
Vanuatu Malaria Programme Review

2018



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List of Abbreviations

ABER	Annual Blood Examination Rate	MOH	Ministry of Health
ACT	Artemisinin Combination Therapy	MPR	Malaria Programme Review
AL	Artemether-Lumefantrine	NSP	National Malaria Strategic Plan
API	Annual Parasite Incidence per Thousand Population	NVBDCP	National Vector Borne Disease Control Program
CCM	Country Coordinating Mechanism	PCD	Passive Case Detection
CMS	Central Medical Stores	PCR	Polymerase Chain Reaction
CRC	Case Review Committee	Pf	Plasmodium falciparum
DFAT	Department of Foreign Affairs and Trade	PR	Principal Recipient
DHIS2	District Health Information System 2	Pv	Plasmodium vivax
DHS	Demographic and Health Survey	QA	Quality Assurance
ECA	External Competence Assessment	RDT	Rapid Diagnostic Test
DOT	Directly Observed Therapy	SOP	Standard Operating Protocol
G6PD	Glucose 6 Phosphate Dehydrogenase	TA	Technical Assistance
GF	Global Fund	TES	Therapeutic Efficacy Study
GIS	Geographical Information System	TWG	Technical Working Group
HR	Human Resources	UNDP	United Nations Development Programme
IRS	Indoor Residual Spraying	WHO	World Health Organization
ISV	Integrated Supervisory		
ITN	Insecticide-Treated Net		
KABP	Knowledge Attitudes Behaviour & Practices		
LFA	Local Funding Agent		
LSM	Larval Breeding Site Management		
LLINs	Long-Lasting Insecticide-treated Nets		
MAP	Malaria Action Plan		
M&E	Monitoring and Evaluation		
MIS	Malaria Information System or Malaria Indicator Survey		
MMLL	Monthly Malaria Line Listing		

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The review team also met with a range of stakeholders and donors, in particular representatives of the respective country offices of the World Health Organization (WHO), the Australian Department of Foreign Affairs and Trade (DFAT) and the World Bank, who all shared their valuable insights and perspectives.

The review team would like to acknowledge the United Nations Development Programme (UNDP) Pacific Office in Fiji for their coordinating and supportive role in the review.

The review was supported by UNDP through the Ensure 81% coverage of long lasting insecticide treated nets (LLINs) in Vanuatu programme, with financial support from the Global Fund.

Executive Summary

Vanuatu is well on its way towards achieving malaria elimination, but it first must stop and address the hot spots in Malampa, Shefa and Sanma caused by the failure to deliver new nets during the last mass distribution campaign in 2015. The administrative mistakes that resulted in this omission set the Programme back by 2-3 years. The hot spots need to be resolved and checks put in place to make sure that a similar mistake doesn't happen again. This includes resolving administrative issues about the release of operational funds, retiring imprests, and proper operational planning for the distribution of long-lasting insecticide-treated nets (LLINs).

The current trend towards decreasing funding is opposite to what is needed to "finish the job." Two things need to happen: the Programme needs to fully and efficiently utilize the funds available and additional funding needs to be mobilized. The first, should be easy and only requires tightening up financial management and changes in financial rules of donor partners but the second will be difficult.

Rigorous elimination-level surveillance can start immediately in Torba, Shefa, and Penama based on the Tafea model but significant human resource issues need to be addressed including recruitment to fill key posts at the national level and for Provincial Malaria Supervisors to enable surveillance to become fully functional. In addition, an elimination officer should be posted in each province to do case investigations, coordinate any necessary responses and do the follow-up.

Widespread and frequent stockouts of malaria medicines remain a major problem. There is a critical need to improve drug supply chain management from national to provincial level. Supervisory visits to health facilities also need to be ensured, conducted in a manner useful to the health workers.

Introduction of the Glucose 6 Phosphate Dehydrogenase (G6PD) point-of-care test has the potential to radically change the treatment of *P. vivax* that is essential if the Country is to achieve elimination, but it will only be successful if the tests

are available in all health facilities and health workers are trained to use them and administer primaquine properly.

The Malaria Programme Review (MPR) Team has made the following key recommendations.

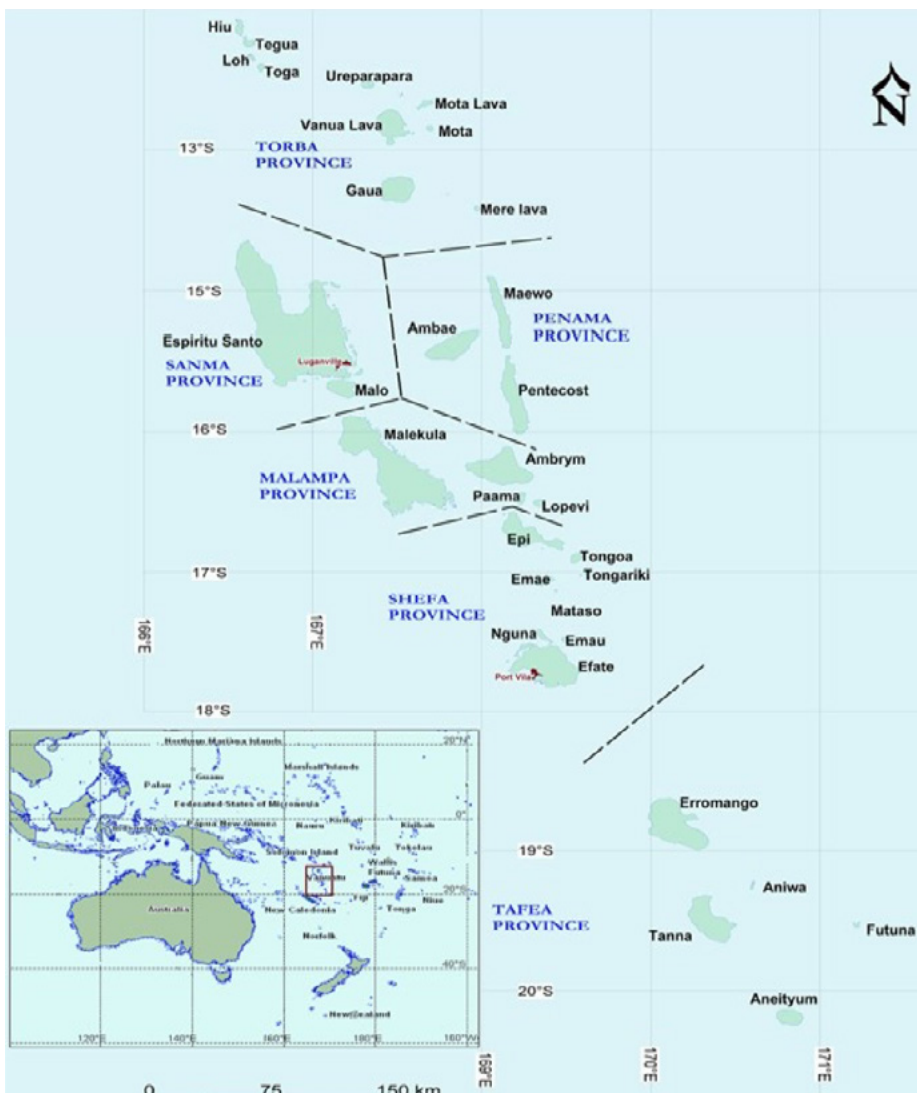
1. Addressing the hot spots in Malampa and Sanma provinces should be the top priority of the Programme. The affected zones should be the first to receive new nets and coverage verified by rigorous supervisory visits.
2. High quality, high coverage indoor residual spraying (IRS), using a non-pyrethroid insecticide, should be implemented in the hot spots as soon as possible.
3. The operational planning for LLINs distribution should be based on a household census not a micro planning model, and distribution based on the actual number of nets each household needs.
4. The Programme and its partners should sit down and work out a streamlined financial system that facilitates field level operations.
5. An essential element of a streamlined financial system should be a fund that provincial staff can draw on quickly to respond to outbreaks and/or imported cases.
6. Medicine stock-outs are a serious long-standing problem. The Ministry of Health (MOH) and health partners should resolve the problem as soon as possible. This means that the Programme should collaborate closely with the Central Medical Stores (CMS) on improving the supply chain including improved forecasting for malaria commodities that reflects the declining number of malaria cases.
7. A national malaria elimination plan should be written and endorsed by the MOH and higher levels of government with targets, activities and budgets.
8. Rigorous pre-elimination surveillance should be implemented in Torba, Shefa and Penama as soon as possible.
9. Additional funding should be sought to allow the Programme to achieve elimination. If the current downward trend in funding from the Global Fund and other partners continue it is difficult to see how Vanuatu is going to "finish the job" or even maintain the current level of transmission and keeping Tafea free.

1. Introduction

This report sets out the findings of an external review of the Vanuatu National Vector Borne Diseases Control Programme (hereafter referred to as the Programme). The Review seeks to provide an independent look at the Programme in terms of its organization, management

framework, and to assess progress towards malaria elimination. Recommendations are made to help the Programme define next steps for improving programme performance, redefine strategic directions and focus including revising policies where necessary. The recommendations will feed into the preparation of the next National Malaria Strategic Plan and next proposal for Global Fund support.

