

★ ROSS RIVER VIRUS DISEASE ★

A MANAGEMENT GUIDE FOR GENERAL PRACTITIONERS AND PATIENTS



**PROTECT
YOURSELF**



against

**DISEASE-CARRYING
MOSQUITOES**



★ **FIGHT** *the* **BITE** ★



ROSS RIVER VIRUS DISEASE

DISEASE OVERVIEW

INTRODUCTION

This booklet provides a summary of the epidemiology, clinical features, diagnosis, management and prognosis of Ross River virus (RRV) disease for both general practitioners and patients.

TRANSMISSION

- ★ RRV occurs in nature in environmentally-driven cycles between mosquitoes and animals, most commonly marsupials.
- ★ People can only become infected when bitten by a mosquito carrying the virus.
- ★ RRV cannot be caught from direct contact with another infected person or animal.
- ★ There has been one report in Western Australia (WA) of transmission occurring by blood transfusion from an infected individual.



PREVENTION

- ★ There is currently no vaccine for RRV.
- ★ The only way to prevent infection is to avoid being bitten by mosquitoes.
- ★ Avoid being outside at dawn and dusk when mosquitoes are most active, but be aware that some RRV vectors will bite both day and night.
- ★ Wear long, loose fitting clothing and apply a chemical-based repellent to all areas of exposed skin.
- ★ Reduce mosquito breeding around your home by removing, emptying or covering anything that holds water.

CLINICAL PRESENTATION

- ★ Clinical presentation of RRV disease can vary between patients.
- ★ Most patients present with arthralgia, with or without arthritis and fatigue.
- ★ Approximately 50 percent of patients present with fever, myalgia, and maculopapular rash.
- ★ Patients are most commonly aged 20 to 60 years, although disease can occur at any age.

DIAGNOSIS

Diagnosis of RRV disease requires three criteria to be met:

1. Clinical syndrome consistent with RRV disease
2. Travel or residence in an area of known or likely RRV transmission
3. Serological evidence of recent RRV infection.

NOTIFICATION

- ★ RRV disease is notifiable under the *Health Act 1911*.
- ★ All laboratory confirmed and probable cases of RRV disease must be reported to the WA Department of Health (DoH) by both the diagnosing doctor and laboratory.

MANAGEMENT

- ★ There is no specific treatment for RRV disease.
- ★ Patients should be informed that symptoms may persist for weeks to months.
- ★ In some rarer cases, symptoms can recur for longer periods of time.
- ★ Rest is useful in the acute phase of infection.
- ★ Simple analgesics can alleviate inflammation and pain during the course of the illness.
- ★ Gentle physical therapies including hydrotherapy, physiotherapy, massage and swimming may improve symptoms.
- ★ Depression is common in prolonged cases of RRV disease and may require active management.

PROGNOSIS

- ★ Most patients recover from RRV disease within 3-6 months.
- ★ Some patients have a more chronic illness. Searching for alternative diagnoses in some of these cases is recommended.

EPIDEMIOLOGY

- ★ RRV cases have been reported from every state and territory in Australia, and several Pacific Islands.
- ★ The virus is considered endemic in several regions of Australia, including the Southwest and Kimberley regions of WA.
- ★ Large epidemics of RRV disease occur during spring and summer in the Southwest of WA every 3-5 years. Notification rates are highest between Mandurah and Busselton.
- ★ Regular RRV activity is reported in northern WA during and shortly after the wet season, with significant outbreaks occurring following favourable environmental conditions.
- ★ Sporadic outbreaks occur in the Midwest, Goldfields and Wheatbelt regions following above average rainfall or flooding in late summer, early autumn, and in the Pilbara and Gascoyne regions following heavy rainfall or coastal high tides.
- ★ Many suburbs of Perth also experience local transmission in spring/summer, particularly those located toward the outer metropolitan area, in close proximity to natural mosquito breeding habitat, or impacted by increased tidal or rainfall activity.

OCCASIONAL OUTBREAKS AFTER ABOVE AVERAGE RAINFALL OR COASTAL HIGH TIDES.

REGULAR SPRING/SUMMER ACTIVITY WITH MAJOR OUTBREAKS AFTER EXTREME SPRING RAINFALL OR VERY HIGH TIDES.



REGULAR ACTIVITY DURING/AFTER THE WET SEASON. MAJOR OUTBREAKS FOLLOWING ABOVE AVERAGE RAINFALL, CYCLONES OR HIGH TIDES.

OCCASIONAL OUTBREAKS FOLLOWING ABOVE AVERAGE RAINFALL OR FLOODING IN LATE SUMMER/EARLY AUTUMN.

