

# Rocky Mountain Spotted Fever

## **DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS**

Per N.J.A.C. 8:57, healthcare providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of Rocky Mountain Spotted Fever to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at

<http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.826.5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.



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# Rocky Mountain Spotted Fever

## 1 THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

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

### B. Clinical Description

The classic triad associated with RMSF is moderate to high fever, rash, and history of tick bite; however, this combination is not always detected when the patient initially presents for care. Early findings may include sudden onset of fever, malaise, severe headache, muscle pain, and eye inflammation. In 85% to 90% of patients, a rash or small bruises develop on the arms and legs, usually beginning two to six days after the onset of illness. The rash typically begins on wrists and ankles, spreading to the palms and soles, and then to much of the body. “Spotless” fever is seen more commonly in adults and dark-skinned persons. More severe manifestations include anemia, thrombocytopenia, severe clotting disorders, involvement of the major organ systems, and shock. If the disease is promptly recognized and treated, death is uncommon. However, for the United States overall, the reported case-fatality rate for RMSF has been 3% to 5% in recent years.

### C. Vectors and Reservoirs

In New Jersey, the primary vector for RMSF is the dog tick (*Dermacentor variabilis*). The lone star tick (*Amblyomma americanum*) is also a vector of RMSF in southern parts of the state. *R. rickettsii* can be transmitted by ticks at every life stage (egg, larva, nymph, and adult).

### D. Modes of Transmission

RMSF is acquired from a tick bite. Laboratory data suggest that the tick must remain attached for four to six hours before the transmission of *R. rickettsii* can occur. Less commonly, transmission can occur by exposure to fluids released from an infected tick during removal.

### **E. Incubation Period**

Signs of RMSF typically develop one week after exposure (range: three to 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 has been reported in every state except Alaska, Hawaii, Maine, and Vermont, but more than half of US cases (56%) were from only five states: North Carolina, South Carolina, Tennessee, Oklahoma, and Arkansas. RMSF incidence rises between April and October, when the risk of contact with ticks is greatest. The risk of mortality from RMSF is higher for men, people over the age of 40, nonwhites, individuals who do not develop (or recognize) the typical rash, and individuals who do not recognize a tick bite. While rare, accidental transmission in the laboratory setting has occurred. Fewer than 30 confirmed or probable cases of RMSF are reported in New Jersey annually, although the diagnosis is considered in many more cases.

## **2 CASE DEFINITION**

### **A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition**

#### **1. Clinical Description**

RMSF is a tick-borne illness characterized by acute onset of fever accompanied by headache, malaise, myalgia, nausea/vomiting, and conjunctival injection. A maculopapular rash generally appears within three to six days, beginning on the extremities (including palms and soles) and spreading rapidly to much of the body. However, a rash may never develop in as many as 10% to 15% of cases.

#### **2. Laboratory Criteria for Diagnosis**

- Serological evidence of a significant change in serum antibody titer to *R. rickettsii* antigens between paired serum specimens, as measured by a standardized assay conducted in a commercial, state, or reference laboratory\*
- Demonstration of *R. rickettsii* antigen by immunohistochemistry (IHC)
- Detection of *R. rickettsii* DNA by the polymerase chain reaction (PCR) assay
- Isolation of *R. rickettsii* from a clinical specimen in cell culture

**\*NOTE: A significant change in titer must be determined by the testing laboratory; examples of commonly used measures of significant change include, but are not limited to, a fourfold or greater change in antibody titer as determined by indirect immunofluorescent antibody (IFA) assay or an equivalent change in optical density measured by enzyme immunoassay or enzyme-linked immunosorbent assay (ELISA).**

### 3. Case Classification

#### **CONFIRMED**

A clinically compatible case, AND one or more of the following:

- A significant change in antibody titer between paired serum samples, as determined by IFA or ELISA
- Positive IHC or PCR
- Positive culture for *R. rickettsii* from a clinical specimen

#### **PROBABLE**

A clinically compatible case, AND

Serological evidence of antibody titer to *R. rickettsii* antigens in a single specimen, as measured by a standardized assay conducted in a commercial, state, or reference laboratory (See note, above.)

#### **POSSIBLE**

Not used.

### **B. Differences from CDC Case Definition**

The NJDHSS and CDC case definitions are the same.

## **3 LABORATORY TESTING AVAILABLE**

The Public Health and Environmental Laboratories (PHEL) provide serological testing services on paired sera for *R. rickettsii* by IFA methodology. PHEL also provides tick identification. For additional information on submission of samples, contact the Special Immunology Laboratory at 609.292.5819.

