

Rocky Mountain Spotted Fever

Also known as: North American tick typhus, New World spotted fever, RMSF, Tick fever

Responsibilities:

Hospital: Report by IDSS, facsimile, mail, or phone

Lab: Report by IDSS, facsimile, mail, or phone

Physician: Report by facsimile, mail, or phone

Local Public Health Agency (LPHA): Report by IDSS, facsimile, mail, or phone. Follow-up required

Iowa Department of Public Health

Disease Reporting Hotline: (800) 362-2736

Secure Fax: (515) 281-5698

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Agent

Rocky Mountain spotted fever (RMSF) is caused by the bacterium *Rickettsia rickettsii*.

B. Clinical Description

Initial Symptoms include moderate to high fever, nausea, vomiting, significant malaise, muscle pain, severe headache, chills, and eye inflammation.

Later Signs and Symptoms include rash, abdominal pain, joint pain, and diarrhea. Over half of cases develop a rash or small bruises on the arms and legs, which typically appears 3-5 days after the onset of illness. The rash spreads to the palms and soles, and then to much of the body. Among untreated individuals, these signs and symptoms typically persist for 2 - 3 weeks, and the case-fatality rate ranges from 13% - 25%. The classic triad of findings for this disease is fever, rash, and history of tick bite, but this combination is often not present when the patient initially seeks care.

Onset of RMSF is sudden.

Complications: More advanced manifestations include decrease in red blood cells (anemia) and platelets (thrombocytopenia), severe clotting disorders, involvement of the major organ systems, and shock. Severe cases can result in long-term neurological illness. If the disease is promptly recognized and treated, death is uncommon. For the United States, the reported case-fatality rate for RMSF has been 3% - 5% in recent years.

C. Reservoirs

The primary vector for RMSF is the tick, which also serves as a reservoir. Only members of the tick family Ixodidae (hard ticks) are naturally infected with *Rickettsia rickettsii*. Among ticks, *R. rickettsii* is spread through eggs, and between life stages. This species is maintained in nature by a complex cycle involving ticks and mammals; several small wild animals and dogs may develop antibodies to *R. rickettsii*, but their role as possible reservoirs in the maintenance of RMSF is uncertain. Humans are considered accidental hosts, and are not involved in the natural transmission cycle of this pathogen.

D. Modes of Transmission

RMSF is acquired from a tick bite. Laboratory data suggest that the tick must remain attached for

4 - 6 hours before transmission of *R. rickettsii* to occur. Less commonly, infections may occur following exposure to crushed tick tissues, fluids, or tick feces when these fluids get into cuts or scratches.

E. Incubation Period

Signs of RMSF typically develop one week after exposure (range 3 - 14 days). The length of the incubation period is associated with the magnitude of exposure to *R. rickettsii*.

F. Period of Communicability or Infectious Period

RMSF is not communicable from person to person.

G. Epidemiology

RMSF is a seasonal disease, occurring throughout the United States during the months of April through September, when the risk of contact with ticks is most likely. RMSF is uncommon in Iowa. The risk of mortality from RMSF is higher for men, people over the age of 40, non-whites, and individuals who do not develop (or recognize) the typical rash. Two-thirds of RMSF cases occur in children under the age of 15 years as they tend to spend more time in tick-infested areas. While rare, accidental transmission in the laboratory setting has been reported.

The incidence of RMSF has increased during the last decade, from less than 2 cases per million persons in 2000 to over 6 cases per million persons 2010. During the same time period, the proportion of RMSF cases resulting in death (case fatality) has declined to a low of less than 0.5%.

H. Bioterrorism Potential

None

2) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify where RMSF occurs in Iowa, and to recognize changes in disease incidence in the state.
- To focus preventive education, and to target tick control measures.

B. Laboratory and Healthcare Provider Reporting Requirements

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider must report. After completing the investigation and gathering the information to complete the report form, enter the information into the Iowa Disease Surveillance System (IDSS), or FAX the report form with supporting laboratory documentation as follows: The reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736; fax number (515) 281-5698, or mail (in an envelope marked "Confidential") to IDPH/CADE mailing address:

IDPH, CADE
Lucas State Office Building, 5th Floor
321 E. 12th St.
Des Moines, IA 50319-0075

Laboratory Testing services Available

The University of Iowa State Hygienic Laboratory (SHL) tests single serum samples for *R. rickettsii* utilizing Indirect Fluorescence Antibody tests. Laboratory confirmation involves a single IFA serological titer of $\geq 1:64$. The State Hygienic Laboratory will identify ticks potentially carrying *R. rickettsii*. For more information on either sera or tick specimen submission, call the SHL at (319) 335-4500.

