



MINISTRI BLONG HELT

VANUATU

Annual Program Report 2022

Malaria and other Vector Borne Diseases
Control Program

Foreword

The Malaria and Other Vector Borne Diseases Program is pleased to provide this annual report of activities, achievements and challenges for 2022. In the past decade, Vanuatu has experienced drastic reductions in malaria incidence through concerted efforts guided by the *National Malaria Strategic Plan (2015-2020)* and earlier plans. In 2021, the Program entered a new era under the *National Strategic Plan for Malaria Elimination (2021-2026)*. This elimination strategy presents ambitious goals and targets with the aim to eliminate malaria from Vanuatu by the end of 2023.

Progress in the first year of the strategy was good. There were just 322 cases reported nationwide and the API was further reduced to 1.1 per 1000 population, despite multiple challenges to implementing activities and to the health system more broadly - including the COVID-19 pandemic. However, in 2022 upsurges of malaria occurred in multiple areas of the country. This included spreading and increase in cases in Santo, Malekula and Epi islands, and re-establishment of transmission in Vanua Lava and Ambae. The total number of cases in 2022 tripled compared to 2021, with 1,143 cases confirmed. All cases reported have been *Plasmodium vivax* with no deaths noted in 2022. However, it is clear that Vanuatu is now off-track to meet the elimination target set for the end of 2023.

This report sets out the malaria situation in 2022 and the activities completed to address the upsurges plus the challenges faced. The intention is that this will serve to inform optimization of activities in 2023 and beyond, and potentially inform adjustments to elimination timelines and targets. The challenges now faced reiterate the importance of continuously working together to strengthen the health systems at all levels of service delivery. We must continue to evaluate and review in order to identify gaps, challenges and weaknesses, as well as to identify windows of opportunity towards success.

The Program wishes to acknowledge the continuous support of health development partners who remain committed to malaria elimination and reduction of vector-borne diseases. Significant technical and financial contributions were provided by the Global Fund through UNDP and from Rotarians Against Malaria (RAM) and the World Health Organization (WHO). This support was key in enabling continued and emergency responses in 2022.

Malaria is preventable, treatable, and can be defeated. I strongly believe that with continuous commitment from the Government of Vanuatu and ongoing support from development partners, we will get back on track to achieving a malaria-free Vanuatu.

Mr Wesley Donald

Coordinator

Malaria and Other Vector Borne Diseases Control Program



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Introduction

Malaria has historically been one of the leading causes of illness in Vanuatu. Since 2004, the Ministry of Health (MOH) and its partners have implemented an intensified program to progressively control and reduce malaria. This has included: widespread access to diagnosis by microscopy or rapid diagnostic test (RDT); highly effective treatment with artemisinin-based combination therapy (ACT); high coverage with long-lasting insecticidal mosquito nets (LLINs) in selected health zones based on stratification; widespread community engagement; surveillance and response; and intensive targeted technical assistance.

The number of cases dropped countrywide from over 15,000 in 2003 to fewer than 1,000 in 2014. There was a sharp dip in reported cases observed in 2015 which was likely due to reduced surveillance and control activities resulting from widespread disruption caused by Tropical Cyclone Pam in March 2015. Since then, the API dropped from 6.8 in 2016 to 1.05 in 2021.

In the southern province of Tafea, the last local cases of malaria were reported in 2014. Tafea was declared malaria-free in November 2017 following three years of no local cases. Province-wide elimination has provided a model that can be adopted elsewhere in the country. This is based on timely delivery of proven interventions by trained personnel to achieve high coverage and impact (see [Case study: Successful elimination of Malaria, Tafea province, Vanuatu](#)).

In 2022, there was a significant increase in API to 3.6 per 1,000 population. Most of the cases were reported on Santo (Sanma), Vanua Lava (Torba), Malekula (Malampa) and Epi (Shefa) islands, although cases have also been reported in Ambae (Penama) and elsewhere in those five provinces. The API is therefore significantly above the national API target of 0.5 set out in the *National Strategic Plan for Malaria Elimination (2021-2026)* for 2022. There have been no confirmed malaria-related deaths in Vanuatu reported since 2011.

Progress against malaria in 2022 was constrained by a number of factors. COVID-19 preparedness activities continued to be implemented in early 2022, with the first community outbreak of reported in March 2022. This led to widespread community lockdowns and domestic travel restrictions, with suspension of any health activities that were not related to COVID-19. Human resources were re-allocated from the Program to support vaccination, community engagement, surveillance and repatriation/quarantine operations. This drew on malaria program staff time and led to the delay of some planned activities.

Other challenges that undermined the ability of the Program to deliver malaria interventions included limited funds from the Government recurrent funds to conduct prompt case investigations, limited human resources, ongoing delays in disbursement of funds that restricted timely implementation of activities, particularly for case investigations and response in areas with other logistic and geographical constraints.

As outlined in the 2021 Annual Program Report, the gains that had been made against malaria in Vanuatu were – and continue to be – fragile. While progress had been remarkable to 2021, in 2022 despite continued efforts there has been an unfortunately backslide with the number of cases increasing rapidly in multiple areas of the country. A reinvigorated and concerted effort will be required over the ensuing years to achieve the vision of a malaria-free Vanuatu contributing to the good health and well-being of the population.

This annual report provides an overview of malaria in Vanuatu in 2022 and program achievements against some of the key performance indicators as set out in the *National Strategic Plan for Malaria Elimination Monitoring and Evaluation* plan. It is important to note that this presents data available to the national team (mainly through DHIS-2) as of 30 January 2023, with additional reports likely. Outcome and output indicators are presented in the context of the five key interventions: vector control; case-based surveillance; case management; health promotions and community engagement; and, disaster preparedness. Progress against impact indicators is discussed in reference to broader trends and baselines, while considering factors that may have influenced overall performance against these targets.

Financial and technical contributions from the Ministry of Health and development partners are presented. In particular, support from the Global Fund to Fight AIDS, Tuberculosis and Malaria, Rotarians Against Malaria, the World Health Organization, and Australia Aid (through the Vanuatu Health Program) is gratefully acknowledged.

Program objectives

The program objectives are set out in the *National Strategic Plan for Malaria Elimination (2021-2026)* and are summarized below.

2.1 Vision

A malaria free Vanuatu, contributing to the good health and well-being of the population.






2.2 Goals

1. Prevent re-establishment of transmission in all provinces where transmission has been interrupted.
2. Achieve zero indigenous malaria cases in all provinces of Vanuatu by the end of 2023.
3. Receive World Health Organization (WHO) certification of malaria-free status in 2026.



2.3 Mission statement

The malaria program aims to progressively control and eliminate malaria in all provinces of Vanuatu (Table 1). The Program works in close partnership with provincial health services and local communities to ensure that universal access to health promotion, prevention with long-lasting insecticidal bed nets, and quality-assured diagnosis and treatment is maintained. It aims to use indoor residual spraying to accelerate reduction in malaria transmission in selected areas. It seeks to strengthen and maintain excellent surveillance and apply new knowledge as it becomes available in order to achieve malaria elimination and prevention of reintroduction.

2.4 Strategic objectives (key interventions)

	Intervention	Objective
	Vector control and personal protection	To maintain very high levels of coverage with long-lasting insecticidal mosquito nets (LLIN); <i>and</i> to rapidly reduce malaria transmission in selected higher-incidence areas and foci using indoor residual spraying (IRS). ¹
	Case-based surveillance	To roll out case-based surveillance and response nationwide using the '1-7-60' approach. ²
	Early and effective malaria case management	To test all fever cases for malaria by rapid diagnostic test (RDT) or microscopy, and provide prompt radical treatment and care for all confirmed cases according to the national Malaria Diagnosis and Treatment Guidelines.
	Health promotion and community engagement	To mobilize communities through health promotion and leverage the support of all stakeholders in a multi-sectoral effort to accelerate the elimination of malaria.
	Disaster relief preparedness and response	To ensure that malaria and other VBD prevention, surveillance and case management are well integrated into disaster preparedness and response activities.

2.5 Strategic objectives (supporting elements)

	Intervention	Objective
	Strengthen program management	To maintain a high level of political commitment to malaria elimination; <i>and</i> to strengthen program management at national level and implementation at provincial and local levels through improved mechanisms for workforce management, program planning, disbursement of funds, information and data management, technical assistance and cooperation, procurement and supply chain management, and performance monitoring.
	Operational research	To leverage technical partnerships in support of innovation by generating new knowledge and applying it to improve delivery and quality of malaria services.

¹ In Vanuatu's elimination context, higher incidence areas are defined as health zones with a persistent annual parasite incidence (API) of 1 or more (cases per thousand population) *and* residual foci of infection.

² Case-based surveillance will follow a '1-7-60' strategy, with every case to be: reported to provincial level within 1 day of detection; investigated, classified and responded to as appropriate within 7 days of detection; and followed-up to verify outcome within 60 days after detection.

2.6 Timelines and targets

Table 1. Key targets outlined in the *National Strategic Plan for Malaria Elimination (2021-2026)*

	2021	2022	2023	2024	2025	2026
National API in cases/ 1,000 pop	≤ 1	≤ 0.5	≤ 0.2	≤ 0.1	≤ 0.1	≤ 0.1
Indigenous cases*	≤ 280	≤ 140	≤ 56	0	0	0
Achieve zero indigenous cases	Penama, Torba	Shefa	Malampa, Sanma			National certification
Maintain prevention of re-establishment	Tafea	Tafea, Torba, Penama	Tafea, Torba, Penama, Shefa	All	All	All

* The target number of cases per year may be adjusted depending on the population, with adjustment according to population growth and estimates based on available evidence.

Due to the significantly changed situation in 2022, these targets may need to be revised. API estimates may also need to be updated based on the 2020 census data.

