

**National Strategic Plan for the
Control of Mosquitoes and
Mosquito Borne Diseases
2023-2033**



**Ministry of Health
Samoa**

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Acronyms and abbreviations

ACRONYM/ABBREVIATION	FULL TERM
ACIAR	Australian Centre for International Agricultural Research
AI	Active Ingredient
APS	Animal Protection Society
AR	Attack Rate
BES	Beyond Essential Services
BG	Biogents
CDC	Centre for Disease Control
CEO	Chief Executive Officer
CHIKV	Chikungunya Virus
COVID-19	Coronavirus Disease 2019
CPD	Continuing Professional Development
DENV	Dengue Virus
DFAT	Department of Foreign Affairs and Trade (Australia)
DLI	Dengue Like Illness
EHO	Environmental Health Officer
EIP	Extrinsic incubation period
GDP	Gross Domestic Product
GEDSI	Gender Equity, Disability, and Social Inclusiveness
GOS	Government of Samoa
HEAPS	Health Education and Promotion Services
HEOC	Health Emergency Operations Centre
HIS	Health Information System
HPU	High Performance Unit
HR	Human Resources
IEC	Information, Education, and Communication
IGM	Immunoglobulin M
IHR	International Health Regulations
IHRD	International Health Regulations Division
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Bednets
IVCC	Integrated Vector Control Committee
KO	Government of Samoa Health Sector Plan Key Outcome
KPI	Key Performance Indicator
LF	Lymphatic Filariasis
LLIN	Long-Lasting Insecticide-Treated Nets
LMIS	Logistics Management Information Systems
MAF	Ministry of Agriculture and Fisheries
MDA	Mass Drug Administration
MESC	Ministry of Education, Sports, and Culture
MJCA	Ministry of Justice and Courts Administration

MNRE	Ministry of Natural Resources and Environment
MOH	Ministry of Health
MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheet
MWCSD	Ministry of Women, Community, and Social Development
NEOC	National Emergency Operations Centre
NHS	National Health Surveillance Division
NS1	Non-Structural protein 1 (of dengue virus)
NUS	National University of Samoa
OMT	Outbreak Management Team
OR	Operations Research
ORS	Outdoor Residual Spraying
PACELF	Pacific Program for the Elimination of Lymphatic Filariasis
PACMOSSI	Pacific Mosquito Surveillance Strengthening for Impact
PAHO	Pan American Health Organization
PCR	Polymerase Chain Reaction
PHC	Primary Health Care
POE	Ports of Entry
SAA	Samoa Airport Authority
PPE	Personal Protective Equipment
RCCE	Risk Communication and Community Engagement
SITREP	Situation Report
SMA	Samoa Medical Association
SOP	Standard Operating Procedure
SP	Strategic Plan
SPA	Samoa Port Authority
SPC	Secretariat for the Pacific Communities
SRWMA	Samoa Recycling and Waste Management Association
SSC	Samoa Shipping Corporation
SSFA	Samoa Sports Facility Authority
STA	Samoa Tourism Authority
SWOT	Strengths Weaknesses Opportunities Threats
TA	Technical Assistance
TTMH	Tupua Tamasese Meaole Hospital
TWG	Samoa Technical Working Group
UHC	Universal Health Coverage
UN	United Nations
USA	United States of America
USD	United States Dollar
VBD	Vector Borne Disease
VBDC	Vector Borne Disease Control
VCS	Vector Control Service

WHO	World Health Organization
WMD	World Mosquito Day
WST	Samoaan Tala
ZIKV	Zika Virus

Foreword from the Honourable Minister of Health



I am pleased to present the National Strategic Plan for the management of mosquitoes and mosquito-borne diseases 2023-2033. This is the very first strategic plan to be developed in Samoa for the prevention of mosquito-borne diseases and represents exciting progress within the health sector.

The burden of mosquito borne disease worldwide is considerable and Samoa has experienced multiple outbreaks of Dengue, Chikungunya and Zika in the last 10 years alone, creating a significant burden on our health system and our population.

This National Strategic Plan represents the views from stakeholders and experts across multiple sectors, including human health, environment, education, and communities. It calls on action from all sectors in a collaborative and cohesive manner to tackle the burden from mosquito-borne diseases on the health of our population.

This strategic plan represents a commitment from the Ministry of Health and its partners from other sectors to work together to achieve our vision of “A Samoa free of mosquito-borne diseases, contributing to the good health and well-being of the population”.

With this, I would like to acknowledge with sincere gratitude and appreciation the time spent, and contributions made by all partners and stakeholders in formulation of this strategic plan:

- Ministry of Health
- All members of the Integrated Vector Control Committee
- Ministry of Natural Resources and Environment
- Ministry of Agriculture and Fisheries
- Ministry of Education, Sport, and Culture
- Ministry of Women, Community, and Social Development
- World Health Organization
- Samoa Recycling and Waste Management Association
- PacMOSSI

We ask all our partners for their continued support and dedication to the staged implementation of this strategic plan over the next 10 years.

Faafetai.

A handwritten signature in black ink, appearing to read 'Valasi Luapitofanua Toogamaga Tafito Selesele'.

Hon. Valasi Luapitofanua Toogamaga Tafito Selesele
MINISTER OF HEALTH

Key Messages from the Director General of Health



Mosquito-borne diseases such as Dengue Fever and Lymphatic Filariasis are endemic in Samoa and there is a constant threat of outbreaks. A clear, integrated plan is required to implement changes from community level through to national policy to reduce the risk of disease. This plan requires strong community engagement and risk communication actions, using existing community-based communication pathways.

The core focus of this strategy is on the surveillance and control of the *Aedes* mosquito, which is the key vector for Dengue, Chikungunya and Zika viruses. It aligns with the clinical and case surveillance guidelines as developed for the National Communicable Disease Control Guidelines.

This strategic plan is well aligned with Ministry of Health core principles and values as laid out in the Health Sector Plan (2019/2020- 2029/2030), specifically:

- Cultural Appropriateness with a strong community focus and local leadership.
- Quality and Safety, using only evidence-based strategies used both regionally and globally.
- Efficient use of resources.
- Genuine partnerships, inclusiveness, and a focus on intersectoral collaboration.
- Quality Leadership and Stewardship with monitoring of plan performance and accountability for progress.

Ma le fa'aaloalo lava.

A handwritten signature in black ink, appearing to read 'Aleo', written over a horizontal line.

Aiono Professor Alec Ekeroma
DIRECTOR GENERAL OF HEALTH

Acknowledgements

This Strategic Plan was developed with the assistance and input from the stakeholders listed below:

- Ministry of Health
- All members of the Integrated Vector Control Committee
- Ministry of Natural Resources and Environment
- Ministry of Agriculture and Fisheries
- Ministry of Education, Sport, and Culture
- Ministry of Women, Community, and Social Development
- World Health Organization
- Samoa Recycling and Waste Management Association
- PacMOSSI: The Pacific Mosquito Surveillance Strengthening for Impact Program.

Special acknowledgements to the following people in the Ministry of Health who supported the development and review of this Strategic Plan:

- | | |
|--------------------------------------|---|
| • Tuafaiva Mele Tanielu | ACEO - NHSIHRD |
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| • Chris Atoa | Principal Policy Officer - SPPRD |
| • Judith Gafa | Snr Officer – Disease Unit NHSIHRD |

Executive Summary

This strategic plan focuses on the vector surveillance and control activities required to minimise the transmission of dengue and other arboviruses that are endemic or could be re-introduced to Samoa. This plan is to be implemented alongside the National Communicable Disease Control Guidelines which supports the clinical aspects of diagnosis, treatment, and case surveillance.

The target audiences for this plan are:

- All implementing partners named in the plan.
- International development partners.
- Ministry of Finance.
- Academic and research institutions in Samoa and the Pacific region.

This strategic plan is aligned with several of the core principles and values of the existing Health Sector Plan (2019/2020-2029/30), namely community focus, local leadership, efficiency, quality and safety, efficiency, genuine partnership and inclusiveness, and quality leadership and stewardship. It also has been informed by and aligns with the WHO *Global vector control response 2017–2030* (2017) and *Global plan for insecticide resistance management in malaria vectors* (2012), the *Framework for national surveillance and control plans for Aedes vectors in the Pacific* and the WHO/SPC *Manual for surveillance and control of Aedes vectors in the Pacific* (2020).

The vision statement for this strategic plan is:

A Samoa free of mosquito-borne diseases, contributing to the good health and well-being of the population and the mission is to: minimise the severity and frequency of mosquito-borne disease transmission and outbreaks.

The strategic objectives are to:

1. Implement routine mosquito surveillance and preventative control activities,
2. Implement an effective mosquito control response during outbreaks,
3. Prevent the importation of exotic mosquito species into Samoa,
4. Implement focal vector surveillance and control during case investigations,
5. Build capacity to optimise the performance of management processes to support mosquito surveillance and control activities.

The key entomological interventions are:

1. Routine vector surveillance to inform locally adapted vector control,
2. Vector control implemented with the aim to minimise the transmission of mosquito-borne diseases and reducing the risk of outbreaks,
3. Health promotion to support an enabling environment and engaged community to promote community led vector control interventions, and to strengthen knowledge, attitudes, and practices.

A strong enabling environment is required to support the implementation of the strategic plan, including:

1. Ensure strong and dynamic national leadership of the *Aedes*-vector control agenda to maintain high level political and partner commitment and adequate financial support,
2. Ensure sufficient workforce to enable implementation of effective vector control,
3. Improve financial management and timely mobilisation of funds,
4. Improve entomological data management and reporting,
5. Strengthen insecticide management processes and the capacity for forecasting, procurement and supply chain for entomological consumables and vector control supplies.

Additionally, vector surveillance and vector control activities at Points of Entry (seaports and airport) will monitor mosquito species presence to detect and respond to the introduction of exotic species and to minimise the risk of

exporting mosquitoes to other countries. The activities in this strategic plan align with International Health Regulations obligations.

The scale and scope of activities will be adjusted as informed by factors such as: increased cases of dengue-like illness, regional outbreaks, high influx of international travellers and climate patterns. The Integrated Vector Control Committee (IVCC) will meet every three months for the multisectoral planning and coordination of vector surveillance and vector control strategies, including community engagement activities.

Partnerships are a critical foundation to this Strategic Plan (henceforth: SP) implementation and include:

- Samoa Ports Authority and Samoan Airport Authority,
- Ministry of Education, Sports, and Culture,
- Ministry of Justice and Courts Administration,
- Ministry of Health,
- Ministry of Women, Community, and Social Development,
- National Emergency Operations Centre,
- Samoa Sports Facility Authority,
- Samoa Shipping Corporation,
- International development partners including World Health Organization (henceforth: WHO) and Secretariat for the Pacific Communities (henceforth: SPC),
- Integrated Vector Control Committee (henceforth: IVCC),
- Samoa Animal Health Protection Society, and
- The communities of Samoa.

Routinely, communities should be informed about vector control activities and their needed engagement in reducing sources, transmission, and waste management through e.g., community clean-ups, the use of larvicide, indoor residual spraying, and personal protection measures. The Health Promotion activities within this plan aim to support and develop community level mechanisms and prevention plans that communities can take ownership of, with support and monitoring/evaluation provided by the Ministry of Health.

In an outbreak, communication activities should be undertaken to ensure the community is informed about the vector control activities that will be undertaken to control the outbreak. The focus would be on strategies aimed to reduce the number of adult mosquitoes.

Strong emphasis on monitoring and evaluation and responding to findings as part of continuous quality improvement including annual, mid-term and end of plan reviews, with findings feeding into annual operational and updating of the strategic plans. The first 2 years of the plan include many inception activities to fill gaps in knowledge required to focus the plan to the real epidemiological, entomological, insecticide resistance, and socio-cultural knowledge, beliefs and practices in Samoa and several consultations with partners to develop approaches to training, insecticide management, waste management, schools, and community engagement in the plan. The plan has flexibility to adapt to these results of these activities as well as lessons learnt from evaluations after any Health Promotion, waste management and other campaigns or response to an outbreak. The plan has been costed for the first 2 years, and then a review in the second year will be required to support annual costing based on the aforementioned inception activities. The first 2 years have been estimated to cost: Tala 1,636,176.

1. Country Profile

Samoa is a Pacific country consisting of four inhabited islands and a series of smaller, uninhabited islands (DFAT, 2022). The two largest islands are Savaii and Upolu (Figure 1).

Figure 1. Map of Samoa.



Source: <https://gisgeography.com/samoa-map/>

1.1. Political System

Samoa is a parliamentary republic, in 2022 led by chief of state Afioga Tuimaleali'ifano Va'aleto'a Eti Sualauvi II, elected in 2017. The Samoan government consists of a legislative, an executive, and a judicial branch. The executive branch is led by prime minister Hon. Fiame Naomi Mata'afa (Government of Samoa, 2022). The Samoan Ministry of Health is currently led by Hon. Valasi Luapitofanua Toogamaga Tafito Selesele. (Samoa Ministry of Health, 2022).

1.2. Demographic Data

The population of Samoa was approximately 206,000 in 2022 with a population growth rate of 0.63% (estimate), total fertility rate is 3.93 and life expectancy at birth is 72.77 years. The age structure shows 32.8% of the population are under the age of 15 years, 55.5% between 15 and 54 years of age and 11.8% are in the 55+ age bracket. Most of the Samoa's population, live on Savaii (25%) and Upolu (75%). It has been estimated that 36,000 people live in the capital, Apia and 80% of the population live in rural areas (Samoa Bureau of Statistics, 2021). The majority of Samoa's population and infrastructure are located in the low-lying coastal areas.

Samoa has two official languages: Samoan and English. Main spoken languages are Samoan (Polynesian) (91.1%), Samoan/English (6.7%) and English (0.5%). 55% of the population are protestant Christians, 19% Roman Catholics, 17% Church of Jesus Christ of Latter-day Saints. There are also small Bahá'í and Muslim minorities (The World Factbook, 2022).

1.3. Ecosystem, Environment and Climate

Samoa has a tropical climate. Temperatures vary only a couple of degrees between wet season (November to April) and dry season, averaging between 22 °C to 30 °C. The islands are volcanic with a forested rugged interior and surrounded by fringing barrier reefs.

Samoa generates around 28,000 tons of solid waste annually. Of this, around 10,000 tons are recycled. Current threats to Samoa's environment include overfishing, soil erosion, deforestation and the introduction of invasive species (The World Factbook, 2022).

1.4. Socioeconomic Situation

Samoa's nominal GDP is roughly \$844 million (USD). 90% of Samoa's exports come from agriculture and fishing (The World Factbook, 2022). Samoa's economy has been impacted by the COVID-19 pandemic, particularly due to the suspension of international tourism (DFAT, 2022). 20.3% of Samoans live below the poverty line (The World Factbook, 2022). The unemployment rate among 15-24 year olds is 43% for women and 25% for men (The World Factbook, 2022). The ratio of men to women in Samoa is 1.03 men/women. The gender inequality rate is 0.457 (numbers >0 entail some degree of inequality). The Samoan Ministry of Women, Community and Social Development (MWCSD) is formally responsible for the rights and representation of women (UN Food and Agriculture Organization, 2016). 99.1% of Samoans are literate and it is equal for men and women (99% men, 99.2% women). Currently, 4.8% of the GDP is attributed to education (The World Factbook, 2022).

1.5. Sociocultural Systems

Samoa society is based on a collectivist governance system (*fā'a Matai*) organised by extended families (*aiga*), each with its own chief/leader (*Matai*) – a highly respected position. There is a cultural code - The Samoan way (*fā'a Samoa*) - that guides people on how to lead their life. Individuals within each *aiga* are expected to prioritise the interests of the group or community over their personal interests. The Matai are responsible for maintaining the traditions and customs of the village as well as administrative duties (such as ensuring the family/village is self-sufficient, well-nourished, and maintaining social order). They are also spiritual caretakers. At village level, local laws prevail. Many people who move to Apia see this as a temporary move and intend to return to their villages (Gero, Méheux, & Dominey-Howes, 2011; Huffer & So'o, 2005; Scroope, 2017). The villages maintain strong traditional governance structures including the Council of Chiefs and Women's Committees, which, along with church groups, are very significant influences on how a village functions. These are formalised through links to the government (see [Appendix 1](#)). According to Samoan cultural principles, men and women have equal rights to family resources, including land. Both men and women can fulfill the role of family chief. Women are viewed as equal to men (Motusaga, 2017).

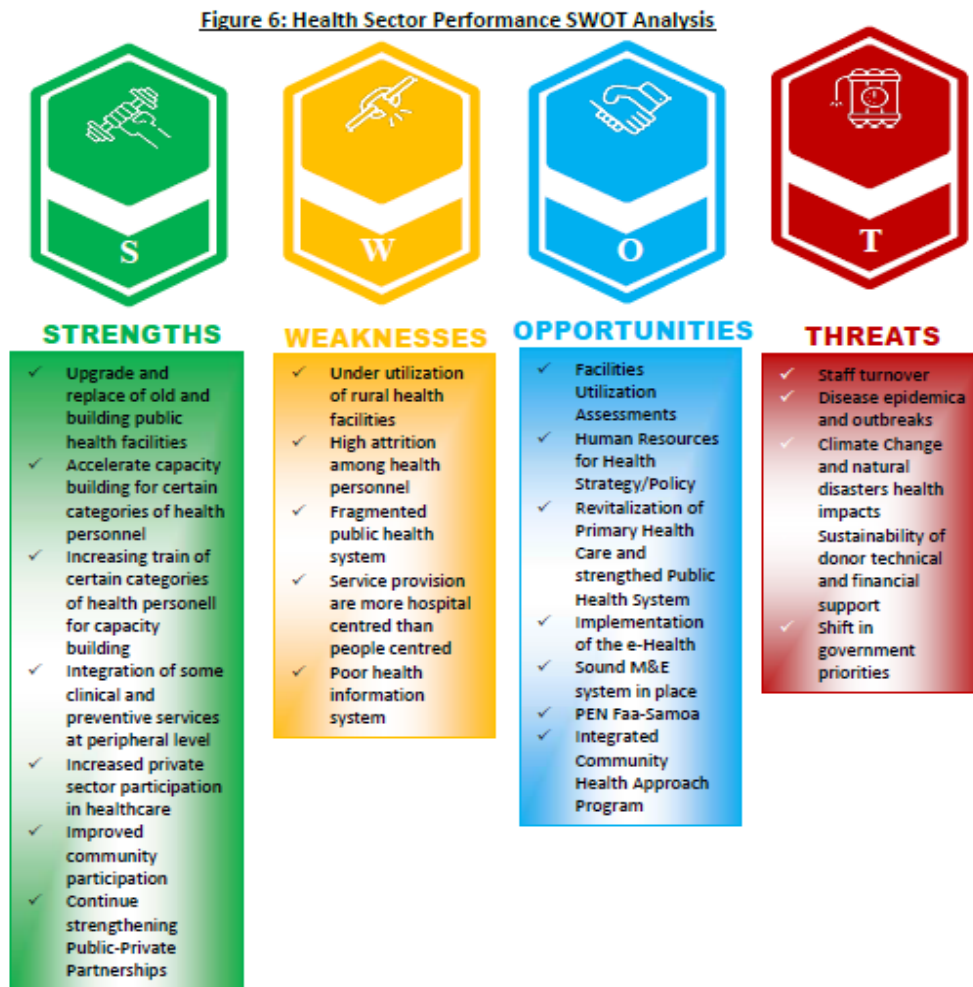
1.6. Health System

Samoa has a National Health Sector Plan (2019/2020 – 2029/30) (Government of Samoa Ministry of Health, 2019). The vision of this plan is that when all partners and stakeholders are working effectively and cohesively it strengthens Samoa's health system's response to the health demands of the population and improve the population's overall health. The plan states that in achieving the vision and mission, the sector will be guided by the following Principles:

- Accessibility requires easy access to the healthcare system considering safe and friendly health facilities; quality health services are always affordable and geographically available as well as having health care providers whom the patient trusts and can communicate with.
- Accountability requires improvement, transparent and accountable capacity of individuals, families, communities, the government, and the country to look after and protect health and wellbeing.
- Efficiency is demonstrated by allocating resources (budgets, health workforce, equipment etc.) to where they will have the greatest result and impact.
- Equity requires that all health services are fair, just, and unbiased.
- Safety implies that the utmost care is always performed and demonstrated in the care of the public and workers.
- Quality is demonstrated by striving to achieve the high standards of operation of the health system.

To develop the plan the Ministry of Health (MOH) undertook a Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis in the National Health Sector Plan (Figure 2).

Figure 2. Health sector performance SWOT Analysis **Source:** Government of Samoa Ministry of Health (2019).

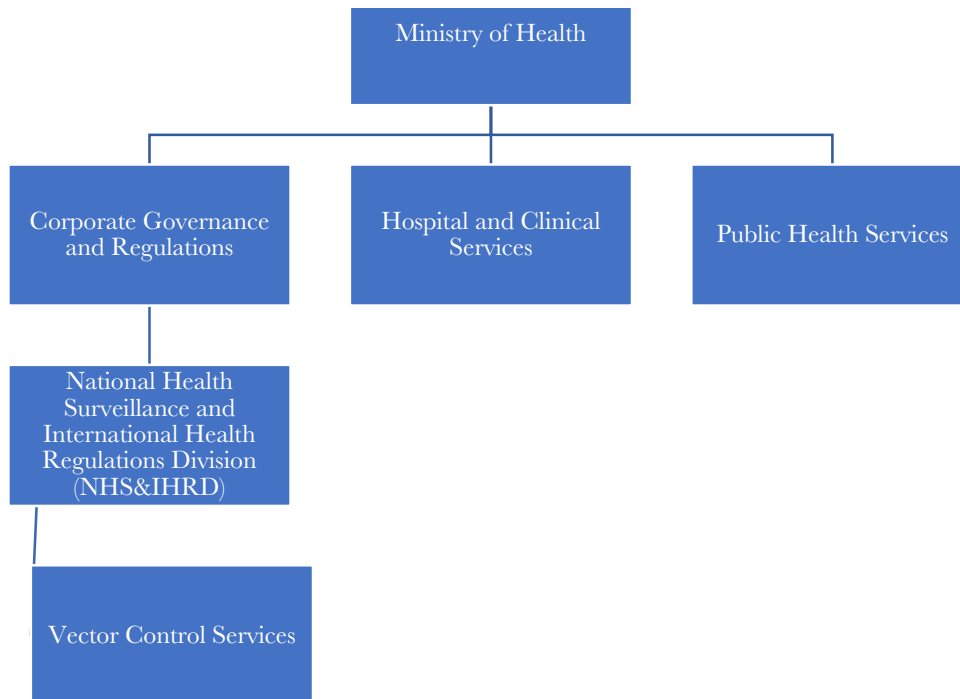


The Health Sector Plan, along with the SWOT analysis, have been critical in the development of the present SP.