Map of Vanuatu



2. Background

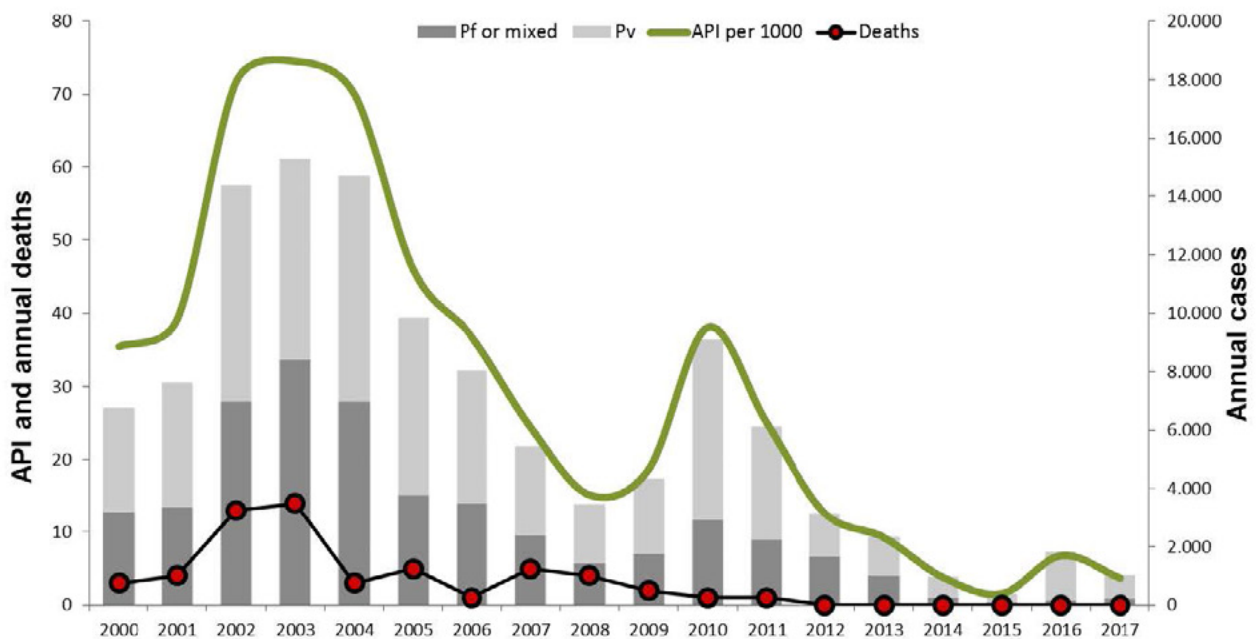
Malaria has historically been one of the leading causes of illness in Vanuatu. In 1991 malaria was eliminated from Aneityum, the southernmost island in the archipelago, and the southernmost point for the distribution of malaria in the Pacific, providing a model for the rest of the country to follow.

Since 2008, the Ministry of Health (MOH) and its partners have implemented an intensified program to progressively control malaria through: widespread access to diagnosis by microscopy or rapid diagnostic test (RDT); widespread access to highly effective treatment with artemisinin-based combination therapy (ACT); high coverage with long

lasting insecticidal bed nets (LLIN); widespread community engagement; and intensive, targeted technical assistance. This has resulted in the annual parasite incidence (API) falling from 74 per 1,000 population in 2003, to 1.6 per 1,000 in 2015. This was followed by a jump to 6.8 per 1,000 in 2016, with the increase in cases coming from two provinces Malampa and Samna (Figure 1). The final numbers for 2017 showed that there was a slight decrease in API to 3.7.

Despite the increase in cases since 2015, the country remains committed to malaria elimination. Tafea Province was declared malaria free in November 2017 after having no indigenous cases for the past three years. Torba Province will soon follow.

Figure 1 – Annual Morbidity and Mortality Data, 2005-2017



Source: NVBDCP

3. Current Epidemiological Situation

Tafea Province recorded one imported case in March 2017, but no locally acquired cases since 2014. Three other provinces (Torba, Penama and Shefa) have reached very low levels of transmission. No cases were recorded in Torba in 2017 but the remaining two provinces (Malampa and Sanma) together reported 1,011 cases. The APIs were slightly more than 10 per 1,000 (Figure 2) compared to the other provinces with APIs of less than 1 per 1,000.

One major problem in interpreting the data is that 75% of the cases were *P. vivax*, and there is no way to determine which are new cases and which are relapses. It is therefore possible that a significant proportion of cases in Malampa and Sanma are relapses due to the failure of health facilities to give primaquine, even though it has been part of the national malaria treatment guidelines since 2009.

There have been no malaria deaths since 2012.

For Malampa, the outbreak report¹ and discussions with Provincial staff suggest that the large number of cases in Unmet and the surrounding area was due to a combination of two factors.

Figure 2 – Summary of Key Epidemiological Indicators –2017

Province	Total Pop	Total Case	Confirmed & Treated %	API	TPR	Pf Micro & RDT %
				Micro & RDT per 1000		
Malampa	40,416	429	76.6%	10.6	7.9%	9.3%
Penama	34,728	27	96.3%	0.75	1.51%	73.1%
Sanma	55,453	582	100%	10.5	8.9%	35.1%
Shefa	105,279	19	100%	0.18	0.31%	47.4%
Tafea	35,525	1	100%	0.03	0.03%	0%
Torba	10,886	0	0%	0	0%	0%
Vanuatu	282,287	1058	88.3%	3.7	4.17%	25.7%

Of the 1,058 cases reported 2017, 96% were from Malampa and Sanma provinces. Further analysis shows that for Malampa, 62% of the cases came from three health facilities in Zone 6 in addition to Norsup Hospital. There was a similar pattern in Sanma Province. (Figure 3)

Source: NVBDCP

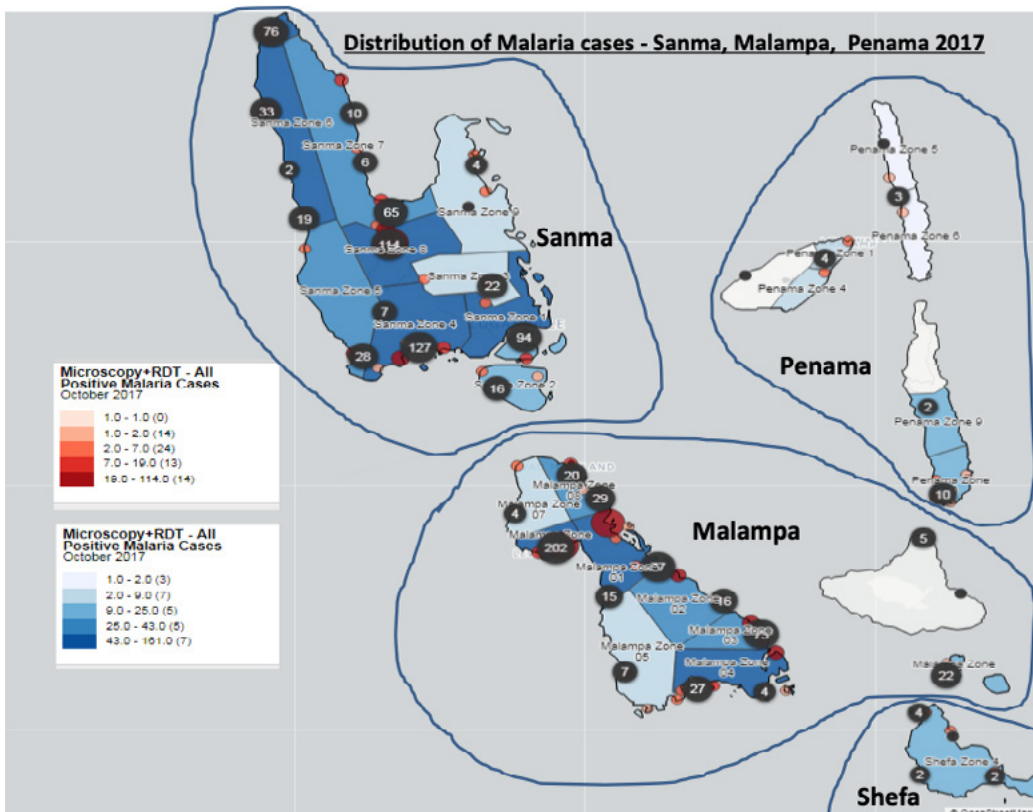
¹ M. Shortus, "Malaria Outbreak Investigation – Malampa Province, August 2016," (Unpublished Report: World Health Organization, 2016).

3. Current Epidemiological Situation

1. A few villages in Zone 6 did not receive new nets in 2015, so the nets were more than three years old. Failure to deliver new nets was due to the lack of sufficient funds. The micro planning on which the net supply and operational funds for distribution was faulty and when the nets and funds ran out additional funds to complete the job were not released. In Sanma Province, three whole villages didn't receive nets.
2. There was a stock-out of RDTs in 2016, so health facilities in the "hot spot" in both Malampa and Sanma did not have RDTs for three to four months meaning that cases were diagnosed, and treatment given based on clinical signs and symptoms. As a result, the case data might have been inflated.

The bottom line is the upsurge in cases seen since 2015 is almost certainly due to a failure of the Programme to deliver interventions to a few areas of high transmission in two provinces. It should therefore be expected that once the full set of interventions is implemented, cases in the two provinces and nationally will quickly decrease meaning that the country can continue to progress to elimination.

Figure 3 – Distribution of Reported Malaria Cases in Malampa and Samna Provinces from January to October 2017



Source: NVBDCP

4. Programme Goal and Objectives

4.1 Goal

Effective control in four provinces and elimination of malaria in two provinces by 2016 and full elimination by 2026.

4.2 Objectives

The specific objectives of the National Vector Borne Disease Control Programme as stated in the National Malaria Strategic Plan 2015-2020 are:

- By the end of 2016, to achieve zero local transmission of malaria in one province (Tafea) and reduce the annual parasite incidence rate to < 5 per 1,000 nationally and maintain zero confirmed deaths from malaria.
- By the end of 2018, to reduce the annual parasite incidence rate to < 2.5 per 1,000 nationally and reduce the annual parasite incidence rate to <1 per 1,000 in one additional province (Torba) and maintain zero confirmed deaths from malaria.

5. Programme Review

The Review consisted of two parts. The first was a comprehensive desk review that took place from 27 November to 16 December 2017. The report from the Review was circulated prior to the second part that consisted of consultations with the Programme, key partners and other stakeholders plus field visits to five provinces to meet with Programme staff, health workers and to interview villagers. Visits were also made to the Central Medical Store in Port Vila as well as to Regional Medical Store in Luganville and to the Provincial Pharmacies in Shefa, Sanma, Torba and Tafea to check on stocks and the distribution system for medical commodities.

The overall objectives of the Review were as follows:

- to review the epidemiology of malaria in the country;
- to review the structure, organization, and management framework for the policy and programme development within the health system and the national development agenda;
- to assess progress towards achievement of national, regional and global targets;
- to review the current programme performance by intervention thematic areas and by service delivery levels.
- to define the next steps for improving programme performance or redefining the strategic direction and focus, including revising the policies and strategic plans.

5.1 Activities and Methods

The review schedule was as follows:

- Initial briefing and MPR planning in Port Vila, 2 July 2018
- Provincial visits, 3-5 July 2018
 - Malampa Province (Kevin Palmer)
 - Shefa Province (Lasse Vestergaard)
- Consultations in Port Vila, 6 July 2018
- Provincial visits, 9-11 July 2018
 - Sanma Province (Kevin Palmer)
 - Torba Province (Lasse Vestergaard)
- Consultation and feedback of review findings in Port Vila, 11-12 July 2018
- Provincial visit, 16-17 July 2018
 - Tafea Province (Lasse Vestergaard)

During the visits to health facilities, the Team did a thorough check of malaria registers, equipment, as well as drug and RDT stocks. The Team also visited villages and communities in the area of the health facilities and held discussions with residents about their family's experiences with malaria and about their LLINs. We found the villagers to be very responsive. In some houses, we were able to check whether LLINs were being used and the condition of the nets.

