

## 09-ID-16

**Committee:** Infectious

**Title:** Public Health Reporting and National Notification for Spotted Fever Rickettsiosis (including Rocky Mountain spotted fever)

### I. Statement of the Problem

CSTE position statement 07-EC-02 recognized the need to develop an official list of nationally notifiable conditions and a standardized reporting definition for each condition on the official list. The position statement also specified that each definition had to comply with American Health Information Community recommended standards to support “automated case reporting from electronic health records or other clinical care information systems.” In July 2008, CSTE identified sixty-eight conditions warranting inclusion on the official list, each of which now requires a standardized reporting definition.

### II. Background and Justification

#### *Background<sup>1</sup>*

Spotted fever rickettsioses are responsible for several diseases with similar clinical presentation. Rocky Mountain spotted fever, the most common and well-known spotted fever, is a tick-borne disease caused by *Rickettsia rickettsii*. While initially recognized only in the Western United States, the most cases are now found in the South Atlantic States and the west south-central region. Rocky Mountain spotted fever is a serious illness with a 23% mortality rate if untreated. Mortality in the US is currently less than 5%, with fatal cases often resulting from delayed initiation of antimicrobial therapy because the characteristic rash may be absent early in the course of disease. There is also increasing awareness that other, likely less pathogenic spotted fever rickettsioses may be responsible for human illness frequently confused with Rocky Mountain spotted fever, including disease associated with the tickborne pathogen *Rickettsia parkeri* or other *Rickettsia* species. Ongoing surveillance is necessary to monitor the geographic and temporal occurrence of disease so that clinicians can maintain a high awareness of the disease and the public kept adequately informed about their risk of contracting the disease.

#### *Justification*

Spotted Fever Rickettsiosis (including Rocky Mountain spotted fever) meets the following criteria for a nationally and **standard** notifiable condition, as specified in CSTE position statement 08-EC-02:

- A majority of state and territorial jurisdictions—or jurisdictions comprising a majority of the US population—have laws or regulations requiring **standard** reporting of Spotted Fever Rickettsiosis (including Rocky Mountain Spotted Fever) to public health authorities

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<sup>1</sup> Much of the material in the background is directly quoted from the CDC’s Rocky Mountain spotted fever website. See the references for further information on this source.

- CDC requests **standard** notification of Spotted Fever Rickettsiosis (including Rocky Mountain Spotted Fever) to federal authorities
- CDC has condition-specific policies and practices concerning the agency’s response to, and use of, notifications.

**III. Statement of the desired action(s) to be taken**

CSTE requests that CDC adopt this standardized reporting and classification definition for Spotted Fever Rickettsiosis (including Rocky Mountain spotted fever) to facilitate more timely, complete, and standardized local and national reporting of this condition.

**IV. Goals of Surveillance**

To provide information on the temporal, geographic, and demographic occurrence of Spotted Fever Rickettsiosis (including Rocky Mountain Spotted Fever) to facilitate its prevention and control.

**V. Methods for Surveillance**

Surveillance for Spotted Fever Rickettsiosis (including Rocky Mountain spotted fever) should use the sources of data and the extent of coverage listed in Table V below.

**Table V.** Recommended sources of data and extent of coverage for ascertaining cases of Spotted Fever Rickettsioses (including Rocky Mountain spotted fever.)

Source of data for case ascertainment	Coverage	
	Population-wide	Sentinel sites
clinician reporting	X	
laboratory reporting	X	
reporting by other entities (e.g., hospitals, veterinarians, pharmacies)	X	
death certificates	X	
hospital discharge or outpatient records	X	
extracts from electronic medical records	X	
telephone survey		
school-based survey		
other _____		

## VI. Criteria for Reporting

Reporting refers to the process of healthcare providers or institutions (e.g., clinicians, clinical laboratories, hospitals) submitting basic information to governmental public health agencies about cases of illness that meet certain reporting requirements or criteria. Cases of illness may also be ascertained by the secondary analysis of administrative health data or clinical data. The purpose of this section is to provide those criteria that should be used by humans and machines to determine whether a specific illness should be reported.<sup>2</sup>