Samoa’s Ministry of Health (MOH) is organised under three pillars: Corporate Governance and Regulations, Hospital and Clinical Services, and Public Health Services.

Samoa’s Vector Control Services (VCS) sit within the National Health Surveillance and International Health Regulations Division (NHS&IHRD). This falls within the Corporate Governance and Regulations division and is reportable to the Director General of Health. The NHS&IHR Division is led by the Assistant CEO. VCS is currently comprised of a Principal Officer, a Senior Officer and an Officer. If more human resources (HR) are required, other officers from the NHS&IHRD Divisions of Port Health, Typhoid, or Water Quality and Sanitation, may be requested to join the response (Figure 3).

Figure 3. Organizational diagram of Ministry of Health, showing location of Vector Control services.



Samoa's main national hospital is in Apia. There are two additional hospitals (one on each of the main islands), 6 rural district hospitals and 5 community health centres (The World Factbook, 2022). The district hospitals and health centres are staffed mainly by nurses. Care provided at these locations consists of basic health checks and primary care (Baghirov, Ah-Ching, & Bollars, 2019). The current health expenditure is 6.4% of the GDP (The World Factbook, 2022). Baghirov et al. (2019) noted "The main bottleneck in the provision of universal health coverage (UHC) in Samoa is a limited health workforce and its uneven distribution".

Dengue infections are considered an urgent and high public health priority in Samoa, while chikungunya and Zika infections are considered high public health priorities. These three conditions are considered immediately notifiable diseases. Lymphatic filariasis (LF) is endemic in Samoa and should be reported to the national health surveillance division daily. Samoa has guidelines in place for the management of dengue, chikungunya, Zika, and LF, the National Communicable Disease Surveillance and Control Guidelines (Government of Samoa Ministry of Health, 2020b).

1.7. Health Promotion

The Healthy Islands approach was endorsed by Samoa in 2005 (WHO, 2005) and has been used for Healthy Village campaigns for several years, including for Island Clean-ups and Health Promoting Schools. The annual plans for the MOH have key performance indicators (KPIs) listed for these activities. These are done in partnership with the Samoa Tourism Authority (STA) and ministries of: Natural Resources and Environment (MNRE), Women, Community, and Social Development (MWCSO), and Education, Sports, and Culture (MESC). The MWCSO leads community engagement and social development activities through health inspectors, engagement with mayors, and youth and women's representatives. STA leads the annual festival which promotes the importance of cleaning the country to support tourism. The MNRE hosts National Sanitation Day and the MOH manages an annual one-week National Health Week, promoting the importance of healthy villages. The MWCSO and MOH have an MOU to cover these arrangements.

1.8. Disaster Preparedness Mechanisms

Samoa is prone to natural disasters such as flooding, earthquakes, tsunamis, droughts, and cyclones (Government of Samoa Ministry of Health, 2017). The government has several preparedness strategies and policies in place. Samoa has formulated a holistic strategy for disaster management and preparedness in the health sector (Government of Samoa, 2017). Disaster preparedness is a high and urgent priority for Samoa. There is a separate strategy for climate adaptation of the health system in Samoa (Government of Samoa Ministry of Health, 2013).

Samoa also has an epidemic and pandemic preparedness plan with focus on influenza and other infectious diseases. This was updated for the financial year 2020/2021 (Government of Samoa Ministry of Health, 2020a). A response plan for COVID-19 was initiated in February 2020 (Government of Samoa Ministry of Health, 2020c).

The World Bank Group (2021) noted the following key messages about the risks of climate change to Samoa:

- It is predicted that warming is likely to take place at a rate slightly lower than the global average,
- Potential threats to human well-being and natural ecosystems include increased prevalence of natural hazards such as extreme heat, intensified cyclones, wave-driven flooding, coastal erosion, and extreme rainfall,
- Extreme pressure on Samoan biodiversity and the natural environment,
- Geographic isolation and economic vulnerabilities exacerbate the challenges faced by communities and decision makers.

1.9. Impact of COVID-19 on vector control programmes

In response to COVID-19, Samoa initiated border closures and remained free from community transmission of COVID-19 until March 2022. The most devastating impact of COVID-19 has been on Samoa's economy, primarily due to the fall in tourism and trade (DFAT, 2021). Vector surveillance and control programmes in Samoa were heavily impacted by COVID-19. Though the number of reported cases of dengue like illness (DLI) in Samoa have been decreasing since 2020 (WHO, 2022), the syndromic surveillance system was paused during the COVID 19 control and surveillance efforts and data is limited.

2. Mosquito-borne diseases situation analysis¹

2.1. *Aedes*-borne diseases

2.1.1. Epidemiological situation

In Samoa, dengue and LF are endemic, and there is a risk that chikungunya and/or Zika viruses could be re-introduced. Dengue, chikungunya and Zika are arboviruses transmitted to humans by the *Aedes* species mosquitoes, in particular *Ae. aegypti* and *Ae. albopictus*. There is no specific treatment for these arboviruses. There is no vaccine available for chikungunya or Zika. While a vaccine exists for dengue, it is only recommended for use in seropositive individuals. As such, vector control remains the most effective measure to prevent and control the transmission of arboviruses.

LF is a parasitic disease, transmitted by *Aedes* mosquitoes such as *Aedes polynesiensis*. Elimination campaigns for LF have been conducted since 1965, however increased efforts have begun under the Pacific Program for the Elimination of Lymphatic Filariasis (PacELF), which commenced in 1999. Control efforts have focused on using mass drug administration (MDA) with antiparasitic drugs. The strengthening of *Aedes* vector surveillance and control in Samoa may present an opportunity for enhanced control of LF transmission.

Arbovirus outbreaks have occurred sporadically over the past decade (Table 1). Outbreaks of dengue were reported in 2015 (1,507 cases) and 2018 (3,255 cases; see Figure 4). During the 2018 outbreak, there was an attack rate (AR) of 16.6 cases/1,000 population. The most affected areas were Vaimauga West (AR 34.4 cases/1000 pop), Faleata East (AR 30.9 cases/1000 pop), and Vaimauga East (AR 25.5 cases/1000 pop) (SITREP NO.9, Dengue Serotype 2 Outbreak in Samoa). A large outbreak of chikungunya virus occurred in 2014-2015, and Zika cases were reported between 2015 and 2016.

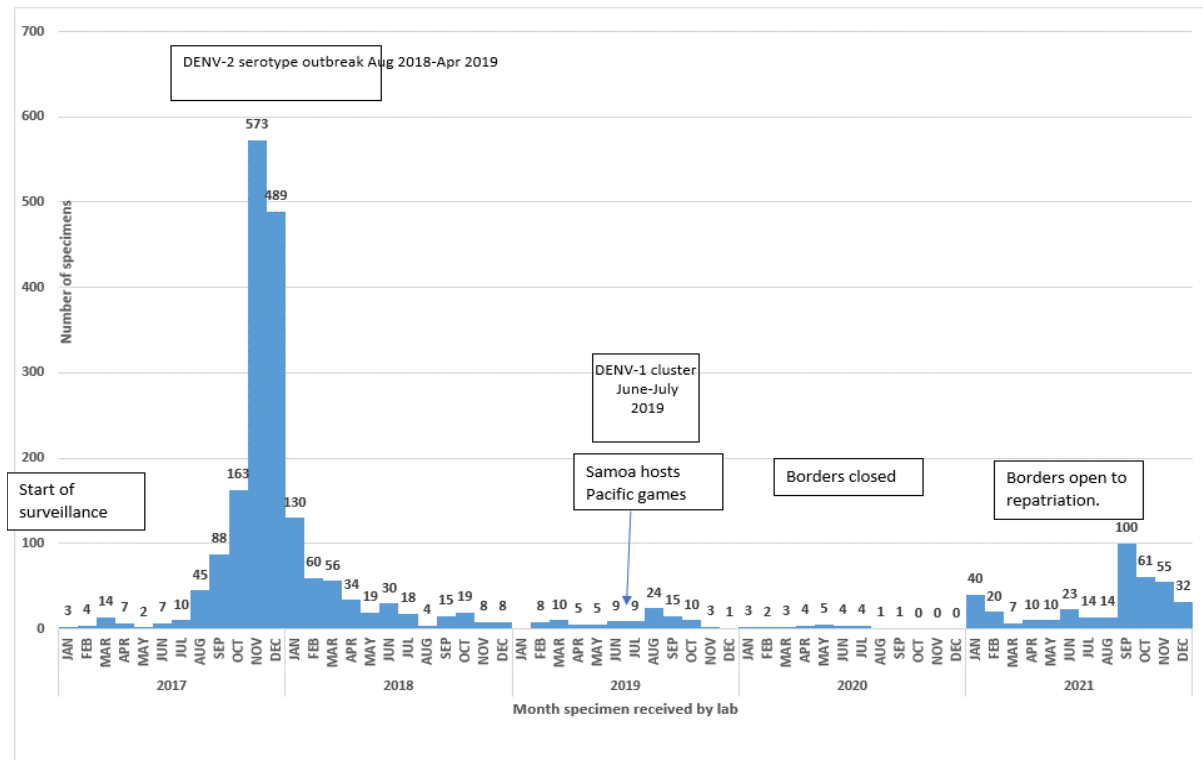
¹ Note that throughout this plan the usage of the term vector is limited to mosquito vectors. It is acknowledged that there are other vectors beyond mosquitoes present in Samoa, however the control of non-mosquito vectors hasn't been included in this current plan.

Table 1. Arboviral outbreaks in Samoa, 2014-2022

Date report of first cases	Latest information	Implicated virus	Number of Cases
July 2014	March 2015	Chikungunya virus	4524
June 2015	Sept 2016	Dengue virus V3	1507
September 2015	May 2016	Zika Virus	167 suspected, 24 confirmed
August 2017	May 2018	Dengue virus 2	3255

Source: Matthews et al. (2022)

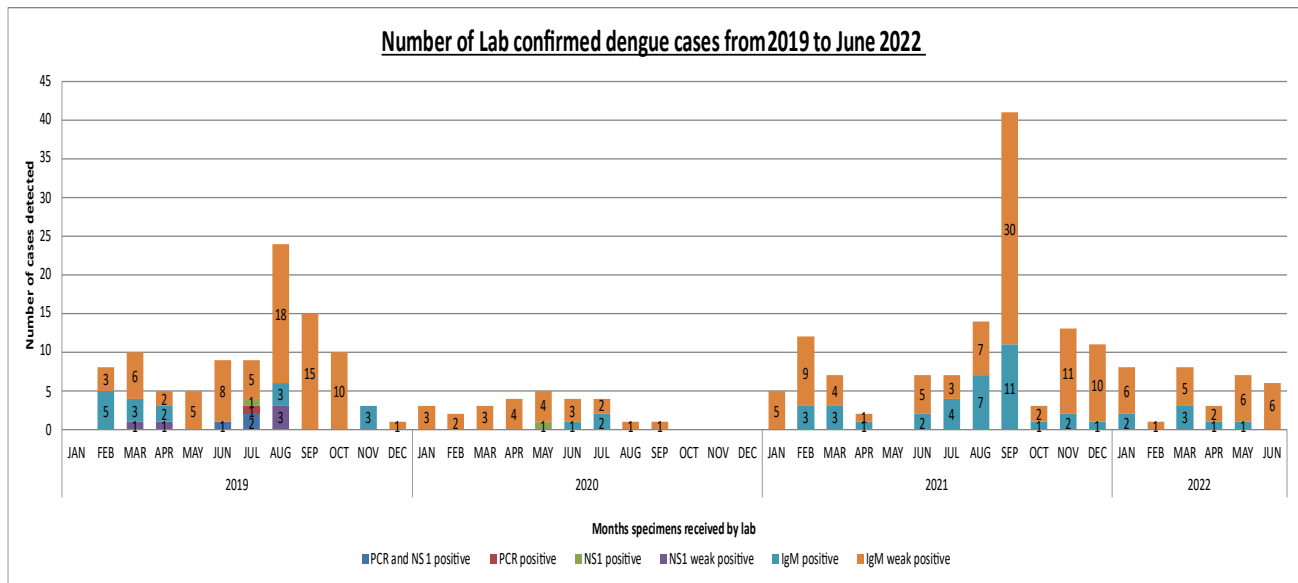
Figure 4. Number of Specimens Received in the National Clinical Laboratory for dengue diagnosis (2017-2021).



Source: Samoa National Clinical Laboratory

Data from the Samoa National Clinical Laboratory shows that laboratory-confirmed dengue cases have continued to occur in Samoa almost every month between 2019-2022 (Figure 5). In 2021, August, September, and November had the most cases, suggesting a higher risk in the second half of the year. A similar pattern can be seen in 2019.

Figure 5. Number of laboratory-confirmed dengue cases in Samoa from 2019 to June 2022.



Source: Samoa National Clinical Laboratory

2.1.2. Entomological situation

There are 14 species of mosquito in Samoa (Appendix 2), some of which have the potential to transmit pathogens (Table 2). The Aedes-borne arboviruses (dengue, chikungunya and Zika) are primarily transmitted by *Aedes aegypti*, with *Aedes albopictus* and *Aedes polynesiensis* potentially playing secondary roles. LF is primarily transmitted by *Aedes polynesiensis* and *Aedes samoanus*, with potential secondary vectors being *Aedes tutuilae* and *Aedes upolensis*. The presence of *Aedes tutuilae* in Samoa is suspected. See Appendix 3 for a summary of their larval habitats and behaviours.

Table 2. List of mosquitoes that are medically important vectors in Samoa.

Disease	Genus	Species
Dengue, chikungunya and Zika	<i>Aedes</i>	<i>aegypti</i> *
		<i>albopictus</i>
		<i>polynesiensis</i>
		<i>tutuilae</i> (suspected)
Lymphatic filariasis	<i>Aedes</i>	<i>samoanus</i> *
		<i>polynesiensis</i> *
		<i>upolensis</i>

*Primary vectors which should form the focus of vector control operations.

Several entomological surveys have shown that the most common mosquito species in Samoa are *Aedes aegypti* and *Aedes polynesiensis*. In 2016, a density survey of adult mosquitoes was carried out in four areas of Upolu. At that time, the most frequently collected species were *Aedes aegypti* (95%) and *Aedes polynesiensis* (3%). Also, *Aedes albopictus* (adult mosquitoes and larvae) was detected for the first time in Samoa (Government of Samoa, 2016).

During 2019, entomological surveillance was conducted across Upolu, Savai'i, and Manono Island. This survey found that among the *Aedes* species, the most common were *Aedes polynesiensis* (60%) and *Aedes aegypti* (21%) (McPherson et al., 2022). In 2022, entomological surveillance led by the VCS found that *Aedes albopictus* is now widespread throughout Samoa (Government of Samoa Ministry of Health, 2022).

3. Strategic framework

3.1. Vision

A Samoa free of mosquito-borne diseases, contributing to the good health and well-being of the population.

3.2. Mission

Minimise the severity and frequency of mosquito-borne disease transmission and outbreaks.

3.3. Strategic directions and policy priorities

This SP is aligned with several of the core principles and values of the existing Health Sector Plan (2019/2020-2029/30) (Government of Samoa Ministry of Health, 2019), namely community focus, local leadership, efficiency, quality and safety, genuine partnership and inclusiveness, and quality leadership and stewardship (Figure 6).

Figure 6. Core values and principles of the plan.



3.4. Strategic objectives

This SP has five objectives that respond to several of the key outcomes of Samoa's health sector, as shown in Table 3. The activities included under the SP are those undertaken routinely, as well as in response to an outbreak.

Table 3. Strategic objectives of this plan and their alignment to key outcomes of Samoa's health sector.

Objective	Aligned to Key outcome of Samoa's health sector
1. To implement routine mosquito surveillance and preventative control activities.	KO2: Improved prevention, control, and management of communicable and neglected tropical diseases. KO6: Improved healthy living through Health Promotion and Primordial Prevention. KO7: Improved risk management and response to disaster, public health Emergencies (health security) and change.
2. To implement an effective mosquito control response during outbreaks.	KO2, KO6 and KO7
3. To prevent the importation of exotic mosquito species into Samoa.	KO7
4. To implement focal vector surveillance and control during case investigations.	KO2 and KO7
5. To build the capacity to optimise the performance of management processes to support mosquito surveillance and control activities.	KO1: Improved health systems, governance, and administration.

3.4.1. Key strategies.

The strategic objectives of the plan are shown below in Table 4.

Table 4. Strategic objectives of the plan and strategies to achieve these objectives.

Objectives	Strategies
1. Implement routine mosquito surveillance and preventative control activities.	1.1. Routine vector surveillance activities, including surveys of adult and larval stages as well as insecticide resistance status. 1.2. Routine vector control activities, including regular source reduction and larviciding. 1.3. Community engagement activities including clean-up programmes in communities. 1.4. Health Promotion including World Mosquito Day. 1.5. Vector control products waste management. 1.6. Increased vector control activities coinciding with high-risk events/times.
2. Implement an effective mosquito control response during outbreaks.	2.1. Responsive vector control activities, including indoor residual spraying (IRS) targeted to high-risk areas. 2.2. Disseminate locally appropriate information in high-risk areas, including promotion of personal protection measures. 2.3. Supply of insecticide treated nets to febrile patients. 2.4. Support community engagement in outbreak response.
3. Prevent the importation of exotic mosquito species into Samoa.	3.1 Routine vector surveillance conducted at airports and wharfs. 3.2 Regular larval control, including source reduction and larviciding at airports and wharfs. 3.3 Indoor residual spraying in planes and boats. 3.4 Routine annual IRS in airports and wharfs. 3.5 Increased vector control activities at Points of Entry (PoE) coinciding with high-risk events/times.
4. Implement focal vector surveillance and control during case investigations.	4.1 Assess the larval population as well as the types and quantities of aquatic habitats at the case house. 4.2 Conduct IRS at the dengue patients' house/s, as well as other houses within a 200 m radius within 72 h. 4.3 Implement larval source reduction and larviciding. 4.4 Risk communication and health promotion activities including community engagement. 4.5 Promote personal protection measures, including supply of insecticide treated nets to febrile patients.
5. Build the capacity to optimise the performance of management processes to support mosquito surveillance and control activities.	5.1 Building capacity within the health surveillance system to conduct vector surveillance and control. 5.2 Insecticide use and management. 5.3 Human resource management. 5.4 Health information systems including electronic data management. 4.5 Training. 4.6 Implementation research. 4.7 Logistics management. 4.8 Other management. 4.9 Networking and reporting.

3.4.2. Key interventions and supporting elements.

This SP focuses on the vector surveillance and control activities required to minimise the transmission of dengue and other arboviruses. This plan is to be implemented alongside the National Communicable Disease Control Guidelines which supports the clinical aspects of diagnosis, treatment, and case surveillance.

The key entomological interventions are:

1. Routine vector surveillance to inform locally adapted vector control, including adult surveillance, assessing key larval habitats and insecticide resistance status,
2. Vector control implemented to minimise the transmission of mosquito-borne diseases and reducing the risk of outbreaks. This includes regular source reduction, larviciding, proactive IRS and promotion of personal protection measures. Vector control activities are to be implemented both routinely and during outbreaks, with the scope and scale of activities adjusted in response to the local epidemiological situation and in consideration with other environmental and social influences,

3. Health Promotion to support an enabling environment, promote community led vector control interventions, and to strengthen knowledge, attitudes, and practices.

A strong enabling environment is required to support the implementation of the SP, including:

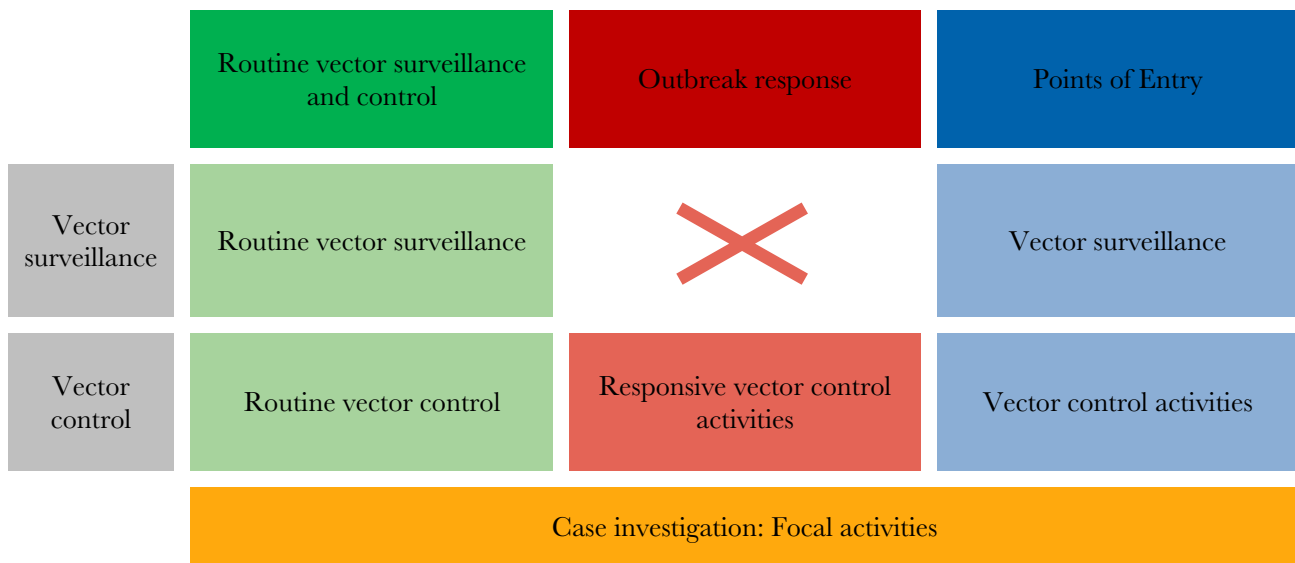
1. Ensure strong and dynamic national leadership of the *Aedes*-vector control agenda to maintain high level political and partner commitment and adequate financial support,
2. Ensure sufficient workforce to enable implementation of effective vector control by ensuring existing posts are filled and supporting them to engage with capacity building opportunities,
3. Improve financial management and timely mobilisation of funds,
4. Improve entomological data management and reporting,
5. Strengthen insecticide management processes and capacity for forecasting, procurement, and supply chain for entomological consumables and vector control supplies.