CLINICAL PRESENTATION

INCUBATION PERIOD

- ★ Symptoms usually develop 7 to 9 days after being bitten by an infected mosquito (range 3 to 21 days).

ASYMPTOMATIC INFECTION

- ★ Many people infected with RRV are either asymptomatic or have only mild symptoms.

TYPICAL PRESENTATION

- ★ Clinical symptoms associated with RRV disease can vary between patients.
- ★ The table below outlines the common symptoms experienced by patients with RRV disease.
- ★ There is no specific order of symptom onset in affected patients.
- ★ Symptoms persist for more than 1 month in 90 per cent of cases.
- ★ Other symptoms (e.g. lymphadenopathy, sore throat, coryza, tingling in hands or feet, headache, neck stiffness, and photophobia) can occur, but are less common.

FREQUENCY OF SYMPTOMS OF RRV DISEASE IN PATIENTS

SYMPTOM	FREQUENCY
Joint pain	95%
Fatigue	90%
Arthritis	80%
Myalgia	60%
Rash	50%
Fever	50%

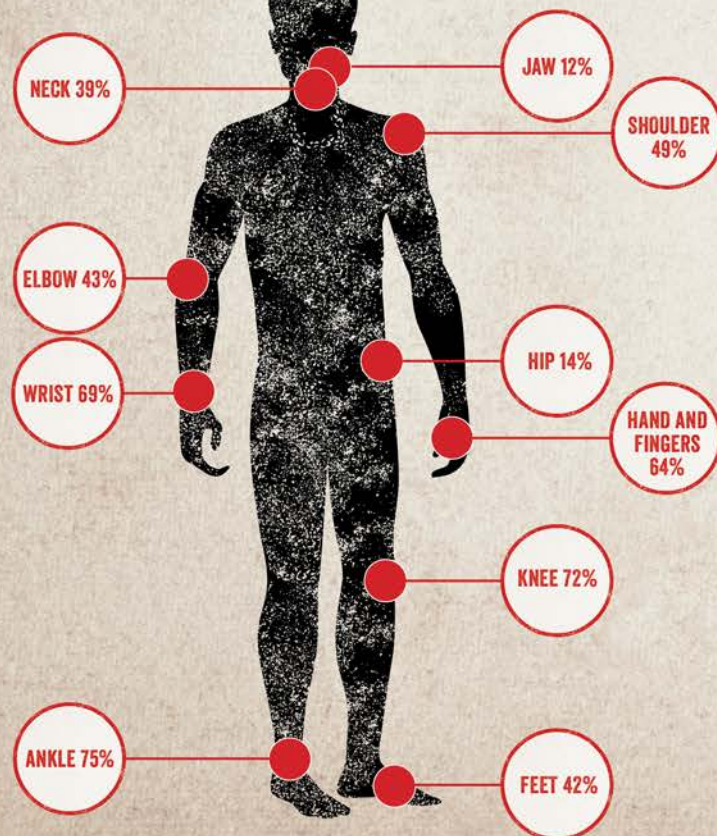
Harley, Sleigh, Ritchie, 2002; Smith 2001

CLINICAL PRESENTATION

JOINT INVOLVEMENT

- ★ The involvement of joints can range from tenderness and minor restriction of movement to severe swelling, effusion and redness.
- ★ Peripheral joints are most commonly involved in RRV disease, including knees, ankles, wrists and fingers.
- ★ Most patients have symmetrical involvement of joints.

FREQUENCY OF INVOLVEMENT OF DIFFERENT JOINTS IN RRV DISEASE PATIENTS



Source: combined data from several clinical reviews of RRV disease

CLINICAL PRESENTATION

RASH

- ★ The characteristic rash is generally maculopapular in appearance and is commonly distributed on the limbs and trunk.
- ★ The rash usually resolves within two weeks.



Swollen ankle joint (top) and rash in a RRV patient.

Photo courtesy: Dr K Murray, Princess Margaret Hospital, Perth, WA

DIAGNOSIS

A DIAGNOSIS OF RRV DISEASE IS BASED ON THREE KEY COMPONENTS

SYMPTOMS

SYMPTOMS OR SIGNS CONSISTENT WITH RRV DISEASE

PROXIMITY TO RRV ACTIVITY

RESIDENCE IN, OR RECENT TRAVEL TO, AN AREA WITH RRV ACTIVITY

LABORATORY DIAGNOSIS

LABORATORY INVESTIGATION TO DETERMINE RRV IgM/IgG TITRE

LABORATORY DIAGNOSIS

Most cases of RRV disease are diagnosed serologically. Whilst not common practice, isolation of RRV or detection of RRV by nucleic acid testing can also be used.

