



National Strategic Plan for Malaria Elimination 2021-2026

Malaria and other Vector Borne Diseases Control Program

The Vanuatu Ministry of Health aims to eliminate indigenous malaria transmission from Vanuatu by the end of 2023.

This National Strategic Plan for Malaria Elimination in Vanuatu considers the findings and recommendations of a comprehensive Malaria Program Review conducted in 2018 and extensive follow-up action, health system and financing analysis, impact modelling, and deliberations by the national Malaria and Other Vector Borne Diseases Control Program and Provincial Health Managers, with the support of WHO and other key partners.

To achieve its malaria control and elimination targets, the NVBDCP will work in close partnership with provincial health services to ensure very high levels of prevention – primarily with long-lasting insecticidal mosquito nets – and universal access to quality-assured diagnosis and treatment are achieved and maintained. It will mobilise local communities and their representative bodies to adopt healthy behaviours and retain a high level of awareness of the importance of malaria elimination to Vanuatu. Special attention will be given to employing innovative approaches towards ensuring safe and effective treatment of Plasmodium vivax with primaquine, including in remote and outer island settings.

It will strengthen and maintain strong surveillance aimed at rapidly identifying, reporting and responding to every case, and ensuring that every case is followed up within 60 days.

Building on experience gained from elimination activities in Tafea province, the Program will use indoor residual insecticide spraying and mosquito breeding site management to selectively accelerate the reduction in malaria transmission or to mitigate outbreaks in higher incidence areas (based on increasingly precise stratification), and in transmission foci in elimination settings and those areas that are already aligned with the prevention of re-introduction and re-establishment of malaria.

Noting the vulnerability of Vanuatu to natural disasters and consequent population displacement, the Program and the MOH will work closely with the National Disaster Management Office to develop and maintain malaria- and VBD-related preparedness and rapid response mechanisms for affected areas and populations.

Finally, the Program will work with technical and academic partners to learn and apply new knowledge as it becomes available in order to achieve malaria elimination and prevent its re-establishment in Vanuatu after elimination of indigenous transmission.

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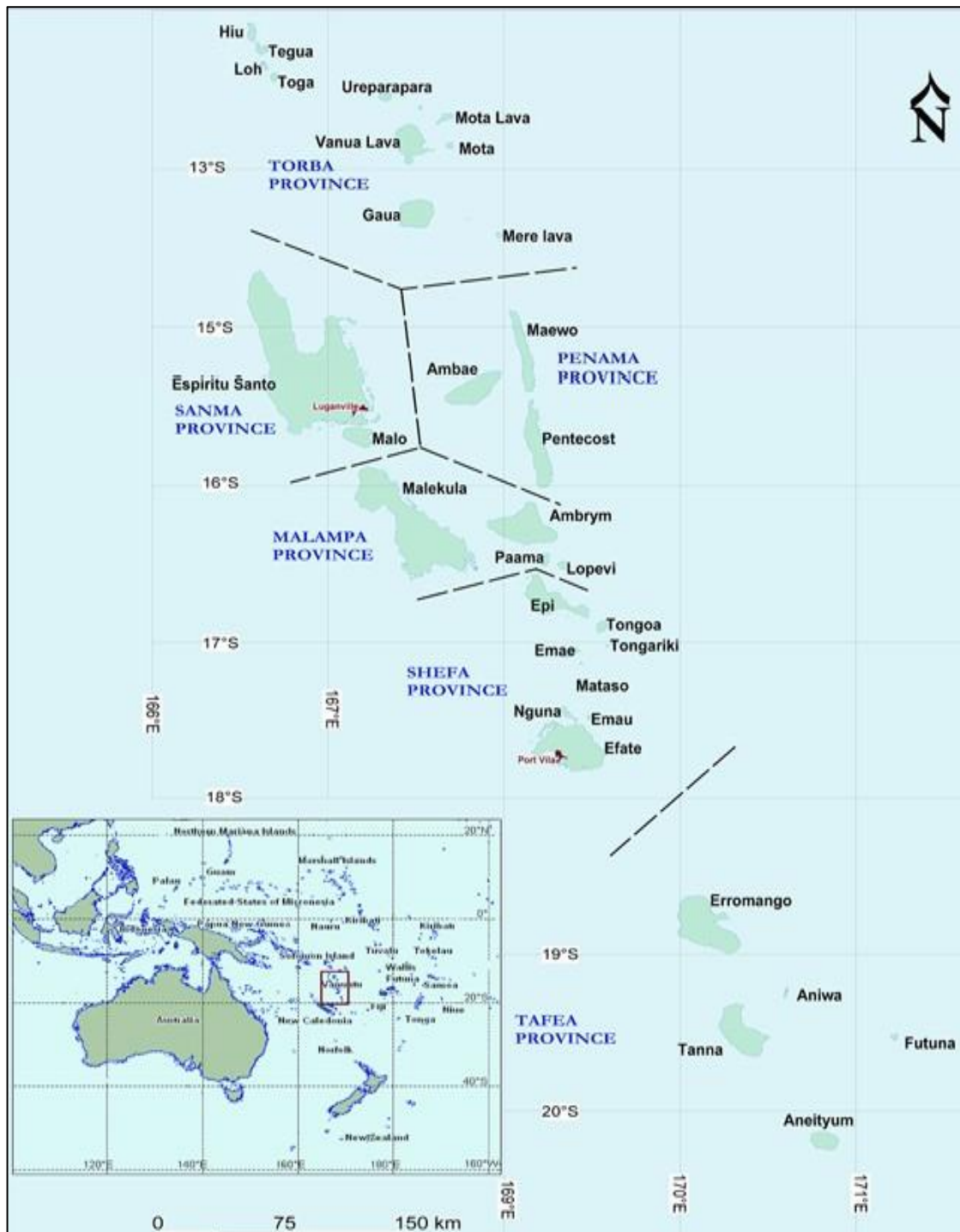
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Acronyms and abbreviations

ABER	Annual blood examination rate
ACT	Artemisinin-based combination therapy
ACT-Malaria	Asian Collaborative Training Network for Malaria
An.	<i>Anopheles</i>
ANC	Antenatal care
API	Annual parasite incidence
APLMA	Asia Pacific Leaders' Malaria Alliance
APMEN	Asia Pacific Malaria Elimination Network
ARI	Acute respiratory illness
AUD	Australian dollar
BCC	Behaviour change communication
CMO	Chief Medical Officer (Provincial)
CMS	Central Medical Stores
COVID-19	Coronavirus disease of 2019
CRC	United Nations Convention on the Rights of the Child
DFA	Direct funding agreement (Vanuatu Health Program)
DFAT	Australian Department of Foreign Affairs and Trade
DHIS2	District Health Information System 2
DHS	Demographic and Health Survey
DP	Development partner
G6PD	Glucose-6-phosphate dehydrogenase
GDP	Gross Domestic Product
GIS	Geographic information system
GOV	Government of Vanuatu
HPU	Health Promotion Unit
HR	Human resources
iDES	Integrated drug efficacy surveillance
ILI	Influenza-like illness
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
LLIN	Long-lasting insecticidal net
LSM	Larval source management
M&E	Monitoring and evaluation
MAP	Malaria Action Plan
MEAG	Malaria Elimination Advisory Group
MEMTI	Malaria Elimination in Melanesia and Timor-Leste Initiative
MEO	Malaria Elimination Officer
MESC	Malaria Elimination Steering Committee
MMFO	Malaria Management for Field Officers
MMLL	Monthly Malaria Line Listing
MOFEM	Ministry of Finance and Economic Management

MOH	Ministry of Health
MPR	Malaria Program Review, 2018
NCD	Non-communicable disease
NDMO	National Disaster Management Office
NGO	Non-governmental organization
NMSP	National Malaria Strategic Plan (2015-20)
NSDP	National Sustainable Development Plan 2016–2030
NSPME	National Strategic Plan for Malaria Elimination (2021-26)
NSO	National Statistics Office
NVBDCP	National Malaria and other Vector Borne Diseases Control Program
PHC	Primary Health Care
<i>P.</i>	<i>Plasmodium</i>
PHT-ME	Provincial Health Teams for Malaria Elimination
PMS	Provincial Malaria Supervisor
POC	Point-of-care
PR	Principal Recipient (Global Fund grant)
PSM	Procurement and supply chain management
RACD	Reactive case detection
RAM	Rotarians Against Malaria
RDP	Role Delineation Policy
RDT	Rapid diagnostic test
RRT	Rapid Response Teams
SMS	Short (text) message service
SOP	Standard operating procedure
SPC	Pacific Community
STI	Sexually transmitted infections
TA	Technical assistance
TB	Tuberculosis
TC	Tropical cyclone
TES	Therapeutic efficacy surveillance
UHC	Universal Health Coverage
UNDP	United Nations Development Programme
USD	United States dollar
VBD	Vector Borne Disease
VCH	Vila Central Hospital
VHP	Vanuatu Health Program
VHW	Village Health Worker
WHO	World Health Organization

Map of Vanuatu showing provinces



Strategy at a glance

Vision

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

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.

Strategic Objectives (Key Interventions)

1. To maintain very high levels of coverage with long-lasting insecticidal mosquito nets (LLIN); and to rapidly reduce malaria transmission in selected higher-incidence areas and foci using indoor residual spraying (IRS).¹
2. To roll out case-based surveillance and response nationwide using the '1-7-60' approach.²
3. 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.
4. To mobilize communities through health promotion and leverage the support of all stakeholders in a multi-sectoral effort to accelerate the elimination of malaria.
5. To ensure that malaria and other VBD prevention, surveillance and case management are well integrated into disaster preparedness and response activities.

Strategic Objectives (Supporting Elements)

6. To maintain a high level of political commitment to malaria elimination; and 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.
7. To leverage technical partnerships in support of innovation by generating new knowledge and applying it to improve delivery and quality of malaria services.

Timelines and targets

Major impact targets and provincial milestones on this final stage of Vanuatu's journey towards malaria elimination are summarised in the following table.

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.

	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-establishment³	Tafea	Tafea, Torba, Penama	Tafea, Torba, Penama, Shefa	All	All	All

Key interventions and supporting elements

Key interventions

1. Malaria vector control and personal protection including: rolling three-yearly mass distribution of LLINs to achieve very high levels of coverage of Vanuatu's entire population;⁴ continuous LLIN distribution to maintain coverage between mass distributions; and, high-quality IRS with a non-pyrethroid insecticide in selected areas.
2. Case-based surveillance and response for elimination and prevention of re-establishment of malaria, harmonised as appropriate with other fever and disease surveillance systems.
3. Early and effective malaria case management including periodic campaigns to expertly provide and ensure adherence to radical treatment for recently detected vivax malaria cases.
4. Health promotion to support the enabling environment for malaria elimination, to strengthen elimination related knowledge, attitudes and practices, and to promote community led engagement in elimination interventions.
5. Rapid provision of comprehensive malaria services to those affected by disaster as part of Vanuatu's disaster relief package.

Supporting elements

1. A strong enabling environment
 - i) Ensure strong and dynamic national leadership of the malaria elimination agenda in order to maintain high level political and development partner commitment and adequate financial support for elimination
 - ii) Strengthen communications and advocacy to ensure that malaria elimination becomes a national goal with full engagement of provincial and local level leaders and stakeholders.
 - iii) Conduct a malaria-specific human resource review and develop and implement an approach to attract, motivate and retain key skilled staff.
 - iv) Ensure sufficient workforce to enable elimination by filling all existing posts and mobilize surge staff,⁵ e.g. through short-term contracts and volunteer positions

³ Torba was originally planned to achieve zero indigenous cases of malaria in 2020. Eight cases of malaria were reported in early 2020 and have been investigated and classified as locally acquired relapses of *P. vivax*.

⁴ Distribution will take sleeping arrangements into consideration to ensure that everyone has access to an LLIN.

⁵ Each province should have a Malaria Elimination Officer pending integration of those functions into broader disease control mechanisms after achievement of elimination.

- v) Maintain malaria-specific capacity and capability in all provinces and ensure malaria elimination activities are included in the integrated package of health services through active provincial elimination committees, inclusive health planning and coordinated, integrated community responses
- vi) Ensure Malaria Program partnership and participation in regular supportive supervision for health workers in facilities at all levels, especially at peripheral and community levels
- vii) Maintain and support capacity for Program strategy development, planning and review
- viii) Improve financial management and timely mobilisation of funds
- ix) Improve data quality, information management and reporting
- x) Ensure technical assistance and cooperation
- xi) Strengthen capacity for forecasting, procurement and supply chain management (PSM).
- xii) Investigate regional financing options and adopt innovative mechanisms to mobilize resources for elimination.

2. Operational research and monitoring to support innovation and improved delivery of services

- i) Monitor antimalarial therapeutic efficacy, insecticide resistance, vector bionomics and residual efficacy of insecticidal interventions.
- ii) Investigate the causes of residual transmission and conduct pilot implementation of new tools, technologies and approaches – and scale-up if justified.
- iii) Conduct operations research in collaboration with technical partners to optimize the impact and cost-effectiveness of existing and new interventions and strategies (i.e. 'learning by doing').

1. BACKGROUND

Introduction

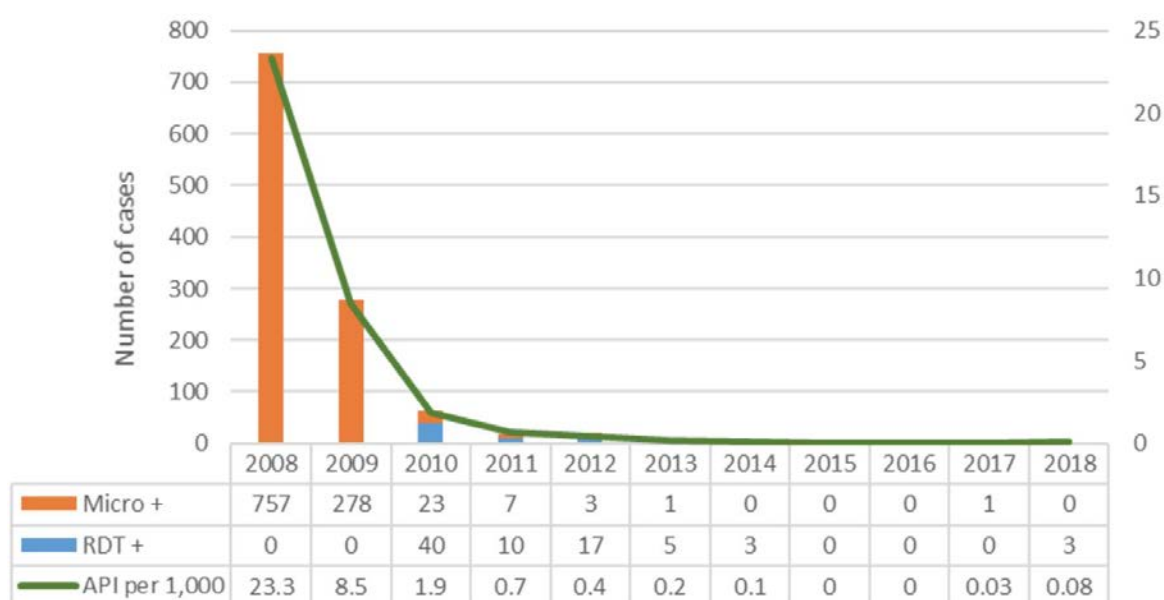
Malaria has historically been one of the leading causes of ill health in Vanuatu. In 1990, this mosquito-borne disease infected an estimated 198 per 1,000 people and caused many deaths;⁶ as recently as 2010, it was among the top five notifiable diseases nationally.⁷

Sub-national elimination efforts have been a sporadic feature of the national program since the 1980s. In 1991, malaria was thought to have been eliminated from Aneityum in Tafea Province – the southernmost island in the archipelago, and the southernmost point for the distribution of malaria and vector mosquitoes in the Pacific; however, malaria reappeared sporadically until 2007 and it was not until 2010 that it was agreed to have been eliminated from the island. This work provided an example of elimination that helped to garner support for elimination in other areas of the country.

In 2008, the program launched dedicated malaria elimination efforts in the whole of Tafea province. These efforts involved: 100% coverage with all malaria interventions; improved surveillance, case finding and case investigation; strong provincial and community engagement; additional staff (Malaria Elimination Officers); and strong attention to program management, monitoring, evaluation and reporting. These extra efforts were made possible by significant targeted financing by development partners (DP), as well as technical and implementation support from WHO and academia.

Although Tafea Province recorded one imported case in March 2017, no locally acquired cases have been detected since 2014 (Figure 1).

Figure 1: Case load and annual parasite incidence (API) in Tafea Province (2008-18)



⁶ Ministry of Health (2013). Vanuatu Malaria Programme Review, 2013.

⁷ World Health Organization (2011). *Country Health Information Profile – Vanuatu*.

The Ministry of Health (MOH) and technical partners verified the quality of the surveillance system and declared sub-national malaria-free status for Tafea in November 2017.⁸

By 2015, just a few cases remained on the islands of Torba Province at the northern end of the country. Malaria vectors are still present in Tafea and Torba and so both provinces remain at risk of re-establishment of malaria transmission, particularly following importation by travellers from other endemic islands in neighbouring provinces. Therefore, the whole population of Vanuatu is still considered to be potentially at risk of malaria infection.

Guided by the *National Malaria Strategic Plan (NMSP) 2015-20*, the national Malaria and other Vector Borne Diseases Control Program (NVBDCP; “the Program”) has been implementing a range of strategies and interventions with the aim of progressively controlling and eliminating malaria in all provinces of the country and a view to national level verification and certification of malaria-free status by 2027. The goals of the Program have been to reduce the API to < 1 per 1,000 nationally by the end of 2020 and maintain zero confirmed deaths from malaria. The Program has implemented a range of activities related to vector control, diagnosis and treatment, active surveillance and response in support of elimination and program management in order to achieve the following four objectives:

- 1) Maintain universal coverage with LLINs for the whole population of Vanuatu and accelerate reduction in malaria transmission in selected areas using IRS
- 2) Achieve 100% testing of suspected malaria cases by microscopy or RDT and provide prompt treatment and care for 100% of confirmed malaria cases according to the national *Malaria Diagnosis and Treatment Guidelines*
- 3) Once a province has entered the elimination phase, to investigate and manage all malaria cases and identify, investigate and manage foci of infection according to national *Malaria Diagnosis and Treatment Guidelines*
- 4) Strengthened Malaria Program leadership and management capacity at provincial and national level to plan, deliver and report on malaria interventions in a well-coordinated, efficient and timely manner.

As a result of these efforts, the national API has decreased from 3.8 per 1,000 in 2017 to 2.2 per 1,000 in 2018 and 1.9 per 1,000 in 2019; there have been no confirmed malaria deaths in Vanuatu since 2011 (NVBDCP Annual Report, 2019).

Malaria epidemiology is discussed in more detail in Section 2.

Malaria in the context of the national health plan

The *Vanuatu Health Sector Strategy 2017-20* highlights the importance of ensuring universal access to quality assured vector control, malaria diagnosis and malaria treatment and strengthening the application and integration of disease notification and surveillance and response systems to achieve malaria elimination. It reiterates the NMSP commitment to universal coverage and its vision of malaria elimination.

The *Strategy* is due for renewal during the period of this new NMSP.

⁸ Ministry of Health (2019). *Case Study: Successful Elimination of Malaria, Tafea Province, Vanuatu*

International context and commitments

The emphasis placed by the Government of Vanuatu (GOV) over the last 12 years on moving towards malaria elimination has been supported by DPs like WHO, the Global Fund to fight AIDS, Tuberculosis and Malaria (“the Global Fund”) and the Australian aid program (under the Department of Foreign Affairs and Trade; DFAT).

Vanuatu is one of twenty countries that have endorsed the *Leaders Malaria Elimination Roadmap* developed by the Asia Pacific Leaders Malaria Alliance (APLMA), which committed to a malaria-free Asia-Pacific region by 2030. Vanuatu is also a founding member – since 2009 – of the Asia Pacific Malaria Elimination Network (APMEN), which is composed of 21 Asia Pacific countries pursuing malaria elimination, as well leaders and experts from key multilateral and academic agencies.

Country profile

Geography

Vanuatu is an archipelago consisting of 82 islands of volcanic origin, spanning 1,176 kilometres from north to south in the South Pacific, 800 km west of Fiji and 1,770 km east of Australia. Sixty-five of the 82 islands are inhabited. The total land area is just less than 12,300 square kilometres. The highest point of elevation is 1,877 metres.

The country is divided into six provinces, the names of which are derived from their constituent islands or island groups (Map, page 8). From north to south, they are:

- Torba (Torres and Banks Islands)
- Sanma (Espiritu Santo, Malo)
- Penama (Pentecost, Ambae, Maewo)
- Malampa (Malekula, Ambrym, Paama)
- Shefa (Shepherd group of islands, Efate)
- Tafea (Tanna, Aniwa, Futuna, Erromango, Aneityum)

Demographics

The population of Vanuatu is young and predominantly rural. Based on National Statistics Office (NSO) projections from the 2009 census and a supplementary mini-census conducted after Tropical Cyclone (TC) Pam in 2016, the NSO-estimated population in 2019 was 289,546. The estimated annual population growth rate is 2.0%. From the 2016 mini-census, 28.5% of the population is aged less than 10 years (and almost half are aged less than 20) while just 6.2% is aged 60 or above. Almost 80% of the population lives on just 7 islands: Efate (where the capital, Port Vila, is located), Santo (the largest island), Tanna, Malekula, Pentecost, Ambae and Ambrym. The urban population lives primarily in the two largest cities, Port Vila and Luganville (on Santo). Approximately 75% of the population lives in rural areas – either in coastal settlements that may span several kilometres, or in reasonably well-defined inland villages ranging in size from a few families to several hundred people. The interiors of Pentecost, Tongoa, Tanna and Santo are quite density populated. There are three official languages (Bislama, English and French), though Vanuatu has the world's highest linguistic density per capita with 138 indigenous languages.

Climate and the environment

There is a rainfall gradient from the north to the south of the country. Rainfall averages about 2,360 mm per year nationwide, but ranges from around 2,000 mm in the southern islands

(Tafea province) to 4,000 mm in the north (Torba province). The wet season is from November to April and coincides with peak malaria transmission.

The wet season is also associated with tropical cyclone risk; the greatest frequency is usually in January and February. Vanuatu receives between 20–30 cyclones per decade, of which three to five may cause severe damage and extensive disruption of services. Severe TC Pam in March 2015 was the second most intense tropical cyclone ever to strike the South Pacific and is regarded as one of the worst natural disasters in the history of Vanuatu. The Manaro Voui volcano on the island of Ambae undergoes periodic eruption, resulting in large population displacements in 2005, 2017 and 2018. In April 2020, TC Harold caused widespread destruction, population displacement and disruption of services in the provinces of Sanma, Penama and Malampa, where more than half the population lives; it is the strongest cyclone to strike Vanuatu since TC Pam.