6. Findings

The following sections provide details of the MPR Team's findings.

6.1 Programme Management

The Team found that the Programme faces three major management problems: shortage of staff at all levels, diminishing funds, and delays in releasing operational funds.

The full organizational structure of the Programme is in Annex 2.

6.1.1 Human Resources

The Programme saw a large but temporary scale up in staff at both the national and provincial levels during the period of heavy investment in malaria control and elimination from 2009 to 2014. These additional staff allowed the Programme to move forward and achieve impressive progress. But since then, the number of staff has been cut back and there is now a critical shortage at all levels of the Programme.

There are many vacant positions, so staff are having to take on extra work without any extra compensation. Many of the senior staff already have or will soon be retiring and most key staff are on contracts that require regular annual renewals thereby continually putting them in a position of not knowing if they will have jobs the following year. As a result, highly experienced staff have been lost to other programmes. At the national level, the important post of Case Management Officer is vacant. At the provincial level, many Provincial Malaria Supervisor posts have not been filled. In Malampa, the retired Provincial Supervisor was brought back on a temporary contract to deal with the resurgence of cases and the information officer had been working for four months without pay because there was a problem getting her appointment approved by the Public Service. In Samna, there has been no Provincial Supervisor for more than a year. Torba has an Acting Provincial Supervisor.

As the Programme moves toward elimination, it is important that key staff positions especially the Provincial Supervisor and Malaria Information Officers are filled with well-trained individuals. The MPR Team was especially concerned that there were no staff to take on the added tasks associated with the intensive surveillance needed for malaria elimination, i.e. who will do the case investigations, follow-up on cases, organize and supervise outbreak and foci response measures. In Tafea, several malaria surveillance and malaria elimination posts were created for this purpose. Similar posts are needed in the other provinces.

6.1.2 Funding

Money comes from three main sources: the Vanuatu Government, the Australian Government through DFAT and the Global Fund through UNDP as the Principle Recipient (PR). Additional support is provided by WHO (Figure 4). DFAT primarily supports surveillance and case management activities, while GF through UNDP purchases LLINs as well as other commodities, supports staff positions, training, and infrastructure development. Drugs are purchased by Government.

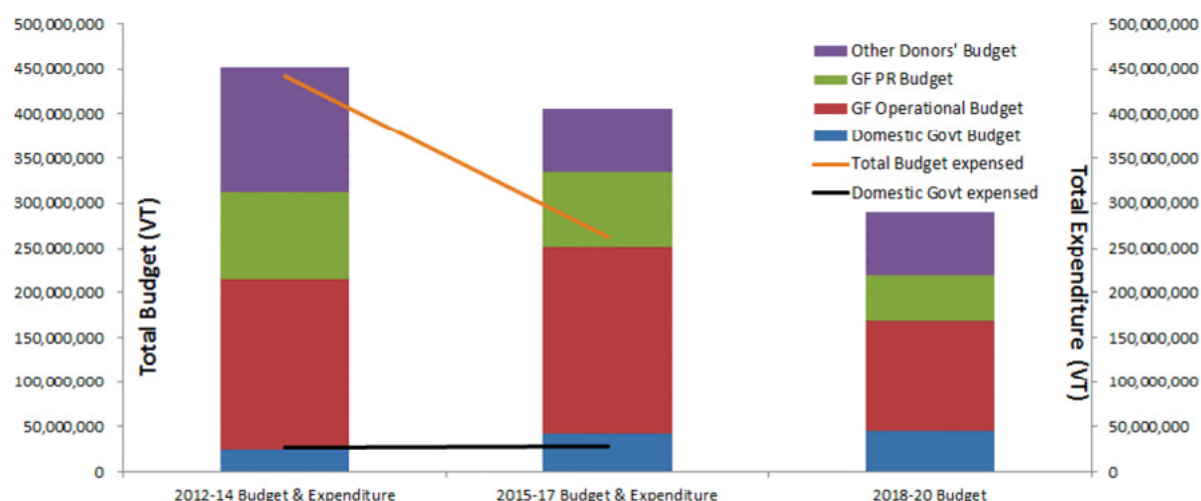
The MPR Team is concerned that projected funding may not be enough to carry the Programme through to elimination. There has been a pattern of decreasing GF allocations (as well as other external donor contributions) over the previous two GF grant cycles (Figure 4), and the 2015-2017 allocation under the GF New Funding Model was reduced by nearly 40% from the 2012-2014 allocation.

A big portion, 25%, of the grant goes for funding UNDP, thereby significantly reducing funds for operations and adding an additional layer of bureaucracy. The MOH has shown an interest to become the PR and has indicated that it may take over as PR for the 2020-2021 funding period.

The implementation of donor funding is a major concern and needs to be addressed by the Programme and partners. According to a recent World Bank report²,

² World Bank., "Vanuatu Health Financing System Assessment \$Pend Better," (New York: World Bank, 2018).

Figure 4 – Funding by Source per Budget Cycle



Source: FMIS database, Government of Vanuatu (2017); GF PR Budget & Expenditure 2012-17 and all 2018-20 budget provided directly in internal communications by DPs.

the severity of the funding cut means that the existing service-delivery model will not be viable, even if the low implementation rate is addressed by improvements in planning and financial management. Implementation of donor funding for the 2012-2014 period was 94% but it has dropped for the current budget period. At the time of the Review, the reported levels of implementation were 40% for DFAT and 50% for GF, but the GF figures included outstanding expenditures, so the annual figure will be higher. One scenario that the MOH is considering in response to this is a move from the model of nationwide LLIN coverage to targeted coverage for vulnerable and high-risk groups and areas. This is discussed further in the section below on vector control.

6.1.3 Operational Issues

The World Bank report cites weaknesses in planning and financial management. Examples cited include: (i) the Malaria Action Plan (MAP) for 2014 not finalized until

halfway through the year; and (ii) disqualified expenditures on imprests leading to the Programme being blocked from receiving funds.

The problem with imprests is a major concern to the MPR Team because at the operation level the lack of funds means that field activities that were planned and budgeted for, have not taken place or were delayed this includes important supervisory visits. There are two components to this: delays in generating imprests and failure to properly retire imprests.

The Team heard from Programme staff at all levels that funds are not being released in a timely manner. A lot of time is spent on planning so not getting funds on time means that operations are often implemented on a sub-optimal, ad hoc basis. Donor partners and the PR appear to be applying different rules for releasing funds, but each claim to be following Government financial rules. One donor reportedly requires extremely detailed information including maps of the operational areas and

regularly returns requests for further clarification meaning that it sometimes requires months to get funds released. The donor told the MPR Team that it is only following Government rules, but another partner told the Team that no such rules exist.

The issue of failing to properly retire imprests, results in individual staff being placed on the so-called “black list” preventing them from holding another imprest until the issue is resolved. An individual can only hold one imprest at a time. Given that the Programme relies on imprests to carry out field operations, some activities are delayed, and/or the individual’s pay is docked to pay off any unretired balances.

The Team also found critical errors in operational planning. As described in the following section on vector control, during the last mass distribution of LLINs there were major errors in micro planning so there was a shortage of nets and a shortage of funds for distribution so in one area of Malampa Province and in Sanma in 2016, three whole villages did not get new nets. Nets were later available, but there were no funds to distribute them. Finally, at the end of 2017, funds were available for finishing the distribution in Sanma but people in the affected areas had been using nets that are more than four years old. The normal life of an LLIN is three years, meaning that a significant number of people were unprotected.

The bottom line is that the combination of decreased funding, multi layers of bureaucracy, different financial rules and procedures, poor operational planning and problems with retiring imprests is posing major problems to the Programme that if not solved will impair its ability to implement the necessary surveillance and response activities that will be crucial to progressing to elimination.

The MPR Team tried to explore the possibility of setting up some sort of fund either at national or provincial level, outside of the imprest mechanism that can be accessed at short notice for focal or outbreak response. Without such a facility, the level of surveillance and response needed for elimination will not be possible. The Team heard the story of Malampa that put in a request for funds to respond to the resurgence of cases in Zone 6 back in May 2017 that at the time of the Team’s visit in July 2018, had not been funded.

This sort of delay cannot be tolerated. Requirements of the Programme should always come before any administrative requirements.

The Team was pleased to learn that the MOH just recently established some new Provincial Finance Officer and Provincial HR Officer positions in each of the six provinces, recognizing the need for additional support to deliver and handle the large number of activities and funds by each of the Provincial Health Offices in support of multiple public health programmes. These administrative posts have recently been filled and the new staff were undergoing practical training in the MOH in Port Vila at the time of the MPR Team visit. Hopefully, these new staff will make a strong positive impact on the practical implementation of malaria and other MOH activities at the provincial level.

6.1.4 Donor Coordination

The MPR Team is concerned about the obvious lack of coordination and communication among the major donor partners: UNDP as the PR, DFAT, WHO and between the partners and the MOH/NVBDCP. Until a few years ago, there was active consultation between all the partners. The Malaria Steering Committee met every second month to review progress, to discuss new strategies and activities, and to endorse work plans and budgets etc. This coordination directly benefited the Programme, but at present each partner appears to operate in its own little box: DFAT supporting elimination, UNDP supporting LLINs and WHO providing technical assistance in the form of one international staff and funds for training. This has resulted in the Programme having to juggle the specific interests of each partner and deal with different sets of financial rules and procedures. The Team discussed with partners the possibility of re-vitalizing the former Malaria Steering Committee, perhaps in the form of a National Malaria Elimination Committee. There was support for this and the Team concluded that WHO would be in the best position to make it happen.

3 Generally defined as a geographical area within an endemic focus of malaria transmission where transmission intensity exceeds the average level

6.2 Vector Control

6.2.1 LLIN

Looking at the LLIN coverage figures, it would appear that the Programme is doing very well with net distribution (Figure 5), but the MPR Team discovered that the coverage is far from universal and that the current hot spots³ were not covered at all by nets during the last round of LLIN distribution. It is inconceivable that, in Malampa and Sanma, the supply of nets and funds ran out, so distribution stopped and for three years there was apparently no effort by the Programme, to find additional nets and generate the funding needed to go back and fill the gaps. That irresponsible management decision has set the Programme back two to three years. Safeguards must be put in place to prevent such a situation from arising again in the future.

