

 The logo for the Missouri Department of Health and Senior Services (DHSS) features a black silhouette of the state of Missouri. Inside the silhouette, the word "Missouri" is written in white at the top, "DHSS" is written in large white letters in the center, and "Department of Health and Senior Services" is written in smaller white text at the bottom.	Division of Community and Public Health	
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## Spotted Fever Rickettsioses

**Case Definition** – [2020 Case Definition - Spotted Fever Rickettsiosis \(SFR, including RMSF\)](#)

### Overview

- **Agents** – Spotted fever rickettsioses (SFR) are caused by a group of closely related bacteria. Rocky Mountain spotted fever (RMSF), caused by *Rickettsia rickettsii*, is the most commonly reported infection from this group in Missouri.
- **Reservoir** – RMSF reservoirs include small mammals, such as rodents and rabbits, and dogs.
- **Occurrence** – RMSF is commonly reported in North, South, and parts of Central America. Within the United States, over 60% of the reported cases each year come from five states: North Carolina, Oklahoma, Arkansas, Tennessee, and Missouri.
- **Risk Factors** – Children aged 5-9, adults aged 40+, and those who are immunocompromised are considered at higher risk and may experience more severe illness. Individuals that spend a lot of time outdoors for work/recreation are also considered at higher risk due to increased tick exposures.
- **Mode of Transmission** – Transmission occurs through the bite of an infected tick. In Missouri, RMSF is transmitted by the American dog tick (*Dermacentor variabilis*) and the brown dog tick (*Rhipicephalus sanguineus*). History of a tick bite is not required, as many individuals do not recall having ticks attached.
- **Incubation Period** – 3-12 days
- **Clinical Illness** – Most individuals that become infected are asymptomatic. If disease develops, it can range from mild febrile illness to severe illness and even death. Commonly reported symptoms are non-specific and include acute onset of fever, headache, malaise, and myalgia. Maculopapular rash occurs in some patients. Rash typically begins on the extremities around day 3 to 5 and moves to the trunk. Laboratory findings may include thrombocytopenia and elevated liver enzymes. Delayed treatment significantly increases the risk of severe illness and death.
- **Laboratory Testing** – Testing for some SFR, specifically RMSF, can be obtained through commercial laboratories. The Missouri State Public Health Laboratory (MSPHL) does not currently conduct tick-borne disease testing. In special cases, arrangements can be made to send specimens for testing to the Centers for Disease Control and Prevention (CDC).
- **Treatment** – Doxycycline is the antibiotic of choice to treat most tick-borne diseases, including SFR. Alternative antibiotics may be used if doxycycline is contraindicated, but use of other antibiotics may not reduce the likelihood of death.
- **Priority** – Routine; SFR should be reported to DHSS within three (3) calendar days of first knowledge or suspicion.

### Quick References / Factsheets

- Health Professionals:
  - [Diagnosis and Management of Tick-Borne Rickettsial Diseases in the United States, A Practical Guide for Health Care and Public Health Professionals](#) (CDC MMWR)

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- [Tick-Borne Diseases of the United States – A Reference Manual for Health Care Providers, 2018](#) (CDC)

### **Forms**

- Disease Case Report (CD-1) [PDF format](#) [Word format](#)
- [2020 Tick-Borne Rickettsial Infection Case Report Form](#) (MO 580-2602)
- [Missouri Outbreak Report Form \(MORF\)](#)

### **Notifications**

- Contact a [District Epidemiology Specialist](#), the [District Senior Epidemiology Specialist](#), or the Missouri Department of Health and Senior Services (MDHSS) – Bureau of Communicable Disease Control and Prevention (BCDCP), phone (573) 751-6113, or for afterhours notification of possible outbreaks of SFR, contact the MDHSS – Emergency Response Center (ERC) at (800) 392-0272 (available 24/7).

### **Reporting Requirements**

- SFR, including RMSF, are Category 3 diseases and shall be reported to the local health authority or to MDHSS within three (3) calendar days of first knowledge or suspicion; for afterhours notification of possible outbreaks of SFR, contact the MDHSS – ERC at (800) 392-0272 (24/7).
- SFR are nationally notifiable conditions in the “Routinely notifiable” reporting category. The MDHSS reports confirmed and probable cases of SFR, including RMSF, to CDC through routine electronic transmission.
- SFR reporting includes the following:
  1. For all cases, complete a [Disease Case Report](#) (CD-1).
  2. For confirmed and probable cases, complete the [2020 Tick-Borne Rickettsial Infection Case Report Form](#) (MO 580-2602).
  3. All outbreaks or suspected outbreaks must be reported as soon as possible (by phone, fax or e-mail) to a [District Epidemiology Specialist or Senior Epidemiology Specialist](#).
  4. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to a [District Epidemiology Specialist or Senior Epidemiology Specialist](#).

### **Laboratory Testing and Diagnosis**

Laboratory confirmation of infection is vital to understanding the epidemiology and public health impact of tick-borne rickettsial diseases (e.g., ehrlichiosis, anaplasmosis, and RMSF). Obtaining paired, appropriately timed acute and convalescent specimens for serological analysis is important for disease surveillance. A single serologic test does not provide the diagnostic strength of paired acute and convalescent specimens.

Routine diagnostic testing for SFR, specifically RMSF, is available through commercial laboratories.