The mailing address is:

NJDHSS  
Division of Public Health and Environmental Laboratories  
Specimen Receiving and Records,  
PO Box 361, John Fitch Plaza  
Trenton, NJ 08625-0361

**NOTE: The PanBio assay is frequently used to determine serological evidence of antibody titer to *R. rickettsii* antigen. This assay is used for the qualitative detection of antibodies to RMSF; it does not express quantity of titer. Therefore, PanBio assays alone cannot satisfy the case definition requirement of demonstrating significant change in titers between paired sera for confirmed status. To confirm a case, the PanBio should be used in conjunction with other Rickettsial serologies, such as IFA, that express titer levels. A clinically compatible case should be classified as probable when positive single or multiple assay results demonstrate presence of antibody.**

## **4 PURPOSE OF SURVEILLANCE AND REPORTING AND REPORTING REQUIREMENTS**

### **A. Purpose of Surveillance and Reporting**

- To identify where RMSF occurs in New Jersey, and to recognize areas where RMSF incidence has changed (increased or decreased)
- To focus preventive education, and to target tick control measures

### **B. Laboratory Reporting Requirements**

New Jersey Administrative Code (NJAC 8:57-1.8) stipulates that laboratories report all cases of RMSF to the health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. The report shall contain, at a minimum, the reporting laboratory's name, address, and telephone number; the age, date of birth, gender, race, ethnicity, home address, and telephone number of the person tested; the test performed; the date of testing; the test results; and the healthcare provider's name and address.

### **C. Healthcare Provider Reporting Requirements**

NJAC 8:57-1.4 stipulates that healthcare providers report (by telephone, confidential fax, or in writing) all cases of RMSF to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider's practice is located. The report shall contain the name of the disease; date of illness onset; and name, age, date of birth, race, ethnicity, home address, and

telephone number of the case being reported. The name, address, institution, and telephone number of reporting official should also be included.

#### **D. Health Officer Reporting and Follow-Up Responsibilities**

NJAC 8:57-1.8 stipulates that each local health officer must report the occurrence of any case of RMSF, as defined by the reporting criteria in section 2A above.

Current requirements are that cases be reported to the NJDHSS electronically via the confidential and secure CDRSS. Additionally, when the case is classified as confirmed or probable, the CDC Tick-Borne Rickettsial Disease Case Report Form must be completed and sent to DHSS via mail or fax (609.588.2546). The mailing address is:

NJDHSS  
Communicable Disease Service  
PO Box 369  
Trenton, NJ 08625-0369

## **5 CASE INVESTIGATION**

#### **A. Health Officer Responsibilities**

It is the health officer's responsibility to investigate the case by interviewing the patient, healthcare provider, or others who may be able to provide pertinent information. The investigation should be completed in a timely manner, and the case reported according to the guidelines listed below.

#### **B. Objectives of the Case Investigation**

The first objective of the case investigation is to determine case classification by obtaining information from the patient and/or the healthcare provider. The second objective is to document information obtained in CDRSS and on the CDC Tick-Borne Rickettsial Disease Case Report Form.

#### **C. Investigation Guidelines**

1. Interview the patient and/or healthcare provider to determine clinical signs and symptoms. Ask about date of illness onset as well as onset/resolution for each clinical feature. Was the patient hospitalized? If yes, get dates. Was there underlying immunosuppression? Did any life-threatening or fatal complications occur?
2. Establish exposure history. Focus on the period three to 14 days prior to the illness onset. Find out if the patient spent time in tick habitats such as woody or grassy areas. If yes, was this in New Jersey or outside the state? Specify location. Does the patient recall

being bitten by a tick? If yes, record information about the duration of tick attachment, and date(s) and geographic location(s) where bite(s) occurred.

3. Laboratory data: Ask the healthcare provider if any additional tests (convalescent sample) are scheduled. Explain that a significant change in quantity of antibody titer between paired sera is needed to meet criteria for classifying a case as confirmed. (See section 3.)
4. If the case was diagnosed at the same time as another tick-borne disease (such as Lyme, ehrlichiosis, or babesiosis) please refer to other chapters in this manual and complete the appropriate case report.
5. Instruct the patient in prevention measures as listed below in section 6.
6. Complete the CDC Tick-Borne Rickettsial Disease Case Report Form being sure to circle in section 9 the symptoms that apply to the patient. Fax to DHSS (609.588.2546) or mail to:

NJDHSS  
 Communicable Disease Service  
 PO Box 369  
 Trenton, NJ 08625-0369

#### D. Documentation of the Investigation

Use CDRSS to record information obtained and actions taken during the investigation. CDRSS serves as a communication tool between state, regional and local health entities and is the official record of the case investigation. The mandatory fields in CDRSS include: disease, last name, county, municipality, gender, race, ethnicity, case status, report status. The following table can be used as a quick reference guide to determine which CDRSS fields need to be completed for accurate and complete reporting of RMSF cases.

CDRSS Screen	Required Information
<b>Patient Info</b>	Enter disease name (RMSF, no subgroup), patient demographics, illness onset date, and the date the disease was reported to the local health department.
<b>Addresses</b>	Enter any alternate address (e.g., college residence, vacation home). Use the comments box in this screen to note any pertinent information about the alternate address (e.g., lives in dorm room; returns home weekends). Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.
<b>Clinical Status</b>	Enter physician and hospitalization information.

