



Spotted Fever Group Rickettsiosis

3/30/2026

REPORT CONFIRMED CASES BY THE NEXT BUSINESS DAY

Local health officers shall report confirmed cases by the close of the next business day to NJDOH by electronic reporting (CDRSS).

1 PURPOSE OF DOCUMENT

This document is intended to be a guide for local health departments conducting public health investigations.

2 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Spotted fever group rickettsioses (SFGR) are a group of diseases caused by closely related bacteria spread to people through the bites of infected ticks and mites. In the United States, the most serious and commonly reported spotted fever group rickettsiosis is Rocky Mountain Spotted Fever (RMSF), caused by *Rickettsia rickettsii*. Less serious spotted fevers include: *Rickettsia parkeri* rickettsiosis, caused by *R. parkeri*, Pacific Coast Fever, caused by *Rickettsia* species 364D, and rickettsialpox, caused by *R. akari*. The burden and distribution of each of the various rickettsioses remains unclear and serologic assays are not able to distinguish between SFGR species.

B. Clinical Description

Spotted fevers can range from relatively mild infections to fatal disease. Infections caused by *R. parkeri*, *R. species 364D*, or *R. akari* are characteristically less severe than RMSF. Hospitalizations occur less frequently from these spotted fevers and deaths have not been reported. Some patients may resolve without treatment.

Similar to *R. rickettsii*, *R. parkeri*, *R. species 364D*, and *R. akari* cause acute febrile illnesses often accompanied by headache, myalgia, and rash, but are also likely to have ulcerated, necrotic regions at the site of tick or mite attachment, called eschars. Eschars often appear before the onset of fever and can be non-tender or mildly tender. Clinical indicators such as thrombocytopenia (low platelet count), hyponatremia (low serum sodium), or mild to moderately elevated levels of hepatic transaminases can be helpful predictors of spotted fever infection but may not be present in all patients, particularly those in early stages of illness.

RMSF is a rapidly progressing illness, which, when left untreated, can lead to widespread vasculitis, resulting in death, even in previously healthy individuals. Untreated case fatality rates may be up to 20-25%. Early treatment is the best way to reduce the likelihood of severe disease or fatal outcome for patients of all ages.

Early signs and symptoms of RMSF can be non-specific and include a sudden onset of fever, headache, myalgia and fatigue. Gastrointestinal symptoms (nausea, vomiting, diarrhea, abdominal pain) may also be present. While most (90%) people with RMSF have some type of rash during the course of illness, less than 50% of patients have a rash during the first 3 days of illness, when most people first seek medical care. Rash typically begins on the wrists and ankles and spreads to the palms, soles and much of the body. Later signs and symptoms include multi-

organ failure, septic shock, meningoencephalitis, necrosis of digits and limbs, severe thrombocytopenia and hyponatremia. There is no evidence that *R. rickettsii* causes persistent or chronic disease.

C. Treatment

Early recognition and treatment with doxycycline is critical to survival. Doxycycline is the treatment of choice for all suspected tickborne rickettsial infections in patients of all ages (including children <8 years of age). Doxycycline is most effective at preventing severe complications from developing if started within the first 5 days of illness. Treatment for asymptomatic individuals is not currently recommended.

D. Vectors and Reservoirs

In New Jersey, the primary vector for RMSF is the American dog tick (*Dermacentor variabilis*). Adult females are most likely to bite humans although the principal hosts tend to be deer, dogs and livestock. Maximum activity occurs in late spring through early summer. The lone star tick (*Amblyomma americanum*), found in the middle and southern parts of the state, is also a vector of SFGR.

E. Modes of Transmission

SFGR is transmitted by the bite of an infected tick. Although cases are reported in every month of the year, most cases occur during May–August. Inquiring about contact with pets, especially dogs, and a history of recent tick attachment or removal from pets might be useful in assessing potential human tick exposure. 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.

Transmission of *R. rickettsii* via blood transfusion has been reported but is extremely rare. Organ transplant acquired RMSF has not been documented but is physiologically possible. *R. parkeri* and *Rickettsia* species 364D transmission via infected blood products has not been documented in the United States.

