

Rickettsial Infections

Revision Dates

Case Definition	January 2013
Reporting Requirements	January 2013
Remainder of the Guideline (i.e., Etiology to References sections inclusive)	December 2005

Includes Rocky Mountain Spotted Fever (RMSF)

Case Definition

Confirmed Case

Clinical illness^[1] with laboratory confirmation of infection:

- Fourfold or greater rise in antibody titre to *Rickettsia rickettsii*^[2] by Immunofluorescence Assay (IFA) in acute and convalescent phase serum specimens ideally taken greater than or equal to 3 weeks apart

OR

- Detection of *Rickettsia* species nucleic acid (e.g., PCR) in an appropriate clinical specimen (e.g., blood, tissue biopsy of eschar)^[3]

OR

- Demonstration of *Rickettsia sp.*^[4] by immunostaining in an appropriate clinical specimen (e.g., tissue biopsy of eschar)

OR

- Isolation of *Rickettsia sp.* from an appropriate clinical specimen (e.g., blood, tissue biopsy of eschar).

Probable Case*

Clinical illness^[1] with one of the following:

- A single high ($\geq 1:256$) IFA serologic titre^[5]

OR

- Epidemiologically linked to a confirmed case.

*This probable case definition is provided as a guideline to assist with case finding and public health management, and should not be reported to AH.

^[1] Clinical illness is characterized by acute onset of fever and is usually accompanied by malaise, myalgia, headache, chills, conjunctival injection and rash. The rash is initially maculopapular (on the palms and soles with rapid centripetal spread) and two-thirds of patients then develop a petechial exanthem.

^[2] A fourfold or greater rise in antibody titre to *Rickettsia rickettsii* with a clinical and exposure history indicates a recent exposure to a *Rickettsia sp.* but cannot pinpoint which species due to cross reactivity. Tissue or lesion samples can be sent via the Provincial Laboratory for Public Health (ProvLab) to the National Microbiology Laboratory (NML) to determine the species.

^[3] Refer to the [National Microbiology Laboratory \(NML\) Guide to Services](#) for current specimen collection and submission information.

^[4] Immunostaining is performed using polyclonal antibodies that will detect all or most spotted fever *Rickettsial* sp. but is unable to determine the exact species responsible for infection. Epidemiological history is essential in establishing case classification.

^[5] It is recommended that a convalescent specimen be collected at least three weeks after the initial specimen if clinically indicated to either rule out or confirm infection.

Superseded

Reporting Requirements

1. Physicians, Health Practitioners and others

Physicians, health practitioners and others listed in Sections 22(1) or 22(2) of the *Public Health Act* shall notify the Medical Officer of Health (MOH) (or designate) of all confirmed cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two days).

2. Laboratories

Section 23(a)(ii) of the *Public Health Act* requires that all laboratories, including regional laboratories and the ProvLab, shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two days) to the:

- Chief Medical Officer of Health (CMOH) (or designate),
- MOH (or designate) and
- Attending/ordering physician.

3. Alberta Health Services and First Nations and Inuit Health Branch

- The MOH (or designate) of the zone where the case currently resides shall forward the preliminary Notifiable Disease Report (NDR) of all confirmed cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
- For out-of-zone reports, the MOH (or designate) first notified shall notify the MOH (or designate) of the zone where the client currently resides by mail, fax or electronic transfer and fax a copy of the positive laboratory report within 48 hours (two days).
- For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two days) including:
 - name,
 - date of birth,
 - out-of-province health care number,
 - out-of-province address and phone number,
 - attending physician (locally and out-of-province) and
 - positive laboratory report (faxed).

Etiology

Rocky Mountain Spotted Fever (RMSF) is caused by the *Rickettsia rickettsii*. Rickettsiae are bacterial organisms. They are obligate intracellular parasites.

Clinical Presentation

Rickettsial infections are characterized by a sudden onset of moderate to high fever, significant malaise, deep muscle pain, severe headache, chills and conjunctival injection. The fever may persist for 2 – 3 weeks in cases that remain untreated. A characteristic rash (maculopapular) often appears on the extremities (wrists and ankles) on the third to fifth day. It quickly spreads to the palms and soles, and then the remainder of the body. Many individuals will have a petechial exanthem. There may be an effect on the CNS, cardiac and pulmonary systems, gastrointestinal tract, renal involvement, disseminated intravascular coagulation and shock. The case fatality rate is about 13 – 25% in untreated cases.