It is clear, that the so-called micro planning system for estimating net requirement and the budgeting for net distribution used in the last mass distribution was severely flawed and needs to be changed. The bottom up system used in the past needs to be reinstated. Macro planning based on a fixed ratio of 1.4 persons per net is fine, but operationally that number needs to be forgotten and the simple principle of “enough nets for everyone in the household” must be applied. It is easier and cheaper to plan, using what is essentially a model, while sitting in an office in Port Vila, but the results are clear: failure to cover the entire population resulting in hot spots. The same thing has happened in Solomon Islands where a similar micro-planning tools was used.

The right way to do an LLIN distribution plan is to first go out and do a household census. It means going from house to house, determining the number of nets needed

Figure 5 – Summary of LLIN Distribution, 2015-2017

Year	Target	Actual	Percent of Target
2015	38,211	35,240	92%
2016	108,705	92,710	85%
2017	91,028	94,920	104%

Figure 6 – Stratification of LLIN Distribution

	Stratification		Risk Demographics				Estimated Budget (USD)		
	API	No. of HZs	Receptive Population	Vulnerable Urban Population	Vulnerable Foci Population	Total Risk Population	Receptive Budget	Vulnerable Budget	Total Budget
Low Risk	<1	49	303,371	n/a	n/a	303,371	993,826	n/a	993,826
Medium Risk	<10	38	170,377	92,133	4,560	267,070	632,270	167,161	799,430
High Risk	>10	13	40,922	92,133	4,560	137,615	176,132	210,977	387,109

Figure 7 – Planned Coverage for LLIN During 2018

Province	Zone	Description
Torba	1	Torres Islands
Sanma	9	East Santo
Penama	2 & 4	West and South Ambae
Malampa	5, 6 & 7	West Malakula
Shefa	3 & 4	Sheperds Group and Epi

in each house (not how many nets they want) based on the number of sleeping spaces and number of and ages of the occupants. Later during the mass distribution, LLIN are given out based on the list. It is expensive, but it is the only way to get enough nets to households thereby preventing hot spots from popping up because of the lack of nets. The same thing can be done by going village by village a few days before net distribution and doing a census but that usually requires a lot of extra nets.

Due to the reduction in funds received from GF and the decision of the CCM not to shift funds from the TB/HIV grant to fund LLINs, full coverage of the whole Country is not possible. As a result, starting in 2018 net distribution zones will be covered based on a stratification system that classes each zone as low (API less than 1), medium (API between 1 and 10) or high risk (API greater than or equal to 10) (Figure 6). Only high and medium risk areas will be prioritized to receive LLINs, while low risk areas will be covered if additional funds and nets are available.

For 2018, only nine health zones will receive nets including those that did not receive nets during the last round of distribution. Although the MPR Team understands that this system is not optimal, there is clearly reduced risk in all but two provinces, and it fits with the resources currently available to the Programme.

The nine zones are listed in figure 7 but judging from the results of the MPR Team's visit, the number of zones in Sanma to be covered need to be increased to include the areas in southern and west coast Santo where there are numerous hot spots.

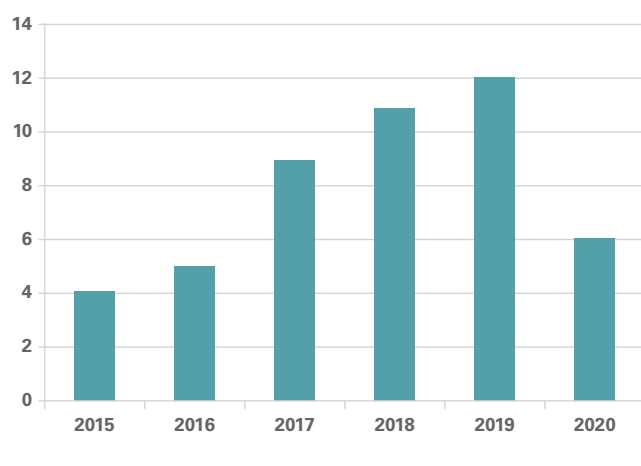
Ideally, full net coverage should continue indefinitely even in Tafea, as a proactive barrier to prevent transmission from and around any imported cases.

For the 2018 distribution, a new brand of nets, Yorkool[®] produced in China will be used for the first time. It is different from the Permanets[®] that were used in the last round in that the insecticide (deltamethrin) is coated on the outside and not incorporated into the fibres. It will be important to regularly monitor the effectiveness of the nets to ensure that the insecticide is not washed off.

Another issue related to LLIN that needs to be addressed is the lack of availability of nets between mass distributions. Nets should be available at health centres or other health facilities for people to get additional nets to replace damaged nets, for families that are new to a village or who for other reasons didn't receive nets during the normal distribution of that need extra nets so that everyone in the household can sleep under a net every night. The factor preventing this from happening appears to be the misconception on the part of the Programme that GF requires that the head of the household needs to sign a form certifying that they received a certain number of nets. The Programme told the MPR Team that the receipt system is so that GF or the LFA can go out to houses and physically check the number of nets against what was signed for even though this is not GF policy and it will never happen under the current funding arrangement.

Low net usage was documented in the last MIS (2011) and the more recent DHS (2013). Although there is no recent data, the MPR Team found that many people were

Figure 8 – Total Number of Health Zones Sprayed and Planned to be Sprayed, 2015-2020⁴



⁴ From the NSP

not using their nets or are not using them regularly. More importantly there was no visible effort by the Programme to ensure high net usage. It appeared that the only objective was high coverage and not high net usage.

The DHS found that 87% of all households owned at least one mosquito net. Of the two high risk groups, only 53% of children under five years and 41% of pregnant women were reported to have slept under any net the night before the survey. These numbers are consistent with the MIS results that showed that of all households only 51% slept under a mosquito net the night before the survey. These are very low compliance rates and it would be interesting to know if the rates have changed.

It should be acknowledged that despite what would appear to be problems with coverage and low usage, the LLINs have been a key component of an effective interventions strategy.

6.2.2 IRS

IRS was part of the elimination strategy in Tafea province, where three rounds of spraying at high coverage was successfully implemented in 2009-2011. Targeted IRS

has also been done successfully in Shefa (high risk areas in Port Vila), and in the Torres and Gaua islands in Torba. Targeted spraying in three provinces Malampa, Penama and Shefa was included in the 2015-2020 NSP (Figure 8) and is mentioned in the 2017 Annual Report, but it was not in the 2017 business plan.

IRS is expensive, but there is clear technical justification supported by historical evidence from other Pacific countries and elsewhere that good quality IRS done in a defined geographic area for a limited time is the only way to rapidly reduce transmission. That is exactly what needs to happen now in Vanuatu. When viewed against the cost already incurred to bring malaria cases down to so-called pre-elimination levels and the fact that if IRS is not applied, the gains already made may be lost, the expense incurred is not that high.

The type of limited spraying being proposed does not go against the WHO guidance of not using nets and IRS together because that is aimed at countries that want to do both on an ongoing basis. For Vanuatu, IRS is needed in only the few well documented hotspots for a limited time, probably two cycles. With guidance from WHO, a programme of high quality, well supervised spraying can be rapidly planned and implemented. Selection of an appropriate insecticide will be important since there is some suggestion in the 2017 Annual Report that resistance permethrin may present. WHO guidance is that the same class of insecticide should not be used on LLINs and for IRS.

6.2.3 Vector Surveillance

The primary vector in Vanuatu is *An farauti*. Its primary breeding sites are well defined as are its habits: it bites outdoors in the early evening before most people are inside their bed nets. Even so, there is ample evidence to prove that the insecticide treated nets work.

The 2017 Annual Report describes a lot of work that is labelled research that was done on identifying vector breeding sites, biting patterns and vector densities and resistance of vectors to the insecticides being used that seemingly added little to the already significant volume of vector surveillance data that has been done over the

past 40+ years. The MPR Team can find no justification for continuing any type of routine vector surveillance.

Instead, the role for vector surveillance is as part of case and/or focal investigations where there is a need to evaluate and if necessary coverage and effectiveness of LLINs in the index case's house and the surrounding area. Data on possible breeding sites and indications of mosquito density in the area should be collected when feasible to determine if any change in the vector population or behaviour had increased the risk of transmission within the focus.

6.3 Malaria Diagnosis and Treatment

6.3.1 RDTs

The MPR Team did not come across any major issues on RDTs. The currently used RDT brand is the "CareStart® Malaria Pf/PAN (HRP2/pLDH) Ag Combo RDT". The test continues to perform well in the independent RDT product testing done by WHO/FIND and it meets the WHO recommended minimum requirements. The test is also among the only Pf/PAN tests available that have been prequalified by WHO.

Lot quality testing of samples from new batches of RDTs are usually sent to a regional reference laboratory but the batch currently in use was never sent for testing. It is important the testing be done for all new batches of RDTs purchased.

Interviews with health workers did not express any major issues with using the RDTs, but the MPR Team noted that the current CareStart® RDT introduced in 2012-2013 has a different design than the previous test rolled out in 2009-2010. The test lines are in the opposite order and there are no parasite species labels on the device, but only shows "1" and "2". This may result in misreading the test result. The MPR Team found updated job aids about the new test in most health facilities visited, showing how to read the tests, but not in all facilities. At the Northern Provincial Hospital in Santo the team found that results of

microscopic examinations in 2017 showed that of 1,673 slides examined there were 26 positives all *P. vivax* while of 1,505 RDTs done, there were 16 positive all *P. falciparum* (Figure 9). Although there may be other explanations for this discrepancy it suggests that the RDTs, primarily used by nurses in the Emergency Room, were being read incorrectly thereby inflating the number of *P. falciparum* cases reported in Sanma. This could be happening elsewhere and needs to be investigated and if necessary additional training provided.

6.3.2 Microscopy

In 2014, the decision was made to phase out microscopy services from lower level health facilities and limit it to hospitals due reduced funding and the reduced malaria burden resulting in fewer slides for examination. It was decided that for the remaining microscopists it would be important to ensure quality.

The malaria microscopy laboratory at Vila Central Hospital serves as the National Malaria Reference Laboratory and has been put in charge of quality assurance trainings and supervisory visits to hospitals laboratories in other provinces but the MPR Team found that ongoing quality assurance and supervision activities are currently limited even though guidance documents and SOPs are in place. In 2017, all 9 hospital-based national and provincial microscopist completed a WHO-organized 10-day training course on quality assurance and supervisory visits, and refresher training on malaria microscopy reading but the MPR Team found that microscopy standards in the malaria laboratories varied. In Lenakel Hospital in Tafea Province, the staining of slides was of very low quality due to lack of fresh giemsa stain. In other hospitals the MPR Team found that the quality of slides and the condition of microscopes was good.