There is a slight north-south temperature gradient, but this is less pronounced than the rainfall gradient: Shefa and Tafea provinces have cooler and slightly longer winters than the more northerly island groups. In coastal areas, daily temperatures average 26°C in the hot season with an average maximum of 30°C and an average minimum of 24°C. Night-time minimum temperatures in southern coastal areas may fall to 13°C in the dry season.

Political system

Vanuatu is a lower-middle income country. It is a constitutional democracy with a republican political system headed by a President (elected by sitting members of Parliament and presidents of Regional Councils) and a Prime Minister (who is the head of the ruling party or coalition within Parliament). Members are elected every four years to represent multi-seat constituencies.

Governments may change more frequently than four-yearly due to shifting alliances within the Parliament. The most recent parliamentary election was in March 2020.

Economy

Vanuatu is a small, geographically remote, island economy that is especially vulnerable to global economic shocks and natural disasters (including tropical cyclones) that can quickly and dramatically reduce service delivery, economic growth and government revenue.

The mainstays of Vanuatu's economy have been agriculture, tourism, offshore financial services and raising cattle. Vanuatu also sells citizenship (allowing visa-free travel throughout Europe and other countries) and passport sales may now account for more than 30% of the country's revenue. There is also a substantial fishing industry, although this does not bring in much foreign exchange. Exports include copra, kava, beef, cocoa and timber, and imports include machinery and equipment, foodstuffs and fuels. Mining activity is insubstantial.

More recently, economic growth has been driven by a construction boom that is the result of major new infrastructure projects and disaster reconstruction – in particular following TC Pam, which was associated with production losses estimated at 24.2% of Gross Domestic Product (GDP). Tourism, which has recovered strongly in recent years and continues to have significant growth potential, contributes appreciably to the country's economic well-being – an estimated 48% of GDP.

Aid inflows also make a substantial contribution to the economy, and are a significant source of financing in the health sector – albeit one that has shown great variation across recent years, making planning in the MOH difficult. According to national data, DP funding made up almost one-fifth of public expenditure on health over the period 2010-16. However, key constraints to implementing development assistance persist: these include Vanuatu's remoteness, small market size, underdeveloped institutions, and limited absorptive capacity.

Vanuatu's GDP growth rate was, even recently, expected to slow from a peak of 4.4% in 2017 to 3.0% in 2019 and 2.8% in 2020.⁹ The evolving pandemic of coronavirus disease (COVID-19) in 2020 will now have a further direct and substantial impact on tourism and related economic activity beyond these estimates; international borders are currently fully closed to quarantine the population from importation of the virus and this will continue for an unknown duration.

This will be further compounded in the short- to medium-term by TC Harold. Time bound, targeted fiscal support will be needed in the short term to mitigate the impacts of these twin disasters on employment and livelihoods, and avoid a destructive loss of tourism and other private sector capacity.¹⁰

Reduced government revenue is highly likely to reduce the funding available to the health sector.

Ni-Vanuatu families have also received increasing inflows of remittances in recent years. This may decline due to economic slowdown and reduced population movement in major regional migrant workforce destinations like Australia and New Zealand.

Human rights

Vanuatu has ratified core human rights treaties, including:

- Convention on the Elimination of All Forms of Discrimination Against Women
- Convention on the Rights of Persons with Disabilities
- Convention on the Rights of the Child
- International Convention on Civil and Political Rights
- Convention Against Torture.

Vanuatu has also ratified a number of International Labor Organization conventions that aim to protect and uphold the rights of its workers. Furthermore, Vanuatu has also ratified the Optional Protocol to the CRC on the involvement of children in armed conflict and the Optional Protocol to the CRC on the sale of children, child prostitution and child pornography. Generally, the Government respects the human rights of its citizens; however, a number of issues have arisen relating to the rights of women (see *Gender equality*, below), conditions in prisons, government corruption and access to education.

Gender equality

There are a number of human rights issues in Vanuatu relating to women. Domestic violence is a concern, although there is a lack of current statistical information on this.

By law, women have equal rights; however, Vanuatu's traditional culture can, at times, conflict with this. According to UN Women, three in five women in Vanuatu who have been in a relationship have experienced physical or sexual violence. Cultural practices like bride price are still widespread and effectively place a commercial value on women; it has also been seen as a justification for violence against women. Tradition means that women also face discrimination in relation to land ownership, although land ownership by women is not barred by law.

The 2008 Family Protection Act and the linked Family Protection Unit have seen progress in Vanuatu towards the protection of women's rights. Police also undergo specialized training to deal with cases of domestic and sexual violence and have implemented a policy of not dropping cases of domestic violence unless the complainant formally makes a request to the court for the case to be withdrawn.

⁹ <https://www.adb.org/countries/vanuatu/economy>

¹⁰ World Bank, 2020. *East Asia and Pacific in the Time of COVID-19*. East Asia and Pacific Economic Update (April), World Bank, Washington, DC.

Women's groups such as the Vanuatu Women's Centre and non-governmental organizations (NGO) are also heavily involved in promoting and protecting the rights of women in Vanuatu.

Health and development

Overview of health outcomes

Vanuatu has made good progress in terms of improved life expectancy, which has risen from 56 years at the time of independence from France and the United Kingdom in 1980 to 74 years in 2018. Infant mortality rate has fallen from 31 per 1,000 live births in 1990 to 13.9 per 1,000 in 2018. The maternal mortality ratio is estimated to have halved from 220 per 100,000 live births in 1990 to 72 per 100,000 in 2017.

Health care and health programs are primarily delivered by the Government with support from DPs, NGOs, faith-based organizations and a small private sector consisting of a few well-established primary care practices operating in Port Vila and Luganville.

Health expenditure is largely publicly funded, with a high reliance on external financing and low formal out-of-pocket (OOP) payments. Patients pay modest OOP contributions for inpatient care and outpatient services in public facilities. However, OOP payments are not regarded as a significant barrier to access although other costs not reported as formal OOP, such as travel to and from health facilities, can be significant.

There are four basic levels of publicly operated health-care facility: 1) hospitals (there are five main hospitals, one in each of the larger provinces, including the national referral hospital in Port Vila and a regional referral hospital in Luganville); 2) health centres (37); 3) dispensaries (89); and 4) community-supported aid posts (231), staffed by a volunteer village health worker (VHW) whose primary mandate is health promotion and outreach as opposed to curative services.

Recent efforts to improve financial management processes, health information systems and health planning cycles and to strengthen primary health care (PHC) and immunization programs are delivering results. Despite these successes, limited access to quality health services remains a challenge. Scattered populations, geographical isolation, poor infrastructure, costly transportation and logistics are major challenges in delivering essential health care. Increasing urbanization of the two major towns is causing urban overcrowding and creating environmental conditions that contribute to the emergence of disease and other health problems such as non-communicable diseases (NCD), sexually transmitted infections (STI), unplanned pregnancies, childhood malnutrition and domestic violence. In addition, lack of an adequately skilled workforce, limited financial capacity and other health systems issues continue to hinder the delivery of quality services for all.

Vanuatu faces an evolving triple burden of disease in the form of: increasing rates of NCDs; emerging threats from climate change, and death and illness from communicable diseases; and conditions affecting mothers and children. NCDs – in particular diseases of the circulatory system, diabetes, cancers and chronic respiratory disease – are among the most common causes of adult morbidity and premature mortality. In children, respiratory infections, diarrhoeal disease and neonatal conditions continue to account for most childhood illnesses and under-five deaths. Despite some progress in neonatal, infant and child health, the decline in under-five mortality and infant mortality appears to have plateaued over the past 10 years. Undernutrition and stunting remain a concern. Maternal and neonatal health continue to pose major challenges as access to emergency obstetric and neonatal services remains limited.

While the prevalence of malaria has declined remarkably, that of other communicable diseases such as tuberculosis (TB) and STIs has not and the population is at risk from disease outbreaks such as dengue fever, measles and other vaccine-preventable diseases, and emerging regional and global infectious diseases threats that carry a risk of cross-border outbreaks, epidemics and pandemics.

National health policies and health sector strategies

Health sector development is guided by an overarching National Sustainable Development Plan (NSDP) 2016–2030, which outlines the overall national development priorities. Society Goal 3 of the NSDP addresses quality health care and aims for “a healthy population that enjoys a high quality of physical, mental, spiritual and social well-being”.

The four health policy objectives under the NSDP are:

1. Ensure that the population of Vanuatu has equitable access to affordable, quality health care through the fair distribution of facilities that are suitably resourced and equipped;
2. Reduce the incidence of communicable and non-communicable diseases;
3. Promote healthy lifestyle choices and health-seeking behaviour to improve population health and well-being; and
4. Build health sector management capacity and systems to ensure the effective and efficient delivery of quality services that are aligned with national directives.

The *National Health Sector Strategy 2017–20* is closely aligned with the policy objectives of the NSDP. It provides the strategic directions for health interventions for improved services that are accessible to all without financial hardship. PHC and strengthening the core components of the health system are key elements of the Ministry’s strategy to build a system that is resilient to the health consequences of climate change, the increasing burden of NCDs and the ongoing impact of communicable diseases.

Vanuatu has five national strategic priorities for health. The first of these is ‘to reduce morbidity and mortality from communicable diseases and continue to integrate disease-specific programs into broader health system structures’. The first activity under this strategic priority is to ‘continue the malaria elimination agenda through effective surveillance and information management systems and mobilization of resources to maintain the required coverage and quality of interventions’. Malaria is thus a key national priority.

Health care delivery system

The current health system structure must overcome some significant challenges to achieve the first NSDP policy objective of ensuring equitable access to quality, affordable health services. First, there are obvious physical challenges. Vanuatu has a small population that is dispersed across 83 islands. Villages in remote areas are often small and isolated, and people who live there pay high transport costs (via boat or truck) to reach health facilities. In the wet season, travel by sea is often dangerous and roads may be cut by flooding.

While some programs and services can be delivered effectively nationwide, and in some places services are working well together, overall the health system faces significant challenges in its effort to achieve Universal Health Coverage (UHC). Reasons for this, which are well described in the current *Health Sector Strategy*, include:

Health workforce – Staffing shortages are seen as the major factor limiting the fair distribution of health services. Many public health facilities are understaffed, particularly in rural areas, and some are not staffed at all. Vanuatu has only 1.46 frontline health staff (doctors, registered nurses, midwives) per 1,000 population,¹¹ well below the level of 4.5 per 1,000 regarded by WHO as necessary for achieving UHC (and even this ratio does not recognise the particular challenges in small island states with widely dispersed populations). Lack of human resources (HR) planning and development has led to the gap between staffing requirements and available workforce, particularly in nursing.

A new staffing structure is proposed for MOH under a revised Role Delineation Policy (RDP; 2018), focusing on strengthening services at the provincial level.

The medical workforce is now increasing in size, particularly as a result of an accelerated development program through sending medical undergraduates to train in Cuba. This offers the chance to place more doctors in provincial settings, but most new doctors are quite inexperienced and those who trained in Cuba have studied in a health system quite different to Vanuatu's and with a different burden of disease. Decentralisation of clinical services is planned, and urgently required; however, this will require careful management to provide adequate support and supervision to recent graduates in the provinces, as well as having sustainable specialist services at referral hospitals.

The return of the Village Health Worker (VHW) Program to the MOH gives an opportunity to strengthen PHC at its roots. The Government of Vanuatu (GOV) and MOH recognise a need for VHWs to be recognised, trained, awarded and included in any future workforce planning.

Service mix/balance – Resource allocation is currently skewed towards curative services – particularly those at Vila Central Hospital (VCH): i.e. the policy commitment to PHC is not reflected in resource distribution. The high level of dependence on VCH for clinical services is costly for both patients and health authorities in other provinces. Increasing patient flows to VCH General Outpatient Department reflect the inadequacy of PHC facilities in and around Port Vila, as well as apparent community dissatisfaction with those services. Rural and remote areas are widely seen as even more disadvantaged: the further away from the capital, the weaker the service response and the greater the cost to consumers – both in terms of money and health.

Service model and system functionality – There is a need for greater clarity about the range of services to be provided at different types of health facilities and the linkages between the different levels. Referral policies and protocols are generally not in place or not being used effectively.

Outreach services and supportive supervisory visits are an important means of improving service access in rural areas, but work is needed to make them better developed and more functional – both for HR and financial management reasons.

Systems for the supply and distribution of essential medicines, vaccines and other clinical supplies are not always able to keep up with demand. This means that patients attending some health facilities do not get the treatment they need.

There is limited integration of curative and public health services. Separate 'silos' lead to poor coordination and inefficiencies in resource use. Some models (like Integrated Management of Childhood Illness and the Malaria Program) work better to link up separate parts of the system to provide a better 'continuum of care'.

¹¹ Vanuatu Health Sector Strategy 2017-20.

By comparison with other public health programs, there is no provincial staffing structure in place to address NCDs. Working relationships with other sectors and ministries need to be strengthened (recognising that a multi-sectoral approach is needed to tackle the complex nature of NCDs and their determinants).

Management and financing – Although public expenditure on health is in line with expectations for a country with Vanuatu's national income, there is evidence that the existing health budget is not being applied in a way that helps improve health system performance. There is also considerable reliance on financial support from DPs – particularly for operational financing of public health programs – while Government funding has tended to be spent more on HR costs.

With the reorganization envisaged under the revised RDP, GOV, MOH and funding partner priorities are now increasingly focusing on health system strengthening. This strengthening includes adopting a more integrated approach, especially with regard to public health policy, financial and operational planning, workforce development at all levels, and disease surveillance and control. The RDP seeks to ensure roles of health staff are clearly defined at all levels. Traditionally 'vertical' disease control programs must increasingly adapt to this new model.

Better health service management and information services are needed to guide investments most effectively, improve system performance and make better use of scarce resources.

Currently, most people appointed to management positions within the health sector do not have management qualifications or experience, even though they may be highly skilled health professionals.

Infrastructure and equipment – Infrastructure needed for service delivery and support must also be developed in line with the service model and staffing structure proposed under the RDP.

While there are some functional, modern health facilities in Vanuatu, a 2014 audit showed that many buildings are in poor condition due to lack of maintenance. Natural disasters have caused further damage and accelerated the need to address preventative maintenance. Many health facilities do not have the right kind of functional space and equipment needed for staff to provide the services required and not all health facilities are in the best location in terms of access for the people who use them.

Telecommunications provide a valuable means of linking rural and remote health services with higher level facilities, but not all facilities have adequate mobile phone coverage, requiring other forms of communication to facilitate information-sharing and access to clinical guidance.

New technologies may provide alternative options for improving access to services. For example, the use of drones has been trialled to distribute vaccine supplies and to monitor population displacement after the most recent Ambae volcanic eruptions and, while it demonstrated promise, it also reiterated the major logistic challenges of health service delivery in Vanuatu.

Information systems – Good information is essential if health services are to be planned and managed so that they work better to improve the health of the people of Vanuatu. Previously, a great deal of data had been collected with a lack of or limited analysis leading to little flow of information back to staff managing and delivering services, and for use in decision making. Information systems were fragmented and provided only partial coverage and provide hard to use when seeing 'the big picture' or using information to assess progress. However, use of the District Health Information System, Version 2 (DHIS2), initially for malaria surveillance, has been used efficiently and effectively for malaria information management and use over recent years.

This system is now being rolled out more broadly to incorporate data from other health programs, such as tuberculosis and the expanded program of immunisation. Better availability of information will help managers and clinicians to better understand the problems they are dealing with and act to resolve them. A direct limitation to expansion of DHIS2 use and effectiveness relates to telecommunications and internet availability.

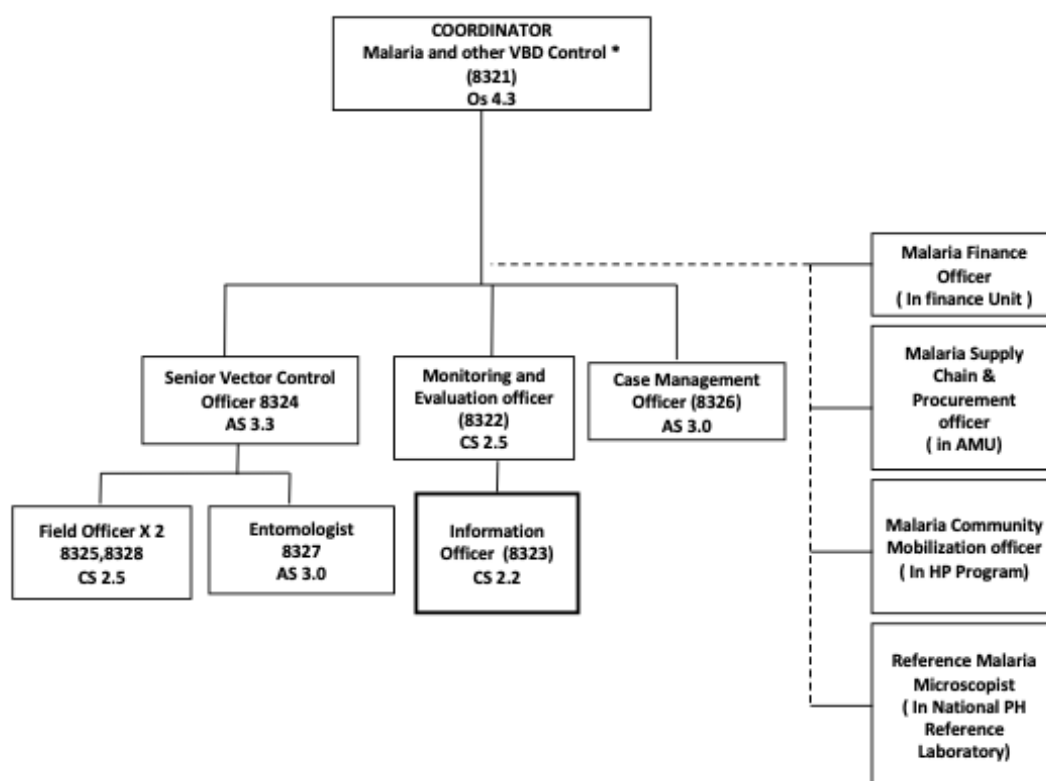
Organization of the Malaria and other Vector Borne Diseases Control Program

Place within the MOH – At present, the MOH is organized under three directorates: Public Health; Hospitals and Curative Services; and Planning, Policy Coordination and Corporate Services. Within Public Health, there are seven divisions, of which the NVBDCP is one. Other divisions that are closely linked to VBDC are Health Promotion, Surveillance and Environmental Health. The NVBDCP is by far the largest of these divisions.

Each of the seven divisions is generally recognized with positions at provincial level under a Provincial Public Health Manager. There are 13 recognised public health programs within the seven divisions. However, the structure of the MOH is currently undergoing comprehensive reorganization under the revised RDP. The reorganization process, which is designed to transform the provision of health services in Vanuatu, is expected to take 14 years to implement fully. Once complete, MOH will have a total of 2,525 staff positions compared to approximately 900 at present.

The organizational structure of the NVBDCP at central level is presented in Figure 2.

Figure 2: Organizational structure of the National Malaria and other Vector Borne Disease Control Program



Program partners – MOH's development partners – mainly the WHO, DFAT, Rotarians Against Malaria (RAM), the Global Fund and UNDP (which manages funding from the Global Fund as

Principal Recipient; PR) – are supporting the fight against malaria in Vanuatu, working in close collaboration with provincial health services and local communities. Other program partners include regulatory agencies, other government ministries, civil society and the private sector.

Program oversight – While NVBDCP benefits from strong political commitment, its efforts have been hampered by a lack of coordination and communication among program partners and between these partners and the MOH/NVBDCP. The Program also historically lacked a formal oversight mechanism.

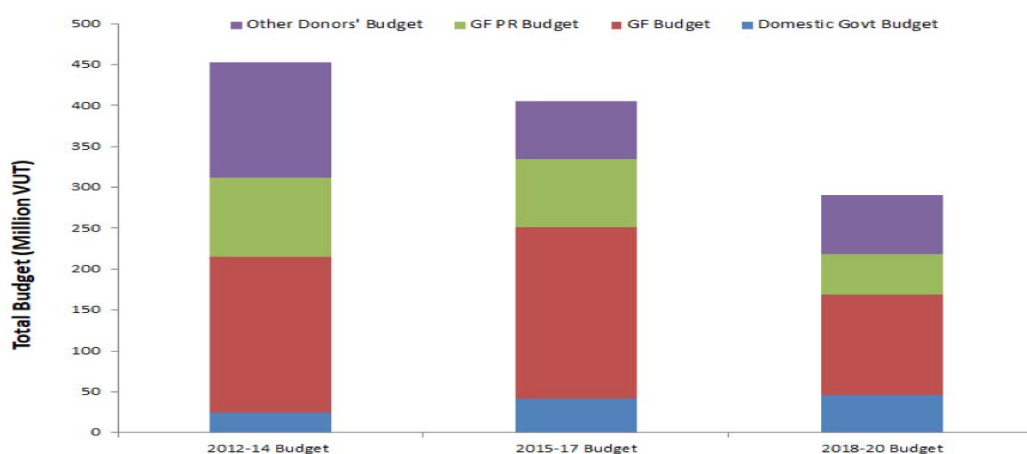
To address these issues, NVBDCP has recently established a high-level multi-sectoral Vanuatu Malaria Elimination Advisory Group (MEAG), following the recommendation of the comprehensive Malaria Program Review (MPR) conducted in 2018. The MEAG will include representatives from MOH, MO VBDCP, NGOs and technical and development partners; its role will be external technical review of malaria trends, broad effectiveness of Program implementation and progress towards elimination. The MEAG will also review progress and gaps in elimination activities in line with the national strategy and operational plans, assist in adapting WHO guidance to the national context, and support the national program in the preparing for eventual certification of malaria elimination.

In addition, a National Malaria Elimination Steering Committee (MESC) has been formed, comprised of key MOH and Program staff. The role of the MESC is to periodically review progress against malaria elimination strategies, and to direct the planning, detailed implementation, resource utilization and partner coordination to address issues or gaps.

Program financing – GOV spending is stable (figure 3) but will have little capacity to increase in the foreseeable future. The three-yearly malaria allocation from the Global Fund fell from USD 2.7 million in 2015-17 to USD 1.6 million in 2018-20, although it will increase again to almost USD 3 million in 2021-23.

Funding from DFAT is predominantly through a 15-year, AUD 25 million commitment under the Vanuatu Health Program (VHP). The VHP currently places AUD 2 million into the Vanuatu health sector each year, divided approximately evenly between: a direct funding agreement (DFA) with the MOH (which can be used at the Ministry's discretion); and four defined program support areas (which include priority public health programs and an operational funding stream for the provinces). Either of the VHP funding streams – the DFA or the priority programs stream – is potentially accessible for malaria control and elimination, subject to prioritisation by the MOH.