4. Implementation Plan

The vector surveillance and control activities to be undertaken are shown in Figure 7. The details of these activities are described in section 4.1-4.5. Embedded within each set of activities is community engagement and local ownership (section 4.6).

The scale and scope of activities will be adjusted as informed by factors such as: increased cases of dengue-like illness, regional outbreaks, high influx of international travellers, and climate patterns. The IVCC will meet every three months for the multisectoral planning and coordination of vector surveillance and vector control strategies, including community engagement activities.

Figure 7. Overview of routine and outbreak surveillance and control activities.



4.1. Routine Vector Surveillance Activities

The routine vector surveillance and control activities are aimed at minimising the transmission of mosquito-borne diseases and reducing the risk of outbreaks (**green column** in Figure 7). **Routine vector surveillance** is an essential component of this SP, as it will provide critical data to inform all vector control activities.

The vector surveillance activities to monitor are:

- the adult mosquito population,
- key larval habitats, and
- insecticide resistance.

Specifically, the surveillance activities will be used for decisions on the following:

- Choice of vector control tool based on the mosquito vectors present and their behaviours (biting profile and resting habitats),
- Choice of insecticide based on the insecticide resistance profile of the vectors,
- Community clean up messages based on information about the containers utilized by larvae,

The IVCC should be informed of vector status at quarterly meetings to inform the decision-making process.

The vector surveillance activities have been designed to build a sustainable routine program that will provide critical information for decision making, as follows:

- **Adult mosquito population:** Routine surveys of the adult mosquito population to be conducted either quarterly or semi-annually in selected surveillance sites. [Appendix 4](#) contains a full list and details of types of locations for adult mosquito surveillance in Samoa. In the first year of the plan, the feasibility of conducting surveys for adult behaviours (to guide where indoor or outdoor residual spraying is warranted) will be investigated.
- **Key larval habitats:** In the first year of the plan, the potential sites for larval surveys will be selected by the VCS. The aim is to conduct larval surveys periodically (two or fewer times per year depending on need).
- **Insecticide resistance testing:** In the first year of the plan, the potential sites for larval surveys will be selected by the VCS. The aim is to conduct insecticide resistance testing annually, or at least every second year.

To conduct larval surveys and insecticide resistance testing, training will be required. Training of personnel supported by peer-to-peer mentoring from regional colleagues will be a key priority in the first years of the plan.

4.2. Routine Vector Control Activities

Routine vector control (green column in Figure 7) activities are ongoing activities that are conducted before an outbreak occurs to control endemic dengue transmission.

The vector control activities to be undertaken are:

- regular source reduction through community engagement,
- the use of larvicides where aquatic habitats cannot be contained with source reduction,
- IRS targeted to high-risk areas,
- disseminating locally appropriate information in high-risk areas, and
- promotion of personal protection measures.

The following components will be prioritised in Samoa for an integrated and sustainable routine preventive vector control program:

- **Regular larval source reduction:** Implementing year-round source reduction to reduce or eliminate larval habitats for vectors. This is done to prevent or minimise mosquito biting densities with strong community engagement (WHO Division of Pacific Technical Support, 2020). [Appendix 3](#) contains general information on the key larval habitats of *Aedes* vectors. This information will be used initially to inform the larval source reduction campaigns (including community clean-ups) and to ensure that the key habitats are targeted. Once local data on key larval habitats becomes available for Samoa, this will be used to target source reduction activities more accurately. [Appendix 5](#) outlines the different ways in which potential larval habitats could be treated to minimise the presence of *Aedes* larvae.

- Community engagement:** Disseminating contextualised, locally appropriate information and education materials about *Aedes* vectors and personal protection measures, as well as working in partnership with communities to reduce vector aquatic habitats (for more details see Section 4.6). A priority activity will be the annual celebration of World Mosquito Day (WMD) in August with multi-sectoral collaboration on aligned messaging.

The scale and scope of vector control activities will be adjusted as informed by epidemiological, environmental, and social factors such as increased cases of dengue-like illness, regional outbreaks, high influx of international travellers and climate patterns (Table 5).

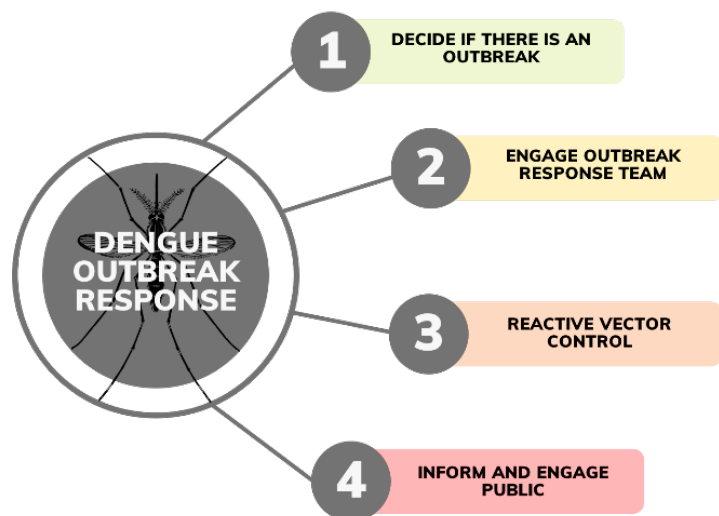
Table 5. Epidemiological, environmental, and social factors that adjust the scale of vector control activities.

Category	Inputs
National Health Surveillance	Rise in dengue-like illness above threshold. Rise in laboratory confirmed dengue cases above threshold. Severe dengue cases detected. Detection of arbovirus other than dengue.
Regional Factors	Outbreak in other countries within region. Mass movement of travellers within region.
High-risk events	Mass-gathering events. Hosting of international/regional events. Events with a likelihood of increased travellers to Samoa.
Climate	Based on findings of local operational research. Natural disasters such as cyclones, flooding, or tsunamis. Higher than average rainfall.

4.3. Outbreak Vector Control Activities

Reactive vector control activities (**red column** in Figure 7) are to be initiated in response to an outbreak. Outbreaks are declared by the Health Emergency Operations Centre (HEOC) (The National Communicable Disease Control Committee converts to this designation at times of an outbreak). The HEOC provide health recommendations to the National Emergency Operations Centre (NEOC) who coordinate the national response for all types of emergencies including outbreaks. During an outbreak the IVCC will report to the HEOC ([Appendix 6](#)). This SP exclusively outlines the vector control activities that will be conducted in parallel with other response activities (Figure 8). During widespread outbreaks, routine vector surveillance activities are de-prioritised in favour of shifting all existing capacity to implement reactive vector control activities. This is justified by having undertaken routine, ongoing vector surveillance activities, meaning that essential entomological data will be readily available in the event of an outbreak. Noting that as a part of initial outbreak investigations, case investigations are often requested, including a vector assessment (see Section 4.5 for more details).

Figure 8. Summary of the four steps in a dengue outbreak response.



Outbreak vector control aims to rapidly reduce the density of adult mosquitoes before they can complete the extrinsic incubation cycle (typically 8-12 days) and transmit the virus. Thus, reactive vector control has a focus on adult mosquito control. The vector control activities will be adjusted according to the conditions of the outbreak. When transmission is widespread, interventions will be prioritised for the areas with the highest transmission (identified through national health surveillance situation reports and laboratory data). [Appendix 6](#) and [Appendix 7](#) contains details of the outbreak vector control activities.

The vector control activities to be undertaken in response to an outbreak are:

- IRS in high-risk areas when outbreak is driven by *Ae. aegypti* (most likely scenario),
- outdoor residual spraying if outbreak is driven by *Ae. albopictus* or *Ae. polynesiensis*,
- regular source reduction through community engagement,
- the use of larvicides where aquatic habitats cannot be contained with source reduction,
- disseminating locally appropriate information in high-risk areas, and
- promotion of personal protection measures.

The following activities will be prioritised to rapidly reduce the density of potentially infectious adult mosquitoes:

- **Indoor residual spraying targeted to high-risk areas:** IRS-*Aedes* is the application of residual insecticides to the resting sites of *Aedes* mosquitoes inside houses, primarily for *Ae. aegypti*. When the vector comes into contact with the sprayed surface, it absorbs a lethal dose of the insecticide, resulting in death. This contributes to reducing vector densities. During an outbreak, IRS-*Aedes* is the best method to quickly reduce the density of infected mosquitoes in the area. For step-by-step guidance see the Pan American Health Organization (PAHO) *Manual for Indoor Residual Spraying in Urban Areas for Aedes aegypti Control* (PAHO, 2019).
- **Risk communication:** For public health emergencies, risk communication refers to the real-time exchange of information, advice and opinions between experts or officials and people who face a threat to their survival, health, or social well-being. Its ultimate purpose is that everyone at risk can take informed decisions to mitigate the effects of the health threat and take protective and preventive action. Engaging communities is key to the success of the vector control implementation, including early detection and especially during outbreak response. Communities, when appropriately engaged, are the front line in detecting and managing epidemics. They are the ones who are affected, and their behaviour and actions can help contain an outbreak (see [Appendix 8](#)).

4.4. Vector Activities at Points of entry (PoE)

The purpose of vector surveillance and vector control activities at Points of Entry (henceforth: PoE) (**blue column** in Figure 7) will be to monitor the presence of mosquito species to detect and respond to the introduction of exotic species and to minimise the risk of exporting mosquitoes to other countries. The activities in this SP align with IHR obligations. These activities will be coordinated in collaboration with Samoa Ports Authority (SPA) and Samoan Airport Authority (SAA). The PoE in Samoa are the airports (Faleolo, Fagalii, Moata, and Asau) and the wharfs (Mulifanua, Salelologa, and Asau).

Currently, there are direct international flights to Apia from Honolulu, Hawaii; Nadi, Fiji; Auckland, New Zealand; Brisbane, Australia; Sydney, Australia. The majority of merchandise imports (cargo) that arrive in Samoa are from New Zealand, Singapore, China, Australia, and The United States of America (Government of Samoa Ministry of Agriculture, 2003). It is important to understand the vectors present in these locations that could be of high risk of exotic incursion. All vessels (sea and air) intending to enter Samoa must comply with the Quarantine (Biosecurity) Act 2005 (Government of Samoa Ministry of Health, 2005). The quarantine procedures for vessel clearance are outlined in the WHO manual for disinsection of aircrafts (WHO, 2021).

When an incursion of a mosquito vector species is detected, spot checks should be initiated to determine the distribution and spread of the species away from the PoE, as well as the aquatic habitats and insecticide resistance profile to inform an urgent vector control response.

The vector surveillance activities to be undertaken at PoE are to:

- monitor the adult mosquito population,

- monitor for mosquito larvae, and
- inspect air and sea cargo containers for the presence of insects, including mosquitoes.

The key vector surveillance activities that should be implemented at and around PoE are as follows:

- **Adult mosquito population:** Routine surveys of the adult mosquito population to be conducted either quarterly or semi-annually at the PoE surveillance sites. [Appendix 4](#) contains a full list and details of types of locations for adult mosquito surveillance in Samoa.
- **Larval habitat availability:** The PoE should be regularly surveyed for the presence of potential larval habitats. Any larvae can be assessed to determine mosquito species occurrence.
- **Inspect air and sea cargo containers for the presence of insects, including mosquitoes:** During routine docking and clearance of cargo shipments, assessments of the holds can be made to determine if any mosquitoes have been inadvertently transported with the shipment. Visual inspections can be made for both adult and mosquito larvae. If live insects are found, close the container until it can be disinfected via fumigation (see details in the Operations Manual (<https://www.who.int/publications/i/item/9789240014459>)).

Further details about routine vector surveillance at PoE available via the WHO:

<https://www.who.int/publications/i/item/vector-surveillance-and-control-at-ports-airports-and-ground-crossings>.

4.4.1. Routine vector control at PoE

Under the IHR obligations, designated PoE are to be maintained free of insects, vermin, and risk of transmission. Thus, vector control activities aim to control *Aedes* vectors to a minimum distance of 400m around each PoE. These prophylactic vector control operations are ongoing, regardless of the status of exotic mosquito incursions.

The vector control activities will focus on:

- regular larval source reduction,
- larviciding,
- routine disinsection of planes and boats, and
- routine annual IRS in airports and wharfs.

The following activities will be prioritised to ensure PoE are to be maintained free of mosquitoes:

- **Larval source reduction:** Source reduction should be the primary strategy used for larval control. The larvae of *Aedes* vectors utilise artificial and natural habitats. The staff at PoE should ensure that the premises are maintained to minimise the occurrence of larval habitats. Details on appropriate measures for larval source reduction are outlined in [Appendix 5](#).
- **Larviciding:** Where larval habitats cannot be addressed through source reduction, it is appropriate to apply larvicides.
- **Routine disinsection of planes and boats:** Aircrafts are disinfected to protect from the introduction of potential disease vectors and to help prevent the spread of pathogens borne by mosquitoes and other vectors. The latest WHO guidance is outlined in the manual for aircraft disinsection methods and procedures (WHO, 2021). Procedures for disinsection of vessels are outlined in the Quarantine Operations Manual (Government of Samoa Ministry of Agriculture, 2003). In liaison with the departure country, the requirements for disinsection of arriving aircrafts should be assessed. The relevant countries that require disinsection of all in-bound flights are Australia, Fiji, and New Zealand.
- **Routine annual IRS in airports and wharfs:** IRS-*Aedes* (the application of residual insecticides) should be applied to the resting sites of *Aedes* mosquitoes inside airports and wharfs. Timing will depend on residual life of available insecticides, and/or to coincide with high-risk events/times (planned in advance). For step-by-step guidance see PAHO (2019).

4.5. Vector Control Activities at locations of selected laboratory-confirmed cases

The purpose of vector control activities during a case investigation (**yellow row** in Figure 7) is to contain or prevent ongoing local transmission. Case investigations can be undertaken at any moment if a laboratory-confirmed vector-borne case has been detected (a laboratory-confirmed case is defined as a case testing weak-positive or positive on any of the following tests: IgM, NS1 or PCR) and a case investigation is requested by the public health division.

The scope of the activities is focal and conducted at the house and contact location of the case(s). With regards to vector activities, a radius of up to 200m around the case and contact locations is utilised, as this includes the flight range of potentially infectious mosquitoes. Focal vector assessments should be conducted within 24h of being requested, or within 24h of the outbreak being declared. The Case Investigation Process is described in [Appendix 9](#).

4.5.1. Vector surveillance during case investigations

Vector surveillance during case investigations focuses on conducting larval surveys to inform the responsive vector control activities. The vector surveillance activities should be practical and able to be implemented easily during a single visit to the premises. The vector surveillance activities to be undertaken during case investigations are to:

- **Survey larval habitats:** Assess the quantity of potential larval habitats, and the density of associated larvae, to provide a proxy to rapidly indicate the presence and density of *Aedes* vectors in the immediate vicinity. The information from the larval survey should be immediately disseminated to the householders, along with advice on how to minimise the occurrence of *Aedes* larval habitats within the premises.

4.5.2. Vector control during case investigations

The package of responsive vector control will depend on the local situation as informed by the vector survey and epidemiological situation. The vector control response should be focal and targeted to the case and contact houses and implemented rapidly to prevent further spread.

The vector control activities will include:

- IRS,
- source reduction via community action,
- larviciding,
- the provision, use and recommendation of personal protection measures following a needs assessment of the residence, and
- provision of targeted Information, Education, and Communication (IEC) materials and specific risk reduction recommendations.

The following activities will be prioritised to rapidly reduce the density of potentially infectious adult mosquitoes:

- **IRS:** IRS-*Aedes* should be conducted at the dengue patients' house/s, as well as other houses within 200m radius within 72h. The purpose is to rapidly kill any potentially infectious adult mosquitoes before they can vector ongoing transmission.
- **Larval control (source reduction and/or larviciding) as a second priority:** Larval control is not as effective as adulticiding at rapidly preventing time sensitive ongoing transmission (as the adult mosquito population that are already potentially infectious are not killed). Nonetheless, larval control can often be rapidly and economically implemented during case investigations. During the vector survey, all larval habitats at the location can be emptied or manipulated to prevent further larval breeding. Where necessary, hand application of larvicides can be made.
- **Promotion of personal protection measures:** The case household residents should be informed to use personal protection measures to protect against day-biting mosquitoes, including the use of topical

repellents. Any viremic patients (in the ward or at home) should be provided with a mosquito net to sleep under during the day.

- **Risk communication:** Risk Communication and Community Engagement (RCCE) efforts should begin immediately and focus on the case and surrounding houses. IEC materials for patient and close contacts/neighbours should be provided with information about the current risk of dengue transmission and methods that can be used to minimise ongoing transmission.

4.6. Mobilization of Communities: Community Engagement, Health Promotion, and Risk Communication

4.6.1. Community engagement

The program's community engagement efforts will aim to promote an enabling environment for *Aedes*-vector control, by strengthening knowledge, attitudes, and practices, as well as promoting community-led engagement in vector control activities (especially larval source reduction). There is emphasis on increasing community leadership and responsibility for *Aedes*-vector control through community leaders, including the MWCSO.

The focus of routine Health Promotion is to provide information on vector control activities and their roles and develop community ownership of prevention.

The focus of risk communication is reducing the occurrence of adult mosquitoes through community adherence to and engagement in vector control activities.

4.6.1.1. Ministry of Women, Community and Social Development (MWCSO)

The MWCSO is a key stakeholder of these activities through their role of informing and supporting the local women's committees (*Komiti Tumama*) who are the main implementers of community-based activities in the villages.

The MWCSO has identified the need to provide further education to the members of the local women's committees to ensure a deeper understanding of the need for the various vector control activities regarding:

- the mosquitoes' role in dengue, chikungunya, and Zika transmission,
- the behaviour of these mosquitoes (biting habits, breeding sites),
- the triggers for outbreaks, and
- techniques for behaviour change communication, including needs of sub-populations, such as those with low literacy, people living with disability, and the elderly.

It should be highlighted that the local women's committee members act as health inspectors by conducting household-based inspections of waste and vectors.

The work with women's committees will be supported by the Health Education and Promotion Services (HEAPS-MOH) with the VCS and MWCSO as co-partners. Initially, a scoping consultation will be undertaken by HEAPS/MWCSO to assess the existing knowledge and programs of *Komiti Tumama* and MWCSO. With a focus on understanding any lessons learnt from previous engagement in vector control and outbreak management, the work will co-design a program for the 'champions' of the community to ensure these women have a high level of knowledge and can participate in outbreak management in the community. The *Komiti Tumama* will also identify vulnerable members of the community who may need additional support in the face of an outbreak. Monitoring and evaluation of these activities will occur after each outbreak response. Annual refresher events will be held to maintain the community system capacity in case needed.

Training is also required for the MWCSO supervisors to help them perform duties of informing and supervising the local women's committees. This training will be provided by VCS on an annual basis as well as in response to outbreaks. The roles and responsibilities of the MOH, the MWCSO, and the community in waste management and vector control need to be clearly defined, including clear lines of communication between all parties involved. A foundational activity for the partnership between MWCSO and the MOH will be the finalisation and signing of an MOU at the highest levels within each ministry, outlining the program of work, clear definition of roles, responsibilities, communication channels, and review mechanisms.

4.6.1.2. Ministry of Education, Sports, and Culture (MESC)

The MOH have responsibility for health inspection of public, private, and church-owned schools under the requirements described within the Health Ordinance 1959 legislation and the Yanuca Island Declaration 1995 (WHO Western Pacific, 2015). These declarations work together to promote the concept of ‘Health Promotion in the School Setting’. This includes waste management, water and sanitation, and vector habitat management. Regular orientation and communication with schools is required to ensure these community locations are well managed in partnership with the VCS and Environmental Health Officers (EHOs).

Initially, a consultation with between MOH and the Ministry of Education, Sports, and Culture (MESC) will be undertaken (Year 1) to ascertain what their program is, identify lessons learnt, and what support is needed. Environmental Health Inspectors will support the Health Promotion in schools programme and be involved in the annual VCS refresher training and IRS training. They will be a critical lead of the outbreak response for schools in collaboration with MESC.

4.6.2. Health Promotion

Health Promotion as defined as “the process of enabling people to increase control over, and to improve, their health. It moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions” (WHO, 2023). Health Promotion activities to support community understanding ownership and engagement are therefore essential in this plan.

The community engagement activities to be undertaken are:

- source reduction through waste management, e.g., community clean-ups,
- health promotion activities in schools and villages, e.g., develop women’s groups capacity to support vector control activities and education in the communities,
- WMD activities. All health promotion will be evaluated to ensure coverage, reach, and effectiveness - including for diverse populations such as women, people with low literacy, and people living with disabilities.

Led by the Health Promotion team at the MOH and supported technically by VCS, the key partners for this work will include:

- MWCS and the local women’s committees,
- MESC,
- Village councils ‘Fono faavae itumalo’,
- Ministry of Natural Resources and Environment (MNRE),
- Private sector partners such as the Samoa Recycling and Waste Management Association (SRWMA).

[Appendix 8](#) provides some examples of key messages and principles.

[Appendix 5](#) contains an overview of activities for source reduction through community engagement.

4.6.3. Risk communication

At the time of outbreaks, targeted risk communication activities will be launched to ensure the strategies required to address the outbreak reach, and are supported by, the at-risk groups.

The risk communication activities to be undertaken are:

- informing people at risk of the threat, including outlining actions for them to protect themselves and their community,
- inform people of the signs and symptoms of infection and what to do if they experience them,
- ensuring real-time communication based on rapid assessments of various risk group’s knowledge, attitudes, perceptions, and concerns about the vector control activities being undertaken, and any changes in level of risk.