### A. Narrative description of criteria to determine whether a case should be reported to public health authorities

Report any illness to public health authorities that meets any of the following criteria:

1. Any patient with clinical illness and laboratory evidence of Spotted Fever Rickettsiosis (including Rocky Mountain spotted fever) including any of the following:
  - A fourfold change in immunoglobulin G (IgG)-specific antibody titer reactive with *Rickettsia rickettsii* or other spotted fever group antigen by indirect immunofluorescence assay (IFA) between paired serum specimens (one taken in the first week of illness and a second 2-4 weeks later)
  - Elevated IgG antibody reactive with *R. rickettsii* or other spotted fever group antigen by IFA, enzyme-linked immunosorbent assay (ELISA), dot-ELISA, or latex agglutination
  - Elevated IgM antibody reactive with *R. rickettsii* or other spotted fever group antigen by IFA, enzyme-linked immunosorbent assay (ELISA), dot-ELISA, or latex agglutination
  - Detection of *R. rickettsii* or other spotted fever group DNA in a clinical specimen via amplification of a specific target by PCR assay
  - Demonstration of spotted fever group antigen in a biopsy or autopsy specimen by IHC
  - Isolation of *R. rickettsii* or other spotted fever group rickettsia from a clinical specimen in cell culture.
2. A person whose healthcare record contains a diagnosis of Spotted Fever Rickettsiosis (including Rocky Mountain spotted fever).
3. A person whose death certificate lists Spotted Fever Rickettsiosis (including Rocky Mountain spotted fever) as a cause of death or a significant condition contributing to death.

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<sup>2</sup> “Human-based” criteria (described below under “A. Narrative”) can be applied by medical care providers and laboratory staff based on clinical judgment and clinical diagnosis. Machine-based criteria (described below under “B. Table”) can be applied using computerized algorithms that operate in electronic health record systems, including computerized records of laboratory test orders and laboratory test results; other clinical data systems (e.g., hospital discharge data systems serving multiple hospitals); or administrative data (e.g., healthcare provider billing data, vital records, and EMS data).

*Other recommended reporting procedures*

- All cases of Spotted Fever Rickettsiosis (including Rocky Mountain spotted fever) should be reported.
- Reporting should be on-going and routine.
- Frequency of reporting should follow the state health department’s routine schedule.

**B. Table of criteria to determine whether a case should be reported to public health authorities**

**Table VI-B.** Proposed Table of criteria to determine whether a case should be reported to public health authorities. Note: The following criteria are proposed for evaluation before general implementation. For purposes of currently implementing reporting the narrative description in VI-A, should be used.

Criterion	Reporting	
<i>Clinical Presentation</i>		
Healthcare record contains a diagnosis of Spotted Fever Rickettsiosis (including Rocky Mountain Spotted Fever)		S
Death certificate lists Spotted Fever Rickettsiosis (including Rocky Mountain Spotted Fever) as a cause of death or a significant condition contributing to death		S
<i>Diagnostic Laboratory Findings</i>		
Fourfold change in <i>Rickettsia rickettsii</i> -specific or other spotted fever group IgG antibody titer by indirect immunofluorescence assay (IFA) with paired serum specimens	O	
Elevated <i>Rickettsia rickettsii</i> -specific or other spotted fever group IgG antibody titer by indirect immunofluorescence assay (IFA), Elisa, Elisa-dot or latex agglutination on a single serum specimen	O	
Elevated <i>Rickettsia rickettsii</i> -specific or other spotted fever group IgM antibody titer by indirect immunofluorescence assay (IFA), Elisa, Elisa-dot or latex agglutination on a single serum specimen	O	
Detection of <i>R. rickettsii</i> or other spotted fever group DNA in a clinical specimen by PCR assay	O	
Demonstration of spotted fever group antigen in a biopsy or autopsy specimen by IHC	O	

Isolation of <i>R. rickettsii</i> or other spotted fever group rickettsia from a clinical specimen in cell culture	O	
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Notes:

S = This criterion alone is sufficient to report a case

O = At least one of these “O” criteria in each category in the same column (e.g., clinical presentation and laboratory findings)—in conjunction with all other “N” criteria in the same column—is required to report a case.