Figure 3: Malaria budget during the last three Global Fund grant periods.



Source: GOV (cited in 2018 MPR)

2. Malaria in Vanuatu

Epidemiology and disease burden

Parasites

Plasmodium falciparum and *P. vivax* are both present in Vanuatu, but *P. vivax* has in recent years become the predominant species, and increasingly so as disease burden declines. In 2019, *P. vivax* accounted for 93.5% of all confirmed cases.

A study published in 2015 revealed a high level of genetic diversity in *P. vivax*, likely maintained by high levels of gene flow among sites and among islands[1]. This suggested that an island-by-island malaria elimination strategy might need to be complemented by more centrally integrated measures to control *P. vivax* movement across islands. Mass population movements between islands associated with sporting, religious or cultural events are a common occurrence in Vanuatu – exacerbated periodically by natural disasters – and have been associated with documented malaria outbreaks in recent years.

Vectors

Malaria transmission in Vanuatu is highly heterogeneous – most recently demonstrated by a pre-elimination malaria prevalence mapping exercise conducted in Tafea Province in 2008[2]. This confirmed that malaria transmission was strongly associated with proximity to the coast and often concentrated within well-defined foci.

Anopheles farauti s.s. is the only vector of malaria in Vanuatu and collections carried out in the region in the past indicate that it is found almost exclusively within a few kilometres of the coast[3,4]. This appears to support restricting the use of IRS to the coastal fringe (as was done on the island of Tanna in Tafea Province), leaving hinterland / 'middle bush' areas free of a need for IRS. However, an entomological evidence base for Vanuatu is lacking so further work to corroborate these findings may need to be carried out if epidemiological data suggest that transmission may be occurring inland.

The aquatic larval stages of *An. farauti* s.s are most commonly found in brackish water pools high in organic debris and subject to tidal fluctuations, particularly in lagoons and areas characterized by mangrove swamp [4]. Lagoons and swamps are the largest, most common and potentially most productive larval sites for this vector[5]. These sites are generally 'few, fixed and findable' and therefore theoretically amenable to vector control through larval source management (LSM). However, the scale and complexity of these ecosystems has raised concerns about the practicality of LSM and its potential for unintended consequences (e.g. incomplete larviciding triggering density dependent increases in larval survivorship [5]) and the approach has therefore not been widely adopted for the control of this vector.

An. farauti s.s. is characterized by early outdoor biting [6], and this might be expected to limit to some extent the effectiveness of LLINs and IRS for vector control and personal protection. However, studies have indicated that the frequent blood-feeding habit of this vector means that it can be expected to come into contact with insecticidal interventions frequently enough to result in substantial mortality [7]. This likely explains the significant reductions in malaria that have been achieved with insecticide-treated bednets and IRS in the Pacific region over the past twenty years.

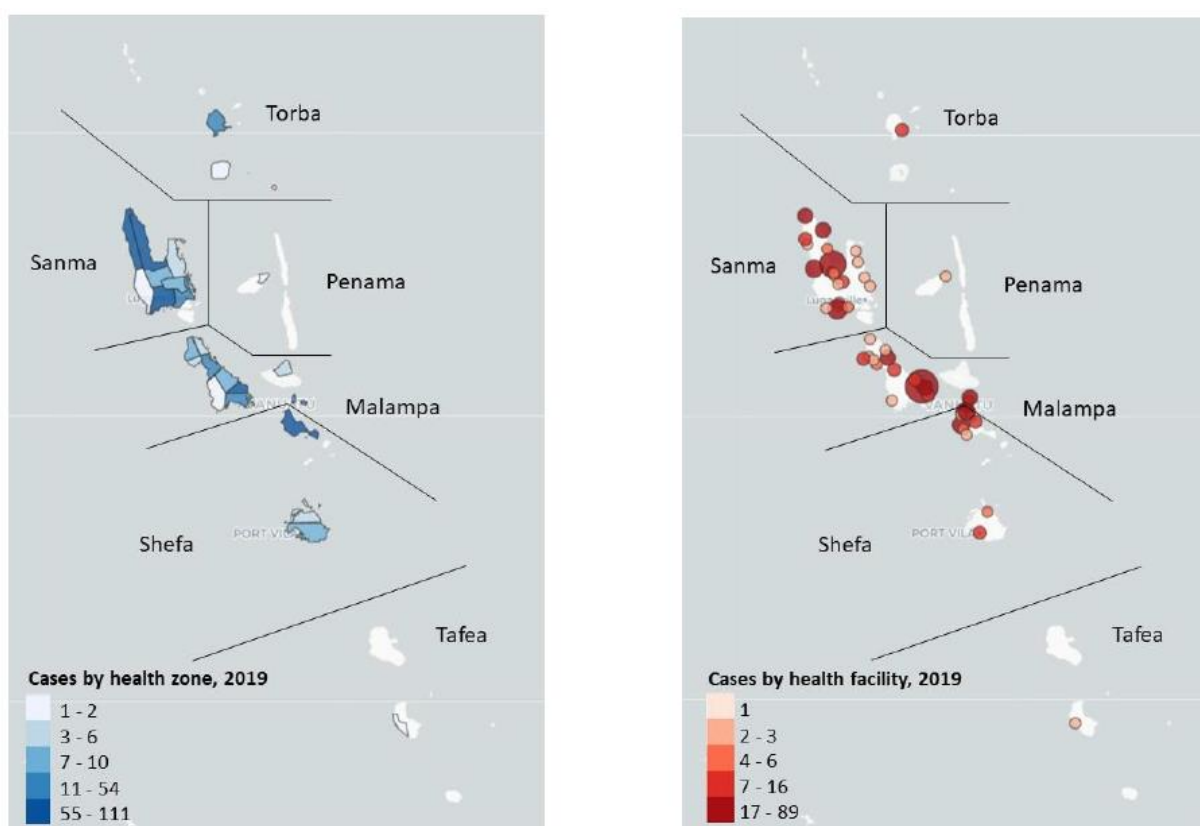
In islands where malaria has been eliminated, the vectors commonly persist, making the islands receptive. Population movements from endemic islands (see 2.1.1, *Parasites*, above) mean there is risk of importation of malaria parasites, and therefore any malaria-free islands of Vanuatu can be considered at risk of re-establishment of transmission.

Populations at risk

As described above, malaria transmission in Vanuatu is strongly associated with proximity to the coast and often concentrated within well-defined zonal strata and foci (e.g. Figures 4, with more detail shown in Figure 5), although infections acquired in coastal areas are sometimes imported into and detected in communities with very few or no vectors in the interior of islands.

The disease is becoming increasingly focal as elimination efforts continue. Of the 576 cases reported in 2019, 563 (97.7%) were from Sanma, Malampa and Shefa provinces. Further analysis shows that reported cases tended to be clustered: in Sanma health zones 4, 6 and 7; in Malampa health zones 2, 3, 4, 6 and 12; and, in Shefa, on Epi island (health zone 4, bordering Malampa).

Figure 4: Malaria case map showing distribution of cases by Health Zone (left) and Health Facility (right), Vanuatu, 2019



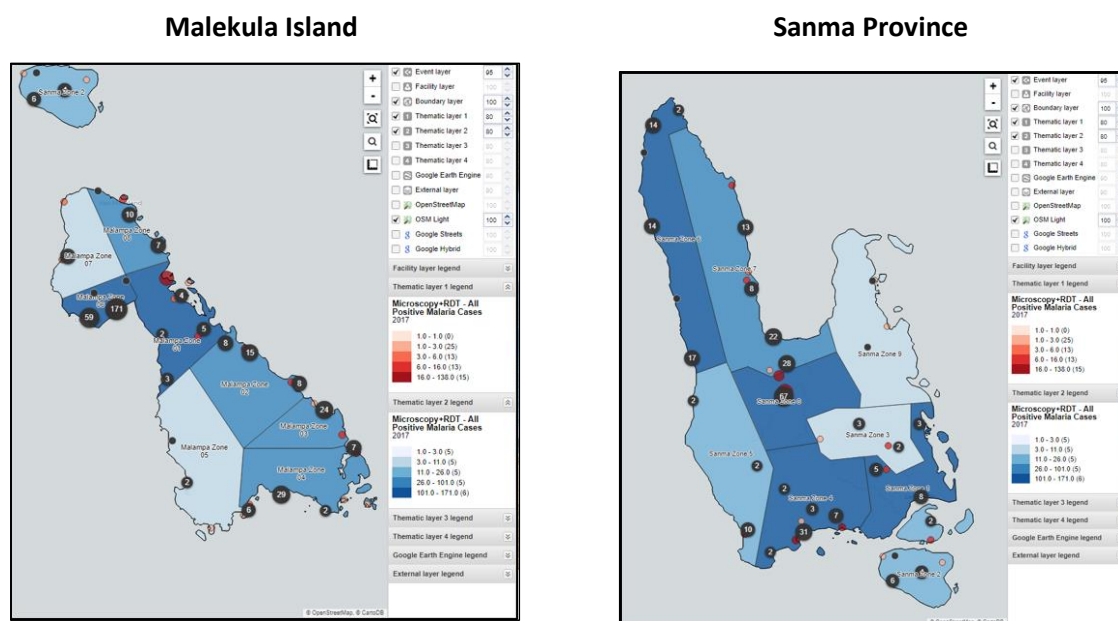
Source: NVBDCP Annual Report, 2019

The ongoing high level of focal malaria transmission – particularly seen in Malampa and Sanma provinces (Figure 5) – represents a real threat to malaria control and elimination in the whole of Vanuatu as cases are imported to other islands when people travel.

As an example, Vanua Lava island in Torba province achieved zero local cases in 2017 but, in early 2018, some cases of *P. vivax* were detected in residents who recently visited Espiritu Santo island; subsequently, a number of local cases were detected on Vanua Lava. This example demonstrates the high risk of malaria re-establishment in otherwise malaria-free areas and emphasizes the importance of aggressively addressing all remaining transmission foci in the country.



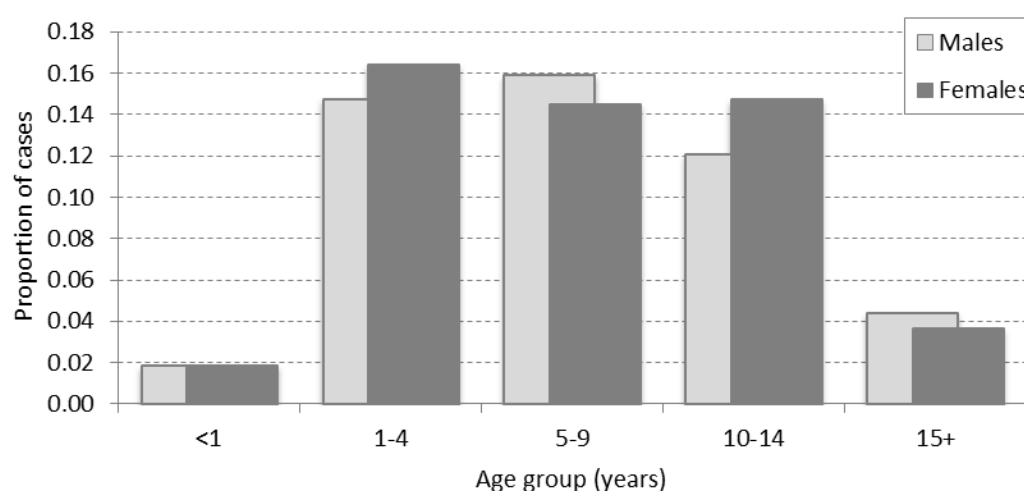
Figure 5: Spatial distribution of malaria cases on Malekula Island in Malampa Province (left) and in Sanma Province (right) in 2019



An analysis of the distribution of malaria cases by age group and sex (Figure 6) is indicative of relatively intense transmission resulting in increasing immunity with age plus immunity amongst neonates because of maternal antibodies.

With disease burden approximately equal overall in males and females, there is no evidence of occupational malaria – suggesting that transmission takes place primarily within villages.

Figure 6: Proportion of malaria cases by age group and sex, Vanuatu, 2018-19¹²

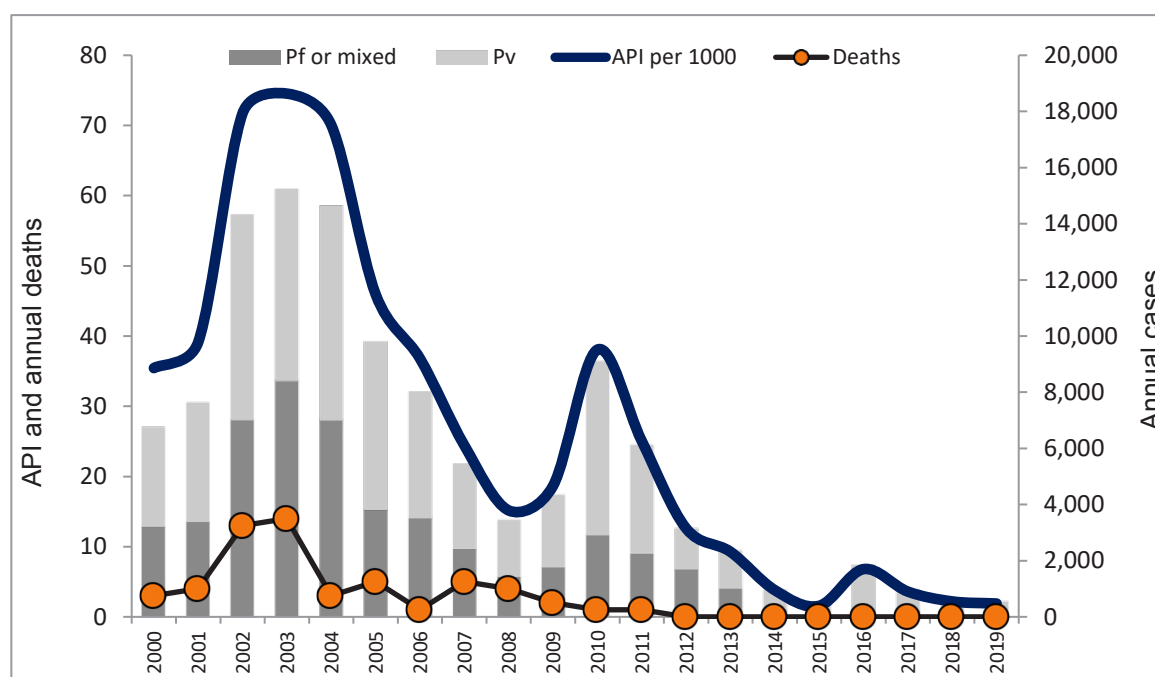


¹² Based on an analysis of 845 cases recorded between 1 January 2018 and 5 May 2019.

Trends in malaria incidence

API has decreased from 3.8 per 1,000 in 2017 to 2.2 per 1,000 in 2018 (figure 7) and 1.9 per 1,000 in 2019. There have been no confirmed malaria deaths in Vanuatu since 2011 (NVBDCP Annual Report, 2019).

Figure 7: Annual parasite incidence, caseload by species (*P. falciparum* or mixed and *P. vivax*) and deaths by year, Vanuatu, 2000 to 2019



As shown in Figures 4 and 5 and Table 1, most cases are now reported from Sanma, Malampa and Epi Island in Shefa.

Table 1: Annual parasite incidence by province and year, Vanuatu, 2015 to 2019

Province	2015	2016	2017	2018	2019
Malampa	2.8	24.3	10.7	5.1	4.9
Sanma	3.8	15.7	10.7	3.8	4.2
Penama	2.2	0.6	0.78	0.17	0.03
Shefa	0.2	0.4	0.18	1.7	1.0
Tafea	0.0	0.0	0.03	0.08	0.03
Torba	2.4	0.7	0.0	0.72	0.97
Vanuatu	1.6	6.8	3.8	2.2	1.9

Program performance, and health system constraints to malaria elimination

A malaria-focused health system *Landscape Analysis* was conducted in 2019-20 to assess the feasibility of malaria elimination in Vanuatu and neighbouring malaria-endemic countries.¹³ This validated many of the health system and service delivery constraints described on pages 18-20 and the financing trends noted on page 22.

The analysis – together with the 2018 MPR – emphasised that delivering services and interventions to at-risk populations in remote areas, while challenging, will be a priority if Vanuatu is to achieve elimination.

Malaria diagnosis and treatment

In 2009, the Program implemented a major shift in malaria treatment policy, rolling-out RDTs and artemisinin-based combination therapy (ACT) in all health facilities. This strategic shift in policy reduced malaria morbidity and had a significant impact on malaria transmission. Relapsing cases of vivax malaria, however, remained a major obstacle to malaria control and elimination efforts. To address this problem, the Program piloted the use of primaquine for radical cure of *P. vivax* at peripheral health facility level in association with new point-of-care glucose-6-phosphate dehydrogenase (G6PD) deficiency testing (to avoid the risk of primaquine induced acute haemolytic anaemia in G6PD deficient patients). An independent assessment of the intervention revealed that the approach was undermined at numerous levels by issues relating to program management, geography, supply, guidance, supervision and manpower, resulting in poor and potentially dangerous primaquine prescribing practices. Under this *National Strategic Plan for Malaria Elimination* (NSPME) 2021-26, the program will apply alternative approaches to primaquine treatment for vivax malaria, based on G6PD status.

It is worth noting that Vanuatu recently successfully eliminated vivax malaria in Tafea Province, where there was no evidence of relapse despite it not being possible to verify full compliance with primaquine for radical cure in all cases treated.

Surveillance and case tracking

Information management, while complex, has been strengthened in recent years. Vector control and case management indicators are monitored through routine operational data and a case-based surveillance tool called the monthly malaria line listing (MMLL). The NVBDPC has led the Ministry in entering and collating data through the DHIS2 platform; MMLLs are compiled at health facilities and submitted to provinces monthly for online entry. The 2018 MPR identified issues with internet connectivity in some provinces, which may result in reporting delays. A standardized DHIS2 dashboard has been developed to help the Program to monitor key indicators at both national and provincial level.

In some elimination areas, case investigation, reactive case detection (RACD) and response have now been established. Surveillance is being strongly prioritized – including on islands that have already eliminated malaria – to detect any reintroduction or re-establishment of transmission.

While case-based and focal investigation and response have extended from Tafea to other provinces, immediate access to operational funding at the provincial level and communication challenges in remote and outer island settings limit timely investigation, classification, response and follow-up of identified cases.

¹³ Malaria Elimination Initiative (University of California, San Francisco), Nossal Institute for Global Health (University Of Melbourne), 2020. *A landscape analysis to assess the technical, operational and financial feasibility of malaria elimination in Papua New Guinea, Solomon Islands, Timor-Leste and Vanuatu.*

Strong program management and monitoring and evaluation (M&E) implemented during the period 2009-2014 period was instrumental in achieving the good progress described above (Figure 6). The Program has continued to place strong emphasis on M&E to guide control and elimination activities but has been hampered by limitations in funding and HR, affecting outreach and supervision.

Vector control

With over 600,000 LLINs distributed since 2010, the Program has provided consistent protection with LLINs to those populations targeted.

In 2017 the program's LLIN distribution strategy shifted from one of mass coverage to one of targeted coverage based on stratification. This was due to unanticipated decreases in funding commitments from GOV and DPs, and resulted in LLINs being replaced in Tafea only in identified foci; however, no cases have been reported since then from areas without net coverage. Continuing excellent surveillance and clear definition of foci and strata with residual transmission will allow the Program to continue this policy.

Insecticide resistance testing conducted in selected sites in 2017 and 2019 has not found any resistance in *An. farauti* to pyrethroids although possible resistance to permethrin was detected at one site (Barrick village, Malekula Island).

Human resources, leadership and supervision

The 2018 MPR identified human resource weaknesses at both national and provincial levels, despite significant investment in training, as an impediment to further progress towards elimination.

In particular, Provincial Malaria Supervisors (PMS) are key positions for management of accelerated malaria prevention and elimination efforts. At the time of development of this NSPME, PMS positions were vacant in three of the six provinces of Vanuatu: Malampa, Sanma and Torba (and, as noted above, Malampa and Sanma account for most of Vanuatu's current malaria transmission risk and cases). These and other such vacancies represent a major strategic gap in the workforce.

DFAT supported quarterly malaria specific supervision until around 2016 but then moved to providing support for integrated supervisory visits (with a malaria component). Unfortunately, the supervision activities became non-functional due to discontinuity in staff and DFAT cut funding as a result. There was a near complete lack of formal malaria-related supervision in 2018-19 due to those budget cuts. What supervision there was, was based on case investigations rather than on systematic approaches.

Procurement and supply chain management

A number of procurement and supply chain management challenges have also been identified, which may also compromise progress towards malaria elimination. These include: late submission of resupply orders; poor communication between health facilities, provincial pharmacies and the Central Medical Stores (CMS); and poor management of stock data at facility level. These factors have affected the availability of RDTs and ACT as managed through the standard MOH supply system, and point-of-care (POC) G6PD RDTs and primaquine as managed by VBDCP through a parallel system.

The quantification of requirements has been weak and the demand for Pf/Pan RDTs, G6PD POC RDTs and primaquine has been inaccurately estimated. Insufficient quantities of Pf/Pan RDTs have resulted in overuse (for presumptive treatment) and subsequent stock-outs of ACT. G6PD POC RDT have a relatively short shelf life (up to 12 months, compared with around two years for malaria diagnostic RDTs) and are often close to expiry when supplied to the end user.

Primaquine has been supplied in containers of 100 rather than 1,000 7.5mg tablets (sufficient for just one complete course for a G6PD normal adult male). It is clear that further strengthening of procurement and supply chain management is essential to support timely and appropriate malaria case management.

Financing and financial management

The operational budget for malaria is already the third largest component of the operational budget for Provinces: this is important because this is where on-the-ground service delivery occurs. The Malaria Action Plan (MAP) for 2020 notes that over half (59%) of the national operational budget for malaria, and 18% of the provincial operational budgets, are still “unfunded”.

DPs provided 71% of the health financing and support for malaria in 2019. Such heavy reliance on DP funding introduces a high level of unpredictability in financing due to shifting priorities, especially as the malaria burden declines and other priorities like COVID-19 and disaster response appear.

It will be impossible to make and sustain progress with the elimination agenda in the event of decreasing investment. Maintaining progress – or even just ‘holding the line’ – will require funding partners to re-commit to Vanuatu’s elimination agenda, as they did during the period 2008-14. Increased financial commitment by Government will be needed in the longer term.

At the same time, there is consistent under-expenditure of budgets, including in malaria. This emphasises that capacity to improve the quality of implementation and expenditure remains a priority for the Program and the Ministry.

Timely access to funds for implementation of malaria activities (including case investigations, supervision and mass LLIN distribution) is a key issue. While neighbouring countries (such as Solomon Islands) have moved to a grant-based system for funding sub-national malaria activities based on quality-assured annual work plans, Vanuatu still relies on the use of imprests for specific activities and Ministry of Finance imprest policies are complex and restrictive. This may result in delays in the receipt of funds.