[Appendix 8](#) contains an overview of risk communication activities.

4.7. Monitoring and quality management of vector control

4.7.1. Monitoring

Monitoring is routine observing, gathering, and use of data, as well as reporting on programme implementation. Its aim is to ensure that programmes are working satisfactorily and to make adjustments, if necessary, especially to the suitability of vector control interventions. The data collected will be integrated into the standard data collection and storage systems used in Samoa.

4.7.2. Monitoring of vector surveillance

Routine vector surveillance data from the sentinel sites will be recorded in the *Tupaia* system. Vector surveillance data will be reviewed at least quarterly.

The core essential indicators to be monitored for mosquito vector surveillance in Samoa are:

- surveillance sites (number of sites with functional mosquito surveillance is taking place),
- mosquito species adult occurrence (presence/absence of species in a given area),
- mosquito species adult density (relative abundance of species in a given area),
- habitat availability/key larval habitats for mosquito vectors (number and type of habitats), and
- insecticide resistance frequency of adult mosquito vectors (based on susceptibility testing).

4.7.3. Monitoring of vector control

Routine data on intervention activities for mosquito control will be collected and stored by the Vector Control Unit and monitored on a quarterly basis, or as needed. The indicators to be monitored regularly by the mosquito control unit will give an indication of deployment and coverage, and are:

- larval control (number of aquatic habitats removed or treated in a given area),
- insecticide spraying (number of premises treated with residual insecticides), and
- community engagement (number of villages where awareness/clean up campaigns were conducted).

4.7.4. Quality management of vector control products

A quality management system should be implemented to ensure effective vector control products are deployed.

4.7.5. Quality assurance of purchased products

The first step in this system begins with quality assurance. This is the processes and checks that monitor the manufacture, procurement, and storage of vector control products to ensure that they adhere to product specifications.

To support this process, VCS will:

- liaise with WHO to secure and manage supplies of insecticides for use in Samoa, and
- engage with the Pesticide Technical Committee to establish processes and procedures for oversight of pesticides imported and used in Samoa, including establishing registration processes for use of pesticides of public health importance e.g., pyrethroids.

4.7.6. Sound implementation

Sound implementation of vector control products requires that operational teams have appropriate training and that their activities are properly supervised and audited.

To support this process, VCS will:

- engage with regional partners such as WHO and others to access training (or training of trainers) for vector control officers on safe and effective use of pesticides for vector control, including:
 - techniques for application of indoor and outdoor residual spraying,
- develop of Standard Operating Procedures (SOPs) for the use of insecticide products, and
- conduct regular training and assessment for VCS staff.

4.7.7. *Monitoring of product efficacy*

This includes monitoring the action of residual insecticide applications to check their lifespan and potency when used in Samoa, including:

- cone tests to monitor the efficacy of indoor residual spraying, and
- random spot checks of larviciding applications.

4.8. Programme management

4.8.1. *Governance of the vector control strategy*

Overall, the Vector Control Unit Principal Officer will be responsible for the management of the SP. The IVCC will provide oversight and direction to the implementation. The Vector Control Unit will liaise with the implementing partners identified in the SP including MSCE, MWCD, and MNRE, as well as other groups within the MOH such as HEAPS, to ensure timely including in their respective annual activity plans and budgets.

For planning of the implementation of the SP there will be:

- A launch of this SP in August 2023.
- Annual review of the SP progress. Based on the findings there will be an annual planning and budgeting activity conducted to feed into the MOH financial year (which runs from July-June).
- A midterm review of the SP after 4-5 years, including revisions to the SP as required.

The following policies will need to be reviews or updates within the first 3 years of the SP to provide the legal framework for the plan:

- The Quarantine (Biosecurity) Act (2005),
- The Food Act (2015),
- The Food (Safety and Quality) Regulations (2017),
- The Amenities Act, and
- The Health Ordinance of 1959. (For example, ‘the health inspector cadre’ is referred to in this ordinance although no longer a position. A review may also allow other aspects of the ordinance to be updated in light of lessons learnt from e.g., the COVID-19 response.)

This work will be led by the Policy and Legal Division of the MOH in partnership with the Vector Control Unit.

4.8.2. *Financial management*

The financing of the SP will be managed by Vector Control Unit according to the MOH and Government of Samoa (GoS) policies and guidelines. This will require careful linkage of the annual plan and activities to the funding cycle of the GoS and MOH including any development partners and external sources of financing.

There will also need to be timely coordination of the financial management for the key partners in implementing this plan to ensure adequate funding when and where needed. The IVCC will assist in oversight of this coordination.

4.8.3. *Human resources*

It is anticipated that there will need to be human resources (HR) made available for both a surge capacity and actual new full-time positions to assist in implementation of this plan over 10 years. The SP will also need to adapt to changes mooted in the revitalisation of Primary Health Care (PHC) in the Samoan health sector and the various roles and responsibilities assigned to positions under that evolving structure.

A critical first step will be to conduct resourcing assessment of human resources requirements in the first year of the plan. The present HR mechanisms in the GoS public service does not allow for people to be hired occasionally as casuals. People can be part-time employees for 6+ months, or there is an option of one off one-month contracts, but it cannot be ensured that this is the same people every year when IRS required. This may mean that it is necessary to tender the extra staffing requirement to private companies.

It will be required to map out what staff internally in the MOH can be used for surge capacities and identifying designated staff from airports/ports/other ministries to be part of outbreak response. Technical Assistance (TA) may be needed for this process.

4.8.4. Training

A training implementation plan will be co-developed and implemented with the professional development division of the MOH and relevant professional associations. There are several categories of staff who will require training within the MOH (training for communities, women's committees and other non-MOH partners will be covered under the Health Promotion and community engagement sections).

To address an existing knowledge and skills gap as well as increase the capacity of the system to identify and manage mosquito borne illnesses and outbreaks, nurses and EHOs in hospitals and district health facilities will be trained in vector control and vector borne diseases, and their role in assisting identification and case investigation as well as health promotion and outbreaks management. For new EHO graduates, this will be part of their induction training, and for existing staff, refresher training will be conducted on a 2-3 yearly basis to maintain their capacity and provide updates. In the first year, there will be an initial 2-day training program for staff who will lead and support the community-based efforts, e.g., district hospital staff, environmental health officers, community health workers. Subsequently, there will be a one-day annual refresher training including monitoring and evaluation of activities by the MOH VCS. When any new technology or technique, such as IRS, is rolled out in the vector control programme, training will need to be provided to the relevant providers e.g., to the vector control officers.

Samoa doctors have a regular Continuing Professional Development (CPD) programme provided to them by the Samoa Medical Association (SMA) and the MOH professional development division. The Vector Control Unit will work with these groups to ensure that this program includes annual updates on vector control, case investigation protocols, and outbreak management. More specifically, the four public health doctors in Samoa should be provided in-depth refresher training programs on vector-borne diseases to assist in the management of vector borne diseases in Samoa.

The MOH is planning increased numbers and roles for EHOs in Samoa, working closely with the National University of Samoa (NUS) in the development of the Bachelor of Environmental Health. In the first year, consultation by the VCS with NUS for inclusion and development of vector control in this degree programme will be conducted, as well as advocating for increased number of training positions in the Bachelor of Environmental Health at NUS over 5-10 years. The MOH will additionally advocate for an increased number of EHOs as part of the PHC team at each district health facility (part of the PHC revitalisation plan).

4.8.5. Health information systems including electronic data management.

4.8.5.1. For case data

Clinical and syndromic surveillance data on vector-borne diseases will be submitted at all levels through the routine Health Information System (HIS). The National Health Surveillance Unit monitors laboratory reports on confirmed dengue cases and produces weekly reports for syndromic dengue like illness cases. These are shared with VCS. Any unusual increases in cases as noted by the HIS team will be notified immediately to VCS as per the outbreak plan ([Appendix 6](#)).

4.8.5.2. For vector data

Standardised mosquito vector surveillance data collection surveys will be developed in *Tupaia Meditrak* to provide a readily available set of mobile data collection tools to support ministry led routine vector surveillance activities. The Tupaia web-based data aggregation, analysis, and visualisation platform will be utilised to support the rapid presentation of key vector surveillance indicators through interactive map overlays and data dashboards. Technical support is provided by the MOH Information Technology Unit and Beyond Essential Systems (BES). At present, the Samoan Tupaia vector surveillance data collection system is supporting both adult and larval mosquito collections. When preparing to conduct insecticide resistance surveys, the MOH will need to engage with BES to deploy the insecticide resistance data collection form.

mSupply is a Logistics Management Information System (LMIS) used for stock management and dispensing in health supply chains. During the duration of this SP, the Samoan MOH will implement *mSupply* to manage environmental health commodity stock. Environmental health commodity data collected in *mSupply* will be displayed in Tupaia for rapid aggregation, analysis, and visualisation. Deployment of *mSupply* will involve establishing a Samoan Technical Working Group (TWG) for environmental health commodities. Stakeholder meetings will be held to document the *mSupply* configuration and Tupaia visualisation requirements. *mSupply* will be configured for the Samoan MOH Vector Control Unit by BES, and *mSupply* training will be delivered.

4.8.6. Partner coordination

The successful implementation of this plan relies upon robust trusting and mutual partnerships both within the MOH, but also with other ministries, local communities, NGOs, private sector, and development partners. The IVCC, which has a broad membership representing these various partners, is a key mechanism for coordination of the vector control activities across Samoa. Relationships with development partners will be through the IVCC as well as through regular attendance and reporting to key regional meetings.

4.8.7. Procurement, supply chain management, and logistics

Ensuring the right commodities are in the right quantity and quality, and in the right place at the right time, is a fundamental principle of logistics management in this SP. One of the critical elements of achieving this is ensuring orders from overseas account for the full lag time from order to delivery, as this can be several months. This lag time is particularly significant for the period between 2024 and 2027 when delays to global supply chains are expected due to disruptions of the COVID-19 pandemic.

A stock-take of all commodities including equipment, peripherals, insecticides, and other commodities (including personal protective equipment) should be undertaken annually to inform the necessary orders for the next annual cycle (linked to *mSupply*, see above). In addition, any decisions made about addition or withdrawal of commodities, increased activities, or predicted increased needs must be accounted for in this quantification. These orders will be managed through the regular MOH health commodities ordering system from the suppliers or the development partner that supplies these commodities and will utilise the existing Samoan health logistics management information system.

The MOH is planning increased health warehousing capacity and could include storage of vector control related equipment, commodities, and insecticides, if designed to warehouse these safely and securely. In the first year, consultations need to be undertaken with the National Warehouse Manager to investigate ways to ensure appropriate storage facilities in the country for vector control commodities. Until this is available, appropriate locations for storage must be secured and a person must be assigned as responsible.

It will likely be necessary to have some stockpiling capacity if an outbreak is anticipated. This should be accounted for in the estimation of cubic meterage needs and conditions for storage. Warehouse staff will require training on the safe handling of insecticides at induction as well as every 2-3 years.

4.8.8. Insecticide management

Maintaining the viability and effectiveness of insecticides to be used in the vector control programme necessitates a national insecticide management programme that addresses all uses of the insecticides required for the health sector.

In the first year, these will be an assessment of resources and feasibility for regulating insecticide use. Based on this assessment, and reviewing programs in other countries, VCS will develop a proposal for licensing and for a training program for commercial insecticide users. This will require some consultation with other stakeholders such as the Ministry of Agriculture and Fisheries (MAF) and Pesticides Technical Committee. If passed, there will need to be a licensing and training program for commercial insecticide users developed and implemented (year 2-3), as well as regular monitoring and evaluation of the success of the programme against the objectives and adaptation as required.

Insecticide Resistance (IR) testing is also a key element of this activity ([Appendix 10](#) contains details on what should be included in Insecticide resistance testing and management). The IR testing SOPs for Samoa will be updated in Year 1 and IR testing will be undertaken in Year 1-2 to ensure the effectiveness of the existing products being used in Samoa for vector control. Before the testing can be undertaken, IR testing materials and equipment will need to be purchased. Additionally, staff will need to be trained in IR testing in the first year, and then biannually moving forward.

4.8.9. Other management issues

To implement this SP, some TA will be required. The need for the TA should be based on the annual activity plans, the needs assessment being planned, and account for the time needed to identify, procure, and mobilise national and international TA.

The strategic planning process has identified that TA will be required for:

- for curriculum development,
- formative research design and conduct,
- monitoring and evaluation,
- development of the curriculum and related facilitator and participant materials and in some cases training of trainers for specialised training including IRS training and set up, school education, and women's committees,
- operational research,
- scaling up and resource planning for a) community testing, b) procurement c) training detailed in the SP.

The funding for most of the TA is likely to come from development partners and donors. It is critically important to annually:

- prioritise of the need for TA,
- linking the timing of the recruitment, mobilisation, and completion of the TA to the critical path of the activities and timelines in the SP,
- work with development and funding partners in planning these requests linked to the partners' 2–3-year planning cycles.

It may be possible that the needs of other countries in the region are similar and there may be efficiencies in resourcing of this TA or expertise collectively. Building this technical expertise in Samoa through e.g., the national health research community, the NUS, and other training institutions should be a secondary objective in the Terms of Reference of each TA activity to support national capacity building, sustainability, and cost effectiveness.

4.9. Cross cutting themes

4.9.1. Gender and social inclusion

Gender issues and perspectives should be mainstreamed into all activities of the SP. A gender matrix analysing strategic and practical gender needs linked to this SP appear in [Appendix 11](#).

In the first year, and as part of the induction and biannual refresher training, all vector control staff, key implementation partners, and the IVCC should participate in a 1-day training programme on gender equity, disability, and social inclusiveness (GEDSI), with case studies and application to the SP activities and outcomes.

An annual and midterm review of the gender strategy linked to the SP should be undertaken. This should include feedback from women and people with disabilities, or other groups such as providers or advocates of GEDSI to improve the plan and its implementation.

4.9.2. Environmental protection

There are three major sets of activities linked to the protection of the environment, which also are critical for the success of the vector control programme. These are the management of insecticide related wastes, the management of solid wastes in Samoa (aquatic habitats for mosquitoes), and the plans for recycling of solid wastes.

4.9.2.1. Insecticide related waste management

Included in the SOPs for the use of insecticides will be details of the safe and effective disposal of insecticides/packaging/decommissioned IRS equipment and contaminated personal protective equipment (PPE). These plans need to be developed in the first year and can be informed by existing plans used in the region for malaria programmes. The head of the Vector Control Unit will be responsible for ensuring these SOPs are developed and implemented in conjunction with the Pesticide Technical Committee and MNRE. This should be a regular agenda item of the IVCC meetings.

4.9.2.2. Waste management

The SP has a strong focus on undertaking source reduction through community and stakeholder action to manage waste. Advocacy for waste reduction will be supported within all government and stakeholder levels including considerations of ministry procurement processes to reduce plastic waste. The MNRE will be supported to ban single use plastics with a view to eventually banning all plastics. These efforts will be undertaken during the first two years of the SP. Efforts will include roundtable meetings and community consultations to support and promote segregation initiatives and increasing public awareness on sustainable waste management. Supporting the work of the SRWMA to collect plastic and to provide large waste containers across villages will be crucial to these efforts. Protocols for the management of waste tours will also be developed in collaboration with MNRE and other stakeholders. This will include promoting tyre reuse initiatives at village committee level. In Year 3, advocacy to develop a policy about importers and salespersons which will cover the costs of disposal of major waste (including tyres) will be initiated. To support this initiative, widespread consultations will be held with MNRE, MOF, MCR, stakeholders, and communities to develop policy and cabinet submissions.

4.9.2.3. Recycling of solid wastes

The Vector Control Unit will work closely with the SRWMA to develop approaches to support the implementation of solid waste recycling solutions. As part of this national effort, the Vector Control Unit will advocate within the MOH that all catering of the ministry activities e.g., meetings, training, field work etc will use recyclable materials as a 'lead by example' approach. The IVCC members will also be encouraged to advocate for this in their respective constituencies.

4.9.3. One Health

The VCS will work closely with MAF regarding vector surveillance and management, environmental and waste management, and use of insecticides, to ensure that activities planned for this SP provide value for the animals, environment, plants, and ecosystems of Samoa and its waters. It will be critical for this One Health approach to co-design some of the activities with the relevant sectors relating to these areas as well as the local communities.

5. Strategic Plan budget (with indication of year/s of expenditure).

Appendix 12 has annual budgets for years 1 and 2.

Table 6. Overview of budget.

Strategies	Activities	Responsible person/group	Year					Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10					
Objective 1: Implement routine mosquito surveillance and preventative control activities											
1.1 Routine vector surveillance activities.	1.1.1.a Identify resourcing requirements for mosquito surveillance program. Identification and procurement begun, including adult surveys, larval surveys, and insecticide resistance monitoring (Appendix 10)	VCS	x				List of items used for Mosquitoes Monitoring Program.		\$30,000		
	1.1.1.b Procure and distribute /warehouse required items.	VCS		x	x	x	Pay local payments and charges e.g, duty, freight custom fees, cargo fees, etc		\$3,000		
	1.1.1.c Finalise annual stock take (Annual from year 2).	VCS, PO-GIS, Carol Martin (TA mSupply/Tupapa)		x	x	x	Stocktaking, categorisation of items, tools, equipment, bulk in quantity, MSDS, proper storage area, mSupply Services, hardware and maintenance.		\$1,000		
	1.1.2 a Identify appropriate location for public health entomology laboratory.	VCS	x				No costs		0		
	1.1.2b Undertake and commission public health entomology laboratory renovations.	VCS, MOH		x	x	x	Staff time Laboratory equipment Refrigerator x 1 Computer x 1 Laptop x 1 Office equipment		\$4,000		
1.1.3 Conduct training on vector surveillance, including	VCS, PacMOSSI, WHO, SPC	x		x	x	Staff only					

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
	adult surveys, larval surveys, and insecticide resistance testing.						Assumes donor covers all costs. Not costed			
	1.1.4a Conduct routine adult vector surveillance activities.	VCS, TA	x	x	x	x	Staff time		tbc	
	1.1.4b Assess key aquatic habitats biannually (from year 2).	VCS		x	x	x	Staff time	0	\$2,000	
	1.1.4c Assess insecticide resistance status biannually (From year 1) (Using discriminatory concentrations of WHO larval and adult tube tests) and other tests if any resistance confirmed in initial assessments).	VCS	x		x	x	Staff time	0		
	1.1.4d Undertake annual IR testing SOP updates.	VCS	x	x	x	x	Staff time	0		
	1.1.4e Purchase required materials, equipment for IR testing (biannual).	VCS	x		x	x	Procurement costs			
	1.1.4f VCS staff training on IR testing (bi-annual).	VCS	x		x	x	Staff time	\$5,000		
	1.1.5 Undertake monitoring and evaluation of findings of routine vector surveillance and surveys and implement remedial measures/updates as required.	VCS, MOH, TA	x	x	x	x			\$5,000	
1.2 Routine vector control activities, including regular source reduction and larviciding.	1.2.1 Resource routine larval source reduction through community engagement and larviciding.	VCS, MOH	x	x	x	x	Staff only		\$2,000	
	1.2.2 Continue acceptability and communication work for larval source reduction and larviciding.	MOH		x	x	x			\$3,000	

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
	1.2.3 Undertake training on larval source reduction and larviciding.			x	x	x		Training	\$3,000	
	1.2.4 Conduct larviciding.	MOH		x	x	x	Will develop protocols and list of supplies in Year 2. Budget will be updated.		\$3,000	
	1.2.5 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS		x	x	x			\$5,000	

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
1.3 Community engagement activities including clean-up programmes in communities.	1.3.1 Undertake source reduction through community and stakeholder action: waste management.	IVCC Committee – MWSCD, MOH, MNRE, MAF	x	x	x	x				
	1.3.1a Advocate for waste reduction programs starting with the IVCC members (e.g, no plastic for catering for events) through consultations with ministry procurement processes and IVCC members.	IVCC	x						\$4,000	

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	Budget per
			1	2	3-5	6-10				
	<p>1.3.1b Support the Ministry of Natural resources and environment (MNRE) program to have single use plastics/all plastics banned:</p> <ul style="list-style-type: none"> • Conduct roundtable meeting with MNRE and relevant stakeholders. • Select two problematic sites (one in Upolu and one in Savaii) and conduct community consultations prior to clean-up campaigns. • Conduct and promote segregation initiatives. • Conduct community clean-up and provide recyclable cages for plastic bottles and aluminium cans (three sets per two compartments per village) • Improve public awareness campaign on sustainable waste management. 	MNRE, IVCC, VCS, Samoa Water Authority	x	x	x	x			\$50,000	
	<p>1.3.1c Support the work of the SRWMA to collect plastic and place large bins in each village.</p>	MOH, MNRE, SWRMA, Samoa Water Authority	x	x	x	x	Purchase of bins Public education and media campaign Collection costs ongoing Disposal/Recycling plan		\$10,000	
	<p>1.3.1d Develop protocols for management of tyre waste in Samoa</p>	MNRE	x	x	x	x			\$5,000	

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
	<ul style="list-style-type: none"> Consult with MNRE and relevant stakeholders. Promote waste tyre reuse initiatives with Village Komiti o Tina Discuss and collaborate with regional counterparts. 									
	<p>1.3.1e Advocate for development of policy about importers/salespersons being charged a tax to cover costs of disposal (Year 3)</p> <ul style="list-style-type: none"> Consult with MNRE, MAF, MCR. Develop of proposal for policy. Submit to cabinet. Consult with stakeholders. Develop policy and implement. 	MAF, MCR, MNRE		x		Meeting costs		\$3,000		
	<p>1.3. If Integrate and align waste management activities with MWCSDD</p> <p>District Development Plans</p> <ul style="list-style-type: none"> Consult initially with MWCSDD to determine program of activities and areas for collaboration. Provide on-going support to MWCSDD programs to link to vector control 	MWCSDD, VCS	x	x	x	Consultations and meetings. Support for clean-up campaigns.		\$10,000		
	<p>1.3.3 Conduct consultations with MWSCD over capacity building or women's committee 'champions'.</p>			x		Meeting		\$1,000		