Key outcomes and achievements in 2022

Key program achievements in 2022 included:

- Continuation of routine program activities despite significant interruptions due to COVID-19 community transmission
- Launch of emergency responses to upsurges in five provinces from July 2023
- 1,030 case investigations completed across 5 provinces
- Decrease in the proportion of *P. falciparum* or mixed cases from 9.2% in 2020 to 0% (0 cases) in 2022
- 62,359 LLINs distributed in targeted health zones in 2022.
- 9,017 LLINs distributed to target risk groups through continuous distributions.
- 100% of all confirmed cases treated with Coartem (but only 21% treated with Primaquine) as the first line treatment regimen

Table 2. Key impact indicators and annual targets

INDICATORS	2021	2022	2023	2024	2025	2026
Annual parasite incidence	≤1	≤0.5	≤0.2	≤0.1	≤0.1	≤0.1
Indigenous malaria cases*	≤280	≤140	≤56	0	0	0

Number of provinces with zero locally transmitted cases of malaria	3	4	6	6	6	6
Inpatient malaria deaths per year: rate per 100,000 persons per year	0	0	0	0	0	0
Malaria test positivity rate	≤1.25	≤1	≤1	0	0	0
Number of active foci of malaria	36	18	8	0	0	0
Number of people and percentage of population living in an active foci	TBC	TBC	TBC	TBC	TBC	TBC

API: Confirmed malaria cases (microscopy or RDT): rate per 1000 persons per year

* This has been updated for 2022 based on recent population estimated from the Vanuatu National Statistics Office, as informed by the 2019 Population and Housing Census.

Table 3. Key outcome indicators and annual targets, by intervention

OUTCOME						
KEY INTERVENTION 1: Malaria vector control and personal protection						
Percentage of population living in receptive areas covered by appropriate vector control	100%	100%	100%	100%	100%	100%
KEY INTERVENTION 2: Case-based surveillance for elimination						
Annual blood examination rate: per 100 population per year	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Percentage of expected MMLL reports that are actually received	100%	100%	100%	100%	100%	100%
Percentage of cases notified to provincial officers within 24 hours of confirmation	100%	100%	100%	100%	100%	100%
Percentage of confirmed cases investigated, classified and managed within 7-days of notification	90%	95%	100%	100%	100%	100%

Percentage of cases investigated, classified and managed within 7-days of notification that are followed up within 60 days	75%	90%	100%	100%	100%	100%
Percentage of malaria foci fully investigated, classified and managed as within 60 days	90%	95%	100%	100%	100%	100%
KEY INTERVENTION 3: Early and effective malaria case management						
Proportion of suspected malaria cases that receive a parasitological test	100%	100%	100%	100%	100%	100%
Percentage of hospitals with microscopy results cross-checked by national reference laboratory	100%	100%	100%	100%	100%	100%
Proportion of confirmed malaria cases that received first-line antimalarial treatment	100%	100%	100%	100%	100%	100%

All indicators are included in Annex 1. Due to the significantly changed situation in 2022, some targets may need to be revised. This will be examined in the Malaria Program Review planned for early 2023.

Malaria situation in 2022

Key national-level indicators are presented below in reference to the targets set in the *National Strategic Plan for Malaria Elimination (2021-2026)*. Further details are provided in the sections below.

Table 4. National outcome indicators, targets and 2022 progress.

INDICATORS	2022 TARGET	2022 SITUATION	TARGET MET?
Annual parasite incidence	≤0.5	3.6	No
Indigenous malaria cases	≤140	1,143	No

Number of provinces with zero locally transmitted cases of malaria	4	1	No
Inpatient malaria deaths per year: rate per 100,000 persons per year	0	0	Yes
Malaria test positivity rate	≤1	5.8	No
Number of active foci of malaria (based on health zones)	18	11	Yes

4.1 Annual parasite incidence (API)

Remarkable reductions in malaria have been evident since 2016, with a decline in annual parasite incidence (API) from 6.8 per 1,000 populations in 2016 to 1.05 per 1,000 populations in 2021. The incidence rate increased by 2.58 from 1.05 in 2021 to 3.63 per 1,000 populations in 2022, which represents more than a tripling in the space of one year.

Table 5. API by province for 2016 - 2022

Province	2016	2017	2018	2019	2020	2021	2022
Malampa	24.3	10.7	5.1	4.9	3.7	1.07	4.18
Sanma	15.7	10.7	3.8	4.2	4.7	2.24	7.55
Penama	0.6	0.78	0.17	0.03	0.05	0	0.35
Shefa	0.4	0.18	1.7	1.0	0.43	1.24	1.98
Tafea	0.0	0.03	0.08	0.03	0.03	0	0
Torba	0.7	0.0	0.72	0.97	0.87	0.34	20.95
Vanuatu	6.8	3.8	2.2	1.9	1.7	1.05	3.63

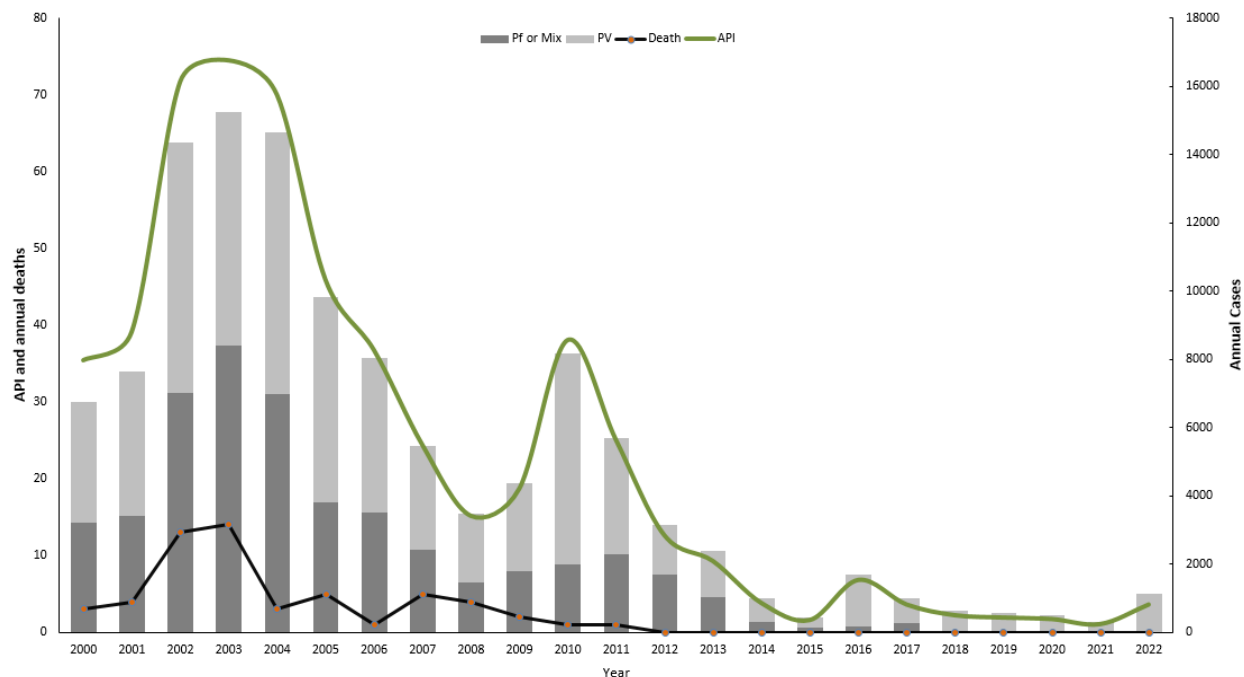
Note: API formula: Total malaria cases/Total population*1000

4.2 Malaria cases and deaths

The number of confirmed malaria deaths has continued to be maintained at zero (0) since 2012. The total number of reported cases decreased from almost 2,000 in 2016 to 322 in 2021 but then increased to 1,143 in 2022. The initial calculation of the target number of cases per year was based on a national population estimate of 280,000. However, the 2019 Population and Housing Census estimated the population at 300,019. Adjusted for population growth, the estimated total national population in 2022 was 314,813. Therefore, this translates to a target of less than 157 cases for 2022 (rather than 140). This target was clearly significantly exceeded.

Since 2010, the predominant parasite species detected in Vanuatu has been *P. vivax* with fewer cases identified as *P. falciparum*. In 2022, for the first time there were zero (0) *P. falciparum* cases reported as all confirmed cases were *P. vivax*.

Figure 1. Number of malaria cases by species (*P. falciparum* & *P. vivax*), deaths, and API for 2000-2022.



4.3 Test positivity rate

Test Positivity Rate (TPR) represents the number of confirmed tests against the tested population. It can give an indication of whether reductions in case numbers represent a true decrease in burden, or whether there may have been issues with under-testing.

The total number of cases confirmed using both RDT and microscopy in 2022 was 1,143 cases. This represents a decline from almost 2,000 confirmed cases in 2016 but an increase relative to 2018-2021. In 2022, the TPR achieved was 5.8% based on the reported confirmed cases. This was higher than the TPR in 2020 of 3.2%. This increase may have been influenced by the number of people presenting to health facilities with fevers for testing in 2022, as a result of concerns over COVID-19, and also the number of cases detected through emergency response activities that included widespread screening with RDTs.

While there were some concerns over a new brand of RDTs for detection *P. falciparum* and/or *P. vivax* infections, the detection of many cases and the moderate TPR indicate that testing is still of use. Any concerns over RDT sensitivity or specificity should be evaluated with quality assurance or a controlled field study rather than relying on anecdotal evidence.

