

PUBLIC HEALTH REFERENCE SHEET

Spotted Fever Rickettsiosis



Name	<i>Rickettsia</i> species INCLUDES: Rocky Mountain spotted fever, Pacific Coast tick fever, African tick-bite fever, and others EXCLUDES: <i>Rickettsia prowazekii</i> and <i>Rickettsia typhi</i> . See Typhus Fever case definition
Reservoir & Transmission	Variety of tick species, rodents, domestic and wild ruminants (e.g., cattle, sheep), dogs Arthropod vectors (fleas, lice, mites, ticks)
Incubation Period	2–21 days
Common Symptoms	Spotted Fever group <i>Rickettsiae</i> (SFGR) are illness characterized by fever (reported by the patient or provider) and one or more of the following: rash, eschar, headache, myalgia, anemia, thrombocytopenia, or any hepatic transaminase elevation (AST or ALT). The macular or maculopapular rash appears on the fourth to seventh days following fever onset in most patients, often present on the palms and soles.
Gold Standard Diagnostic Test	Indirect immunofluorescence antibody (IFA) assay for serological diagnosis confirmation
Risk Groups	alcoholism, glucose-6-phosphate dehydrogenase (G6PD) deficiency, or immunocompromise
Geographic Significance	Worldwide Rocky Mountain spotted fever: throughout the U.S.; Argentina, Brazil, Canada, Colombia, Mexico, and Central America <i>Rickettsia parkeri</i> rickettsiosis: coastal regions of southeastern U.S.; southern South America

What is spotted fever rickettsiosis?

Spotted Fever group *Rickettsiae* (SFGR) are bacterial diseases caused by the species of the genus *Rickettsia*. Since 2010, cases are reported in the category spotted fever rickettsiosis.

What is the occurrence of spotted fever rickettsiosis?

SFGR occur world-wide. Rocky Mountain spotted fever (RMSF) occurs across the U.S., in Argentina, Brazil, Canada, Colombia, Mexico, and Central America. In most of the U.S., infections occur primarily from April through September, mainly in the southeast and south-central regions; highest incidence rates are seen in North Carolina and Oklahoma; in the southwest, cases occur year-round with most reported March–November.

How is spotted fever rickettsiosis transmitted?

Most spotted fever infections are transmitted by ixodid (hard) ticks, which are widely distributed throughout the world. Contamination of breaks in the skin or mucous membranes, feces of the tick, or aerosolized particles in the case of RMSF, may also lead to infection. The disease is not directly transmitted from person-to-person. Household clusters may occur because of the possible proximity to the infected tick population. Animal hosts include dogs, rodents, and domestic and wild ruminants (e.g., deer).

Who is at risk for spotted fever rickettsiosis?

Susceptibility is general. Risk factors for severe or fatal outcome include young or advanced age, alcoholism, G6PD deficiency, or immunocompromise. Fatal outcome can occur in previously healthy people of all ages in severe diseases such as RMSF.

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

PUBLIC HEALTH REFERENCE SHEET

Spotted Fever Rickettsiosis



What are the signs and symptoms of spotted fever rickettsiosis?

SFGR illnesses are a closely related group of primarily tickborne bacterial infections causing clinically similar diseases, which are characterized by sudden onset of moderate to high fever and one or more of the following: rash, eschar, headache, myalgia, anemia, thrombocytopenia, or any hepatic transaminase elevation. The macular or maculopapular rash, often present on the palms and soles, may appear a few days following fever onset in most patients. A primary lesion or eschar, which is a small ulcer 2–5 mm in diameter with a black center and red areola, may occur at the site of a tick bite and become evident at the onset of fever.

What are potential complications of spotted fever rickettsiosis?

Although clinical presentations and severity vary by species, some spotted fever infections can be associated with multiorgan involvement such as respiratory failure, hepatosplenomegaly, heart failure, renal failure, bleeding, and neurological complications. In the absence of treatment, the diseases can be fatal.

How is spotted fever rickettsiosis diagnosed?

Most routine laboratory tests are unable to distinguish between Rocky Mountain Spotted Fever (RMSF) and rickettsial diseases caused by other, antigenically similar spotted fever group *Rickettsia* species such as *R. parkeri* and *Rickettsia 364D*.

The indirect immunofluorescence antibody assay (IFA) is the gold standard for serological diagnosis confirmation. Serological diagnosis is confirmed by a four-fold or greater rise in specific antibody (immunoglobulin class G [IgG]) titer when comparing acute and convalescent-phase serum samples. The acute sample should be taken in the first week of illness and the convalescent should be taken 3–4 weeks after the acute sample. IFA tests become positive generally in the second to third week of illness. An acute titer taken in the first week of illness should be used as a baseline for comparison to the convalescent sample, and a negative acute result does not rule out active infection, nor does a positive acute result confirm the diagnosis. A four-fold rise in titer should not be excluded as confirmatory laboratory criteria if the acute and convalescent specimens are collected within 2 weeks of one another. Older Weil-Felix tests using *Proteus* OX-19 and *Proteus* OX-2 antigens are less sensitive and less specific and are not recommended. During acute stages of infection and prior to doxycycline treatment, rickettsiae may sometimes be detected by polymerase chain reaction (PCR) in blood and serum. Detection can be achieved in skin biopsies using immunostains or PCR. Culturing blood or buffy coats on cell culture monolayers permits isolation of the organisms and facilitates precise confirmatory diagnosis.