Strategies	Activities	Responsible person/group	Year					Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10					
	1.4.1f Implement radio and TV public education activities (July/August).	VCS	x	x	xx		Travel and staff time		\$1,200		
	1.4.1g Produce IEC materials for environmental waste campaigns (July -Sept).	MNRE, VCS, SRWMA	x	x	x	x	Materials, printing, activities		\$10,000		
	1.4.1h Participate in annual National Health Week of GoS (November).	HEAPS, VCS	x	x	x	x	Included in MOH National health week budget. Staff time		0		
	1.4.1i Conduct training for communities, women's committees, and non-MOH partners on health promotion tri-annually.	HEAPS, VCS		x	x	x	Training materials, Staff time, Training costs e.g, venue, participant refreshments etc		\$20,000		
	1.4.1j Undertake monitoring and evaluation and implement remedial measures/updates as required.	HEAPS, VCS	x	x	x	x	Travel, data collection and analysis, staff time		\$10,000		
	1.4.2a Approved budgeted WMD annual plans (Appendix 12).		x	x	x	x	No cost		0		
	1.4.2b Submit WMD plans to Cabinet (January annually).	MOH	x	x	x	x	Staff time only		0		
	1.4.2c Finalise Budget allocation and workplan for WMD (January).	VCS, IVCC	x	x	x	x	Staff time		0		
	1.4.2d Endorsement of WMD Budget and workplan by IVCC (January).	IVCC	x	x	x	x	Support for meetings – catering, refreshments		\$1,200		
	1.4.2d Confirm WMD Funding (February).	IVCC	x	x	x	x	Staff time only		0		
	1.4.2e Decide on annual WMD slogan and theme (April IVCC meeting).	IVCC	x	x	x	x	Support for IVCC meetings – catering, refreshments		\$1,200		

Strategies	Activities	Responsible person/group	Year					Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10					
1.5 Increased vector control activities coinciding with high-risk events/times	1.4.2f Implement sectoral activities for WMD.	Relevant sectors	x	x	x	x	See partner budgets				
	1.4.2g Undertake monitoring and evaluation of WMD targets.	Relevant sectors	x	x	x	x	See partner budgets				
	1.4.3a Implement school educational program (August/Sept).	VCS, MESCC	x	x	x	x	Staff time Printing of resources Travel related costs		\$6,000		
	1.4.3b Consult with MESCC over school's educational program.	VCS, MESCC	x	x	x	x	Meetings		\$1,000		
	1.4.3c Begin school's educational program.	VCS, MESCC		x	x	x	See partner budgets				
	1.4.3d Undertake monitoring and evaluation of school's educational program and implement remedial measures/updates as required.	VCS, MESCC		x	x	x	Staff time		0		
	1.5.1 Conduct annual assessment of anticipated high-risk events or time events.	VCS	x	x	x	x	Staff time		0		
	1.5.2 Produce/update and disseminate Vector control plans for major high-risk events to relevant stakeholders.	VCS	x	x	x	x	Printing		\$2,500		
	1.5.3 Conduct targeted IRS activities as part of the preparation.	VCS	x	x	x	x					
	1.5.4 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS	x	x	x	x	Staff time		0		
Objective 2 Implement an effective mosquito control response during outbreaks											

Strategies	Activities	Responsible person/group	Year					Inputs	Unit cost	Budget annum (AUD)	per	
			1	2	3-5	6-10						
2.3 Supply of insecticide treated nets to febrile patients	2.3.1 Procure ITNs every 3 years.	VCS, WHO/SPC	x		x		x		Net, freight, customs and duties, warehousing costs			
	2.3.2 Distribute ITNs to hospitals and febrile patients through health facilities.	VCS, MOH	x	x	x		x		Distribution costs		\$5,000	
Objective 3 Prevent the importation of exotic mosquito species into Samoa												
3.1 Routine vector surveillance conducted at airports and wharfs	3.1.1 Undertake routine adult vector surveillance activities.	VCS, Port Authority	x	x	x		x					
	3.1.2 Survey PoE regularly for the presence of potential larval habitats.	VCS, Port Authority	x	x	x		x					
	3.1.3 Inspect air and sea cargo containers for the presence of insects, including mosquitoes.	VCS, Port Authority	x	x	x		x		Staff time		0	
3.2 Regular larval control, including source reduction and larviciding at airports and wharfs	3.2.1 Conduct training of port health and biosecurity staff on source reduction and larviciding.	VCS, Port Authority	x	x	x		x		Training		\$5,000	
	3.2.2 Implement ongoing source reduction and larviciding.	VCS, Port Authority	x	x	x		x					
	3.2.3 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS, Port Authority	x	x	x		x		Staff time		0	
3.3 Indoor residual spraying in planes and boats	3.3.1 Inspect all incoming planes and boats.	VCS, Port Authority	x	x	x		x		Staff time		0	
	3.3.2 Implement IRS on planes and boats.	VCS, Port Authority	x	x	x		x		Spraying costs in Port Authority budget			
	3.3.3 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS, Port Authority	x	x	x		x		Staff time		0	

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
3.4 Routine annual IRS in airports and wharfs	3.4.1 Conduct training of point of entry staff including on spray equipment, calibration and washing to prevent environmental contamination. 3.4.2 Undertake Annual IRS at wharfs and airports as per plan. 3.4.3 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS, Port Authority	x	x	x	x	Training. See Activity 3.3.1			
		VCS, Port Authority					See Activity 3.3.2			
		VCS, Port Authority	x	x	x	x	Staff time		0	
Objective 4 Implement focal vector surveillance and control during case investigations										
4.1 Assess the larval population as well as types and quantities of aquatic habitats at the case house	4.1.1 Finalise case investigation (entomology component) framework. 4.1.2 Undertake training of vector control staff and case investigation protocols and procedures. 4.1.3 Implement entomological case investigations as requested.	VCS, MOH	x	x	x	x	Staff time		0	
		VCS, TA	x	x	x	x	Training TA costs to be covered by development partners		\$5,000	
		VCS	x	x	x	x				
4.2 Conduct IRS at the dengue patients' house/s, as well as other houses within a 200 m radius within 72 h	4.2.1 Implement IRS at the case house and any other houses within a 200m radius within 72h.	VCS		x	x	x				
4.3 Implement larval source reduction and larviciding	4.3.1 Implement larval source reduction simultaneously with larval surveillance. During the vector survey, all larval habitats at the premise,	VCS		x	x	x				

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
	including schools, can be emptied or manipulated to prevent further larval breeding.									
	4.3.2 Conduct hand application of larvicides to aquatic habitats that aren't removed.	VCS		x	x	x				
4.4 Risk communication, including promote use of personal protection measures	4.4.1 Implement RCCE efforts immediately - these efforts should begin immediately and focus on the case and surrounding houses.	VCS, HEAPS, MWSCD, Ministry of Education	x	x	x	x				
4.5 Supply of insecticide treated nets to febrile patients	4.5.1 Provide any viremic patients (in the ward or at home) with a mosquito net to sleep under during the day.	MOH	x	x	x	x	Budget for nets in outbreaks will come from WHO/SPC/government		0	
Objective 5 Build the capacity to optimise the performance of management processes to support mosquito surveillance and control activities										
5.1 Building capacity within the health surveillance system to conduct vector surveillance and control	5.1.1a Develop training plan for SP: all cadres in health system	VCS, TA	x				Staff Time TA		\$20,000	
	5.1.1b Identify refresher training needs for vector staff (Biannually including Year 1)	VCS, TA	x		x	x	Survey of staff – staff time		0	
	5.1.1c Finalise refresher training curriculum, activities, materials, and trainers.	VCS, TA		x	x	x	TA time, printing costs		\$20,000	
	5.1.1d Conduct training of district health staff, EHOs, CHWs. (2-day training Year 1 and annual (1-day) refresher)		x	x	x	x	Training costs		\$10,000	
	5.1.1e Conduct post-training evaluation.	VCS		x	x	x	Survey		0	
	5.1.2a Undertake higher level training needs assessment as	VCS, MOH	x		x	x	No additional costs		0	

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
	part of HR performance reviews and programme needs (e.g. environmental health, vector control, public health, one health) (Year 1 and every 3 years)									
	5.1.2b Identify suitable training programmes to meet needs in Samoa, region and internationally (online and face-to-face) (Year 1 and every 3 years)	VCS	x		x	x	International and national training programmes.			
	5.1.2c Identify scholarships or fellowships if required and apply (Year 1 and every three years)	VCS, donor partners, MOH, and GoS	x		x	x				
	5.1.2d Support attendance at training attended by chosen candidates.				x	x	See Activity 5.1.2b and c			
	5.1.2e Place graduates in positions requiring their skills and expertise.	Assumes position available MOH			x	x	No additional costs – funded position and costs under MOH HR		0	
	5.1.4a Consult with NUS on the bachelor of environmental health for inclusion/development of vector control.	VCS, NUS	x				Meetings		\$1,000	
	5.1.4b Advocate for EHCs in the revitalisation of PHC plan and implementation (Year 2-3)	VCS, MOH, HR		x			Staff time		0	
	5.1.4c Develop positions developed for EHOs and place EHO graduates (including at district level) as part of PHC revitalisation (Year 4 onwards)	VCS, MOH, HR			x	x	Positions costs		MOH and Treasury costs ?	

Strategies	Activities	Responsible person/group	Year					Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10					
5.2 Insecticide use and management, including safe storage and disposal of old insecticides and decommissioned equipment/PPE	5.2.1a Assess resources required for and feasibility of regulating insecticide use.	VCS, MAF, Pesticides Committee	x				Staff time				
	5.2.1b Develop a proposal for licensing and training program for commercial insecticide users.	VCS, Legal		x			Staff time				
	5.2.1c Undertake a licensing and training program for commercial insecticide users.	VCS Other? TA?			X ⁽³⁾		Curriculum development Training costs		\$15,000 \$10,000		
	5.2.2a Update insecticide use and management SOPs and status.	VCS, Pesticides committee, MNRE		x			Staff time		0		
	5.2.2b Provide training on insecticide use and management for vector control staff? (Biannually starting Year 2)	VCS		x	x	x			\$10,000		
	5.2.2c Conduct refresher training on VBD and its management for the public health doctors annually.	VCS, NUIS, Professional association, National Hospital		x	x	x	Included in routine training programme of doctors. Staff time only		0		
5.3 Human resource management	5.2.3 Undertake monitoring and evaluation and implement remedial measures/updates as required (Biannually starting Year 2).	VCS, Pesticides committee		x	x	x	Staff time Travel to sites		\$10,000		
	5.3.1 Assess HR resource requirements to support vector control plan and map for surge capacity.	VCS, MOH, TA	x				Staff time Contract for TA		\$20,000		
	5.3.2 Conduct annual performance review.	MOH	x	x	x	x			0		
	5.3.3 Conduct annual HR mapping of needs and recruitment as required.	VCS	x	x	x	x	Staff time		0		

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
5.4 Health information systems and electronic data management	5.3.4 Develop SP period and annual training implementation plan (Link to 5.3.1 and 5.3.3).	VCS, MOH HR, Professional associations, hospitals, EHOs, etc	x	x	x	x	Staff time Meetings		\$5,000	
	5.3.5 Conduct GEDI training all vector control staff, key implementing partners and IWCC (Biannual)	MOH, MWCIDS	x		x	x	Training costs		\$5,000	
	5.4.1 Analyse routine NHIS case and laboratory data.	VCS	x	x	x	x	Staff time		0	
	5.4.2a Implement Tupapa system including vector data integration.	VCS, MOH IT, Beyond essential systems	x				MOH covered costs		0	
	5.4.2b Review of Tupapa system and any customisations made (Biannually starting Year 2)	VCS, MOH IT	x	x	x	x	Staff time		0	
	5.4.2c Develop and review regular reports from Tupapa.	VCS, MOH IT	x	x	x	x	Staff time		0	
	5.4.2d Roll out Tupapa Meditrack for monitoring insecticide resistance	VCS, MOH IT	x	x	x	x	Staff time		0	
	5.4.3a Establish a Samoan Technical Working Group for environmental health commodities for mSupply.	VCS, MOH IT	x	x	x	x	Staff time		0	
	5.4.3b Hold stakeholder meetings to document the mSupply configuration and Tupapa visualisation requirements.	VCS, MOH IT, Beyond essential systems	x	x	x	x	Meetings		\$5,000	
	5.4.3c Implement mSupply for stock management of environmental health commodities.	MOH IT, Beyond essential systems	x	x	x	x	Ongoing budget for mSupply support (approx. \$960 AUD/year) and ad hoc hardware replacement/maintenanc			

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
5.5 Operational/ Implementation/ Research	5.5.1 Identify the operational research gaps.	VCS, academic and research institutes in Samoa, Partners	x				e (approx. \$5,000 AUD when needed) Staff time		0	
	5.5.2 Review the best mechanisms in which to actively engage the community to support vector surveillance and/or vector control activities.	VCS, Contract		x			Survey and TA costs		\$20,000	
	5.5.3 Conduct study on community perceptions of indoor residual spraying. (link to 2.1)	VCS, Contract		x			Survey and TA costs		\$20,000	
5.6 Logistics management	5.6.1 Consult with warehouse regarding appropriate central insecticide storage and distribution.	VCS, National warehouse manager	x	x	x	x	Staff time		0	
	5.6.2 Conduct training for warehouse staff on safe handling of insecticides at induction and every 2 -3 years.	VCS	x		x	x	Training materials Staff time		\$5,000	
	5.6.3 Hold discussions on collaboration with WHO regional insecticide reserve.	VCS/MOH	x	x	x	x	Staff time		0	
5.7 Other management	5.7.1 Launch of SP (August)	VCS/MOH/IVCC	x				Launch event		\$10,000	
	5.7.2 Conduct annual review of SP progress.	VCS		x	x	x	Staff time		0	
	5.7.3 Conduct midterm review of plan including GEDSI and revisions as required (Year 4-5).	VCS			x		Staff time		0	
	5.7.4a Develop TA plan annually.	VCS	x	x	x	x				
	5.7.4b Mobilise TA as per plan.	VCS	x	x	x	x	Costs under activity			

Strategies	Activities	Responsible person/group	Year				Inputs	Unit cost	Budget annum (AUD)	per
			1	2	3-5	6-10				
5.8 Networking and reporting	5.8.1 Produce annual report.	VCS	x	x	x	x	Staff time	0		
	5.8.2 Engage with regional meeting and networks e.g., PPHSN.	VCS	x	x	x	x	Travel related costs	\$15,000		
	5.8.3 Build relationships and collaboration with regional counterparts to share knowledge and resources.	VCS	x	x	x	x	Staff time	0		

6. Gaps in evidence and knowledge

Operations Research and Implementation Research (OR, IR) will be used to support the quality, effectiveness, and efficiency of the vector control activities as well as introducing and scaling up innovations in the programme. An OR plan will be developed and updated annually at the time of the annual evaluation of the plan. This will be done to identify emerging issues or innovations that need to be addressed in the program, and to review results of completed or ongoing OR/IR to either scale up the changes or remove interventions or approaches no longer proving useful.

In Year 1-2, the following OR is required:

- A baseline survey of key larval habitats to accurately target source reduction activities.
- A survey of community perceptions of IRS.
- A review of climate variables compared with larval and adult mosquito surveillance data (potential).

This research will be undertaken in-house, if possible, or outsourced to a preferably national research group. TA may be required to review the design and assist in analysis. This will be determined on a case-by-case basis.

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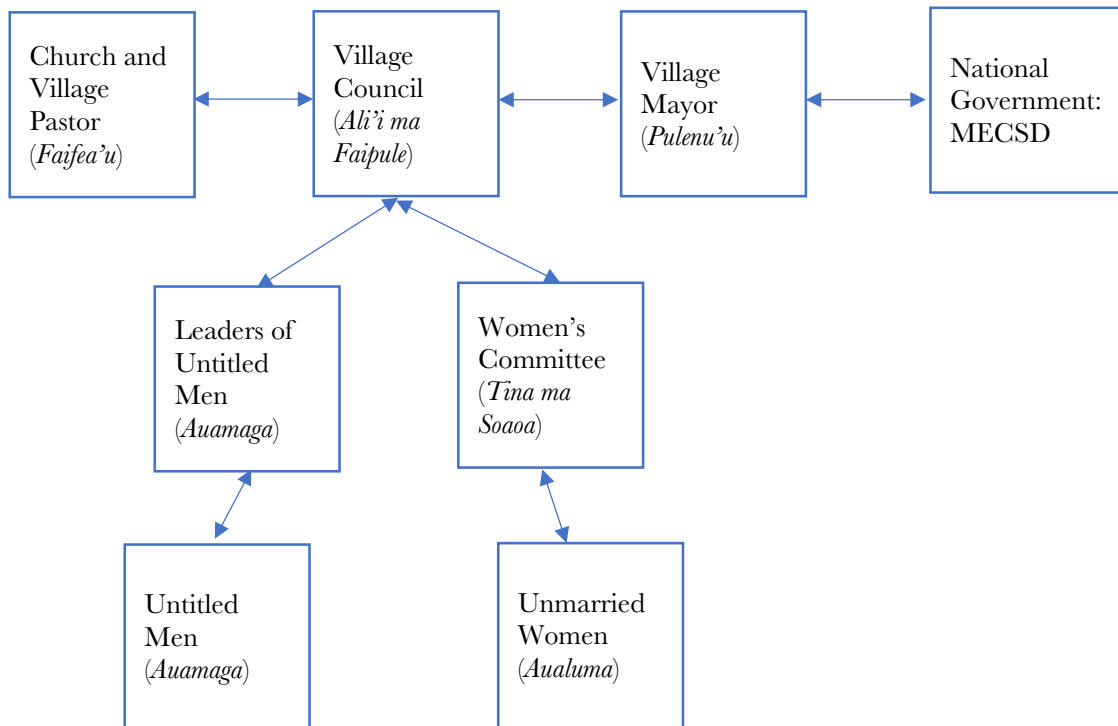
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Appendices

Appendix 1. Traditional Samoan Village Governance Structure.



Source: Gero et al. (2011)

Appendix 2. Subnational Distribution of Mosquito Species Present in Samoa (14 species).

Genus	Species	Upolu	Savai'i
<i>Aedes</i>	aegypti	<input type="checkbox"/>	<input type="checkbox"/>
	albopictus	<input type="checkbox"/>	<input type="checkbox"/>
	oceanicus	<input type="checkbox"/>	<input type="checkbox"/>
	polynesiensis	<input type="checkbox"/>	<input type="checkbox"/>
	samoanus	<input type="checkbox"/>	<input type="checkbox"/>
	tutuilae	<input type="checkbox"/>	<input type="checkbox"/>
	upolensis	<input type="checkbox"/>	<input type="checkbox"/>
	vexans	<input type="checkbox"/>	<input type="checkbox"/>
<i>Culex</i>	annulirostris	<input type="checkbox"/>	<input type="checkbox"/>
	quinquefasciatus	<input type="checkbox"/>	<input type="checkbox"/>
	samonaensis	<input type="checkbox"/>	
	sitiens	<input type="checkbox"/>	
<i>Coquillettidia</i>	samonaensis	<input type="checkbox"/>	
<i>Toxorhynchites</i>	amboinensis	<input type="checkbox"/>	<input type="checkbox"/>

Note that ticks indicate confirmed presence; where there is no tick the information remains unknown.

Source: Engber, Sone, and Pillai (1978); Government of Samoa Ministry of Health (2022); Ramalingam (1976)

Appendix 3. Information about Aquatic Habitats of *Aedes* Species from the Literature

Little information is available about the types of containers, and quantity of these, that are utilised by the *Aedes* species in Samoa. The information presented here is drawn from the literature and needs to be updated with local data to confirm the key larval habitats that are utilised in Samoa.

Bionomic parameter	<i>Aedes aegypti</i>	<i>Aedes albopictus</i>	<i>Aedes polynesiensis</i>
Larval habitats	Inhabits artificial containers (e.g. tanks and others for water storage, tyres, pot-plant bases, buckets, discards or those typically found around or inside homes) (Christophers, 1960). Can utilise natural sites (e.g., bromeliads)	Inhabits a broad range, from natural sites (e.g., bamboo stumps, bromeliads, coconuts, and tree holes) to artificial containers (Bonizzoni, Gasperi, Chen, & James, 2013; Hawley, 1988)	Cryptic natural and artificial containers such as tree holes, crab burrows, and coconuts (Bonnet & Chapman, 1958)
Peak feeding times	Feeds during daylight hours, usually more active in the early morning or late afternoon (crepuscular)	Feeds during daylight hours, usually more active in the early morning or late afternoon (crepuscular)	Feeds during daylight hours, usually more active in the early morning or late afternoon (crepuscular)
Preferred host species	Only feeds on humans	Will opportunistically feed on humans and other animals	Will opportunistically feed on humans and other animals
Preferred feeding location	Tends to feed more commonly indoors	Tends to feed more commonly outdoors	Typically feeds outdoors (Russell, Webb, & Davies, 2005)
Preferred resting sites	Rests indoors in dark shady areas below 1.5 m in height (Scott & Takken, 2012)	Rests outdoors on vegetation and also indoors (Paupy, Delatte, Bagny, Corbel, & Fontenille, 2009)	Generally rests outdoors on vegetation
Flight range	Limited flight dispersal – usually only 50–100 m (Harrington et al., 2005; Liew & Curtis, 2004)	Average flight range is 50–200 m (Marini, Caputo, Pombi, Tarsitani, & Della Torre, 2010)	Limited flight dispersal, usually only 50–100 m (Hapairai, Sang, Sinkins, & Bossin, 2013)

Appendix 4. List and Details of Mosquito Surveillance Sites.

Routine vector surveillance should be conducted at representative sentinel sites. The designation of surveillance sites is based on areas which previously have been the areas of highest cases. Places of interest include border and PoE (airport, wharf, freight handlers and custom clearance zones), schools/universities, hospitals, district health centres, and areas of mass gatherings (markets, sports centres, event spaces). It is expected that there will be quarterly monitoring of all sites. Sampling stations have been identified within each surveillance site. A minimum of one indoor and one outdoor site for each site will be sampled.