In June 2017, an external competence assessment (ECA) was done, which showed that among the 9 microscopists assessed, 6 reached Level 1 and 3 reached Level 2. The results of the ECA done in 2014 and 2017 are shown in the table below (Figure 10). This is obviously a major improvement from the previous assessments in 2014 and is an excellent achievement of the Programme.

Figure 9 – 2017 Microscopy and RDT Results – Northern District Hospital

Month	No. of Slides	Passive Case Detection (PCD)							Rapid Diagnostic Test (RDT)							
		No. of Positive	Species			Mixed 0.5 yrs Infant			No. of RDT	No. of Positive	Species			Mixed 0.5 yrs Infant		
			PF	PV	PM	Infect	Exam	Pos.			PF	PV	PM	Infect	Exam	Pos.
Jan	321	9	–	9	–	–	89	–	33	0	–	–	–	–	–	–
Feb	215	8	–	8	–	–	55	–	68	3	3	0	0	0	0	0
Mar	322	5	–	5	–	–	67	–	184	4	4	0	0	0	0	0
Apr	170	1	–	1	–	–	33	–	165	3	3	0	0	–	–	–
May	225	0	–	–	–	–	22	–	218	4	1	0	0	–	–	–
Jun	27	0	0	0	–	–	7	–	372	3	3	0	0	–	–	–
Jul	109	1	–	1	–	–	30	–	34	1	1	0	0	–	–	–
Aug	28	1	–	1	–	–	9	–	163	0	0	0	0	–	–	–
Sep	23	0	–	–	–	–	5	–	87	0	0	0	0	–	–	–
Oct	80	0	0	0	0	–	17	–	65	0	0	0	0	–	–	–
Nov	144	1	–	1	–	–	38	–	27	0	0	0	0	–	–	–
Dec	9	0	–	–	–	–	0	–	199	1	1	0	0	–	–	–

Figure 10 – Results of Microscopy Quality Control

Province	Health Facility	2014 Results ECAMM	2017 Results ECAMM
National	National Reference Lab	Level 1	Level 1
Torba	Torba Mini Hospital	Level 3	Level 1
Shefa	Port Vila Central Hospital	Level 3	Level 1
Malampa	Norsup Hospital	Level 3	Level 1
Malampa	Norsup Hospital	Level 4	Level 1
Tafea	Lenakel Hospital	Level 2	Level 1
Sanma	Northern Provincial Hospital	Level 2	Level 2
Sanma	Northern Provincial Hospital	Level 2	Level 2
Penama	Lolowai Hospital	Level 2	Level 2
Shefa	Port Vila Central Hospital	Level 4	Level 3

Note: Level 1 is Excellent performance, while Level 2 is Good and Level 3 is average and acceptable.

6.3.3 PCR

The Programme recently purchased a PCR machine based on the widely-held belief that it will be necessary to detect every sub-microscopic infection to prevent the resumption of transmission in elimination areas. The paper (by Isozumi et al. which used samples from Vanuatu in a nested PCR) showing that PCR was more sensitive than microscopy⁵ was used as one justification for purchasing the machine. It is however still questionable that PCR will be required in most settings including Vanuatu. Recently published papers (based on modelling) suggest that extremely low parasite densities may not be enough to re-establish transmission.⁶ A practical example is Sri Lanka, that has had no indigenous cases for five years and has been declared malaria free, has never used PCR. The MPR Team therefore questions the need for malaria PCR in Vanuatu and it strongly feels that PCR has no role given the technical and operational requirements, the need for highly trained technical staff to run them, and the high operating costs. It makes no practical sense for a Programme that has difficulty in ensuring the quality of routine microscopy services. Other programmes may be able to use the machine.

6.3.4 Treatment

Artemether-lumefantrine (Coartem[®]) was adopted as 1st-line treatment for all uncomplicated cases of malaria in Vanuatu back in 2008. The national treatment guidelines were thoroughly revised and implemented during 2009-2010. The guidelines were revised again in 2015 with only some minor changes.

The MPR Team did not encounter any major issues or questions related to the management of malaria cases and the use of the Coartem[®] blister packs, dosing issues etc.

The Team saw copies of the current treatment guidelines and updated posters and job aids about malaria testing procedures and medicine dosing in many, but not all health facilities visited.

The major change in the updated guidelines was the introduction of a newly available point-of-care G6PD test and the requirement that all patients with *P. vivax* should be tested prior to treatment with primaquine. Primaquine has been part of the national guidelines since 2009 but has not been used because of the fear of haemolysis in patients with G6PD deficiency. The introduction of the test represents a bold move by the Programme that has the potential to remove once and for all the fear of primaquine, but only if all health facilities have the tests and know how to use them properly.

The MPR Team found G6PD point-of-care tests (the CareStart[®] test from AccessBio) in health facilities in Shefa, Sanma and Malampa. These three provinces are targeted initially in the new initiative, supported by WHO in Vanuatu. Tests were procured by UNDP and the WHO technical officer assisted the Programme in developing patient observation forms and other training materials. The new procedures will be progressively introduced in all health facilities in the remaining provinces together with training. The MPR Team found that health staff interviewed knew how to use the tests, how to monitor and follow-up patients. This was reassuring, but it will take time before the impact will be seen but having the tests marks the first step in tackling the *P. vivax* problem.

As Vanuatu is among the first countries to introduce the G6PD deficiency point-of-care test for universal use in support of primaquine administration, it will be important to monitor and evaluate the new procedures systematically over the coming 6-12 months. Similarly, there is a need to pay attention to the QA/QC aspects around the use of the test in daily clinical practice at the field level.

Yet another issue, is the challenge of ensuring full compliance with the required 14 days of primaquine dosing to radically treat *P. vivax*. On Vanua Lava in Torba Province, the MPR Team visited a household where an adult male had recently suffered from an episode of vivax-malaria. He was tested and had normal G6PD and was prescribed the full dose of 14 days of primaquine, but he admitted to the

5 R. Isozumi et al., "Improved Detection of Malaria Cases in Island Settings of Vanuatu and Kenya by PCR That Targets the Plasmodium Mitochondrial Cytochrome C Oxidase Iii (Cox3) Gene," *Parasitol Int* 64, no. 3 (2015).

6 E. R. A. Refresh Consultative Panel on Characterising the Reservoir mal and Transmission Measuring, "Malera: An Updated Research Agenda for Characterising the Reservoir and Measuring Transmission in Malaria Elimination and Eradication," *PLoS Med* 14, no. 11 (2017).

Team that he had only completed the first 4 days of his treatment. Similar cases were found everywhere the Team visited. This shows the universal challenge of primaquine treatment, and calls for extra attention and support, by involving a household member or other resource person to help remind the patient about his treatment.

There are plans for an updated version of the treatment guidelines to be issued in 2020. In the meantime, an annex needs to be prepared about the new G6PD deficiency testing procedures and primaquine dosing for *P. vivax* based on the new dosing flowchart, including explaining the difference in dosing for males and females. The updated 2015 treatment guidelines also introduced the use of a single-dose of primaquine to block transmission of *P. falciparum*, in line with global WHO recommendations. The MPR Team found that of those facilities that already had the G6PD tests, only a few were giving primaquine for *P. falciparum*. This new part of the national treatment policy needs to be more strongly emphasized.

Artesunate remains the recommended treatment for severe malaria but there are no severe cases in Vanuatu. The MPR Team found no stocks or only expired stocks of Artesun[®] in all the health facilities visited. Even at the Central Medical Stores in Port Vila and in provincial pharmacies in Luganville, Lenakel and Torba only expired stocks of artesunate were seen. Likewise, quinine iv was not seen anywhere. It is important that this issue be resolved so that Artesun[®] is available at all health facilities and that health staff are regularly updated on management of severe cases.

Artesunate suppositories are no longer available. These were introduced as part of the 2009 treatment guidelines for the purpose of prereferral treatment of severe cases from aid posts to higher-level facilities. In practice they are not used. It should be considered to remove them from the national treatment guidelines.

There is no evidence of resistance to the drugs (artemether-lumefantrine) currently in use. The last full therapeutic efficacy study (TES) was done in 2011-2012 on Epi Island and enrolled 76 patients with *P. vivax*. 100% of the patients were effectively treated with artemisinin-lumefantrine (AL), the current first-line treatment. More recently, a TES was started on Epi Island but was not completed in the absence of sufficient patient numbers. Now that the number of cases

has reached very low levels throughout the Country, no new TESs are likely to be done. It will be useful to stay in close contact and liaise with the national malaria programme in the Solomon Islands, which still has a sufficient number of malaria patients for a proper TES for both *P. falciparum* and *P. vivax*. TES results obtained in Solomon Islands would be considered applicable to Vanuatu.

6.4 Supply Chain Management

Most commodities for malaria diagnosis and treatment are procured and distributed to health facilities through the standard drug supply system, funded under the government recurrent budget for medicines. In 2009, when the new artemisinin drugs and malaria RDTs were introduced, they were all procured and distributed by the Programme itself, with assistance from WHO and in close collaboration with the CMS. This allowed for a focused distribution process with very few stock-out problems, but the “push” system was only meant to be temporary and eventually become part of the standard “pull” system managed by the CMS. The CMS ships the commodities to the Provincial Pharmacies, that send them to health facilities based on their 2-monthly ordering cycle like all other medicines. For remote areas the delivery time often extends to several weeks or even months resulting in frequent stock-outs.

The MPR Team observed stock-outs of Coartem[®] in many health facilities and in many facilities, it found Coartem[®] that had expired.

Many health workers complained to the MPR Team that it often took too long to receive medicines, and even newly arrived Coartem[®] would often have only a short remaining shelf life. For example, one health facility on Epi Island had received a batch of Coartem[®] in March 2018 that expired in April 2018. Even in the CMS and Provincial Pharmacies, the Team came across lots of near-expiring Coartem[®].

Similarly, all Artesun[®] seen in the facilities, in the CMS and in Provincial Pharmacies had expired in January 2018, no fresh stocks were available. Likewise, no vials of iv quinine were found anywhere. It is essential to ensure proper stocks of these life-saving medicines in all provinces as severe malaria cases may still be seen in Vanuatu, even if only rarely.

Artesunate suppositories were not found in any of the health facilities visited.

