PENNSYLVANIA DEPARTMENT OF HEALTH
2025 – PAHAN – 800 – 07 -22 - ADV

Rocky Mountain Spotted Fever (RMSF) and Spotted Fever Rickettsiosis (SFR) in Pennsylvania

DATE:	July 22, 2025
TO:	Health Alert Network
FROM:	Debra L. Bogen, M.D., FAAP, Secretary of Health
SUBJECT:	**Rocky Mountain Spotted Fever (RMSF) and Spotted Fever Rickettsiosis (SFR) in Pennsylvania**
DISTRIBUTION:	Statewide
LOCATION:	N/A
STREET ADDRESS:	N/A
COUNTY:	N/A
MUNICIPALITY:	N/A
ZIP CODE:	N/A

This transmission is a "Health Advisory" which provides important information for a specific incident or situation; may not require immediate action.

HOSPITALS: PLEASE SHARE WITH ALL MEDICAL, PEDIATRIC, NURSING AND LABORATORY STAFF IN YOUR HOSPITAL**; EMS COUNCILS:** PLEASE DISTRIBUTE AS APPROPRIATE; **FQHCs:** PLEASE DISTRIBUTE AS APPROPRIATE **LOCAL HEALTH JURISDICTIONS**: PLEASE DISTRIBUTE AS APPROPRIATE; **PROFESSIONAL ORGANIZATIONS:** PLEASE DISTRIBUTE TO YOUR MEMBERSHIP; **LONG-TERM CARE FACILITIES:** PLEASE SHARE WITH ALL MEDICAL, INFECTION CONTROL, AND NURSING STAFF IN YOUR FACILITY

Summary

- Spotted fever rickettsioses (SFR), including Rocky Mountain spotted fever (RMSF), are tickborne diseases commonly seen in PA in May through August.
- A suspect case of RMSF based on symptoms consistent with RMSF should be treated immediately. Do not wait for results of testing.
- Serology alone cannot show current evidence of SFR disease. Due to elevated titers in healthy populations and cross reactivity between rickettsial species, both consistent symptoms and confirmatory testing should be used to confirm SFR in a patient.
- Contact Pennsylvania Department of Health (DOH) or your local health department to coordinate PCR testing in cases that may be consistent with SFR, but confirmation is needed.
- If you have any questions, please call DOH at 877-PA-HEALTH (877-724-3528) or your local health department.

Background

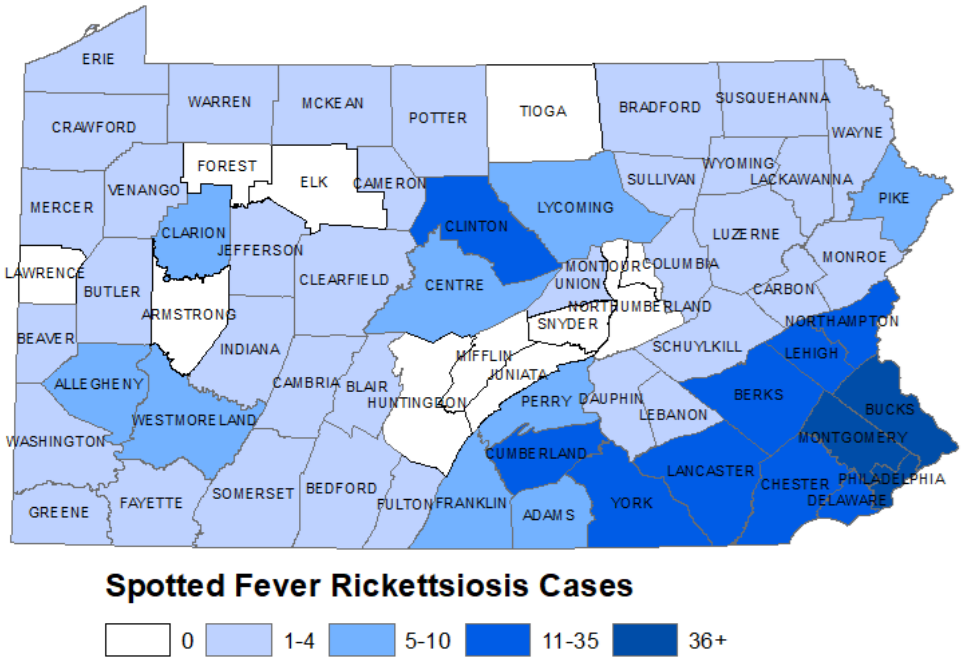
The Pennsylvania Department of Health (DOH) has noted an increase in Rocky Mountain spotted fever (RMSF) testing, although case counts remain low and stable. DOH is releasing the following information regarding RMSF, a type of spotted fever rickettsiosis (SFR).