C. Local Public Health Agency Follow-Up Responsibilities

Case Investigation

- a. The LPHA is responsible for completing the case investigation form in IDSS by interviewing the case and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the case's healthcare provider or the medical record.
- b. Use the following guidelines in completing the IDSS form:
 - 1) Accurately record demographic information, occupation, whether hospitalized (including location and associated dates), date of symptom onset, symptoms, laboratory information, treatment information, healthcare provider information, and disease outcome (*e.g.*, recovered, died).
 - 2) Exposure history: Use the incubation period range for Rocky Mountain spotted fever (3-14 days). Specifically, focus on the period beginning a minimum of 3 days prior to onset and ending no more than 14 days before onset for the following exposures:
 - a) Determine if a tick bit the case. If yes, record information about the duration of tick attachment, date(s) and geographic location(s) where the bite occurred.
 - b) Travel history: Determine the geographic area(s) visited by the case.
 - 3) If the patient was diagnosed at the same time with another tick-borne disease (such as Lyme disease, ehrlichiosis, or babesiosis) please refer to other chapters in this manual and complete the appropriate IDSS case report forms.
 - 4) If several unsuccessful attempts have been made to obtain case information (the case or healthcare provider does not return calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), complete the IDSS form with as much information as possible. Make notations in IDSS "Notes" why any information is incomplete. If unable to get information, in IDSS select the appropriate reason under the Event tab in the Event Exception field.

If assistance is needed, contact CADE at (800) 362-2736; epidemiologists are available to answer questions about completing a case investigation.

- c. Institution of disease control measures is an integral part of case investigation. It is the LPHA responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 3), Controlling Further Spread.

3) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

None.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

None.

D. Preventive Measures

Environmental Measures

Provide individuals the following information: Prevention of Rocky Mountain spotted fever involves making one's property less attractive to ticks.

- Remove leaf litter and brush from around the home.
- Mow lawns regularly, and prune low-lying bushes to let in more sunlight.
- Keep woodpiles in sunny areas off the ground.
- If insecticides are used around the home, always follow the label instructions. Never use near streams or other bodies of water.

Personal Preventive Measures/Education

The best preventive measure is to avoid tick-infested areas. In areas where contact with ticks may occur, individuals should be advised of the following:

- Wear long-sleeved shirts and long, light-colored pants tucked into socks or boots to make it easier to see ticks crawling on your clothing, and to prevent ticks from crawling up the inside of the pants legs.
- Stay on trails when walking or hiking.
- Use insect repellants properly. Repellants that contain DEET (diethyltoluamide) should be used in concentrations no higher than 30% for children. Remember, repellants should *never* be used on infants. Permethrin is a repellant that can be applied only to clothing, *not* exposed skin.
- After each day spent in a tick-infested area, thoroughly check yourself, children, and pets for ticks. Remove any tick found on the body. Clothing should also be checked.
- Promptly remove any attached tick using fine-point tweezers. The tick should not be squeezed or twisted, but grasped close to the skin and pulled straight out with steady pressure. Once removed, the tick should be drowned in rubbing alcohol or the toilet.

4) ADDITIONAL INFORMATION

The Council of State and Territorial Epidemiologists (CSTE) surveillance case definitions for Rocky Mountain Spotted Fever can be found at:

www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis.htm#top

CSTE case definitions should not affect the investigation or reporting of a case that fulfills the criteria in this chapter. (CSTE case definitions are used by the state health department and the CDC to maintain uniform standards for national reporting.)

References

American Academy of Pediatrics. *2006 Red Book: Report of the Committee on Infectious Diseases, 27th Edition*. Illinois, American Academy of Pediatrics, 2006.

Beran, G.W. *Handbook of Zoonoses, 2nd Edition, Section A: Bacterial, Rickettsial, Chlamydial, and Mycotic*. Boca Raton, CRC Press, 1994.

Heymann, David L., ed., *Control of Communicable Diseases Manual, 20th Edition*. Washington, DC, American Public Health Association, 2015.

Resources

www.cdc.gov/ticks/diseases/rocky_mountain_spotted_fever/