external quality control

with a reference laboratory in the region (for example, a reference laboratory in South Africa).

- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.
- The country conducts active and proactive case finding and provides free treatment of all positive cases registered within 24 hours.

Strategies to accelerate malaria elimination

The following strategies were implemented in 2022 in areas with malaria cases on the island of Grande Comore:

- active and proactive case finding
- targeted IRS
- targeted TDM
- daily analysis of cases for rapid decision-making
- awareness-raising of the population on malaria prevention measures.

Costa Rica

Costa Rica is a country in Central America, bordered by Nicaragua to the north, the Caribbean Sea to the north-east, Panama to the south-east and the Pacific Ocean to the south-west. It shares a maritime border with Ecuador to the south of Cocos Island. Costa Rica has a land area of 51 060 km^2.

- Costa Rica has a population of around 5.2 million, with an estimated 350 000 people living in the capital and largest city, San José, and around 2 million people living in the surrounding metropolitan area.
- Malaria transmission is year-round.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported 406 indigenous malaria cases, of which more than 90% were *P. falciparum* cases.

Figure 1. Map of Costa Rica showing primary administrative divisions and bordering countries

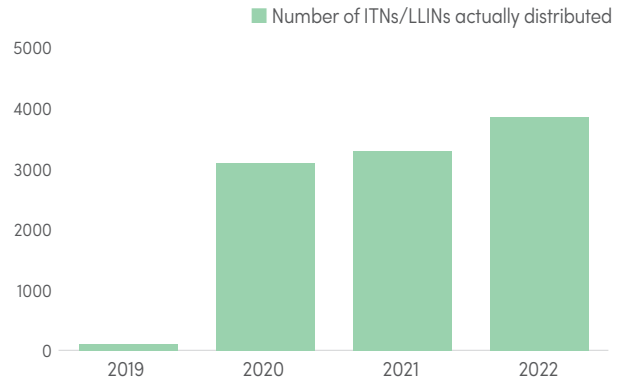
Malaria cases and foci

Figure 2. Map of current malaria transmission foci

Implementation

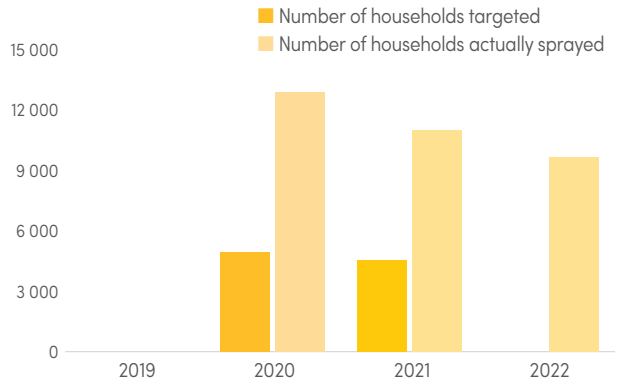
Vector control

Figure 3. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - cross-checking of slides: 10% of negative slides sent monthly and 100% of positive films sent immediately (within one week at the latest)
  - panel slide reading: one round per year (one panel made up of 10 slides)
  - external performance assessment: the national level receives a panel of 20 slides from Honduras once a year for quality performance assessment
  - 65 face-to-face training sessions conducted at the National Reference Centre for Parasitology, Costa Rican Institute of Research and Teaching in Nutrition and Health (INCIENSA); in addition, 258 participants completed the virtual course on malaria diagnosis.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

In Costa Rica, the populations most at risk are those living in areas at altitudes lower than 600 m above sea level. Those living at these altitudes in the transboundary mountain ranges, mainly in the northern part of the country bordering Nicaragua, are even more exposed.

This heightened exposure is because of an irregular migratory flow towards the interior of the country, with people from Nicaragua coming to work in the agricultural and commercial exploitation of the area (mainly the cultivation and harvesting of pineapples and oranges). The seasonality with which workers enter the country has been identified, based on which the Costa Rican Ministry of Health has coordinated with the agricultural farms to schedule proactive searches.

- Strategies have been developed to strengthen surveillance. Thanks to support provided by the Inter-American Development Bank and PAHO, human resources have been strengthened in the active focus that represents 90% of the total number of cases in the country (Los Chiles focus), and inputs have been provided to facilitate the implementation of surveillance, such as vehicles, personal protective equipment, vector control equipment, and additional human resources for the visualization and reporting of thick droplets.
- Virtual courses are offered by the National Reference Centre for Parasitology to strengthen the capacity of personnel involved in the provision of health services, and a virtual course on entomological surveillance and vector control is under development.
- In addition, the country's legislation has been modified to validate the position of voluntary collaborator (COLVOL). Accordingly, the country is working actively on the formation of the COLVOL

network, and, in line with the changes to the legislation, civil service inspectors have been empowered to conduct RDTs, take thick droplet samples and administer drugs.

- The national malaria surveillance protocol has been updated. This protocol is a cross-cutting document that comprehensively covers all actors involved in the implementation of the Diagnosis, Treatment, Investigation and Response (DTI-R) strategy that the country has implemented to achieve the elimination target. Training was provided for focus management teams throughout 2022, with training scheduled for 2023.
- Costa Rica has implemented optimized processes for carrying out the DTI-R strategy and has defined facilitator teams to provide training to all health centres in their area.
- In addition, thanks to the partnership with the Council of Central American Ministers of Health, the country is in the process of developing an information system that will enable interoperability between data on the provision of health services and the epidemiological data managed by the Costa Rican Ministry of Health.
- The vector control component has provided the country with five fully equipped entomological units, which are strategically located in sites where there is a high probability of acquiring vector-borne diseases. These units are responsible for the evaluation and constant monitoring of insecticide resistance of the products used in the country, the characterization of existing malaria foci and the entomological characterization of other vector-borne diseases.

Strategies to accelerate malaria elimination

- Two legislative changes have been formulated to overcome existing policy barriers in the access to timely malaria diagnosis:
  - Presidential Directive No. 066-S published on 20 December 2019, available at https://www.imprentanacional.go.cr/pub/2019/12/20/COMP_20_12_2019.html, empowers the Ministry of Health and the Costa Rican Social Security Fund to use the RDTs for malaria, recommended by WHO, and thick droplets for malaria microscopy diagnosis, prioritizing their use in Strata 3 and 4, according to the national risk stratification.
  - Executive Decree No. 43722-S published on 1 November 2022, available at https://www.imprentanacional.go.cr/pub/2022/11/01/COMP_01_11_2022.html, validates the position of volunteer collaborator to participate in the actions to contain malaria outbreaks in places where the installed capacity does not meet the demand in order to facilitate the timely detection and treatment of the disease, as well as the position of health inspector for the administration of treatment.
- Within the framework of the pro-tempore presidency of the Central American Integration System, the foreign ministries of Costa Rica and Nicaragua signed the "Binational Agreement for the Implementation of Joint Cross-Border Interventions for the Elimination of Malaria between the SICA Member States, the Republic of Costa Rica and the Republic of Nicaragua" in April 2021. Under the agreement, both nations commit to working together on the following four components: effective actions on both sides of the border; complementarity in the care of cases at border points; availability of antimalarials and RDTs; and exchange of information. In addition, after the agreement, technical meetings have been held to develop micro-plans for the cross-border focal points, called "fruit" and "mining", and a road map for the implementation of the planned activities.
- The national malaria regulations have been updated, including the national surveillance protocol and the national strategy for the elimination of malaria and prevention of the re-establishment of the disease, along with new instruments that enable primary data collection and the definition of information flows to ensure the traceability of information. In addition, the national database has been standardized and training has been provided to the different levels of management on the proper use of data and follow-up to ensure data quality.
- The risk stratification and inventory of outbreaks are updated annually, enabling strict monitoring and micro-planning.
- The optimized DTI-R processes and procedures have been implemented in the health services and health steering areas in the regions with active malaria foci, and focus management teams have been defined.
- The country participates in the Regional Malaria Elimination Initiative (RMEI), a results-based aid program seeking to accelerate progress toward malaria elimination in Mesoamerica and the Dominican Republic.

Dominican Republic

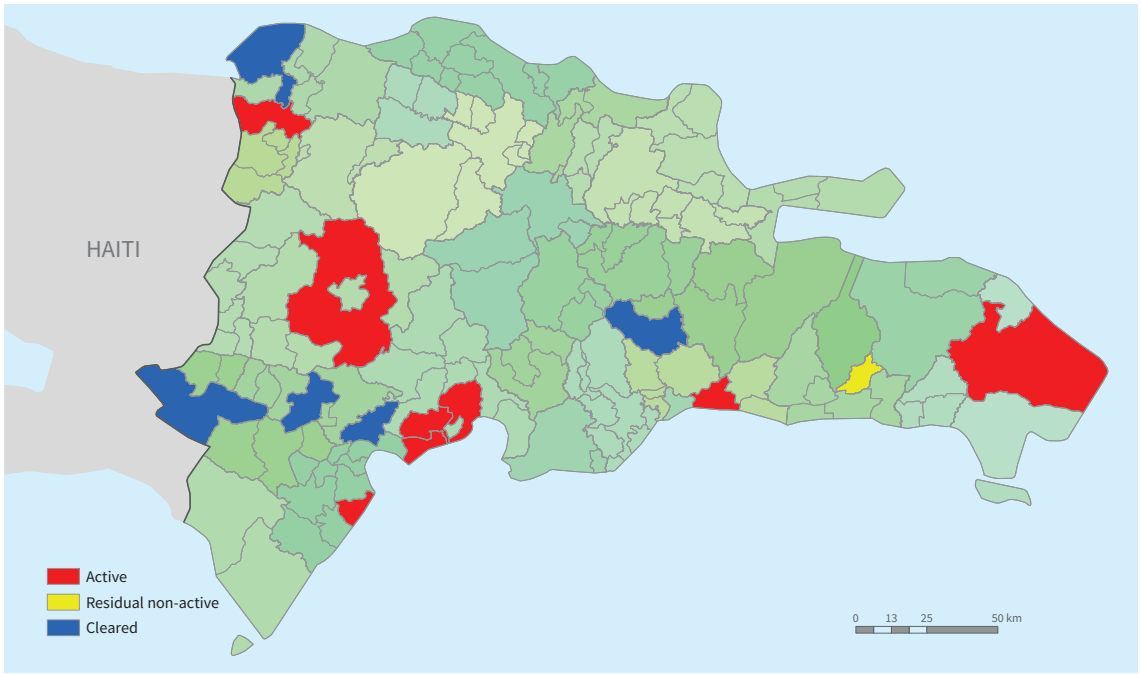
The Dominican Republic is a country located on the island of Hispaniola in the Greater Antilles archipelago of the Caribbean region. It occupies the eastern five eighths of the island, which it shares with Haiti. The Dominican Republic is the second largest nation in the Antilles by area (after Cuba) at 48 671 km^2, and the third largest by population.

- The Dominican Republic has an estimated population of about 10.7 million.
- The national malaria elimination goal was set for 2025.
- In 2022, the country reported 320 indigenous (*P. falciparum*) malaria cases.

Figure 1. Map of the Dominican Republic showing primary administrative divisions and bordering countries

Malaria cases and foci

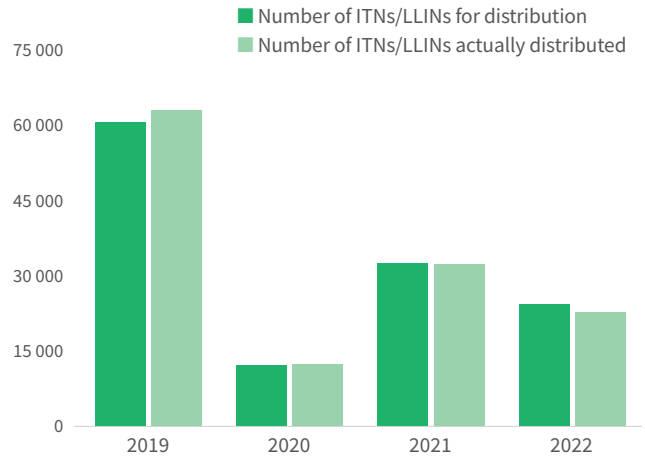
Figure 2. Map of current malaria transmission foci



Implementation

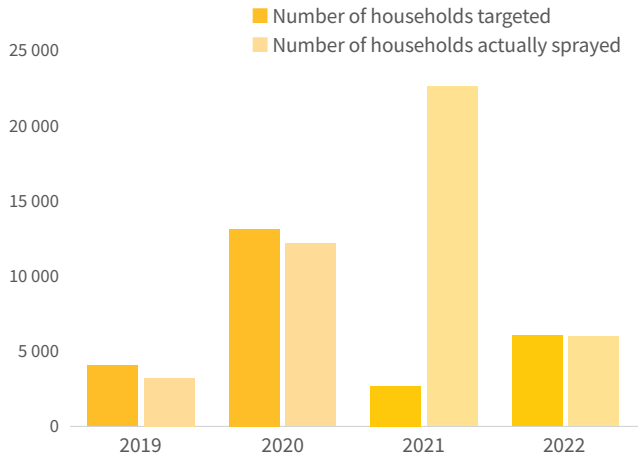
Vector control

Figure 3. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - In terms of cross-checking of slides:
    - 100% of positive cases at the local level are sent to the national malaria reference laboratory for indirect quality control; and
    - 10% of negative slides at the local level are sent to the national malaria reference laboratory for indirect quality control.
  - Performance evaluation: Local levels receive a panel of 20 slides prepared from the central level once a year for direct quality control.
  - External performance assessment: The national level receives a panel of 20 slides from Honduras once a year for quality performance assessment.
  - Training in microscopy diagnostics for the national laboratory network takes place at least once a year.
  - New and reinforcement microscopists are trained whenever necessary.
  - On-site support supervision: The national level carries out supervision of the regional and local level laboratory network.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

Strategies to accelerate malaria elimination

- The implementation of the Diagnosis, Treatment, Investigation and Response (DTI-R) strategy is being promoted at the national level in conjunction with outbreak management. The network of community collaborators for the elimination of malaria has been implemented and expanded in areas where access to timely diagnosis and active malaria transmission is difficult. Similarly, focal point management coordinators and malaria technicians have been hired to strengthen focal point management and the DTI-R strategy.
- Supervision of health facilities and diagnostic points at the local level has been strengthened in order to maintain coverage of access to timely diagnosis (RDT/microscopy) and treatment.
- Priority is given to IRS interventions, installation of LLINs and management of anopheline breeding sites in communities with a malaria burden in the past three years, especially if they are located in endemic areas and, even more so, if they maintain active malaria transmission. Each intervention must comply with the quality and coverage necessary to guarantee effectiveness and ensure impact.
- The National Malaria Strategic Plan is still pending.
- The country participates in the Regional Malaria Elimination Initiative (RMEI), a results-based aid program seeking to accelerate progress toward malaria elimination in Mesoamerica and the Dominican Republic.

