Mosquito-borne diseases

Mosquitoes in the Northern Territory

In the Northern Territory (NT) there are over 100 species but only about 20 are pest or problem mosquitoes. They live and breed in a variety of habitats. Some of the species are capable of spreading diseases to humans, pets and livestock. Although mosquitoes usually occur in highest numbers in the Top End, mosquitoes and mosquito-borne diseases occur in all regions of the NT.

Exposure to large numbers of mosquitoes increases the risk of acquiring a mosquito-borne disease.

What diseases do mosquitoes spread?

Murray Valley encephalitis (MVE) virus disease

This is a rare disease but can cause serious illness and death. It is characterised by headaches, fever and confusion and is spread by the common banded mosquito, *Culex annulirostris* or the flood water mosquito, *Aedes normanensis*.

The high risk period for MVE is February to June, with an average of one case recorded in the NT every year.

Kunjin virus disease

This is also a rare disease similar but generally milder than MVE.
The virus is also spread by the common banded mosquito.

Japanese encephalitis virus disease

The first case of locally acquired Japanese encephalitis (JE) was reported by in the NT in February 2021. Over the following 18 months 2 further cases of JE acquired in the NT were diagnosed. All 3 cases were acquired in the Top End of the NT.

Mosquito species capable of spreading JE include the common banded mosquito and *Culex tritaeniorhynchus*.

JE is a potentially fatal disease and work is being undertaken across Australia to understand the extent of the JE virus (JEV) distribution and seasonality. Locally acquired JE cases were first found in Australia in 1995 in the Torres Strait, with limited cases thereafter in that area. A vaccine program was introduced in areas of the Torres Strait in response.

The first locally acquired cases of JE in southern Australia occurred in early 2022. A National Japanese Encephalitis Virus (JEV) Vaccination Plan has been established and the NT has a NT Japanese Encephalitis Virus Vaccination Strategy targeting those most at risk of JE in the NT. For more information see the NT government website.

Ross River virus disease

This potentially debilitating disease results in rash, fever, swelling and pain in the joints and muscle and is spread by a number of mosquito species including the common banded mosquito, the flood water mosquito and the salt marsh mosquito, *Aedes vigilax*.

There are usually around 150 cases notified every year in the NT.

Barmah Forest virus disease

This disease is less common than, but similar to, Ross River virus disease and is generally milder.

What diseases are also spread by mosquitoes, but NOT in the NT?

Malaria

The last locally-acquired malaria case occurred in the NT in 1962 and Australia was certified malaria free in 1981.

While mosquitoes capable of spreading the malaria parasite are present in the NT the disease has been eliminated. The parasite could be re-introduced into the NT by infected people returning or visiting from overseas and infecting local *Anopheles* mosquitoes. It is therefore important that those who have recently visited regions were malaria is present seek urgent medical attention if they develop symptoms of malaria (fever, night sweats, muscle pains, headache, vomiting). People proposing to visit countries with malaria should consult their doctor regarding anti-malarial prophylactic treatment.

Dengue fever

Aedes aegypti, the mosquito species capable of transmitting dengue disappeared from the NT in the 1950s. *Ae. aegypti* is present in nearby overseas countries and in northern Queensland and could potentially be introduced into the NT. Old tyres, pot plant drip trays or any receptacle that has held water could contain drought resistant mosquito eggs and should not be brought into the NT from north Queensland.

Dengue fever is characterised by fever, headache and severe muscle and joint pain.

Zika virus infection

Zika is a mosquito-borne flavivirus that is closely related to dengue. The Zika virus can be found in animals in many parts of Asia and Africa. Between 2013 and 2016 large outbreaks of Zika occurred in a number of Pacific countries and the Americas.

It is spread most commonly by the dengue mosquito, *Ae. aegypti*, but also by the Asian Tiger mosquito, *Aedes albopictus*. In Australia, the latter is only found in the Torres Strait. Zika virus is also transmitted sexually. Zika infection in pregnancy can cause serious birth defects including microcephaly and is associated with other pregnancy problems. Rarely, Zika infection may cause Guillain-Barré Syndrome.

All people travelling to Zika endemic countries should take steps to prevent mosquito bites, and high risk people such as pregnant women and couples trying to conceive should consult with their health care provider before travel.

Chikungunya virus disease

Chikungunya is a disease similar to Ross River virus disease.

It is found mostly in West and East Africa, around the Indian Ocean, Asia and South East Asia. It is usually spread by the dengue mosquito, *Ae. aegypti*.

Returned travelers with symptoms should see their doctor for a blood test.

What measures are taken to prevent mosquito-borne diseases in the NT?

Medical Entomology, in conjunction with the Department of Agriculture, Water and the Environment, environmental health officers and local government conduct mosquito surveillance, monitoring and control programs in major towns, provide advice and conduct a public mosquito awareness service.

To prevent the establishment of *Ae. aegypti*, *Ae. albopictus* and other exotic mosquitoes in the NT, comprehensive exotic mosquito surveillance and control programs are ongoing at NT international sea and airports and in major NT towns.

What measures can be taken against mosquito-borne diseases in the NT?

Elimination of breeding areas around the home and use of personal protective measures are the best ways to avoid mosquito-borne diseases.

Pregnant women should discuss their travel plans with their doctor prior to travel.

Vaccination against JE is being targeted for those deemed at highest risk of JE virus

Personal protective measures

Houses

- screen all doors and windows
- all doors should be self-closing and open outwards.

Outdoor activities

- Screen tents
- Wear loose light-coloured clothing with long sleeves, long trousers and socks.
- Use apvma (australian pesticides and veterinary medicines authority) approved personal repellents containing di-ethyl-toluamide (deet), picaridin or oil of lemon eucalypt (pmd).
- Use apvma approved aerosol insecticide dispensing devices in sheltered outdoor situations such as patios or verandas.

Locations

- Recognise and avoid exposure at times and locations of mosquito activity e.g. Large shallow vegetated swamps

- Store all containers which hold water (tins, tyres, jars, buckets) out of the rain or discard.
- Keep fish ponds stocked with fish. Keep edges of ponds and drains clear of grass
- Keep swimming pools full and properly maintained.
- Fix leaking taps
- Fill or drain depressions in the ground that hold water. Keep drains clean
- Screen all septic tank vents. Seal all gaps. Flush disused toilets once a week
- Screen rainwater tanks. Ensure guttering is not holding water. Treat tanks with an appropriate insecticide, if required
- Empty pot plant drip trays once a week or fill with sand, or treat with an appropriate insecticide
- Empty and wipe clean any pet/bird drinking containers weekly
- For short term adult mosquito control apply an appropriate residual spray.

Contact

For more information on mosquitoes and virus ecology contact Centre for Disease Control, Medical Entomology on 8922 8901.

Location	Phone
Darwin (Top End Region)	(08) 8922 8044 1800 008 002
Katherine (Big Rivers Region)	(08) 8973 9049
Tennant Creek (Central Australia Region)	(08) 8962 4259
Alice Springs (Central Australia Region)	(08) 8951 7540
Nhulunbuy (East Arnhem Region)	(08) 8987 0357

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