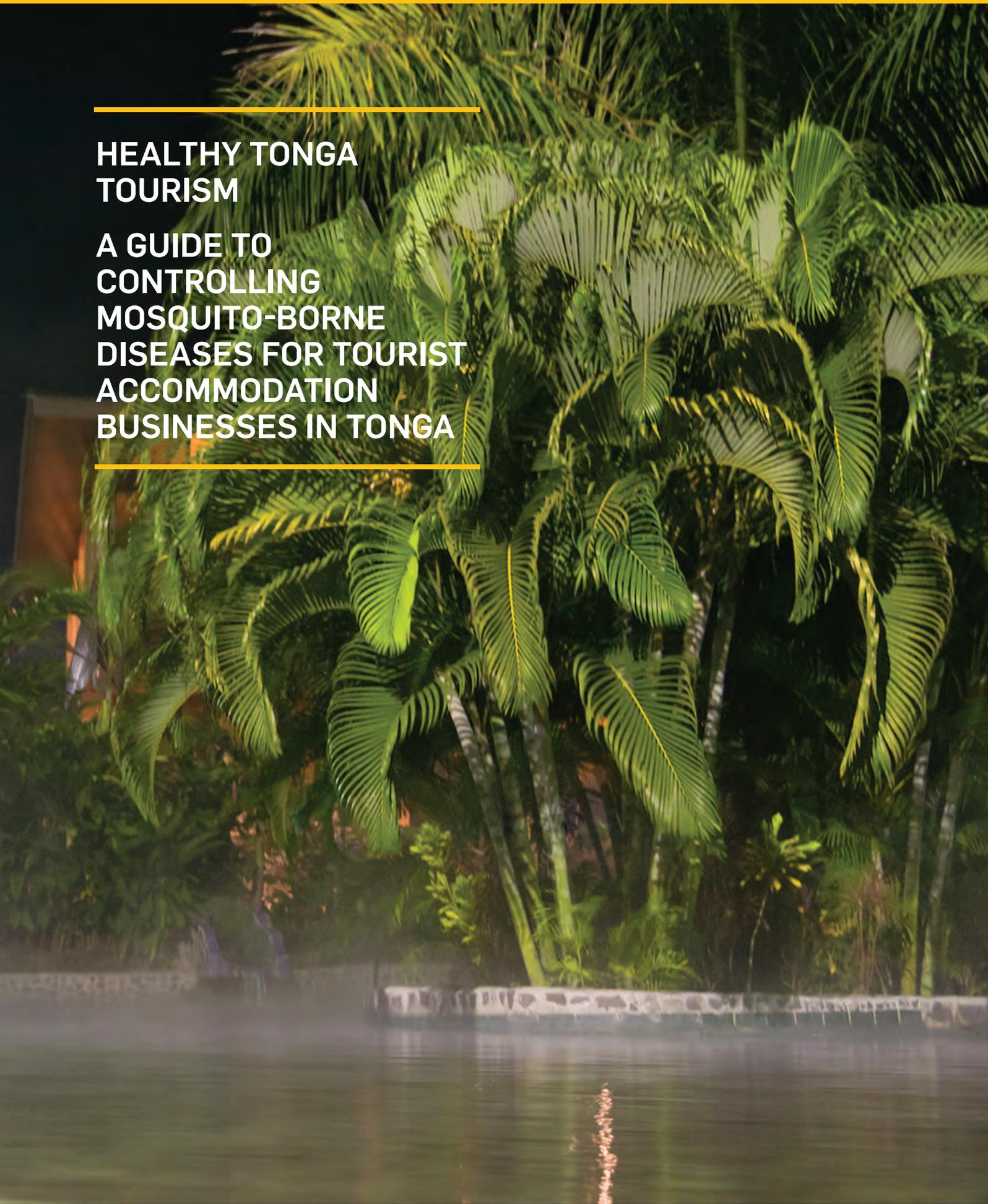

HEALTHY TONGA TOURISM

A GUIDE TO CONTROLLING MOSQUITO-BORNE DISEASES FOR TOURIST ACCOMMODATION BUSINESSES IN TONGA



Contents

1. Purpose of guide	1
2. Vector-borne diseases and control planning	1
Mosquito habits	2
Mosquito-borne disease control planning	2
3. Mosquito-borne disease control checklist	3
4. Essential elements of mosquito-borne disease control	3
Reducing mosquito breeding sites on the property	3
Reducing likelihood of guests being bitten	5
5. Desirable elements of mosquito-borne disease control	6
Reducing mosquito breeding sites in the surrounds	6
Reducing numbers of adult mosquitos	6
Using preventative maintenance plans and checklists	7
6. Optional elements of mosquito-borne disease control	7
Good record keeping of maintenance, checks, problems and fixes	7
APPENDIX 1: Mosquito-borne disease control checklist	8
7. Useful contacts	9

Healthy Tonga Tourism is a New Zealand Aid Programme funded collaboration. The Tongan Ministry of Infrastructure and Tourism, the Tongan Ministry of Health and ESR are working in partnership to provide public and environmental health support to the Tourism Industry in Tonga. The project delivers approaches to public health practice which contribute to a healthy and safe stay for visitors and enhance the Kingdom of Tonga's economic sustainability.