DEFINITIVE DIAGNOSIS

- ★ The first serum sample should be taken during the acute stage (< 7 days following symptom onset) and the second specimen at least 10 days later.
- ★ A definitive diagnosis (confirmed case) is achieved by demonstrating a >4-fold rise in RRV IgG antibody, or seroconversion between acute and convalescent samples.
- ★ In the absence of a rising IgG titre, other potential diagnoses should be considered.

SUGGESTIVE DIAGNOSIS

- ★ A suggestive diagnosis (probable case) of RRV disease is reached through detection of both RRV IgM and RRV IgG (unless RRV IgG was detected in a specimen collected more than 3 months earlier).

INCONCLUSIVE DIAGNOSIS

- ★ A single serum specimen with a positive RRV IgM is not conclusive evidence of an acute RRV infection.
- ★ RRV IgM can persist for months to years after primary infection and may represent previous mild or asymptomatic infection, not the current cause of illness.
- ★ False positive IgM results do occur and should be suspected if IgM is detected in the absence of IgG.

DIFFERENTIAL DIAGNOSIS

DIFFERENTIAL DIAGNOSES

The differential diagnoses of RRV disease is broad, and includes a spectrum of infectious and non-infectious causes of polyarthropathy (*see table below*).

A number of exotic infectious differentials should also be considered if the patient has a history of travel overseas or to northern Queensland, where sporadic outbreaks of dengue occur.

Whilst characteristic symptoms will often suggest RRV disease, a differential diagnosis of RRV disease should be reconsidered if the patient has any of the following findings:

- ★ a high erythrocyte sedimentation rate/C-reactive protein (ESR/CRP)
- ★ anaemia
- ★ persistent reduction in joint movement
- ★ radiological changes consistent with polyarthritis.

NON-INFECTIOUS CAUSES	INFECTIOUS CAUSES (ACQUIRED IN WA)	INFECTIOUS CAUSES (ACQUIRED ELSEWHERE)
Rheumatoid arthritis (RA)	Barmah Forest virus	Dengue virus
Systemic lupus erythematosus (SLE)	Parvovirus B19 (erythema infectiosum)	Chikungunya
Reiter's Syndrome	Rheumatic fever	Zika virus
Adult-onset Still's disease	Some other viral infections	Sindbis virus
Henoch Schonlein purpura		

DISEASE MANAGEMENT

There is no specific treatment for RRV disease. None of the current treatment recommendations for RRV disease are based on high levels of evidence, such as randomised controlled trials.

1. GENERAL MEASURES

- ★ Rest is useful in the acute phase of infection.
- ★ Gentle physical therapies including hydrotherapy, physiotherapy, massage and swimming, may improve symptoms.
- ★ Patients with a more prolonged course of illness commonly experience depression and other psychological sequelae from RRV disease.
- ★ Psychosocial management and referral to other therapists may form an important part of the management of some patients.

2. MEDICATIONS

- ★ Simple analgesics, such as paracetamol, may be sufficient to control pain.
- ★ Nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin and ibuprofen can effectively reduce pain and swelling in some patients.
- ★ Corticosteroids are not a recommended treatment due to their questionable efficacy in RRV disease and adverse side effects.

3. OTHER THERAPIES

- ★ Anecdotal evidence suggests that some patients find relief from symptoms through self-help techniques such as the use of heat on sore joints, relaxation exercises, planning daily activities to avoid fatigue, maintaining a good diet and moderate exercise.

PROGNOSIS

- ★ Most patients will experience resolution of major symptoms within 3-6 months.
- ★ Some patients have a chronic course of symptoms, with persistence of non-rheumatic symptoms (such as fatigue and poor concentration) a common feature.
- ★ In some of these chronic cases, prolonged illness may be due to a comorbid condition, and it is important to investigate for other conditions that may be causing or contributing to symptoms.
- ★ A relapsing course of RRV disease is occasionally experienced.

NOTIFICATION

- ★ RRV disease is a notifiable disease under the *Health Act 1911*.
- ★ All cases of laboratory confirmed and probable RRV disease must be reported to the WA Department of Health (DoH) by both the diagnosing doctor and laboratory.
- ★ Notification data are vital for disease surveillance and informing mosquito control programs.
- ★ The DoH monitors RRV disease notifications to ensure potential outbreaks are detected in a timely manner.
- ★ Upon receipt of notification of a case of RRV disease, the WA DoH will initiate an investigation via local government environmental health officers aimed at identifying the most likely time and place of exposure to infected mosquitoes.
- ★ This information is also used by local governments to assist in their mosquito management efforts.