F. Incubation Period

Incubation periods for SFGR rickettsial infections range from 2-21 days. Symptoms of RMSF typically appear 3-12 days after the bite of an infected tick.

G. Period of Communicability or Infectious Period

SFGR is generally not communicable from person to person, although transmission through blood transfusion has been reported rarely.

H. Epidemiology

RMSF has been a nationally notifiable condition since the 1920s. As of January 1, 2010, cases of RMSF are reported under the new SFGR category. The number of SFGR cases reported to CDC annually has increased from 495 cases in 2000, to a peak of 6,248 in 2017. However, cases reported in 2018 and 2019 were slightly lower. Cases dropped substantially in 2020, likely due

to a combination of the new case definition in 2020 and the COVID-19 pandemic. Notably, while the number of cases and incidence rose, the case fatality rate has declined since the 1940s when tetracycline antibiotics became available. The case fatality rate for spotted fever rickettsioses using surveillance data is still <0.5% of cases. The inclusion of less severe spotted fevers, such as *R. parkeri* rickettsiosis, likely leads to the lower case fatality rate observed in recent decades.

SFGR cases have been reported throughout the United States. Between 2018-2022, over 50% of SFGR cases were reported by five states: Arkansas, North Carolina, Alabama, Missouri and Tennessee. Cases of spotted fever rickettsiosis are more frequently reported in men than in women. Most reported cases are among people at least 40 years old, however children under 10 years old represent the highest number of reported deaths. Persons with glucose-6-phosphate dehydrogenase (G6PD) deficiency are at increased risk for severe and fatal disease. Surveillance data show higher risk for hospitalization in people with compromised immune systems (e.g., resulting from cancer treatments, advanced HIV infection, prior organ transplants, or some medications).

In New Jersey, cases of SFGR increased from 58 reported cases in 2014 to 208 cases in 2019 (prior to the 2020 case definition). Between 2020-2023, there was an average of 34 cases reported annually. Since 2020, the highest number of SFGR cases in New Jersey was reported in Atlantic, Ocean, Monmouth, and Camden counties.

3 CASE DEFINITION

NJDOH follows the current case definition as published on the CDC National Notifiable Disease Surveillance System (NNDSS) website.

SFGR Case Definition: <https://wwwn.cdc.gov/nndss/conditions/spotted-fever-rickettsiosis/>

Case definitions enable public health to classify and count cases consistently across reporting jurisdictions and should not be used by healthcare providers to determine how to meet an individual patient's health needs.

A. Clinical Criteria

Fever as reported by the patient or a healthcare provider, AND one or more of the following: rash, eschar, headache, myalgia, anemia, thrombocytopenia, or any hepatic transaminase elevation.

B. Laboratory Criteria

Confirmatory laboratory evidence:

- Detection of SFGR nucleic acid in a clinical specimen via amplification of a *Rickettsia* genus- or species-specific target by Polymerase Chain Reaction (PCR) assay,
OR
- Serological evidence of a fourfold increase in Immunoglobulin G (IgG) -specific antibody titer reactive with SFGR antigen by indirect immunofluorescence antibody assays (IFA) between paired serum specimens (one taken in the first two weeks after illness onset and a second taken two to ten weeks after acute specimen collection),*
OR
- Demonstration of SFGR antigen in a biopsy or autopsy specimen by immunohistochemical methods (IHC),
OR
- Isolation of SFGR from a clinical specimen in cell culture and molecular confirmation (e.g., PCR or sequence).

Presumptive laboratory evidence:

- Serologic evidence of elevated IgG antibody at a titer $\geq 1:128$ reactive with SFGR antigen by IFA in a sample taken within 60 days of illness onset.**

Supportive laboratory evidence:

- Serologic evidence of elevated IgG antibody at a titer $< 1:128$ reactive with SFGR antigen by IFA in a sample taken within 60 days of illness onset.

*A four-fold rise in titer should not be excluded (as confirmatory laboratory criteria) if the acute and convalescent specimens are collected within two weeks of one another.

**This includes paired serum specimens without evidence of fourfold rise in titer, but with at least one single titer $\geq 1:128$ in IgG-specific antibody titers reactive with SFGR antigen by IFA.