More details on program financing and a *Financing Strategy* for the first three years of this NSPME are included at Section 6.

Opportunities for health system investments to support malaria elimination

Significant progress has been made against malaria in Vanuatu and elimination is now a real and imminent prospect. However, it will not be achieved without a final concerted effort by MOH and its partners.

The 2018 MPR and subsequent *Landscape Analysis* identified a number of interventions for strengthening the health system in support of malaria elimination, and the *Landscape Analysis* modelled the potential impact of many of them. They included:

- Integration of malaria services into broader communicable disease control and disaster preparedness programs in provinces that have already achieved zero (or close to zero) local transmission.
- Provision of technical support to develop or strengthen malaria elimination strategies in those provinces that are approaching zero malaria incidence, addressing both malaria technical (e.g. case investigation, classification and management) and health system (e.g., supply chain management) aspects.
- Strengthening systems for quantification and forecasting of commodities for malaria case management, and potentially also for LLIN procurement to ensure universal coverage of the population with vector control interventions.
- Ensure continuity of the supply chain for LLIN, RDT and drug procurement arrangements using the donor-assisted mechanisms that are currently available through the Global Fund.
- Support VHWs to sustain community engagement around malaria health promotion and use of LLIN, especially where malaria is becoming less common.
- Sustain human resources for the malaria program at provincial level (progressively integrated with other aspects of communicable disease control as appropriate)
- Strengthen supportive supervision efforts at lower-level facilities to ensure compliance with standards of case management and reporting, supply management, and to support advocacy, communication and social mobilization activities in support of malaria elimination.
- Strengthen case-based surveillance and response systems, and the capacity to identify and manage potential foci of transmission.
- Strengthen HIS performance and the ability to communicate promptly and effectively between different levels of the health system.
- Roll out radical cure for vivax malaria cases while delivering cross border / enhanced surveillance initiatives to accelerate and maintain elimination.

The *Landscape Analysis* modelling predicted that accelerated implementation of many of the above interventions could potentially see the national API fall below 1 per 1,000 as early as 2021 (at which time further program reorientation would potentially make it feasible for the country to achieve its elimination targets).

There is currently a critical window of opportunity: funds are precarious but are likely to be available, and there is no drug or insecticide resistance to hamper efforts. Before the situation changes, Vanuatu must seize this opportunity to eliminate malaria once and for all.

3. STRATEGIC FRAMEWORK (2021–2026)

Vision

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

Mission

The Government of the Republic of Vanuatu works to achieve and sustain malaria elimination through partnership between national, provincial and local health services and communities to ensure universal access to malaria prevention, diagnosis and treatment. It supports improvement of surveillance systems, health promotion and response capacity to prevent re-establishment of malaria.

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 WHO certification of malaria-free status in 2026.

Principles

- Country ownership and leadership by the Government of Vanuatu – including the Ministry of Health, NVBDPC and provincial and local health services – will be critical to strengthening community participation, multi-sectoral collaboration, and engagement of technical and development partners to achieve and sustain malaria elimination.
- Shared and increasing community responsibility and leadership for malaria control and elimination (e.g. through community leaders, community health and surveillance committees and provincial elimination committees) will increase the speed and strengthen the quality of implementation.
- Free universal access to quality-assured prevention measures (LLINs for the defined population-at-risk) will be key to interrupting malaria transmission and preventing its re-establishment.
- Every patient presenting at a health facility with a fever and/or other symptoms of malaria must have timely access to free, appropriate and accurate malaria diagnostic testing.
- All confirmed malaria cases should be treated promptly and for free with effective antimalarial medicines – for their own health, and to prevent onward transmission of malaria in the community.
- Equity in access to quality-assured interventions and health services is essential.
- A strong case-based surveillance system – harmonized as appropriate with other fever and disease surveillance systems – will enable rapid and appropriate investigation, characterization, classification and response for every case and focus of transmission, with household-level mapping of cases to further strengthen response capacity.
- Progress towards elimination will be accelerated by targeted deployment of selected evidence-based interventions to high-risk individuals, communities or areas.
- In the event of funding constraints, appropriate subnational stratification of transmission risk and reintroduction risk will inform targeted deployment of interventions and support planning, progress monitoring and impact evaluation to optimize implementation.

- Innovation in tools and implementation approaches will help to maximize progress.
- Efficiency and value for money will be a key consideration for operational planning.
- Synergies will be leveraged wherever possible through partnerships with other public health programs, health sector interventions and innovations, non-health sector ministries and organizations, DPs and funding partners, academic and research institutions, private sector entities and civil society organizations.
- Transparency, accountability and high ethical standards must be maintained throughout.

Strategic Objectives

1. To maintain very high levels of coverage with LLINs; *and* to rapidly reduce malaria transmission in selected higher-incidence areas and foci using IRS.¹⁴
2. To roll out case-based surveillance and response nationwide using the '1-7-60' approach.¹⁵
3. To test all fever cases for malaria by RDT or microscopy and provide prompt radical treatment and care for all confirmed cases according to the national Malaria Diagnosis and Treatment Guidelines.
4. To mobilize communities through health promotion and leverage the support of all stakeholders in a multi-sectoral effort to accelerate the elimination of malaria.
5. To ensure that malaria and other VBD prevention, surveillance and case management are well integrated into disaster preparedness and response activities
6. To maintain a high level of political commitment to malaria elimination; *and* 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.
7. To leverage technical partnerships in support of innovation by generating new knowledge and applying it to improve delivery and quality of malaria services.

Timelines and targets

	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

¹⁴ In Vanuatu's elimination context, higher incidence areas are defined as health zones with an annual parasite incidence (API) of 1 or more cases per thousand population.

¹⁵ Case-based surveillance will follow a "1-7-60" strategy, with every case to be reported to provincial level within 1 day of detection, every case to be investigated and responded to as appropriate within 7 days of detection, and every case to be followed-up to verify outcome within 60 days after detection.

Maintain prevention of re-establishment	Tafea	Tafea, Torba, Penama	Tafea, Torba, Penama, Shefa	All	All	All
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Key interventions and supporting elements

Key interventions

1. Malaria vector control and personal protection including: rolling three-yearly mass distribution of LLINs to achieve very high levels of coverage of Vanuatu's entire population;¹⁶ continuous LLIN distribution to maintain coverage between mass distributions; and high-quality IRS with a non-pyrethroid insecticide in carefully selected areas.
2. Case-based surveillance and response for elimination and prevention of re-establishment of malaria, harmonized as appropriate with other fever and disease surveillance systems.
3. Early and effective malaria case management including periodic campaigns to expertly provide and ensure adherence to radical treatment for recently detected vivax malaria cases.
4. Health promotion to support the enabling environment for malaria elimination, to strengthen elimination related knowledge, attitudes and practices, and to promote community led engagement in elimination interventions.
5. Rapid provision of comprehensive malaria services to those affected by disaster as part of Vanuatu's disaster relief package.

Supporting elements

6. A strong enabling environment
 - i) Ensure strong and dynamic national leadership of the malaria elimination agenda in order to maintain high level political and development partner commitment and adequate financial support for elimination.
 - ii) Strengthen communications and advocacy to ensure that malaria elimination becomes a national goal with full engagement of provincial and local level leaders and stakeholders.
 - iii) Conduct a malaria-specific human resource review and develop and implement an approach to attract, motivate and retain key skilled staff.
 - iv) Ensure sufficient workforce to enable elimination by filling all existing posts and mobilize surge staff,¹⁷ e.g. through short-term contracts and volunteer positions.
 - v) Maintain malaria-specific capacity and capability in all provinces and ensure malaria elimination activities are included in the integrated package of health services through active provincial elimination committees, inclusive health planning and coordinated, integrated community responses
 - vi) Ensure Malaria Program partnership and participation in regular supportive supervision for health workers in facilities at all levels, especially at peripheral and community levels.
 - vii) Maintain and support capacity for Program strategy development, planning and review
 - viii) Improve financial management and timely mobilisation of funds
 - ix) Improve data quality, information management and reporting
 - x) Ensure technical assistance and cooperation
 - xi) Strengthen capacity for forecasting, procurement and supply chain management.
 - xii) Investigate regional and collaborative financing options and adopt innovative mechanisms to mobilize resources for elimination.

¹⁶ Distribution will take sleeping arrangements into consideration to ensure that everyone has access to an LLIN.

¹⁷ Each province should have at least one Malaria Elimination Officer pending integration of those functions into broader disease control mechanisms after achievement of elimination.

7. Operational research and monitoring to support innovation and improved delivery of services
 - i) Monitor antimalarial therapeutic efficacy, insecticide resistance, vector bionomics and residual efficacy of insecticidal interventions.
 - ii) Investigate the causes of residual transmission and conduct pilot implementation of new tools, technologies and approaches – and scale-up if justified.
 - iii) Conduct operations research in collaboration with technical partners to optimize the impact and cost-effectiveness of existing and new interventions and strategies (i.e. ‘learning by doing’).

Immediate priorities

- Immediately ensure (and verify) universal access to malaria prevention and treatment services in remaining higher-incidence areas of Malampa, Sanma and Shefa Provinces.
- Further integrate malaria services into broader communicable disease control and disaster preparedness programs in provinces that have already achieved zero (or close to zero) local transmission.
- Establish a streamlined financial system that facilitates field level operations allowing quick draw-down of funds by staff in the periphery when necessary.
- Improve forecasting of requirements and supply for malaria medicines and commodities – this will be especially important given that MOH is currently undergoing significant internal transition and domestic funding uncertainty.
- Strengthen the supply chain in a locally appropriate way to ensure uninterrupted supply despite seasonal and other challenges to communications and logistics.
- Re-introduce robust and regular supervision (integrated where feasible) for all activities at all levels – particularly at lower-level facilities – to ensure compliance with standards of case management and reporting, supply management, and to bolster health promotion and community mobilization activities in support of malaria elimination.
- Continue to strengthen case-based surveillance and response systems across all provinces (involving health care providers and program staff at all levels), including the capacity to identify and manage potential foci of transmission.
- Strengthen HIS performance and the ability to communicate promptly and effectively between different levels of the health system.
- Support VHWs to sustain community engagement around malaria health promotion and use of LLIN, especially where malaria is becoming less common.
- Sustain human resources for the Malaria Program at provincial level (progressively integrated with other aspects of communicable disease control as appropriate).
- Strengthen program management and oversight by the MOH and partners.

4. KEY INTERVENTIONS AND SUPPORTING ELEMENTS

KEY INTERVENTION 1: Malaria vector control and personal protection

Strategic Objectives: *To maintain very high levels of coverage with LLINs; and to rapidly reduce malaria transmission in selected higher-incidence areas and foci using IRS.*

Insecticide treated nets (ITN)/LLINs and IRS are core interventions for reducing the human biting rate and vector survival, which significantly reduce vectorial capacity and transmission. ITNs/LLINs provide protection for the occupants of houses against biting malaria mosquitoes by killing them before they can take a blood meal, whereas IRS kills mosquitoes that rest indoors after they have taken a blood meal.

While the effectiveness of both of these interventions is maximal with high coverage and use, their impact is temporary and depends on them being maintained; their effectiveness is also influenced by mosquito behaviour – where they rest and where and when they bite. Premature withdrawal of vector control interventions can result in a rebound of malaria transmission to pre-existing levels. This is a particular risk in situations of natural disaster with large, sudden population displacement (see also Key Intervention 5). In areas where transmission has been interrupted, the scale-back of vector control should be based on a detailed analysis that includes assessment of receptivity and vulnerability, surveillance system, and capacity for case management and vector control response.

The selection of vector control interventions as outlined in this *Strategic Plan* has been informed by the eco-epidemiological situation as indicated by malaria case and entomological surveillance data. Implementation will be in line with WHO's *Guidelines for Malaria Vector Control* to ensure optimal use of resources.¹⁸ Selection and use of insecticidal interventions will follow technical recommendations provided in WHO's *Global Plan for Insecticide Resistance Management in Malaria Vectors*.¹⁹ Core vector control interventions will include achieving high levels of personal protection (and associated 'mass' community protection) using LLINs, and the use of IRS with non-pyrethroid insecticides in selected areas at risk of outbreaks to accelerate the reduction in malaria transmission. Where appropriate, and subject to resource availability, larval source management may be added as a supplementary intervention in specific areas.

1.1 Provide free LLINs for all

LLINs are one of the core malaria interventions applied in Vanuatu and elsewhere to reduce transmission and provide personal protection. In theory, the effectiveness of LLINs may be undermined by the early outdoor biting habit of *An. farauti*, the only vector of malaria in Vanuatu [6]. However, due to the short duration of *An. farauti*'s blood-feeding cycle, a significant proportion of females that reach an age at which they could potentially become infective can still be expected to come into contact with an LLIN during their lifetime [7]. LLINs can therefore be expected to continue to have a significant impact on malaria transmission in Vanuatu.

The NVBDCP will use multiple delivery strategies to maximize coverage of LLINs in all areas. Specialists at national level will provide training, technical assistance and operational guidance to provincial teams to ensure that they are able to develop, manage and implement their operational plans for LLIN delivery.

1.1.1 Mass distribution

The entire population of Vanuatu has historically been considered at risk of malaria and therefore – subject to resources being available – free LLINs will continue to be provided for all, as an

¹⁸ <https://apps.who.int/iris/bitstream/handle/10665/310862/9789241550499-eng.pdf?ua=1>

¹⁹ <https://www.who.int/malaria/publications/atoz/gpirm/en/>

integral component of UHC. As resources are unlikely to be sufficient to ensure universal nationwide coverage, the Program will continue its present policy of distributing LLINs to the entire population of known foci of transmission in otherwise malaria-free health zones (with supplementary nets available for newly detected foci).

To minimize logistic constraints, LLINs will be delivered through regular 'rolling' mass distributions whereby one-third of health-zones will be targeted annually (the 3-yearly periodicity of these mass distributions is based on the expected effective lifespan of the pyrethroid impregnated polyester LLINs currently procured).

The target coverage rate for these mass distributions will be 1.25 people per net, in line with WHO standards to achieve 100% coverage.²⁰

Immediately before each mosquito net distribution campaign, Provincial Health Teams for Malaria Elimination (PHT-ME) – under the guidance of national Program staff – will conduct a micro-level planning exercise using the NVBDCP's existing LLIN micro-planning tool and based on the latest population projections from the mini-census conducted immediately after TC Pam in 2015. This micro-level planning will be adjusted based on local level knowledge about which members of a household share a sleeping space to ensure 100% coverage of LLINs without wastage.

The Provincial Malaria Supervisors will prepare and organize their teams according to standard operating procedures (SOP) for LLIN distribution. Generally, each team will comprise of a Malaria Elimination Officer (MEO), peripheral health staff (where available), and village level volunteers and community members. LLINs will be delivered directly to household level. Mass distribution operations will be coordinated and monitored by the PMS.

To optimise the impact of bed net distribution, the Program will investigate options for external assessors (e.g. schoolteachers or other local village officials) to conduct post-campaign LLIN coverage assessments in targeted sites as a component of programmatic quality assurance, and to coach communities in the care and use of their nets.

In addition to the rolling 3-yearly mass distribution of LLINs in communities, there will be *annual* mass distribution of LLINs to children living away from home in boarding schools. These nets will be delivered by MEOs and teachers under the guidance of PMSs.

In the event of disasters, outbreaks and confirmed transmission foci, LLINs will be provided to anyone who does not have continuing access to a LLIN (see *Key Intervention 5: Disaster Relief Package*).

1.1.2 Continuous distribution

Continuous distribution channels should be functional before, during and after mass distribution campaigns to avoid coverage gaps that may appear relatively soon after mass campaigns.

In addition to mass distribution channels, continuous distribution channels will be maintained in order to address population growth plus any LLIN attrition between mass distributions. LLIN stockpiles will be established at provincial level and at strategically located health facilities to supply the continuous distribution channels. These LLINs will be provided to:

- a. Every pregnant woman attending ante-natal care (ANC) services (one net per pregnancy). As well as maximizing LLIN coverage for infants, this approach reportedly has a positive impact on ANC attendance levels.
- b. Anyone indicating they have lost or damaged their net.
- c. All confirmed cases, in case they do not already have access to an LLIN.

²⁰ This is the average coverage target for all nets, and is based on a split between small, medium and large nets. It will be adjusted for household composition during micro-planning. It exceeds the standard guidance of one net per 1.8 individuals in order to achieve very high coverage and promote high levels of utilisation.

- d. Any families that are newly arrived in a community, if they do not already have access to bed nets.

1.1.3 Forecasting, procurement and monitoring

Quantification of LLIN procurement requirements will be overseen by MOH with technical inputs by WHO and collaborating development partners, including Rotarians Against Malaria.

Wherever possible, procurement of LLINs will be through the Global Fund's Voluntary Pooled Procurement mechanism. In-country supply management will use the existing inventory system and sub-national storage depots. An assessment will be carried out to verify if there are any gaps in supply chain management and storage facilities for vector control tools and measures will be put in place to improve the system as necessary such as through the construction of additional storage facilities. To reduce the logistic costs to the Program, opportunities for freight forwarding agents to deliver nets to provincial or even health zone level will be explored.

All of those involved in LLIN distribution, whether it be through mass distribution channels or through continuous distribution channels, will use VBDCP's standardized recording and reporting tools to ensure that accurate records are kept of all LLINs distributed.

The 2013 Demographic and Health Survey (DHS) revealed that, despite high LLIN coverage, utilization of LLINs in Vanuatu was unacceptably low (53% among children under 5 years old and 41% amongst pregnant women). Current utilization rates are not known but will be assessed through a nationwide bednet coverage assessment to be conducted in 2020.²¹ All distributions of LLINs will be coupled to intensified locally appropriate behaviour change communication (BCC) to promote community mobilization and maximize high and correct LLIN utilization. BCC will also include advice on the use of expired LLINs (e.g. for screening windows and doors or for weaving into ropes or sleeping mats and pillows).

The operational success of this intervention will be measured by periodic household surveys either through the forthcoming DHS, multiple indicator cluster surveys or similar social indicator surveys (due to the reduction in malaria burden, no more malaria indicator surveys are foreseen). Outcome targets will be at least 90% access and 80% utilization at the population level.

1.2 Conduct focal responsive IRS as appropriate

As with LLINs, the effectiveness of spraying the walls and ceilings of houses and structures with residual insecticides (IRS) may be partly constrained by the observed early outdoor biting habit of *An. farauti*. Similar to LLINs, IRS can still be expected to have a significant impact on malaria transmission provided that the construction of houses is sufficiently solid to provide enough sprayable surfaces. Although there is no categorical epidemiological evidence (i.e. from well-organized randomized-controlled trials) to demonstrate the effectiveness of IRS for malaria control in areas where *An. farauti* is the primary vector, there is ample entomological, circumstantial and anecdotal evidence to indicate that the approach is likely to be highly effective. IRS was part of the elimination strategy in Tafea province, where three rounds of spraying at high coverage was successfully implemented in 2009-11. Targeted IRS has also been carried out successfully in Shefa (high risk areas in Port Vila), and in the Torres and Gaua islands in Torba, which rapidly and significantly reduced transmission in these areas.

Quality-assured IRS using a non-pyrethroid insecticide (to avoid exerting pressure for the selection of pyrethroid resistant vectors that could undermine the effectiveness of LLINs) will be applied to

²¹ The Program will also explore with the NSO whether this can be incorporated into the next national census, also expected to be conducted during the next 12 months.

quickly reduce transmission in support of the elimination effort.²² Up to three annual cycles may be applied in selected villages and communities to reduce API to manageable levels;²³ where there is compelling evidence that transmission has been interrupted, spraying will not be repeated so it is expected that, in some situations, one or two annual cycles will be sufficient.

In the event of outbreaks (e.g. in higher incidence strata, such as those identified in Figures 4 and 5), or in the event of persistent transmission foci in elimination settings,²⁴ the Program will also conduct one-off focal responsive IRS.

To be effective, IRS requires sustainable financing and a well-organized operation. Quality implementation requires skilled spray-staff supported by strong field supervisors. Some capacity and experience still exist from previous IRS activities in Tafea and parts of Shefa and Torba. Training will now be rolled out to other provinces. Provincial level teams (MEO led by PMS) will be strengthened accordingly and spray-staff will be recruited and trained as required.

As with LLINs, IRS operations require careful planning at both the macro and the micro levels (including geographic reconnaissance to map sprayable structures and ensure the suitability of house construction in target areas). Technical assistance for planning will be an integral component of the proposed partnership with RAM. Improved planning and technical skills will allow capacity established in one province to be leveraged for application in another province.

As with LLINs, community mobilization and BCC will be key a key component of IRS operations. This is essential to ensure that spray teams have adequate access to homes to achieve the high level of coverage (>80%) required to maximize impact. Emphasis will be placed on strengthening logistics to ensure timely and adequate supplies of consumables, equipment (spray pumps, replacement parts, personal protective equipment etc.) and transport.

Attention will also be given to strengthening coverage assessments and documentation of IRS operations.

In accordance with the national policy the choice of insecticide will take into account safety, efficacy, cost, availability, existing insecticide susceptibility of vectors, and likely effect on susceptibility of vectors. Guidelines on the management, monitoring and correct use of insecticides (including annual reporting and mapping of insecticide usage for public health and agriculture) will be developed and implemented. Technical assistance for safe disposal of expired insecticide will be provided by the Department of Environmental Protection and Conservation, in consultation with the Secretariat of the Pacific Regional Environment Program.

KEY INTERVENTION 2: Case-based surveillance for elimination and prevention of re-establishment

Strategic Objective: To roll out case-based surveillance and response nationwide using the '1-7-60' approach.

Surveillance of malaria infection in the human population is the backbone of malaria elimination. Identifying where transmission is occurring with increasing accuracy will permit targeted, effective responses where they matter most. Steady improvements in the quality, timeliness and use of surveillance information must begin early to ensure that elimination work is well directed and monitored. Ultimately, surveillance will become part of the intervention, focused on case characterization and classification, treatment and investigation and on identification,

²² Targeted areas for IRS will be defined as specific villages or communities with identified foci of transmission in Health Zones with an API > 1 per 1,000.

²³ i.e. to reduce API to < 1 per 1,000.

²⁴ Where transmission persists for >3 months from initial case detection, and in spite of adequate LLIN coverage.

management and clearance of transmission foci.

The standard basic system of surveillance, which involves monthly reporting supplemented by outbreak monitoring, will be replaced with 'case-based surveillance' whereby effectively every case is treated as an outbreak in that for each an investigation is conducted and a response is mounted. PHT-MEs will be responsible for conducting case-based surveillance. The DHIS2 malaria tracker module will be activated and used for information management and reporting.

Similar strategies will be used to; investigate suspected outbreaks and suspected emerging transmission foci in higher incidence strata; and to deal with confirmed transmission foci in elimination and prevention of re-establishment settings.