REPELLENT APPLICATION GUIDELINES

GENERAL REPELLENT GUIDELINES

There is no cure or vaccine for mosquito-borne diseases acquired in WA. The only way to prevent infection is to avoid being bitten.

Insect repellents containing diethyltoluamide (DEET) or picaridin are the most effective products. As a general rule, the greater the percentage of DEET or picaridin, the longer the product will remain effective. Always read and follow the label instructions. Incorrect application may reduce the effectiveness of the product.

- ★ Choose a repellent with an appropriate concentration of DEET or picaridin to match the length of time you are outdoors.
- ★ As a general rule, a product containing 20 per cent DEET will provide approximately four hours of protection.
- ★ Apply repellent evenly to all areas of exposed skin.
- ★ For all areas (except face), apply repellent directly to skin and spread evenly with hands.
- ★ For face application, apply first to hands and then spread evenly on face, avoiding the mouth and eyes.
- ★ Do not apply repellent under clothing.
- ★ Repellents will not work if you apply them sparingly to the skin.

REAPPLYING REPELLENT

- ★ For prolonged periods outdoors, you may need to reapply repellent. Follow label instructions about how often you need to do this.
- ★ Reapplication may also be required after swimming or sweating.

PROTECT YOUR BABY OR TODDLER

Where possible, avoid exposing your baby or child to mosquitoes. Consider staying indoors, using pram netting or dressing them in loose, long-sleeved clothing, socks and shoes.

Mosquito repellents for children

- ★ **Under 12 months** – repellents containing DEET or picaridin are not recommended.
- ★ **From 12 months** – repellents containing up to 10 per cent DEET or picaridin can be used.

Application guidelines for children

- ★ Always apply the repellent according to the instructions on the label.
- ★ Do not allow children to apply repellents.
- ★ Apply repellent firstly to the hands of the carer and then spread evenly to exposed skin of child.
- ★ Avoid applying repellents to hands, near the eyes or mouth.
- ★ Avoid applying repellent under clothing.
- ★ Wash repellent off skin, once mosquito exposure is no longer a risk.
- ★ Wash all clothing that has come into contact with repellent, once mosquito exposure is no longer a risk.



**WEAR LONG,
LOOSE-FITTING,
CLOTHING.**



**USE INSECT
REPELLENT.**



**REMOVE THE
WATER THEY
BREED IN.**

FOR MORE INFORMATION

- ★ For more information about RRV or other mosquito-borne diseases, consult a Clinical Microbiologist, Infectious Diseases Physician, or Rheumatologist. Alternatively visit www.healthywa.wa.gov.au/FighttheBite.
- ★ For more information about the ecology of RRV, surveillance programs and management of outbreaks, or to access Fight the Bite resources, contact the Environmental Health Directorate on (08) 9285 5500 or email medical.entomology@health.wa.gov.au.
- ★ Patients can be referred for patient support information and groups to the Arthritis Foundation of WA on (08) 9388 2199 or www.arthritiswa.org.au.

REFERENCES

Harley D, Bossingham D, Purdie D, Pandeya N, Sleigh A. Ross River virus disease in tropical Queensland: evolution of rheumatic manifestations in an inception cohort followed for six months. *Medical Journal of Australia* 2002;177(7):353-5.

Harley D, Sleigh A, Ritchie S. Ross River virus transmission, infection and disease: a cross-disciplinary review. *Clinical Microbiological Reviews* 2001; 14(4):909-32.

Mylonas A, Brown A, Carthew T, McGrath B, Purdie D, Pandeya N et al. Natural history of Ross River virus-induced epidemic polyarthritis. *Medical Journal of Australia* 2002;177(7):356-60.

Smith D. Ross River virus and Barmah Forest virus infections. Perth: PathCentre; September 2001.

★ FIGHT *the* BITE ★



★ COVER UP. REPEL. CLEAN UP. ★



WEAR LONG,
LOOSE-FITTING,
CLOTHING.



USE INSECT
REPELLENT.



REMOVE THE
WATER THEY
BREED IN.

Mosquitoes can spread serious and potentially deadly diseases. For more information contact the Department of Health visit:

www.healthywa.wa.gov.au / **FIGHTTHEBITE**



Government of Western Australia
Department of Health

★ FIGHT *the* BITE ★

★ COVER UP. REPEL. CLEAN UP. ★



WEAR LONG,
LOOSE-FITTING,
CLOTHING.



USE INSECT
REPELLENT.



REMOVE THE
WATER THEY
BREED IN.

For more information

Contact the WA Department of Health or visit:

www.healthywa.wa.gov.au/ **FIGHTTHEBITE**

Fight the Bite is an initiative of the Government of South Australia.
This artwork has been reproduced with permission from SA Health.