Name of surveillance site	Entomological Indicator	Monitoring technique	Total no. of sampling sites	Tapping duration per month	Proposed months of sampling	Sampling Stations	Responsible
Airports	Adult Occurrence IR testing	BG Pro BG sentinel	Faleolo-2/3 Fagali-2 Moata-2	24 hours/week for 2-4 weeks for Upolu 24 hours/week for 1 week for Savaii	June, September, December, April for Upolu June and December for Savaii	Faleolo International Airport. Fagali Airport. Maota Airport. Asau Airport	Vector Control Samoa Airport Authority (SSA)
Wharf	Adult occurrence IR testing	BG Pro BG sentinel	Mulifanua Saleologa	24 hours/week for 2-4 weeks for Upolu 24 hours/week for 1 week for Savaii	June, September, December, April for Upolu June and December for Savaii	Matautu Apia International Wharf. Mulifanua Wharf. Saitoa Wharf Saleologa Wharf. Asau Wharf	Vector Control Samoa Shipping Corporation (SSC) Samoa Ports Authority (SPA)
Tupua Tamasese Meaole Hospital (TTMH)	Adult occurrence IR Testing Larval Surveys Mosquito behaviour	BG Pro BG sentinel	4	24 hours/week for 2-4 weeks	June, September, December, April IR testing conducted annually in September	Tupua Tamasese Meaole II Hospital Ministry of Health Main Office Confidential Building. Warehouse Building – Pharmaceutical.	Ministry of Health Public Health (MOH) VCS
District hospitals Upolu	Adult occurrence IR testing Larval Surveys	BG Pro BG sentinel	2 per site	24 hours/week for 2-4 weeks	June, September, December, April	Lufilufi Health Centre. Lalomaniu District Hospital.	District Hospital- Nurse Managers VCS

Name of surveillance site	Entomological Indicator	Monitoring technique	Total no. of sampling sites	Trapping duration per month	Proposed months of sampling	Sampling Stations	Responsible
	Mosquito behaviour				IR testing conducted annually in September	Poutasi District Hospital. Saanapu Health Centre. Faleolo Medical Hospital. Leulumoega District Hospital.	
District Hospitals Savaii	Adult occurrence IR testing Larval surveys Mosquito behaviour	BG Pro BG sentinel	2 per site	24 hours/week for 1 week	June and December IR testing conducted annually in September	Mali'etoa Tanumafili II Tuasivi Referral Hospital. Safotu District Hospital. Satana District Hospital. Foailalo District Hospital. Satupaitea Hospital	District Hospital- Nurse Managers Vector Control
Schools	Adult occurrence	BG Pro BG sentinel	2 per site	24 hours/week for 2-4 weeks	June, September, December, April	5 x Randomly select govt schools. (rural), 5 x Randomly select govt schools (urban). 5x Churches schools. 5 x Private schools.	Ministry of Education, Sports, and Culture (MESG)
Sports Complex	Adult occurrence	BG Pro BG sentinel	4 sites	24 hours/week for 2-4 weeks	June, September, December, April	Tanainato Sport Complex. Apia Park. Princess Edward Park – Iva Savaii Marist Club Park – Lotopa.	Samoan Sports Facility Authority (SSFA)
Hotels/Resorts	Adult occurrence	BG Pro BG Sentinel	2 per site	24 hours/week for 1 week	June and December	Vaisala Hotel, Savaii Le Lagolo Hotel, Savaii Jeyover Hotel, Savaii	Savaii only Selected resort operators
Government Stakeholder Buildings	Adult occurrence	BG Pro BG Sentinel	2 per site	24 hours/week for 1 week	June, September, December and April	TATTE Building – Savalalo. Tofilau Alesana Building. – Mulinu. Parliament Building – Mulinu.	Vector Control Related government ministry IVCC members

Name of surveillance site	Entomological Indicator	Monitoring technique	Total no. of sampling sites	Trapping duration per month	Proposed months of sampling	Sampling Stations	Responsible
Markets	<i>Aedes</i> Adult occurrence	BG Pro BG Sentinel	2 per site	24 hours/week for 1 week	June, September, December and April for Upolu June and December for Savaii	Ministry of Justice and Courts Administration (MJCA) Building – Mulinuu. Ministry of Education, Sports, and Culture (MESO) Building – Malifa. Savalalo Market. Fugalei Market. Ah Iki Market – Taufusi. Atega Market. Salelologa Market – Savaii	Vector Control

Appendix 5. Detailed Information of Source Reduction for *Aedes* Larval Control

Source reduction is the removal, destruction, covering or emptying of water habitats to reduce the sources of mosquitoes. Such actions should be the mainstay of any *Aedes* vector control programme. The key to success is a strong community outreach programme. Education on the biology of the mosquito, their ecology, and environmental management measures are of utmost importance to engage communities, develop RCCE/IEC materials and prevent vector proliferation (see Section 4, above).

Source Reduction Activities (WHO Division of Pacific Technical Support, 2020)

Activity	Details
Pipe water supply	Where reliable piped water is provided there is generally a reduction in the storage of water in containers. This helps to reduce <i>Aedes</i> breeding and thus helps reduce the risk of arbovirus transmission.
Mosquito-proof essential water containers	Where water containers are needed for water storage, measures should be taken by communities to prevent vector breeding. This could be by tight mesh or sealed lids. Examples: plastic and metal drums, water tanks or septic tanks.
Clean and scrub	Water storage containers can be regularly emptied and scrubbed to remove eggs sticking to the inner surface. Using bleach is an effective method to kill eggs. Examples: plastic and metal drums, vases, pot plant saucers or other ornamental containers.
Empty and turnover	Unused containers, such as buckets and boats, can easily accumulate rain water when not in use and should therefore be kept in a sheltered space or turned upside-down. Examples: plastic and metal drums, construction equipment, vases, pot plant saucers, other ornamental containers, plastic buckets and boats.
Fill in	Filling in potential larval habitats is a sustainable option to prevent future use by <i>Aedes</i> vectors. Examples: fill tree holes with cement or sand, fill rock pools or puddles with sand or stones, or filling unused septic tanks with cement. Also avoid the presence of plants with plant axils, such as bromeliads, around people's houses.
Remove	Items that need to be retained, but could contain water if left outside, should be moved to into appropriate storage so that they don't fill with rainwater. Examples: Plastic buckets, boats, tarpaulins or construction equipment.
Unblock	When appropriate, unblock potential containers to ensure that water flows and doesn't become stagnant. Examples: rain gutters or septic tanks.
Dispose of waste	Waste needs to be removed or destroyed to prevent vessels filling with rainwater and providing aquatic habitat sites. Examples: combine community awareness and education, clean-up campaigns, and garbage collection services to reduce small containers, empty bottles, cans, plastic bags.
Manage solid waste	Solid or bulk waste can provide larger volumes of standing water and produce substantial numbers of <i>Aedes</i> vectors throughout the rainy season. Bulk waste should be collected and properly disposed of or recycled, with community participation by municipality services and civil society organisations. Examples: used tyres, discarded refrigerators, disused boats or old cars.
Maintain houses	Maintenance and certain adaptations of houses and other structures can help prevent larval breeding or adult mosquito entry/residence. House screening and air conditioning reduces entry and presence of <i>Aedes</i> vectors indoors. There are a number of household features that should be maintained to prevent larval habitats forming, such as guttering, provision of piped water to minimise water storage containers, maintaining septic tanks and reducing the presence of containers and buckets in the yard.

Appendix 6. Summary of Outbreak Response

Outbreaks are declared by the Health Emergency Operations Centre (HEOC) (The National Communicable Disease Control Committee converts to this designation at times of an outbreak).

In the event of an outbreak, the health response is co-ordinated through the HEOC. HEOC is established to co-ordinate the health response to an outbreak and inform the National Emergency Operations Centre (NEOC) of any recommendations. The IVCC should be informed so that a multisectoral response can be co-ordinated. IVCC should be recalled in the first 48h after the notification of the outbreak.

IVCC will lead the mobilization of the team members within 72h after the IVCC emergency meeting. IVCC will organise and ensure appropriate training of staff likely to be deployed. Through its regular meetings, the IVCC should consider doing this prior to an outbreak (if one is predicted or expected). The National Focal Point will assess the need to notify the WHO of the outbreak under the IHR (2005).

When there is an outbreak, the *outbreak response team* (OMT) needs to be engaged. In Samoa, the OMT for Dengue, Chikungunya and Zika consists of different stakeholders across government ministries. Each stakeholder has a different area they are responsible for, as well as tasks that need to be done. Staff with experience in arbovirus control should be included. If extra advice is needed, contact the WHO through the Samoa Country office in Moototua.

See the National Communicable Disease Surveillance and Control Guidelines (Government of Samoa Ministry of Health, 2020b) for more details about confirmation and management of dengue infections as well as definitions of what constitutes an outbreak. The table below summarises Samoa's OMT:

Members of the outbreak response team (OMT)

Stakeholder	Area	Outbreak management tasks
Health Emergency Operations Centre (HEOC)	Co-ordination and governance	<ul style="list-style-type: none"> Coordinate national response with National Emergency Operations Centre (NEOC). Produce health guidance under RCCE mechanisms and guidance.
Integrated Vector Control Committee (IVCC)	Multisectoral Response	<ul style="list-style-type: none"> Declare IVCC meeting once outbreak confirmed, hold regular IVCC meetings to co-ordinate multisectoral response. Agree and mobilise budget needed. Conduct rapid assessment of resources needed and request through IVCC response (done for each member). Provide weekly updates on progress of allocated activities (each member). Develop, coordinate, and disseminate agreed RCCE materials.
Ministry of Health's (MOH) Vector and Sanitation Unit	Vector Control Measures	<ul style="list-style-type: none"> Mobilize and act as secretariat to IVCC. Coordinate outbreak vector control response (to rapidly reduce the density of potentially infectious adult mosquitoes)
NHS & IHR, Division of the Ministry of Health	Surveillance and Reporting	<ul style="list-style-type: none"> Develop situational reports on a daily/48hr/weekly basis – based on the progress of the outbreak – disseminate to relevant personnel (HEOC members) Assess the regional situation – any regional outbreaks and inform them of our local situation. Locally vs regionally circulating serotypes. Conduct case investigations and close contact tracing.
National Public Health Laboratory	Testing and Reporting	<ul style="list-style-type: none"> Conduct rapid resourcing assessment. Request assistance where needed from WHO/donors for testing. Procure testing equipment. Reporting cases rapidly to NHS & IHRD

Stakeholder	Area	Outbreak management tasks
Ministry of Education, Sports, and Culture (MESC)	RCCE Source Reduction	<ul style="list-style-type: none"> Dissemination of age appropriate RCCE materials to schools, colleges, and universities. Management and source reduction at schools
Ministry of Women, Community, and Social Development (MWCSD)	RCCE Source Reduction	<ul style="list-style-type: none"> Mobilise women's committees in village clean-up campaigns, disseminate RCCE, conduct source reduction activities, identify vulnerable members of society
Ministry of Natural Resources and Environment (MNRE)	Waste Management RCCE	<ul style="list-style-type: none"> Scale up waste disposal services. Collaborate with SWRMA to increased recycling of plastics.
Media	RCCE	<ul style="list-style-type: none"> Disseminate MOH approved information to public. Provide clear, consistent messaging to avoid panic and confusion. Co-coordinate RCCE with HEAPS (MOH) and HEOC.
Public of Samoa (civilians)	Community-based Source Reduction	<ul style="list-style-type: none"> Conduct community clean-up campaigns. Encourage testing and personal protection measures.

Appendix 7. Reactive Vector Control Activities

Reactive vector control activities aim to reduce the density of adult mosquitoes before they complete their EIP (8-12 days) after which they can transmit virus (WHO Division of Pacific Technical Support, 2020). Reactive activities should employ multiple strategies for best impact. To be effective, vector control activities should be employed rapidly, and be well-coordinated across government departments. Understanding the level of transmission that has occurred is important for guiding the vector control response:

1. **Isolated cases:** If cases are isolated (especially if imported), the vector control response should be rapid and focus on the case and contact houses to prevent further spread (often aligned with case investigations).
2. **Cluster of cases:** If a cluster of cases has occurred, the vector control response should be targeted to the entire community where the cluster has occurred.
3. **Widespread outbreak:** If transmission is already widespread, then the vector control response is targeted to the areas with highest transmission (identified through epidemiological surveillance).

Reactive control of *Aedes* vectors will be informed by routine vector surveillance data and information detected through passive surveillance of suspected or confirmed cases at health facilities. As a part of initial outbreak investigations, case investigations are often requested, including a vector assessment (see Section 4.5 and [Appendix 6](#) for more details).

Activity	Details
Conduct regular source reduction through community engagement	Source reduction is the removal, destruction, covering or emptying of water habitats to reduce the sources of mosquitoes. The key to success is a strong community outreach programme, with the goal of 70% to 80% participation. Education on the biology of the mosquito, its ecology, and environmental management measures is of utmost importance to engage communities and prevent vector proliferation.
Conduct larviciding (where aquatic habitats can't be contained with source reduction)	Larviciding is the regular application of chemical or biological agents to aquatic mosquito habitats. The use of larvicides is supplementary to source reduction, aiming to kill larvae in water bodies that cannot be drained, filled, or otherwise modified.
Conduct indoor residual spraying (IRS- <i>Aedes</i>) when outbreak is driven by <i>Ae. aegypti</i> (most likely scenario)	IRS- <i>Aedes</i> is the application of residual insecticides to the resting sites of <i>Aedes</i> mosquitoes inside houses, primarily for <i>Ae. aegypti</i> . When the vector meets the sprayed surface, it absorbs a lethal dose of the insecticide, resulting in mortality, which contributes to reducing vector densities. During an outbreak, IRS- <i>Aedes</i> is the best method to quickly reduce the density of infected mosquitoes in the area. For step-by-step guidance see the PAHO manual (2019). Spraying should be conducted at high-risk and suspected locations of cases and repeated, as necessary. Should be carried out throughout outbreak area. Long-lasting, residual insecticides should be used. Note that space sprays (fogging/misting) which have no long-lasting effect or demonstrated efficacy.
Conduct outdoor residual spraying when outbreak is driven by <i>Ae. albopictus</i> or <i>Ae. polynesiensis</i>	Outdoor residual spraying (ORS- <i>Aedes</i>) is the application of residual insecticides to the resting sites of <i>Aedes</i> mosquitoes outside houses. The vectors <i>Ae. albopictus</i> and <i>Ae. polynesiensis</i> express a preference to rest in vegetation in the peri-domestic area close to houses. For these vectors, it is useful to apply residual insecticides to peri-domestic vegetation; this practice is commonly referred to as “barrier sprays” or “harbourage spraying”.
Initiate RCCE	RCCE efforts should begin immediately. See Appendix 8 for more details on RCCE.

Activity	Details
Promote personal protection measures	Personal protection measures should be used to protect against day-biting mosquitoes. These include the use of appropriate repellents and wearing of light-coloured, loose-fitting clothing. This is especially important for viraemic patients to prevent the onwards transmission of arboviruses. Since transmission of dengue occurs mostly during the daytime, the use of insecticide-treated bed nets (ITNs) has rarely been considered as a control strategy. However, ITNs can be important to prevent the onwards transmission of arboviruses from viraemic patients. For patients admitted with dengue, mosquito nets may be used to cover hospital beds, especially if the ward does not have window/door screens to prevent mosquitoes from entering.

Appendix 8. Dengue Health Promotion, Risk Communication, and Community Engagement (RCCE) - Activities and Principles

Many of the following messages and activities are also relevant to health promotion.

Activity	Details
Alert health professionals	Contact local hospitals and community health providers, as well as private health providers to advise them of the confirmed case/s and to determine whether other people are affected.
Inform patients	Patients with confirmed dengue, as well as family members and close contacts should receive IEC materials.
Inform the community to support engagement. Key messages: Understand, prevent, act, and monitor.	<p>UNDERSTAND</p> <p>Inform the community about dengue and how it spreads:</p> <ul style="list-style-type: none"> • Dengue, chikungunya and Zika are all transmitted by <i>Aedes</i> mosquitoes, which bite mainly during the day. • Dengue is one of the fastest spreading mosquito-borne diseases. Worldwide, the incidence of dengue has increased 30-fold over the past 50 years. • <i>Aedes</i> mosquitoes usually bite during the day, with peaks during early morning and late afternoon/evening. They can bite outside and inside dwellings if there are no screens. • <i>Aedes</i> mosquitoes inhabit stored and stagnant water found in and around the home. • The current risk of dengue in the local area (including geographic extent of the outbreak) should also be communicated. <p>PREVENT</p> <p>The best way individuals can protect themselves from getting sick is to avoid getting bitten. Residents and travellers should take extra precautions and:</p> <ul style="list-style-type: none"> • Use insect repellents containing tropical strength DEET picaridin, citriodiol, IR3535. • Wear clothing that covers the skin – light-coloured clothing if possible (as these do not hold as much heat as dark clothing; mosquitoes are attracted to heat). • Sleep in rooms that are either screened against mosquitoes or sleep under a mosquito net – especially when sleeping during the day, in the early morning, and around sunset. • Particularly for Zika: the community, in particular pregnant women and women of reproductive age, should be educated about the risk of transmission and how to minimise this risk by reducing contact with mosquitoes. <p>ACT</p> <p>Encourage the community to help prevent further dengue spread by suggesting that they:</p> <ul style="list-style-type: none"> • Clean surroundings of all waste and garbage that can retain water. • Change water in flower vases, pot-plant drip trays or any other water-filled container at least once a week. • Always keep water in covered containers, tanks, and drums. If possible, use mosquito-proof covers. • Empty, wash or scrub once a week all water storage dishes and containers to remove any mosquito eggs that may exist. • Drain roof gutters and assure free flow of water. • Report mosquito breeding grounds in abandoned lots, public spaces, playgrounds, and workplaces. • Report broken pipes or water to the authorities.

	<p>MONITOR</p> <p>A person infected by the dengue virus develops severe flu-like symptoms. The disease affects infants, children, and adults alike and can be fatal. Symptoms of dengue fever vary according to the age of the patient, but generally individuals should suspect dengue when a high fever (over 38°C) is accompanied by two or more other symptoms:</p> <ul style="list-style-type: none"> • swollen glands • muscle and joint pains • rash • severe headache • pain behind the eyes • nausea, vomiting <p>Symptoms usually last for 2–7 days, after an incubation period of 4-10 days after the bite from an infected mosquito.</p> <p>There is no specific treatment for dengue fever. If a person suspects they have dengue, particularly if they live or have recently visited a place where dengue fever is circulating, they should seek immediate medical advice.</p>
Engage the press	Consider involving the press/media to assist in informing the community about dengue cases. The press can also help inform people on how to avoid mosquito contact and eliminate mosquito habitats. Media methods could include social media, posters in public places, newspaper articles and commercials on TV or radio, and be based on an understanding of where various audiences to reach prefer to access their information and informed by evaluation after every health promotion/RCCE campaign.
Engage the community	For routine prevention and when there is an outbreak. In an outbreak, community and household clean-ups should be maintained until the outbreak is finished.

Source: WHO Division of Pacific Technical Support (2020)

The following principles help the creation of effective health promotion and risk communication materials for public access and comprehension.

Key communication principle	Details
Use words that are easy to understand.	Use words that most people use often. For example, say “think”, “feel” and “know”, instead of “consider”, “wish”, “sense”. Words like these are also easier to translate into other languages, which means materials written in this way are fosters more efficient translation into community languages. Example message: - “Talk to your doctor about what to do” instead of “Consult with your doctor for advice”.
Use clear and precise words and phrases.	Be clear and precise about your message, even if it means a slightly longer text. Messages that are too short often leave out important details. When telling people what they cannot do, always provide the positive alternative as well. Example message: - “Wear light clothes if you can. Mosquitoes are more likely to bite you when you wear dark clothes” instead of “Don’t wear dark clothes”.
Use the same terminology for a concept throughout.	Be consistent and avoid alternating between different terminology for the same thing. Example message: - “Mosquitoes can bite inside houses” consistently instead of alternating with “...inside residences” “...inside dwellings” “...inside buildings”
Explain medical terminology and jargon.	Try not to use medical and technical terminology, e.g., say “not bad for you” instead of “benign”. If you do need to use a technical

	<p>term, explain it.</p> <p>Example message:</p> <ul style="list-style-type: none"> - “Dengue is spread by a type of mosquito called ‘<i>Aedes aegypti</i>’” instead of “Dengue is vector-borne and is primarily spread by <i>Aedes aegypti</i>.”
Use words and phrases that work across languages.	<p>Choose words and phrases that work across languages, for example in both Samoan and English. Avoid English-specific phrasing.</p> <p>Example message:</p> <ul style="list-style-type: none"> - “Do this to avoid mosquito bites” instead of “Beat the bite”
Use simple sentences.	<p>Create simple sentences and avoid abstract scenarios.</p> <p>Example message:</p> <ul style="list-style-type: none"> - “If the person gets much worse very quickly, take them to the hospital or call an ambulance” instead of “In case of rapid deterioration, seek emergency medical assistance”. - “Not all people have the same symptoms” instead of “Symptoms may vary from person to person”.
Choose pictures that look like the real thing.	<p>If not using photographs, choose graphics that look like the thing they are depicting. Do not use overly simplified pictures that can be confusing to someone who cannot read the text.</p>
Choose pictures that cannot be misunderstood in a way that is detrimental to the message.	<p>Use pictures that convey your message, if possible. Don’t use pictures that can be misunderstood if someone cannot read the text.</p>
Choose an accessible layout.	<p>Make sure your design is accessible. Things like contrasting colours and large font types not only attracts attention, but also helps people with visual impairments (e.g., old people who do not see well) to be able to read your materials. Make sure any step-based procedures are clearly outlined, and that the reading direction is clear.</p>
Foster a good communication environment (WHO Division of Pacific Technical Support, 2020)	<p>The following actions foster a good risk communication environment:</p> <ul style="list-style-type: none"> - Build and maintain trust. - Communicate early and often, even in the face of uncertainty. - Involve and engage communities. - Establish and use locally appropriate listening and feedback systems. - Use a combination of methods, including social media, as appropriate. Ensure resources for risk communication operations. - Treat emergency risk communication as a strategic role, not as an add-on. Establish coordination and information systems. - Build capacity outside times of crisis or emergency. - Manage rumours.