4.4 Malaria case distribution

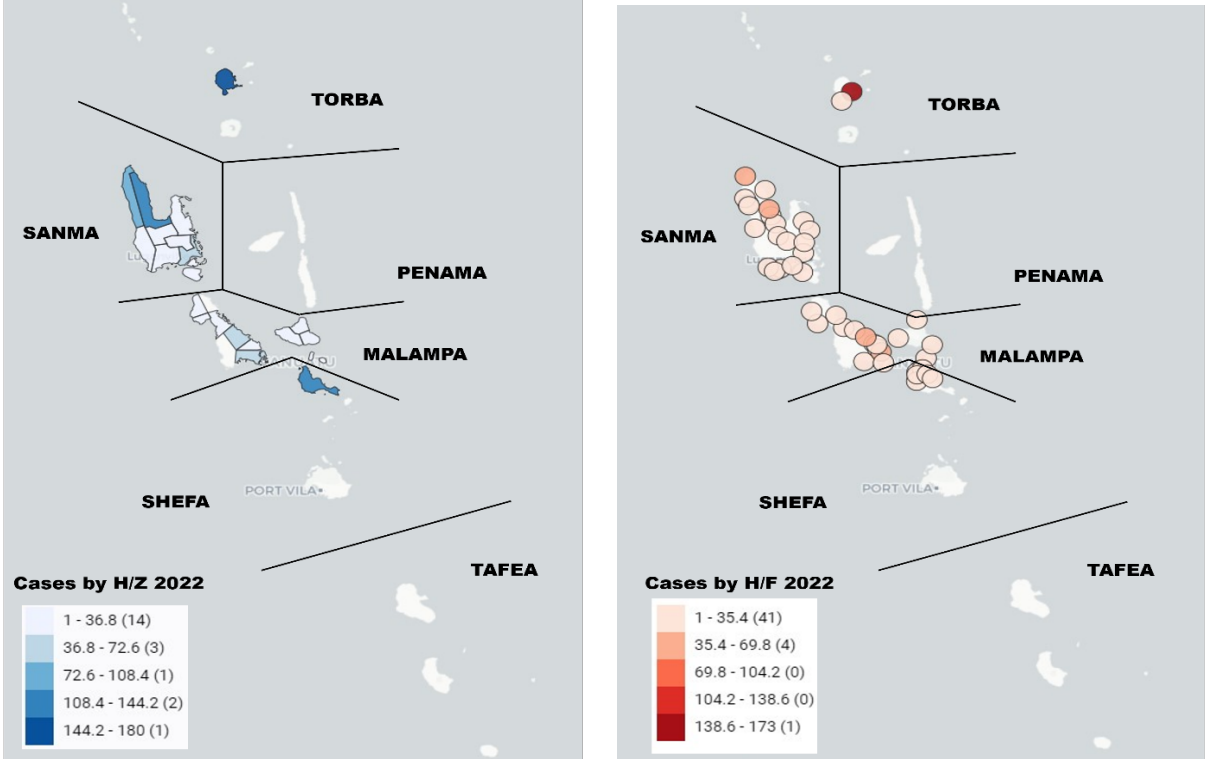
Spatial distribution

Malaria disease distribution in Vanuatu is not uniform but varies by province and health zone, and also exhibits periodicity. Transmission is usually highest close to the coastal zone where the primary and only known vector in Vanuatu (*Anopheles farauti* s.s.) is highly prevalent.

Between 2017 and 2021, malaria burden was concentrated in the islands of Santo in Sanma Province, Malekula in Malampa and Epi in Shefa Province. As seen in Figure 2, Tafea province has continued to maintain zero local case from 2017 onwards. The province of Torba had also reached zero (0) cases in 2017 and 2018, however a small number of indigenous cases were reported from 2019 to 2021, with a significant resurgence in 2022.

Since 2020, malaria transmission has been re-established on some islands after years with no reported cases, such as Paama Island and Ambrym Island (Malampa province). However, in 2022 – or perhaps even earlier - there was geographical spread to other areas that included Vanua Lavae and Ambae. Both Torba and Penama province had been close to elimination, with no local cases for two consecutive years.

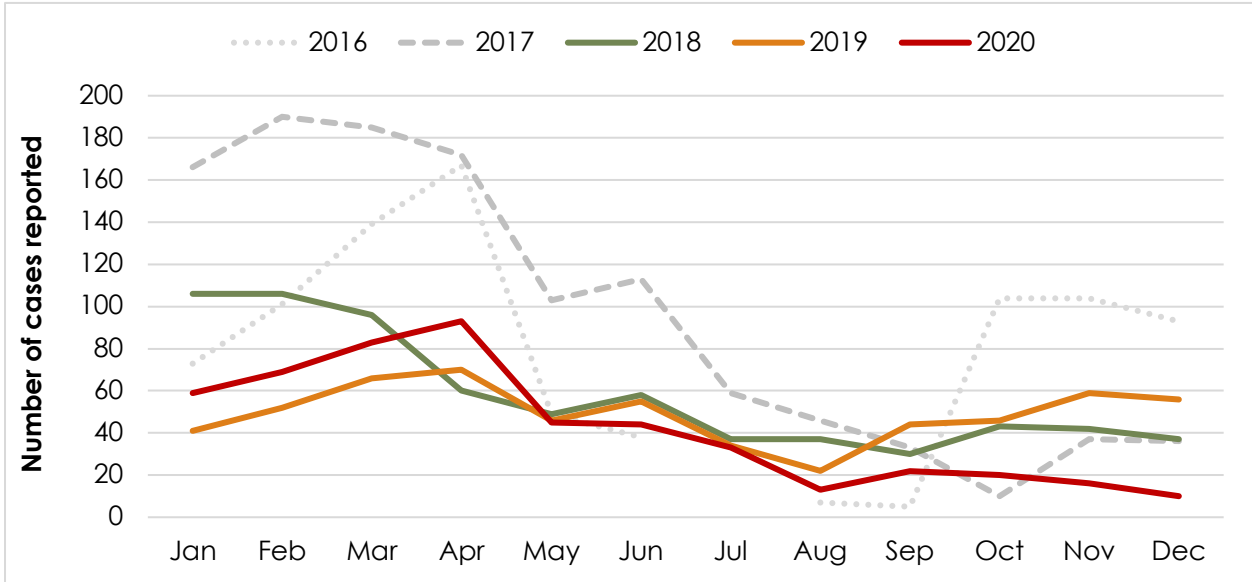
Figure 2. Malaria case map showing distribution of cases by health zone and health facility, for 2022.



Temporal distribution

Malaria incidence has not been stable over time but has fluctuated over the past three years with marked increases in 2022. There have been clear seasonal patterns of malaria transmission, with cases increasing in October, reaching a peak in January to March or April, and then decreasing to a low from May to September.

Figure 3. Number of reported malaria cases by month, for 2016-2020.



Drivers of transmission

Most cases are domestic imported cases due to frequent travelers from other nearby islands with pockets of transmission. Undetected asymptomatic infections and delays in parasitological testing and treatment also contribute to continuous transmission on the islands.

Several other contributing factors are believed to influence the situation, such as unexpected continuous rainfall patterns and tropical cyclones due to climate change, vulnerable mosquito breeding sites along the riverbanks, and an extreme temperature and humidity gradient between the north and south of the country. In addition, those living a nomadic lifestyle in highland areas and the uncontrollable population movements among communities and villagers in transmission zones also challenges the delivery of malaria health services and response activities. Other possible factors complicating control are compliance to treatment especially for *P. vivax* infections under Direct Observe Treatment (DOT).

In spite of these challenges, the Program aimed in 2022 to continue as per the work plan to pro-actively address constraints by conducting more communication and advocacy through health zone meetings with communities and stakeholders, by providing more trainings and supervision, and by conducting focal Indoor Residual Spraying (IRS) in active foci areas in Sanma, Shefa, Torba and Malampa provinces.

Travel advice

With all the investment and support from Vanuatu government through Ministry of Health and development partners to continue the fight against malaria, until recently most islands had continuously experienced declining burden of malaria. However, the significant increase in cases in 2022 that affected most provinces of Vanuatu indicates

an elevated risk of malaria for travellers and local citizens. Whereas previously it was considered quite safe to travel to in Vanuatu, the increase in malaria cases indicates that anyone travelling to or residing in high risk areas should be informed of how to prevent malaria and the symptoms. All people in Vanuatu are reminded to always remember to use preventive measures to protect from mosquito bites, such as using insecticide treated mosquito nets each night, and using mosquito coils or mosquito repellents. Everyone is also encouraged to report to a health facility if they have a fever.

4.5 Stratification of at-risk population

There are certain groups of populations at higher risk of malaria. It is important to identify these groups to appropriately target interventions for the highest impact. In a control setting, these are identified through higher APIs by province and by health zone; for an elimination program, foci classifications are used.

The 2021 Malaria Stratification Plan uses receptivity risk categories based on API but shifts the thresholds downwards relative to the previous Plan. Therefore, the cut-offs for high risk (API ≥ 5) and medium risk (API ≥ 0.5) have been shifted downwards. Three urban centers are also identified as being particularly vulnerable for importation of malaria, with Port Vila and Luganville considered high vulnerability and Lenakel considered medium vulnerability. As there is a shift to identifying foci based on villages (rather than health zones), any populations in foci outside of high risk areas are also be added to the high risk strata.

Further work is required to revise the definition and guidance for foci and to reflect this in the stratification plan for consistency. In particular, it will be important to consider if a re-classification is required given the significant change in malaria burden. While stratification at village level will eventually enable better identification of the important foci of transmission, this should be given careful consideration to ensure that the stratification outcome is useful to guide operations. This process is being supported through the DHIS-2 Tracker which allows mapping of cases to village administrative level. A new Malaria Elimination Operations Manual was developed in 2021 to support this stratification and shift in foci definition.

Table 6. Population at risk in 2021

Risk Strata	Receptive Populations	Vulnerable Urban Populations	Vulnerable Foci Population	Targeted pop (of national pop)
High only	18 highest incidence HZs (≥ 5 API)	Port Vila and Luganville	Additional village foci outside of high HZs	169,062 (55.7%)
Medium and high	36 high and medium incidence HZs (≥ 0.5 API)	Port Vila, Luganville and Lenakel	Additional village foci outside of high and medium HZs	247,543 (81.6%)

All at risk (low, medium and high)	All 49 health zones	Port Vila, Luganville and Lenakel	All foci villages	303,371 (100%)
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Program key deliverables and achievements by intervention area

5.1 Intervention 1: Malaria vector control and personal protection



Long-lasting insecticide treated nets (LLINs) and indoor residual spraying (IRS) are core interventions for reducing vectorial capacity and transmission.