1. Purpose of guide

This *Guide to Controlling Mosquito-borne diseases for Tourist Accommodation Businesses in Tonga* is designed as a training and reference resource for health inspectors, Tonga Mark assessors and accommodation business owners to enable them to identify risks to providing physical surrounds free from these disease-carrying insects and to plan appropriate improvements. The guide is equally useful for communities, schools, churches and other settings that host guests.

As hosts, tourist accommodation business owners have a duty of care to provide safe and healthy services and physical environment for their guests. Controlling disease-carrying mosquitoes is one of these services.



2. Vector-borne diseases and control planning

Vector-borne diseases are illnesses caused by infectious microbes that are spread to people by another living creature, called a *vector* for the disease. The most common vectors are blood sucking insects such as mosquitoes, and mammals such as dogs, rats and bats. Vectors are capable of spreading diseases caused by many different types of microbes including bacteria, viruses and parasites. The disease causing microbe infects the vector and then passes to a susceptible person through the saliva of the vector when it bites the person.

The most common vector-borne diseases in the Pacific region are spread by mosquitoes, and include malaria, dengue and chikungunya. Malaria is spread by anopheles mosquitoes, and dengue and chikungunya by Aedis mosquitoes. Malaria is caused by a parasite, and dengue and chikungunya are caused by viruses.

It is important to know what vector-borne diseases are most prevalent or of most concern to health officials, and exactly what types of microbes cause the infections and what types of vectors carry the microbes, because this information is used to identify risks and solutions to providing physical surrounds free from disease-carrying vectors. Some solutions will be the responsibility of authorities, but there are many actions that business owners need to take responsibility because of the frequency of the action and the location.

This Guide to Controlling Mosquito-borne diseases for Tourist Accommodation Businesses in Tonga focuses on the mosquito vector and on the actions that business owners can be expected to take responsibility.

MOSQUITO HABITS

Understanding a few of the habits of the mosquito vector helps to think of solutions to their effective control. Mosquitoes breed in still water. The females usually mate only once in their life, but continue to produce eggs at intervals throughout their lifespan. A blood meal stimulates the next batch of eggs, after which the female blood-fed mosquito looks for a safe resting place for several days that is shaded and offers protection from desiccation until the batch of eggs is laid. This process is repeated until the mosquito dies. The entire cycle from egg through larva and pupa to adult takes about one to two weeks under tropical conditions.

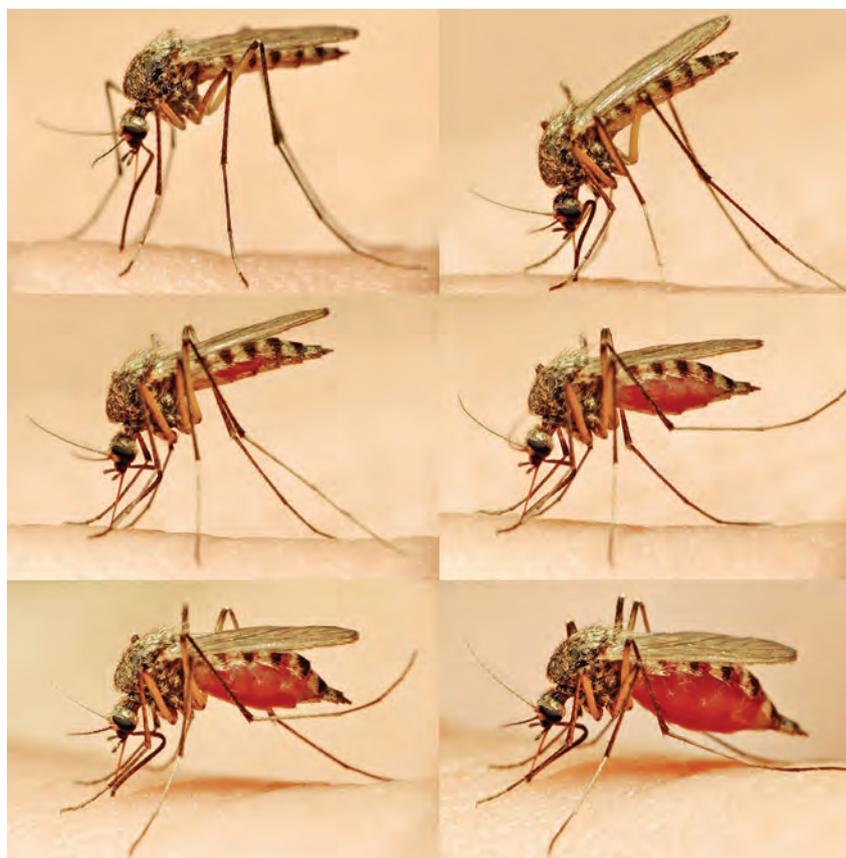
Also important to know is that some mosquito eggs can withstand desiccation for several months, so even if all the larvae and adults were eliminated repopulation can occur.

