ARBOVIRAL DISEASES

Includes Ross River virus disease, Barmah Forest virus, Dengue fever, Japanese encephalitis, Lyme disease and Murray Valley encephalitis. Zika virus disease has a separate protocol. Refer to the MoH Communicable Diseases Manual 2012 for protocols for Yellow Fever and Viral haemorrhagic fevers.

Based on the MoH Communicable Diseases Manual 2012

Associated Documents

Case Report Form:
Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Arboviral\FormsLettersQuest\ArboviralCRF20160215.pdf

Fact sheets:

Dengue Fever:
Manatū Hauora | Ministry of Health NZ – Dengue Fever

Chikungunya:
Te Whatu Ora | Health NZ – Chikungunya

Ross River fever:
Manatū Hauora | Ministry of Health NZ – Ross River Fever

The Illness[1]

Diseases caused by arthropod viruses are known as Arboviral (arthropod borne) diseases and are found in many countries including Africa, the Americas, parts of Europe and Russia, SE Asia, Papua New Guinea and Australia. There are 4 main clinical syndromes: central nervous system disease (meningitis, encephalitis, flaccid paralysis), fevers with or without a rash, haemorrhagic fever with liver damage (especially Yellow fever) and polyarthritis and rash. There are approximately 70 Arboviral diseases including: Ross River fever, Barmah Forest virus infection, Murray valley encephalitis, Sindbis, Kunjin, Dengue fever, West Nile virus, St. Louis encephalitis, California encephalitis, Eastern and Western equine encephalomyelitis, Japanese encephalitis, Chikungunya, Rift Valley fever and Yellow fever.

Neurological symptoms include fever, headache, confusion or other sensory alterations, nausea or vomiting. Signs may include meningeal irritation, cranial nerve palsies, paralysis, weakness and altered reflexes or convulsions. Less common neurological syndromes can include cranial and peripheral neuritis/neuropathies, including Guillain-Barré syndrome.

These viruses may also cause non-neuroinvasive syndromes, most commonly manifesting as febrile illnesses. These are non-localized, self-limited illnesses with headache, myalgias, and arthralgias and sometimes accompanied by a skin rash or lymphadenopathy. In Australia two arboviral infections, Ross River Virus and Barmah Forest Virus, are important because of their frequency and the disabling rheumatic symptoms they can cause. Ross River Virus (RRV) is the most common and widespread of the arboviruses that infect humans in Australia. Although rare, non-neuroinvasive syndromes caused by these viruses may also include myocarditis, pancreatitis or hepatitis. Laboratory confirmation of arboviral illnesses lacking a documented fever does occur and overlap of the various clinical syndromes is common.

Most of the viruses discussed here are transmitted by mosquito and belong to the *Flavivirus* or *Alphavirus* genus. Many species also have bird or mammal transmission options. All case notifications of arboviral infection to date have been in recent overseas travellers.

Flaviviruses
Murray Valley encephalitis; Kunjin; dengue 1, 2, 3, 4; Kokobera, Japanese encephalitis and West Nile virus.
(Note: Yellow fever is also a flavivirus but is discussed in a separate chapter.)

Alphaviruses
Ross River, Barmah Forest, Chikungunya and Sindbis.

The Sindbis-like alphavirus Whataroa virus is established in bird populations on the West Coast of the South Island. Human infection without disease has been documented

serologically. Three mosquito species that have the potential to be vectors of human disease viruses are established in New Zealand: *Culex quinquefasciatus* (possibly a vector for encephalitis viruses), *Aedes notoscriptus* (a vector for dengue virus) and *A. australis* (a vector for dengue and Whataroa viruses). All three are also potential vectors of Ross River virus. Compared with overseas species, however, these three New Zealand mosquito species are poor arboviral vectors and are unlikely to support long-term endemic transmission of arboviruses in New Zealand.

For further reference see the most recent annual reports on (ESR) website at https://surv.esr.cri.nz/surveillance/annual_surveillance.php

Incubation periods:

Arbovirus	Incubation period (days)
Ross River	7–9 (range 3–21)
Barmah Forest	Not clear, probably 7–10
Dengue	5–8 (range 3–14)
Murray Valley encephalitis	7–14 (range 5–26)
Kunjin	Unknown, possibly 5–26
Japanese encephalitis	5–15
West Nile Range	3–14
Chikungunya	3–12
Other arboviruses	Unknown, possibly 3–11

Transmission: The bite of infected mosquitoes, sandflies and midges. Human-to-human transmission occurs only in special circumstances, e.g., rare cases of transplacental transmission, blood transfusion and organ donation with certain arboviral diseases.