C. Criteria to Distinguish a New Case from an Existing Case

A person previously reported as a probable or confirmed case-patient may be counted as a new case-patient when there is an episode of new clinically compatible illness with confirmatory laboratory evidence.

D. Case Classification

CONFIRMED

A clinically compatible case (meets clinical criteria) that is laboratory confirmed.

PROBABLE

A clinically compatible case (meets clinical criteria) that has presumptive laboratory evidence.

POSSIBLE

- A case with laboratory evidence of infection with no clinical information available, OR
- A clinically compatible case (meets clinical criteria) that has supportive laboratory evidence.
 - **Note:** *Elevated IgG titers of <1:128 meet supportive laboratory evidence. If resources are limited, a public health investigation is not necessary; classify these reports as "POSSIBLE."*

4 LABORATORY TESTING

Several categories of laboratory methods are used to diagnose SFGR's. Rapid confirmatory assays are rarely available to guide treatment decisions for acutely ill patients; therefore it is imperative that therapeutic interventions are based on clinical suspicion. Antibiotic treatment should never be delayed while awaiting laboratory confirmation of a rickettsial illness. Nonetheless, laboratory assays are crucial for defining the changing epidemiology and public health impact of tickborne rickettsial diseases. Whenever possible without delaying treatment, species-specific testing methods should be employed, such as detection of DNA by PCR or culture.

A. PCR, IHC, and Culture

SFGR species infect the endothelial cells that line blood vessels and do not circulate in large numbers in the blood until the disease has progressed to a severe phase of infection. For this reason, whole blood specimens obtained during the first several days of illness are often negative when tested by polymerase chain reaction (PCR) assays or culture. If the patient has a rash or eschar, PCR, or immunohistochemical (IHC) assays can be performed on a skin biopsy specimen. Eschars may alternatively be swabbed for the collection of infected exudate. Swabs of eschars are less invasive than skin biopsies, but do not allow for IHC testing or cell culture evaluation. PCR, culture, and IHC assays can also be applied to autopsy tissue specimens. SFGR species are obligate intracellular pathogens and cannot be propagated using routine blood culture methods. Culture of SFGR species is generally available only at specialized laboratories that perform cell culture and are equipped with the appropriate biosafety facilities.

PCR of whole blood specimens can be performed at New Jersey's Public Health and Environmental Laboratories (PHEL). Specimens should be collected before antibiotics are administered but not sooner than three days after symptom onset. If collected earlier, results are often negative. Testing of tissue or swab specimens using PCR or IHC assays can be performed at CDC.

B. Serologic methods

Serologic assays are the most frequently used methods for confirming cases of spotted fever group rickettsiosis and are widely available at commercial laboratories. Immunoglobulin M (IgM) antibodies are less specific than IgG antibodies and more likely to produce a falsely positive result. Closely related species of SFGR (such as *R. rickettsii*, *R. akari*, *R. parkeri*, or *R. species 364D*) share similar antigens such that antibodies directed to one of these antigens can cross-react with other

heterologous spotted fever group antigens. Most commercial labs are unable to differentiate one spotted fever infection from another using these serologic methods.

The reference standard for serologic diagnosis is the indirect immunofluorescence antibody (IFA) assay. Diagnosis is typically confirmed by documenting a four-fold or greater rise in antibody titer between acute and convalescent-phase serum samples. Acute-phase specimens are taken during the first week of illness and convalescent-phase samples are generally obtained 2–4 weeks after the resolution of illness. Eighty-five percent of patients will not have detectable antibody titers during the first week of illness and a negative test during this time does not rule out spotted fever infection. In most patients with a spotted fever group rickettsiosis, the first immunoglobulin G (IgG) IFA titer is negative and the second typically shows a four-fold or greater increase in IgG antibody levels.

Persistent Antibodies

Antibody titers can remain elevated for months or longer after the disease has resolved or can be detected in persons who were exposed previously to antigenically related organisms. For these reasons, as many as 10% of persons in some areas of the United States can have elevated levels of antibodies that react with *R. rickettsii* or similar organisms. Therefore, a single antibody titer should not be used to document or exclude a diagnosis of a spotted fever group rickettsiosis. The most conclusive method is the evaluation of paired serum samples, collected 2-4 weeks apart, which reveal a four-fold or greater rise in antibody titer.