In line with guidance from the WHO *Regional Action Framework for Malaria Control and Elimination in the Western Pacific (2016-20)*, malaria related surveillance and response mechanisms will be progressively integrated into the broader health sector approach. PHT-MEs currently responsible for malaria-specific response efforts will expand and transition to become Malaria Elimination Teams before contracting and transitioning once more, upon interruption of provincial transmission, to become integrated into Provincial Rapid Response Teams (RRTs) for the control of other epidemic prone diseases. There is an emerging opportunity to establish integrated fever surveillance for malaria and other VBDs alongside acute respiratory (ARI) or influenza-like illness (ILI) as part of the COVID-19 response, and to leverage funding provided to the GOV for that purpose.

2.1 Expand, modernize and strengthen the malaria information system

The 'DHIS2 malaria tracker' module will enable real-time case-based reporting. Forms and registers will be standardized, and linkages built into related documents where appropriate. It will be piloted during 2020 and is expected to be fully operational in all provinces by the end of 2021. The module will be updated as required in support of progress towards elimination.

More emphasis will be placed on data analysis, interpretation and utilisation at both national and provincial level, including the provision of timely and succinct strategic feedback from national and provincial levels to health workers including at peripheral and community levels. Where additional staff and capacity development will be required to support the increased workload associated with elimination, creative approaches across public health program will be used to find the most efficient and effective use of personnel. This builds on the experience in Tafea province, where a comprehensive GIS-based spatial decision support system allowed detailed mapping of households and day-to-day tracking of malaria cases within health facility catchment areas, as well as implementation of interventions.

The DHIS2-tracker system will support all aspects of elimination related data collection including case notification, case investigation, case classification, focus investigation and focus response. As is the case now, malaria data will continue to feed into the MOH's DHIS2 malaria module routinely from the Monthly Malaria Line Listing completed at health facility level until the DHIS2 tracker system is fully functional and reliable and can be rolled out to all provinces (incorporating zero reporting). The PHT-MEs will have access to DHIS2 to allow rapid entry of data, including reporting the geographical location of all villages with confirmed malaria cases. The location of specific houses will be well known to local health workers, thereby circumventing the need for a full real-time mapping of residence of malaria cases. DHIS2 and local information will enable detailed planning and support monitoring of progress towards elimination.

Transmission focus preparedness will be maintained through training (integrated) and through the provision of equipment and supplies for district level RRTs. A 5% buffer stock of LLINs, insecticide, RDTs and ACT will be maintained at national level to deal with transmission foci as well as natural disasters. In addition, a 5% buffer stock of ACT will be maintained at health zone

level. Stock rotation with routine supplies will be applied to prevent expiry of these buffer stocks. In addition, the MOH will work with WHO to develop pre-agreed arrangements to obtain ACT from neighbouring countries in the event of a wide-scale resurgence.

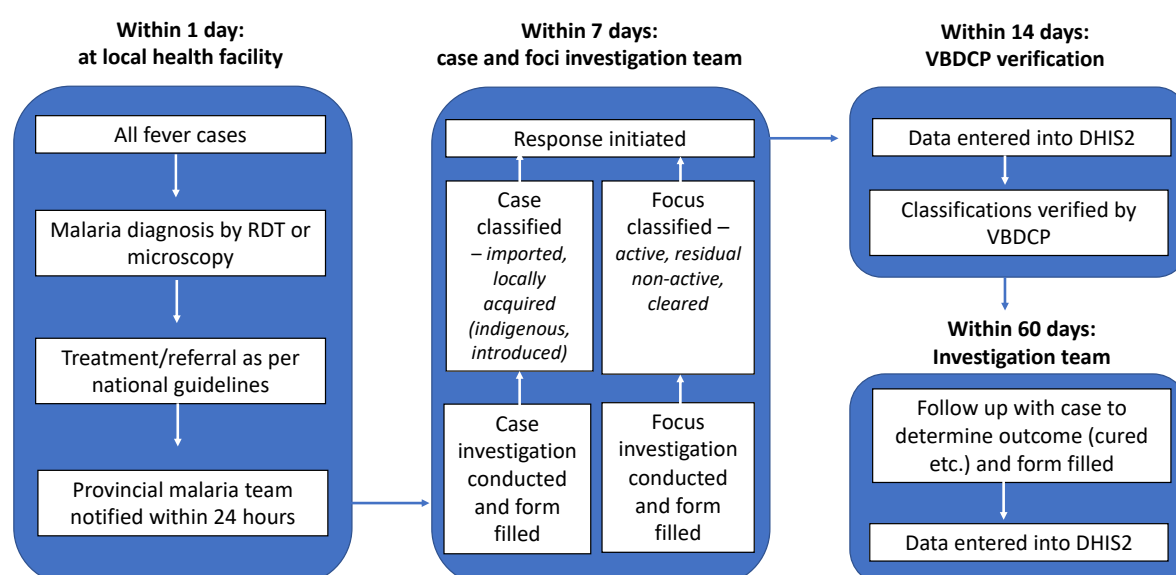
2.2 Transmission focus detection system

A transmission focus detection system will be established in elimination districts through training and supportive supervision for all staff and volunteers involved in case management. NVBDCP will work with MOH to make malaria a notifiable disease nationwide.

The timeliness of the response to confirmed foci is key to effective control. Many malaria eliminating countries have so far followed China's lead, adopting a '1-3-7' approach, whereby: cases must be investigated within one day of detection; investigation of suspected foci must be conducted within three days of detection; response actions must be taken within seven days of detection; and their performance is monitored against this 1-3-7 benchmark. However, in Vanuatu the logistical constraints mean that it would not be practical, affordable or efficient to conduct focus investigations and focus response activities during separate missions on days 3 and 7. Furthermore, Vanuatu is dealing predominantly with *P. vivax* and so radical treatment to eliminate hypnozoites, and follow-up to deal with any relapsing cases, are crucial features of effective case management.

Vanuatu will therefore adopt a '1-7-60' approach (Figure 8), whereby: cases must be reported *within* one day of detection; investigation of suspected foci and any response actions (including RACD, supplementary LLIN distribution or IRS) must be taken *within* seven days of detection; and follow-up assessments must be made *within* 60 days of detection to confirm completion of radical treatment and detect any early relapses of *P. vivax* infection. In Vanuatu, performance will be monitored against this 1-7-60 benchmark.

Figure 8: Case notification and case and focus investigation and classification according to the 1-7-60 days approach



RDT: rapid diagnostic test; VBDCP: Vector Borne Diseases Control Program; DHIS2: district health information system

2.2.1 Case detection reporting

Individuals will be selected for testing according to the principles explained under Key Intervention 3 (Diagnosis and Treatment) using quality assured microscopy or RDT.

If a case is detected, the service provider responsible will immediately submit a 'case notification report' to the PHT-ME. To facilitate and support timely reporting, the Program will work with Provincial health authorities to ensure that health facility staff have sufficient mobile phone credits.

VHWs will be increasingly engaged in direct malaria case detection. Where they have been trained in RDT use, they will be required to report any case detected to their nearest Dispensary or Health Centre immediately for assessment and advice on further action; where the aid post is not yet RDT-enabled, the VHW will consult with their supervising facility for guidance on referral for testing.

Private sector and NGO providers will also be engaged in the malaria elimination effort, and will be similarly required to report any case detected to their PMS.

The NVBDCP will investigate the feasibility of a fixed or pre-paid telephone number for SMS-based reporting, which would be routed automatically to the relevant supervising health worker, PMS or MEO.

2.2.2 Case investigation and classification

Health facility malaria focal points will be trained to review and assess every malaria case identified (based on travel history,²⁵ ecological factors and recent epidemiological data) and submit a 'case investigation and classification report', which will include an assessment of likelihood of local transmission,²⁶ to the PHT-ME – within 3 days if possible but, in any case, no later than 7 days after detection.

2.3 Transmission focus investigation and response

Case investigation and classification reports submitted by health facility staff will be reviewed by PHT-ME. If the case has been identified in a known transmission focus, then appropriate action will be taken based on SOPs for transmission focus management. However, if a locally transmitted case is suspected in an area where there is no known transmission, a prompt investigation will be carried out to assess whether this represents a new transmission focus.

Within 7 days of initial case detection, a team made up of staff from the PHT-ME,²⁷ supported by health staff from various levels and community-based volunteers, will initiate an investigation and, if appropriate, launch a response. The size and composition of the team will be tailored according to local circumstances.

The investigation will include group discussions and interviews (focusing on risk behaviour) and RACD. RDT-based diagnosis will be augmented by microscopy-based diagnosis in order to maximize sensitivity for detection of infections. Data on microscopic and RDT-based diagnosis will be maintained and compared during after-action reviews.

RDT positive cases will receive treatment according to national *Malaria Diagnosis and Treatment Guidelines* on the spot. Any slide positive patients detected subsequently will be provided follow-up treatment as soon as results become available. Follow-up radical treatment campaigns incorporating G6PD testing and hypnozoitocidal treatment will also be carried out as described under *Key Intervention 3: Case Management* once the scale of the focus has been identified.

²⁵ It is difficult for peripheral staff to collect useful travel histories from malaria cases as a detailed understanding of malaria transmission is necessary and probing questions are required. Tools will be improved and training intensified to address this.

²⁶ SMS or 'Access' based reporting.

²⁷ The team will include the Provincial MEO, a microscopist (and a sufficient supply of RDTs to facilitate immediate diagnosis and treatment, or if a microscopist is not available) and the PMS (where the PMS is not otherwise engaged).

The scale of RACD will be tailored by the team to fit the local situation. If additional confirmed indigenous cases are found, the team will confirm that the site is an active transmission focus and RACD will be expanded to surrounding areas. The scale of the focus will be delineated based on case data. LLINs will be given to those without access, and focal responsive IRS will be applied throughout the affected area. Entomological and ecological assessments will be carried out and LSM interventions carried out if appropriate.

In case the investigation and response team does not have the capacity to deal with the entire focus 'there and then', they will immediately submit their investigation report to the PMS and to NVBDCP staff at national level using DHIS2 tracker (with confirmation by phone wherever possible). The intensity of transmission and the likely scale of the focus will be assessed, and an emergency plan will be developed in consultation with the PMS and NVBDCP. The scale of the response will be tailored to suit each specific situation (based on SOPs). In addition to RACD, LLINs, IRS and LSM, the extended response may involve establishing temporary community-based case management services by training volunteers and equipping them with RDTs and ACT.

2.4 Consolidation and updating of foci classification

The central information unit in the national NVBDCP will consolidate and update the classification of foci and update household mapping on at least an annual basis, based on reports submitted by PMS. Feedback will be provided via the PMS to community health staff through annual provincial planning meetings.

2.5 Coordination, monitoring and supervision for case-based surveillance

All dedicated malaria elimination surveillance and response activities will be carefully coordinated, monitored and supervised, both at provincial and national level:

2.5.1 Provincial Malaria Elimination Teams

A dedicated Provincial Health Team for Malaria Elimination will be established in every province. The Team will receive extensive training on elimination. It will operate under the leadership of the PMS and under the overall authority of the provincial Chief Medical Officer (CMO). Strong and regular technical support will be provided by the national NVBDCP team.

The PHT-ME will work closely with provincial health staff and with community-based health workers (nurse practitioners, nurses and VHWs) to undertake passive and active malaria surveillance activities. The national NVBDCP team will assist with training and orientation of health workers as required.

The provincial Teams will organize periodic provincial meetings with health staff from all Health Zones to review program implementation and identify and resolve critical constraints. All case notifications, reporting (completeness and timeliness) and response will be discussed. Findings and feedback from provincial supervisory visits to Health Centres, Dispensaries and Aid Posts will also be reviewed.

The PHT-MEs will also file operational records and prepare Monthly Elimination Reports using DHIS2 tracker to inform the national level and report on foci classification every year.

2.5.2 National oversight and support for provincial malaria elimination teams

Staff from the national NVBDCP will visit PHT-MEs at least quarterly. On at least one of these visits each year, the provincial Team will organize a peer review meeting for key representatives from Health Centres and zonal committees to present, discuss and consolidate essential zonal classification data, prepare action plans and consider budget requirements for the following year.

Visits by the national NVBDCP will also address provincial staff performance and take advantage of opportunities for training and knowledge enhancement.

The national Malaria Elimination Steering Committee will provide oversight of these activities (see also SE1.1.2, *Program Oversight*).

2.6 Epidemic prediction and prevention in relation to mass gatherings and population movement

A baseline mapping of human population movement will be conducted in collaboration with the International Organization of Migration to ascertain importation risk of malaria from endemic provinces or countries to those provinces conducting prevention of re-establishment of malaria activities. The VBDCP will work with other government departments (Ministry of Agriculture, Ministry of Tourism), both at central and provincial levels, to ensure that it is fully informed regarding expected or emerging population movements (e.g. mass gatherings for sporting, religious or cultural events, evacuations in response to natural disasters or extreme weather events) and on major construction or development projects likely to impact on the malaria situation. These activities will be coordinated closely with other relevant surveillance / response activities, including for ARI/ILI and sexual and reproductive health interventions. If there is a high assessed risk of malaria parasite importation to islands where transmission has been interrupted, or where there is high risk of exportation from endemic areas, focal screening and treatment may be conducted.

The NVBDCP epidemic prediction focal point will liaise with counterparts on a regular and *ad hoc* basis. Major religious, sporting or cultural events will be reported immediately and there will be routine quarterly teleconferences between provinces and the VBDCP focal point.

2.7 Specific approach for small, isolated communities

Vanuatu has many small and remote communities that are relatively isolated from the rest of the country (and even the rest of their province), with limited transportation linkages. Undertaking visits to investigate possible cases in remote locations represents an expensive and logistically complex exercise. As an alternative, the 'small island' or isolated community setting (e.g. with a population up to 500 people) lends itself to a strategy that is more integrated into the routine operations of health facility staff.

Positive cases would be identified and treated promptly by the local health worker using a directly observed treatment (DOT) approach. They would be reported to the PMS or Elimination Officer as soon as possible by mobile phone, and remote guidance provided on how to investigate and manage the case and community.

The response may require proactive case detection for the entire community, using mass screening by RDT and treatment of positive cases. At current prevalence rates, the number of cases would generally be small enough for it to be feasible to refer specimens for G6PD screening, which would allow follow-up primaquine administration for radical cure of *P. vivax* in non-deficient individuals.²⁸ (A stat dose of primaquine would be administered as usual for *P. falciparum* gametocyte clearance).

A slightly increased buffer stock of RDTs and antimalarial medications would be maintained on an individual facility basis, overseen by the provincial medical store.

²⁸ An alternative strategy would be to assume that all individuals treated are G6PD deficient and prescribe primaquine at a dose of 0.75 mg/kg once per week for 8 weeks, provided appropriate clinical supervision is available. This regimen is defined in the national *Malaria Diagnosis and Treatment Guidelines* (see also Key Intervention 3, Strategy 3.2).

KEY INTERVENTION 3: Early and effective malaria case management

Strategic Objective: To test all fever cases for malaria by rapid diagnostic test or microscopy and provide prompt radical treatment and care for all confirmed cases according to the national Malaria Diagnosis and Treatment Guidelines.

Providing universal and timely malaria case management is a key component of malaria control and elimination strategies. Quality assured diagnosis by RDT or microscopy and prompt, effective treatment of all malaria cases according to updated national malaria treatment guidelines will remain a high priority, supported by proper training and supportive supervision of health workers, and ensuring universal access throughout Vanuatu. Radical anti-relapse treatment for *P. vivax* will be a particularly high priority to eliminate all remaining parasites.

3.1 Ensure quality malaria diagnostics

3.1.1 Test all suspected malaria cases to detect all malaria infections

Malaria diagnostic testing, using either RDTs or microscopy, needs to be readily available at all health facilities throughout Vanuatu (both public and private), and at community level.

Case management training and supervision will continue to stress the importance of timely detection of all possible malaria cases, in higher-incidence as well as in elimination and prevention of re-establishment areas. Any individual presenting with a fever or a history of fever must be suspected as a case of malaria and be promptly selected for testing in accordance with the national *Malaria Diagnosis and Treatment Guidelines*, regardless of any other known or suspected febrile illness;²⁹ syndromic ARI/ILI surveillance for suspected COVID-19 will incorporate malaria screening for any febrile patient, irrespective of concurrent respiratory symptoms. If the malaria test is negative, malaria treatment should not be administered to the patient; other causes of illness must be considered and ruled out, and the patient may be referred to a higher-level health facility (with respiratory and other protection for the patient and medical attendants according to COVID-19 protocols, as appropriate). If a patient initially has a negative malaria test and no features of ARI or ILI but suffers continued or recurrent episodes of fever, malaria testing should be repeated over the following days or weeks to rule out malaria.

3.1.2 Use of malaria RDTs and microscopy at different facility levels

Experience with use of malaria RDTs since their introduction in Vanuatu in 2009 has generally been positive, allowing widespread access to confirmatory malaria diagnosis even at community level, which has ensured a high level of case detection and provision of rational malaria treatment. Previously, malaria diagnostic testing was only available in hospitals and Health Centres, where microscopy was available. Today, the RDP limits the use of microscopy to hospitals; health workers at all levels, including Aid Post level, are trained and generally confident in using malaria RDTs. The resulting near universal access to malaria testing has allowed a high annual blood examination rate (ABER) to be achieved in most areas - an achievement that is critical to ensure detection of all malaria cases and to interrupt transmission. Continued support for malaria testing to maintain an ABER appropriate to the setting will remain an important part of the strategy to eliminate malaria from Vanuatu.³⁰

²⁹ When people are screened for symptoms before testing, malaria is suspected in anyone with a fever or a recent history of fever, a history of malaria, anaemia of unknown cause or splenomegaly. In areas with low, very low or no known transmission, a history of travel to an area or community with known local transmission is a strong criterion for testing.

³⁰ As an approximate guide, this will be an ABER at or above 10% in areas with known ongoing transmission. However, it is more important to ensure that all fever and other suspected cases are selected and tested for malaria according to the criteria described in the national *Guidelines*. However, testing people not at risk or not fitting the case definition in the national *Guidelines* doesn't improve the surveillance system.

While supporting universal access to malaria testing using RDTs, it will nevertheless be important to maintain high-quality microscopy services at hospital level, where microscopy is required to monitor the severity of disease and the response to treatment of inpatients suffering from severe malaria. However, with declining malaria burden, the up-keep of slide reading skills among malaria microscopists becomes increasingly challenging and requires continued quality assurance and quality control practices, refresher training and external competency assessment. These measures will all be maintained for provincial microscopists using a systematic approach.

Periodic refresher training and one-to-one supportive supervision of diagnostic practices, including the correct use and reporting of test results, at all health facility levels, will remain a critical component of the malaria strategy in Vanuatu.

3.1.3 Engagement with the private sector

The NVBDCP will continue to provide RDTs within the small private sector in Vanuatu and assist and enable private practitioners to prescribe pre-qualified ACT on the basis of a positive RDT. This support will remain conditional on practitioners reporting positive cases through the national malaria reporting system. The Program will work with private sector partners to determine whether it is most feasible for the practice to conduct G6PD screening prior to radical cure for vivax malaria, or whether this would be managed by the Program following timely (immediate) notification.

3.2 Ensure effective and rational malaria treatment at all levels

Ensuring prompt provision of effective treatment for all confirmed cases of malaria according to current national malaria treatment guidelines is essential, not only to secure rapid clinical recovery in infected individuals, but also to reduce onwards transmission within the population. The use of artemisinin-based combination treatment is essential for schizontozidal treatment for all parasite species. In addition, it is important to always provide primaquine treatment (single-dose) for *P. falciparum* cases as an additional means of targeting gametocytes and hence reducing onwards transmission, and to provide primaquine treatment (14 day or 8-week regimen as described in the national *Guidelines*) for *P. vivax* cases to ensure radical cure against relapsing hypnozoite parasite stages (see *G6PD testing and primaquine*, below).

3.2.1 Updating of national Malaria Diagnosis and Treatment Guidelines

The current version of the national malaria treatment guidelines dates from 2015. The latest revision introduced updates on primaquine dosing tables and instructions on testing for G6PD deficiency by use of point-of-care G6PD rapid tests as a means to promote radical cure for *P. vivax*. However, considering recent experiences and external evaluations of current practices related to *P. vivax* radical treatment and G6PD testing in Vanuatu, new approaches will be piloted and the relevant section of the national malaria treatment guidelines will be updated accordingly (see below). Further updates to the guidelines may be made periodically as required based on evidence, normative guidance and expert consultation.

3.2.2 Antimalarial therapeutic efficacy surveillance and monitoring drug resistance

Ensuring the provision of effective first-line malaria treatment relies on regularly updating the national malaria treatment guidelines based on the latest results from therapeutic efficacy surveillance (TES), conducted according to WHO standard procedures. However, repeated attempts over the past years to measure the therapeutic efficacy of the current first-line treatment (artemether-lumefantrine) against *P. falciparum* in Vanuatu have all been unsuccessful, due to the declining number of *P. falciparum* cases providing insufficient subjects for TES. The latest successfully conducted full TES study was done on Epi Island in Shefa province during 2010-11, but only *P. vivax* cases were enrolled as no *P. falciparum* cases were available. (That study demonstrated 100% efficacy of artemether-lumefantrine against *P. vivax*).

Given the steadily declining number of *P. falciparum* cases detected, it is no longer feasible to conduct TES assessments for *P. falciparum* in Vanuatu. Although there have been no indications of declining clinical efficacy of artemether-lumefantrine in Vanuatu, there remains a real risk of artemisinin resistance spreading in the Pacific Region and so the situation needs to be closely monitored. This monitoring will be achieved through the Pacific Network for Monitoring Malaria Drug Resistance, led by WHO. Measures include reviewing TES results from neighboring countries (Solomon Islands and Papua New Guinea). In addition, alternative methods to assess drug efficacy levels in very low endemic countries may be applied, such as Integrated Drug Efficacy Surveillance (iDES), which is currently being piloted by WHO in other countries in the Western Pacific Region. This will be a topic for operational research in Vanuatu. In addition, relevant molecular markers of artemisinin resistance may be used as an additional tool to monitor malaria drug resistance in Vanuatu, in collaboration with technical partners.

3.2.3 Malaria case management training and supportive supervision

The national malaria elimination strategy will continue to place a strong emphasis on maintaining and improving quality of malaria case management through clinical training / refresher training and through one-to-one supportive supervision of clinical staff by provincial hospital staff for Health Centre nurse practitioners, and then cascading through Dispensaries to Aid Posts. Supervisory visits were previously implemented quarterly to all health facilities by the Malaria Program, which helped to ensure timely high-quality malaria case management at all levels. However, this supervision system for malaria was expensive in terms of both time and funding, and has recently integrated with other disease control and public health programs under the RDP with the aim of improving case management and preventive care more broadly across multiple diseases and interventions. The integration process has led to some uncertainties about the roles and responsibilities in the implementation of supervision activities, which needs to be resolved to ensure that proper and timely supervision is again provided to health workers throughout Vanuatu. This will be a key activity for provincial health managers and the NVBDCP in the coming years, in close collaboration with other public health programs.