The MPR Team found stocks of primaquine in health facilities in Malampa, and Sanma provinces but not in the other provinces. The Programme has taken responsibility for the initial procurement and distribution of primaquine and the G6PD tests. It recently procured a large quantity of primaquine that will be “pushed out” to health facilities that do not yet have any. The MPR Team supports this approach as a temporary measure that will jump start the use of the tests and the routine treatment of both *P. falciparum* and *P. vivax* with primaquine, but eventually both commodities will fall under the normal CMS “pull” ordering system and recurrent government funding.

The MPR Team found adequate stocks of malaria RDTs in the CMS, in Provincial Pharmacies and in most health facilities visited. The shelf life of the RDTs was reasonable. The RDTs are procured by the CMS and distributed as part of the routine supply chain system, and the RDT procurement seems to function well.

The weak drug supply system is a long-standing problem. Over the years, DFAT and other partners have invested significant financial and human resources including long-term external TA support to assist the CMS and the MOH to improve the system. Part of this support was an electronic drug inventory system, mSupply, that was purchased through DFAT and installed in the CMS and Provincial Pharmacies around 2011. The funding for mSupply came out of the DFAT funding earmarked for the malaria programme, but it was then strategically decided to use some of these funds to improve the drug supply management system as a way of strengthening the wider health system.

The mSupply software package and technical support comes from Sustainable Solutions based in New Zealand. The package included comprehensive training and technical support, but the system is not yet fully operational. The Company has sent technical consultants to fix problems, but new problems continually crop up. For example, the MPR Team learned that in the Provincial Pharmacy in Luganville, the mSupply system had recently been down for 3 months. A consultant finally came and fixed the problem by transferring data to another server, but it meant that for three months the pharmacy had to use a paper-based system. Another

major problem is that mSupply requires reliable internet connections, that are often not available, and in Torba Province there is no internet at all. As internet connectivity improves mSupply will become more reliable and will hopefully become the backbone of an efficient supply chain.

6.5 Surveillance and Response

Vanuatu is only just beginning to fully understand what surveillance and response means, how it should be applied and most importantly that surveillance must be considered as a primary intervention equal to vector control and case management. It is going to become more and more important that the capacity exists at the provincial level to implement the 1-3-7 (or 1-3-5) timeline – all cases to be reported within 24 hours, investigated within 3 days and necessary response measure initiated within 7 days. The NSP has a comprehensive section about surveillance but the MPR Team found only 7 cases have so far been investigated. One imported vivax case from Tafea plus 5 indigenous and 1 imported vivax cases in Shefa Province.

The NSP calls for the creation of small provincial level teams responsible for “active and passive malaria surveillance under the leadership of the Provincial Malaria Supervisor and overall authority of the provincial Chief Medical Officer...” The MPR Team found no evidence that these teams had been established and in fact during the provincial visits one point of discussion was who was going to do the case investigations and organize any response. However, a comprehensive set of new “Guidelines for Malaria Surveillance and Response” has recently been developed (2017) by the programme with technical assistance from WHO. These guidelines explain the routines and define the roles and responsibilities of staff in malaria surveillance and response, both for control and elimination. The guidelines also contain a number of standard operation procedures (SOPs) and data recording forms etc. It appears that these new guidelines will be a good starting point for strengthening provincial level capacity for a more proactive approach to malaria surveillance and response. Training sessions on surveillance have been done, but further training and supervision at the local level needs to be ensured on an ongoing basis. Furthermore, without the required staff being in place at the provincial level is responsible it isn't going to happen. Many provinces lack

Malaria Supervisors and the only staff the MPR Team found were information officers and microscopists. In Tafea, the post of elimination officer was established to coordinate surveillance. A similar post will need to be established in all provinces but in the meantime the microscopists job description can be revised to include surveillance duties.

The 2017 Annual Report lists a total of 46 foci including 17 in Tafea all of which have been cleared. There are also an additional 11 active foci in Torba and 12 in Shefa both of which are classified as elimination areas. For those provinces considered to still be under control there are 9 active foci in Malampa Province, 9 in Sanma and 5 in Penama.

Although the foci have been identified, the MPR Team found that there is confusion about what to do, how to do it and more importantly where the funds will come from. The NSP mentions the National Guidelines for Malaria Elimination but the MPR Team did not see a copy of those guidelines.

The Team found that in Malampa, Zone 6 was notified as an active focus in May 2017, but as mentioned above, funds needed to mount a response had not yet been received. An investigation of Zone 6 by the Team found that there were no new nets in some localities. The situation was the same in the areas visited in Sanma and is likely the same in the other active foci. Until those foci are cleared, the Programme will not be able to move forward.

6.6 Supervisory visits

Supervisory visits to health facilities are a key element in ensuring access to high-quality malaria case management, effective case reporting, and in facilitating interaction throughout the health system. As part of the intensified malaria control efforts implemented between 2009 and 2014, quarterly supervisory visits were a major part of the Programme and one of the main performance indicators for the GF grant.

The Programme had a comprehensive framework for supervisory visits including checklists. Significant resources were allocated so that visits could take place on a regular 3-monthly basis. The visits required a lot of effort but ensured that proper case management services were available, stock-outs were avoided, and reports were submitted on

time. Recently, as part of the reforms taking place in the MOH, it was decided to opt for integrated supervisory visits that include malaria as well as six other public health programmes. This is in principle the right thing to do, but the MPR Team found that the integrated visits are not happening.

An integrated system for supervisory visits has been developed, with support for WHO, but it has not been implemented. Development of the system has included piloting, training and review workshops in selected provinces that fine-tuned the guidelines. Checklists are meant to produce a summary report of the supervisory visit completed including results of performance, to be shared during the visit. The MOH told the MPR Team that it is still not ready to implement the new system; that there needs to be full buy-in by the public health programmes that are currently doing their own supervisory visits. Funding also needs to be identified

The MPR Team is quite concerned that peripheral health facilities are currently unsupported, creating the risk of incorrect case management practices, the risk of stock-outs, and incomplete reporting. It also means there is no support for the introduction of the G6PD tests that the Programme is relying on to move forward on full and proper treatment of *P. vivax* cases.

The Team's concerns were echoed by Programme staff that cited the lack of supervisory visits as a reason for the constant stock-outs and lack of reporting. The MPR Team was also advised by health workers that the integrated system had a too strong focus on completing checklists, but too little attention was paid to one-on-one interaction with health staff that is key to good supervision. It was recommended by some health workers that to be effective, visits should cover a maximum of three disease programmes, not all of them.

The MPR Team agrees with those concerns and is of the opinion that the proposed visits are good in theory but fall short of the needs of the Programme. Just going through a check-list is not sufficient. Supervision includes reviewing case registers, checking if a proper diagnosis was made and appropriate treatment was given. It means checking the stocks of drugs, RDTs and G6PD tests, checking the two-monthly order forms and the expiry date on the anti-

malarial drugs. It also means checking on the timeliness and accuracy of reporting.

6.7 Malaria Information System

The Programme is currently transitioning from the former malaria information system based on Microsoft Access®, which was set up and used during the intensified malaria control and elimination efforts from 2009 onwards, to the new DHIS2 on line system that is the standard platform for all MOH programmes. The former MS Access system allowed the programme to improve case recordings greatly, including introduction of a monthly malaria line listing (MMLL) of cases from each province, however, the system was technically challenging to apply. The DHIS2 system is also becoming the international standard for health information systems widely used in countries in the Western Pacific Region of WHO, but full functionality depends on the availability of good internet connections at the provincial level. The MPR Team found that provinces were entering malaria data into the system but there were problems with the internet connection in some provinces meaning that hard copies had to be sent to Port Vila for data entry. A standardized dashboard in DHIS2 has been developed to monitor key indicators, and this dashboard also contains a map component. The systems still needs the case tracker tool to be added but this should come soon and will assist the Programme in moving forward towards elimination.

The information system still uses a monthly malaria line listing (MMLL) of cases compiled at health facilities as the basis for data entry into the DHIS2. The MPR Team found that in the provinces where there are a lot of cases (Malampa and Sanma) filling in the form takes a lot of time at the end of each month putting a heavy burden on the Information Officers. Where there are no information officers, other staff have to take on the responsibility. Although the MPR Team fully appreciated the effort needed to fill out the form and enter the information into the DHIS2, it recognizes that the MMLL will provide the information required by the surveillance system, when it becomes operational, to identify and locate a patient so that an investigation can be done, and if necessary a proper response carried out. It is important that entries in the MMLL be validated by checking against outpatient registers, RDT registers and registers maintained by microscopists.

6.8 Monitoring and Evaluation

The Programme has a comprehensive M&E Plan in place for the Period 2015-2020 but without the results of a malaria indicator survey most of the key indicators cannot be calculated. Proxy indicators are used for net coverage i.e. 1.4 persons per net based on distribution data but the MPR Team was not confident that these accurately reflected the situation on the ground. Similarly, important data are missing on health seeking behaviour and treatment compliance that are important for judging the effectiveness of *P. vivax* treatment following the introduction of the G6PD test kits.

Another major problem identified by the MPR Team is low monthly reporting rates. The MPR Team found that for 2017 only one province Tafea had a reporting rate above the target of 80% (Figure 11). All provinces reported

Figure 11 – Reporting Rates and Challenges by Province

Province	Reporting Rate	Challenges ⁷
Penama	62%	Current volcano disaster – affecting reporting from HFs to provincial malaria office.
Sanma	79%	Communication problems
Malampa	62%	MIS officer cannot have access to provincial communication budget – resulting no follow up with the MMLL No Internet access – malaria office
Shefa	69%	Communication issues Delay of Reports – logistic issues
Torba	79%	No internet access, No power supply in Malaria office -Torba mini Hospital as the result the MIS officer & Surveillance Officer having difficulties to do data entry DHIS2 reporting & Surveillance reporting has been delay.
Tafea	86%	Reporting on Time (elimination) Communication

⁷ Quoted from presentation made at the 2018 Annual Malaria Review meeting, May 2018.

communication problems, primarily the lack of internet access as a block to regular reporting.

The MPR Team found that in 2017 the Malaria Information Officer for Torba was relocated to the provincial health office in Luganville. Data from Torba are being transmitted from Sola by mobile phone then entered into the DHIS2 system in Luganville. This is a temporary measure until the internet problems are resolved, but in the meantime Programme staff need to be commended for doing the best they can under difficult conditions.

With the new DHIS2 dashboard in place, the Programme has a good database for passive case detection that with ongoing support from national and provincial level malaria staff can be used to monitor core programmatic performance and adjust for improvement and response capacity in the provinces.