Table 7. Outcome and progress indicators, targets and 2022 progress.

INDICATORS	2022 TARGET	2022 SITUATION	TARGET MET?
Proportion of population with access to an ITN within their household (Survey-derived only)	95.0%	No survey for 2022	n/a
Proportion of population that slept under an insecticide-treated net the previous night (Survey-derived only)	80.0%	No survey for 2022	n/a
Proportion of population using an insecticide-treated net among those with access to an insecticide-treated net	60.0%	No survey for 2022.	n/a
Proportion of children under five years old who slept under an insecticide treated net the previous night (Survey-derived only)	90.0%	No survey for 2022	n/a
Proportion of pregnant women who slept under an insecticide-treated net the previous night (Survey-derived only)	90.0%	No survey for 2022	n/a
Number of persons per LLIN distributed in areas targeted for distribution (Routine programmatic monitoring)	1.25	1.25	Yes
Number of long-lasting insecticidal nets distributed to at-risk populations through mass campaigns	59,090	62,359	Yes
Proportion of targeted population covered with long-lasting insecticidal nets through mass distribution (at a ratio of 1 net per 1.25 individuals)	99.0%	TBD	TBD
Number of long-lasting insecticidal nets distributed to targeted risk groups through continuous distribution	11,657	9,017	No

Proportion of households in targeted areas that received Indoor Residual Spraying during the reporting period	90%	92%	Yes
Percentage of active and residual non-active foci and percentage of population living in receptive areas covered by appropriate vector control (IRS and/or LLINs), by year (Elimination settings)	TBD	TBD	TBD

Long Lasting Insecticidal Nets (LLINs)

The Program continues to provide LLINs through mass distribution campaigns to maintain high levels of coverage and promote prevention efforts in targeted populations. The targeted number of bed nets planned for distribution in 2022 according to the 3 years replacement cycle was 59,090. Based on that, the Program managed to distribute a total of 62,359 LLINs, with around 35,185 LLINs in Sanma, 19,818 in Malampa, and 7,356 in Shefa provinces in 2022. A total of 9,017 LLINs were distributed through continuous distribution mechanisms, which was 78% of the target of 11,657.

As per the M&E framework for 2021-2026, the mass house-to-house distributions were accompanied by monitoring to ensure all operational and logistics components were well managed, and that the high LLIN coverage rate could be consistently maintained. Additionally, M&E was conducted to ensure recording of distribution information at all levels and that associated SOPs were adhered to by the distribution teams.

Historically, it has been a challenge for the Program to ensure that the planned health zones are thoroughly covered, and concurrently also to ensure that other damaged LLINs (such as due to Tropical Cyclone) are replaced with no exceptions. Additionally, this led to reprioritization of funds and mobilizing of additional resources to meet the immediate response needs, either concurrently or consecutively. Some of the affected health zones such as in Sanma are far from towns and hard to reach due to terrain, or with geographical isolations in the interior of highlands. Despite this, the activities have been well conducted and managed and challenges proved a learning experience for the Program to apply in the future.

Table 8. Sum of LLINs distributed in Provinces in 2022 through mass distributions

Province	Health Zone	Household covered	Population covered	Small nets given	Medium nets given	Large nets given	Total LLIN distributed
SANMA	1,4,5,6, 7	10,653	49,316	727	18,805	15,653	35,185
MALAMPA	1,2,3,4, 8	6,707	27,671	453	8,189	11,176	19,818
SHEFA	2	2,344	10,434	685	4,359	2,312	7,356
Vanuatu	11	19,704	87,421	1,865	31,353	29,141	62,359

Indoor residual spraying (IRS)

In 2022, IRS was commenced in active foci areas in Sanma, Torba, Shefa and Malampa. In particular, this was used to urgently address upsurges in malaria in areas where there had been zero local cases for at least a year. Insecticides and equipment for the initial spray operation were from TC Harold emergency response in 2020. In March 2022, a further quantity of IRS chemicals (pirimiphos-methyl) arrived to Port Vila, with support from a Rotary Global Grant through Rotarians Against Malaria. Delayed clearance of these insecticides interrupted spray operations, which were then resumed in November 2022.

Entomology

Periodic data collection is vital for decision making in vector control strategies, and also provides information on the actual or expected impact of interventions on malaria transmission. The aim of conducting vector surveillance and monitoring is to correlate and provide evidence especially in active foci areas, and for decision-making purposes. Entomological activities conducted in 2022 included an assessment of Anopheles farauti biting habits in Sola, Torba province. This studied the time and location of mosquito biting. Not many adult mosquitos were collected over the 4 nights of collections, with high rainfall experienced. While comprehensive data analysis and interpretation is in process, preliminary indications are that: Rates of biting are higher outdoors than indoors; Rates of biting are higher in the early evening around 6:00pm to 10:00pm but decrease when approaching midnight and early dawn; Rates of biting appeared to decline in general when there was heavy rainfall. A report will be circulated once the data analyses have been completed.

5.2 Intervention 2: Case-based surveillance



Malaria case-based surveillance for elimination aims to detect and notify all malaria infections, ensuring that they are given prompt, efficacious treatment to prevent secondary cases.

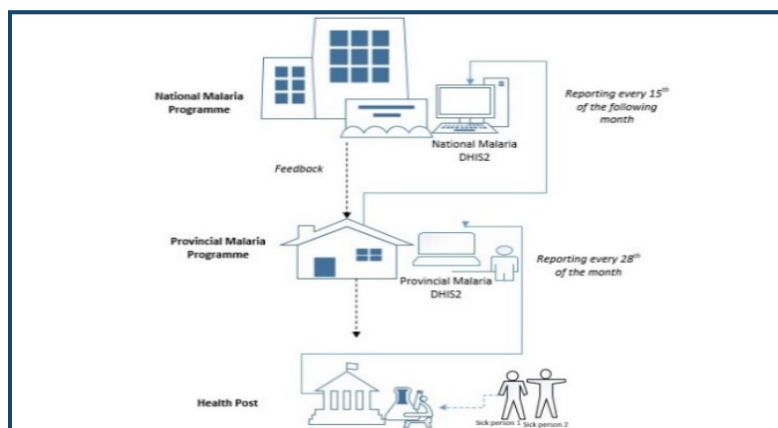
Table 9. Outcome and progress indicators, targets and 2022 progress.

INDICATORS	2022 TARGET	2022 SITUATION	TARGET MET?
Completeness of facility reporting: Percentage of expected facility monthly reports (for the reporting period) that are actually received	80%	64%	No
Timeliness of facility reporting: Percentage of submitted facility monthly reports (for the reporting period) that are received on time per the national guidelines	80%	35%	No
Percentage of cases notified to provincial officers within 24 hours of confirmation (Elimination settings)	100%	80%	No
Percentage of confirmed cases investigated, classified and managed as per national protocol within 7-days of notification (Elimination settings)	90%	90%	Yes
Percentage of confirmed cases fully investigated and classified	90%	90%	Yes

Percentage of malaria foci fully investigated, classified and managed as within 60 days (Elimination settings) per national protocol (Elimination settings)	90%	90%	Yes
Among cases investigated, classified and managed as per national protocol within 7-days of notification, the proportion that are followed up within 60 days (Elimination settings)	75%	60%	No

The monthly malaria line list (MMLL) reporting has been collected or sent by health workers from health facilities to provincial malaria office where the data is entered to MIS system called DHIS2 data base (Figure 4). MMLL is a paper based reporting, kept and filed in the provincial malaria offices. Once the data entry is completed the soft copy of data can be accessed by national staff. DHIS2 is a webpage database that can only use by connecting online. All data is verified at every level of the reporting chain, both manually and through in-built checks in the MIS DHIS2 software. Data entry is also continuing to check against paper records during on-site supervisory visits. Reports are also checked at every level of the reporting chain to ensure accuracy and completeness. Necessary clarifications are sought and corrections are made as required, within the timeframes set out for reporting.

Figure 4: Reporting structure from Health Facility to National Malaria Program



The aim of the elimination phase is to stop local transmission of malaria. Therefore, response measures require every case of malaria to be notified to the Provincial Malaria Office within 24 hours of diagnosis and for a case investigation to be completed within 3 days of notification in order to a) determine whether an infection was acquired locally and b) whether ongoing local malaria transmission is occurring or if not imported.

A case investigation consists of: 1) Completing the Case Investigation form for the index case, 2) Reviewing epidemiological data from previous cases in the same locality, 3) Conducting case detection / contact screening of households within 200 meters radius of the index case, 4) Conducting vector control observations in LLIN access and usage, including identification of potential vector breeding sites, 5) Case classification (local or imported), and 6) Foci identification.