SFR is a group of diseases caused by spotted fever group *Rickettsiae* (SFGR). In Pennsylvania, there are multiple documented species of *Rickettsia*:

- *Rickettsia rickettsii* (transmitted by *Dermacentor variablis*, the American dog tick), that can cause RMSF. Dog ticks are found throughout Pennsylvania, but *Rickettsia rickettsii* infected dog ticks are rare.
- *Rickettsia parkeri* (transmitted by *Amblyomma maculatum*, the Gulf Coast tick), that can cause *R. parkeri* rickettsiosis. Gulf Coast tick populations have been documented by the Pennsylvania Department of Environmental Protection (DEP) in the southeast region of the state. About half of the Gulf Coast ticks identified in southeast Pennsylvania are infected with *R. parkeri*.
- *Rickettsia prowazekii* in flying squirrels, that can cause sylvatic typhus. Typhus outbreaks due to flying squirrels have been documented in the southcentral region of Pennsylvania. Additional information: Sylvatic Typhus Fact Sheet [1]
- *Rickettsia akari* (transmitted by *Liponyssoides sanguineus*, the house mouse mite), that can cause Rickettsialpox. Unlike other SFR, infected mouse mites rather than ticks spread *R. akari*. Cases are most likely to occur in urban settings.

Map 1 shows the county locations of reported SFR cases in Pennsylvania between 2000 and 2024. Most cases (55.6%) are reported in the southeast region of Pennsylvania including Berks, Bucks, Chester, Delaware, Lancaster, Montgomery and Philadelphia counties.

Map 1 – Confirmed and Probable Spotted Fever Rickettsiosis Cases in Pennsylvania, 2000-2024



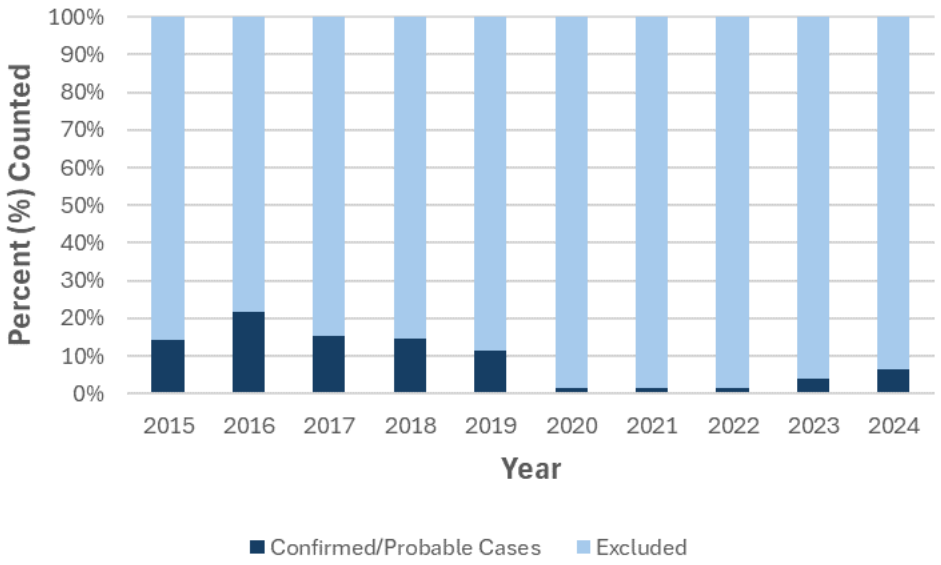
Serology testing conducted by a commercial laboratory can tell us if someone has been exposed to a rickettsial species but cannot confirm current infection with RMSF. IgG antibodies to SFR can remain elevated for months to years following infection. Two serologic tests conducted 2–10 weeks apart are

needed to demonstrate at least a four-fold increase in IgG antibody titer to determine if antibodies are from a recent or past exposure.[2]

Antibodies of closely related rickettsial species may also cross-react. Antibodies to *R. rickettsii* may indicate exposure to other spotted fever group rickettsia, including those that are less pathogenic or non-pathogenic.

The case definition for SFR and RMSF changed in 2020;[3] one change was an increase in the titers needed to be considered a case. High rates of *Rickettsia* spp. seropositivity were detected in a healthy population, indicating that well persons may test positive for *Rickettsia* spp, including RMSF, by serology, but titers are likely to be lower than in an acute infection.[4] Prior to 2020, the average percent of positive reports that were counted as cases was about 15%. Following the 2020 case definition change, the percent of positive reports that can be counted as cases in PA averaged 3%. Figure 1 shows the rate of confirmed and probable cases out of total positive laboratory reports received by DOH from 2015 through 2024.