Ecuador

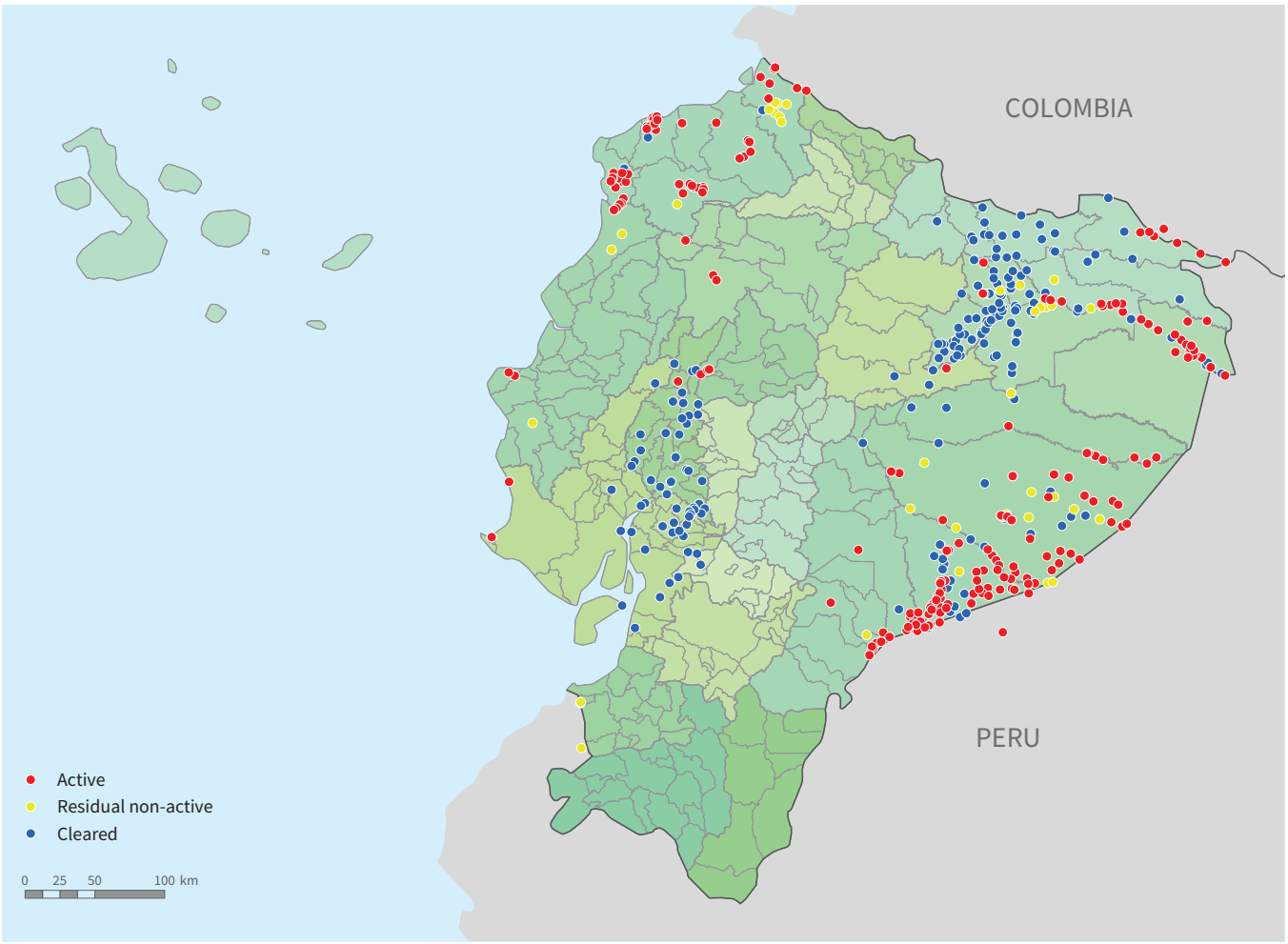
Ecuador is a country in north-west South America, bordered by Colombia to the north, Peru to the east and south, and the Pacific Ocean to the west. Ecuador also includes the Galapagos Islands in the Pacific Ocean, about 1000 km west of the mainland. The country's capital and largest city is Quito.

- Ecuador has an estimated population of about 18 million.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported 1348 indigenous malaria cases.

Figure 1. Map of Ecuador showing primary administrative divisions and bordering countries

Malaria cases and foci

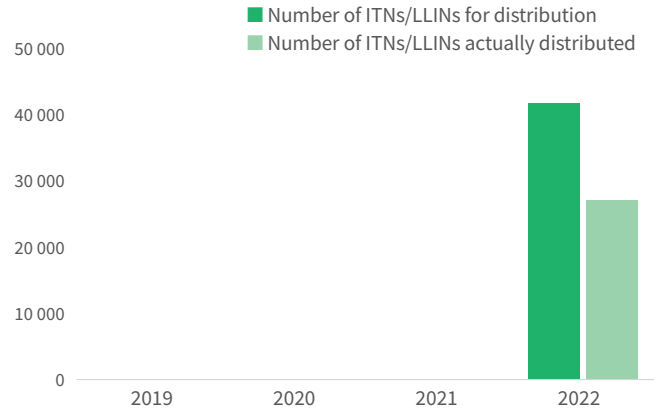
Figure 2. Map of current malaria transmission foci



Implementation

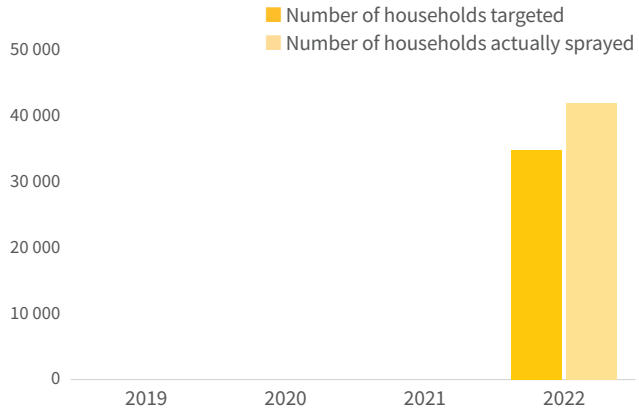
Vector control

Figure 3. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - cross checking slides; all slides are taken to cross-monthly cross-checking of slides: indirect quality control from intermediate laboratories to the premises and from the reference laboratory to the intermediate laboratories; frequency varies due to the lack of available means of transportation, but is monthly on average;
  - external performance assessment: the national level receives a panel of 20 slides from Peru once a year for quality performance assessment;
  - one round of panel slide reading in 2022 at the National Reference Centre, National Institute for Research in Public Health (INSPI);
  - training and re-training of microscopists: a total of seven sessions conducted between April and December 2022; about 100 staff trained.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

Historically, malaria in Ecuador has been a serious public health problem related to permanent structural changes owing to socioeconomic crises, climatic events such as the El Niño phenomenon, expansion of the agricultural frontier into areas of tropical rainforest, unregulated human settlements, resistance of *P. falciparum* to chloroquine, legal and illegal mining exploitation, permeability of the borders with neighbouring countries, political and social problems, migratory processes, and lack of policies to guarantee resources for the control of the disease, leading to a weakening of the operational capacity of the health institutions in charge of malaria control.

Particular conditions in the spatial structure of certain areas, such as in marginal urban neighbourhoods lacking basic infrastructure, are favourable for the persistence of endemic hotspots of high transmission, especially in the north of Esmeraldas Province, influenced by migratory exchanges with Colombia, and in the north-east of the Amazon, especially in Pastaza, Morona Santiago, Orellana and Sucumbíos, due to limited access to health services. The border areas of El Oro Province are especially vulnerable to the introduction of cases from northern Peru.

The populations at highest risk of malaria are found in the coastal and Amazonian regions of the country. In these territories, the populations differ in terms of their customs and ethnicities. In the province of Esmeraldas, the climate varies from subhumid tropical to humid subtropical and very humid subtropical, with an average temperature of 23°C. A large part of the economy depends on

the export of shrimp and bananas. In addition to bananas, cocoa, tobacco and coffee are produced. Fishing, the petrochemical industry and tourism are also important. The majority of the population is of African descent and there are also Awá and Chachi communities. The province shares a border with Colombia, and migration to Colombia is routine through irregular border crossings.

In the Amazonian provinces, the average temperature ranges from 15°C to 40°C. The Amazonian ecosystem, especially its tropical rainforest, contains the richest and most complex plant and animal habitats in the world. These provinces border the Loreto and Amazonas areas of Peru.

Malaria transmission in the country persists due to the limited supply of health services that guarantee access to timely treatment and follow-up of all cases, in accordance with national regulations for the correct application of measures to address malaria transmission, namely Diagnosis, Treatment, Investigation and Response (DTI-R); insufficient epidemiological and entomological surveillance to guide decision-making for interrupting vector transmission and efficiently and sustainably applying measures for the elimination and prevention of malaria reintroduction; and limited intersectoral, inter-institutional and organized community participation in the implementation of the actions planned for malaria elimination.

Between 2015 and 2021, despite the increase in cases at the national level, malaria transmission remained concentrated in six provinces of the country (four in the Amazon, one on the coast and one in the highlands). Outbreaks were reported in localities on the Ecuadorian coast, characterized by short duration and the capacity of local health teams to control them. In 2022, there was a 40% reduction of cases observed compared to 2021. This reduction can be attributed to the empowerment of the local level, prioritization of intervention localities, sensitization of affected communities, emphasis on reactive search and timely and complete treatment, and the availability of diagnostic and treatment supplies.

Strategies to accelerate malaria elimination

The main strategy for the control and elimination of malaria consists of early diagnosis (clinical diagnosis with laboratory support) of the disease and its timely treatment, which are particularly important for avoiding cases of complicated malaria, delivered through the provision of public health services to the entire area at risk. The national health system has made it compulsory to have microscopy and/or RDTs available from the beginning of the year:

- **First level of care:** Because of its direct contact with the community, this level is able to offer diagnosis and treatment in each of the areas at risk of malaria transmission in the country, and follow up on all diagnosed cases until their final resolution, maintaining all the information on the care process for the cases (active/passive file, in physical and digital versions).
- **The second level of care:** This level includes all actions and services of specialized outpatient care and those requiring hospitalization; all malaria cases requiring hospitalization for treatment are managed at this level, and all the information on the care process for the cases is maintained (active/passive file, in physical and digital versions).
- **The third level of care:** This level corresponds to facilities that provide outpatient and inpatient services. The hospital centres are national referral centres; patients with malaria complications that cannot be resolved at lower level units are referred to these centres, and all the information on the care process for the cases is maintained (active/passive file, in physical and digital versions).

In communities in the Amazon without access to health services, volunteer promoters have been trained to support timely diagnosis and treatment, as well as patient follow-up where possible. Strengthening disease surveillance is central to the planning and implementation of the elimination programme and is a critical factor in accelerating progress. This has required the country to implement an effective health management and information system to help the national malaria strategy target resources to the most affected population groups; continue ongoing assessments, such as screening of pregnant women in at-risk areas; recognize gaps in coverage; detect outbreaks; and evaluate the impact of interventions to guide changes in programme focus.

Eswatini

Eswatini is a landlocked country in southern Africa. It is bordered by Mozambique to its north-east and South Africa to its north, west, south and south-east. At no more than 200 km north to south and 130 km east to west, Eswatini is one of the smallest countries in Africa. Despite its size, the country's climate and topography are diverse, ranging from the cool and mountainous Highveld to the hot and dry Lowveld.

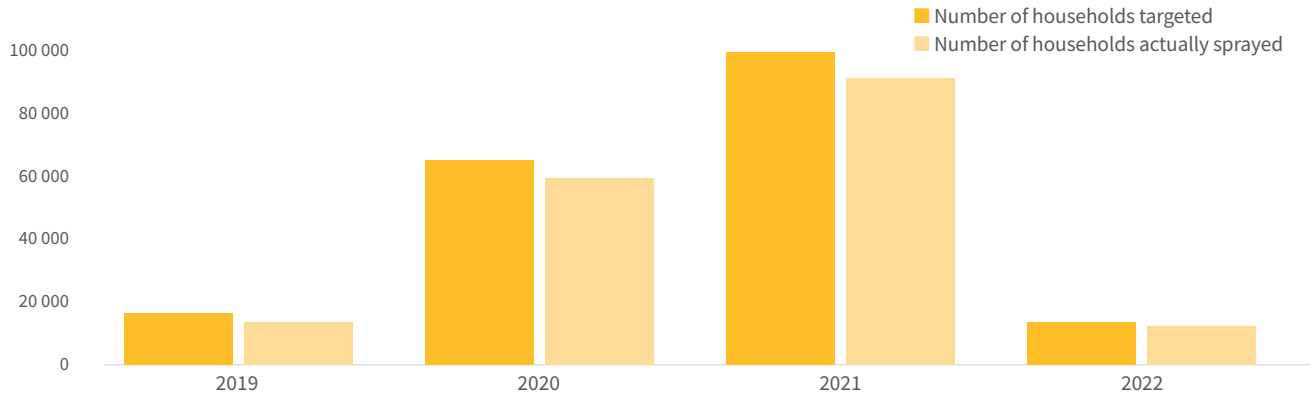
- Eswatini has an estimated 1.16 million inhabitants in its four regions and 55 administrative subdivisions.
- Malaria transmission occurs primarily between January and June in the central and eastern parts of the country.
- The national malaria elimination goal is set for 2025.
- In 2022, the country reported 214 indigenous *P. falciparum* malaria cases.

Figure 1. Map of Eswatini showing primary administrative divisions and bordering countries

Implementation

Vector control

Figure 2. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - cross-checking of slides: all slides taken to cross-check all positive RDTs, discordant slide results cross-checked by other level-1 microscopists at the national malaria programme;
  - on-site supportive supervision (of health facilities);
  - training and refresher training for case management (diagnosis by microscopy & RDT) and treatment according to guidelines.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

Most malaria cases occur in men and boys (60–70%) of the active age group (aged 10–39 years [75%]), who are either involved in farming/agriculture (legal or illegal farming) or are students.

Strategies to target the most affected groups:

- An inclusive approach is used through collaboration with employers so that proactive case screening is done when workers are being hired and reactive case detection is facilitated whenever cases are detected.
- Some employers support IRS, which is the major vector control strategy in the country, through the purchase of insecticides.
- Besides targeted IRS, as a supplementary intervention, over 8200 LLINs were distributed to populations involved in illegal farming. Those receiving nets were sensitized to understand that they need to use the LLINs whenever they sleep outside of their sprayed houses. This intervention contributed to reducing transmission in the most affected area (Madlangempisi) – from 119 indigenous cases in 2021 to seven indigenous cases in 2022.

Strategies to accelerate malaria elimination

- Quality IRS in active foci, residual non-active foci and areas with high malariogenic potential.
- LLIN distribution and supplementary vector control interventions targeting special population groups and areas.
- Strengthening of prevention of re-establishment of malaria in administrative subdivisions that have eliminated.
- Engaging and empowering communities to adopt and own malaria elimination interventions.
- Subnational verification in administrative subdivisions that have interrupted local transmission for three consecutive years.
- Strengthening cross-border and multisectoral collaboration.

French Guiana

French Guiana is an overseas department of France located on the northern coast of South America in the Guianas. Bordered by Suriname to the west and Brazil to the east and south, French Guiana covers a land area of 83 534 km^2. It is the second largest region of France (more than one seventh the size of metropolitan France) and the largest outermost region within the European Union. It has a very low population density, with only 3.6 inhabitants per km^2. Half of its population lives in the metropolitan area of Cayenne, its capital.

- French Guiana is home to about 301 000 inhabitants.
- There has been no malaria seasonality since 2019.
- The national malaria elimination goal was set for 2025.
- In 2022, the country reported 21 indigenous malaria cases.
- The highest risk group is the mining population (with miners also from Suriname, Brazil and Guyana) and the indigenous communities.
- The territory is now developing a strategic plan for elimination and prevention of the re-establishment of transmission. This plan will guide strategic interventions, such as how to target remote areas without community health workers and how to ensure immediate radical cure to all *P. vivax* cases.