CDRSS Screen	Required Information
<b>Signs/Symptoms</b>	Check appropriate boxes for signs and symptoms, and indicate onset and end date for each. Make every effort to get complete information by interviewing the patient, physician, family, or others involved with the case. RMSF can not be classified as “CONFIRMED” or “PROBABLE” based on labs only. Clinical compatibility must be documented in this screen.
<b>Risk Factors</b>	Enter complete information about risk factors to facilitate study of RMSF in New Jersey.
<b>Laboratory Eval</b>	Enter the appropriate lab tests. <b>NOTE:</b> PanBio assays cannot be used to confirm a case.
<b>Contact Tracing</b>	This is an optional screen not used for RMSF.
<b>Case Comments</b>	Enter general comments (i.e., information that is not discretely captured by a specific topic screen or drop-down menu) in the Comments section. <b>NOTE:</b> Select pieces of information entered in the Comments section CANNOT be automatically exported when generating reports. Therefore, whenever possible, record information about the case in the fields that have been designated to capture this information; information included in these fields CAN be automatically exported when generating reports.
<b>Epidemiology</b>	This is an optional screen not used for RMSF.
<b>Case Classification Report Status</b>	<ul style="list-style-type: none"> <li>• Assign case status based on the case definition, not clinical diagnosis.</li> <li>• Assign “CONFIRMED” status only when a significant change in titers is seen, or IHC, PCR, or culture is positive.</li> <li>• Only “CONFIRMED” and “PROBABLE” are used in RMSF. Do not classify a case as “POSSIBLE” when the investigation is complete. (See case definition.)</li> </ul> <p>Do not delete a case that was entered as RMSF, but then proved to be caused by a different organism. Assign “NOT A CASE” and record the reason for the change. If a new case is created for the final diagnosis, note the new CDRSS number in the comment box.</p>

**E. Other Reporting/Investigation Issues**

1. Case report forms (CDS-1 and labs) DO NOT need to be mailed to NJDHSS as long as complete information is entered into CDRSS. The CDC Tick-Borne Rickettsial Disease

Case Report Form must be submitted, however, being sure in section 9 to circle the symptoms that apply to the patient.

2. Once LHD completes its investigation and assigns a report status of “LHD CLOSED,” NJDHSS will review the case. NJDHSS will approve the case by changing the report status to “DHSS APPROVED.” At this time, the case will be submitted to CDC and the case will be locked for editing. If additional information is received after a case has been placed in “DHSS APPROVED,” you will need to contact NJDHSS to reopen the case. This should be done only if the additional information changes the case status of the report.
3. Every effort should be made to complete the investigation within three months of opening a case. Cases that remain open for three months or more and have no investigation or update notes will be closed by NJDHSS and marked as not a case.

## **6 CONTROLLING FURTHER SPREAD**

### **A. Isolation and Quarantine Requirements (NJAC 8:57-1010)**

None.

### **B. Protection of Contacts of a Case**

None.

### **C. Managing Special Situations**

None.

## **7 OUTBREAK SITUATIONS**

If the incidence of RMSF for an area is higher than expected, increased efforts to educate the public about preventive measures may be undertaken. Measures designed to reduce tick populations in the environment are usually impractical on a large-scale basis.

## 8 PREVENTION MEASURES

### A. Environmental Measures

Advise individuals that prevention of RMSF involves making their yards less attractive to ticks.

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

### B. Personal Preventive Measures

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 light-colored clothing that makes ticks easier to see if they get on you.
- Wear long-sleeved shirts and long pants, and tuck the pant legs into your socks.
- Apply tick repellent (containing DEET or permethrin) according to manufacturer's directions.
- While in tick-infested areas, carefully perform "tick checks" on clothing and skin surfaces every few hours. Check again immediately after returning from the outdoors and before going to bed. Don't overlook some of ticks' favorite hiding places—on the scalp, behind the ears, under the arms, on the ankles, and in the groin.

### C. Tick Removal

- If you find a tick, remove it immediately before it attaches to the skin. Do not handle or crush it with bare hands.
- If a tick has already attached to the skin, use tweezers to grasp it by the head (not just the body) as close to the skin as possible. Pull steadily until the tick dislodges (expect some resistance). Do not twist or jerk the tick, as this may cause the mouthparts to break off and remain in the skin.
- Never squeeze an attached tick, burn it, or cover it with Vaseline or any other substance. These actions can cause tick juices to be forced out of the tick and into the skin.
- After removing a tick, disinfect the bite area and tweezers with alcohol, and wash your hands with soap and hot water.
- Place the tick in a sealed container or small plastic bag and deposit in the trash. Do not flush ticks down the toilet because they can easily survive in the water.
- Contact your healthcare provider for advice if part of the tick remains in the skin after attempted removal.

## Additional Information

An RMSF Fact Sheet can be accessed at [http://nj.gov/health/cd/f\\_rocky.htm](http://nj.gov/health/cd/f_rocky.htm).

CDC's Web site for RMSF is at <http://www.cdc.gov/ncidod/dvrd/rmsf/index.htm>.

CDC's surveillance case definition may be found at [http://www.cdc.gov/epo/dphsi/print/rocky\\_mountain\\_spotted\\_fever\\_current.htm](http://www.cdc.gov/epo/dphsi/print/rocky_mountain_spotted_fever_current.htm).

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