5.3 Annual blood examination rate (ABER)

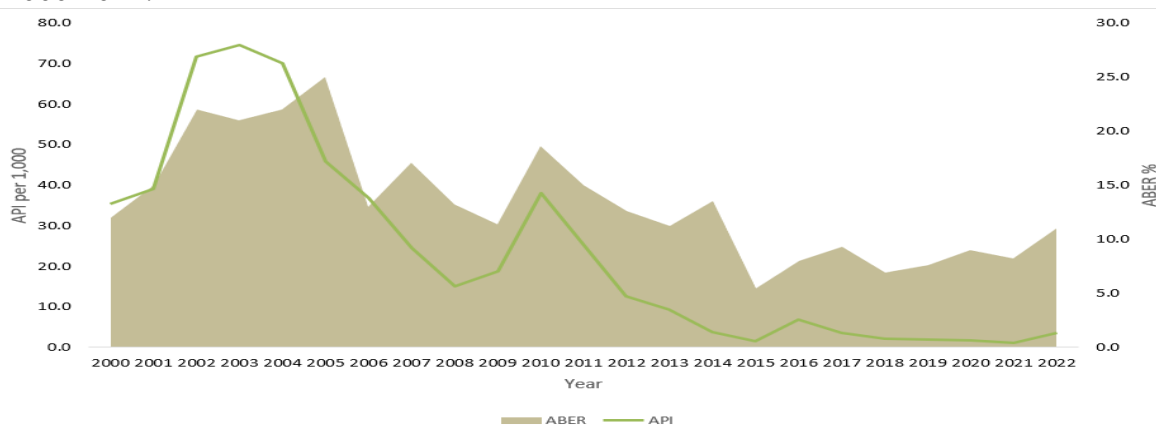
The Malaria Program continues to aim to achieve 100% testing of all suspected malaria cases by Rapid Diagnostic Tests (RDTs) at all levels of service delivery or microscopy at hospitals. All those with fever-like symptoms are advised to seek parasitological blood tests at their nearest health care facility to confirm whether they have malaria or not. This helps to reduce transmission by way of providing early detection and prompt treatment as per the National Malaria Diagnosis and Treatment Guideline. It also enables all confirmed cases to be investigated, classified and appropriate response provided.

Annual blood examination rate (ABER) monitors the percentage of suspected malaria cases that are examined with a parasite-based test, and can indicate if increases or decreases in incidence may be attributed to changes in testing frequency. The testing rate can fluctuate over time depending on the number of suspected cases undergoing parasitological tests. To discern decreases in malaria incidence, the annual blood examination rate should ideally remain constant or be continuously increased, however this depends on the seasonality of flu-like illnesses and the causes of fever. In addition, as the number of cases reduces, the number of fever cases seen at health facilities will also decrease. Some of the other challenging factors such as difficult geographical terrain, limited access to logistic support, and lack of test-seeking behavior have also contributed in low testing rate at different health facility level.

ABER was above 10% between 2002 and 2007, but dropped below this between 2007 and 2015. It increased again in 2017 to 9.3% but subsequently decreased further down to 7.6% in 2019 and up to 9.0% in 2020 (Figure 5). This increase may have been due to more patients' having flu like illness and suspected malaria cases undertaking a parasitological test, either using microscopy or RDTs.

As per the Monitoring and Evaluation Plan, the ABER target set for 2021-2026 is to achieve and maintain ABER at 15% annually. The number of tests conducted in 2022 was 19,561 reaching 9.0% as compared to 8.2% achieved in 2021. The Malaria Program, through Vanuatu Ministry of Health, continuously addresses such challenges at all levels of service delivery, and with community, stakeholders, and with partners support it will aim to improve further in 2023.

Figure 5. Annual blood examination rate (ABER%) and Annual Parasite Incidence (API), for 2000-2022.



5.4 Reporting coverage

Reporting coverage is an important metric as it can further support assessments to determine if decreases in case numbers are true or may be due to under-reporting. Coverage has changed over time based on health systems disruptions, constraints and opportunities. Between 2016 and 2020, reporting coverage ranged from 71 to 76%. In 2022, the overall reporting rate fell further to 64% nationwide. However, the two provinces of Malampa and Shefa achieved over 80% report coverage and almost reached the target of 85%. Penama has improved reporting, reaching over 70% as compared to 2021, with plans in place for Tafea and Torba to improve reporting in 2023.

In 2022, COVID-19 preparedness and response activities constrained reporting due to limited availability of human and financial resources. In particular, there was extensive re-prioritization to support response to the community outbreak that commenced in Efate with the first detection of a case outside of quarantine on 4 March 2022. This interrupted plans to ramp up supervisory visits, health zone meetings and surveillance training in 2022.

It is planned that the Program will continue to address the issues on reporting coverage through continuous supervisory visits, health zone meetings, and surveillance training in 2023, with inclusion of all facilities in some initiatives and additional targeted initiatives to selected health facilities. Monitoring tools and specific resources are to be provided to help strengthen and improve information recording and management at all levels of health facilities.

Some provinces such as Torba, Sanma, and Penama have field officers and Malaria Information System (MIS) Officers who play a key role in ensuring good reporting, including through an acting role as Malaria Supervisors. The Ministry of Health is currently working to formalize permanent positions for Malaria Supervisors with some of the existing officers and to prioritise recruitments for the positions as yet unfilled. The installation of Malaria Elimination Officers is also expected to improve reporting.

Table 10. Reports received versus expected number and rates achieved in 2022

Province	Total Health Facility	Annual Expected reports, 2022	Annual Actual reports	Annual Reporting rate %	Target, 2021	Difference v target, 2020
Malampa	56	672	599	89%	85%	+4%
Penama	48	576	416	72%	85%	-13%
Sanma	65	780	432	54%	85%	-31%
Shefa	69	744	616	83%	85%	-2%
Tafea	50	600	259	43%	85%	-42%
Torba	30	360	89	25%	85%	-60%
Vanuatu	318	3,732	2,402	64%	85%	-21%

5.5 Case investigations in 2022

The total number of case investigations conducted in 2022 was 1,030. These case investigations were conducted in five provinces of Vanuatu, with just 13 in Penama and the remaining 99% in the higher incidence provinces of Sanma, Torba, Malampa and Shefa. Completion of case investigations has been aided by the stationing of provincial surveillance staff in these provinces who primarily are responsible for case investigations. In most provinces, there were major limitations in available funds and staffing to conduct case investigations for all cases.

Case investigations were completed for all (100%) confirmed cases in Penama, while the provinces of Torba, Malampa, and Shefa achieved over 90% of cases investigated. The lower case investigation rates in Sanma province (84%) were the result of geographically restricted access to certain areas in Santo.

Table 11. Total case investigations, by province in 2022

Province	Total number of cases	Total number of case investigations conducted	Number classified as local case	Number classified as imported case
Malampa	181	180	177	4
Penama	13	13	0	13
Sanma	486	410	485	1
Shefa	213	202	205	8
Tafea	0	0	0	0
Torba	250	235	235	15
Vanuatu	1,143	1,030	1,102	41

5.6 Foci investigations in 2022

The total number of foci investigations conducted in 2022 was 11. Two thirds of these were conducted in the higher incidence provinces of Malampa, Sanma, Shefa (Epi Island), and Torba. The same limitations of finances, logistics and staff applied as for the case investigations, and positioning of staff (especially Malaria Elimination Officers) in foci is planned for 2023.

Table 12. Total foci investigations, by province in 2022

Province	*Total Foci	*Foci Investigation	Total Tested (pop)	Total Positive
Malampa	4	4	2,496	5
Sanma	4	4	1,949	22
Shefa	2	2	463	1
Torba	1	1	1,261	9
Vanuatu	11	11	6,169	37

The total number of active foci for 2022 was 11 foci. This was less than the 26 foci identified in 2019, 18 foci identified in 2020 and 16 foci identified in 2021. Planning for a full shift from Health Zones to villages as foci was planned to occur in 2022, but upsurges have complicated this process. The need for this will be further evaluated in 2023.

5.7 DHIS2 training

The Malaria Information Management system has changed over time. DHIS2 was introduced and adopted around October 2016 to replace the Microsoft Access database. DHIS2 is a web base database and very reliable, and can be of use in remote areas if there is access to internet and a computer, laptop or tablet. However, major delays in upgrades and adaptations of DHIS-2 continued in 2022.

Routine malaria data are collected through hard copies of monthly malaria line lists (MMLs) from each Health Facility, with data then entered in the web database. National level staff have access to the database and dashboards to monitor and evaluate the progress and individual performance of health facilities against standard indicators.

In 2020, the Program conducted the pilot DHIS2 Tracker and event capture in Sanma and Malampa. This training was supported by Rotary Against Malaria (RAM) as planned. It involved Malaria Information System (MIS) Officers and Surveillance Officers. In 2022, there was limited activity conducted for management of surveillance data due to a lack of trained staff to support the process of data entry and interpretation at national level.

5.8 Intervention 3: Early and effective malaria case management



Providing universal and timely malaria case management is a key component of malaria control and elimination strategies.

Table 13. Outcome and progress indicators, targets and 2022 progress.

INDICATORS	2022 TARGET	2022 SITUATION	TARGET MET?
Proportion of suspected malaria cases (fevers) that received a parasitological test at public sector health facilities	100%	100%	Yes
Percentage of microscopy results cross-checked by national reference laboratory	100%	0%	No
Proportion of confirmed malaria cases that received first-line antimalarial treatment at public sector health facilities as per national protocol	100%	100%	Yes
Annual blood examination rate: per 100 population per year (Elimination settings)	10.0%	11%	Yes
Proportion of children under five years old with fever in the last two weeks for whom advice or treatment was sought (Survey-derived only)	95.0%	n/a	n/a

Case management

It is essential that the Program also maintains case management standards in terms of ensuring prompt and effective treatment according to national malaria treatment guideline.

The strategy has a strong emphasis on maintaining and boosting quality of clinical care through targeted and corrective supervision of health workers (clinical staff) by provincial hospital staff for Health Centre nurse practitioners, and then cascading through Dispensaries to Aid Posts. Clinical pre-service and in-service trainings is to be adapted according to the health facility type. Supervision and trainings (new or refresher) are to be continuously conducted to improve and strengthen malaria case management and other diseases.

Monitoring indicators measure the number of confirmed malaria cases that are appropriately treated as per the national treatment guideline, such as non-severe cases treated with Coartem and for *P. vivax* cases, also with Primaquine. The indicators show that appropriate treatment with Coartem was highly maintained, with an average of 94% of cases treated across the provinces. The rate in four provinces was 100%, with 86% in Shefa and no confirmed cases for treatment in Penama.