Figure 1. Map of French Guiana showing primary administrative divisions and bordering countries

Guatemala

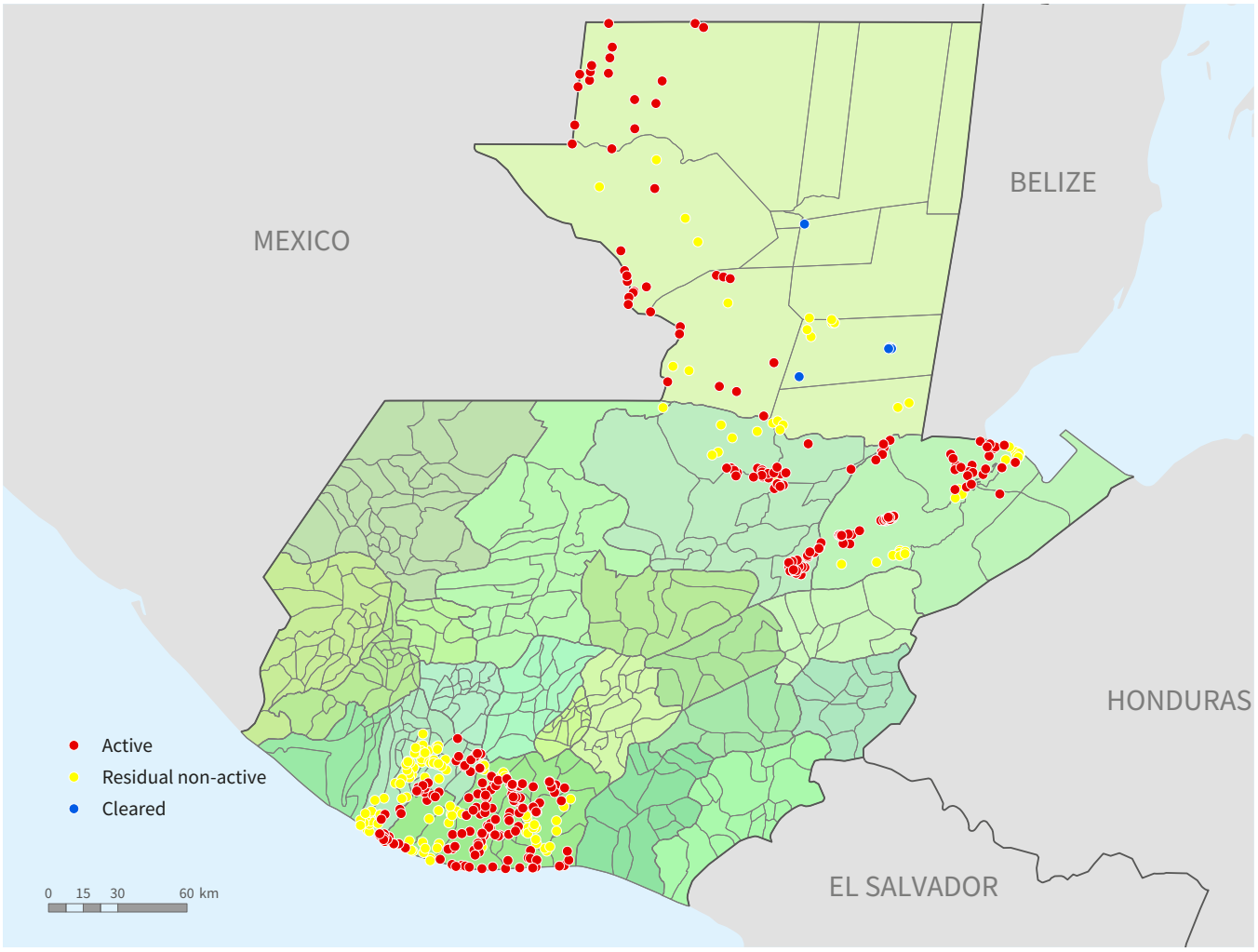
Guatemala is a country in Central America. It is bordered to the north and west by Mexico, to the north-east by Belize and the Caribbean Sea, to the east by Honduras, to the south-east by El Salvador and to the south by the Pacific Ocean. It is the most populous country in Central America. It is a representative democracy, with its capital and largest city being Guatemala City, the most populous city in Central America.

- Guatemala has an estimated population of around 17.4 million.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported 1856 indigenous malaria cases.

Figure 1. Map of Guatemala showing primary administrative divisions and bordering countries

Malaria cases and foci

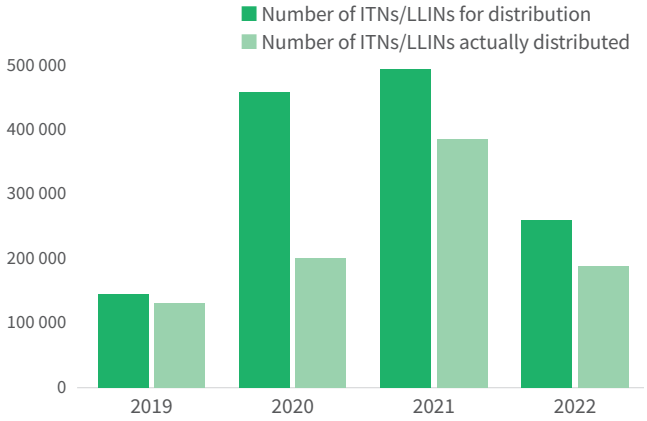
Figure 2. Map of current malaria transmission foci



Implementation

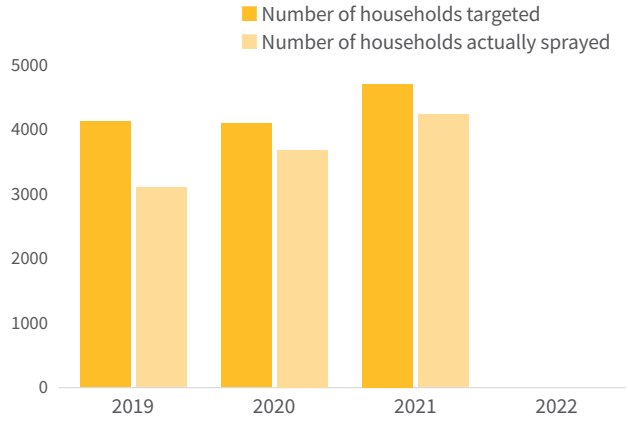
Vector control

Figure 3. Distribution of insecticide treated nets (ITN/LLIN), 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of indoor residual spraying in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - quarterly cross-checking of slides
  - on-site supportive supervision in Alta Verapaz, Izabal, Escuintla, Petén Norte, Suchitepéquez, Santa Rosa, Ixcán, Petén Sur Oriente and Petén Sur Occidente
  - external performance assessment: the national level receives a panel of 20 slides from Honduras once a year for quality performance assessment
  - training and refresher training: four workshops involving 40 microscopists.
- Stockouts of RDTs were experienced in 2022.
- Stockouts of antimalarials were experienced in 2022.

High-risk populations and hard-to-reach areas

Three malaria-endemic areas have been identified in the country. The first corresponds to departments in the northern region (Alta Verapaz, Baja Verapaz, Petén and Izabal); and the second zone (Pacific coast) is made up of departments located in the southern region of the country (Escuintla, Santa Rosa, Suchitepéquez, Retalhuleu). These areas are characterized by high rainfall, high temperatures, high relative humidity and the presence of agro-industrial companies dedicated to the monoculture of sugarcane, African palm and bananas, which is why these areas are highly receptive and vulnerable to malaria. The third central-eastern zone is made up mainly of the departments of Zacapa, Chiquimula, Jalapa and Jutiapa, where high temperatures and low relative humidity are recorded, leading to medium receptivity and low to medium vulnerability.

In the departments of the southern zone, the plantations that produce sugarcane, bananas, corn and African palm require continuous artificial irrigation that alters the natural habitats of the malaria vector and favours local transmission. These agricultural industries hire local workers and temporary migrants from departments in the north-western region of the country.

In the northern part of the country (the departments of Alta Verapaz, Petén and Izabal), the majority of the population at risk belongs to the Kekchi ethnic group. There are also monoculture agro-industrial companies and other determining factors, such as rural location, dispersed and unprotected homes, and poor access to health services due to distance and lack of adequate communication routes. In Izabal, there are inaccessible communities that can only be reached by boat across rivers or the sea.

In Guatemala, the key populations most affected by malaria are: (i) children under 5 years of age; (ii) pregnant women; and (iii) migrant agricultural workers and other migrants. These populations have poorer access to timely diagnosis and therefore experience higher morbidity due to malaria. There is a total of approximately 50 000 agro-industrial workers in the country, half of whom are migrant workers; the other half are residents of endemic areas. Access to health services by these populations is historically lower owing to a variety of conditions, such as poverty, rurality, ethnicity, language, culture, geographical access, distance, schedules and attention. These variables make it difficult to capture cases at the community level.

Strategies to accelerate malaria elimination

The participation of voluntary collaborators or malaria community volunteers is the strongest strategy for the reduction of malaria cases at the local level, since it creates the opportunity to provide fast diagnosis and treatment in remote places with no health services. In addition, these volunteers attend to patients during non-business hours, complementing the assistance and response capacity of traditional health services.

The malaria programme has established alliances with agro-industrial companies to ensure that workers have access to quality services with diagnostic capacity and timely treatment for malaria. This is achieved by training health personnel from these companies, establishing diagnostic and treatment sites, and coordinating integrated response mechanisms and information-sharing between the public and private sector.

Another strategy has been to strengthen the Ministry of Health's field and health service workers as a priority to increase the demand of health services for diagnosis and treatment of malaria by the population at risk. This is achieved through the training of personnel on malaria-specific topics, along with general public health, quality health practices and other topics, to improve the quality of services offered and to reinforce in the population that universal access to health is their right.

Anthropological studies have been carried out with the objective of better understanding the key and vulnerable populations with which vector personnel interact in the different active malaria foci in different prioritized health areas. The results of such studies have yielded better knowledge of the customs and practices of these populations and have better positioned the programme to address and involve communities in carrying out malaria prevention activities in a sustained manner. All of the actions carried out at the community level are done so considering the context, culture, beliefs and language of each of the key populations.

The greatest concentration of activities and investment has been allocated to active foci with the highest malaria burden in the departments of Escuintla, Alta Verapaz and Izabal, targeting key and vulnerable populations at risk. All proposed interventions are based on the National Strategic Plan for the Elimination of Malaria 2018–2022 and the WHO framework for malaria elimination.

The following strategies are being used to accelerate the elimination of malaria:

- Strengthen social participation in the health of communities and vulnerable populations in the malaria elimination process with broad and inclusive spaces for intercultural dialogue.
- Improve the supply of quality health care in the most excluded populations for detection, diagnosis, treatment, research and response for the elimination of malaria, with the development and strengthening of the intercultural competencies of health personnel and community health volunteers.
- Strengthen the implementation of malaria diagnostic services in agricultural industries, bringing these services closer to temporary agricultural workers by providing RDTs and supplies to industry clinics, nurses, etc.
- Establish focus management teams aimed at promoting increased detection of malaria in the areas with the highest transmission, ensuring that cases are detected in a timely manner and complete treatment is received to ensure cure of the patient and elimination of the disease.
- Promote the improvement and implementation of a new malaria information system at the national level, with a real-time platform that enables access to case data and other information necessary for effective epidemiological surveillance.
- Ensure integration of malaria care procedures in routine services for small children, adolescents and pregnant women in high transmission areas. Strengthen detection, diagnosis, treatment and recovery, especially for pregnant women and children under 5 years of age.
- Implement intersectoral actions aimed at mitigating the most important social factors to stop the transmission of malaria in high transmission areas, where there are extensive areas of sugarcane, banana and other agro-industrial crops and the population of workers is mobile and fluctuating. Carry out actions to identify and reach these populations for the delivery of prevention, health promotion, diagnosis and treatment services on a continuous basis.
- Implement behaviour change communication strategies with an intercultural and gender approach based on the anthropological studies carried out.
- Facilitate community incorporation of the approach to malaria foci with strategies and interventions for elimination that respect different cultures, and achieve a sustainable local integrated approach to risk mitigation, health surveillance and environmental improvement actions.
- Participate in the Regional Malaria Elimination Initiative (RMEI), a results-based aid program seeking to accelerate progress toward malaria elimination in Mesoamerica and the Dominican Republic (the country is also beneficiary of the Global Fund).

Honduras

Honduras is a country in Central America. It is bordered to the west by Guatemala, to the south-west by El Salvador, to the south-east by Nicaragua, to the south by the Pacific Ocean at the Gulf of Fonseca, and to the north by the Gulf of Honduras, a large inlet of the Caribbean Sea. Its capital and largest city is Tegucigalpa.

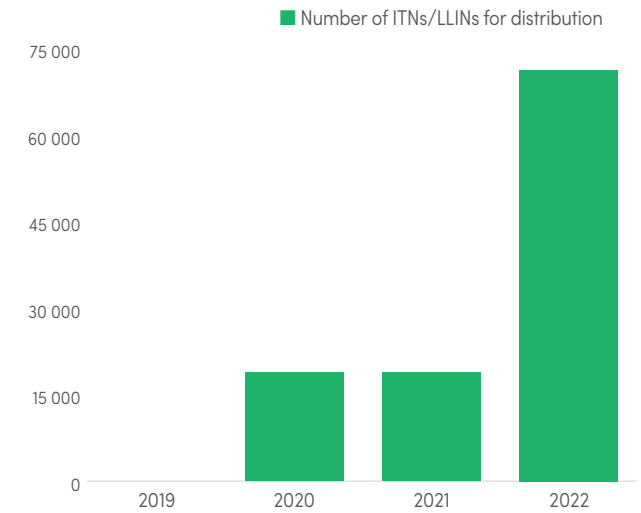
- Honduras has an estimated population of over 9.6 million.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported 3534 indigenous malaria cases.

Figure 1. Map of Honduras showing primary administrative divisions and bordering countries

Implementation

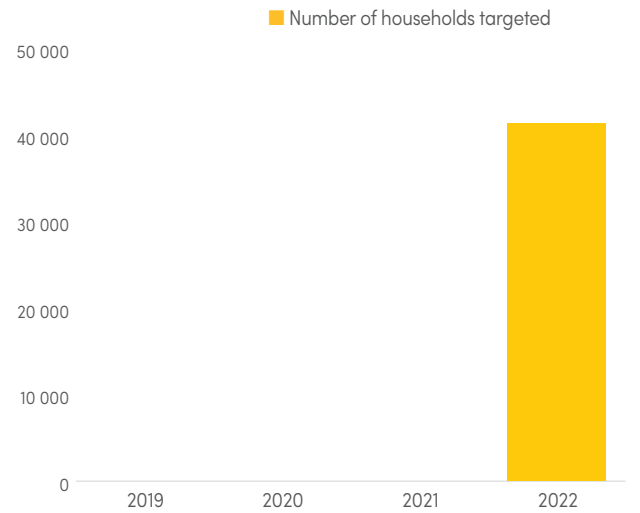
Vector control

Figure 2. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 3. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - one round of panel slide reading in 2022
  - monthly cross-checking of slides (10% of negative slides and 100% of positive slides to the superior level, local to regional and regional to national)
  - external performance assessment: the national level receives a panel of 20 slides from Peru once a year for quality performance assessment
  - training of new microscopists and refresher training.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

The department of Gracias a Dios is the area that has historically presented the highest number of malaria cases at the national level. The department has a population of 108 262 inhabitants and is characterized by neglected areas with high receptivity and high migration of the Miskito culture between Honduras and Nicaragua. This is the area from which the disease begins to spread to other regions of Honduras. The coverage of RDTs is maintained at 100% of the voluntary collaborators in active outbreaks, and posts at border points have been expanded to improve malaria surveillance. The most notable impact of these efforts has been the decrease in cases in the border area. Binational agreements have been established to address cross-border cases in Honduras and Nicaragua.

Strategies to accelerate malaria elimination

The Diagnosis, Treatment, Investigation and Response (DTI-R) strategy for case management at malaria care sites is being promoted nationally. Voluntary collaborator posts have been expanded in high transmission areas with 100% coverage of RDTs. To ensure treatment, strictly supervised treatment is carried out by a promoter, health technician or voluntary collaborator. IRS and LLINs are prioritized in endemic areas to achieve coverage of more than 85%. The National Malaria Strategic Plan 2024–2026 is in development. In addition, an operational strategic plan is being promoted at the regional level to guide actions implemented at the local level in order to strengthen governance and sustain efforts towards the elimination of malaria. The country participates in the Regional Malaria Elimination Initiative (RMEI), a results-based aid program seeking to accelerate progress toward malaria elimination in Mesoamerica and the Dominican Republic (Honduras is also beneficiary of the Global Fund).

Malaysia

Malaysia is a country in the WHO Western Pacific Region. Malaysia shares a land and maritime border with Thailand and maritime borders with Indonesia, Singapore and Viet Nam. East Malaysia shares land and maritime borders with Brunei Darussalam and Indonesia, and maritime borders with the Philippines and Viet Nam. Kuala Lumpur is the national capital, the country's largest city and the seat of the legislative branch of the federal government.

- Malaysia has an estimated population of about 32 million.
- Malaria transmission is year-round in the country.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported zero indigenous cases caused by human malaria parasites, but more than 2500 indigenous cases caused by *P. knowlesi*.