5 SURVEILLANCE AND REPORTING

Purpose of Surveillance and Reporting

- To better understand the local epidemiology of infection with SFGR in New Jersey
- To recognize areas in New Jersey where incidence of disease has changed (increased or decreased)
- To focus preventive education

Laboratory Reporting Requirements

Clinical laboratories must report test results by ELR or electronic reporting into CDRSS by the close of the business day next following the date on which the result is obtained (N.J.A.C. 8:57-2.6).

Reports shall contain:

- Patient demographics (name, age, DOB, sex assigned at birth, current gender identity, sexual orientation, race, ethnicity)
- Patient home address and telephone number
- Test performed and test result
- Specimen source or type, date of specimen collection, and date tested
- Ordering provider's name, address and telephone number
- Reporting laboratory's name, address and telephone number

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- Upon request, results of other tests performed pertaining to the case

Healthcare Professional and Administrator Reporting Requirements

Healthcare professionals and administrators must report confirmed cases by the close of the next business day following the date of confirmation (N.J.A.C. 8:57-2.2, 2.3), including date of diagnosis, receipt of a positive test result, or other confirmation.

Reports shall contain:

- Disease name
- Patient demographics (name, age, DOB, sex assigned at birth, current gender identity, sexual orientation, race, ethnicity)
- Patient home address, all known telephone numbers, and email address
- Clinical presentation & diagnosis
- Date of symptom onset
- Clinical laboratory data that supports the diagnosis, if available
- A description of provided treatment
- Hospitalization and mortality status
- Reporting provider or administrator name, institution name, address, telephone number, and email address
- Medical records upon request

6 CASE INVESTIGATION

A. Investigation

Local health departments are asked to investigate anaplasmosis reports and close cases in CDRSS within 2 weeks of case creation. The [SFGR Investigation Worksheet](#) may be used to help guide the patient or physician interview. If there is only a single serological test result, ask healthcare provider if an acute (or convalescent) test was ordered; request that negative test results be sent to LHD, and then enter into CDRSS. Information collected using the worksheet should be documented in CDRSS. Worksheets should not be sent to NJDOH unless requested.

If investigators do not receive a response from the healthcare provider, they should contact the patient directly to obtain the investigation information. Additionally, if the patient did not have a fever on the day they visited a healthcare provider, the provider may report this as “no fever.” In these cases, it is important for investigators to interview the patient directly and confirm if the patient presented with an acute onset of fever during the course of illness.

A minimum of 3 attempts should be made to obtain information. Attempts to both the healthcare provider/infection preventionist and patient should be made before closing the case. After 3

attempts, enter what is known into CDRSS, including attempts to obtain information (dates and results of the attempts), and classify/close the case according to the case definition.