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At this time, the Missouri State Public Health Laboratory (MSPHL) does not perform any tick-borne disease diagnostic testing. In special situations, testing for SFR can be conducted by CDC. All requests from medical providers regarding SFR testing to be performed by CDC should be coordinated through the Office of Veterinary Public Health (OVPH).

Two forms, linked below, are required for each specimen being submitted for testing at CDC. Questions about specimen packaging or shipping can be obtained by calling the Virology Unit at MSPHL at 573-751-3334.

- [MSPHL Virology Test Request Form](#)
- [CDC Specimen Submission Form 50.34](#)

Forms must be completed by the requesting medical provider and should be included with the specimen. Delays in testing will occur if the forms are not completed with key information including onset date, specimen collection date, complete travel history, and full patient information such as name and date of birth.

**Note:** All results will be sent to the state health department. Healthcare providers are asked to notify the state health department of any planned submissions to CDC by calling MSPHL (573-751-3334) or OVPH (573-751-6113).

### **Conducting the Investigation**

1. **Verify the diagnosis.** Contact physician, hospital and/or laboratory as needed to obtain demographic, clinical, and laboratory information needed to verify diagnosis and to proceed with the investigation. Complete both the [Disease Case Report](#) (CD-1) and the [2020 Tick-Borne Rickettsial Infection Case Report Form](#) (MO 580-2602). Demographic variables, such as race and ethnicity, are required.

Determine what laboratory tests were conducted and the results of those tests. In addition to antibody testing, patients may have had complete blood cell count or comprehensive metabolic blood testing done that may indicate anemia, thrombocytopenia, leukopenia, and/or liver enzyme elevation.

Regarding antibody testing, patients may lack detectable antibody titers in the first 7 days of illness. Positive IgG titers or index values can indicate a past infection or early response to a current infection. IgM tests are not always specific and IgM response may be persistent for months. For these reasons, IgM titers or index values without detectable IgG response should be interpreted with caution.

2. **Establish the extent of illness.** Investigation should consider family members, pets, and other contacts that have or have recently had a febrile illness and shared environmental exposures with the patient.

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**3. Establish the source of infection.** Prior to symptom onset:

- What was the patient’s travel history?
- Are there household or workplace contacts with a similar illness?
- Was the patient’s arthropod exposure (e.g., mosquito/tick bites) in-state, out-of-state, or out-of-country?
- Rule out non-arthropod transmission pathways (which may fall outside the two week timeframe):
  - Does case work in laboratory or clinical setting?
  - Is case a neonate, pregnant, or breast feeding?
- If the patient is a recent organ, tissue (e.g., corneas, skin), or blood donor or recipient (within the last 30 days):
  - Notify the Bureau of Communicable Disease Control and Prevention (BCDCP) or Office of Veterinary Public Health (OVPH).
  - Assure relevant partners have been notified (blood collection agencies, hospitals, CDC, other health departments).
  - Determine the patient/donor identification numbers for any blood products/organs received.
  - Assure quarantine of remaining co-component blood or tissues.
- If necessary, investigate recipients of transfused co-components from implicated donation and other potentially contaminated donations from implicated donor(s).

**Control Measures**

In the United States, there is currently no licensed vaccination to prevent SFR. Even with a reported tick exposure or attachment, treatment for SFR is not indicated unless compatible symptoms develop. Prophylactic antibiotic treatment has not been demonstrated to prevent infection from occurring and may prolong the onset of symptoms in some patients. Contact follow-up is not required after a reported infection because SFR are not transmitted person-to-person.

**Tick Bite Prevention:**

- Avoid tick habitat during the peak time of year (generally April through September).
- Use insect repellent with at least 20% DEET, picaridin, or other EPA-registered active ingredients labeled for ticks to offer the best protection against tick bites.
  - The American Academy of Pediatrics has recommended that repellents containing up to 30% DEET are safe to use on children over 2 months of age.
- Wear clothing that will help protect your skin from ticks, such as long sleeves and pants.
- Check frequently for ticks and remove them promptly.
- Consider applying permethrin to clothing, boots, and gear when spending time in tick habitat. Permethrin binds tightly to fabric and will remain effective after multiple washings.
  - This product should not be applied directly to the skin. Product directions and labels should be read carefully before use.

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### **Resources**

1. American Academy of Pediatrics. [Rocky Mountain Spotted Fever]. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. *Red Book: 2018 Report of the Committee on Infectious Diseases*. 31<sup>st</sup> ed. Itasca, IL: American Academy of Pediatrics; 2018: [697-700]
2. American Academy of Pediatrics. [Rickettsial Diseases]. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. *Red Book: 2018 Report of the Committee on Infectious Diseases*. 31<sup>st</sup> ed. Itasca, IL: American Academy of Pediatrics; 2018: [693-696]
3. American Public Health Association. [Rickettsioses]. In: Heymann DL, ed. *Control of Communicable Diseases Manual*. 20<sup>th</sup> ed. Washington, DC: American Public Health Association; 2015 [514-520]
4. Centers for Disease Control and Prevention. Rocky Mountain Spotted Fever. <https://www.cdc.gov/rmsf/> (12/19)
5. Centers for Disease Control and Prevention. Other Spotted Fever Group Rickettsioses. <https://www.cdc.gov/other spotted fever/> (12/19)