Figure 1. Map of Malaysia showing primary administrative divisions and bordering countries

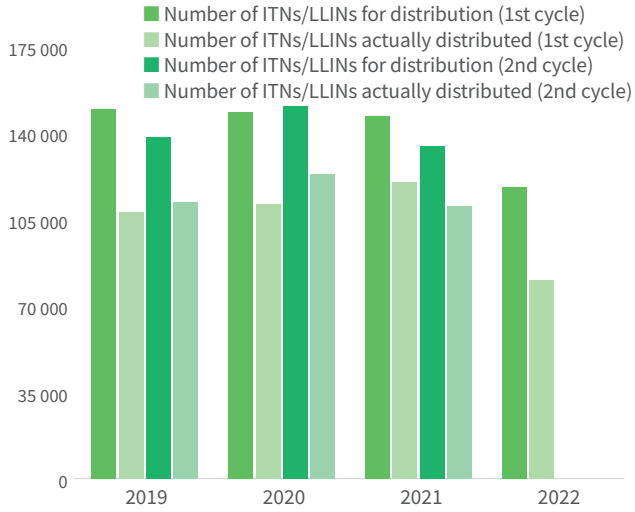
Malaria cases and foci

Figure 2. Map of current malaria transmission foci

Implementation

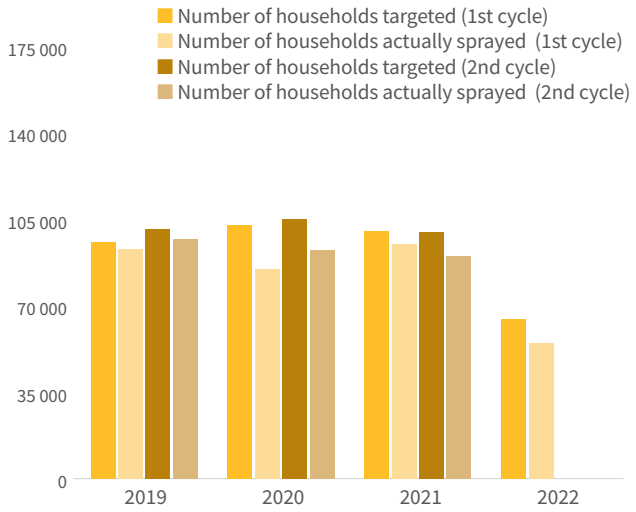
Vector control

Figure 3. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and PCR are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - monthly cross-checking of slides;
  - panel slide reading of two types: (i) WHO panel: two cycles per year (total 15 slides per panel); (ii) National Public Health Laboratory (NPHL) panel: one cycle per year (total 10 slides per panel);
  - training and refresher training: three trainings organized by the NPHL and another five trainings conducted by other departments, such as the State Health Department, and private laboratories for which NPHL provided the trainers (WHO certified malaria microscopists).
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022; antimalarials at clinics and hospitals are monitored by the Ministry of Health's Pharmacy Division.

High-risk populations and hard-to-reach areas

Malaysia will implement new strategies for the prevention of malaria re-establishment phase. The revised definition of high-risk populations and approaches to proactive screening for malaria will be published soon.

Strategies to accelerate malaria elimination

As of January 2023, Malaysia has achieved five consecutive years of zero indigenous cases caused by human malaria parasites. The country's main focus is to enhance the stratification programmes to prevention malaria re-establishment due to imported malaria cases, having achieved interruption of local transmission of human malaria parasites.

Since 2008, the country has been facing a persistent burden of *P. knowlesi* cases of zoonotic origin. The annual reported incidence in humans increased from 1600 cases and 2 deaths in 2016 to more than 3500 cases and 13 deaths in 2021.

Mexico

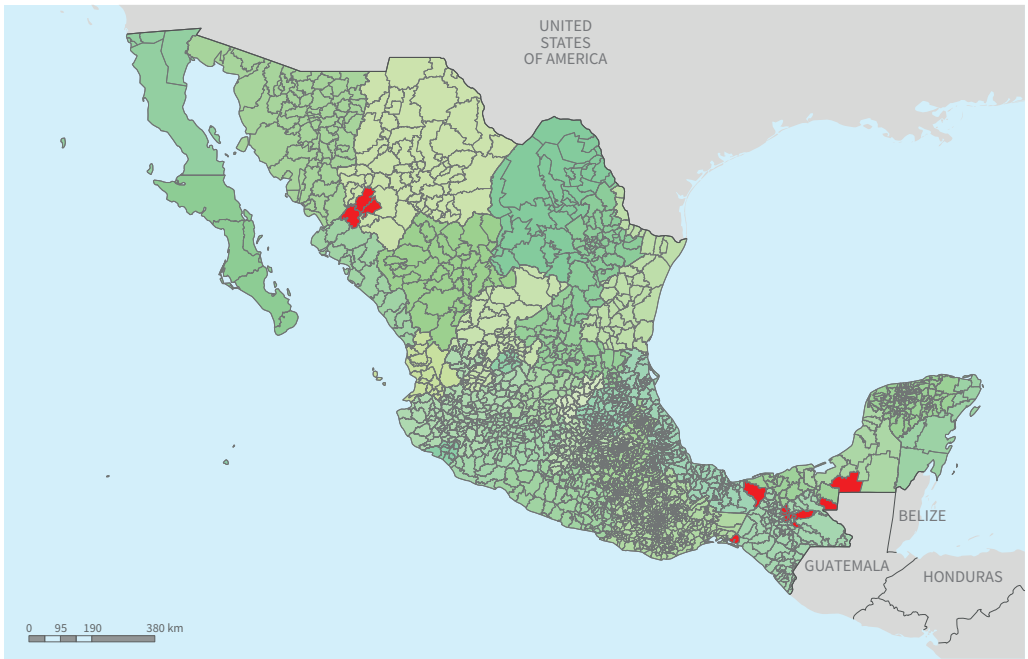
Mexico is a country in the southern portion of North America. It is bordered to the north by the United States of America, to the south and west by the Pacific Ocean, to the south-east by Guatemala, Belize and the Caribbean Sea, and to the east by the Gulf of Mexico. Mexico covers an area of 1 972 550 km^2. It is organized as a federal republic comprising 31 states and Mexico City, its capital. Other major urban areas include Monterrey, Guadalajara, Puebla, Toluca, Tijuana, Ciudad Juárez and León.

- Mexico has an estimated population of about 130 million.
- Malaria transmission is year-round in the country.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported 163 indigenous malaria cases.

Figure 1. Map of Mexico showing primary administrative divisions and bordering countries

Malaria cases and foci

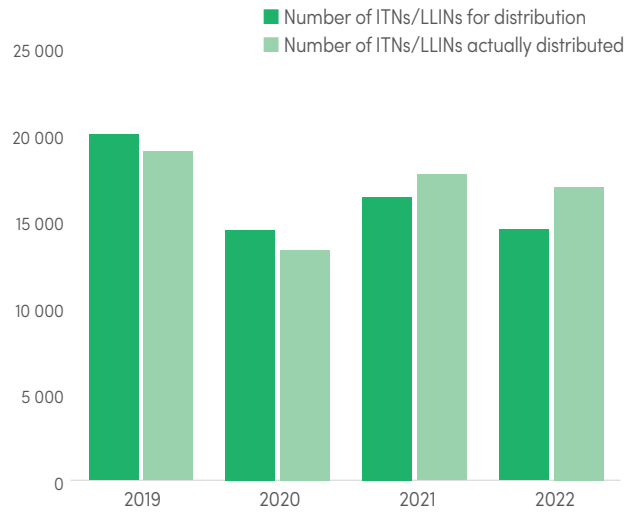
Figure 2. Map of current malaria transmission foci



Implementation

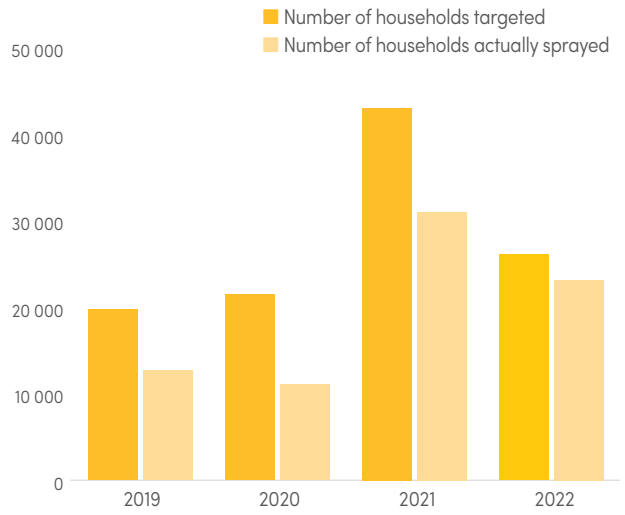
Vector control

Figure 3. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - yearly assessment of slide reading
  - training and re-training of microscopists: once a year
  - external performance assessment: the national level receives a panel of 20 slides from Honduras once a year for quality performance assessment.
- Stockouts of RDTs were experienced in 2022, but a donation by PAHO enabled the country to fill the gap.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

Of the total number of autochthonous cases registered in Mexico in 2022, 80.3% were concentrated in the states of Chiapas and Campeche in the south-east of the country. In Chiapas, the population with the highest prevalence corresponds to the Indigenous population in the municipalities of San Cristóbal de las Casas and Ocosingo. In about 30% of the localities included in active foci, the population showed some reluctance to the different actions implemented by the programme, mainly to vector control and, in some cases, the active search for febrile cases, owing to the population's habits and customs and the risk associated with the COVID-19 context. This reluctance affected the timeliness of the detection of probable cases. Therefore, intensive work has been carried out with the staff of the first-level care units in these areas, and the use of RDTs has been implemented to ensure the immediate initiation of treatment for cases requiring care. The health promotion and municipal authorities have worked in coordination to promote the development of health competencies through culturally and linguistically relevant messages on the implementation of preventive actions with community participation.

In the state of Campeche, a cross-border focus with Guatemala has been identified. There are at least five localities along the border, which is the site of permanent local transit fuelled by the demand for health services and religious, trade and labour activities, both legal and illegal. This constant movement is favourable to the persistence of parasite

loads on both sides of the border. This persistence is further strengthened by the ecological conditions present in these areas that are favourable to the development of vector populations with high densities, mainly *An. albimanus* and *An. darlingi*. Therefore, the local programme in Campeche has established a communication and reinforcement strategy with the volunteer collaborators, guaranteeing immediate diagnosis and timely treatment as soon as samples are reported, and strengthening the Ministry of Health teams with material inputs for carrying out vector control activities; however, these activities are executed sporadically, which does not ensure the desired impact.

Strategies to accelerate malaria elimination

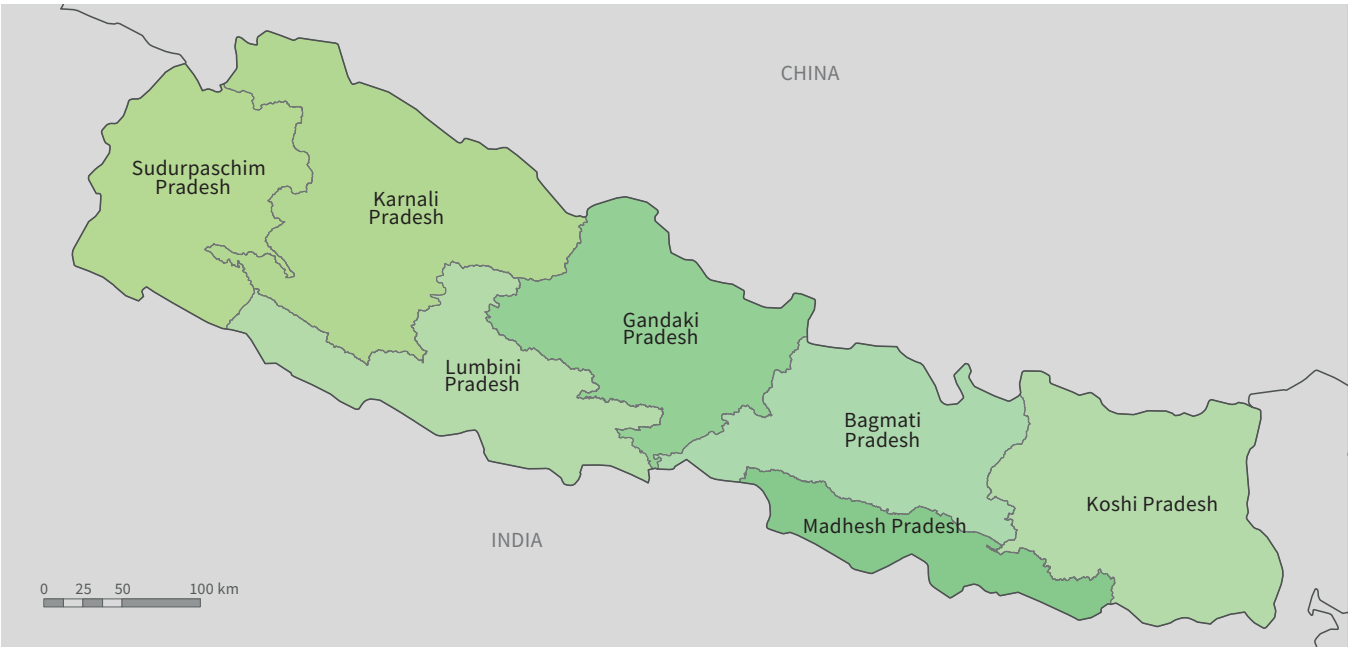
- Permanent supervision activities have been reinforced by the Federal Technical Team in states with active transmission. This Team is made up of the General Directorate of Epidemiology, the Institute of Epidemiological Diagnosis and Reference, the General Directorate of Health Promotion and the National Center for Preventive Programs and Disease Control, with the support of the PAHO representative in Mexico.
- Ongoing training of medical and nursing staff is being carried out for case detection and the collection of samples of thick gout at the first level of care, thereby strengthening passive surveillance.
- This is complemented by the strengthening of the network of voluntary notifiers and notification posts in all categories and the implementation of culturally and linguistically relevant local strategies to encourage timely demand for care.
- The use of RDTs was implemented to improve the timeliness of diagnosis and initiation of treatment in the highland areas farthest from microscopy sites and in hard-to-reach areas.
- Following the shortage of antimalarial drugs, regional distribution centres were established for states without transmission, enabling treatment of imported cases to begin within 24 hours of diagnosis; for states with transmission, the supply of drugs was guaranteed.
- Stratification by malaria focus has led to the reduction of work areas and thus the optimization of material resources and operational personnel.

Nepal

Nepal is a landlocked country in the WHO South-East Asia Region. It is mainly situated in the Himalayas, but it also includes parts of the Indo-Gangetic Plain, bordering the Tibet Autonomous Region of China to the north, and India to the south, east and west. It is narrowly separated from Bangladesh by the Siliguri Corridor, and from Bhutan by the Indian state of Sikkim. Nepal has a diverse geography, including fertile plains, subalpine forested hills and eight of the world's 10 tallest mountains, including Mount Everest, the highest point on Earth. Kathmandu is the nation's capital and largest city.

- Nepal has an estimated population of 30.0 million (United Nations, World Population Prospects 2022).
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported 36 indigenous malaria cases.