Source: Bromhead (2022); Diget (forthcoming); Goddard (2018, 2021); Wierzbicka (2018)

The principles above reference health promotion and risk communication in English and Western cultures, but the same principles apply for communication in any language, e.g., Samoan. However, note that the principles focus only on superficial linguistic and pictorial aspects. It will be necessary to develop risk communication campaigns that are locally appropriate and salient to the target audience. Evaluation of each campaign should help define the principles more clearly for the various Samoan audiences and for people visiting Samoa.

Appendix 9. Summary of Dengue Case Investigation Process

Confirmed dengue cases are notifiable. Refer to the National Communicable Disease Surveillance and Control Guidelines (Government of Samoa Ministry of Health, 2020b) for more details about confirming and managing dengue infections.

Within 24h of notification:

Within 24h of notification, a case investigation may be conducted by the surveillance team.

Multidisciplinary surveillance team:

Surveillance officer, Vector control officer, Laboratory staff/Medical officer.

Initial interview:

The surveillance or medical officer will conduct the initial interview at the location. Obtain a history of travel (locally and overseas) in the previous two weeks (incubation period is 4-7 days but ranges from 3-14 days).

Ask about any possible sources of current dengue infection, such as close contacts with similar symptoms at the home, school, workplace, social gatherings, and recent overseas travel. Obtain a list with details of close contacts. Any symptomatic household contacts should have samples collected and be advised to limit travel until they have recovered.

Often, the team will come across families with limited awareness of what dengue is, how it spreads, what symptoms to look out for, and ways to protect them. In such cases, the majority of the time is spent on counselling them and explaining why family details are obtained and why laboratory samples are to be taken. Communication plays a key role in case investigation activities.

Vector control officer:

The vector control officer will participate in the case investigation and lead the vector surveillance and control operations. The template for capturing vector surveillance and control activities is outlined below.

Template for Vector Assessment for Case Investigations
 Vector Control Assessment Form Name of Assessor: _____ Assessment Date: _____

Case information	
First Name	Telephone Number
Last Name	Date of Diagnosis
Village	Diagnosis made by: IgM NS1 PCR Not confirmed

Case exposure history			
Date of Onset of Symptoms:	Fever	Rash	Muscle Pain Joint Pain Other:
Symptoms experienced:			
Locations been in last 2 weeks:			

Owner of property present: YES/NO Name: _____ Contact number: _____
 Assessment of Outdoor Area:

Containers holding water visible on property	YES / NO	if yes, please describe below and indicate if larvae seen:	
Aim: the purposes of identifying containers holding larvae for treatment and emptying			
Assessor encountered mosquitoes on property	YES / NO		
Type of house	Closed house	Semi -open	Fale
Preventative measures used at home currently (please describe)	Mosquito screens on windows/doors (good condition or torn) Mosquito nets Insect Repellents Mosquito Coils		
Aim: To help structure and guide the vector officers investigation process and response			

Actions taken by Assessor

Action	Description
Mosquito traps set on property	YES / NO

Shared mosquito bite prevention informational materials	YES / NO
Mosquito nets, coils or repellents given	YES / NO
Water holding containers emptied	YES / NO
Larvicide used	YES / NO
Homeowner shown larvae and breeding sites	YES / NO
Indoor Residual Spraying (IRS) Conducted at house	YES / NO
Indoor Residual Spraying (IRS) Conducted within 200m radius	State owner name and contact details for houses sprayed:
Informational leaflet for IRS given to homeowners	YES / NO

Follow up

Environmental Health Inspection form given to owner YES / NO

If actions to be taken at a later date please specify here: Owner sign to confirm: _____

DATE: _____ Action to be taken:

Appendix 10. Draft Samoa Vector Insecticide Resistance Monitoring and Management Plan 2023-2025

Rationale:

Vector control in Samoa is largely reliant on the use of insecticides. As per the Samoa National Strategic Plan for the management of mosquitoes and mosquito-borne diseases 2023-2033 ('the Strategic Plan'), insecticides are used for effective mosquito control response during outbreaks, to prevent the importation of exotic mosquitoes, and for focal control during case investigations.

Use of insecticides in public health is mainly in:

1. **Targeted indoor residual spraying (IRS)**: either a) periodically in high-risk or outbreak areas, or b) periodically for annual coverage in airports and wharves or preceding high-risk events/times.
2. **Disinsection² of vessels**: regularly in arriving planes and boats.
3. **Larviciding of aquatic habitats**: regular application (along with larval source reduction) at PoE (airports and wharfs) or in the community concurrent with larval surveys.
4. Provision of insecticide-treated nets: for febrile patients.

The effectiveness of these interventions depends on the continued susceptibility of target vectors to insecticide products available for use in the country. This appendix therefore seeks to briefly review the situation and set out steps to preserve effectiveness of vector control in Samoa to ensure the vision outlined in the SP can be achieved. This draws on materials developed by WHO, including the *Global Plan for Insecticide Resistance in Malaria Vectors* and the *Framework for Insecticide Resistance Monitoring and Management Plan*.

Details on insecticide management processes have already been laid out in the main body of the SP. Quality control of vector interventions is a key component of maintaining effectiveness of insecticidal tools. This has also already been covered in the SP, such as IRS training on spray equipment, calibration, and washing to prevent environmental contamination (see Activity 2.1.4 in the budget, Section 5 of the SP) and monitoring of LLIN bio-efficacy.

Situation:

The epidemiological and entomological situation in Samoa has been outlined in detail in the SP. This situation analysis therefore presents a brief overview of available information, structures and regulations related to vector resistance and insecticide efficacy.

The following provides a summary of the available information on insecticide resistance for known mosquito vectors of human disease in Samoa (to be developed in Year 1-2).

Year	Vector	Insecticide	Collection site			
			1	2	3	4

S = susceptible, PR = possible resistance; R = confirmed resistance.

The following summarises insecticides currently in use or planned for use in public health in Samoa (to be developed in Year 1-2).

² This is the procedure whereby health measures are taken to control or kill the insect vectors of human diseases present in baggage, cargo, containers, conveyances, goods, and postal packages.

Year	Insecticide class	Insecticide type	Product name	Use (LLINs, IRS, larvicide)	Formulation (mg/kg; g/L)	Quantity used (amount of AI)

AI: active ingredient

Note: a similar table should be constructed for insecticides used in agriculture

Use of insecticides in Samoa for both public health and agriculture is controlled under the Samoa Pesticide Regulations (2011). A review and update on application of this legislation will be undertaken in Year 1 and findings added to this section.

There has been limited assessment of the efficacy or effectiveness of insecticide interventions against local vectors in Samoa. Key questions to be answered through operational research will be defined by the MOH and VCS during the initial year of implementing the SP (see Activity 5.5 in the budget, Section 5 of the SP).

Samoa is included in an Australian Aid and ACIAR project supporting integrated and pest and disease management and strategies for sustainable intensification of fruit and crop production, and to address the threats posed by inappropriate use of pesticides, emerging pests and diseases, and climate change. One objective of this project is to “Extend integrated pest and disease management and insecticide resistance management strategies to other cropping and production systems”. While health sector engagement seems to be limited, options for extending to include resistance management in public health vectors should be explored in Year 1-2 of the SP period.

Strategy:

The following components have been drafted for the further consideration and discussion of the Samoa Ministry of Health in the development of its Insecticide Resistance Monitoring and Management Plan 2023-2033. This will be undertaken by mid-Year 2.

Objective:

To maintain the effectiveness of existing insecticidal vector control interventions, despite the threat of resistance.

Specific objectives

- To provide a framework for insecticide resistance monitoring,
- To provide a forum and strategic framework for decision-making on selection of insecticidal or other interventions,
- To guide decisions on vector control interventions and judicious use of insecticides in agriculture to prevent or reverse the development of insecticide resistance, and
- To strengthen the capacity of personnel to implement monitoring and management activities.

Expected output:

The expected result of implementation of this plan are:

- Rational and judicious use of insecticides in public health and agriculture to minimise insecticide selection pressure,
- Maintenance of susceptibility of vectors to public health insecticides, and
- Maintenance of the effectiveness of insecticidal interventions.

Priority activities:

The following have been identified as priority activities, to be adapted and expanded as needs change and as additional resourcing is identified:

1. Monitor insecticide resistance of vectors collected at PoE.
2. Monitor insecticide resistance of vectors collected through key habitat surveys.
3. Manage insecticide resistance data and implement in decision-making.

Operationalisation:

A standalone framework of governance and decision making is not required as this will already have been established under the SP.

Resistance monitoring:

Monitoring will focus on those insecticides currently in use or planned for use in Samoa. In the first year of the plan, the potential sites for larval surveys will be selected by VCS. The aim is to conduct insecticide resistance testing annually, or at least every second year.

Collection year	Collection sites (Provinces or islands)	Test method	Insecticide classes	Insecticides
2023		WHO tube tests	Pyrethroids	Permethrin 0.75% Pirimiphos-methyl
2024		WHO tube tests		
2025				
2026				

The IR testing Standard Operating Procedures (SOPs) will be updated in Year 1. This will guide procurement of IR testing materials and equipment and training of staff. Some of the considerations for SOP development are outlined below. This plan should be updated accordingly.

Target vectors:

Vectors for testing will include the following species:

- To be determined in Year 1

Sample methods:

Mosquitoes for testing in insecticide resistance tests will include:

- F0 wild-collected larvae from key habitat surveys that are used for WHO larval insecticide resistance bioassays,
- F0 2- to 5-day old adults raised from wild-collected larvae from key habitat surveys.

Test methods:

In Year 1 and 2 of the SP, insecticide resistance testing will use discriminating concentrations in WHO larval and adult tube tests. However, additional testing will be conducted using intensity concentrations and potentially with bottle bioassays to identify resistance intensity and mechanisms if any resistance is confirmed in key vectors during initial assessments.

Data recording and reporting:

Data will be recorded using standard WHO forms and will be compiled in a national insecticide resistance database (embedded in Tupaia Meditrak, cf. Section 4.8.5 of the SP) that lists (at a minimum): collection year, collection date, collection site (and sub-site name), GPS coordinates of location, habitat type and location, vector species, species identification method, number collected, test date, number tested (controls and treatment), number dead (controls and treatment), mortality rate (including rate adjusted with Abbott’s formula), and resistance status. When preparing to conduct insecticide resistance surveys, the MOH will need to engage with BES to deploy the insecticide resistance data collection form.

A vector profile that indicates important public health vectors, their distribution, and their insecticide resistance profiles will be generated (and updated annually). This will be used to guide key decisions on

insecticidal interventions (amongst other decisions), to ensure that interventions with insecticide classes to which susceptibility remains in key vector species are preferentially selected, and are used pragmatically in appropriate insecticide management strategies. In particular, a key decision related to insecticide resistance as included in the SP will be the choice of vector control products (i.e.. considering active ingredient/s) based on the mosquito vectors present and their insecticide resistance profile.

Resistance management:

As per the WHO *Global Plan for Insecticide Resistance Management Plan*, (WHO, 2012) there are four main resistance management strategies that can be used for vectors of public health importance. These are: combinations, rotations, mosaics, and mixtures. Utility of these approaches will depend on target vectors and interventions, available insecticidal products, geographical and temporal application of the products, and the resistance profile of local vector species.

Co-deployment of more than one intervention with the same insecticide class in the same geographical area and at the same time will be avoided. This places unnecessary selection pressure on local vectors and can impel the emergence and increase (in geographic spread and in intensity) of insecticide resistance. For example, IRS with pyrethroid insecticides will not be conducted in areas where pyrethroid LLINs will also be used (for febrile patients). Therefore, a different insecticide class will be needed for spraying of hospitals. To determine the most appropriate approach, all background information will be assembled for assessment by the IVCC during the first year of implementing the SP.

Other vector control interventions:

Wherever possible, use of non-insecticidal interventions will be used to reduce selection pressure on local vector species. This includes the use of larval source reductions methods, such as emptying or screening of key habitats.

Capacity:

Additional capacity will be required for vector surveillance and control, including vector collections, insecticide resistance testing, data analysis and interpretation, and development of resistance management strategies. To conduct larval surveys and insecticide resistance testing, training will be required. Training of personnel supported by peer-to-peer mentoring from regional colleagues will be a key priority in the first years of the plan. The DFAT-funded PacMOSSI project has commenced capacity development of MOH staff, and this initiative is planned to continue throughout the duration of the SP period (pending funding).

Appendix 11. Gender Matrix Analysis

Practical gender needs are the needs of women or men that relate to responsibilities and tasks associated with their traditional gender roles or to immediate perceived necessity. Responding to practical needs can improve quality of life but does not challenge gender divisions or men's and women's position in society. Practical needs generally involve issues of condition or access.

Strategic gender interests concern the position of women and men in relation to each other in a given society. Strategic interests may involve decision-making power or control over resources. Addressing strategic gender interests assists women and men to achieve greater equality and to change existing gender roles and stereotypes. Gender interests generally involve issues of position, control, and power.

Strategy/Activity	Practical needs	Strategic needs
Training	Ensure equitable access to training including the timing and support provided at the training and duration/location of the training)	Include Gender Equity and Social Inclusiveness concepts in training programmes
Committee meetings	Ensure meetings held at times when and for a duration supporting both men and women (all ages) can attend	Ensure equity in representation at all committee meetings
IEC activities and campaigns	Ensure activities have positive gender and different abilities representation and are available to people with low literacy and with disabilities	Involve women and people living with disabilities and advocates in co-design of campaigns
Operations research	Ensure gender disaggregated data	Ensure fair and equitable access for involvement in research.
Field work/surveillance activities	Ensure both men and women are included in surveillance activities	Implement safeguarding policy to protect female workers at the workplace, during field work and surveillance activities.
IRS	Ensure all spaces including those occupied/utilised by women are sprayed. Ensure adequate time allowed for people with disabilities to move from locations to be sprayed.	
Hiring of staff/HR management	Ensure advertisements for recruitment and promotion make clear it is open to all genders	Ensure fair and equitable recruitment processes. Implement women in leadership activities to support women in leadership roles within VBD unit. Ensure fair and equitable promotion performance assessment and process.

Appendix 12. Annual Workplan (Year 1 and 2)

YEAR 1 Strategies	Activities	Responsible person/group	Inputs	Unit cost	Budget (AUD)
1.1 Routine vector surveillance activities	Objective 1: Implement routine mosquito surveillance and preventative control activities				
	1.1.1.a Identify resourcing requirements for mosquito surveillance program identified and procurement begun, including adult surveys, larval surveys, and IR monitoring (Appendix 10).	VCS	List of items used for Mosquitoes Monitoring Program.		\$30,000
	1.1.2.a Identify appropriate location for public health entomology laboratory.	VCS.	No costs		0
	1.1.3 Conduct training on vector surveillance, including adult surveys, larval surveys, and IR testing.	VCS, PacMOSSI, WHO, SPC	Staff only Assumes donor covers all costs. Not costed		
	1.1.4a Conduct routine adult vector surveillance activities.	VSC TA	Staff time		the \$2,000
	1.1.4c Assess insecticide resistance status biannually (From year 1) (Using discriminatory concentrations of WHO larval and adult tube tests) and other tests if any resistance confirmed in initial assessments).	VCS	Staff time		0
	1.1.4d Undertake annual IR testing SOP updates.	VCS	Staff time		0
	1.1.4e Purchase required materials, equipment for IR testing (biannual).	VCS	Procurement costs		
	1.1.4f VCS staff training on IR testing (bi-annual).	VCS	Staff time		\$5,000
	1.1.5 Undertake monitoring and evaluation of findings of routine vector surveillance and surveys and implement remedial measures/updates as required.	VCS, MOH, TA			\$5,000
1.2 Routine vector control activities, including regular source reduction and larviciding	1.2.1 Resourcing for routine larval source reduction through community engagement and larviciding.	VCS, MOH	Staff only		\$2,000

YEAR 1 Strategies	Activities	Responsible person/group	Inputs	Unit cost	Budget (AUD)
1.3 Community engagement activities including clean-up programmes.	1.3.1 Undertake source reduction through community and stakeholder action: waste management.	IVCC Committee – MWSCD, MOH, MNRE, MOF			\$10,000
	1.3.1a Advocate for waste reduction programs starting with the IVCC members (e.g., no plastic for catering for events) through consultations with ministry procurement processes and IVCC members.	IVCC			\$4,000
	1.3.1b Support the MNRE program to have single use plastics/all plastics banned:	MNRE, IVCC, VCS			\$20,000
	<ul style="list-style-type: none"> Conduct roundtable meeting with MNRE and relevant stakeholders. Select two problematic sites (one in Upolu and one in Savaii) and conduct community consultations prior to clean-up campaigns. Conduct and promote segregation initiatives. Conduct community clean-up and provide recyclable cages for plastic bottles and aluminium cans (three sets per two compartments per village) Improve public awareness campaign on sustainable waste management. 				
	1.3.3a Launch national clean-up campaign.		Event		\$5,000
	1.3.3b Submit for cabinet endorsement (January year 1 and annual).	MOH	Staff time		0
	1.3.3c Develop and disseminate media/press releases (August annually).	All IVCC members	Travel, staff time, meetings		\$2,000
	1.3.3d Conduct National Clean-up Campaign (20 th August annually).	All IVCC members	Equipment and consumables		\$5,000
	1.3.3e Undertake monitoring and evaluation and implement remedial measures/updates as required.	MOH, all IVCC members	Staff time		0
	1.4 Health promotion	1.4.1a Develop an annual health promotion and community engagement plan including multimedia campaign through HEAPS and VCS working together.	VCS, HEAPS	Meeting	
	1.4.1c Distribute IEC materials to schools, government buildings, colleges, resorts, ports, health centres and hospitals (August annually).	VCS, HEAPS, STA, SAA, SPA	Travel costs		\$500

YEAR 1 Strategies	Activities	Responsible person/group	Inputs	Unit cost	Budget (AUD)
	1.4.1d Produce targeted IEC materials relevant to the Animal Health (June/July).	MAFS, APS	Printing costs Staff time		\$4,000 (\$2,000 to each APS and MAF)
	1.4.1e Finalise decision on media package materials (July).	HEAPS, VCS	Media package purchased		\$15,000
	1.4.1f Implement radio and TV public education activities (July/August).	VCS	Travel and staff time		\$1,200
	1.4.1g Produce IEC materials for environmental waste campaigns (July -Sept).	MNRE, VCS, SRWMA	Materials, printing, activities		\$10,000
	1.4.1h Participate in annual National Health Week of GoS (November).	HEAPS, VCS	Included in MOH National Health Week budget. Staff time		0
	1.4.1j Undertake monitoring and evaluation and implement remedial measures/updates as required.	HEAPS, VCS	Travel, data collection and analysis, staff time		\$10,000
	1.4.2a Approved budgeted WMID annual plans.	MOH, VCS	No cost		0
	1.4.2b Submit WMID plans for cabinet endorsement (January annually).	MOH	Staff time only		0
	1.4.2c Finalise budget allocation and workplan for WMD(January)	VCS IVCC	Staff time		0
	1.4.2d Endorsement of WMD budget and workplan by IVCC (January).	IVCC	Support for meetings – catering, refreshments		\$1,200
	1.4.2d Confirm WMD funding (February).	IVCC	Staff time only		0
	1.4.2e Decide on annual WMID slogan and theme (April IVCC meeting).	IVCC	Support for IVCC meetings – catering, refreshments.		\$1,200
	1.4.2f Implement sectoral activities for WMD.	Relevant sectors	See partner budgets		
	1.4.2g Undertake monitoring and evaluation of WMD targets.	Relevant sectors	See partner budgets		
	1.4.3a Implement school educational program (August/Sept).	VCS, MESC	Staff time Printing of resources Travel related costs		\$6,000
	1.4.3b Consult with MIFSC over school's educational program.	VCS, MESC	Meetings		\$1,000
1.5 Increased vector control	1.5.1 Conduct annual assessment of anticipated high risk events or time events.	VCS	Staff time		0

YEAR 1 Strategies	Activities	Responsible person/group	Inputs	Unit cost	Budget (AUD)	
activities coinciding with high-risk events/times	1.5.2 Produce/update and disseminate vector control plans for major high risk events to relevant stakeholders.	VCS	Printing		\$2,500	
	1.5.3 Conduct targeted IRS activities as part of the preparation for high risk event.	VCS				
	1.5.4 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS	Staff time		0	
	2.2.1 Develop RCCE plans and materials/activities.	VCS, HEAPS, MWSCD	Meetings, activity, and materials costs		\$10,000	
2.2 Risk communication in high risk areas, including promotion of personal protection measures	2.2.2 Implement RCCE as required as per protocol.	VCS, MWSCD	Staff time, travel, and meetings		\$5,000	
	2.2.3 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS, MWSCD	Staff time		0	
	2.3 Supply of insecticide	VCS, WHO/SPC	Net, freight, customs and duties, warehousing costs			
treated nets to febrile patients	2.3.2 Distribute ITNs to hospitals and febrile patients through health facilities.	VCS, MOH	Distribution costs		\$5,000	
3.1 Routine vector surveillance conducted at airports and wharfs	3.1.1 Undertake routine adult vector surveillance activities.	VCS, Port Authority				
		VCS, Port Authority				
		VCS, Port Authority				
	3.1.2 Regularly survey PoE for the presence of potential larval habitats.	VCS, Port Authority				
		VCS, Port Authority				
		VCS, Port Authority				
	3.1.3 Inspect air and sea cargo containers for the presence of insects, including mosquitoes.	VCS, Port Authority		Staff time		0
		VCS, Port Authority				
		VCS, Port Authority				
3.2 Regular larval control, including source reduction and larviciding at airports and wharfs	3.2.1 Conduct training of port health and biosecurity staff on source reduction and larviciding.	VCS, Port Authority	Training		\$5,000	
		VCS, Port Authority				
		VCS, Port Authority				
3.2.2 Implement ongoing source reduction and larviciding.	3.2.3 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS, Port Authority	Staff time		0	
		VCS, Port Authority				
3.3 Indoor residual spraying in planes and boats	3.3.1 Inspect all incoming planes and boats.	VCS, Port Authority	Staff time		0	
	3.3.2 Implement IRS on planes and boats.	VCS, Port Authority	Spraying costs in Port Authority budget			