Hospital medical staff will be provided with the appropriate clinical guidelines and training for managing severe malaria.

3.2.4 G6PD testing and use of primaquine for all *P. vivax* cases

To accelerate the elimination of malaria in Vanuatu, it will be critically important to ensure administration of anti-relapse radical treatment using primaquine for all *P. vivax* cases. However, as in other countries in the region, the effective and safe administration of primaquine is greatly constrained by the lack of capacity to reliably test patient G6PD deficiency status and by the low level of compliance with the required 14 days of primaquine administration. Both issues need to be addressed strategically by the NVBDCP.

Recent attempts to introduce G6PD rapid testing practices on a pilot basis in selected health facilities have suffered from a number of operational and logistical challenges, inadequate training and supervision, ambiguous guidelines and training materials, and consequently several uncertainties on the part of health workers and patients. Furthermore, timely access to blood transfusion services in case of acute hemolysis cannot be ensured in most settings. The question about how to ensure safe administration of primaquine to females based on the current G6PD qualitative rapid test (Carestart®) is another key issue, due to the test's inability to demonstrate correct G6PD status in women who test normal but may potentially be heterozygous for G6PD deficiency and therefore at risk of hemolysis if treated with long-course primaquine. Consequently, a recent external evaluation concluded that it would not be safe or appropriate to introduce G6PD rapid testing routinely in health facilities in Vanuatu.

As an alternative approach, it was recommended that, in more endemic areas, the NVBDCP should conduct regular and frequent (ideally monthly) retrospective rounds of point-of-care G6PD testing and primaquine treatment managed by highly trained and adequately resourced teams from provincial level. The existing PHT-MEs are best placed to take on this role. Each of the PHT-ME teams will need to be expanded with the addition of a medically qualified team member to manage the clinical component of the work. The main advantages of this approach are that the quality of service provision and the quality of data collection should be greatly improved resulting in improved safety and more robust evidence for project appraisal; the main disadvantage is that treatment would not be immediate, and the relapse rate would potentially increase, resulting in some reduction in the impact of the intervention on transmission.

In elimination settings it was recommended that POC G6PD testing and primaquine treatment be built into the case-based surveillance activities of PHT-MEs as part of case and focus investigations.

In an effort to ensure the timely elimination of malaria in Vanuatu, both of these approaches will be piloted as priority activities within this NSPME. The use of quantitative G6PD rapid test devices may be incorporated as locally appropriate models become available. New approaches to support compliance with prescribed primaquine will also be piloted. All of these approaches will be evaluated, documented and shared through implementation research conducted by the Program and its technical partners.

3.2.5 Engagement with the private sector

The NVBDCP will continue to provide first-line malaria drugs to private practitioners to enable them to prescribe quality-assured treatment on the basis of a positive RDT result, in return for participation in the national malaria reporting system. Participation in either POC or retrospective G6PD testing will also be supported.

KEY INTERVENTION 4: Health promotion

Strategic Objective: To mobilize communities through health promotion and leverage the support of all stakeholders in a multi-sectoral effort to accelerate the elimination of malaria.

The Program's advocacy, strategic communication and social mobilization efforts will aim to: promote the enabling environment for malaria elimination; strengthen elimination related knowledge, attitudes and practices; and promote community-led engagement in elimination interventions. There will be special emphasis on increasing community leadership and responsibility for malaria control and elimination through community leaders, local elimination committees, and community health and surveillance committees.

4.1 National malaria health promotion strategy

The Program will work with the MOH Health Promotion Unit (HPU) to develop an updated advocacy, strategic communication and social mobilization strategy, oriented towards the malaria elimination agenda. Technical assistance will be provided through WHO as required.

It will recruit a suitable candidate to fill the currently vacant position of Community Mobilisation Officer, who will then work to implement the strategy and ensure the integration of suitable malaria BCC content into relevant meetings and workshops (including across other public health programs).

4.2 Advocacy

A broad-based advocacy package will be developed targeting decision makers and community leaders at central, provincial and Health Zone levels. Malaria program experiences, best practices,

successes and lessons learnt will be documented and consolidated and disseminated among stakeholders. NVBDCP representatives will provide regular briefings to government ministers, the business community and leaders within society.

Every year a large-scale community mobilization event will be held on World Malaria Day (25 April), an important opportunity for high-level advocacy and local promotion of the malaria elimination agenda.

4.3 Behaviour change communication

Malaria elimination requires the participation of program beneficiaries. Unless individuals in communities see the merits of preventing the illness, even the best-designed prevention strategies might not be used.

The VBDCP will also partner with health workers, volunteers and schools to educate various target groups.

4.3.1 Provide expert management of BCC effort

The Community Mobilisation Officer will convene a BCC technical working group, which will meet twice a year (integrated into routine NVBDCP review meetings) and *ad hoc* meetings as necessary.

4.3.2 Update BCC methodology periodically

Every three years, the NVBDCP will conduct an in-depth independent assessment of BCC methodology and approaches (integrated into broader Malaria Program Reviews) and strategies will be revised as necessary and appropriate. This will be particularly relevant as the nation passes the initial elimination threshold at the end of 2023.

4.3.3 Develop essential BCC materials

The Community Mobilisation Officer will work in partnership with the HPU to develop and produce target-group-specific and locally appropriate BCC materials and methodologies for higher-risk communities, as well as for communities approaching elimination and those working to prevent re-establishment. Materials are likely to include inter-personal communication aids, audio and video sketches and presentations, a module for incorporation into the school curriculum, billboards, posters, brochures, articles and pamphlets.

However, the approach will be tailored to the specific requirements of the target groups and to the specific requirements of elimination. BCC activities will not focus so much on 'products' but more on the key messages, which are likely to cover: the advantages to Vanuatu of achieving malaria elimination; care and use of LLINs and washing practices; the importance of sleeping under an LLIN; the value of IRS; the importance of early diagnosis and treatment; the importance of compliance with the full course of treatment; and the importance to the community of all cases receiving appropriate treatment in an elimination setting. Where appropriate, work will be carried out through a commercial agency.

4.3.4 Implement communication program

Health practitioners and selected communicators (volunteers, teachers and community leaders) will be trained to provide malaria specific inter-personal communication as part of their normal function. Where appropriate this training will be integrated into routine clinical or vocational training.

PMS, MEOs and volunteers will work together to implement village-based BCC campaigns during mass LLIN distribution and IRS. In addition, volunteers will deliver monthly BCC messages through public announcement systems in selected high-risk villages.

A mobile phone-based BCC program targeting mobile individuals will be implemented. BCC text messages will target phone users entering specific geographical areas that have been designated high risk for either transmission or reintroduction. Messages will include the importance of avoiding mosquito bites and details of services available and contact numbers for local health workers and volunteers. The NVBDCP will investigate the feasibility of a fixed telephone number for volunteers, for which calls would be routed automatically to the nearest volunteer.

Mass media-based communications will be employed both at national and sub-national levels, taking full advantage of free opportunities where possible. Activities will include public service announcements on television and radio, participation in chat shows, articles in newspapers etc.

School teachers will be trained to deliver BCC through an updated module within the national school curriculum. This will focus on malaria elimination but will also cover dengue and other vector borne and parasitic diseases. The new Bachelor of Nursing curriculum will also provide an overview of malaria elimination theory and activities.

Socialization of malaria elimination will be supported by encouraging religious, civil-social and charitable organizations, NGOs and village leaders to be fully involved in malaria elimination. A focal person for malaria socialization will be appointed in each province. In association with community leaders at each level, presentations will be made annually to key community groups (during their own scheduled meetings) to update them on malaria related issues and to gain their support for program activities where necessary; where feasible, these activities will also integrate with community mobilisation outreach for other public health programs. The Program will encourage active participation by the private sector, private enterprises and professional associations.

Central to provincial level coordination will be through quarterly teleconferencing between focal points.

4.3.5 Engage community members in surveillance activities

Community engagement is an essential part of active surveillance and mounting a timely response (for individual fever cases as well as monitoring foci). However, maintaining community involvement in the context of a disappearing disease can be challenging.

The provincial Malaria Elimination Team will help zonal nurses to organize periodic meetings of VHWs and community members from within their health zones to review their local program. Community actions, roles and responsibilities in relation to the response to any notified cases will be reviewed, and community vigilance networks discussed.

Members of communities in designated elimination areas will be encouraged to contribute to the identification of suspected cases (e.g. those with a travel history from endemic zones) by maintaining a high level of awareness of risk and vigilance for fever among their relatives. Public information campaigns and notifications will ensure that community members, migrants, travelers and tourists are aware of the status of a community as a 'malaria free zone' and know: a) that anybody entering from a known malaria-affected area and anyone with a fever should attend for testing by RDT or microscopy; b) where the appropriate testing and treatment centres are located; and c) that diagnosis and treatment for malaria are available free of charge.

KEY INTERVENTION 5: Comprehensive malaria services as part of Vanuatu's disaster relief package

Strategic Objective: To ensure that malaria and other VBD prevention, surveillance and case management are well integrated into disaster preparedness and response activities.

Vanuatu is unusually prone to natural disasters and extreme weather events. Volcanic eruptions, earthquakes and cyclones are all relatively common and there is a high risk of tsunamis. The resulting destruction and subsequent population movements are associated with greatly reduced access to health care services and often leave populations unprotected by vector control measures. Disasters can potentially result in increased vector densities, further increasing person-vector contact; this brings a substantially increased risk to individuals of infection, and to communities of outbreaks and even epidemics of malaria or other VBDs.

After TC Pam in 2015, the National Disaster Management Office (NDMO) formed a standing system of eight national technical 'clusters' to facilitate disaster preparedness and response activities. The Health and Nutrition cluster is led by the MOH and WHO; it aims to reduce mortality and morbidity and restore the delivery of preventive and curative care as quickly as possible following a disaster.

5.1 Disaster planning and preparedness

Under the overall leadership of the MOH, the NVBDCP will work with the NDMO Health and Nutrition Cluster to establish plans and mechanisms to support immediate provision of comprehensive malaria and VBD prevention and case management services as part of Vanuatu's disaster relief package.

A buffer stock of 5% LLINs will be procured in 2021 and stored at national level and in larger provincial centres to ensure that the Program is adequately prepared to react quickly in the immediate aftermath of a disaster. Stock rotation with LLINs for routine mass or continuous distribution will ensure that buffer LLINs do not expire. In the event of larger scale disasters, additional nets may be mobilised from in-country stocks awaiting routine distribution; further stocks may be procured with emergency relief funding from GOV, DPs or humanitarian agencies, or requested 'in kind'.

Other necessary supplies – e.g. for active case detection and treatment – will be procured as a buffer stock in the routine supply system. Stock rotation (first in, first out) will be applied by the Central Medical Stores to ensure inter-changeability of buffer stocks with routine health facility orders and minimize risk of expiry.

Where risk is continuous (e.g. volcanic activity in Ambae), the Program will assist the Provincial Disaster Committee through the Provincial Health Office with ongoing preparedness and monitoring.

5.2 Disaster response

Following a natural disaster or extreme weather event, the Program will follow the directives of the MOH and the Health Emergency Operations Centre to participate in emergency assessments and prepare to mobilise health and malaria-related resources and services as required. These services will support Provincial Disaster Committees, and may include: provision of LLINs to all in need; IRS where the construction of shelters is suitable; LSM where breeding sites adjacent to population locations are 'few, fixed and findable'; passive case detection through emergency clinics; active case detection through emergency outreach teams; and mass treatment or mass screening and treatment prior to repatriation following lengthy mass evacuations and/or population displacement.³¹

The Program will collaborate with the Health Information Unit and WHO to establish emergency systems of syndromic surveillance for malaria and other outbreak-prone diseases.

Emergency imprests will be set up through the NDMO or the MOH Finance Unit so that funds can be released immediately to cover logistical and other emergency requirements.

³¹ Duration of evacuation exceeding the maximum expected lifespan of infected vectors at the depopulated site of origin so that the site of origin is malaria free prior to repatriation.

SUPPORTING ELEMENT 1: A strong enabling environment

Strategic Objective: To maintain a high level of political commitment to malaria elimination; and 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 management, technical assistance and cooperation, procurement and supply management, and performance monitoring.

Supporting Element 1 will:

- a) Ensure that leadership of the malaria elimination agenda remains dynamic so as to maintain strong political commitment and adequate financial support for elimination.
- b) Conduct a malaria-specific human resource review and develop and implement an approach to attract, motivate and retain key skilled staff.
- c) Fill all essential vacant positions (using time-limited contracts for 1-3 years) to ensure the maintenance of case-based surveillance capacity in prevention of re-establishment settings.³²
- d) Maintain malaria-specific capacity and capability in all provinces and ensure malaria elimination activities are included in the integrated package of health services through active Provincial Elimination Committees and inclusive health planning and coordinated integrated community responses.
- e) Ensure regular supportive supervision for health workers in facilities at all levels, especially at peripheral and community levels.
- f) Strengthen capacity for forecasting, procurement and supply chain management.
- g) Strengthen communications and advocacy to ensure that malaria elimination becomes a national goal with full public and development partner support.
- h) Investigate regional financing options and adopt innovative mechanisms to mobilize resources for elimination.

The adoption of the elimination strategy increases the need for strong leadership and good management in NVBDCP. Operations will need to be managed with rigor and flexibility, supported by robust monitoring and quality control. The Program will need to be responsive to the evolving needs of the elimination effort in order to accelerate program impact. WHO and partners will provide support covering a broad range of program areas and will work to strengthen the leadership and management capacity of the Program to enable rapid and high-quality implementation of the elimination strategy.

SE 1.1 Political commitment and program oversight

SE 1.1.1 National level political commitment

Strong political commitment is a prerequisite for embarking on elimination.

The NVBDCP will work to obtain official Prime Ministerial endorsement for the *National Strategic Plan for Malaria Elimination, 2021-26*; this will build on the 2018 Prime Ministerial Commitment to malaria elimination – with Papua New Guinea and Solomon Islands – at the London Malaria Summit for Commonwealth countries.

³² Each Province must have its own Malaria Elimination Officer to coordinate elimination and prevention of re-establishment efforts.

The key message for the Government of Vanuatu is:

‘There is currently a critical window of opportunity: Funds are available and there is no drug or insecticide resistance to hamper efforts. Before the situation changes, Vanuatu must seize this opportunity to eliminate malaria once and for all’.

Representatives from various sectors (governmental and non-governmental) will be involved in the planning and implementation of malaria control and elimination efforts. Partners include: regulatory agencies; other government ministries; civil society; private sector; and WHO, DPs and other International organizations.

Technical assistance – funded by the Australian aid program through APLMA – will be available during the course of the *Strategy* to support high level advocacy for Government funding for malaria elimination.

SE 1.1.2 Program oversight

To ensure strong Program oversight, a high-level multi-sectoral Vanuatu Malaria Elimination Advisory Group has been established and will be maintained. It includes representatives from MOH, NVBDCP, NGOs, and technical and development partners – reporting through the Director of Public Health to the Director-General.

The MEAG will enable external technical review of malaria trends and progress towards elimination, review progress and gaps in elimination activities in line with the national strategy and operational plans, identify and help to address funding constraints, assist in adapting WHO guidance to the national context, and support the national Program in the preparation for national malaria elimination certification.

In addition, a National Malaria Elimination Steering Committee, comprised of key MOH staff, will provide periodic review of progress against malaria elimination strategy targets; the MESC will also direct planning, implementation, resource mobilization and partner coordination to address issues or gaps accordingly.

SE 1.1.3 Sub-national level leadership, partnership and advocacy

NVBDCP partners will work to involve more stakeholders at provincial and local level, including community leaders, hoteliers, major employers and development projects.

SE 1.1.4 Transition of Global Fund principal recipient role to MOH

The Vanuatu MOH communicated to the Global Fund that it wished to become the Principal Recipient of the malaria grant as soon as possible after completion of the 2018 – 2020 funding cycle. In response, the Global Fund has tasked the current PR (UNDP) to support this transition by undertaking relevant assessments and developing a Capacity Building Plan for the Ministry. The intention is for the transition to be undertaken during the funding cycle of 2021-23 for the principal recipient role to fully transfer to the MOH for 2024 onwards.

An initial capacity assessment exercise was undertaken and a draft transition plan developed with support of the current PR. This will be further refined, and the transitional capacity development approach will be planned and monitored: specific capacity gaps will be identified, the root causes analysed, and then addressed through an agreed, prioritised work plan. It will draw on the health system analysis provided in Sections 1 and 2 of this NSPME and the *Landscape Analysis*, with the aim of strengthening relevant health system functions in the context of the enabling environment. To guide this process, UNDP will use its Capacity Building Toolkit – used to support more than 25 grants to transition to national management – and mobilise a dedicated Capacity Building Advisor to assess and provide relevant technical assistance to the MOH to take on this role.

Activities will commence immediately on anticipated receipt of the new grant in early 2021, with a view to the MOH assuming full PR functions during 2023.

SE 1.2 Human resources

Technical capacity within the NVBDCP has declined in recent years due to a number of factors, including retirement, reassignment, and limited opportunities for high-level training. Urgent steps need to be taken to strengthen capacity at all levels of the health system in line with the demanding requirements associated with elimination. Although there has been some recent recruitment – in part supported by WHO – more recruitment will be required, and extensive capacity development will be needed, particularly for newer team members.

SE 1.2.1 Update human resources development plan

The NVBDCP will conduct a comprehensive review of existing malaria HR and identify gaps in relation to changing requirements as the focus of the Program evolves from control to elimination.

Due to the necessity for strong surveillance systems and high-quality operations, HR will need to be increased through the introduction of additional PMSs in the three provinces where they are not already present (i.e. ensuring one PMS per province) and additional contracted MEOs (ranging from one to 5 per province) to ensure that all Health Zones are adequately covered. Additional recruitment may also be required to address the overall elimination goal of this *Strategy*: to support case-based surveillance, G6PD testing and primaquine treatment campaigns, M&E and training. Where possible, the Program will explore multi-tasking in collaboration with other public health programs. Each PHT-ME will need to be accompanied by a medically qualified team member to oversee G6PD testing and radical treatment for vivax malaria.

A training needs assessment will be carried out for existing and planned VBDPC staff.

The HR development plan will be updated annually.

SE 1.2.2 Training

A comprehensive program of training and needs-based refresher training will be implemented to strengthen service provision in all programmatic areas. This training will be integrated wherever practical to maximize cost effectiveness and minimize transaction costs for participants. Training will range from scholarship-supported international degree or diploma courses to in-service training for volunteers in lower level facilities. Access to higher-level training courses will be competitive and merit based, but also guided by Program needs. In the immediate future, staff at all levels will receive reorientation training to support the Program's transition from a control focus to an elimination focus (except in areas where skills are already considered to be adequate). Stronger engagement with VHWs as a key resource for fostering community level vigilance and adequate population screening in designated elimination areas will continue to be prioritized through active engagement with PMS and MEOs.

Old guidance documents and job aids will be disposed of during training sessions and during on-the-job supervision visits, and replaced with current versions as they are re-developed and incorporated into training and supervisory activities.

The NVBDCP will work with the MOH HR Unit to develop and introduce new measures to strengthen staff motivation based on non-cash incentives, such as through formal recognition of accomplishments.

SE 1.2.3 Specialized training opportunities for senior staff

Specialized training will be supported for senior technical staff at central and provincial levels (entomologists, epidemiologists, sociologists, BCC specialists, PMSs etc.). Their training may include participation in the Malaria Management for Field Operations (MMFO) course offered through the Asian Collaborative Training Network for Malaria (ACT-Malaria) in Manila, Philippines, or through the proposed Diploma level course in MMFO that is expected to be available through Solomon Islands National University during the early years of this Strategy (and accessible to malaria field officers from other Melanesian countries).

Pacific regional vector control initiatives supported by the French Government through SPC and the Australian Government through James Cook University and WHO may provide additional training opportunities for field staff.

SE 1.2.4 Ensure supportive supervision for health workers in facilities at all levels

Supportive supervisory visits to health facilities at all levels will remain a key component of malaria elimination activities, ensuring high-quality malaria case management, avoiding stock-outs, ensuring effective case reporting, and facilitating close interaction throughout the health system.

Guided by the RDP, the NVBDCP will work with other MOH Units, public health programs and Provincial Health Offices to implement an effective and reliable supervision system. Together, they will strive in particular to reach lower level health facilities in remote and outer island communities at least 6-monthly, where peripheral health workers have the greatest need for more supervision. The current supervision system is non-functional and will be reviewed and issues resolved. The focus of the new system will be on one-to-one interaction with local health staff to address and resolve problems, rather than just running through checklists or 'inspecting' facilities.

Supervision will also include reviewing case registers to see if a proper diagnosis was made and appropriate treatment was given, ensuring adequate stocks of drugs, RDTs and POC G6PD tests, verifying timeliness and accuracy of reporting via the MMLL, and checking the two-monthly order forms and the expiry date on RDTs and anti-malarial drugs. Appropriate action will be taken to resolve identified problems and will be followed-up during subsequent visits. Supervisory visits will be ensured to every health facility every 3 months, coordinated and overseen by PMSs and VBDCP at national level, and implemented through allocation of the required human, logistical and financial resources.

SE 1.3 Internal program review, strategy development and planning

There will be regular sessions of progress review, strategy development and program planning. A strong participatory approach will be encouraged and promoted to better coordinate malaria elimination efforts and facilitate resource mobilization.

The NVBDCP will deliver efficient and timely malaria operational planning.

Stronger harmonisation between national and provincial health planning processes will be achieved through two consultative planning activities held approximately 6-monthly.

Each year, between March and June, the national Program will undertake consultations with provincial health teams and key technical partners to review malaria activities and interventions and examine priorities for the coming year, their likely cost and available resources.

Provincial CMOs and PMSs will participate in periodic national malaria review meetings (a malaria 'mini-conference'), which donors, DPs and focal points for other public health programs will also attend. All aspects of the performance of the Malaria Program and its interaction with other

public health programs and provincial and zonal health services will be reviewed, and priorities for the coming year will be identified.

Immediately following the national 'mini-conference', in consultation with provincial partners, the NVBDCP will develop an integrated annual malaria operational plan and budget (national and for each province) for the coming year. This will be in a form that can be readily reflected in the national Malaria Action Plan and Provincial Health Office Business Plans.

Based on the findings and outcomes of the national 'mini-conference', the planning meeting will also be used to review and update relevant policies and guidelines.