How is spotted fever rickettsiosis treated?

Doxycycline is the treatment of choice for all suspected rickettsial infections. Empiric treatment with doxycycline is recommended in patients of all ages, particularly when a life-threatening disease such as RMSF is suspected. Treatment is most effective at preventing death and severe illness when doxycycline is started within the first 5 days of symptoms. When treated within the first 5 days of illness, fever generally subsides within 24–48 hours. Severely ill patients may require longer periods before their fever resolves, especially if they have experienced damage to organ systems. Resistance to doxycycline or relapses in symptoms after the completion of the recommended course of treatment have not been documented. In cases of RMSF, use of antibiotics other than doxycycline increases the risk of severe illness and patient death. Post-tick bite antibiotic prophylaxis is not recommended to prevent rickettsial infection.

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

PUBLIC HEALTH REFERENCE SHEET

Spotted Fever Rickettsiosis



How can spotted fever rickettsiosis be prevented?

There is not a vaccine to prevent spotted fever rickettsiosis. SFGR infections can occur in clusters due to similar environmental exposures. Notify people identified in a cluster to be alert for symptoms and be treated if they become febrile. Treat homes, yards, and pets with acaricide containing products if ticks are present. Prevent tick exposure using DEET repellent on skin, treating clothing/gear with permethrin, and using tick prevention products (tick collars, shampoo, top spot medications) on pets. Tick removal devices are available on the market, but fine-tipped tweezers work well. Directions for how to remove a tick and visualization of this process is at <https://www.cdc.gov/lyme/removal/index.html>.

Department of Defense (DoD) Military Tick Identification/Infection Confirmation Kit (MiTICK) is a free tick testing and identification service available for ticks removed from DoD personnel and beneficiaries. Ticks will be identified to species, assessed for how long they have been attached, and tested for pathogens. For additional information, or to request tick kits or services, contact the Tick-borne Disease Laboratory by phone: 410-436-5421 or 410-436-5425 by email: dha.apg.pub-health-a.mbx.tickcom@health.mil or <https://ph.health.mil/topics/envirohealth/epm/Pages/HumanTickTestKitProgram.aspx>.

What are some public health considerations?

- Since 2010, cases are reported in the category spotted fever rickettsiosis. Most routine laboratory tests are unable to distinguish between RMSF and rickettsial diseases caused by other, antigenically similar spotted fever group Rickettsia species such as *R. parkeri*, *R. akari*, and *Rickettsia 364D*. <https://www.cdc.gov/other spotted fever/info/index.html>
- There can be antibody cross-reactivity between spotted fever and typhus group antigens. In cases where antibody titers are positive for both diseases, report the case under the disease most consistent with the case's clinical presentation, exposure history, and travel history.
- When reporting SFGR in the Disease Reporting System, internet (DRSi)—
 - A person previously reported as a probable or confirmed case may be reported as a new case when there is an episode of new clinically compatible illness with confirmatory laboratory evidence.
 - Document relevant travel and deployment history occurring within the 14 days prior to symptom onset.
 - Document potential occupational/high-risk exposure (outdoor activity, camping, hunting, field exercise, mission/duty related, etc.) to known arthropods.

References:

Defense Health Agency. 2022. *Armed Forces Reportable Medical Events: Guidelines and Case Definitions*.

<https://www.health.mil/Reference-Center/Publications/2022/11/01/Armed-Forces-Reportable-Medical-Events-Guidelines>

“Entomology and Pest Management,” Defense Centers for Public Health—Aberdeen (DCPH-A), last modified April 17, 2023.

<https://ph.health.mil/topics/envirohealth/epm/Pages/default.aspx>

Heymann, David L. ed. 2022. *Control of Communicable Diseases Manual*. 21st Edition. Washington, DC: APHA Press.

“Imported Spotted Fevers,” Centers for Disease Control and Prevention (CDC), last reviewed January 18, 2019. <https://www.cdc.gov/other spotted fever/imported/index.html>

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

PUBLIC HEALTH REFERENCE SHEET

Spotted Fever Rickettsiosis



“Other Spotted Fever Group Rickettsioses,” Centers for Disease Control and Prevention (CDC), last reviewed March 29, 2021.

<https://www.cdc.gov/other spotted fever/healthcare-providers/index.html>

“Rickettsial Diseases,” Centers for Disease Control and Prevention (CDC), last reviewed May 1, 2023.

<https://wwwnc.cdc.gov/travel/yellowbook/2024/infections-diseases/rickettsial-diseases>

“Rocky Mountain Spotted Fever (RMSF),” Centers for Disease Control and Prevention (CDC), last reviewed August 5, 2022.

<https://www.cdc.gov/ticks/tickbornediseases/rmsf.html>

“*Rickettsia parkeri* Rickettsiosis,” Centers for Disease Control and Prevention (CDC), last reviewed August 5, 2022.

<https://www.cdc.gov/ticks/tickbornediseases/index.html>

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.