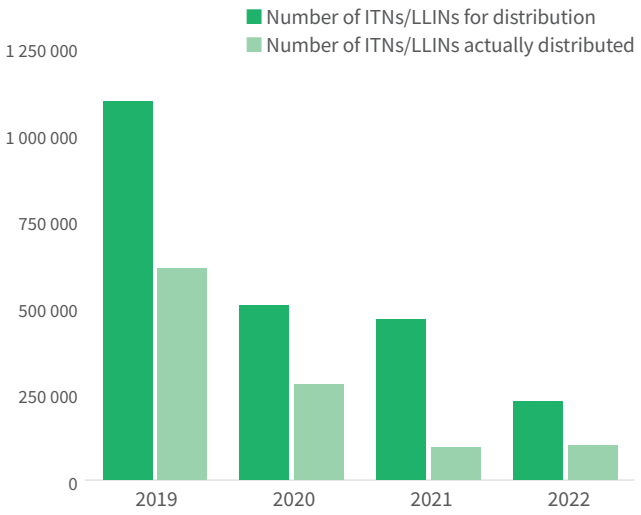
Figure 1. Map of Nepal showing primary administrative divisions and bordering countries



Implementation

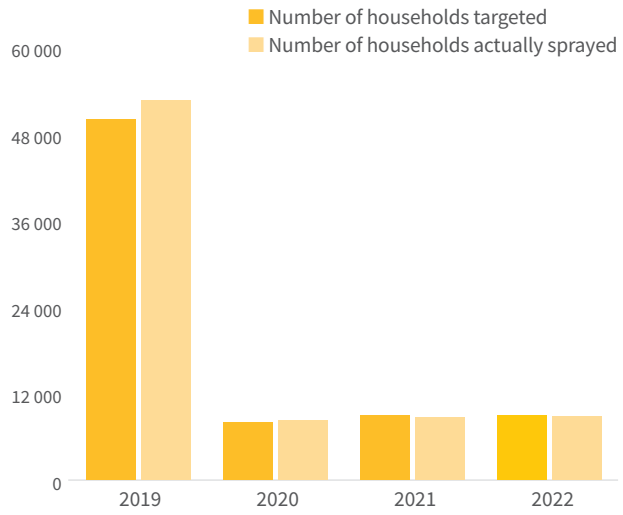
Vector control

Figure 2. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 3. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDT are used for malaria diagnosis. PCR is also functioning in the country and is used in the case of discrepant results and for research purposes with low-density parasitaemia.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
    - cross-checking of slides: six times per year from designated microscopy centres, four times from provincial reference laboratories and twice from the national level – the Vector Borne Disease Research and Training Center;
    - on-site supportive supervision from the provincial reference laboratories to the microscopy centres;
    - panel slide reading: the Vector Borne Disease Research and Training Center participated in an external quality assurance panel twice in 2022; and
    - training and refresher training: beginner training – five times; refresher training – once; external competence assessment for malaria microscopists – once.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

The populations at highest risk are:

- seasonal migrant workers;
- populations living in hard-to-reach, remote areas with limited access that may be cut off during monsoons;
- populations living near forests; and
- people who are internally displaced due to natural disasters, e.g. floods, landslides and earthquakes.

Strategies to accelerate malaria elimination

The following community interventions are being implemented:

- community management of malaria in 55 targeted risk wards through the Global Fund grant (New Funding Model 3), including hard-to-reach, remote areas; wards with marginalized communities and people in poverty; wards with wards that are close to the border with India, where there is a high burden of imported malaria; and wards with residual transmission;
- integrated community testing for COVID-19, malaria, tuberculosis and HIV through the Global Fund grant (COVID-19 Response Mechanism) – an additional 100 wards selected based mostly on the national malaria programme's plan to expand the community management of malaria;
- integrated screening/testing for malaria at 13 designated points of entry;
- an integrated action plan for migrants, which is under development and includes targeted activities at the places from which migrants originate, during travel to points of entry and to their destination, at their destination (workplace and living place), during travel back to points of entry, and at their place of return;
- strengthening private sector engagement;
- creating an enabling environment – formation of guiding bodies: national and provincial malaria elimination steering committees, national and provincial malaria elimination task forces and local malaria elimination task force; and
- fostering community engagement and ownership.

Panama

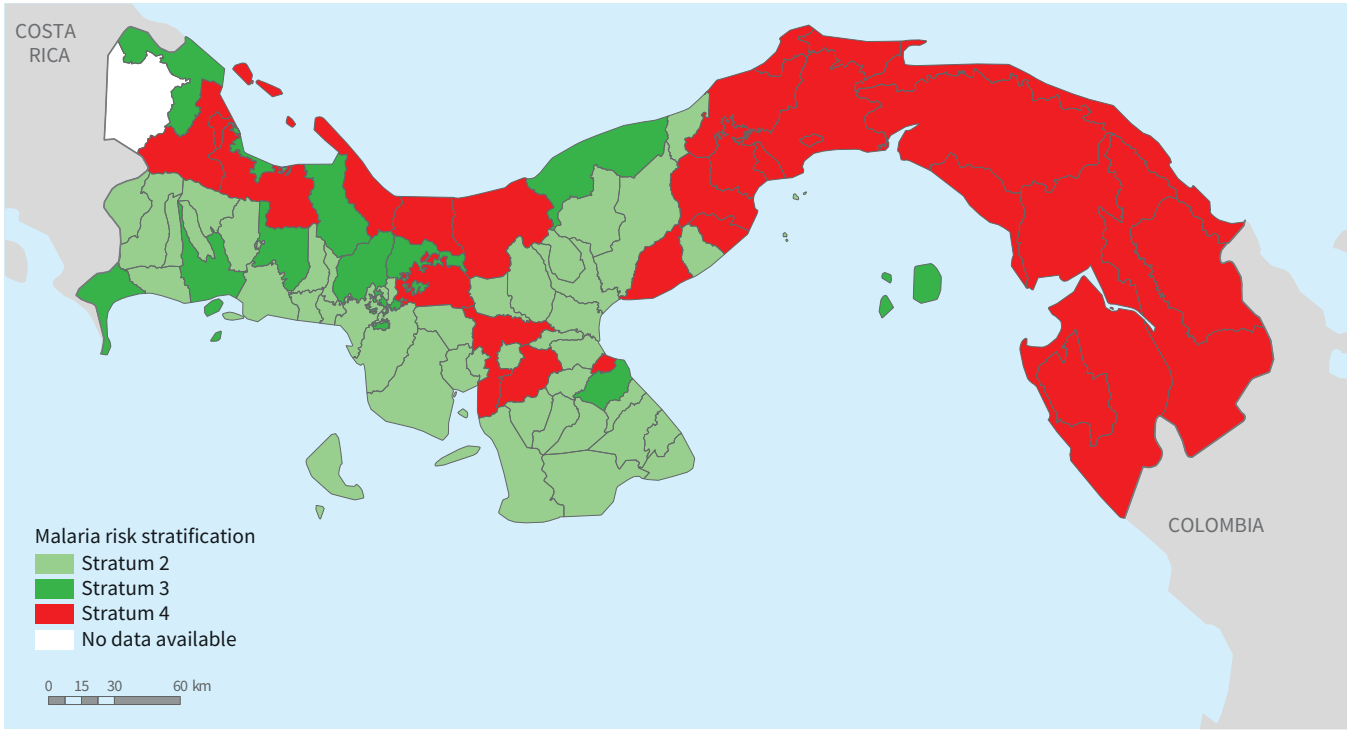
Panama is a transcontinental country spanning the southern part of North America and the northern part of South America. It is bordered by Costa Rica to the west, Colombia to the south-east, the Caribbean Sea to the north and the Pacific Ocean to the south. Its capital and largest city is Panama City, the metropolitan area of which is home to nearly half of the country's population.

- Panama has an estimated population of about 4.4 million.
- There are two malaria transmission seasons in the country.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported 7102 indigenous malaria cases.

Figure 1. Map of Panama showing primary administrative divisions and bordering countries

Malaria cases and foci

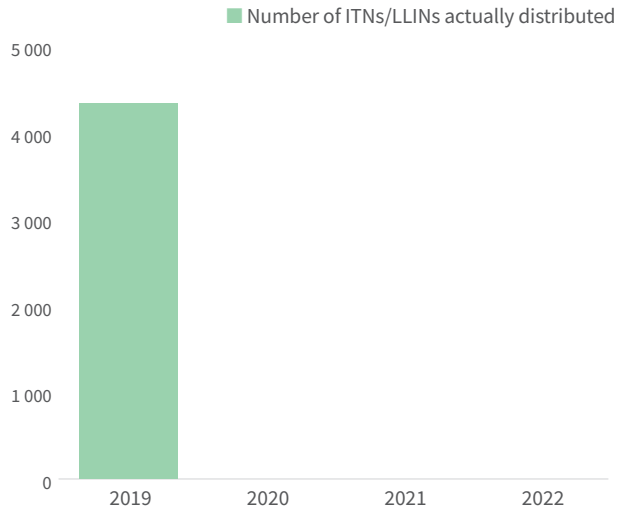
Figure 2. Map of malaria risk stratification



Implementation

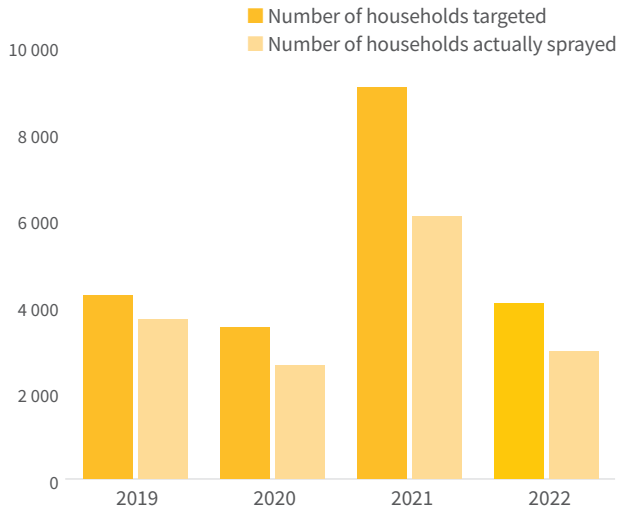
Vector control

Figure 3. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The diagnosis and treatment network with community collaborators rose by 78.8% in 2022, increasing the patient diagnostic rate and access for communities in distant rural areas.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
    - monthly cross-checking by the central laboratory
    - on-site supportive supervision: annually by the central reference laboratory in 11 regions
    - panel slide reading: one annual round in regional laboratories that perform microscopy and belong to the national malaria network
    - external performance assessment: the national level receives a panel of 20 slides from Peru once a year for quality performance assessment
    - training and refresher training: (i) malaria diagnostic recertification workshop in November 2022 for medical technologists from six regions; (ii) competency assessment to ensure the quality of results under PAHO/WHO guidelines, using the parameters and values of the indicators of the National Competency Assessment for Malaria Microscopy; (iii) training on the Diagnosis, Treatment, Investigation and Response (DTI-R) strategy in three regions; (iv) training of vector control technicians on the implementation of the guide for a comprehensive approach to malaria elimination and development of competencies in DTI-R strategy; and (v) training of medical technologists and laboratory assistants on the microscopic diagnosis of malaria.
- Stockouts of RDTs were experienced in 2022, but a donation by PAHO enabled the country to fill the gap.
- Stockouts of antimalarials were experienced in 2022: primaquine 15mg due to raw material shortages. The WHO Regional Office for the Americas also facilitated the donation of this antimalarial and gave support for the acquisition of mosquito nets through the WHO Strategic Fund.

High-risk populations and hard-to-reach areas

In the past decade, more than 90% of autochthonous malaria cases reported in Panama have been in indigenous communities, with the most affected communities located in the Guna de Madungandi comarca, located in the east of the province of Panama, in the province of Darién, and in the Guna

Yala comarca on the Caribbean coast, bordering Colombia, where *P. vivax* is the predominant cause of 99% of malaria cases.

Since the second half of 2018, the operational plan of the malaria elimination plan has been implemented, with the progressive strengthening of capacities in the detection, diagnosis and timely treatment of malaria, and improvement in the underreporting of cases. These efforts have increased the uptake and notification of malaria cases reported to the surveillance system since 2019. This has involved expanding the community care network with community partners: volunteer collaborators and vector control technician staff.

In addition, there is a binational strategic plan to address malaria along the border between Colombia and Panama. This includes strategies to care for vulnerable populations, Indigenous peoples, migrants and persons of African descent, which will address the different ethnic, cultural, religious and lifestyle characteristics, and harmonize them with the promotion, prevention and control of malaria.

Strategies to accelerate malaria elimination

Multiple training programmes have been developed to improve the epidemiological surveillance system to detect new cases and treat them in a timely manner including data quality, case and outbreak investigation and an updated micro-stratification for the identification and characterization of foci or micro-areas of malaria transmission. A project to address cross-cultural challenges and improve the participation of community and local organizations in elimination activities was also carried out. The country maintains its effort to face great challenges, such as the high migratory flow, the geographical, cultural, and socioeconomic determinants of health in malaria areas to achieve the elimination goals. The country participates in the Regional Malaria Elimination Initiative (RMEI), a results-based aid program seeking to accelerate progress toward malaria elimination in Mesoamerica and the Dominican Republic.

Republic of Korea

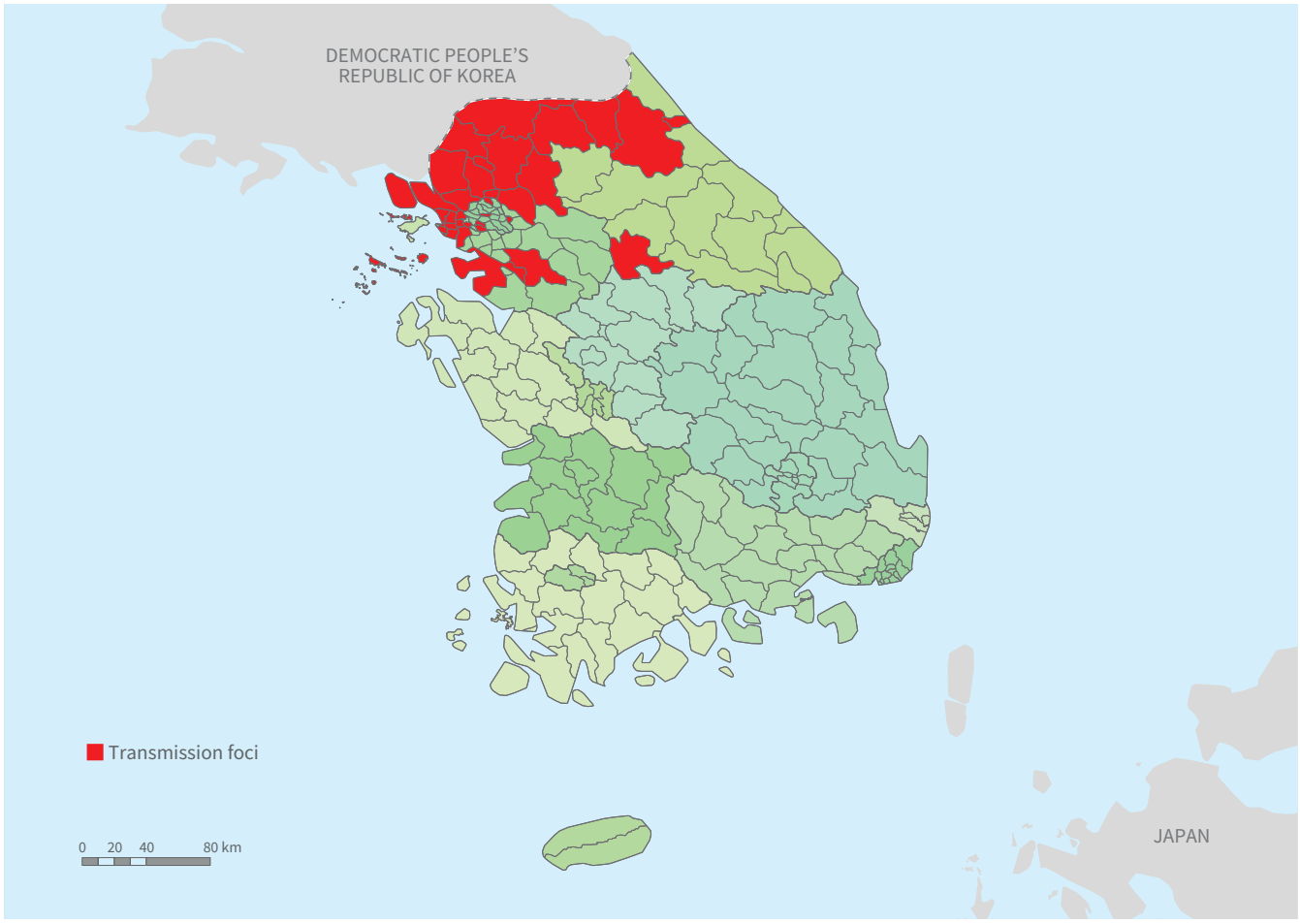
The Republic of Korea is a country in the WHO Western Pacific Region. It constitutes the southern part of the Korean Peninsula and borders the Democratic People's Republic of Korea. The country's western border is formed by the Yellow Sea, while its eastern border is defined by the Sea of Japan. Roughly half of the country's population lives in the Seoul Capital Area, the fourth most populous metropolitan area in the world. Other major cities include Incheon, Busan and Daegu.

- The Republic of Korea has an estimated population of about 51.7 million.
- The malaria transmission season runs from June to October.
- The national malaria elimination goal was set for 2024, as per the national strategic plan.
- In 2022, the country reported 382 indigenous malaria cases.