Table 14. Confirmed malaria cases appropriately treated as per the national treatment guideline in 2022

Province	Microscopy + RDT - All Positive Malaria Cases	% Confirm and treated with Coartem
Malampa	181	100%
Penama	13	100%
Sanma	486	100%
Shefa	213	100%
Tafea	0	100%
Torba	250	100%
Vanuatu	1,143	100%

The number of prescriptions for Primaquine as a radical treatment for *P. vivax* infections and *P. falciparum* as recorded in the MMLs and case investigation from all health facilities was only 161 treated patients. Such cases are registered and treated with primaquine in hospitals and health centers only as outlined in the *Malaria Diagnosis and Treatment Guidelines*. This shows that the number of cases is higher than number of patients prescribed primaquine because most of the cases were detected at lower facility level such as dispensary and aid post. This indicates that the referral system may 'lose' some patients, and hence that correct issuance of Primaquine is not as high as expected. Geographical isolation, high logistical costs, and at times delays in the supply chain for malaria commodities hinders patient access to appropriate and complete treatment as per the national treatment guideline.

Further work will be conducted in 2022 to ensure that all patients diagnosed as positive for malaria receive appropriate and timely treatment.

Table 15. G6PD testing and Primaquine treatment

Province	Confirmed Malaria Cases	Number of G6PD tested	Primaquine Treatment
Malampa	181	51	51
Penama	13	0	0
Sanma	486	50	50
Shefa	213	139	139
Torba	250	50	204
Tafea	0	0	0
Vanuatu	1,143	240	243

The proportion of cases tested by RDT or microscopy through active case detection (ACD) and passive case detection (PCD) continued to decrease due to fewer suspected fever cases reported at reporting health facilities. This was because there are now more areas free of malaria disease, as indicated by the malaria elimination declaration in Tafea province.

Table 16. Number of total PCD tested and total ACD tested with positive cases in 2022.

Period	Province	Total PCD Test	Total PCD Positive	Total ACD Test	Total ACD Positive	Total PCD + ACD Test	Total PCD + ACD Positive
2022	Malampa	2,990	176	2,496	5	5,486	181
	Penama	905	13	408	0	1,313	13
	Sanma	3,506	464	1,949	22	5,455	486
	Shefa	3,862	212	3,862	1	4,325	213
	Tafea	228	0	37	0	265	0
	Torba	1,456	241	1,261	9	2,717	250
Total		12,947	1,106	6,614	37	19,561	1,143

National Malaria Reference Laboratory

The National Malaria Reference Laboratory aims to continue to improve and maintain the standard of microscopy services in Vanuatu. Routine supervisory visits have been conducted to ensure all Malaria Microscopists in all the six hospitals comply with Quality Assurance (QA) standards as per the WHO standards. However, the national staff of the Reference Laboratory was transferred to Torba province in November 2022 therefore with no current staffing there are concerns over continuity of diagnostic activities.

According to malaria microscopy policy, each province should be able to send a 10% (5% positive and 5% negative) sample of its slides for cross-validation at the National Malaria reference laboratory. As the country is approaching elimination it is requested that all slides (both negative and positives) to be send from the six Microscopy stations

within six hospitals nationwide. In 2022, the number of tests conducted using Microscopy was low due to stock out of malaria microscopy consumables. The way forward in 2022 is to inform all service stations to conduct more tests, and regularly send in all testing slides for cross – validation process.

Case management training

The availability of effective and safe malaria treatments at every level of the health care system (hospitals, health facilities and aide posts) is vital to preventing deaths and further infections. As specified in the *Guidelines for Treatment of Malaria in Vanuatu*, artemisinin-based combination anti-malarials are the main treatment.

Primaquine remains essential for the complete eradication of *P. vivax*, although due to concerns of G6PD deficiency in the population the *Guidelines for Diagnosis and Treatment of Malaria in Vanuatu* only prescribe its use through health centers, dispensaries and hospitals. From 2015 onwards, malaria treatments have been procured and distributed through the standard MOH medical products supply system.

Under the NMSP, the role of the program is to maintain and improve the quality of clinical care by facilitating training and supervision for clinical staff. The NMSP contemplates that training and supervisions for malaria treatment will be delivered according to a cascade model: delivered by provincial hospital staff to health centre nurses, who will in turn deliver to dispensaries, and so on to aide posts. Hospital doctors are to be specifically updated on the current guidelines for managing severe and complicated cases of malaria.

The Case Management refresher training conducted in 2022 were 4 in total, with a training each in Malampa, Sanma, Torba and Shefa. Additionally, there were spot refresher trainings conducted at selected health facilities in Sanma, Penama, and Shefa. A total of 82 participants were trained for both sessions. All refresher trainings addressed G6PD testing procedures, primaquine treatment guidelines, and the importance of treatment compliance. Surveillance, M&E feedback, and way forward improvements were also packaged into the training module.

According to plan, further Case Management refresher training should have continued to be conducted in these Provinces of Sanma, Penama, Shefa, and Malampa, however could not happen due to TC Harold response, involvement of National and Provincial Program Staffs in COVID-19 preparedness and response. These Case Management refresher training has been planned to be conducted in quarter 2 and 3 of 2022.

Table 17. Number of health workers who attended case management trainings in 2022

Province	No of trainings	No Health Staff trained
Malampa	1	16
Sanma	1	23
Torba	1	25
Shefa	1	18
Vanuatu	4	82

5.9 Intervention 4: Health promotion and community engagement



Advocacy, strategic communication and social mobilization efforts are essential to support malaria elimination initiatives.

Table 18. Outcome and progress indicators, targets and 2022 progress.

INDICATORS	2022 TARGET	2022 SITUATION	TARGET MET?
Proportion of women who can recall the message: "Sleeping under a bed net prevents malaria" (Survey-derived only)	95.0%	No survey in 2022	n/a
Proportion of women who can recall the message: "Seek care within 24 hours of onset of fever" (Survey-derived only)	95.0%	No survey in 2022	n/a
Proportion of women who can recall an adapted, elimination-focused message (TBC; survey-derived only)	95.0%	No survey in 2022	n/a

Health promotion and community engagement activities accompanied emergency response, screening and treatment, indoor residual spraying, and bed net distributions in 2022. However, there was no specific survey conducted in 2022 to measure outcomes or impact. An Advocacy, Communication and Community Mobilization plan was developed through a consultant, though is yet to be finalized. This is intended to expand malaria and other health-related communication activities, with support from the Global Fund through C19-RM funding stream.

5.10 Intervention 5: Disaster relief preparedness and response



Disasters can potentially increase vector densities and person-vector contact with increased risk to individuals of infection and outbreaks of malaria or other vector-borne diseases.

Table 19. Outcome and progress indicators, targets and 2022 progress.

INDICATORS	2022 TARGET	2022 SITUATION	TARGET MET?
Malaria and VBD disaster response plan developed in line with NDMO Custom Draft Endorsed	Draft completed	Draft completed	Yes

Provincial Health Emergency Incident Management Teams were consulted during a national-level meeting held in November 2021 to solicit inputs on a draft malaria continuity in emergencies plan. A draft has been produced but is not yet finalized and endorsed.

Program management

Table 20. Outcome and progress indicators, targets and 2022 progress.

INDICATORS	2022 TARGET	2022 SITUATION	TARGET MET?
Percentage of health facilities receiving supervisory visits during the reporting period (at least once every 6 months)	95%	89%	No
Malaria is a notifiable disease	Yes	Yes	Yes
The national malaria elimination plan has been approved and endorsed by the Ministry of Health	Yes	Yes	Yes
An independent comprehensive review on progress towards elimination and preparedness for certification assessment is conducted and shared with stakeholders.	Yes	Yes	Yes

The Program has met some of the management outcome indicators within the NMSP framework, despite the COVID-19 community outbreak. The involvement of Programme staff from national and provincial levels in COVID-19 preparedness and response hindered some of the achievements. For instance, nurses who are essential for malaria diagnosis and case management had to play a major role in advocacy and response during 2022.

One of the major achievements in 2022 was the further development of guidance and tools to support implementation of the new *National Strategic Plan for Malaria Elimination (2021-2026)*. With the support of WHO, UNDP and the PacMOSSI project, the following were completed:

- Finalisation and dissemination of the Malaria Operational Manual
- Revision of Vector Surveillance and Vector Control Monitoring and Evaluation Strategy
- Development of a Malaria Toolkit to allow easy access to all key programmatic documents
- Defining key messages, translating and development of a set of informational posters, leaflets and brochures
- Development of additional simple tools for dissemination at health facility level (eg. annual calendar)

The following was also developed with the support of UNDP:

- Draft Malaria Advocacy, Communication and Community Mobilization Strategy

All of the planned high-level technical activities were completed. The Annual Review and Planning meetings was held from 14 to 18 November 2022 and included the Director of Public Health (acting), Coordinator of the National Malaria and Other Vector Borne

Diseases Control Program, Provincial Health Managers from Malampa, Penama, Sanma, Shefa and Torba, and Malaria Provincial Supervisors from Malampa, Penama (acting), Shefa, Sanma (acting), Tafea, and Torba, and other national and provincial staff. Also in attendance were the WHO Technical Advisor and the WHO STOP-malaria Fellow, with periodic attendance from other invited presenters. An executive paper was developed for presentation by the Director of Public Health to the Ministry of Health Executive Committee.

Some meetings and trainings that included external faculty were not conducted due to travel and communication constraints resulting from COVID-19. These included the Malaria Microscopy refresher training and External Competency Assessment training,

Table 21. Overall summary of planned versus completed activities for 2022, by technical area

Technical area	No of BP activities	No of Activities Completed	Completion Rate (%)
Program Management (including supervisory visits)	5	3	60%
Vector Control (including Entomological Surveillance Activities)	4	3	75%
Surveillance	4	3	75%
Case Management			
Health Promotion and Community Engagement	3	2	67%

6.1 Supervisory visits – national team to provincial team

Provincial visits were conducted as part of continuous health systems strengthening initiatives to Provincial Management and Administrations. This involved meeting with Provincial Health Managers and Administrators and discussing human resource issues and challenges, reviewed provincial work plans, discussed annual performance indicators and targets, planned baseline mapping and Indoor Residual Spraying (IRS) in Sanma and Malampa, and sensitized officers on the new *National Strategic Plan for Malaria Elimination (2021-2026)*.