### C. Disease Specific Data Elements:

(To be added)

## VII. Case Definition for Case Classification

### Narrative description of criteria to determine whether a case should be classified as confirmed, probable (presumptive), or suspected (possible)

#### *Clinical presentation*

Spotted fever rickettsioses are a group of tickborne infections caused by some members of the genus *Rickettsia*. Rocky Mountain spotted fever (RMSF) is an illness caused by *Rickettsia rickettsii*, a bacterial pathogen transmitted to humans through contact with ticks. *Dermacentor* species of ticks are most commonly associated with infection, including *Dermacentor variabilis* (the American dog tick), *Dermacentor andersoni* (the Rocky Mountain wood tick), and more recently *Rhipicephalus sanguineus* (the brown dog tick). Disease onset averages one week following a tick bite. Age-specific illness is highest for children and older adults. Illness is characterized by acute onset of fever, and may be accompanied by headache, malaise, myalgia, nausea/vomiting, or neurologic signs; a macular or maculopapular rash appears 4-7 days following onset in many (~80%) patients, often present on the palms and soles. RMSF may be fatal in as many as 20% of untreated cases, and severe, fulminant disease can occur. In addition to RMSF, human illness associated with other spotted fever group *Rickettsia* species, including infection with *Rickettsia parkeri* (associated with *Amblyomma maculatum* ticks), has also been reported. In these patients, clinical presentation appears similar to, but may be milder than, RMSF; the presence of an eschar at the site of tick attachment has been reported for some other spotted fever rickettsioses.

#### *Clinical evidence*

Any reported fever and one or more of the following: rash, eschar, headache, myalgia, anemia, thrombocytopenia, or any hepatic transaminase elevation.

#### *Epidemiologic evidence*

Tick exposure in past 2 weeks; a tick bite is not required. List occupation if relevant to exposure. Travel in past 2 weeks; location of travel

### *Laboratory evidence*

The organism in the acute phase of illness is best detected by polymerase chain reaction (PCR) and immunohistochemical methods (IHC) in skin biopsy specimens, and occasionally by PCR in appropriate whole blood specimens taken during the first week of illness, prior to antibiotic treatment. Serology can also be employed for detection, however an antibody response may not be detectable in initial samples, and paired acute and convalescent samples are essential for confirmation.

For the purposes of surveillance,

Laboratory confirmed:

- Serological evidence of a fourfold change in immunoglobulin G (IgG)-specific antibody titer reactive with *Rickettsia rickettsii* or other spotted fever group antigen by indirect immunofluorescence assay (IFA) between paired serum specimens (one taken in the first week of illness and a second 2-4 weeks later), **or**
- Detection of *R. rickettsii* or other spotted fever group DNA in a clinical specimen via amplification of a specific target by PCR assay, **or**
- Demonstration of spotted fever group antigen in a biopsy or autopsy specimen by IHC, **or**
- Isolation of *R. rickettsii* or other spotted fever group rickettsia from a clinical specimen in cell culture.

Laboratory supportive:

- Has serologic evidence of elevated IgG or IgM antibody reactive with *R. rickettsii* or other spotted fever group antigen by IFA, enzyme-linked immunosorbent assay (ELISA), dot-ELISA, or latex agglutination.