Figure 1. Map of the Republic of Korea showing primary administrative divisions and bordering countries

Malaria cases and foci

Figure 2. Map of current malaria transmission foci



Implementation

Vector control

As per the national policy, IRS is not implemented and ITNs/LLINs are not distributed.

Quality assured diagnosis and case management

- RDTs are used for presumptive diagnosis, and microscopy or PCR are used for confirmatory diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - one round of panel slide reading.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

Areas with persistent malaria transmission are Incheon city (Ganghwa-gun, Gyeyang-gu, Michuhol-gu, Bupyeong-gu, Seo-gu and Jung-gu), Gyeonggi-do (Gapyeong-gun, Goyang-si Deokyang-gu, Goyang-si Ilsandong-gu, Goyang-si Ilsanseo-gu, Gimpo-si, Namyangju-si, Yangju-si, Yeoncheon-gun, Uijeongbu-si, Paju-si and Pocheon-si) and Gangwon-do (Goseong-gun, Inje-gun and Cheorwon-gun).

In 2022, case management in the transmission areas was strengthened through approaches such as the distribution of patient medication diaries to facilitate better adherence to the standard regimen (three-day chloroquine plus 14-day primaquine), encouragement of microscopic examination one month after treatment, and shortening of the time interval from symptom onset to first diagnosis.

Strategies to accelerate malaria elimination

In 2022, the malaria programme established a cooperative network with the Ministry of National Defense to manage malaria cases in military units.

Sao Tome and Principe

Sao Tome and Principe is a Portuguese-speaking island country in the Gulf of Guinea, off the western equatorial coast of Central Africa. It consists of two archipelagos around the two main islands of Sao Tome and Principe, which lie about 150 km apart, about 250 km and 225 km off the north-western coast of Gabon. Sao Tome and Principe is the second smallest and second least populous African sovereign state after Seychelles.

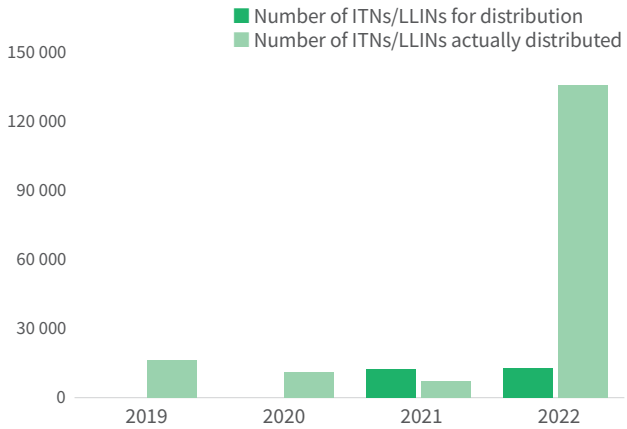
- Sao Tome and Principe is home to about 220 000 inhabitants.
- The malaria transmission seasons run from April to June and from October to December.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported 3970 indigenous malaria cases.

Figure 1. Map of Sao Tome and Principe showing primary administrative divisions and bordering countries

Implementation

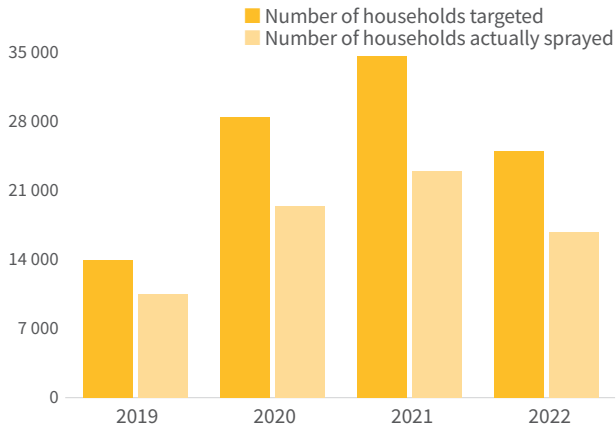
Vector control

Figure 2. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 3. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - quality control of slides on a monthly basis
  - quarterly on-site supportive supervision
  - training and refresher training: malaria microscopy external competency assessment (ECAAM) in Cabo Verde and refresher training of staff on case and outbreak investigation conducted in 2022.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials for first- and second-line treatment in 2022, but shortages of primaquine and injectable artesunate were experienced.

High-risk populations and hard-to-reach areas

High-risk populations are located in the coastal areas of the country, although the entire population is considered to be at risk.

It is essential to use epidemiological surveillance as the most robust tool in this process, as well as integrated vector control, especially in places with persistent cases. All reported cases are treated and followed up according to guidelines.

In 2022, the critical activities were the active search for cases, IRS and LLIN distribution, and the disinsectization of washed-out breeding sites.

Strategies to accelerate malaria elimination

There is an Acceleration Brigade in place to carry out malaria, TB, HIV and COVID-19 testing. Reported cases are investigated and followed up as per national guidelines.

Another activity explored was the expansion of mass treatment in 10 sites, with the aim of accelerating the elimination of the disease.

Integrated vector control has been a well-considered strategy, although spraying has been carried out in a targeted manner throughout the country, according to the evidence. Studies of the persistence and susceptibility of the vector are also considered.

Surveillance is the cornerstone of this process, along with proper diagnosis and case management. In the context of surveillance, the plan is to consolidate the entry of all data in the DHIS2 platform (malaria cases, case and outbreak investigations and case tracking up to 28 days).

Communication is another important area for conveying innovative messages to raise awareness and mobilize the population towards elimination. The programme needs a technical consultant for this purpose.

Internationally, the University of California is collaborating with the programme on vector control through innovative strategies and research on the mechanisms of resistance of *Anopheles* to insecticides, among other areas. The University of California is a research collaborative with a mission to contribute to the elimination of human malaria by genetically modifying mosquito populations to prevent malaria transmission, in partnership and direct collaboration with Sao Tome and Principe scientists, public health officials, government representatives and communities in an ethical and transparent manner.

South Africa

South Africa is the southernmost country in Africa. It is bounded to the south by 2798 km of coastline that stretches along the South Atlantic and Indian Oceans; to the north by the neighbouring countries of Botswana, Namibia and Zimbabwe; and to the east and north-east by Eswatini and Mozambique. It also completely surrounds the country Lesotho. It is the second most populous country located entirely south of the equator, after the United Republic of Tanzania, covering an area of 1 221 037 km^2. Malaria is endemic in the north-eastern parts of the country – in the Limpopo, Mpumalanga and KwaZulu-Natal provinces.

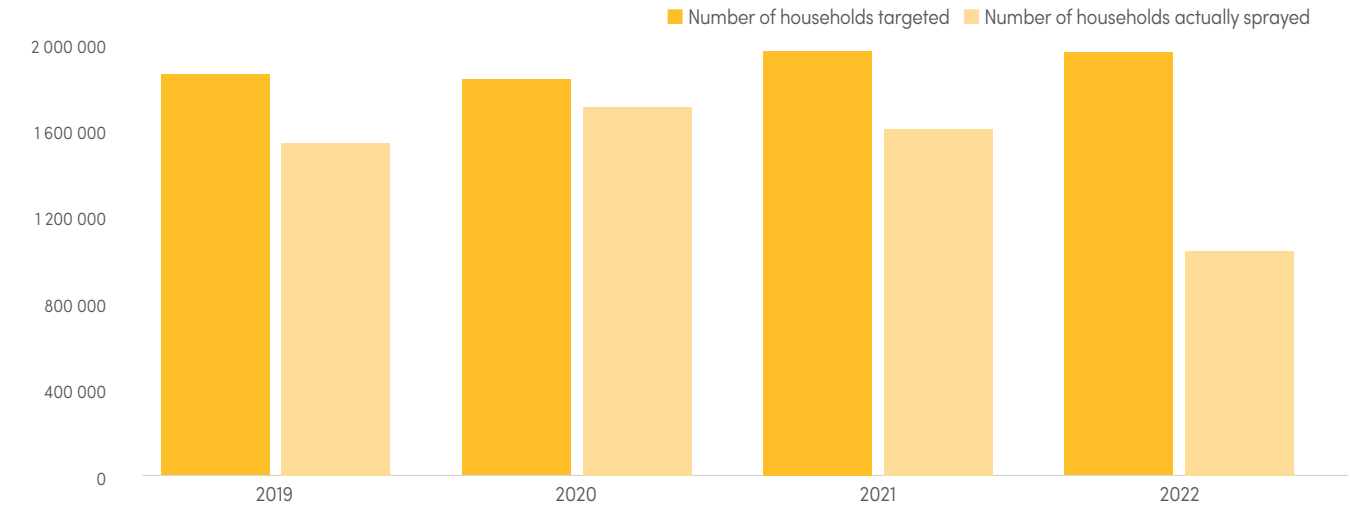
Figure 1. Map of South Africa showing primary administrative divisions and bordering countries

- South Africa is home to about 60.6 million inhabitants and is divided into nine provinces and 52 districts.
- Malaria transmission is seasonal, occurring from September to May, with a peak in the high rainfall months of December and January.
- The national malaria elimination goal was set for 2023, as per the national strategic plan.
- In 2022, the country reported 2043 indigenous malaria cases.

Implementation

Vector control

Figure 2. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Microscopy, RDTs and PCR are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - cross-checking of slides: samples shipped monthly and a report shared quarterly;
  - on-site supportive supervision fully implemented at the facility level through the National Health Laboratory Service utilizing the quality assurance and quality control standards;
  - panel slide reading: slides shared with the National Institute for Communicable Diseases (NICD) and reviews conducted biannually;
  - training and refresher training: annual refresher training for microscopists conducted by the NICD.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

Populations considered at high risk of malaria are mobile and migrant populations, mainly farm and mine workers.

Strategies and approaches

Strategy area	Intervention
Case management	Environmental health practitioner screening, testing and treating at community level
Surveillance	Community health worker screening and testing
Health promotion	Health promotion among farmers and other mobile and migrant populations

Impact achieved

The mobile unit surveillance strategy is to position surveillance units at informal border crossings for mobile and migrant populations. The presence of these units has resulted in the diagnosis and reporting of 50% of all imported cases before they reach the community.

There has been a reduction of unclassified cases in the selected provinces within the main transport hubs.

There has been a decrease in the clustering of cases, thereby lowering local transmission.

Strategies to accelerate malaria elimination

- Subnational verification of malaria elimination is being carried out through the implementation of the malaria elimination audit tool using a multisectoral collaborative approach.
- Implementation of the malaria elimination audit tool in districts earmarked as candidates for elimination has provided avenues for both internal and external teams to conduct supportive visits. The tool has been rolled out in King Cetshwayo District as a candidate district for malaria elimination. Supportive visits target the implementation of the focus programme and response to local cases to ensure that onward transmission is limited or interrupted. This has strengthened the system by creating better documentation and evidence of the drivers of transmission at community level within the targeted districts. The deployment of a multisectoral team comprising national and provincial units and partners, such as the NICD, the National Health Laboratory Service and Clinton Health Access Initiative, as part of the local team conducting supportive visits has raised awareness outside of the malaria vertical structures. Engagement with the Elimination 8 Initiative and WHO at the regional level has also provided opportunities to share experiences and seek advice on any gaps and action plans developed to address those gaps.

Suriname

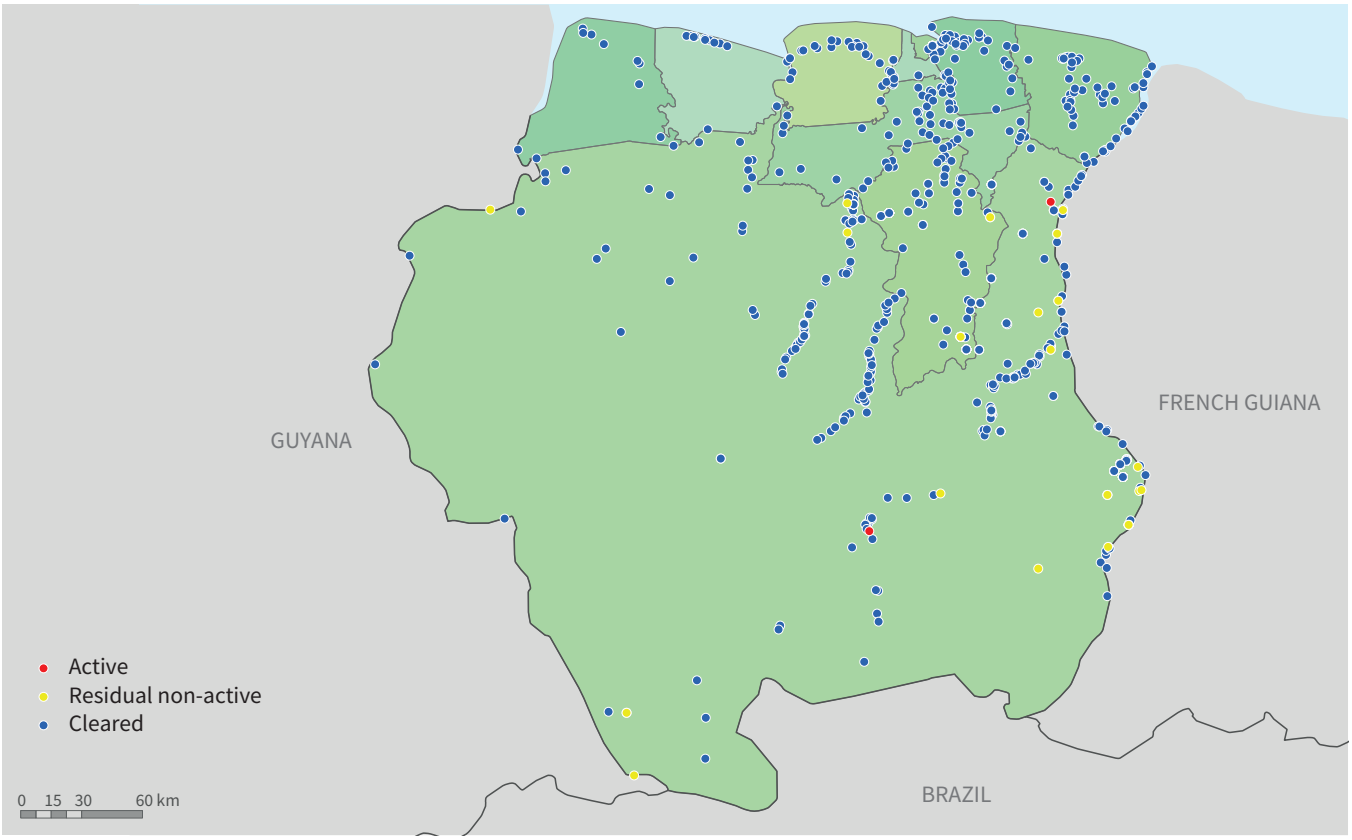
Suriname is a country in northern South America. It is bordered by the Atlantic Ocean to the north, French Guiana to the east, Guyana to the west and Brazil to the south. At just under 164 000 km^2, it is the smallest sovereign state in South America. Suriname has an estimated population of about 613 000. Most of the inhabitants live near the country's (north) coast, in and around its capital and largest city, Paramaribo. It is also one of the least densely populated countries in the world.

- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported zero indigenous malaria cases.
- No malaria death has been reported in the country since 2018.