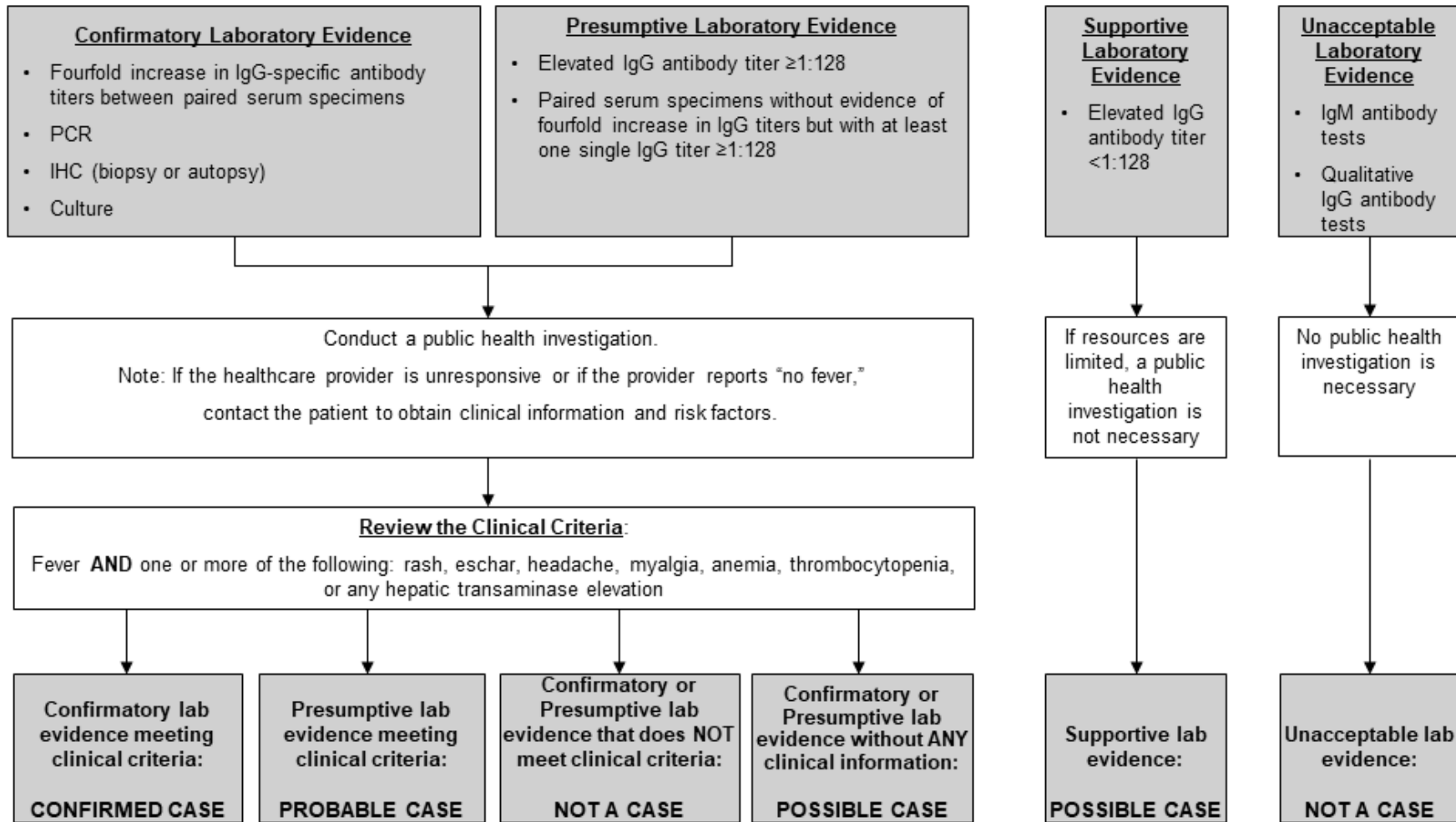
Beginning in 2020, a person previously reported as a probable or confirmed case-patient may be counted as a new case when there is an episode of new clinically compatible illness with confirmatory laboratory evidence. Local health departments should check prior cases for all investigations without confirmatory test results. Also, to count as laboratory evidence for case classification, samples for serologic and smear testing (presumptive laboratory evidence) must be collected within 60 days of illness onset.

B. Key CDRSS Fields Specific for Spotted Fever Group Rickettsiosis

CDRSS Screen	Required Information
Patient Personal Information	<ul style="list-style-type: none"> Ensure name, sex, date of birth, race and ethnicity are entered.
Laboratory and Diagnostic Test Information	<ul style="list-style-type: none"> Review test result to determine if it meets laboratory criteria for case definition. To count as laboratory evidence for case classification, samples for serologic testing (presumptive laboratory evidence) must be collected within 60 days of illness onset. If negative results of acute or convalescent serology testing were provided by healthcare provider, enter the results.
Additional Requirements	<ul style="list-style-type: none"> Enter information on other tickborne disease testing, severe clinical complications, immunocompromising conditions and blood donation. If the patient donated blood in the 30 days prior to illness onset/diagnosis, document the date and location of donation. Notify the CDS Vector Team (CDSVectorTeam@doh.nj.gov) by email. NJDOH CDS Vector-borne Disease staff will complete questions related to transfusion-associated infections.
Clinical Status	<ul style="list-style-type: none"> Enter illness onset date, hospitalization (as part of this investigation), pre-existing conditions and mortality information.
Contact Tracing	<ul style="list-style-type: none"> In transfusion transmitted infection investigations, the donor and recipient information will be linked by CDS Vector-borne Disease staff.
Industry and Occupation Information	<ul style="list-style-type: none"> Indicate the patient’s occupation and industry/work setting