6.2 Supervisory visits – provincial team to health facilities

These visits are part of system strengthening wherein check lists are provided to:

- cross-check malaria consumable stock (i.e. RDTs, G6PD tests, ACTs, Primaquine)
- verify information on Monthly Malaria Line Lists (MMLL) for all tested and confirmed cases
- provide information and feedback to the source
- provide spot trainings for selected health facilities, and
- provide or collect other valuable information as part of HSS.

In 2022, supervisory visits were conducted with support from Global Fund and integrated activities through Government recurrent funds. Some provinces planned for priority health facility visits but achievement of planned visits was lower than expected due to diversion of staffing to COVID-19 with public health officers heavily engaged in

COVID-19 vaccinate roll-out. Moreover, this activity could not be continued in quarter 4 as planned due to all Government systems being hacked and was down. Thus no funding requests could be made till later December 2022.

Table 22. Supervisory Visits Coverage from the selected zones and health facilities, 2022

No.	Province	# of selected Health Zones	Health facilities		
			Planned to visit	Actually visited	Coverage (%)
1	Sanma	4	17	15	88%
2	Malampa	4	12	12	100%
3	Shefa	1	16	10	63%
5	Torba	4	28	28	100%
Total		13	73	65	89%

Human resources



Insufficient human resources remained a major issue for malaria service delivery in Vanuatu in 2022. This constrained overall operations, supervision and technical support at national, provincial and community levels. The human resource shortages in 2022 ultimately compromised the timely achievement of malaria elimination as outlined in the NSPME.

In 2021 and 2022 there was progress made in appointing additional Acting Provincial Malaria Supervisors to ensure these positions were filled in all provinces. However, this left key staffing gaps in the structure. Other important positions at national and provincial levels remained vacant.

The Program sought technical assistance such as through WHO and UNDP/Global Fund to tackle the workforce sector issues, including through recruitment of short-term staff on Special Service Agreements or on Temporary Contracts.

As noted in the 2021 Annual Report, increased surge staffing should have been a critical focus for program management in 2022 but this was not adequately undertaken. The NSPME noted the Government of Vanuatu's emphasis on delivering integrated health services directly to community level (under predominantly Provincial Health Office management and supervision). Additional workforce was therefore included to enable progress such as through the recruitment of 10 Malaria Elimination Officers. However, despite funding from UNDP/Global Fund available since mid-2021, these positions were not filled by December 2022 due to administrative delays.

7.1 National level staffing

Through the course of 2022, no national staff previously on contracts through development partners became permanent staff funded by the Vanuatu Government through the Ministry of Health. This was due to budget constraints and a focus and priority on other activities, such as COVID-19 community outbreak response.

Table 1. Staffing for National Malaria Program in 2022

(P = Permanent, C = Contract, T = Temporary; D = Daily Rated; EL = Extended leave)

Name	Position Title	Status of employment	Position Funder
Wesley Donald	Coordinator	P	Vanuatu government
	Deputy Program Coordinator	Vacant	Development Partner (UNDP/GF)
Andrew Tavi	Case Management Officer	C	Development Partner (WHO)
Guy Emile	Vector Control Officer	P	Vanuatu government
Johnny Nausien	Monitoring and Evaluation Officer	P (EL)	Vanuatu government
Donalyn Poilapa	Surveillance Officer	C	Development Partner (WHO)
Lekon Takavi	Vector Surveillance and Control Officer	C	Development Partner (WHO)
Christie Makikon	Vector Laboratory Technician	C	Development Partner (UNDP/GF)
Frederick Yakaula	Entomologist	P	Vanuatu government
Mark Babu	Field Officer	P	Vanuatu government
Timothy Takau	Procurement and Supply Chain Officer	C	Development Partner (UNDP/GF)
Peter Lenis	National Reference Laboratory Officer	P (Transferred Oct 2022)	Vanuatu government Vacant
	Information Officer	Vacant	Development Partner (UNDP/GF)
	Community Mobilization Officer	Vacant	Development Partner (UNDP/GF)

7.2 Provincial level staffing

Table 24. Staffing in the provincial malaria offices in 2022

<i>Name</i>	<i>Position Title</i>	<i>Status of employment</i>	<i>Position Funder (or allocation)</i>
Tafea Province			
Harry Iata	Supervisor	P	Vanuatu government
James Amon	Provincial Malaria Information Officer	P	Vanuatu government
Ruatu Sapa	Surveillance Officer	P (Assigned to NTDs)	Vanuatu government
Naies Kopin	Microscopist	P	Vanuatu government
Shefa Province			
Kalo Kalkoa	Supervisor	P	Vanuatu government
Aida Simon	Provincial Malaria Information Officer	P	Vanuatu government
Sylver Lowac	Microscopist	P	Vanuatu government
	Field Officer	Vacant	Development Partner (WHO)
	Malaria Elimination Officer (SHE04)	Vacant	Development Partner (UNDP/GF)
Malampa Province			
Kollan R	Acting Malaria Supervisor	P	Vanuatu government
Atty Jeffery	Provincial Malaria Information Officer	P	Vanuatu government
	Field Officer	Vacant	
Kilion Nempekrow	Microscopist	P	Vanuatu government
	Malaria Elimination Officer (MAL03/04)	Vacant	Development Partner (UNDP/GF)
	Malaria Elimination Officer (MAL12)	Vacant	Development Partner (UNDP/GF)
Sanma Province			
	Supervisor	Vacant	
	Field Officer	Vacant	
Roger Jimmy	Provincial Malaria Officer (Acting Supervisor)	P	Vanuatu government
Thomas Taribego	Surveillance Officer	C	Vanuatu government
Freddy Moses	Microscopist	C	Recurrent
	Malaria Elimination Officer (SAN04/05)	Vacant	Development Partner (UNDP/GF)

	Malaria Elimination Officer (SAN06)	Vacant	Development Partner (UNDP/GF)
	Malaria Elimination Officer (SAN07)	Vacant	Development Partner (UNDP/GF)
	Malaria Elimination Officer (SAN08)	Vacant	Development Partner (UNDP/GF)
Penama Province			
	Supervisor	Vacant	
Douglas Garae	Provincial Malaria officer (Acting Malaria Supervisor)	P	Vanuatu government
	Microscopist	Vacant	
	Malaria Field Officer	Vacant	
	Malaria Elimination Officer (PEN01)	Vacant	Development Partner (UNDP/GF)
	Malaria Elimination Officer (PEN08)	Vacant	Development Partner (UNDP/GF)
Torba Province			
Peter Lenis	Malaria Supervisor	P (Started Oct 2022)	Vanuatu government
John Sanga	Surveillance Officer	P	Vanuatu government
Haward Lonsdale	Microscopist	P	Vanuatu government
	Provincial Malaria Information Officer	Vacant	
	Malaria Elimination Officer (TOR04)	Vacant	Development Partner (UNDP/GF)

7.3 Technical assistance

In 2022, WHO provided essential technical assistance to develop the necessary documents and tools to support implementation of the *National Strategic Plan for Malaria Elimination (2021-2026)*. This included development of the following documents and tools:

- National Vector Surveillance and Vector Monitoring and Evaluation Plan
- Revision of the Malaria Diagnosis and Treatment Guidelines
- Malaria Information Toolkit
- DHIS-2 improvements for event and tracker modules, including for monthly provincial reporting on key indicators and commodity stocks
- Key messages for public communication on malaria
- Brochures on symptoms, testing, LLIN correct usage, and IRS
- Posters on malaria
- Informational calendar on malaria

Additional technical and implementation support was provided through a full-time international technical adviser and STOP-malaria consultants from July to August 2022 and from November 2022 onwards. Vector surveillance and control technical support was provided through the Australia Aid-funded PacMOSSI project. Technical support was also provided by UNDP for development of the M&E plan. Program support was also provided by UNDP for implementation of the Global Fund grant (NFM3).

Table 25. Key in-country technical assistance to the program in 2022

Technical Advisory Support Name	Name	Start	Finish	Development Partner
Technical Officer - Malaria & Other Vector Borne and Parasitic Diseases	Dr Tessa Knox	November 2018	January 2023	WHO
STOP-Malaria Consultant	Dr Ranjith de Alwis	July 2022	August 2022	WHO
STOP-Malaria Consultant	Dr Christopher Vunni	November 2022	June 2023	WHO
UNDP Programme Analyst	Dr Win Thu	June 2022	November 2022	UNDP

Financing



The annual malaria program operational budget is based on the annual program 'Business Plans'. These plans were first devised in mid-2016 and were generated for the two levels of program implementation, the national level and the provincial level. Each of these business plans is focused on the core activities that fall within the functions and role delineation of that level:

1. National level focuses on supervision, planning, monitoring, evaluating and supporting provincial service delivery;
2. Provincial level focuses on implementation and service delivery for community-based activities, and training and support for malaria diagnostics and case management for staff at the health facilities.

The budgeted amount for staffing funded either through domestic "recurrent" funds or from development partner contributions is not included in this budget, which focuses on operational activities. Funding allocated for malaria diagnostics or drugs is also not covered in this action plan as this budget area is managed through the Central Medical Stores (CMS).

The overall estimated cost to implement national-coordinated activities (through budget centre 61UC) for 2022 was 51,038,330 VUV. Of this, the total committed was 40,670,530 VUV (80%) with 10,367,800 VUV (59%) estimated as savings due to the Government of Vanuatu system not functioning in quarter 4 of 2022 due to a cyber-attack. Within the overall national budget, the budget was allocated to vector control (42.5%), program management (17%), diagnostics and case management (26.4%), surveillance, monitoring and evaluation (13.2%), and community awareness and advocacy (0.9%), without any allocation in 2022 to disaster preparedness (0%). The large allocation to vector control was influenced by the core activities of LLINs distributions and indoor residual spraying, which in 2022 were conducted in five provinces. There were commitment shortfalls at national level across all thematic areas.