Figure 1. Map of Suriname showing primary administrative divisions and bordering countries

Malaria cases and foci

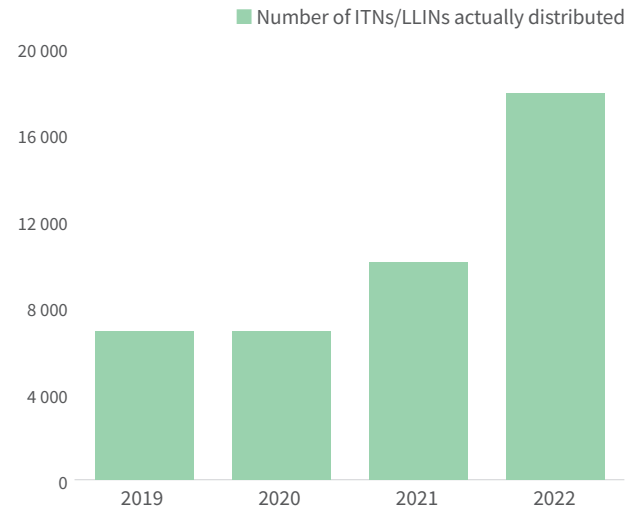
Figure 2. Map of current malaria transmission foci



Implementation

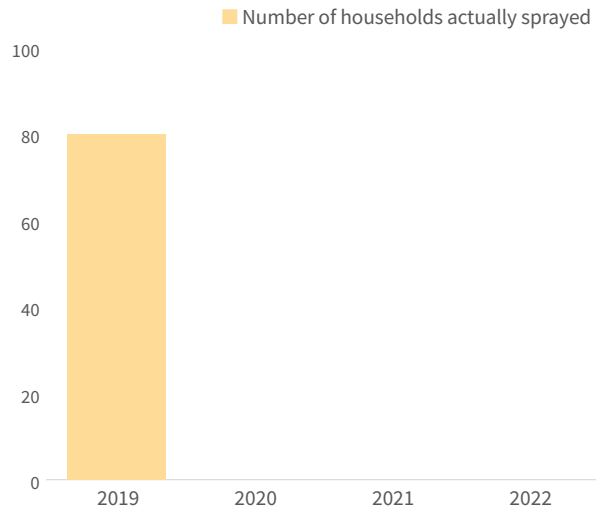
Vector control

Figure 3. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - weekly cross-checking of slides;
  - on-site supportive supervision for malaria service deliverers; other service providers supervised on an ad hoc basis; following the implementation of the national surveillance manual, all laboratories will be included in the supervision;
  - one round of panel slide reading in 2022;
  - external performance assessment: the national level receives a panel of 20 slides from Peru once a year for quality performance assessment;
  - one training (medical mission) and one national refresher training.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

The populations with the highest risk of malaria are migrant miners working in the country and in French Guiana. In Suriname, these migrant miners are offered malaria services from the malaria service deliverers, which are community health workers.

The other high-risk groups are the Indigenous communities. In Suriname, the Indigenous peoples of the interior belong to two main groups: Maroons and Amerindians. They live in villages in the interior of the country along the main rivers. There is a special public health structure, Medische Zending, that provides care for these communities.

These at-risk groups are highly mobile with cross-border movement mostly into French Guiana and Brazil, and to a lesser extent Guyana.

Strategies to prevent re-establishment of malaria transmission

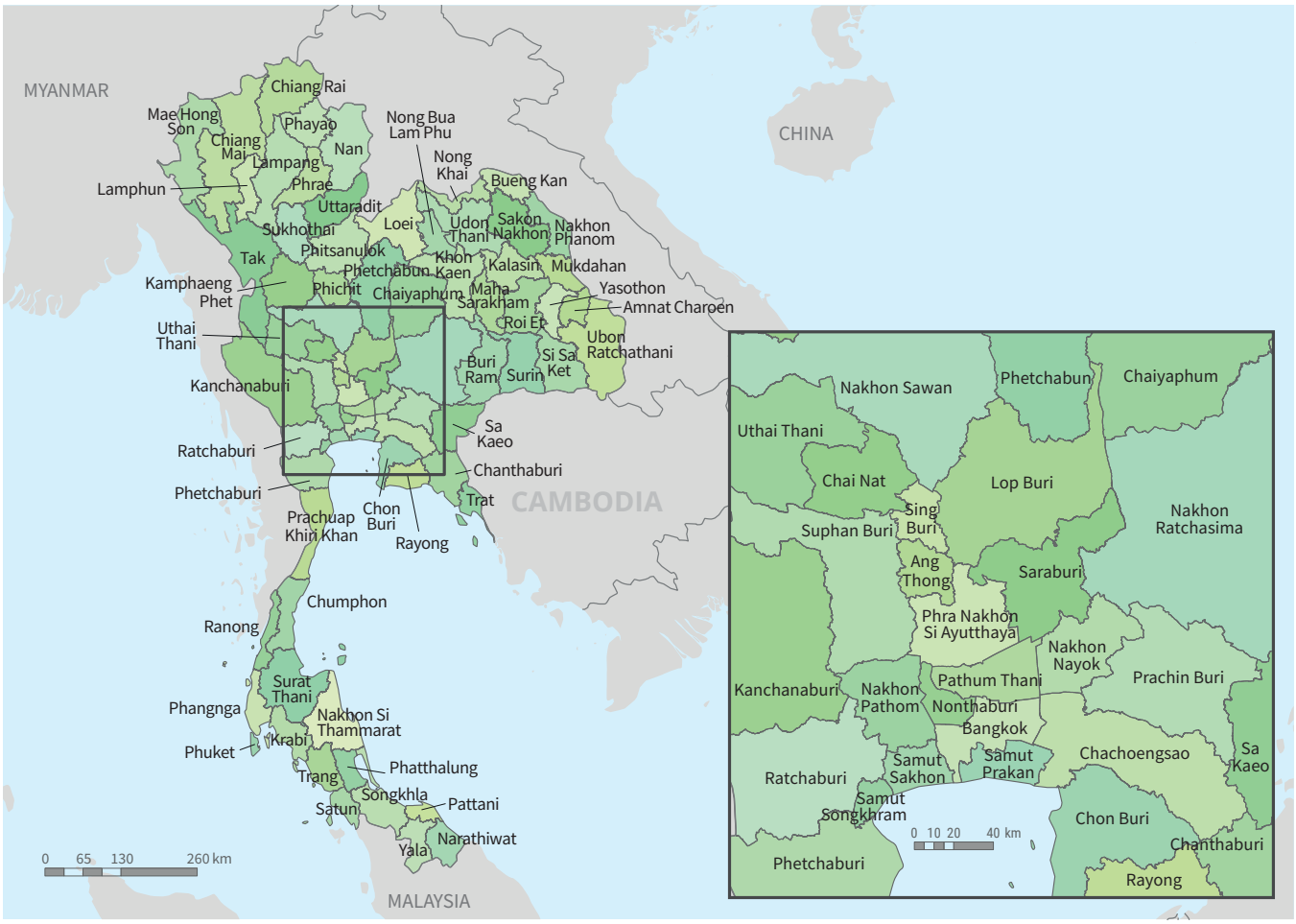
The main components of the national malaria elimination strategy for accelerating malaria elimination in Suriname are to intensify the current commitment and the national and regional coordination of malaria elimination efforts in the country, and to work with partners, such as PAHO/WHO, to extend malaria elimination throughout the whole Guiana Shield. Suriname is also beneficiary of the Global Fund.

Thailand

Thailand is a country in the WHO South-East Asia Region, located at the centre of the Indochinese Peninsula, spanning 513 120 km^2. The country is bordered to the north by Lao People's Democratic Republic and Myanmar, to the east by Cambodia and Lao People's Democratic Republic, to the south by the Gulf of Thailand and Malaysia, and to the west by the Andaman Sea and the extremity of Myanmar. Thailand also shares maritime borders with Viet Nam to the south-east, and India and Indonesia to the south-west. Bangkok is the nation's capital and largest city.

- Thailand has an estimated population of about 66.1 million.
- The malaria transmission season runs from May to August in the country.
- The national malaria elimination goal was set for 2024, as per the national strategic plan.
- In 2022, the country reported 6263 indigenous malaria cases.

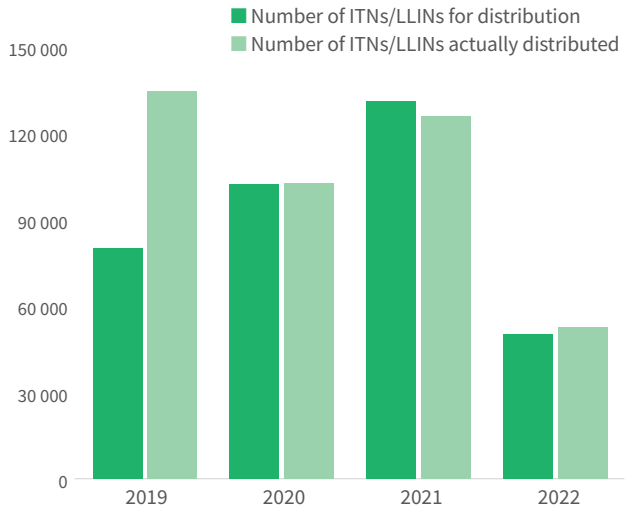
Figure 1. Map of Thailand showing primary administrative divisions and bordering countries



Implementation

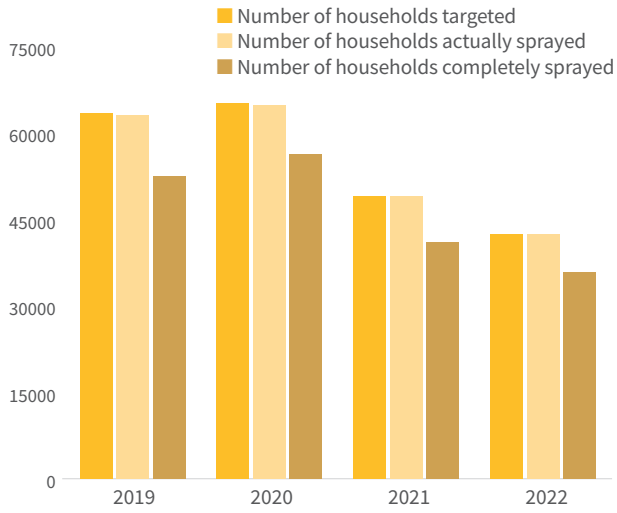
Vector control

Figure 2. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 3. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Microscopy is the main method used for malaria diagnosis, but RDTs are also used in remote areas or where no microscopists are available.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
    - Cross-checking of slides: There are two main levels of slide cross-checking or rechecking. Each level performs this procedure three time per month. The first level is carried out at 12 regional offices (Office for Disease Prevention and Control or Vector-Borne Disease Center) by taking 10% of all slides to recheck. A feedback report is returned to each unit. The second level is done at the national reference laboratory at the Division of Vector-Borne Diseases (DVBD) after completion of the first-level rechecking; 10% of rechecked slides from the Office for Disease Prevention and Control are sent to DVBD for rechecking by external competency assessment experts. A feedback report is sent to the Office for Disease Prevention and Control.
    - On-site supportive supervision: In 2022, the national reference laboratory at DVBD conducted outreach training and supervision at peripheral units and at the provincial level (Vector-Borne Disease Center, Vector-Borne Disease Control Unit and malaria clinic).
    - Panel slide reading (proficiency testing) was carried out once in 2022 (10 slides).
    - Training and refresher training: In 2022, the national reference laboratory at DVBD conducted one training workshop for new microscopists and one refresher training workshop.
- There were no stockouts of RDTs in 2022.
- Stockouts of antimalarials were experienced in 2022.

High-risk populations and hard-to-reach areas

- Tak Province, located in the northern part of Thailand, has Myanmar as its neighbour and remains a persistent malaria transmission area. Many parts of this province are inaccessible during the rainy season.
- Population movements are observed, as the border can be crossed easily when the river is shallow in dry season or along some narrow paths.
- The influx of cross-border migrants due to conflicts in Myanmar has caused malaria outbreaks in the areas near the border.
- Although some activities have been implemented, the number of imported cases detected in migrants is higher than the number of indigenous cases. This will hinder the success of malaria elimination and Thailand may not reach its target by 2024.
- Thailand cannot manage the transmission focus along the border alone, and it is proposed that the focus radius be extend beyond the country's border.

Strategies to accelerate malaria elimination

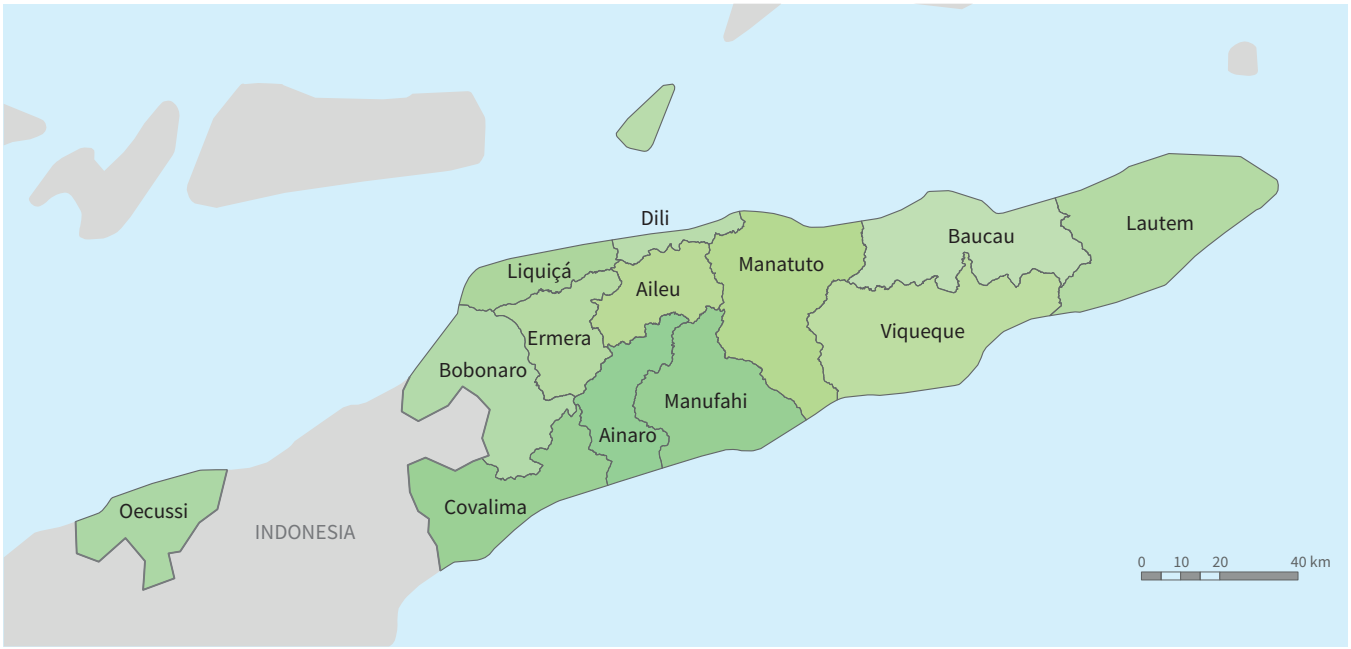
- Intensify the 1-3-7 approach in target areas, including camps.
- Increase coverage of ITNs among migrants.
- Mobilize additional commodities.
- Conduct focal IRS.
- Implement proactive case detection at increased frequency, targeting schools.
- Engage in information, education and communication/behaviour change communication activities.
- Consider chemoprevention with chloroquine for targeted active foci with primarily indigenous cases from provinces along the Myanmar border.

Timor-Leste

Timor-Leste is a country in the WHO South-East Asia Region. It is eastern half of the island of Timor, of which the western half is administered by Indonesia. To the south, its neighbour is Australia, separated by the Timor Sea. The country's size is 14 874 km^2. Dili is its capital and largest city.

- Timor-Leste has an estimated population of over 1.3 million.
- The malaria transmission season runs from September to October in the country.
- The national malaria elimination goal was set for 2025, as per the national strategic plan.
- In 2022, the country reported zero indigenous malaria cases for the second consecutive year.