YEAR 1 Strategies	Activities	Responsible person/group	Inputs	Unit cost	Budget (AUD)
	3.3.3 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS, Port Authority	Staff time		0
3.4 Routine annual IRS in airports and wharfs	3.4.1 Conduct training of point of entry staff including on spray equipment, calibration, and washing to prevent environmental contamination. 3.4.3 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS, Port Authority	Training See Activity 3.3.1		
	4.1.1 Finalise case investigation (entomology component) framework.	VCS, Port Authority	Staff time		0
4.1 Assess the larval population as well as types and quantities of aquatic habitats at the case house	4.1.2 Undertake training of vector control staff and case investigation protocols and procedures. 4.1.3 Implement entomological case investigations as requested.	VCS/MOH	Staff time		0
	4.1.2 Undertake training of vector control staff and case investigation protocols and procedures.	VCS/TA	Training TA costs to be covered by development partners		\$5,000
4.4 Risk communication, including promote use of personal protection measures	4.4.1 Implement RCCE efforts immediately - these efforts should begin immediately and focus on the case and surrounding houses.	VCS, HEAPS, MWSCD, Ministry of Education			
4.5 Supply of insecticide treated nets to febrile patients	4.5.1 Provide any viremic patients (in the ward or at home) with a mosquito net to sleep under during the day.	MOH	Budget for nets in outbreaks will come from WHO/SPC/government		0
5.1 Building capacity within the health surveillance system to conduct vector surveillance and control	5.1.1a Develop training plan for SP: all cadres in health system.	VCS, TA	Staff Time TA		\$20,000
	5.1.1b Identify refresher training needs for vector staff (Biannually, including Year 1)	VCS, TA	Survey of staff – staff time		0
	5.1.1d Conduct training of district health staff, EHO, CHWs. (2-day training (Year 1), then annual refresher (one day))		Training costs		\$10,000
	5.1.2a Undertake higher level training needs assessment as part of HR performance reviews and programme needs	VCS, MOH	No additional costs		0

YEAR 1 Strategies	Activities	Responsible person/group	Inputs	Unit cost	Budget (AUD)
5.2 Insecticide use and management, including safe storage and disposal of old insecticides and decommissioned equipment/PPE	(e.g. environmental health, vector control, public health, one health) (Year 1 and every 3 years)				
	5.1.2b Identify suitable training programmes to meet needs in Samoa, surrounding region, and internationally (online and face-to-face) (Year 1 and every 3 years)	VCS	International and national training programmes.		
	5.1.2c Identify scholarships or fellowships, if required, and implement (Year 1 and every 3 years)	VCS, donor partners, MOH and GoS			
	5.1.4a Consult with NUS over bachelor of environmental health for inclusion/development of vector control.	VCS, NUS	Meetings		\$1,000
	5.2.1a Assess resources required for and feasibility of regulating insecticide use.	VCS, MAF, Pesticides Committee	Staff time TA		
5.3 Human resource management	5.3.1 Assess HR resource requirements to support vector control plan and map for surge capacity.	VCS, MOH, TA	Staff time Contract for TA		\$20,000
	5.3.2 Conduct annual performance review.	MOH process			0
	5.3.3 Conduct annual HR mapping of needs and recruitment as required	VCS	Staff time		0
	5.3.4 Develop SP period and annual training implementation plan (see Activity 5.3.1 and 5.3.3).	VCS, MOH HR, Professional associations, Hospitals, EHOs, etc	Staff time Meetings		\$5,000
	5.3.5 Conduct GEDI training of all vector control staff, key implementing partners, and IVCC (Biannual)	MOH, MWCCDS	Training costs		\$5,000
5.4 Health information systems and	5.4.1 Analyse routine NHIS case and laboratory data.	VCS	Staff time		0
	5.4.2a Implement Tupai system including vector data integration.	VCS, MOH IT, Beyond essential systems	MOH covered costs		0

YEAR 1 Strategies	Activities	Responsible person/group	Inputs	Unit cost	Budget (AUD)
electronic data management	5.4.2c Develop and review regular reports from Tupaia.	VCS, MOH IT	Staff time		0
	5.4.2d Roll out Tupaia Meditrack for monitoring insecticide resistance (see Section 5.2)	VCS, MOH IT	Staff time		0
	5.4.3a Establish a Samoan Technical Working Group for experimental health commodities for mSupply.	VCS, MOH IT	Staff time		0
	5.4.3b Hold stakeholder meetings to document the mSupply configuration and Tupaia visualisation requirements. (VCS, MOH IT, Beyond essential systems	meetings		\$5,000
	5.4.3c Implement mSupply for stock management of environmental health commodities.	MOH IT, Beyond essential systems	Ongoing budget for mSupply support (approx. \$960 AUD/year) and ad hoc hardware replacement/maintenance (approx. \$5,000 AUD when needed)		
	5.5.1 Identify the operational research gaps.	VCS, academic and research institutes in Samoa, partners	Staff time		0
5.5 Operational/ Implementation research	5.6.1 Consult with warehouse regarding appropriate central insecticide storage and distribution.	VCS, National warehouse manager	Staff time		0
	5.6.2 Conduct training for warehouse staff on safe handling of insecticides at induction and every 2 -3 years.	VCS	Training materials Staff time		\$5,000
	5.6.3 Hold discussions on collaboration with WHO regional insecticide reserve.	VCS/MOH	Staff time		0
	5.7.1 Launch of SP (August).	VCS/MOH/IVCC	Launch event		\$10,000
5.7 Other management	5.7.4a Develop TA plan annually.	VCS			
	5.7.4b Mobilise TA as per plan.	VCS	Costs under activity		
5.8 Networking and reporting	5.8.1 Produce annual report.	VCS	Staff time		0
	5.8.2 Engage with regional meeting and networks e.g., PPHSN.	VCS	Travel related costs		\$15,000
	5.8.3 Build relationships and collaboration with regional counterparts to share knowledge and resources.	VCS	Staff time		0

YEAR 2 Strategies	Activities	Responsible person/ group	Inputs	Unit cost	Budget per annum (AUD)
1.1 Routine vector surveillance activities	1.1.1.b Procure and distribute/warehouse required items.	VCS	pay local payments and charges e, g duty, freight custom fees, cargo fees etc		\$3,000
	1.1.1.c Finalise annual stock take (annual from Year 2)	VCS, PO-GIS, Carol Martin (TA mSupply/T upaia.	Stocktaking, categorisation of items, tools, equipment, bulk in quantity, MSDS, proper storage area mSupply Services, hardware and maintenance.		\$1,000
	1.1.2b Undertake and commission public health entomology laboratory renovations.	VCS, MOH	Staff time Laboratory equipment Refrigerator x 1 Computer x 1 Laptop x 1 Office equipment		\$4,000
	1.1.4a Conduct routine adult vector surveillance activities.	VSC, TA	Staff time		\$2,000
	1.1.4b Assess key aquatic habitats biannually (from Year 2)	VCS	Staff time		0
	1.1.4d Undertake annual IR testing SOP updates.	VCS	Staff time		0
	1.1.4e Purchase required materials, equipment for IR testing (biannual).	VCS	Procurement costs		
	1.1.4f VCS staff training on IR testing (bi-annual).	VCS	Staff time		\$5,000
	1.1.5 Undertake monitoring and evaluation of findings of routine vector surveillance and surveys and implement remedial measures/updates as required.	VCS, MOH, TA			\$5,000
	1.2 Routine vector control activities,	1.2.1 Resourcing for routine larval source reduction through community engagement and larviciding.	VCS, MOH	Staff only	

YEAR 2 Strategies	Activities	Responsible person/ group	Inputs	Unit cost	Budget per annum (AUD)	
including regular source reduction and larviciding	1.2.2 Continue acceptability and communication work for larval source reduction and larviciding.	MOH			\$3,000	
	1.2.3 Undertake training on larval source reduction and larviciding.			Training	\$3,000	
	1.2.4 Conduct larviciding.	MOH	Will develop protocols and list of supplies in Year 2. Budget will be updated		\$3,000	
	1.2.5 Undertake monitoring and evaluation and implement remedial measures/updates as required.	VCS			\$5,000	
	1.3 Community engagement activities including clean-up programmes.	1.3.1 Undertake source reduction through community and stakeholder action: waste management. 1.3.1b Support the MNRE program to have single use plastics/all plastics banned: <ul style="list-style-type: none"> Conduct roundtable meeting with MNRE and relevant stakeholders. Select two problematic sites (one in Upolu and one in Savaii) and conduct community consultations prior to clean-up campaigns. Conduct and promote segregation initiatives. Conduct community clean-up and provide recyclable cages for plastic bottles and aluminium cans (three sets per two compartments per village) Improve public awareness campaign on sustainable waste management. 	IVCC Committee – MWSCD, MOH, MNRE, MOF MNRE, IVCC, VCS			\$10,000
	1.3.1c Support the work of SRWMA to collect plastic and place large bins in each village.	MOH, MNRE, SWRMA	Purchase of bins Public education and media campaign Collection costs ongoing Disposal/Recycling plan			\$10,000
	1.3.1d Develop protocols for management of tyre waste in Samoa <ul style="list-style-type: none"> Consult with MNRE and relevant stakeholders 	MNRE				\$5,000

YEAR 2 Strategies	Activities	Responsible person/ group	Inputs	Unit cost	Budget per annum (AUD)
	<ul style="list-style-type: none"> Discuss and collaborate with regional counterparts 	MWCSGD, VCS	Consultations and meetings. Support for clean-up campaigns.		\$10,000
	<p>1.3.1f Integrate and align waste management activities with MWCSGD District Development Plans</p> <ul style="list-style-type: none"> Consult with MWCSGD to determine initial program of activities and areas for collaboration. Provide ongoing support to MWCSGD programs to link to vector control 				
	1.3.3 Conduct consultations with MWSCSD over capacity building or women's committee 'champions'.		Meeting		\$1,000
	1.3.3a Launch national clean-up campaign.		Event		\$5,000
	1.3.3b Submit for cabinet endorsement (January Year 1 and annual).	MOH	Staff time		0
	1.3.3c Develop and disseminate media/press releases (August annually).	All IVCC members	Travel, staff time, meetings		\$2,000
	1.3.3d Conduct National Clean-up Campaign (20 th August annually).	All IVCC members	Equipment and consumables		\$5,000
	1.3.3e Undertake monitoring and evaluation and implement remedial measures/updates as required.	MOH, all IVCC members	Staff time		0
1.4 Health promotion	1.4.1a Develop an annual health promotion and community engagement plan including multimedia campaign through HEAPS and VCS working together.	VCS, HEAPS	Meeting		\$5,000
	1.4.1b Produce IEC materials and multimedia campaigns (June/July annually).	HEAPS	Printing costs Multimedia production costs – TV and radio Airing packages		\$100,000
	1.4.1c Distribute IEC materials to schools, government buildings, colleges, resorts, ports, health centres and hospitals (August annually).	VCS, HEAPS, STA, SAA, SPA	Travel costs		\$500

YEAR 2 Strategies	Activities	Responsible person/ group	Inputs	Unit cost	Budget per annum (AUD)
	1.4.1d Produce targeted IEC materials relevant to the Animal Health (June/July).	MAFS, APS	Printing costs Staff time		\$4,000 (\$2,000 to each APS and MAF)
	1.4.1e Finalise decision on media package materials (July).	HEAPS, VCS	Media package purchased		\$15,000
	1.4.1f Implement radio and TV public education activities (July/August).	VCS	Travel and staff time		\$1200
	1.4.1g Produce IEC materials for environmental waste campaigns (July-Sept).	MNRE, VCS, SRWMA	Materials, printing, activities		\$10,000
	1.4.1h Participate in annual National Health Week of GoS (November).	HEAPS, VCS	Included in MOH National health week budget. Staff time		0
	1.4.1i Conduct training for communities, women's committees, and non-MOH partners on health promotion tri-annually.	HEAPS, VCS	Training materials, staff time, training costs e.g. venue, participant refreshments, etc		\$20,000
	1.4.1j Undertake monitoring and evaluation and implement remedial measures/ updates as required.	HEAPS, VCS	Travel, data collection and analysis, staff time		\$10,000
	1.4.2a Approve budget for WMD annual plans.		No cost		0
	1.4.2b Submit WMD plans for cabinet endorsement (January annually).	MOH	Staff time only		0
	1.4.2c Finalise budget allocation and workplan for WMD(January).	VCS, IVCC	Staff time		0
	1.4.2d Endorsement of WMD budget and workplan by IVCC (January).	IVCC	Support for meetings – catering, refreshments		\$1,200
	1.4.2d Confirm WMD funding (February).	IVCC	Staff time only		0
	1.4.2e Decide on annual WMD slogan and theme (April IVCC meeting).	IVCC	Support for IVCC meetings – catering, refreshments		\$1,200
	1.4.2f Implement sectoral activities for WMD.	Relevant sectors	See partner budgets		
	1.4.2g Undertake monitoring and evaluation of WMD targets.	Relevant sectors	See partner budgets		
	1.4.3a Implement school educational program (August/Sept).	VCS, MESC	Staff time Printing of resources		\$6,000

YEAR 2 Strategies	Activities	Responsible person/ group	Inputs	Unit cost	Budget annum (AUD)	per
	1.4.3b Consult with MEESC on school educational program.	VCS, MEESC	Travel related costs		\$1,000	
	1.4.3c Begin school educational program.	VCS, MEESC	See partner budgets			
	1.4.3d Undertake monitoring and evaluation of school's educational program and implement remedial measures/updates as required	VCS, MEESC	Staff time		0	
	1.5.1 Conduct annual assessment of anticipated high risk events or time events	VCS	Staff time		0	
	1.5.2 Produce/update and disseminate Vector control plans for major high risk events to relevant stakeholders	VCS	Printing		\$2,500	
	1.5.3 Conduct Targeted IRS activities as part of the preparation	VCS				
	1.5.4 Undertake monitoring and evaluation and implement remedial measures/updates as required	VCS	Staff time		0	
	2.1.2 Undertake Acceptability study and follow up regarding IRS (see OR)	VCS, contract/TA	Contract and costs of study		\$15,000	
	2.1.4 Conduct IRS training on spray equipment, calibration and washing to prevent environmental contamination	VCS	Training		\$5,000	
	2.1.5 Implement IRS (As required as per protocol)	VCS				
	2.1.6 Undertake monitoring and evaluation and implement remedial measures/updates as required	VCS	Staff time only		0	
	2.2.1 Develop RCCE plans and materials/activities	VCS, HEAPS, MWSCD	Meetings, activity, and materials costs		\$10,000	
	2.2.2 Implement RCCE as required as per protocol	VCS, MWSCD	Staff time, travel, and meetings		\$5,000	
	2.2.3 Undertake monitoring and evaluation and implement remedial measures/updates as required	VCS, MWSCD	Staff time		0	
2.2 Risk communication in high risk areas, including promotion of personal						

YEAR 2 Strategies	Activities	Responsible person/ group	Inputs	Unit cost	Budget per annum (AUD)
protection measures	2.3.2 Distribute ITNs to hospitals and febrile patients through health facilities	VCS, MOG	Distribution costs		\$5,000
3.1 Routine vector surveillance conducted at airports and wharfs	3.1.1 Undertake Routine adult vector surveillance activities 3.1.2 Regularly survey PoE for the presence of potential larval habitats 3.1.3 Inspect air and sea cargo containers for the presence of insects, including mosquitoes	VCS, Port Authority VCS, Port Authority	Staff time		0
3.2 Regular larval control, including source reduction and larviciding at airports and wharfs	3.2.1 Conduct training of port health and biosecurity staff on source reduction and larviciding 3.2.2 Implement ongoing source reduction and larviciding 3.2.3 Undertake monitoring and evaluation and implement remedial measures/updates as required	VCS, Port Authority VCS, Port Authority VCS, Port Authority	Training Staff time		\$5,000 0
3.3 Indoor residual spraying in planes and boats	3.3.1 Inspect All incoming planes and boats 3.2.2 Implement IRS on planes and boats 3.3.3 Undertake monitoring and evaluation and implement remedial measures/updates as required	VCS, Port Authority VCS, Port Authority VCS, Port Authority	Staff time Spraying costs in Port Authority budget Staff time		0 0
3.4 Routine annual IRS in airports and wharfs	3.4.1 Conduct training of point of entry staff including on spray equipment, calibration and washing to prevent environmental contamination 3.4.2 Undertake Annual IRS at wharfs and airports as per plan 3.4.3 Undertake monitoring and evaluation and implement remedial measures/updates as required	VCS, Port Authority VCS, Port Authority VCS, Port Authority	Training See Activity 3.3.1 See Activity 3.3.2 Staff time		0
4.1 Assess the larval population as well as types and quantities of aquatic habitats at the case house	4.1.1 Finalise Case investigation (entomology component) framework 4.1.2 Undertake training of VC staff and case investigation protocols and procedures 4.1.3 Implement entomological case investigations as requested	VCS, MOH VCS/TA VCS	Staff time Training TA costs to be covered by development partners		0 \$5,000

YEAR 2 Strategies	Activities	Responsible person/ group	Inputs	Unit cost	Budget per annum (AUD)
4.2 Conduct IRS at the dengue patients' house/s, as well as other houses within a 200 m radius within 72 h	4.2.1 Implement IRS at the case house and any other houses within a 200 m radius within 72 h	VCS			
4.3 Implement larval source reduction and larviciding	4.3.1 Implement larval source reduction simultaneously with larval surveillance. During the vector survey, all larval habitats at the premise including schools, can be emptied or manipulated to prevent further larval breeding. 4.3.2 Conduct hand application of larvicides to aquatic habitats that aren't removed.	VCS			
4.4 Risk communication, including promote use of personal protection measures	4.4.1 Implement Risk Communication and Community Engagement (RCCE) efforts immediately - these efforts should begin immediately and focus on the case and surrounding houses.	VCS, HEAPS, MWSCD, Ministry of Education			
4.5 Supply of insecticide treated nets to febrile patients	4.5.1 Provide any viremic patients (in the ward or at home) with a mosquito net to sleep under during the day.	MOH	Budget for nets in outbreaks will come from WHO/SPC/govt		0
	5.1.1c Finalise Refresher training curriculum, activities, materials and trainers	VCS, TA	TA time, printing costs		\$20,000
	5.1.1d Conduct Training of district health staff, EHO, CHWs. (2 day training Year 1 and annual refresher 1 day)		Training costs		\$10,000
	5.1.1e Conduct Post-training evaluation	VCS	Survey		0
	5.1.2e Place Graduates into positions requiring their skills and expertise	Assumes position available MOH	No additional costs – funded position and costs under MOH HR		0

YEAR 2 Strategies	Activities	Responsible person/ group	Inputs	Unit cost	Budget per annum (AUD)
5.3 Human resource management	5.1.4b Advocate for EHCs in the revitalisation of PHC plan and implementation (Year 2-3)	VCS, MOH HR	Staff time		0
	5.2.1b Develop a Proposal for licensing and training program for commercial insecticide users	VCS, Legal	Staff time		
	5.2.2a Update insecticide use and management SOPs and status,	VCS, Pesticides committee, MNRE	Staff time		0
	5.2.2b Provide Training on insecticide use and management for vector control staff ? (Biannually starting Year 2)	VCS			\$10,000
	5.2.2c Conduct refresher training on VBD and its management for the Public Health Drs annually	VCS, NUS, Professional association, National Hospital	Included in routine training programme of doctors. Staff time only		0
	5.2.3 Undertake monitoring and evaluation and implement remedial measures/ updates as required (Biannually starting Year 2)	VCS, Pesticides committee	Staff time Travel to sites		\$10,000
	5.3.2 Conduct Annual performance review	MOH process			0
	5.3.3 Conduct Annual HR mapping of needs and recruitment as required	VCS	Staff time		0
	5.3.4 Develop SP period and Annual training implementation plan (Link to 5.3.1 and 5.3.3)	VCS, MOH HR, Professional associations, hospitals, EHOs, etc	Staff time Meetings		\$5,000
	5.4 Health information systems and electronic data management	5.4.1 Analyse routine NHIS case and laboratory data	VCS	Staff time	
5.4.2b Review of Tupapa system and any customisations made (Biannually starting Year 2)		VCS, MOH IT	Staff time		0
5.4.2c Develop and review Regular reports from Tupapa		VCS, MOH IT	Staff time		0
5.4.2d Roll out Tupapa Meditrack for monitoring insecticide resistance (Link to 5.2 and)		VCS, MOH IT	Staff time		0

YEAR 2 Strategies	Activities	Responsible person/ group	Inputs	Unit cost	Budget per annum (AUD)
	5.4.3a Establish a Samoan Technical Working Group for environmental health commodities for mSupply.	VCS, MOH IT	Staff time		0
	5.4.3b Hold stakeholder meetings to document the mSupply configuration and Tupaia visualisation requirements.	VCS, MOH IT, Beyond essential systems	meetings		\$5,000
	5.4.3c Implement mSupply for stock management of environmental health commodities.	MOH IT, Beyond essential systems	Ongoing budget for mSupply support (approx. \$960 AUD/year) and ad hoc hardware replacement/maintenance (approx. \$5,000 AUD when needed)		
	5.5.2 Review the best mechanisms in which to actively engage the community to support vector surveillance and/or vector control activities.	VCS, Contract	Survey and TA costs		\$20,000
	5.5.3 Conduct study on Community perceptions of indoor residual spraying. (Link to 2.1)	VCS, Contract	Survey and TA costs		\$20,000
5.6 Logistics management	5.6.1 Consult with warehouse regarding appropriate central insecticide storage and distribution	VCS, National warehouse manager	Staff time		0
	5.6.3 Hold discussions on Collaboration with WHO regional insecticide reserve	VCS/MOH	Staff time		0
5.7 Other management	5.7.2 Conduct annual Review of SP progress	VCS	Staff time		0
	5.7.4a Develop TA plan annually	VCS			
	5.7.4b Mobilise TA as per plan	VCS	Costs under activity		
	5.8.1 Produce annual report	VCS	Staff time		0
5.8 Networking and reporting	5.8.2 Engage with regional meeting and networks e.g., PPHSN	VCS	Travel related costs		\$15,000
	5.8.3 Build relationships and collaboration with regional counterparts to share knowledge and resources	VCS	Staff time		0