Note: Current commercially available ELISA tests are not quantitative, cannot be used to evaluate changes in antibody titer, and hence are not useful for serological confirmation. IgM tests are not strongly supported for use in serodiagnosis of acute disease, as the response may not be specific for the agent (resulting in false positives) and the IgM response may be persistent. Complement fixation (CF) tests and other older test methods are neither readily available nor commonly used. CDC uses in-house IFA IgG testing (cutoff of  $\geq 1:64$ ), preferring simultaneous testing of paired specimens, and does not use IgM results for routine diagnostic testing.

### **Exposure**

Exposure is defined as having been in potential tick habitats within the past 14 days before onset of symptoms. Occupation should be recorded if relevant to exposure. A history of a tick bite is not required.

## Case Classification

**Confirmed:** A clinically compatible case (meets clinical evidence criteria) that is laboratory confirmed.

**Probable:** A clinically compatible case (meets clinical evidence criteria) that has supportive laboratory results.

**Suspect:** A case with laboratory evidence of past or present infection but no clinical information available (e.g. a laboratory report).

## B. Classification Tables

Table VII-B lists the criteria that must be met for a case to be classified as confirmed, probable (presumptive), or suspected (possible).

**Table VII-B.** Proposed table of criteria to determine whether a case is classified. Note: The following criteria are proposed for evaluation before general implementation. For purposes of current notification, the narrative description in VII-A, should be used.

Criterion	Case Definition			
	Confirmed	Probable	Suspected	
<i>Clinical Presentation</i>				
Fever	N	N	N	N
Rash	O	C	O	C
Eschar	O	C	O	C
Headache	O	C	O	C
Myalgia	O	C	O	C
<i>Clinical Laboratory Findings</i>				
Anemia	C	O	C	O
Thrombocytopenia	C	O	C	O
Increased Hepatic Transaminases	C	O	C	O
<i>Diagnostic Laboratory Findings</i>				
Fourfold change in <i>Rickettsia rickettsii</i> or other spotted fever group-specific IgG antibody titer by indirect	O	O		O

immunofluorescence assay (IFA) with paired serum specimens					
Elevated <i>Rickettsia rickettsii</i> - or other spotted fever group specific IgG antibody titer by indirect immunofluorescence assay (IFA), Elisa, Elisa-dot or latex agglutination on a single serum specimen			O	O	O
Elevated <i>Rickettsia rickettsii</i> - or other spotted fever group specific IgM antibody titer by indirect immunofluorescence assay (IFA), Elisa, Elisa-dot or latex agglutination on a single serum specimen			O	O	O
Detection of <i>R. rickettsii</i> or other spotted fever group DNA in a clinical specimen by PCR assay	O	O			O
Demonstration of spotted fever group antigen in a biopsy or autopsy specimen by IHC	O	O			O
Isolation of <i>R. rickettsii</i> or other spotted fever group rickettsia from a clinical specimen in cell culture	O	O			O

Notes:

N = This criterion in conjunction with all other “N” and any “O” criteria in the same column is required to classify a case.

O = At least one of these “O” criteria in each category in the same column (e.g., clinical presentation and laboratory findings)—in conjunction with all other “N” criteria in the same column—is required to classify a case.

C = This finding corroborates (i.e., supports) the diagnosis of—or is associated with—Rocky Mountain spotted fever, but is not included in the case definition and is not required for classification.

### VIII. Period of Surveillance

Surveillance should be on-going.

## **IX. Data sharing/release and print criteria**

- Notification to CDC of probable and confirmed cases of Spotted Fever Rickettsiosis is recommended.
- Summaries and analyses of reported cases of Spotted Fever Rickettsiosis, including RMSF, are compiled and published periodically dependent upon accumulation of data and changes in disease activity and regional incidence. A manuscript covering diagnosis and management of Rickettsial Diseases in the U.S. was published in 2006.
- Annual state case totals and national incidence rates are available via MMWR.
- Final verification of case counts with SHDs is usually completed by August of the year following the surveillance year and reported annually in the National Summary of Notifiable Diseases - United States published in March or April of the subsequent year.
- Aggregate numbers of cases the United States are available to WHO via MMWR.

## **X. References**

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