Communicability: There is no person-to-person transmission apart from the special cases mentioned above. The virus is generally not detectable in human blood after onset of symptoms. Mosquitoes remain infective for life.

Prevention: Educate the public, destroy larvae, kill vector mosquitoes, eliminate breeding places, protect against mosquito bites and immunise domestic animals and house them away from humans.

Notification Procedure

Attending medical practitioners or laboratories must immediately notify the local Medical Officer of Health of suspected cases. Notification should not await confirmation.

Case definition
Clinical description of arboviral diseases

Virus	Clinical description
Ross River and Barmah Forest viruses	Most cases are asymptomatic. Severity is variable. Typical symptoms incl a rash, particularly on palms; polyarthritis/arthralgia; myalgia; lethargy and l grade fever. Symptoms such as arthralgia, myalgia and lethargy r occasionally persist for months.
Chikungunya virus	Similar to Ross River and Barmah Forest. Flu-like, with high fevers, chills muscle aches. Other symptoms include severe headaches; a rash on the ar legs and trunk; and nausea and vomiting. In 80 percent of cases, there is p or inflammation in the small joints of the hands and feet; this can persist weeks or months.
Dengue fever	Classical dengue fever is more commonly seen in older children and adu Symptoms include sudden onset of fever; headache, particularly retro orb myalgia and arthralgia; and a fine rash, which may be itchy and usually beg on the extremities but spares the palms and soles. Other symptoms incl weakness, depression, anorexia, abnormal taste, sore throat, coughing, vomiting and abdominal pain.

Dengue haemorrhagic fever	This can occur when a person who has previously had one type of dengu fever becomes infected by another type. It is most commonly seen in childre under 15 years of age but can also occur in adults. Onset same as classic dengue followed after 2–5 days by haemorrhagic manifestations an hypovolaemic shock (dengue haemorrhagic fever/dengue shock syndrome).
Murray Valley encephalitis, Japanese encephalitis and Kunjin	More than 99 percent of infections are asymptomatic. Symptoms are variabl but typically include sudden onset of fever, anorexia and headache. Vomiting nausea and diarrhoea, muscle aches and dizziness may also occur. Encephalitis: photophobia, lethargy, irritability, drowsiness, neck stiffnes confusion, ataxia, aphasia, intention tremor, convulsions, coma and death. 25 percent of symptomatic cases of Murray Valley and Japanese encephaliti are fatal, and a further 25 percent result in permanent disability. It is rare fo encephalitis to follow Kunjin infection.
Sinbis Fever, arthritis, rash. Tick-borne encephalitis	Most infections are asymptomatic. Symptoms can include fever, malaise headache, nausea, vomiting, myalgia and muscle fasciculation. Within 1 weel these symptoms resolve spontaneously, but in less than 0.5 percent infections, there is a relapse after 2–8 days with high fever, headache vomiting, meningitis, encephalitis or myelitis.
West Nile encephalitis	Most infections are asymptomatic. Features can include fever, malaise headache, arthralgia, myalgia, anorexia, nausea, vomiting, diarrhoea coughing, sore throat, flushed face, conjunctival injection, generalise lymphadenopathy, maculopapular rash and hepatosplenomegaly Encephalitis or myelitis occurs in less than 1 percent of cases.

Case classification

- **Under investigation**: A case which has been notified but information is not yet available to classify it as probable or confirmed.
- **Probable***:* A clinically compatible illness in a person who has come from an endemic area.
  [The main clinical syndromes are:
  - encephalitis: acute CNS disease with aseptic meningitis or encephalitis, e.g., Japanese encephalitis virus, Murray Valley encephalitis virus, Kunjin
  - fever with or without exanthem: e.g., dengue fever, Ross River virus infection, Sindbis, Kunjin and Barmah Forest virus diseases, yellow fever
  - arthritis and rash: e.g., Ross River virus infection, dengue fever, Sindbis and Barmah Forest virus diseases]
- **Confirmed**: A clinically compatible illness that is that is confirmed by specific serological testing
- **Not a case**: A case that has been investigated and subsequently has been shown not to meet the case definition.

Laboratory Testing

Laboratory test for diagnosis
Consult ESR or LabPlus at Auckland District Health Board to discuss appropriate testing and interpretation of results.