Diagnosis

The diagnosis may be confused with ehrlichiosis, meningococemia, and enteroviral infection. It can be confirmed by a serologic response to specific antigens, however, serological evidence of infection occurs no earlier than the second week of illness in any of the rickettsial diseases. In the early stages of disease the infection may be detected in blood by PCR and in skin biopsies using immunostains or PCR. The direct immunofluorescence test on skin lesions identifies organisms and allows the diagnosis to be made when the rash appears (3 – 5 days). The rash may be difficult to detect in dark skinned individuals contributing to delay in diagnosis and an increase in fatality. Cultures are generally not done due to the risk of transmission to laboratory personnel. The analysis of ticks is not performed as part of the diagnosis.

Epidemiology

Reservoir

Rickettsiae are maintained in nature in ticks. These ticks exist in a classically commensal fashion with insect vectors. The rickettsiae can be transmitted to dogs, various rodents and other animals. Infection in animals has been observed but when RMSF is present, it is most commonly asymptomatic.

The primary vector in Alberta is the Rocky Mountain wood tick, *Dermacentor andersoni*, a common tick seen in the foothills each spring. (M Pybus, personal communication, June 2005)

Transmission

Infection is typically transmitted by the bite of an infected tick. In humans, the tick must be attached and feed for at least 4 – 6 hours before the rickettsiae become reactivated and infectious. An infected crushed tick or the feces of an infected tick entering a break in the skin or on mucous membranes are considered other sources of infection. On rare occasions, transmission has occurred through blood transfusion.

Incubation Period

The incubation period is from three to approximately 14 days, possibly depending on the size of the inoculum.

Period of Communicability

The infection is not transmitted from person-to-person. The tick itself remains infective for life (about 18 months).

Host Susceptibility

Susceptibility is general. Any individual exposed to ticks is at risk. It is believed that one attack confers immunity.

Occurrence

General (1,2)

RMSF is generally limited to the western hemisphere. It is endemic in the United States and despite the name very few cases are reported from the Rocky Mountain region. Most cases occur in the Atlantic states. Infection has been documented in Canada, western and central Mexico, Panama, Costa Rica, Columbia, Argentina and Brazil. April through October are the months of highest prevalence. Rates parallel the tick season in a given geographical area. The incidence is highest in children less than 15 years of age and in other individuals who frequently work in or visit tick-infested areas.

Canada

Although RMSF cases have been reported in Canada, the incidence cannot be obtained. RMSF is not a nationally notifiable disease.

Alberta

From 1985 to 2002, one case of RMSF presented in a traveller (in 2000) who had visited South Africa.

Key Investigation

Single Case/Household Cluster

- Determine history of travel to a tick infested area especially hikers and campers.
- Identify if pets are in the household.
- Assess for occupational risk e.g., animal handler.

Control

Management of a Case

- Consultation with an infectious diseases physician is advised.
- Check carefully for ticks and remove if they are present. See Preventive Measures.

Treatment of a Case

- Serological evidence of infection occurs no earlier than the second week of illness in any of the rickettsial diseases, therefore treatment should be initiated on clinical and epidemiological grounds.
 - Tetracycline, in particular doxycycline, is the treatment of choice.
 - Chloramphenicol may be used when there is a contraindication to tetracyclines.

Management of Contacts

- The infection is not passed from person-to-person.

Preventive Measures

- The public and physicians should be made aware that ticks transmit disease.
- Avoid tick-infested areas.
- Wear protective clothing and apply tick or insect repellent to clothes and exposed body parts for added protection.

- After exposure to tick-infested habitats, thoroughly inspect all individuals and their clothing. Carefully remove attached or crawling ticks.
 - Pay special attention to the exposed hairy regions of the body where ticks often attach.
 - For removal, the tick should be grasped with fine tweezers close to the skin and gently pulled straight out without twisting motions.
 - If fingers are used for removal, they should be protected with tissue and washed after removal.
 - Avoid squeezing the body of the tick.
- Remove ticks from dogs and use tick repellent collars to minimize tick population.

Superseded

References

- (1) *Rocky mountain spotted fever*. The Merck Manual Second Home Edition Online. Rickettsial Infections. 2004.
<http://www.merck.com/mmhe/sec17/ch195/ch195b.html>
- (2) Public Health Agency of Canada. *Infectious substances: Rickettsia rickettsii*. Office of Laboratory Security. Material Safety Data Sheet. January 2001.

Superseded