A total of 12% of the total budget committed to malaria was allocated from the Vanuatu Government recurrent budget. Three major development partners contributed to the malaria elimination operation budget at national level in 2022: Global Fund through UNDP (44%), WHO (23%), Australia Aid through the Vanuatu Health Program (15%), and Rotary or Rotarians Against Malaria (21%).

The Vanuatu Government recurrent budget for malaria was allocated mainly to diagnosis and case management, and program management. Global Fund has historically supported mainly vector control along with diagnosis and case management, and this support continued in 2022. In 2022, Rotarians Against Malaria continued support across all thematic areas. WHO support was mainly to program management, vector control and case management in order to fill funding gaps for essential activities, and also assisted in emergency procurement of Primaquine to fill a gap.

Major challenges

The major challenges facing implementation in 2022 were as follows:

- Disruption to activities, reporting and supply chains due to COVID-19 preparedness and response
- Continuous reductions in annual budget despite requirements for Malaria elimination
- Late disbursement of operational funds, e.g Global Fund
- Lack of sustainable capacity building and staff retention at all levels of service delivery
- Lack of integration of activities on the ground
- Lack of logistics and financial support in the provinces to enable Malaria surveillance activities, such as case investigation and response
- Interrupted government communications channels from November 2022

Future priorities

The following were identified by attendees at the Malaria Annual Review and Planning Meeting as priority actions for 2023 and beyond to address the challenges that faced the Program in 2022:

- Increase availability of malaria commodities at health facilities, especially Primaquine, RDTs and ACTs
- Improve surveillance to ensure timely reporting of cases and a clear picture of disease burden across the country
- Strengthen case management, including training of health facility staff to rapidly recognize, test and treat malaria, and to ensure microscopy capacity for validation of RDT accuracy
- Continue case investigations that include screening by RDT around confirmed cases
- Continue distribution of long-lasting insecticidal net distribution campaigns, and supplement with top-ups in active foci
- Conduct targeted indoor residual spraying in active foci, prioritizing those with high numbers of cases
- Enhance community education and mobilization to ensure awareness of malaria
- Improve advocacy and stakeholder engagement to ensure participation of communities in anti-malaria activities

A set of recommendations was developed by the malaria team accordingly, and was presented to the Ministry of Health Executive Committee in November 2022.

Conclusions

Building on past and recent successes and achievements, the Malaria Program remains committed to the vision of a malaria-free Vanuatu contributing to the health and well-being of the population. This is clearly articulated and set out in the new *National Strategic Plan for National Malaria Elimination (2021–2026)*.

Continuous and high-quality support will be provided to enable health services at all levels of the health system. Cooperation and coordination with development partners will be further strengthened for the betterment of the services endorsed by Government of Vanuatu. It is anticipated that concerted work will continue to reap the benefits of decreased malaria burden in Vanuatu, towards national malaria elimination and WHO certification of malaria-free status in the near future.

Annexes

Annex 1. Malaria indicator matrix from Monitoring and Evaluation Plan

INDICATORS	Base-line	Base-line year	2021	2022	2023	2024	2025	2026
IMPACT								
Confirmed malaria cases (microscopy or RDT)*	576	2019	≤ 280	≤ 140	≤ 56	≤ 56	0	0
Annual parasite incidence: Confirmed malaria cases (microscopy or RDT): rate per 1000 persons per year (Elimination settings)	1.9	2019	0.91	0.44	0.17	≤ 0.1	≤ 0.1	≤ 0.1
Number of provinces with zero locally transmitted cases of malaria	1	2019	3	4	6	6	6	6
Inpatient malaria deaths per year: rate per 100,000 persons per year	0	2019	0	0	0	0	0	0
Malaria test positivity rate	2.4%	2019	≤ 1.25	≤ 1	≤ 1	0	0	0
Number of active foci of malaria (Elimination settings)	26	2019	36	18	8	0	0	0
Number of people and percentage of population living in active foci (Elimination settings)	TBC	TBC	TBC	TBC	TBC	TBC	0	0
OUTCOME								
Proportion of population that slept under an insecticide-treated net the previous night (Survey-derived only)	44.3%	2013	80.0%	80.0%	80.0%	TBC	TBC	TBC
Proportion of children under five years old who slept under an insecticide treated net the previous night (Survey-derived only)	51.0%	2013	90.0%			TBC	TBC	TBC
Proportion of pregnant women who slept under an insecticide-treated	40.5%	2013	90.0%	90.0%	90.0%	TBC	TBC	TBC

net the previous night (Survey-derived only)								
Proportion of population using an insecticide-treated net among those with access to an insecticide-treated net	68,4%	2020	60.0%	70.0%	80.0%	TBC	TBC	TBC
Proportion of population with access to an ITN within their household (Survey-derived only)	83.0%	2013	95.0%			TBC	TBC	TBC
Number of persons per LLIN distributed in areas targeted for distribution (Routine programmatic monitoring)	1.35	2019	1.25	1.25	1.25	1.25	1.25	1.25
Annual blood examination rate: per 100 population per year (Elimination settings)	7.6%	2019	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Proportion of children under five years old with fever in the last two weeks for whom advice or treatment was sought (Survey-derived only)	57.0%	2013	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Proportion of women who can recall the message: "Sleeping under a bed net prevents malaria" (Survey-derived only)			95.0%				TBC	TBC
Proportion of women who can recall the message: "Seek care within 24 hours of onset of fever" (Survey-derived only)			95.0%				TBC	TBC
Proportion of women who can recall an adapted, elimination-focused message (TBC; survey-derived only)			95.0%				TBC	TBC
OUTPUT or COVERAGE								
Number of long-lasting insecticidal nets distributed to at-risk populations through mass campaigns	80,623	2019	27,385	46,378	107,116	TBC	TBC	TBC

Proportion of targeted population covered with long-lasting insecticidal nets through mass distribution (at a ratio of 1 net per 1.25 individuals)	99.0%	2019	99.0%	99.0%	99.0%	TBC	TBC	TBC
Number of long-lasting insecticidal nets distributed to targeted risk groups through continuous distribution		TBC	1,000	4,000	4,719	TBC	TBC	TBC
Proportion of suspected malaria cases (fevers) that received a parasitological test at public sector health facilities	80%	2019	80%	80%	80%	TBC	TBC	TBC
Percentage of malaria foci fully investigated and classified	100.0%	2019	100.0%	100.0%	100.0%	TBC	TBC	TBC
Proportion of confirmed malaria cases that received first-line antimalarial treatment at public sector health facilities	98.44%	2019	100%	100%	100%	TBC	TBC	TBC
Proportion of households in targeted areas that received Indoor Residual Spraying during the reporting period	95.0%	2013	90%	95%	100%	TBC	TBC	TBC
Percentage of active and residual non-active foci and percentage of population living in receptive areas covered by appropriate vector control (IRS and/or LLINs), by year (Elimination settings)			TBC	100%	100%	100%	100%	100%
Percentage of cases notified to provincial officers within 24 hours of confirmation (Elimination settings)	100%	2019	100%	100%	100%	100%	100%	100%
Percentage of confirmed cases investigated, classified and managed as per national protocol within 7-days of notification (Elimination settings)	100%	2019	90%	95%	100%	100%	100%	100%

Among cases investigated, classified and managed as per national protocol within 7-days of notification, the proportion that are followed up within 60 days (Elimination settings)			75%	90%	100%	100%	100%	100%
Percentage of malaria foci fully investigated, classified and managed as within 60 days (Elimination settings) per national protocol (Elimination settings)	100%	2019	90%	95%	100%	100%	100%	100%
Malaria and VBD disaster response plan developed in line with NDMO Custom Draft Endorsed			Draft	Endorsed		After-action review as appropriate		
Completeness of facility reporting: Percentage of expected facility monthly reports (for the reporting period) that are actually received	70.6%	2019	80%	85%	90%	90%	90%	90%
Percentage of confirmed cases fully investigated and classified	35.8%	2019	90.0%	95.0%	100.0%			
Timeliness of facility reporting: Percentage of submitted facility monthly reports (for the reporting period) that are received on time per the national guidelines	47%	2019	80%	85%	90%	90%	90%	90%
Percentage of health facilities receiving supervisory visits during the reporting period (at least once every 6 months)	24%	2019	95%	95%	95%	95%	95%	95%
Percentage of health facilities without stock-outs of ACT & Primaquine during the reporting period.	NA		90%	95%	100%	100%	100%	100%

Percentage of HFs without stock-outs of RDTs & G6PD during the reporting period.	NA		90%	95%	100%	100%	100%	100%
Percentage of health product batches for malaria tested for quality in line with Global Fund Quality Assurance policy	NA		90%	95%	100%	100%	100%	100%
QUALITY of CARE								
Proportion of confirmed malaria cases that received first-line antimalarial treatment at public sector health facilities as per national protocol	99.0%	2019	100%	100%	100%	100%	100%	100%
Percentage of microscopy results crosschecked by national reference laboratory	4.2%	2019	100%	100%	100%	100%	100%	100%
ELIMINATION-ORIENTED PROGRAMMATIC MILESTONES								
Malaria is a notifiable disease	Yes		Yes	Yes	Yes	Yes	Yes	Yes
The national malaria elimination plan has been approved and endorsed by the Ministry of Health	Yes		Yes	Yes	Yes	Yes	Yes	Yes
An independent national malaria elimination advisory committee has been set up and convenes at least quarterly	Yes		Yes	Yes	Yes	Yes	Yes	Yes
An independent comprehensive review on progress towards elimination and preparedness for certification assessment is conducted and shared with stakeholders.	Yes	2018		Yes			Yes	