Some mosquitoes are active (bite) during the day, others between sunset and sunrise. Some mosquitoes have a preference for indoor biting and others for outdoor biting.

MOSQUITO-BORNE DISEASE CONTROL PLANNING

The current approach to reducing the risk to people's health caused by disease-carrying mosquitoes is multi-pronged because, as described in the previous section, it has to simultaneously tackle the egg, larval and adult stages. It starts with controlling the insects, by preventing them from breeding and reducing their numbers. The next barrier is to reduce the likelihood of people being bitten by the insects. These control measures are backed up by appropriate medical attention for those who do get bitten.

Mosquito-borne disease control planning is a practical approach of assessing the physical surrounds for what could cause infestation of mosquitoes and contact between them and people, then planning improvements to eliminate, reduce or manage these causes. Plans are also made to deal with the emergency situations of insect infestation or disease outbreak. A mosquito-borne disease control plan guides day-to-day maintenance of the physical surrounds and guides investment in necessary



improvements. A mosquito-borne disease control plan is required for every tourist accommodation business because every business has a slightly different setting. A mosquito-borne disease control plan is best prepared by the owner of the business because they know best the setting and have the responsibility for implementing the plan.

3. Mosquito-borne disease control checklist

To help focus attention on the most important barriers to mosquito-borne disease control, a checklist has been developed (see Appendix 1), categorising elements of the physical setting and management practices into Essential, Desirable and Optional for controlling mosquito-borne diseases. This checklist prioritises barriers to controlling mosquito-borne disease, recognising that some risks are more important to eliminate, reduce or manage than others.

It also recognises that responsibility for actions is not always the tourist accommodation business owners. It provides space for recording and tracking the status of the Essential elements, recommendations for improvements and improvements made over time.

The target status for all elements should be **GREEN** (= acceptable). For elements where risks have been identified that need to be eliminated, reduced or managed, there is an option of **ORANGE** status (meaning improvements are underway) or **RED** (meaning improvements are needed).

Other benefits of applying the checklist include:

- ▶ making transparent and explicit to accommodation business owners the Ministry of Health's expectations of a mosquito-borne disease control plan
- ▶ providing for consistency of inspection for all health inspectors
- ▶ providing a way to track improvements over time.

The following three sections provide guidance to assist with completing the checklist and developing plans to eliminate, reduce or manage risks.

4. Essential elements of mosquito-borne disease control

The elements of mosquito-borne disease control considered to be essential are discussed in this section. These elements focus on controlling locally (ie within the accommodation business property) the mosquito numbers and reducing the likelihood of people being bitten.

REDUCING MOSQUITO BREEDING SITES ON THE PROPERTY

PROBLEMS

Ponding or stagnant surface water within the tourist accommodation business property, an ideal breeding place for mosquitoes.



SOLUTIONS

- Reduce situations where surface water ponds for more than 2–3 days; keep water moving.
- Clear ditches of debris and ensure sufficient slope so that water drains away from the property to a natural stream or proper drain. Make temporary drainage pathways if needed.
- Fill in low-lying land to eliminate ponding.

REDUCING MOSQUITO BREEDING SITES ON THE PROPERTY *(continued)*

PROBLEMS

Ponding or stagnant surface water within the tourist accommodation business property, an ideal breeding place for mosquitoes. *(continued)*



SOLUTIONS

- Remove artificial ponds, or ensure water surface is constantly broken by a fountain, or treat the water with a larvicide [ask Health Inspector for advice], or add fish that will eat the mosquito larvae.
- Fix overflowing or leaking septic tanks.

Ornaments or rubbish that can fill with water, within the tourist accommodation business property, an ideal breeding place for mosquitoes.



- Remove items around the property that can fill with water, including disused water tanks, bird baths, buckets, saucers under plant pots, containers and tyres, or actively pour out the water immediately after rain.
- For large structures that hold water, treat the water with a larvicide [ask health inspector for advice].
- Remove rubbish from the property.
- Clean the roof gutter regularly so that rainwater flows away freely.

Parts of a water supply provide an ideal breeding place for mosquitoes.



- Ensure rainwater storage tanks have sealed lids and fine mesh over all openings.
- Clean the roof gutter regularly so that rainwater flows away freely.

REDUCING LIKELIHOOD OF GUESTS BEING BITTEN

PROBLEMS

Mosquitoes getting indoors, and then biting guests at night.