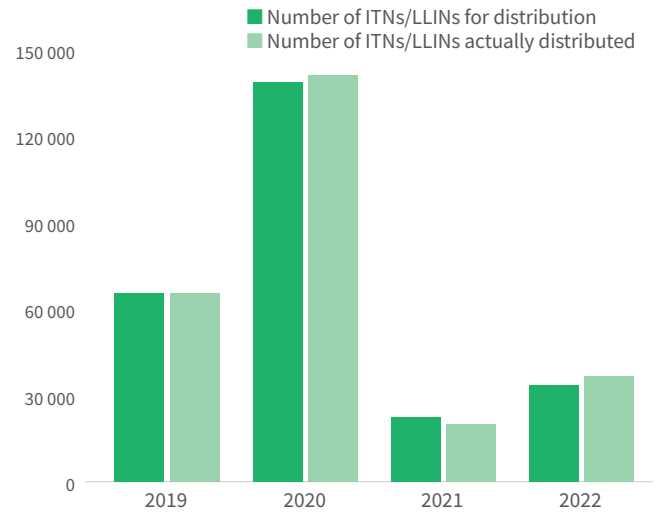
Figure 1. Map of Timor-Leste showing primary administrative divisions and bordering countries



Implementation

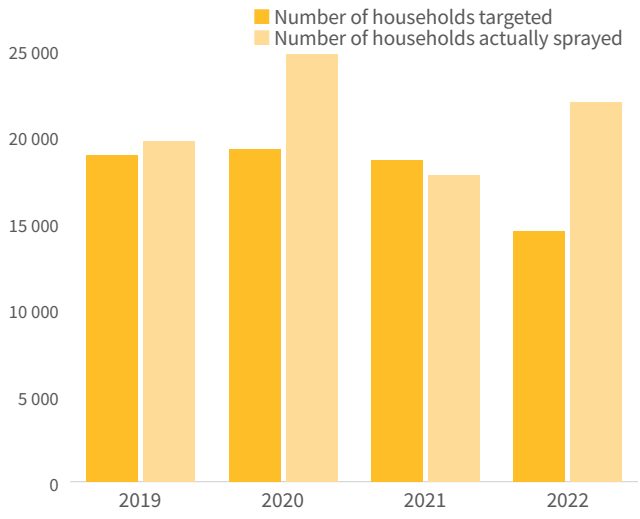
Vector control

Figure 2. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 3. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDT are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - quarterly cross-checking of slides;
  - on-site supportive supervision conducted in municipalities, namely Aileu, Ermera, Bobonaro, Oecusse, Lautém, Baucau, Viqueque, Manatuto, Liquiçá and Dili (including supervision from quality control);
  - nine rounds of panel slide reading;
  - training and refresher training for analysts, clinicians, nurses, midwives, malaria officers and other relevant health staff on quality-assured diagnosis and case management.
- There were no stockouts of RDTs in 2022.
- There were no stockouts of antimalarials in 2022.

High-risk populations and hard-to-reach areas

At present, the groups at high risk of malaria infection include:

- local people residing in villages close to the international border, where they may be exposed to malaria from the bite of infected mosquitoes that fly across the border;
- ethnic minority groups who live in remote and hard-to-reach areas and whose visits to border areas for hunting and collecting products may make them vulnerable to malaria;
- mobile and migrant populations that move between Timor-Leste and West Timor, Indonesia, for temporary work or other business;
- national security forces who are posted or patrol along borders;
- family members and their relatives who live on both sides of the international border and visit their relatives in West Timor, Indonesia;
- farmers engaged in slash and burn agricultural practices and plantation work, and migrant fishermen in border areas; farmers are very often accompanied by their wives and children.

The overall goal is to sustain Timor-Leste's malaria-free status.

The first "Cross Border Initiative collaboration meeting" between Indonesia and Timor-Leste was held in Bali, Indonesia, on 11 January 2017. Efforts to eliminate malaria in Indonesia and Timor-Leste were discussed, focusing on the border areas and migrants.

The second and third Cross Border Meetings on communicable diseases control between the Ministries of Health of Indonesia and Timor-Leste were held in February and August 2019. The second meeting focused on developing a broad plan of action for priority diseases, as agreed by the Ministries of Health of both countries, which led to the "Dili Declaration".

The primary objectives of the third meeting were to develop activity implementation plans for each programme based on the identified topics, to establish the coordination mechanism and service pathway for disease control/elimination and prevention of AIDS, tuberculosis and malaria, and to monitor and evaluate the existing joint activities on AIDS, tuberculosis and malaria. These discussions led to the development of a joint strategic action plan 2019–2020, which was signed by both countries.

However, the joint action plan could not be implemented as planned due to the COVID-19 situation in 2019–2021. The COVID-19 situation also affected the implementation of the road map for cross-border collaboration for malaria elimination in Indonesia and Timor-Leste 2021–2022, which was also developed.

The high-level technical meeting on cross-border collaboration, held on 11–15 July 2022 in Jakarta, was recommended to establish a mechanism for data-sharing between the two countries, to establish an inter-country task force on cross-border collaboration, to determine resource mobilization needs to inform the next funding request from the Global Fund to Fight AIDS, Tuberculosis and Malaria and support from WHO, and to advocate for flexibility of policies to ensure that Timorese nationals in Indonesia can access care and treatment support.

Over the past four years (June 2018–December 2022) Timor-Leste has reported zero indigenous cases, including in the border municipalities (except for a few locally acquired cases reported in Oecusse in 2020), demonstrating that the country would have been capable of detecting local transmission of malaria when it was occurring.

However, in the absence of appropriate action, malaria could become re-established. The probability of this is determined by the levels of receptivity and vulnerability.

Carrying out regular assessment of the degree of receptivity and vulnerability and the mapping of populations at risk, particularly in border areas, will ensure that all populations are adequately covered by malaria surveillance.

Strategies to prevent re-establishment of malaria transmission

To strengthen cross-border cooperation and collaboration, the focus is on:

- establishing an inter-country task force with nominated national and border focal points; and
- setting up inter-country reporting mechanisms to support the regular exchange of information, based on standard/agreeable formats/forms, and ensure timely reporting of unusual/outbreak malaria situations in the border areas of participating countries.

To enhance programme capacity, the focus is on:

- conducting in-service training for different categories of malaria programme and health staff, depending on local needs arising in border areas; and
- supporting exchange visits, study tours and joint training on malaria.

To improve disease management, surveillance and prevention practices in border areas, the focus is on:

- conducting the countries' problems/needs assessment;
- carrying out regular assessment(s) of the levels of receptivity and vulnerability to update risk stratification and map vulnerable populations;
- upgrading national capacities in malaria surveillance to enhance community capacity-building, focusing on maintaining the high standards of health staff's competencies and skills as malaria becomes less common in both countries; and
- identifying and forecasting outbreak-prone areas/situations to boost emergency preparedness.

To enhance community capacity-building, the focus is on:

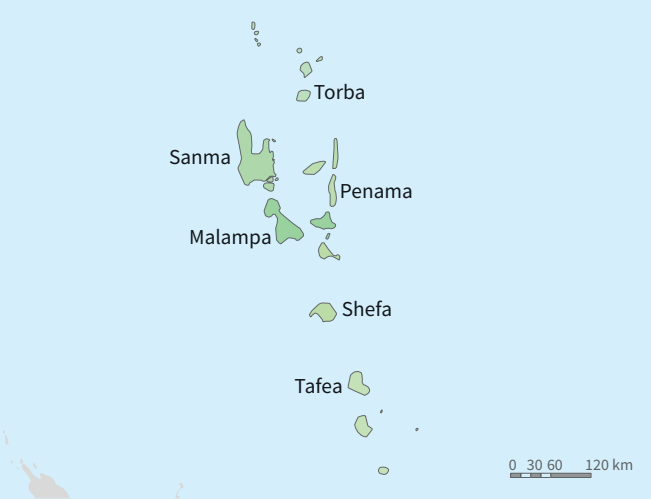
- producing and disseminating targeted/local information, education, communication and advocacy materials related to malaria elimination and prevention; and
- raising public awareness on malaria prevention.

Vanuatu

Vanuatu is an island country located in the South Pacific Ocean and the WHO Western Pacific Region. The archipelago, which is of volcanic origin, lies 1750 km east of northern Australia, 540 km north-east of New Caledonia, east of New Guinea, south-east of Solomon Islands and west of Fiji.

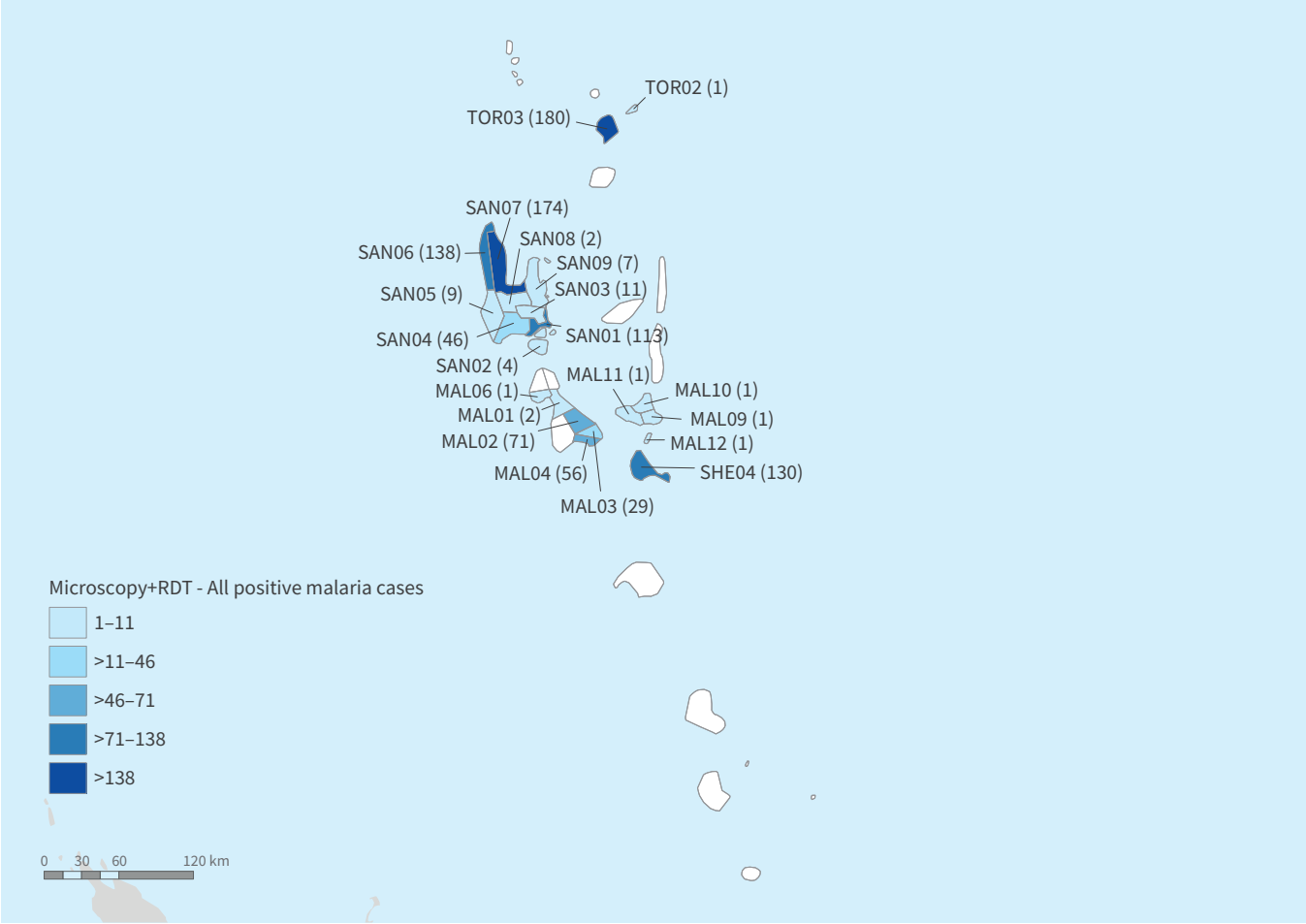
- Vanuatu has an estimated population of over 301 000.
- The malaria transmission season runs from November to April in the country.
- The national malaria elimination goal was set for 2026, as per the national strategic plan.
- In 2022, the country reported 1102 indigenous malaria cases.

Figure 1. Map of Vanuatu showing primary administrative divisions and bordering countries



Malaria cases and foci

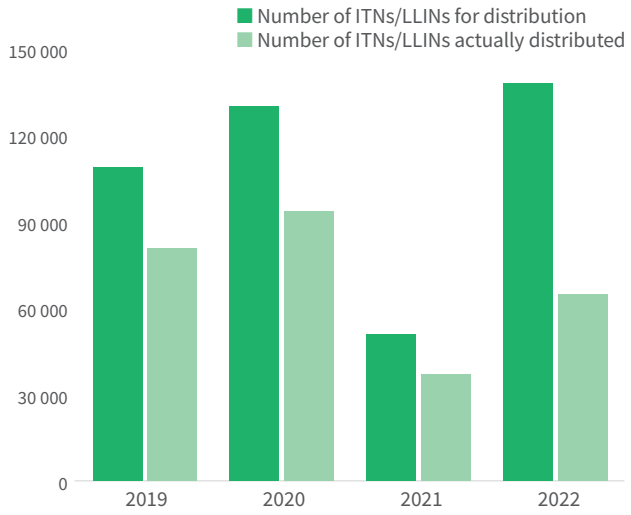
Figure 2. Malaria cases (microscopy + RDT)



Implementation

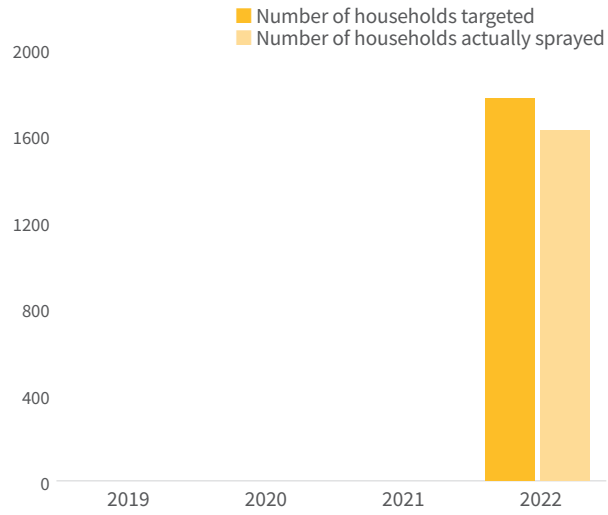
Vector control

Figure 3. Distribution of ITNs/LLINs, 2019–2022



ITN: insecticide-treated mosquito net; LLIN: long-lasting insecticidal net.

Figure 4. Implementation of IRS in 2019–2022



IRS: indoor residual spraying.

Quality assured diagnosis and case management

- Both microscopy and RDTs are used for malaria diagnosis.
- The following activities were implemented in 2022 to assure the quality of malaria diagnosis:
  - on-site supportive supervision for individual cases within each health zone.
- Stockouts of RDTs were experienced in 2022 for a short duration.
- Stockouts of primaquine were experienced in 2022.

High-risk populations and hard-to-reach areas

The population at risk for malaria are people living in active focus areas, who are more susceptible to malaria disease. The vectors in these areas are more receptive, presenting a high likelihood that a person will become sick from the bite of an infected mosquito. In addition, the impact of climate change and the creation of favourable breeding sites in human habitats have increased the vulnerability of the population to infection. Furthermore, Vanuatu is made up of small islands, with populations residing along the mountainous coastlines and in the interior. Some populations are hard to reach due to geographical isolation and mountainous terrain, which hinders support from preventive and curative services and surveillance response.

The strategies and approaches taken include:

- maintaining very high levels of coverage with LLINs and implementing IRS in selected higher incidence areas and foci to rapidly reduce malaria transmission;
- continuously conducting case-based surveillance and responding to cases from high-risk populations and hard-to-reach areas using the 1-7-60 approach;
- continuously testing all fever cases for malaria by RDT or microscopy, and providing prompt radical treatment and care for all confirmed cases according to the national malaria diagnosis and treatment guidelines; and
- implementing a contiguous community mobilization approach through health promotion and leveraging the support of all stakeholders in a multisectoral effort to accelerate the elimination of malaria.

Strategies to accelerate malaria elimination

The strategies that were implemented in 2022 to help accelerate elimination are:

- continuous monitoring and ensuring that malaria commodities are always available for prompt diagnosis and appropriate treatment;
- continuous distribution of LLINs to high-risk and hard-to-reach populations under universal coverage, within the three-year replacement cycle in targeted and planned areas;
- continuous case management training of health workers on appropriate diagnosis and treatment, and new diagnostic tools and treatment regimens; training also includes data quality and reporting timelines for prompt response;
- monitoring cases through case-based surveillance and response, and ensuring that all cases are reported, investigated, classified and responded to within the timeline of the 1-7-60 approach;
- monitoring and encouraging health workers to test all fever cases;
- collaborating with other multisectoral organizations to address the situation and the hope of achieving elimination;
- strengthening programme management at all levels of programme implementation, such as improved workforce management, programme planning, funds disbursement, technical assistance and cooperation, procurement and supply chain management, and performance monitoring; and
- continuing to leverage technical partnerships in support of innovation by generating new knowledge and applying it to improve the delivery and quality of malaria services in the country.
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