Figure 12 – Elimination Timeline and Targets

2016	2018	2020	2022	2025	2028
* Zero Local cases in Tafea Province * Nationally API<5/1000 population * Maintain zero deaths	* Zero Local cases in Torba Province * Nationally API<2.5/1000 population * Maintain zero deaths	* Zero Local cases in Shefa Province * Nationally API<1/1000 population * Maintain zero deaths	* Zero Local cases in Pennama Province * Prevent re-establishment in Tafea, Torba and Shefa * Maintain zero deaths	* Zero Local cases in Sanma and Malampa Province * Prevent re-establishment of malaria in all Provinces * Maintain zero deaths	Request for WHO Certification

Figure 13 – Malaria Cases in Tafea, 2011- 2016

Year	CASE DETECTION				CASES					MANAGEMENT							
	POP	PCD		ACD	Total Positive	Detected by				Noti-fication	Investi-gation	Classification		Treatment			
		Rep%	Test	Test		PCD	REACT	PROACT	SPO E			24 Hrs	3 Days	Imported	Local	DOT	Coartem
2011	33,371	80%	1,630	1,643	17	17	0	0	0	17	10	6	11	5	17	0	
2012	33,635	80%	1,53	1,955	20	16	0	0	4	20	11	10	10	20	20	6	
2013	33,371	97%	1,667	1,798	6	4	0	2	0	6	6	4	2	6	6	3	
2014	33,371	69%	2,370	2,359	3	3	0	0	0	1	1	2	1	3	3	1	
2015	33,371	82%	1,453	1,288	0	0	0	0	0	0	0	0	0	0	0	0	
2016	33,371	81%	2,470	2,404	0	0	0	0	0	0	0	0	0	0	0	0	

6.9 Malaria Elimination

There is no national malaria elimination plan. The closest that the MPR Team was able to find is the following Figure (Figure 12). As mentioned above, the poor management decisions that resulted in the hot spots in Malampa and Sanma have already put the timeline back by two to three years.

6.9.1 Tafea

In November 2017, Tafea was declared malaria free after reporting no cases of local transmission for three years. One imported case was reported in 2017 (Figure 13).

Tafea consists of five islands: Tanna, Erromango, Aneityum Aniwa, and Fortuna. Only the first three ever had malaria. Aneityum eliminated malaria in the 1990s but transmission continued in Tanna and Erromango. The three rounds of IRS was conducted in 2009, 2010 and 2011 that brought cases down on both islands. The last locally acquired malaria case was recorded in 2014.

The question now is how to keep Tafea malaria free. The risk of re-introduction appears to be low. The main risk are students staying at boarding schools located in areas of continuing transmission returning for school breaks to their home villages where there are vectors, but no local transmission. There is also significant movement between Tanna and Efate. Once Efate has reached elimination, the

risk of cases coming into Tafea will be extremely low. Until then screening of students and developing/maintaining community awareness of the risk posed by newcomers from high transmission areas will be the most effective method for preventing reintroduction. Any attempt to sample arrivals by plane or through the port would be difficult to implement and would probably not be effective.

The MPR Team was not able to visit Tafea during its official schedule but one Member of the Team (LV) was able to go to Tanna on his own time. He learned that recently there was an imported case of vivax-malaria in a former malaria hot spot near Lenakel. The individual arrived in January 2018, but only became symptomatic in March. A case investigation was done, and active case detection was carried out in the surrounding area, but luckily no secondary cases were found. The case however illustrates that Tafea is receptive to reintroduction and that it is vulnerable due to constant movement of people from other islands where there is ongoing malaria transmission. Hence the need for constant vigilance on the part of health staff and the community.

The Provincial Malaria Supervisor reported that available resources for malaria in the provincial health budget keep declining. This will soon make it very difficult to keep the necessary surveillance and response capacity in place. It is critical that funding for a fully functional surveillance system that is able to rapidly respond to every reported case of malaria following the 1-3-7 rule be maintained. This requires reliable transport, but the current vehicle is in bad condition and needs to be replaced.

The Team was very concerned because at the time of the visit to Tafea, DFAT, the primary funding partner for elimination activities, was unable to provide assurance that its funding for Tafea would continue. If it withdraws or substantially reduces its level of support Tafea’s malaria-free status may be compromised and with it the success of the Programme.

6.9.2 Torba

Malaria transmission has been low for several years on most of the islands in Torba Province, with the exception of Gaua. In 2015, it was decided to initiate elimination

activities following the successful model developed in Tafea, triggered by a further drop in API from 14.1/1000 in 2013 to 2.4/1000 in 2014. Activities included GIS household mapping, blanket IRS, all cases were investigated, and malaria foci were managed according to the national guidelines for malaria elimination. This has led to further accelerated reductions in malaria transmission (Figure 14). There were no malaria cases reported in 2017 (Figure 15).

Performance and progress of the Programme as measured by the standard elimination indicators is shown in Figures 16 and 17. Performance is generally good, but there is a problem with inadequate monthly reporting from some health facilities. This is an important issue for the Programme to resolve quickly to ensure a proper passive surveillance system.

The MPR Team visited the Provincial Malaria Office and malaria laboratory located at the Mini Hospital in Sola on Vanua Lava. Both were well organized, and the staff appeared to be highly engaged and committed despite having to work in a challenging environment with no internet access and a geography that means frequent travel in open boats between islands.

The level of vulnerability in Torba is illustrated by a malaria case that was investigated in June 2018 by the Acting Provincial Malaria Supervisor on Mota Lava island. He found that the case on Mota Lava was related to an outbreak of *P vivax* malaria that occurred in April-May 2018 on Vanua Lava, probably linked to a group of infected individuals that came from nearby Santo. Active case detection in the local area revealed a total of 10 *P. vivax*

Figure 14 – Torba Annual Parasite Incidence, 2008-2017

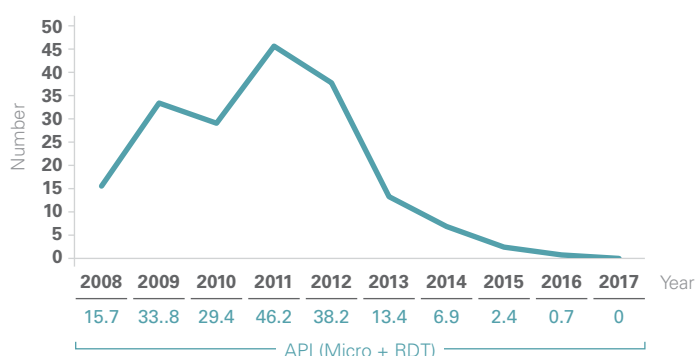


Figure 15 – Active RDT Screening in Malaria Foci Torba Province, 2017

Island	Total Village	Population	Household	Total Tested	Total Positive
Vanua Lava	16	2,559	353	1,809	0
Gaua & Mere Lava	9	1,453	417	1,134	0
Total	25	4,042	770	2,943	0

Figure 16 – Elimination Outcome Indicators in Tafea and Torba Provinces, 2017

Ind.	Indicator	Target	2017	Gap
14	% of active foci investigated, classified and updated each year according to Elimination Guidelines and SOPs	Tafea 100%	N/A (no foci in 2016)	N/A
		Torba 100%	100%	100%
15	% of cases in elimination provinces investigated and managed (including response in surrounding area) within 5 days according to Guidelines and SOP ("1-3-5")	Tafea 100%	100%	100%
		Torba 100%	N/A	N/A

Figure 17 – Elimination Programme Indicators in Tafea and Torba Province, 2017

Indicator	Target	2017	Gap
Percentage of monthly reports from health facilities	Tafea 100%	86%	14%
	Torba 100%	79%	21%
Annual Blood Examination Rate (PCD)	Tafea 10%	9%	1%
	Torba 10%	16%	0%
Annual Blood Examination Rate (ACD)	Tafea 5%	6%	0%
	Torba 5%	24%	0%
Percentage of cases notified to the Malaria Office within 24 hours of diagnosis	Tafea 100%	100%	0%
	Torba 100%	N/A	N/A
Percentage of cases notified to the Provincial Malaria Office within 24 hours of diagnosis	Tafea 100%	100%	0%
	Torba 100%	N/A	N/A

cases, 3 imported and 7 introduced. In addition, there was one related *P. vivax* case on Mota Lava. There is a clear risk of additional imported cases coming from nearby Santo, but the current hot spots in Malampa and Shefa (Epi Island) also pose a threat to Torba. This is another reason for the Programme to quickly eliminate those transmission foci.

The MPR Team was encouraged to see that there was a new malaria boat, purchased under the GF malaria grant but the province still needs a new vehicle and a functional internet connection to fully implement the essential surveillance activities.

It was clear to the MPR Team that the malaria programme in Torba Province seems to do a good job in implementing key malaria elimination activities in a timely manner, with good support from the national team and the malaria elimination team in Tafea. However, as the Acting Malaria Supervisor raised to the MPR Team during our visit to health facilities and communities in Mota Lava and Rah islands, it would be useful to build local capacity to undertake some of the key malaria elimination activities by local health workers, e.g. allowing rapid investigation of new cases and thereby being able to meet the recommended 1-3-7 strategy. At times of bad weather conditions, it may just not be possible for the malaria staff in Sola to reach the outer islands by boat and conduct the necessary activities in a timely manner. Such capacity building should form part of the elimination plan for Torba Province.

The MPR Team believes that Torba Province has a good chance of achieving elimination in the next few years provided that the required human and financial resources are made available. A practical elimination plan including a proposed timeline, and budget needs to be drafted as the first step in reaching that goal.

6.10 Advocacy, Information, Education, Communication and Community Mobilization

The MPR Team was disappointed to find that health promotion activities and materials are no longer active

components of the Programme. In the past, there were numerous activities targeted at school children as well as messages about the importance of seeking treatment when a person has fever and to use bed nets. It wasn't clear why this has happened, but it is presumably related to the decrease in funding. Like trying to cut corners on planning for bed net distribution, stopping health promotion activities represents false economy that will eventually hurt the ability of the Programme to effectively implement key interventions.

6.11 Operational Research

The Programme is not in a position to carry out research projects on its own. It just doesn't have enough staff. Any needed research will have to rely on external partners and be fully vetted by the MOH to ensure that the research will directly contribute to the Programme.

7. Conclusions and Recommendations

7.1 Conclusions

Vanuatu is well on its way towards achieving malaria elimination, but it first must stop and address the hot spots in Malampa and Sanma caused by the failure to deliver new nets. The administrative mistakes that resulted in this omission need to be resolved. This includes resolving issues that are holding up the release of operational funds, issues on retiring imprests, and proper operational planning for the distribution of LLINs. Rigorous surveillance can start in Torba, Shefa, and Penama based on the Tafea model immediately but significant human resource issues need to be addressed including the recruitment of Provincial Malaria Supervisors to fill vacant posts and the designation of an elimination officer for each province. That person will be given the task of doing case investigation, coordinating necessary responses and doing the follow-up.