Figure 1 – Percent of Confirmed/Probable Cases Out of Total Positive Laboratory Reports to DOH, 2015-2024



*Spotted fever rickettsiosis 2010 case definition used for 2015-2019.[5] Spotted fever rickettsiosis 2020 case definition used for 2020-2024.

Overview for Health Care Providers

Remember that tick bites are usually painless and many people do not remember being bitten. Even if a patient does not recall a tick bite, consider tickborne infection in the differential diagnosis. Ask about exposures to wooded areas or areas with high grasses as well as exposures to pets who spend time outdoors. Also, consider exposures to house mice or rodents given the potential for rickettsialpox, particularly in urban areas.

SFR disease can be mild or fatal. RMSF can rapidly progress to serious and deadly illness. Early treatment with doxycycline is essential when RMSF is suspected and is the recommended treatment for all SFR. Delaying treatment may result in severe illness and death.

RMSF Symptoms

The incubation period of RMSF is 3–12 days. Early signs and symptoms (1–4 days) include high fever, severe headache, malaise, muscle pain, swelling around eyes and on the back of hands, and gastrointestinal symptoms including nausea, vomiting, and lack of appetite.

A rash usually appears 2–5 days following symptom onset. The decision to treat should not be based on presence of rash, since roughly 10% of patients do not develop rash and rash may not develop until several days after symptom onset. Early rash is maculopapular, consisting of flat, pink, non-itchy spots (macules) that may first appear on the wrists, forearms, and ankles. They then spread to the trunk and may spread to the palms of hands and soles of feet. Late rash is red to purple spots (petechiae) that do not appear until day 6 or later after symptom onset.

Petechial rash indicates severe disease progression. Every attempt should be made to begin treatment before petechiae develop. The untreated case fatality rate is 20–30%. Empiric treatment with doxycycline should be started as soon as RMSF is suspected and should not depend on lab testing results due to the rapidly increasing severity of RMSF.

Late signs and symptoms (5 days and beyond) include altered mental status, coma, cerebral edema, respiratory compromise, necrosis that may require amputation or skin grafts, and multiorgan system damage.

Laboratory findings may include thrombocytopenia, elevated hepatic transaminases, and hyponatremia.

Factors that may increase risk of severe illness include delayed treatment, age below 10 years, and glucose-6-phosphate dehydrogenase (G6PD) deficiency. While fewer than 6% of cases of RMSF occur in children under 10 years of age, 22% of deaths occur in this age group.

Other SFR Symptoms

It can be difficult to distinguish between RMSF and other SFR in the early stages of disease

R. parkeri rickettsiosis and RMSF have similar incubation periods and signs and symptoms, though *R. parkeri* rickettsiosis and rickettsialpox are less severe than RMSF. There is usually an eschar (necrotic lesion) at the site where the tick was attached. Several days after the eschar appears, additional symptoms may include fever, headache, rash, and muscle aches. Rash is often described as maculopapular or vesicular on the trunk, arms, and legs.

Note that eschar is uncommon in RMSF.

Laboratory findings may also include mild elevations in hepatic transaminases, mild leukopenia, or less commonly, mild thrombocytopenia.

RMSF and SFR Testing

- **Serology**: A four-fold or greater increase in IgG-specific antibody titer by indirect immunofluorescence antibody (IFA) assay in paired serum samples collected 2–10 weeks apart.
  - Collect the first sample (acute) within the first 2 weeks of illness or while the patient is still symptomatic.
  - Collect the second sample (convalescent) 2 to 10 weeks later.
  - Antibody titers may be negative in the first week of illness. RMSF cannot be confirmed using single acute antibody results.

    - IgM is less specific than IgG. IgM alone should not be used to diagnose SFR.
- **PCR**: DNA detected in a skin biopsy specimen of a rash lesion by PCR assay or an acute phase whole blood specimen.
    - Collect PCR samples within the first 2 weeks of illness, while the patient is still symptomatic.
    - Pan-Rickettsia and R. rickettsii-specific PCR assays are available through the CDC.
    - If confirmation of SFR is needed, contact DOH at 877-PA-HEALTH (877-724-3528) or your local health department (if in Philadelphia: Philadelphia Department of Public Health, 215-685-6741) to coordinate PCR testing.
- **IHC and Culture**: Immunohistochemical (IHC) staining from skin or tissue biopsy specimen.
    - Culture and IHC assays of *R. rickettsii* are available from specialized laboratories only.

For a chart comparing serology and PCR testing, see CDC's Rickettsial Disease Diagnostic Testing and Interpretation Fact Sheet [6]

RMSF and SFR Treatment

RMSF and SFR are treated with the antibiotic doxycycline. Treatment should be started as soon as RMSF is suspected and should not depend on lab testing results due to the rapidly increasing severity of RMSF.