SE 1.4 Financial management and timely mobilisation of funds

The NVBDCP – together with relevant MOH Units, Ministry of Finance and Economic Management (MOFEM) and partners – will address the current issues in financial management, which often cause bottlenecks and delays in flow of funding from national to provincial levels. These problems relate partly to the current government 'imprest' system and partly to different rules for releasing funds being applied by different partners; together, they lead to delay and sub-optimal planning of implementation and delivery of malaria interventions, training, supervision and other key program activities in the field. Unless these financial management problems are resolved and a new system to ensure smooth implementation of field activities is put in place, the agreed national malaria elimination goals may not be achieved.

Harmonized national and provincial planning will ensure that required financial resources are clearly reflected in both the national MAP and in provincial business plans. Financial management capacity will be engaged within the national Program to ensure that expenditure on malaria is occurring as per the annual MAP and provincial business plans, and that reporting and acquittal of expenditure is timely and accurate.

Disbursement for field expenses will gradually migrate from the present 'imprest' system to the proposed decentralized model as the Financial Services Bureau becomes operational in provincial centres. Advances for malaria-related activities will need to be jointly authorized by both the NVBDCP Manager and the Provincial CMO, according to the national MAP and provincial business plan. Acquittal of field expenses will follow MOFEM regulations.

The proposed NVBDCP Finance Officer will work closely with the MOH Finance Manager. Expenditure tracking reports for the malaria components of both national and provincial health business plans will be produced in cooperation with the Finance Manager. Together, they will ensure that donor liaison and reporting are completed as required.

To make more efficient use of both malaria-specific and other MOH resources, the NVBDCP will undertake trials of innovative service delivery options at the community level. This will build on activities conducted under the present *Strategic Vision*, where some Maternal, Neonatal and Child Health and immunization services were given the opportunity to use transport for community outreach activities funded by the Malaria Program. Internal efficiencies will be sought by undertaking multiple interventions during community visits (e.g. LLIN distribution combined with IRS, environmental assessment, health promotion and other community level activities), instead of the historic, less efficient single-purpose community visits.

Under the new *Strategy* and its greater degree of harmonization with provincial health services, the NVBDCP's provincial work plans will also look for opportunities for cost sharing between public health programs with independently identifiable funding. This will support integrated community outreach more efficiently and effectively, in line with the RDP.

SE 1.5 Information management, reporting and data quality

SE 1.5.1 Information systems and management

The Program will continue to work closely with the Health Information Unit and WHO on elimination-focused enhancements to DHIS2 and linked reporting systems. This will include the activation of the DHIS2 malaria tracker module for information management and reporting of all aspects related to malaria elimination.

These enhancements will contribute to timely and effective monitoring and reporting, including provincial level data analysis and utilisation and enhanced national-level tracking.

SE 1.5.2 Improved timeliness of reporting

The Program will also support the progressive expansion of mobile phone (SMS) based reporting and communication, especially in more remote areas with mobile phone connectivity, to support the 1-7-60 strategy in elimination areas. Local health workers will be supported to communicate with the PMS, HEO or their nearest Health Centre for advice in the event of a case or a cluster of cases; this may include advice on treatment, reactive case detection, environmental assessment and shipping of specimens for confirmation of diagnosis or G6PD status.

SE 1.5.3 Improved data quality in preparation for WHO certification

When applying for national certification of malaria elimination through WHO, an essential point of assessment by the certifying team is the quality of malaria data (cases and foci) and timeliness of data submission (i.e. linked to SE1.5.2). During the course of this NSPME, the Program will introduce routine annual assessment and validation of data quality and timeliness. This activity will be aligned with the requirements of WHO technical guidance for eliminating countries, including compliance with minimum requirements for certification.

SE 1.6 Technical assistance and cooperation

SE 1.6.1 Whole-of-Program TA and planning

Ongoing technical assistance (TA) will be available through the resident in-country WHO malaria officer, WHO supported short-term consultants and other visiting technical specialists as requested by MOH.

As part of annual planning processes, the VBDCP and technical partners will analyse TA needs for the coming year and develop a TA plan that justifies the placement of long-term advisers and the engagement of *ad hoc* TA.

SE 1.6.2 Where necessary, recruit international technical assistance to support operations at provincial level

The program will request DFAT and other international aid program support to place experienced professional volunteers (with surveillance, planning and logistical skills) in selected provinces where existing challenges may impede successful orientation towards elimination. They will work alongside PHT-ME staff providing day-to-day technical support for management, planning and operations, and thereby bolster implementation.

SE 1.6.3 Technical exchanges with other elimination-oriented countries

Technical and managerial capabilities will be strengthened at central and provincial levels through international exchange visits, including with neighbouring countries like Papua New Guinea and Solomon Islands that are embarking on malaria elimination strategies predominantly at the sub-national level.

SE 1.7 Infrastructure development, maintenance and running costs

Infrastructure strengthening and maintenance will be supported. Buildings, vehicles and equipment will be insured and maintained, and their running costs will be supported at national level and in the periphery.

SE 1.8 Procurement and related quality assurance

SE 1.8.1 Procurement

Transportation and communication facilities require significant strengthening. Vehicles (cars, boats, outboards and motorcycles), equipment, commodities and consumables will be procured (or hired) as required. All procurement will be carried out in strict accordance with GOV policies and guidelines.

Accurate quantification of drug and commodity requirements is critical for the effective implementation of the program. It is a complex task and so, in the short-term at least, MOH will seek TA in order to achieve this. Forecasting and deployment of RDTs and antimalarials will be strengthened with technical support from WHO (based on caseload and trend analysis) until the *mSupply* tender module is fully functional. The latter will require high quality data entry, which will only be achieved once robust supportive supervision is in place.

The timing of procurements will take both suppliers' expected lead-times and past delays into consideration.

The Program will only procure products for large-scale implementation that have been pre-qualified by WHO's various pre-qualification mechanisms. To maximize the cost effectiveness of the Program, large-scale procurements will be directed through available pooled procurement mechanisms, such as that coordinated by the Global Fund, or through other mechanism such as UNICEF's global procurement facility.

Other, smaller scale local procurement will be directed through the Assets, Infrastructure and Procurement Unit in the MOH (as per existing arrangements).

SE 1.8.2 Quality assurance for program commodities

Quality assurance will be managed according to SOPs. Samples will be taken from all batches of insecticide and insecticide treated materials on receipt. The samples will be sent for both chemical and bio-efficacy testing at WHO collaborating centres or other reputable institutions prior to deployment to ensure that they are within the specifications set out in the manufacturer's product documentation. Sub-standard products will be rejected and returned to the supplier.

Lot quality assurance sampling will be carried out routinely for RDTs and antimalarials. Again, these samples will be sent for testing at WHO collaborating centres or other reputable institutions prior to deployment to ensure that they are within the specifications set out in the manufacturer's product documentation; again, any sub-standard products will be rejected and returned to the supplier in accordance with procurement agreements.

SE 1.9 Supply chain management

Distribution of pharmaceuticals, diagnostics and small-scale equipment and infrastructure will use the existing CMS system wherever feasible in order to ensure correct transportation and storage.

mSupply desk-top is available in national and provincial medical stores; however, *mSupply Mobile* is not yet available at any lower level facilities. Supply systems will be strengthened through *mSupply* training of all Pharmacy Department staff. *mSupply* system updates will be made whenever appropriate. Logistics strengthening workshops will be held periodically. The Pharmacy

Department will provide strong supportive supervision from national level to ensure efficient program logistics in line with national SOPs.

Provincial pharmacy officers will be increasingly involved in assessing orders and quantities of malaria consumables placed from peripheral centres to ensure they are consistent with projected requirements.

As demand for RDTs and related consumables increases (i.e. to maintain ABER) and for microscopy reagents and drugs reduces (in line with reduced use of community-based microscopy and reduced malaria incidence), forecasting mechanisms and formulae will be re-evaluated and adjusted with technical support from WHO.

A system for the collection and proper disposal of expired antimalarials will be established; wastage will be monitored and mitigation measures put in place.

SE 1.10 Programmatic supervision and monitoring and evaluation

SE 1.10.1 Program performance framework

Monitoring and evaluation is a fundamental component of this *National Strategic Plan for Malaria Elimination, 2021-26*. Through M&E, the NVBDCP's results at impact, outcome, output and input levels can be measured to provide the basis for accountability and informed decision making at both policy and implementation levels.

M&E is an essential feature of performance-based funding, and external funding partners such as the Global Fund, DFAT and Rotary Against Malaria make a significant contribution to the national budget for malaria control and elimination. The Program will use its comprehensive 'Performance Framework' (a legal document through which Vanuatu's Principal Recipient for the Global Fund mutually agree on the indicators to be used and the targets to be achieved to demonstrate performance and consequently, ensure continued funding) to monitor all aspects of performance at the impact, outcome and coverage levels. Program performance at the output and input levels will be monitored through annual MAP management mechanisms.

A detailed M&E Plan that describes how the M&E system should be run will be developed and harmonised with the Global Fund Performance Framework. The M&E Plan will describe routine data collection, analysis and reporting, information flow, as well as feedback mechanisms and associated infrastructure. The Plan will provide an overview of the evaluations, reviews, periodic surveys, surveillance and special studies that go together to support routine data collection. Data quality assurance mechanisms and related supportive supervision, coordination and capacity building measures will be included. The M&E Plan will include a Program Indicator Framework, which will provide a detailed description of each indicator at the impact and outcome levels.

The M&E system will ensure that data can be collected, processed and transformed into strategic information to allow informed decision-making at local, country, regional and global levels.

SE 1.10.2 Independent expert review

An independent review of the Program will be conducted in 2022 to assess progress against the *Strategy* and, if necessary, to change elements to ensure the country is on track to achieve zero cases by the end of 2023.

A follow-up review will be conducted in 2024 or early 2025 to assess prevention strategies against reintroduction and re-establishment of malaria, and to conduct an interim assessment in preparation for WHO certification after the end of 2026.

SUPPORTING ELEMENT 2: Operational research and monitoring

Strategic Objective: To leverage technical partnerships in support of innovation by generating new knowledge and applying it to improve the delivery and quality of malaria services.

Given the NVBDCP's current programmatic priorities, it does not have the HR or technical capacity to conduct operational research or some of the more technical aspects of malaria related surveillance and technical monitoring. Supporting Element 2 will therefore focus on encouraging technical partner agencies to:

- Conduct entomological surveillance to guide and support strategy adjustments where necessary.
- Develop novel tools and approaches to respond to existing challenges to malaria elimination, such as outdoor early biting vectors and population movements.
- Conduct operational research to optimize impact and cost-effectiveness of existing and new tools, interventions and strategies.
- Take action to facilitate the rapid uptake of new tools, interventions and strategies.
- Monitor the therapeutic efficacy of first-line antimalarials using alternative approaches to standard TES (e.g. using iDES) and monitor development of artemisinin resistance by use of relevant molecular markers (outsourced where necessary).

Technical partners will be encouraged to conduct a comprehensive package of ethical, high quality research of immediate programmatic relevance. This research will be selected to addresses operational bottlenecks and find innovative ways to tackle residual malaria transmission and accelerate progress towards elimination.

Research priorities will be reviewed annually and revised as necessary, but may include:

- Re-purposing of used bed nets to avoid accumulation in the environment
- Human population movement assessment to determine importation risk between islands, provinces, and into Vanuatu
- mHealth applications (mobile applications for health)
- Larval source management, such as through use of local fish species
- Repellent use (including topical or spatial repellents) for personal protection
- Endectocidal ivermectin for the prevention of transmission
- Attractive toxic sugar baits (ATSB) for vector control
- Implementation of retrospective G6PD testing and primaquine administration for confirmed *P. vivax* cases in a targeted campaign approach
- Implementation of compliance support for primaquine radical cure for *P. vivax*
- Piloting different approaches for the delivery of integrated supportive supervision for the management of malaria and other diseases
- Piloting implementation of iDES
- Collection of blood specimens from used RDTs as a means to monitor molecular markers of artemisinin resistance

Several activities planned and approved by the Australian aid program under its Centre for Health Security funding stream will be available to support operational research in Vanuatu for vector control and epidemiological and entomological surveillance. NVBDCP, WHO and partners will conduct an annual review of research findings, and strategies and research priorities will be updated accordingly. Regular meetings between Program representatives and research partners will ensure a coordinated national approach.

A Technical Working Group will be established within MESC to place special emphasis on moving proven new interventions and approaches quickly towards operational adoption.

5. PROGRAM PERFORMANCE ASSESSMENT

Revision of National M&E Framework

Currently, assessment of programmatic performance is guided by the detailed *Malaria National M&E Framework, 2015-2020*. This will be updated to reflect the strong strategic reorientation towards malaria elimination described in this NSPME for the present planning cycle and WHO guidance on elimination phase indicators.³³

Table of core indicators

The following table summarizes the key programmatic indicators and targets in this *Plan*.

Table 2: Key programmatic indicators and targets for 2021-26

	Code	Baseline	Baseline year	2021	2022	2023	2024	2025	2026
IMPACT									
Confirmed malaria cases (microscopy or RDT)	Malaria I-10 ^(M) (numerator)	576	2019	≤280	≤140	≤56	0	0	0
Annual parasite incidence: Confirmed malaria cases (microscopy or RDT); rate per 1000 persons per year (Elimination settings)	Malaria I-10 ^(M)	1.9	2019	≤1.0	≤0.5	≤0.2	≤0.1	≤0.1	≤0.1
Number of provinces with zero locally transmitted cases of malaria	Custom	1	2019	3	4	6	6	6	6
Inpatient malaria deaths	Malaria I-3 (numerator)	0	2019	0	0	0	0	0	0
Malaria test positivity rate	Malaria I-4	2.4%	2018	<1.25	<1	<1	0	0	0
Number of active foci of malaria (Elimination settings)	Malaria I-9 ^(M)	26	2019	36	18	8	0	0	0
Number of people and percentage of population living in active foci (Elimination settings)	Custom	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC
OUTCOME									
Proportion of population that slept under an insecticide-treated net the previous night (Survey-derived only)	Malaria O-1a	44.3%	2013	80.0%				TBC	TBC
Proportion of children under five years old who slept under an insecticide-treated net the previous night (Survey-derived only)	Malaria O-1b	51.0%	2013	90.0%				TBC	TBC
Proportion of pregnant women who slept under an insecticide-treated net the previous night (Survey-derived only)	Malaria O-1c	40.5%	2013	90.0%				TBC	TBC
Proportion of population with access to an ITN within their household (Survey-derived only)	Malaria O-2	83.0%	2013	95.0%				TBC	TBC
Number of persons per LLIN distributed in areas targeted for distribution (Routine programmatic monitoring)	Custom	1.35	2019	1.25	1.25	1.25	TBC	TBC	TBC
Annual blood examination rate: per 100 population per year (Elimination settings)	Malaria O-9 ^(M)	7.6%	2019	10.0%	10.0%	10.0%	TBC	TBC	TBC
Proportion of children under five years old with fever in the last two weeks for whom advice or treatment was sought (Survey-derived only)	Custom	57.0%	2013	95.0%				TBC	TBC
Proportion of women who can recall the message: "Sleeping under a bed net prevents malaria" (Survey-derived only)	Custom			95.0%				TBC	TBC
Proportion of women who can recall the message: "Seek care within 24 hours of onset of fever" (Survey-derived only)	Custom			95.0%				TBC	TBC
Proportion of women who can recall an adapted, elimination-focused message (TBC; survey-derived only)	Custom			95.0%				TBC	TBC
OUTPUT or COVERAGE									
Number of long-lasting insecticidal nets distributed to at-risk populations through mass campaigns	VC-1 ^(M)	80,623	2019	62,040	62,040	62,040	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)	Custom	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	VC-3 ^(M)	TBC	TBC	10,500	9,720	9,340	TBC	TBC	TBC
Proportion of households in targeted areas that received Indoor Residual Spraying during the reporting period	VC-5			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)	Custom			TBC	100%	100%	100%	100%	100%
Percentage of cases notified to provincial officers within 24 hours of confirmation (Elimination settings)	Custom	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)	CM-5 ^(M) (adapted)	100%	2019	90%	95%	100%	100%	100%	100%

³³ WHO (2017). *A framework for malaria elimination* [Annex 3]. Geneva: World Health Organization; 2017.

	Code	Baseline	Baseline year	2021	2022	2023	2024	2025	2026
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)	Custom			75%	90%	100%	100%	100%	100%
Percentage of malaria foci fully investigated, classified and managed as per national protocol (Elimination settings)	CM-6 ^(M)	100%	2019	90%	95%	100%	100%	100%	100%
Malaria and VBD disaster response plan developed in line with NDMO	Custom			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	M&E-2a	70%	TBC	80%	85%	90%	90%	90%	90%
Timeliness of facility reporting: Percentage of submitted facility monthly reports (for the reporting period) that are received on time per the national guidelines	M&E-2b		TBC	80%	85%	90%	90%	90%	90%
Vacancy rate: Number of full time posts unfilled for at least 6 months as a percentage of total number of funded posts	HRH-1		TBC	TBC	TBC	TBC	TBC	TBC	TBC
Percentage of health facilities receiving supervisory visits during the reporting period (at least once every 6 months)	SD-5		TBC	TBC	TBC	TBC	TBC	TBC	TBC
Percentage of months that health facilities have continuous supply without stock-outs of ACTs and RDTs	Custom		TBC	90%	95%	100%	100%	100%	100%
Percentage of health product batches for malaria tested for quality in line with Global Fund Quality Assurance policy	PSM-7 (adapted)		TBC	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	CM-2a ^(M)	99.0%	2019	100%	100%	100%	100%	100%	100%
Percentage of microscopy results cross-checked by national reference laboratory	Custom			100%	100%	100%	100%	100%	100%
ELIMINATION-ORIENTED PROGRAMMATIC MILESTONES									
Malaria is a notifiable disease	Custom	Yes		Yes	Yes	Yes	Yes	Yes	Yes
The national malaria elimination plan has been approved and endorsed by the Ministry of Health	Custom	Yes		Yes	Yes	Yes	Yes	Yes	Yes
An independent national malaria elimination advisory committee has been set up and convenes at least quarterly	Custom	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.	Custom	Yes	2018		Yes			Yes	

TBC = To be confirmed in updated M&E Framework

Annual Program reviews

An internal review covering all aspects of this NSPME will be conducted annually. The annual reviews will be used for validating Program performance, as a basis for development of the next year's MAP and, if necessary, for adjusting program targets for subsequent years.

An assessment of M&E (based on established tools) and data validation will form an important component of the internal reviews.

Surveys

As Vanuatu approaches malaria elimination, it becomes less cost-effective to undertake specific malaria surveys.

Instead, the Program will negotiate with the NSO for malaria-relevant indicators and questions to be included in the national census, DHS or similar mechanisms (as described at Strategy 1.1, above). Variables to be addressed through national surveys could include: bed net access and utilisation; malaria-related knowledge, behaviours and practices in the home; and health seeking behaviour (especially prompt assessment of fever), access to and utilisation of health services.

A DHS and a targeted bed net survey are provisionally planned for 2021.

Three-yearly Program evaluations

An external evaluation covering all aspects of the national malaria control and elimination program and specifically examining criteria for eventual WHO certification of Vanuatu as malaria-free will be conducted approximately every three years.

The first of these evaluations will be conducted in the second half of 2022 to ascertain progress towards the sub-national impact targets and zero locally transmitted cases nationally, and to make specific recommendations to the Program on areas requiring strengthening or adaptation.

As with the internal reviews, data validation and assessment of M&E standards will form an important component of these evaluations and will be highlighted in the team's terms of reference. This will be a principal area of focus for the team undertaking the second external evaluation in late 2025 or early 2026.

6. BUDGET AND FINANCING

Budget for the costed NSPME

The Program has undertaken a detailed costing and prioritisation exercise to determine the overall budget most efficient and cost-effective models of implementation of the NSPME. The budget assumptions are as described in the relevant areas of the Plan (Sections 3 and 4).

The overall budget for the six-year period of the *Plan*, 2021-2026, is estimated at just over VUV 1,529 million (USD 13.0 million at current exchange rates) including salaries, and just over VUV 1,097 million (USD 9.3 million) excluding salaries.³⁴

Table 3, below, summarises the budget breakdown by Key Intervention (Strategic Objective, Supporting Element and Salaries) by year. Figure 9 shows the proportionate allocation to each Key Intervention area for each year of the *Plan*, and Figure 10 summarises the budget by Key Intervention and HR costs for the full six years' duration of the *Plan*.

A detailed cost matrix, by thematic area, is included at Annex 1.

Table 3: Budget summary in USD by Key Intervention, Vanuatu NSPME 2021-26

Level	#	Objective and Strategy	Year						Total
			2021	2022	2023	2024	2025	2026	
Total			\$3,442,493	\$2,612,713	\$2,442,391	\$1,735,259	\$1,772,403	\$1,601,316	\$13,606,575
Objective	1	VECTOR CONTROL AND PERSONAL PROTECTION METHODS. MAINTAIN 100% COVERAGE IN SELECTED HIGH AND MEDIUM RISK AREAS WITH LLINS FOR THE WHOLE POPULATION OF VANUATU AND ACCELERATE REDUCTION IN MALARIA TRANSMISSION IN SELECTED AREAS USING IRS	\$861,271	\$642,597	\$608,395	\$202,805	\$236,569	\$203,424	\$2,755,061
Strategy	1.1	Distribute LLINs to all at-risk populations in high-endemic areas through mass campaigns carried out at three-year intervals with the next distribution scheduled for 2021	\$503,827	\$459,107	\$459,373	\$87,240	\$87,547	\$87,859	\$1,684,954
Strategy	1.2	Conduct indoor residual spraying (IRS) to rapidly reduce malaria transmission in identified foci within the two remaining high-burden provinces, Sanma, Malampa and Shefa, during the first three years of the strategy, 2021-2023	\$308,546	\$134,591	\$100,124	\$66,666	\$100,124	\$66,666	\$776,719
Strategy	1.3	Implement entomological surveillance of vector habits, effectiveness of current and alternative vector control interventions and monitor insecticide resistance	\$48,898	\$48,898	\$48,898	\$48,898	\$48,898	\$48,898	\$293,388
Objective	2	CASE-BASED SURVEILLANCE FOR ELIMINATION AND PREVENTION OF RE-ESTABLISHMENT. ONCE A PROVINCE HAS ENTERED THE ELIMINATION PHASE, INVESTIGATE AND MANAGE ALL MALARIA CASES	\$511,527	\$333,801	\$293,561	\$224,844	\$234,760	\$243,166	\$1,841,659
Strategy	2.1	Expand, modernize and strengthen the malaria information system	\$50,549	\$0	\$3,692	\$0	\$3,692	\$25,683	\$83,616
Strategy	2.2	Update national protocols and strengthen capacity to carry out all surveillance activities. Consolidate the routine use of the DHIS2 Malaria Module for case surveillance through national and provincial staff training.	\$198,085	\$187,779	\$211,952	\$184,526	\$190,751	\$177,166	\$1,150,260

³⁴ These budget estimates exclude any cost recovery associated with Principal Recipient functions under the Global Fund. However, these costs are included in the last two rows of Table 3.