Important health system issues related to unreliable drug supplies and dysfunctional supervisory visits to health facilities are key obstacles to the Malaria Programme, which the MOH must address urgently.

The current trend towards decreasing funding is opposite with what is needed to “finish the job.” Two things need to happen: the Programme needs to fully utilize the funds available and additional funding needs to be mobilized. The first should be easy and only requires tightening up financial management and changes in financial rules of donor partners but the second will be difficult.

7.2 Recommendations

The following recommendations are not “cost neutral.” The Programme will need to update the costing of the national strategy for the period 2018-2019 to take into account the recommendations of this review. It will need to identify the funding gaps for implementing prioritized recommendations and actively seek additional partners to generate the funding that is required to implement these recommendations

1. Addressing the hot spots in Malampa and Sanma provinces should be the top priority of the Programme. The affected zones should be the first to receive new nets and coverage verified by rigorous supervisory visits. The longer those hot spots are left uncontrolled the higher the risk that cases will be exported to other provinces thereby resulting in additional hot spots and once that starts to happen it is going to be more difficult to control.
2. High quality, high coverage IRS, using a non-pyrethroid insecticide, should be implemented in the hot spots as soon as possible. There is a clear technical justification for IRS as the best and quickest way to resolve the current hot spots. Donor partners should be approached to provide the necessary injection of funds.
3. The operational planning for LLINs distribution should be based on a household census not a micro planning model, and distribution be based on the actual number of nets each household needs.
4. The Programme and its partners should sit down and work out a streamlined financial system that facilitates field level operations. The current system is inefficient. It places administrative processes above technical requirements resulting in operational failures combined with low implementation rates.
5. An essential element of a streamlined financial system should be a fund that provincial staff can draw on quickly to respond to outbreaks and/or imported cases. The delays currently experienced for releasing funds by the field staff are unacceptable. A compromise that meets both the administrative and operational requirements needs of all the agencies involved must be found.
6. A national malaria elimination plan should be written and endorsed by the MOH and higher levels of government with targets, activities and budgets.
7. A National Elimination Advisory Committee should be established, either as a stand-alone committee or as a task of an existing MOH committee. It should provide guidance to the NVBDCP, bring together the partners as well as serving as a linkage to NGOs outside the health sector and with communities to garner support for malaria elimination. WHO is in the best position to organize and chair such a committee.
8. The Tafea model for elimination model should be rolled out to all provinces once the current hot spots are cleaned up. The strategy should be national, not province by province. DFAT is in the best position to support the roll out and a formal request from the MOH should be made to DFAT to make it happen.
9. Rigorous pre-elimination surveillance should be implemented in Torba, Shefa and Penama as soon as possible. Cases should be quickly reported, investigated and any required response should be implemented following the 1-3-7 rule (cases reported within 1 day, investigated within 3 days and a response implemented within 7 days).
10. Given the vulnerability of the situation in Tafea province, the MPR Team recommends continuation of full coverage with LLINs as a means of preventing reintroduction of malaria from the other provinces. Once the hot spots in Malampa, Sanma and Shefa have been taken care of and full surveillance is implemented in all the other provinces LLIN coverage may be pulled back but until then full coverage is necessary.

7. Conclusions and Recommendations

11. Additional funding should be sought to allow the Programme to achieve elimination. If the current downward trend in funding from the Global Fund and other partners continue it is difficult to see how Vanuatu is going to “finish the job” or even maintain the current level of transmission and keeping Tafea free. The idea that as cases go down the Programme requires less funding is totally invalid.
12. A Malaria Elimination Officer position should be established in every province similar to Tafea. The individual selected should be responsible for coordination, surveillance and response activities including ensuring timely and accurate reporting. Alternatively, microscopists or nurses should be assigned an active role and given the needed support to do case and outbreak investigations, and similar malaria elimination activities.
13. The introduction of the G6PD rapid test offers the possibility that *P. vivax* cases will be fully treated using primaquine for the first time in more than 30 years. Full treatment of *P. vivax* will be critical for achieving elimination, but it will only be successful if all health facilities have an adequate and continuous stock of tests and primaquine. The Programme should carefully monitor the availability of tests, the availability and use of primaquine.
14. The Programme should collaborate with the Central Medical Stores and provincial pharmacies to prevent stockouts of ACTs and RDTs.
15. The correct use and reading of RDTs should be monitored and when needed additional training should be provided.
16. Ensure that supervisory visits take place on a regular basis to support peripheral health facilities. The supervisory team should ideally include a malaria staff, as there is a real need for a special focus on ensuring proper “malaria procedures” and proper technical standards as the MOH moves towards malaria elimination.
17. To ensure to maintain an adequate microscopy, SOPs and QA/QC plans should be in place, and the necessary funds should be available for travel and field supervision activities. It is important to ensure proper supervision and support for microscopy, including the maintenance and repair of microscopes.
18. The next version of the national treatment guidelines, scheduled to be issued in 2020, should include a new section (stand-alone annex) explaining in detail the procedures for G6PD point-of-care rapid testing and administration of primaquine. Also, a monitoring system should be put in place to follow the introduction of the new G6PD tests and how it translates into correct dosing of primaquine in the field.
19. Medicine stock-outs are a serious long-standing problem. The MOH and health partners should resolve the problem as soon as possible. This means that the Programme should collaborate closely with the CMS on improving the supply chain including improved forecasting for malaria commodities that reflects the declining number of malaria cases.
20. Elimination must be made a national goal with full public support. A national promotional campaign is needed designed to mobilize popular support for the national elimination goal. It should drive home the reasons for elimination, how it will impact the overall health situation, what individuals and organizations need to do including regularly sleeping under their LLINs, seeking treatment for all fevers and taking the full course of medicines.

Annex 1: List of Review Team Members and People Met

Review team members

- Kevin Palmer, malaria expert and independent consultant, Honolulu, Hawaii
- Lasse Vestergaard, malaria expert and independent consultant, Copenhagen, Denmark

People met and consulted during the Vanuatu MPR, July 2018

National Level:

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- Devika Perera, Technical Officer
- Philippe Guyant, Medical Officer
- Michael Buttsworth, Technical Officer

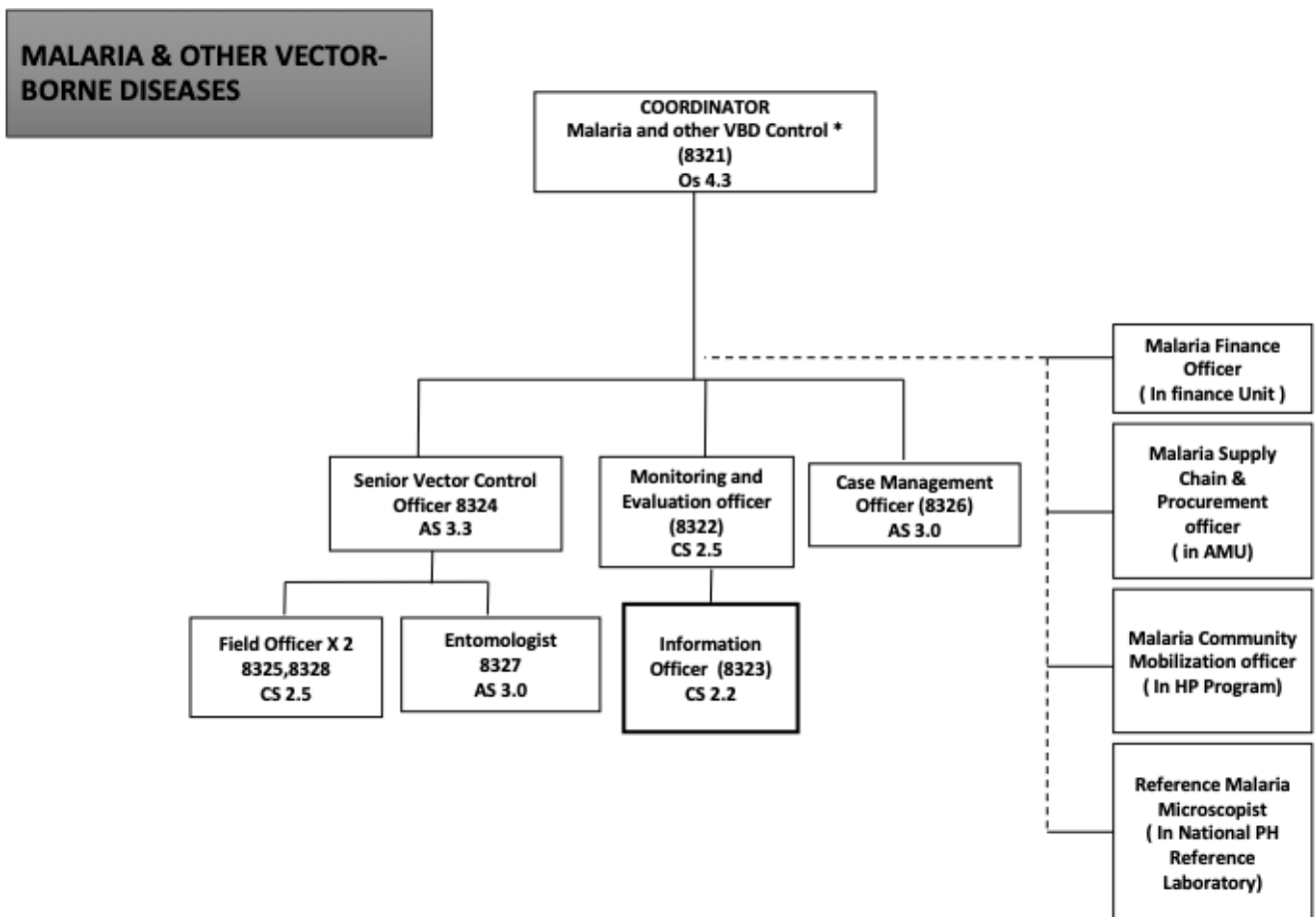
Australian Government Department of Foreign Affairs and Trade, Port Vila:

- Megan Kybert, First Secretary for Health, DFAT
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- Kenslyne Lele, In-country Analyst, World Bank, Port Vila

Annex 2: Organizational Structure of the NVBDCP



ORGANIZATIONAL STAFF STRUCTURE OF THE NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME (NVBDCP), MINISTRY OF HEALTH, 2018

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