CDRSS Screen	Required Information
Medical Facility and Provider Information	<ul style="list-style-type: none"> For admitted/hospitalized patients, ensure patient status is marked as INPATIENT and admission and discharge dates are entered.
Risk Factors	<ul style="list-style-type: none"> Answer all risk factors questions (i.e., known tick exposures). Focus on two weeks prior to illness onset and note tick bite or other exposure history. Ask about receipt of blood transfusion or solid organ transplant in the year prior to symptom onset. Include dates and hospital where blood/organ products were received. Notify the REP and CDS Vector Team (CDSVectorTeam@doh.nj.gov) by email. Ask about organ donation in the 30 days prior to illness onset. Include dates and hospital where organ was donated. Notify the REP and CDS Vector Team (CDSVectorTeam@doh.nj.gov) by email.
Signs/Symptoms	<ul style="list-style-type: none"> Inquire if the patient had each sign/symptom and update the response to Yes, No or Unknown accordingly. Not Asked should not be left as a default response. Enter onset and resolution dates, if known. In addition to asking about clinical symptoms, ask healthcare provider about other lab work, specifically anemia, thrombocytopenia, and elevated liver enzymes and enter values in attribute fields when possible.
Treatment	<ul style="list-style-type: none"> Document all medications received with duration/dates of treatment. This should include treatment that will be continued in an outpatient setting.
Comments	<ul style="list-style-type: none"> If requested information was not provided by the patient’s healthcare provider, list the dates attempts were made to obtain information and the outcomes. For example, 1/12/24 faxed form to provider; 1/31/24, spoke with office manager and re-sent form; 2/15/24, refaxed form to provider. Missing information should be obtained by interviewing the patient. If the patient is non-responsive, document attempts and call outcomes in Comments section as well. If a confirmed or probable case of ehrlichiosis was reported in CDRSS on or after January 1, 2024 and a subsequent case is created that only meets presumptive lab evidence, document this, referencing the prior case ID# in comments when closing current case as Not a Case.

2020 NEW JERSEY SPOTTED FEVER GROUP RICKETTSIOSES SURVEILLANCE ALGORITHM



To Distinguish a New SFGR Case from an Existing Case: A person previously reported as a PROBABLE or CONFIRMED SFGR case may be counted as a new SFGR case if there is an episode of **NEW CLINICALLY COMPATIBLE ILLNESS WITH CONFIRMATORY LABORATORY EVIDENCE**. Otherwise, classify the current report as NOT A CASE.

Note: IgG antibody titers collected > 60 days after illness onset are unacceptable laboratory evidence. Classify the report as NOT A CASE.

7 CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements/Protection of Contacts of a Case

There are no isolation or quarantine restrictions.

B. Managing Special Situations

Transfusion-Associated Cases

If the patient received one or more blood transfusions in the 12 months prior to illness onset, contact the infection preventionist at the facility(s) where the transfusion(s) took place and request a list of the transfusions, including:

1. Date transfused
2. Healthcare facility where transfused
3. Type of blood product (red blood cells, platelets, plasma, other)
4. Source of blood product (blood center name)

Enter this information into the Comments and Risk Factors section of CDRSS. Notify the CDS Vector Team (CDSVectorTeam@doh.nj.gov) by email with the information above. CDS will reach out to the blood center for further investigation.

Transplant Transmitted Cases

If the patient received one or more organ transplants in the year prior to illness onset, contact the infection preventionist at the facility(s) where the transplant took place and request a list of the transplanted organs, including:

1. Date of transplant
2. Healthcare facility where transplant occurred
3. Organ(s) received
4. Source of organ (donation center/foundation)

Enter this information into the Comments and Risk Factors section of CDRSS. Notify the CDS Vector Team (CDSVectorTeam@doh.nj.gov) by email with the information above. CDS will reach out to the healthcare facility for further investigation.

