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	<b>Section: 4.0 Diseases or Conditions</b>	10/2024
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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, 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** – People of all ages can be infected. However, children, adults aged 40+, and those who are immunocompromised are considered at higher risk. Individuals in the higher risk categories can experience more severe illness. Individuals who spend a lot of time outdoors for work or 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 primarily transmitted by the American dog tick (*Dermacentor variabilis*) but the brown dog tick (*Rhipicephalus sanguineus*) can also transmit it. 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 who 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 and is a later sign of illness. 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 tickborne disease testing. In some cases, arrangements can be made to send specimens to CDC for testing.
- **Treatment** – Doxycycline is the antibiotic of choice to treat most tickborne 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.

#### Quick References / Factsheets

- Health Professionals:

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- [Diagnosis and Management of Tickborne Rickettsial Diseases: Rocky Mountain Spotted Fever and Other Spotted Fever Group Rickettsioses, Ehrlichioses, and Anaplasmosis – United States \(CDC MMWR\)](#)
- [Tickborne Diseases of the United States – A Reference Manual for Health Care Providers, Sixth Edition, 2022 \(CDC\)](#)
- eLearning Course (CDC): [Rocky Mountain Spotted Fever: Clinical Diagnosis & Treatment](#)
- [Healthcare Provider Toolkit](#) (CDC)
  - Includes links to a physician pocket card, additional training videos, and publications

### **Forms**

- Disease Case Report (CD-1) [PDF format](#) [Word format](#)
- [Tickborne Rickettsial Disease Case Report](#)
- [Missouri Outbreak Report Form \(MORE\)](#)


### **Reporting Requirements**

- SFR, including RMSF, are Category 3 diseases and shall be reported to the local health authority or to the MDHSS within three (3) calendar days of first knowledge or suspicion.
- 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 [Tickborne Rickettsial Disease Case Report](#).
  3. All outbreaks or suspected outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the [District Epidemiologists](#).
  4. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the [District Epidemiologists](#).

### **Laboratory Testing and Diagnosis**

Laboratory confirmation of infection is vital to understanding the epidemiology and public health impact of tickborne rickettsial diseases (e.g., ehrlichiosis, anaplasmosis, and Rocky Mountain spotted fever). 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. At this time, the Missouri State Public Health Laboratory (MSPHL) does not perform any tickborne disease diagnostic testing. In special situations, testing for SFR can be

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conducted by CDC. All requests from medical providers regarding SFR testing to be performed by CDC should be coordinated through the Zoonotic Disease Program (ZDP).


### **Conducting the Investigation**

1. **Verify the diagnosis.** What laboratory tests were conducted, and what were the results? Obtain demographic, clinical, and laboratory information on the case from the provider, laboratory, and/or patient. Complete both the [Disease Case Report](#) (CD-1) and the [Tickborne Rickettsial Disease Case Report](#).

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. If the patient was hospitalized during their illness, verify the availability of these results as part of the investigation.

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 specific, and detectable IgM may persist for months or longer. For these reasons, IgM titers or index values without detectable IgG response should be interpreted with caution.

2. **Establish the extent of illness.** The investigation should consider family members, pets, and other contacts who have or have recently had a febrile illness and shared environmental exposures with the case.
3. **Establish the source of infection.** Prior to symptom onset:
  - What was the case’s travel history (including specific travel dates)?
  - Are there household or other contacts with a similar illness?
  - Was the case’s tick exposure in-state, out-of-state, or out-of-country?
  - Rule out non-tick transmission pathways (which may fall outside the two-week timeframe):
    - Does the case work in a laboratory or clinical setting?
    - Is the case a neonate, pregnant, or breastfeeding?
    - Has the case recently received any blood, blood products, tissues, or organs?
  - If the case is a recent organ, tissue (e.g., corneas, skin), or blood donor or recipient within the last 30 days:
    - Notify the Zoonotic Disease Program.
    - Assure relevant partners (blood collection agencies, hospitals, etc.) have been notified.
    - Determine the patient/donor identification numbers and any other available details regarding blood products/organs received.
    - Assure quarantine of any remaining co-component blood or tissues.
  - If necessary, investigate all recipients of transfused co-components from the implicated donation and other potentially contaminated donations from implicated donor(s).

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## **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 recommended by CDC unless compatible symptoms develop. Prophylactic antibiotic treatment in the absence of symptoms has not been demonstrated to prevent infection from occurring and may prolong the onset of symptoms in some patients. Aside from cases associated with blood donation, tissue, or organ transplants, contact tracing is not required because SFR infections are not transmitted person-to-person.

The best way to avoid infection with SFR is to avoid tick bites. Key personal prevention methods for avoiding tick bites include:

- Whenever possible, avoid tick habitat during the peak time of year when ticks are most active (generally April through September). Ticks are generally found in areas with tall grass, brush or in heavily wooded areas. However, they can also be present in neighborhoods and backyards.
- Use an insect repellent product with at least 20% DEET, picaridin, or other EPA-registered active ingredients labeled specifically for ticks.
  - 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.
  - For other active repellent ingredients, check the product label for minimum age requirements before applying to children.
  - EPA offers an [insect repellent search tool](#) that the public can use to identify repellent products that work best for their needs.
- Weather-permitting, wear long sleeves and pants to help reduce the amount of exposed skin. This will make it harder for ticks to find a place to attach.
  - Wearing light-colored clothing can make it easier to spot ticks that may be crawling on clothing when you are outdoors.
- Consider applying permethrin to clothing, boots, and outdoor 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.
  - Items such as shirts, pants, and socks that have been pre-treated with permethrin can also be purchased through many outdoor retailers.
- After returning indoors, shower as soon as possible and do a thorough full-body check for ticks. If any ticks are attached, remove them as soon as possible.
  - Don't forget to check pets for ticks as well!

## **Resources**

1. American Academy of Pediatrics. [Rocky Mountain Spotted Fever]. In: Kimberlin DW, Barnett, ED, Lynfield, R, Sawyer, MH, eds. *Red Book: 2021 Report of the Committee on Infectious Diseases*. 32<sup>nd</sup> ed. Itasca, IL: American Academy of Pediatrics; 2021: [641-644]

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2. American Public Health Association. [Rickettsioses]. In: Heymann DL, ed. *Control of Communicable Diseases Manual*. 21<sup>st</sup> ed. Washington, DC: American Public Health Association; 2022 [542-552]
3. Centers for Disease Control and Prevention. Rocky Mountain Spotted Fever. <https://www.cdc.gov/rocky-mountain-spotted-fever/about/index.html> (7/24)
4. Centers for Disease Control and Prevention. Other Spotted Fever Group Rickettsioses. <https://www.cdc.gov/other-spotted-fever/about/> (7/24)