SOLUTIONS

- Make the house insect-proof with insect screens on doors, windows and other openings. Regularly check for tears or holes and mend as soon as found.
- Residual wall and/or space spraying with insecticide.
- Install mosquito nets (ideally insecticide-impregnated) over all beds, and regularly check for tears or holes and mend as soon as found.

Mosquitoes biting guests when they are outdoors.



- Burn insect repellent coils in entertainment areas.
- Have available insect repellent coils for guest to use on their balconies or patios.
- Have available insect repellent for guest use on all exposed skin (especially the neck, wrists and ankles).
- Advise guests to cover arms, legs and ankles when outdoors.

5. Desirable elements of mosquito-borne disease control

The elements of mosquito-borne disease control considered to be *desirable* are discussed in this section. These elements mostly focus on aspects that cannot be controlled within the accommodation business property or by the business owner, or that are more practicably managed by personal actions. The focus is still on reducing the mosquito numbers and reducing the likelihood of people being bitten.

REDUCING MOSQUITO BREEDING SITES IN THE SURROUNDS

PROBLEMS

Slow-moving (including lagoons and mangrove swamps), ponding or stagnant water in ditches, roads, pathways or waterways nearby the tourist accommodation business property (within 200 meters), an ideal breeding place for mosquitoes.



SOLUTIONS

- Ask neighbours to keep surface water moving or drain ponding water on their properties, as listed in the Essential section. If necessary, ask for assistance from the health inspector.
- Ask the appropriate authority (eg village council or health inspector) to take action to keep natural or public utility waterways moving, or drain ponding water from public spaces.

REDUCING NUMBERS OF ADULT MOSQUITOES

PROBLEMS

Significant numbers of female adult mosquitoes around the property, increasing the number of successive egg-laying cycles, and increasing the likelihood of guests being bitten.

Shady, dry and undisturbed areas near still water provide ideal resting sites for female mosquitoes between blood-feed and egg laying. This can include inside houses.



SOLUTIONS

- Outdoor surface and space/fog spraying with insecticide [ask Health Inspector for advice].
- Indoor residual wall and/or space spraying with insecticide [ask Health Inspector for advice].

REDUCING NUMBERS OF ADULT MOSQUITOES

PROBLEMS

Significant numbers of female adult mosquitoes nearby the tourist accommodation business property (within 200 meters), increasing the number of successive egg-laying cycles.



SOLUTIONS

- Ask neighbours to eradicate adult mosquitoes, as listed in the essential section. If necessary, ask for assistance from the health inspector.
- Ask the appropriate authority (eg village council or health inspector) to take action to eradicate adult mosquitoes from public spaces.

USING PREVENTATIVE MAINTENANCE PLANS AND CHECKLISTS

A good preventative maintenance plan provides a reminder of what needs to be checked and how often. The checklist is a record of the maintenance and routine checks undertaken. The maintenance plan and checklist also act as guides for all staff who may be asked to look after mosquito-borne disease control on the property.

6. Optional elements of mosquito-borne disease control

The elements of insect-borne disease control considered to be *optional*, but good practice, are discussed in this section. They are mostly about providing the evidence that the businesses mosquito-borne disease control plan is working.

GOOD RECORD KEEPING OF MAINTENANCE, CHECKS, PROBLEMS AND FIXES

A well maintained set of records demonstrates to the authorities that mosquito-borne disease control is being actively managed and revised to deliver consistently safe physical environments for guests and staff.

Appendix 1: Mosquito-borne disease control checklist

Healthy Tonga Tourism mosquito-borne disease checklist

Name of Business _____ Date _____ Assessed by _____

Year (Quarter)			
Q1	Q2	Q3	Q4

Evidence of good management	Year (Quarter)				Action required or in progress
	Q1	Q2	Q3	Q4	
1. Essential for food safety and hygiene	Indicate status as green (acceptable), orange (making improvement), red (improvement needed)				(MUST be doing active checks and maintenance)
Reducing mosquito breeding sites on the property					
Reducing likelihood of guests being bitten					
2. Desirable for mosquito-borne disease control (indicate with ✓ or X)					
Reducing mosquito breeding sites in the surrounds					
Reducing numbers of adult mosquitos					
Using preventative maintenance plans and checklists					
3. Optional for mosquito-borne disease control (indicate with ✓ or X)					
Good record keeping of maintenance, checks, problems and fixes					

7. Useful contacts

Ministry of Health

Supervising Public Health Inspector, Vaiola Hospital, Tongatapu

Tourism Division (Tonga Mark)

Institute of Environmental Science and Research Limited (Healthy Tonga Tourism project)

Mr Matt Ashworth

Dr. Jan Gregor

healthytongatourism@esr.cri.nz

Tel: +64 3 351 6019



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