Laboratory confirmation requires at least one of the following:

- isolation of the virus
- detection of arbovirus nucleic acid
- detection of arbovirus-specific IgM
- IgG seroconversion
- a significant increase (four-fold or greater) in antibody titres to specific arbovirus.

Note: Closely related arboviruses can be clinically indistinguishable and exhibit serologic cross-reactivity. Therefore, positive results of serologic tests should be investigated further by cross-neutralisation methods using a battery of viruses relevant to the region where the case was exposed.

Management of Case

Investigation

- Cover sheet and Investigate on the day of notification
- Fax Case Report Form to notifying doctor
- Confirm date of onset and symptoms of illness
- Confirm results of relevant pathology tests
- Obtain a history of travel, mosquito or other insect bite and protective measures taken against insect bites.
- Telephone case if necessary to complete the Case Report Form
- Discuss every case with the MOH who will
  a) advise the notifying doctor if any further laboratory tests are indicated (see Laboratory Testing above)
  b) contact the Ministry of Health for further advice and management if the disease was possibly contracted in New Zealand.

Restriction

Nil.

Treatment

Supportive and symptomatic.

Counselling

- Advise the case and their caregivers of the nature of the disease and its mode of transmission. Explain that if the case had Dengue fever, this may predispose developing Dengue Haemorrhagic fever if re-infected. Therefore the case should take increased precautions against mosquito bites when travelling in regions where dengue infections occur.
- Fact sheets are available:

  Dengue Fever:
  Manatū Hauora | Ministry of Health NZ – Dengue Fever

  Chikungunya:
  Te Whatu Ora | Health NZ – Chikungunya

  Ross River fever:
  Manatū Hauora | Ministry of Health NZ – Ross River Fever

Management of Contacts

- Advise those exposed to the same risk factors as the index case to protect against mosquitoes for at least 2 weeks after leaving the risk area.
- Advise also regarding the incubation period and common symptoms of arboviral infections and encourage contacts to seek early medical attention if symptoms develop.
- Fact sheets are available: *refer to management of cases section above for links.*

Other Control Measures

There is a risk of certain arboviral diseases e.g., Ross River fever, becoming endemic in New Zealand. Mosquito surveillance and control is important. For further information see the Environmental Health Protection Manual (MoH 1997a) (a controlled copy is kept in the HPO Lab and it is also available from the Environmental Health Library in HealthEMIS).

Identification of source

If there is a possibility of locally acquired infection, check for other cases in the community and liaise with Ministry for Primary Industries staff to investigate potential mosquito vectors for infection. When mosquito vectors have been identified, they will be subject to surveillance or eradication to ensure they do not become established. For example, the

southern saltmarsh mosquito, *Ochlerotatus camptorhynchus*, has established in several areas and is subsequently the target of eradication campaigns in the Kaipara, Whangaparoa and Wairau areas. This species is a vector for Ross River fever and possibly Barmah Forest and Murray Valley encephalitis viruses.

Disinfection
Nil.

Health education
- For locally acquired cases, consider a media release and direct communication with health professionals to encourage prompt reporting of symptoms and assist with biosecurity investigations.
- In communications with doctors, include recommendations regarding diagnosis and treatment.
- All travellers to arbovirus-endemic countries should get travel medicine advice on personal protection before travelling. This includes advice on mosquito protection in the form of repellents containing DEET, protective clothing and insecticide impregnated mosquito nets as well as details of possible vaccines. Japanese encephalitis vaccine is available in New Zealand.
- For further advice, consult an infectious diseases physician or ESR Kenepuru Science Centre.

Reporting
- Ensure complete case information is entered into EpiSurv.
- Medical officers of health should immediately notify the Ministry of Health Communicable Diseases Team if there is any suspicion that the infection was acquired locally.
- If the case may have acquired an arbovirus in New Zealand, the Ministry of Health Communicable Diseases Team will notify the appropriate staff in the Ministry for Primary Industries so that further investigation of a mosquito vector can be undertaken.
- The International Health Regulations (IHR) National Focal Point in the Ministry must use the IHR Decision Instrument for any event involving cholera, pneumonic plague, yellow fever, viral haemorrhagic fevers, West Nile fever or any unusual or potentially serious public health event, and then notify the World Health Organization if required.

Reporting

- Contact the Ministry of Health if there was any suspicion that the disease was acquired locally
- Ensure entered on EpiSurv
- File.

References and further information

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