C. Preventive Measures

Removing a Tick

1. Remove the tick as soon as possible.
2. Use fine-tipped tweezers to grasp the tick as close to the skin as you can.
3. Pull upward with steady, even pressure. Don't twist or jerk the tick.
4. After removing the tick, clean the bite area and your hands with rubbing alcohol or soap and water.
5. Dispose of the tick by putting it in alcohol, placing it in a sealed container (e.g. plastic bag), wrapping it tightly in tape, or flushing it down the toilet. Never crush a tick with fingers. Petroleum jelly, a hot match, nail polish, or other products should not be used to remove a tick.

For more information and CDC Tick Bite Bot: [cdc.gov/ticks/after-a-tick-bite/](https://www.cdc.gov/ticks/after-a-tick-bite/)

Tick Prevention

- **Know where ticks are:** ticks live in or near wooded or grassy areas. Always walk in the center of trails to avoid contact with ticks.
- **Keep your yard clean:** mow lawns, clear brush and remove leaf litter.
- **Apply insecticides:** use EPA-registered repellent with DEET on skin and permethrin on clothing, boots and camping gear. Always follow product instructions.
- **Cover up:** wear long sleeves and light-colored pants tucked into socks to prevent ticks from getting under clothes.
- **Shower:** showering (preferably within 2 hours) can help find and wash off unattached ticks.
- **Check your body for ticks:** use a hand-held or full-length mirror to view all parts of your body upon return from tick-infested areas. Parents should check their children for ticks under the arms, in and around the ears, inside the belly button, behind the knees, between the legs, around the waist and especially in their hair.
- **Examine gear and pets:** ticks can ride into the home on clothing and pets, then attach to a person later, so carefully examine pets, coats, and day packs.
- **Dry clothing:** tumble dry clothes in a dryer on high heat for 10 minutes to kill ticks on dry clothing after you come indoors.
- **Protect pets:** talk to your veterinarian about the best tick prevention products for your dog and tickborne diseases in your area.

For more information: <https://www.cdc.gov/ticks/prevention/>

Tick Testing and Identification

Tick testing of individual ticks is not useful because:

- If the test shows that the tick contained disease-causing organisms, that does not necessarily mean that the person has been infected.

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- If someone has been infected, they will probably develop symptoms before results of the tick testing are available. Treatment should not be delayed while waiting for tick testing results.
- Negative results can lead to false assurance. For example, the person concerned may have been unknowingly bitten by a different tick that was infected.

Tick identification may be of value when discussing tick bite exposures with a healthcare provider. County mosquito control agencies or agricultural extension offices may offer tick identification services. Online identification resources include: the [TickEncounter Resource Center](#) at the University of Rhode Island.

Tick Bite Prophylaxis

Post-tick bite antibiotic prophylaxis is not recommended to prevent rickettsial infections. People who have been bitten by a tick should watch for signs and symptoms of infection. They should see their healthcare provider if fever or other symptoms develop within two weeks of the tick bite. Treatment for asymptomatic individuals is not currently recommended.

Additional Information

A Spotted Fever Group Rickettsiosis Fact Sheet, Investigation Worksheet and additional information can be obtained from the NJDOH website: <https://www.nj.gov/health/cd/topics/rocky.shtml>

References

Centers for Disease Control and Prevention. Case definitions for infectious conditions under public health surveillance, 2020. <https://wwwn.cdc.gov/nndss/conditions/spotted-fever-rickettsiosis/>

Diagnosis and Management of Tickborne Rickettsial Diseases: Rocky Mountain Spotted Fever and Other Spotted Fever Group Rickettsioses, Ehrlichiosis, and Anaplasmosis — United States; A Practical Guide for Health Care and Public Health Professionals. Recommendations and Reports / May 13, 2016 / 65(2);1–44

Centers for Disease Control and Prevention. Other Spotted Fever Group Rickettsioses. <https://www.cdc.gov/other-spotted-fever/about/index.html>

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