Doxycycline treatment should start within five days of symptoms onset. Fever should resolve in 1–3 days following treatment initiation. Doxycycline is recommended in patients of all ages and pregnant women. In case of severe doxycycline allergy, inpatient rapid desensitization may need to be considered. Severely ill patients may require a longer treatment duration.

Note that doxycycline is the first-line treatment in children when RMSF is suspected and is recommended by both CDC and the American Academy of Pediatrics Committee on Infectious Diseases. No evidence of tooth staining has been shown at the dose and duration used to treat RMSF. For more information, see CDC's information about Doxycycline and Tooth Staining [7]

Doxycycline treatment in persons who have a single positive rickettsial serology and inconsistent symptoms is unlikely to be therapeutic and may cause unwanted side effects. Given the background positivity rate of rickettsial serology in a healthy population, patients presenting with symptoms that are not consistent with rickettsial disease are unlikely to have a rickettsial disease even with a positive serology. Treatment with doxycycline will likely not be effective and other diagnoses should be considered.

For additional information about SFR and RMSF clinical presentation, diagnosis, and treatment, see CDC's Tickborne Diseases of the United States Reference Manual for Healthcare Providers [8]

RMSF and SFR Recommendations

1. A suspect case of RMSF based on symptoms consistent with RMSF should be treated immediately. Do not wait for results of testing. Deterioration is rapid and may result in severe outcomes including death if treatment is not started immediately.
2. Order testing if your patient has symptoms that are consistent with RSMF or SFR. Testing may help determine if a patient has another SFR that may need treatment.
3. A positive IgM and low IgG titers in persons exhibiting symptoms that are not consistent with SFR are unlikely to have SFR. Further testing and consideration of other diagnoses should be conducted.

4. Doxycycline treatment in persons who have a single positive serology and inconsistent symptoms is unlikely to be therapeutic and may cause unwanted side effects. Other diagnoses should be considered.
5. Contact DOH at 877-PA-HEALTH (877-724-3528) or your local health department to coordinate PCR testing in cases that may be consistent with SFR, but confirmation is needed.

For More Information about RMSF

- Rocky Mountain Spotted Fever Fact Sheet [9]
- CDC's Rocky Mountain Spotted Fever Healthcare Providers Toolkit [10]
- CDC's Data and Statistics on Spotted Fever Rickettsiosis: Rocky Mountain Spotted Fever (RMSF) [11]

For More Information about SFR

- CDC's Tickborne Diseases of the United States Reference Manual for Healthcare Providers
- Spotted Fever Rickettsiosis (including Rocky Mountain Spotted Fever) (SFR, including RMSF) 2020 Case Definition

Citations

1 https://www.pa.gov/content/dam/copapwp-pagov/en/health/documents/topics/documents/diseases-and-conditions/Sylvatic%20Typhus%20.pdf
2 https://www.cdc.gov/rocky-mountain-spotted-fever/hcp/diagnosis-testing/index.html
3 https://ndc.services.cdc.gov/case-definitions/spotted-fever-rickettsiosis-2020/
4 Straily A, Stuck S, Singleton J, et al. Antibody Titers Reactive With *Rickettsia rickettsii* in Blood Donors and Implications for Surveillance of Spotted Fever Rickettsiosis in the United States. *J Infect Dis*. 2020;221(8):1371-1378. doi:10.1093/infdis/jiz316
5 https://ndc.services.cdc.gov/case-definitions/spotted-fever-rickettsiosis-2010/
6 https://www.cdc.gov/rocky-mountain-spotted-fever/media/pdfs/2024/05/rickettsial-disease-diagnostic-testing-and-interpretation-fs-508_1.pdf
7 https://www.cdc.gov/rocky-mountain-spotted-fever/hcp/data-research/index.html
8 https://www.cdc.gov/ticks/hcp/data-research/tickborne-disease-reference-guide/index.html
9 https://www.pa.gov/content/dam/copapwp-pagov/en/health/documents/topics/documents/diseases-and-conditions/vectorborne/Rocky%20Mountain%20Spotted%20Fever.pdf
10 https://www.cdc.gov/rocky-mountain-spotted-fever/hcp/toolkit/index.html
11 https://www.cdc.gov/rocky-mountain-spotted-fever/data-research/facts-stats/index.html

For questions, please call your local health department or the DOH at 877-PA HEALTH (1-877-724-3258).

Individuals interested in receiving future PA-HANs can register at:
https://ondemand.mir3.com/han-pa-gov/login/

Categories of Health Alert messages:
Health Alert: conveys the highest level of importance; warrants immediate action or attention.
Health Advisory: provides important information for a specific incident or situation; may not require immediate action.
Health Update: provides updated information regarding an incident or situation; unlikely to require immediate action.

This information is current as of July 22, 2025, but may be modified in the future.