Level	#	Objective and Strategy	Year						
			2021	2022	2023	2024	2025	2026	Total
Strategy	2.3	Implement case investigation via national	\$172,090	\$100,621	\$57,739	\$39,362	\$39,362	\$39,362	\$448,535
Strategy	2.4	Detect and respond promptly to active transmission foci	\$90,802	\$45,401	\$20,178	\$956	\$956	\$956	\$159,249
Strategy	2.5	Provide monitoring and constructive supervision visits	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy	2.6	Support epidemic prediction and prevention interventions	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy	2.7	'Small Island strategy': a specific approach for small, isolated communities	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective	3	EARLY AND EFFECTIVE MALARIA CASE MANAGEMENT TO ACHIEVE 100% TESTING OF SUSPECTED MALARIA CASES BY MICROSCOPY OR RDT AND PROVIDE PROMPT TREATMENT AND CARE FOR 100% OF CONFIRMED MALARIA CASES ACCORDING TO THE GUIDELINES FOR TREATMENT OF MALARIA IN VANUATU	\$519,168	\$448,526	\$402,901	\$398,498	\$357,470	\$350,812	\$2,477,375
Strategy	3.1	Increase access to and utilization of malaria diagnostics to ensure early and accurate diagnosis of malaria	\$42,552	\$30,869	\$18,282	\$30,219	\$18,232	\$13,780	\$153,934
Strategy	3.2	Strengthening the quality assurance for malaria diagnosis and antimalarial drugs	\$80,624	\$39,852	\$5,105	\$23,279	\$5,447	\$5,447	\$159,753
Strategy	3.3	Ensure effective and rational malaria treatment at all levels	\$112,096	\$93,908	\$95,617	\$61,103	\$49,894	\$47,688	\$460,307
Strategy	3.4	Supervision and Monitoring for Case Management	\$283,897	\$283,897	\$283,897	\$283,897	\$283,897	\$283,897	\$1,703,382
Objective	4	HEALTH PROMOTION TO MOBILIZE COMMUNITIES AND LEVERAGE THE SUPPORT OF ALL AVAILABLE PERSONNEL IN A MULTISECTORAL EFFOCRT TO ACCELERATE THE ELIMINATION OF MALARIA	\$118,963	\$81,678	\$81,678	\$118,963	\$81,678	\$81,678	\$564,637
Strategy	4.1	Develop the national health promotion strategy for malaria elimination	\$15,686	\$0	\$0	\$15,686	\$0	\$0	\$31,372
Strategy	4.2	Deploy mass communication campaign for malaria elimination	\$46,646	\$25,471	\$25,471	\$46,646	\$25,471	\$25,471	\$195,178
Strategy	4.3	Mobilize communities to improve awareness about malaria risk, prevention, diagnosis and treatment	\$56,631	\$56,207	\$56,207	\$56,631	\$56,207	\$56,207	\$338,088
Strategy	4.4	Supervision and Monitoring for IEC/BCC activities	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective	5	MALARIA SERVICES AS PART OF NATIONAL DISASTER RELIEF PACKAGE	\$24,186	\$9,509	\$9,509	\$24,186	\$9,509	\$9,509	\$86,409
Strategy	5.1	Develop a malaria risk management plan for disaster situation	\$24,186	\$9,509	\$9,509	\$24,186	\$9,509	\$9,509	\$86,409
SE	6	SUPPORTING ELEMENT 1: A STRONG ENABLING ENVIRONMENT	\$419,906	\$119,360	\$126,731	\$114,360	\$178,669	\$100,391	\$1,059,418
SE	6.1	Human resources. Increase human resources capacity for malaria control and elimination at all levels	\$20,547	\$20,547	\$20,547	\$20,547	\$170	\$170	\$82,527
SE	6.2	Strengthen political commitment for malaria elimination and programme oversight	\$15,950	\$15,950	\$15,950	\$15,950	\$15,950	\$15,950	\$95,703
SE	6.3	Progress review, strategy development and programme planning	\$21,506	\$21,506	\$21,506	\$21,506	\$63,856	\$21,506	\$171,385
SE	6.4	Strengthen financial management capacity	\$340	\$340	\$340	\$340	\$340	\$340	\$2,038
SE	6.5	Strengthen partnerships	\$9,934	\$9,934	\$9,934	\$9,934	\$9,934	\$9,934	\$59,603
SE	6.6	Strengthen International exchange and cooperation	\$10,188	\$10,188	\$10,188	\$10,188	\$10,188	\$10,188	\$61,131
SE	6.7	Ensure adequate and sufficient Technical Assistance (TA) is available	\$0	\$0	\$0	\$0	\$0	\$0	\$0
SE	6.8	Strengthen infrastructure development, maintenance and running costs	\$324,853	\$40,895	\$42,264	\$35,895	\$72,230	\$42,303	\$558,440
SE	6.9	Procurement and related quality assurance costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
SE	6.10	Strengthen supply chain management	\$6,001	\$0	\$6,001	\$0	\$6,001	\$0	\$18,004
SE	6.11	Strengthen programmatic supervision and monitoring and evaluation activities	\$10,588	\$0	\$0	\$0	\$0	\$0	\$10,588

Level	#	Objective and Strategy	Year					
			2021	2022	2023	2024	2025	2026
SE	7	SUPPORTING ELEMENT 2: OPERATIONAL RESEARCH AND TECHNICAL MONITORING TO SUPPORT SERVICE DELIVERY	\$170,649	\$147,495	\$111,267	\$39,268	\$61,411	\$0
SE	7.1	Monitor malaria treatment efficacy (TES/iDES/molecular markers)	\$0	\$21,226	\$0	\$21,226	\$0	\$0
SE	7.2	Monitor insecticide resistance (4 sentinel sites annually)	\$8,236	\$8,236	\$8,236	\$8,236	\$0	\$0
SE	7.3	Assess vector bionomics	\$40,304	\$40,304	\$40,304	\$0	\$0	\$0
SE	7.4	Monitor efficacy of insecticidal interventions	\$61,411	\$0	\$61,411	\$0	\$61,411	\$0
SE	7.5	Determine effectiveness of alternative vector control tools and personal protection measures as appropriate for at-risk, high-exposure populations (implementation dependent on the outcome of trials)	\$21,226	\$0	\$0	\$0	\$0	\$0
SE	7.6	Evaluate causes of residual transmission	\$0	\$76,414	\$0	\$0	\$0	\$0
SE	7.7	Evaluate approaches to retrospective radical treatment of Pv	\$21,175	\$0	\$0	\$0	\$0	\$0
SE	7.8	Evaluate health worker's use of G6PD POC tests	\$8,490	\$0	\$0	\$0	\$0	\$0
SE	7.9	Operational research on re-purposing of used bed nets	\$8,490	\$0	\$0	\$8,490	\$0	\$0
SE	7.10	Organize annual technical meeting to review outcomes of technical monitoring and operational research, discuss technical challenges and solutions.	\$1,316	\$1,316	\$1,316	\$1,316	\$0	\$0
8		SALARIES	\$612,336	\$612,336	\$612,336	\$612,336	\$612,336	\$612,336
8.1		Salaries	\$612,336	\$612,336	\$612,336	\$612,336	\$612,336	\$612,336
9		PR total cost	\$204,487	\$217,411	\$196,013	\$0	\$0	\$0
9.1		PR cost	\$204,487	\$217,411	\$196,013	\$0	\$0	\$0

Figure 9: Budget summary in VUV by Key Intervention and year, Vanuatu NSPME, 2021-26

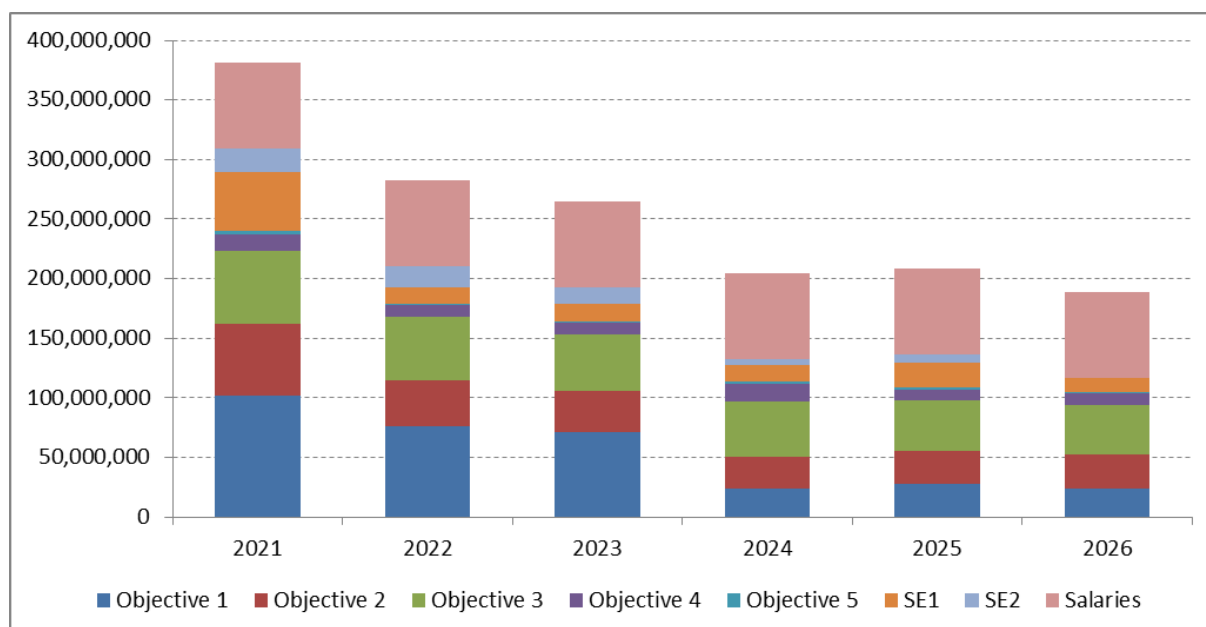
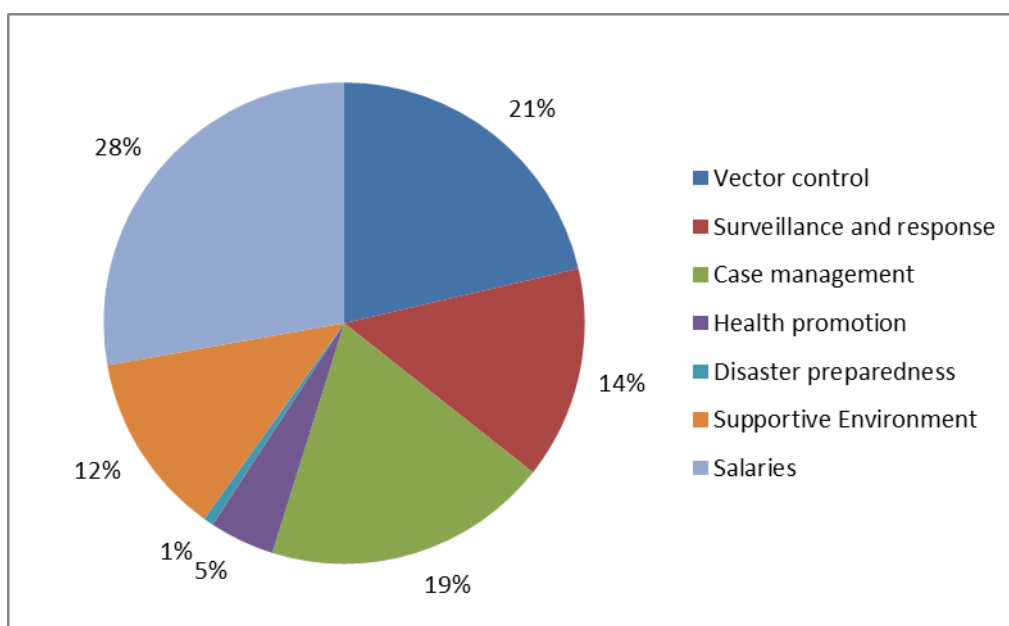


Figure 10: Budget distribution by Key Intervention cost category, Vanuatu NSPME 2021-26



Financing strategy for 2021-23

Financing options

Options for financing the *Strategic Plan* include:

- Domestic sources (principally the MOH budget)
- Donor funding (e.g. Global Fund disease-specific and MEMTI allocations,³⁵ Australian aid program in-country support for Priority Public Health Programs and Provincial Health Services),
- The ADB *Systems Strengthening for Effective Coverage of New Vaccines in the Pacific* Project (a hybrid financing facility supporting stronger immunisation-related health system performance)
- Technical and in-kind assistance through technical partners (e.g. RAM, Australian regional support through the Centre for Health Security, and WHO)
- Harmonisation of health system functions that support malaria elimination but are funded through other mechanisms or with other targeted public health priorities (e.g. support for surveillance, PSM and primary care service delivery as part of the response to the COVID-19 pandemic).

National financing

The GOV has committed to providing an estimated USD 277,074 excluding salaries and USD 1,276,356 including salaries (both at current exchange rates) for the first three years of the NSP,

³⁵ MEMTI = Malaria Elimination in Melanesia and Timor-Leste Initiative – discussed later in this section. Countries eligible for MEMTI include Vanuatu, Papua New Guinea, Solomon Islands and Timor-Leste.

i.e. the funding period 2021-2023. Protection of achievements to date would also be addressed through a strong focus on ensuring and strengthening the quality of interventions.

Global Fund (malaria allocation)

As Vanuatu will be applying to the Global Fund for both disease-specific and MEMTI financing from 2021, this new NSPME will be used as a basis for that application. Concurrently, the Program is in discussion with other potential donors, collaborators and funding partners to explore cost-sharing opportunities and avenues for technical support.

The Global Fund has made a malaria allocation of USD 2,968,368 for the period 2021-2023. Table 4 summarises the distribution of the Vanuatu funding request by year and Global Fund module.

Table 4: Funding request by year and module, Global Fund malaria allocation, Vanuatu, 2021-23

	GF Funding Request (within allocation)			
	2021	2022	2023	Total
Case management	\$216,595	\$200,320	\$199,728	\$616,644
Program management	\$288,421	\$290,345	\$268,947	\$847,714
RSSH: Financial management systems	\$0	\$0	\$0	\$0
RSSH: Health management information systems and M&E	\$0	\$0	\$0	\$0
RSSH: Health products management systems	\$0	\$0	\$0	\$0
RSSH: Health sector governance and planning	\$0	\$0	\$0	\$0
RSSH: Human resources for health, including community health workers	\$39,280	\$39,280	\$39,280	\$117,840
RSSH: Laboratory systems	\$0	\$0	\$0	\$0
RSSH: Integrated service delivery and quality improvement	\$161,674	\$7,181	\$7,181	\$176,037
Specific prevention interventions (SPI)	\$0	\$0	\$0	\$0
Vector Control	\$403,094	\$403,376	\$403,663	\$1,210,133
Total	\$1,109,065	\$940,503	\$918,800	\$2,968,368

A *Funding Request* has been prepared and submitted to the Global Fund.

Collaborative financing (MEMTI and partner-funded development projects)

As noted above, the Global Fund may potentially make an additional allocation under the proposed MEMTI funding stream, which has been introduced for the 2021-23 funding period.

MEMTI is an innovative financing mechanism rather than conventional malaria-specific funding. It was designed to have a catalytic effect on participating Malaria Programs, encouraging them to move away from a 'business as usual' approach to malaria control and elimination and the way the Program is financed.

The strategic approach to securing MEMTI funds for Vanuatu has been informed by a malaria-focused health system *Landscape Analysis* and impact modelling and a MEMTI financing scoping exercise – both commissioned by the Global Fund.^{36,37}

No up-front MEMTI allocation has yet been made to any of the eligible countries. The Global Fund will assess the quality of the overall funding requests and the alignment of MEMTI-relevant content in the submission with a number of conditions: a national or sub-national orientation towards malaria elimination; MEMTI funds being used to address health system or other critical barriers to national or sub-national elimination; and the availability of Government or donor co-financing for elimination-relevant aspects of the NMSP or Global Fund *Funding Request*.

³⁶ Malaria Elimination Initiative, Nossal Institute. *Op. cit.*

³⁷ Anderson I, Hetzel M, Segura L. *MEMTI discussions in Vanuatu: findings and key recommendations*. 7 April 2020

Proposals for MEMTI funding will be assessed as part of the prioritised above-allocation request (PAAR) to the Global Fund

The *Landscape Analysis* identified a number of high priority health system barriers to malaria elimination, and modelled what might be achieved if interventions could be put in place to address them (described at Section 2).

The GOV has not yet made any policy commitments (e.g. raising or borrowing additional funds) in response to the recommendations of the *Landscape Report* or other communications from the Global Fund about MEMTI. Moreover, the financing options paper concluded that the original MEMTI funding model – especially the availability of MEMTI being able to leverage additional Government borrowing or donor financing – was unlikely and probably not feasible, given: the current macro-economic conditions in Vanuatu (including the economic impact of closure of the tourism industry in response to the COVID-19 pandemic and TC Harold); the diversion of Government and donor financing to preparedness and response to COVID-19 and the cyclone; and the likely impact of the pandemic on bilateral donor countries (and therefore their aid budgets in the medium term). The financing paper did, however, identify a number of existing donor-financed projects addressing health systems strengthening or malaria and other VBDs that are already funded and either about to commence or already under way in Vanuatu and the region, which could potentially be ‘leveraged’ to ensure sustainable benefit to the NVBDCP and support the NSPME to guide Vanuatu through the ‘last mile’ to malaria elimination.

The Program has costed a range of activities within the NSPME as relevant to the overall purpose of MEMTI, and is requesting a total of USD \$2,630,818 under this funding stream. These activities are summarised in Table 5, below, and presented in detail in the detailed budget (Annex 1).

Table 5: Summary of proposed investments under the MEMTI funding stream during the first three years of the Vanuatu NSPME 2021-26

	MEMTI			
	2021	2022	2023	Total
Case Management	\$441,736	\$285,824	\$217,454	\$945,014
Program management	\$36,073	\$36,073	\$36,073	\$108,218
RSSH: Financial management systems	\$0	\$0	\$0	\$0
RSSH: Health management information systems and M&E	\$9,996	\$8,224	\$8,224	\$26,444
RSSH: Health products management systems	\$0	\$0	\$0	\$0
RSSH: Health sector governance and planning	\$0	\$0	\$0	\$0
RSSH: Human resources for health, including community health workers	\$65,456	\$65,456	\$65,456	\$196,368
RSSH: Laboratory systems	\$0	\$0	\$0	\$0
RSSH: Integrated service delivery and quality improvement	\$128,715	\$128,715	\$128,715	\$386,144
Specific prevention interventions (SPI)	\$8,490	\$0	\$0	\$8,490
Vector Control	\$359,811	\$185,856	\$151,390	\$697,057
Subtotal (specific NMSP activities)	\$1,050,277	\$710,148	\$607,311	\$2,367,736
Unallocated (HSS co-activities with MOH or partner investments) @ 10%	\$78,925	\$131,540.90	\$52,616	\$263,082
Subtotal (unallocated MEMTI 'reserve' funds for HSS co-financing)	\$78,925	\$131,541	\$52,616	\$263,082
Total	\$1,129,201	\$841,689	\$659,928	\$2,630,818

The proposed activities include a range of elimination-relevant RSSH investments that will be bolstered by parallel development partner investments in health systems, either nationally or directly at provincial level. The largest allocations within the requested MEMTI funds are for case management (mainly G6PD POC testing commodities in the ‘pre-elimination’ provinces to support radical cure of vivax malaria) and supplementary vector control activities and commodities (mainly for IRS for managing identified foci of transmission and higher incidence communities in Malampa and Sanma provinces and Epi Island as they re-orient towards elimination. The cost of supervisory outreach – an integral aspect of the transition-to-elimination model at health zone level – is the third highest intervention area requested for MEMTI support.

An un-earmarked component equivalent to 10% of the total requested MEMTI funds is 'reserved' for detailed activity mapping against partner-funded support for malaria-relevant health system improvements once travel restrictions in relation to the COVID-19 pandemic are relaxed, and to provide co-financing for those activities where that would enable the NVBDCP to benefit more explicitly. Those activities potentially include: health sector leadership and governance; quality and effectiveness of PSM; laboratory quality management and diagnostic systems; and financial management systems at provincial level.

Relevant existing donor-financed projects in Vanuatu are summarised in Table 6.

Table 6: Donor co-financed activities either addressing health system barriers to malaria elimination or generating elimination-relevant knowledge during the first three years of the Vanuatu NSPME 2021-26

Activity Title	Donor	Implementing partner	Geographic focus	Technical focus	Duration	Value (est.)
Broad-based health system strengthening (indirect or potential relevance to malaria)						
Systems Strengthening for Effective Coverage of New Vaccines in the Pacific Project	ADB	MOH (with project-funded TA as needed)	National and all provinces	Regional procurement; sub-national planning, PSM and broader HSS; community awareness and mobilisation	2019-23	USD 9 million (grant) USD 2.25 million (loan) USD 2.19 million (GOV contribution)
Vanuatu Health Program	DFAT	MOH and Provincial Health Offices	National and all PHOs	HSS; corporate services; public health priorities (including malaria elimination); provincial implementation; workforce development	2019-33	AUD 25 million for first 5 years
WHO Country Cooperation Strategy	WHO	MOH with WHO TA	National and all PHOs	Communicable diseases; NCDs; RMNCH; UHC; health aspects of disaster response	2018-22	As per biennial budgets (est. USD 400,000 for 2021-23, excl. salaries)
Projects strengthening specific areas of the health system (direct or indirect relevance to malaria)						
FET-PNG	DFAT-CHS	University of Newcastle	National and selected provinces	Surveillance, outbreak detection and investigation	2020-22	AUD 925,000
Tupaia	DFAT-CHS	Beyond Essentials Systems	National and all PHOs	Data aggregation for improved medicines availability (including roll-out mSupply Mobile), mapping disease outbreaks, disaster response	2020-22	Up to AUD 650,000 (indicative share)
Malaria program, systems or technical support; operational research						
APLMA / APMEN	DFAT-CHS	APLMA	National	Financing malaria elimination, access to quality commodities	2020-22	Up to AUD 350,000 (indicative share)
Capacity building for vector surveillance and control	DFAT-CHS	James Cook University, in partnership with SPC and WHO	Selected provincial study sites	Capacity development for national and provincial vector control officers; operational research	2020-22	Up to AUD 425,000 (indicative share)

Financing gap

A residual financing gap of just over USD 458,000 for the period 2021-23 is currently addressed through a non-MEMTI prioritised above-allocation request to the Global Fund.

The NVBDCP will continue to explore ways to mobilize resources for malaria elimination beyond just relying on increased domestic revenues and donor funding streams, including through partnerships with local communities and enterprises and sustainable regional financing options. It will aim for reduced donor dependency by 2026.

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