

## NC DEPARTMENT OF HEALTH AND HUMAN SERVICES

ROY COOPER • Governor

KODY H. KINSLEY • Secretary

MARK T. BENTON • Deputy Secretary for Health

Division of Public Health

Developed by the North Carolina Division of Public Health, Communicable Disease Branch

### ***Spotted Fever Group Rickettsiosis Surveillance Summary from 2016—2021***

#### **Background**

Spotted fever group rickettsioses (SFGR), including Rocky Mountain spotted fever (RMSF), are a group of bacterial infections caused by *Rickettsia* spp. including *R. rickettsii* and *R. parkeri*, among others. Spotted fevers are transmitted to humans through the bite of an infected tick. In North Carolina the most common vectors of spotted fevers include the American dog tick, *Dermacentor variabilis*, the Rocky Mountain wood tick, *D. andersoni*, and the Lone star tick, *Amblyomma americanum*. The brown dog tick, *Rhipicephalus sanguineus* has been implicated in transmission in other parts of the US. If left untreated, illness can become serious, even leading to death.

#### **Symptomology**

Early signs of SFGR are non-specific, including fever and headache. Symptoms may appear 3 –12 days following a tick bite. Other signs and symptoms can include nausea, vomiting, stomach pain, muscle pain, lack of appetite, and rash (may be present or absent). Rash is a common sign among those infected with *R. rickettsii*, the causative agent of RMSF, and usually develops 2-4 days following fever onset. Rashes can look like red splotches or pinpoint dots.

#### **Epidemiology**

##### National

Incidence varies considerably by geographic area. Between 2008-2012, 63% of reported SFGR cases originated from five states: Arkansas, Missouri, North Carolina, Oklahoma, and Tennessee<sup>1</sup>. Thousands of cases of SFGR occur every year, but it is unknown how many cases are RMSF. Case fatality rates vary annually, but have decreased overall from 28% in 1944 to < 1% in 2001. The national average incidence of **confirmed and probable** SFGR cases in 2019 was 1.59 cases per 100,000.<sup>2</sup>

##### North Carolina

The number of confirmed and probable cases of spotted fever rickettsiosis decreased significantly in North Carolina in 2020. In January 2020, the case definition of SFGR was amended to require an elevated IgG antibody titer of  $\geq 1:128$  within 60 days of illness onset<sup>3</sup>, which resulted in a sharp decrease in SFGR cases nationwide. The decline in SFGR cases in 2021 may also be linked to the large number of events that were closed as “suspect.” Suspected events occur when a patient has a positive laboratory test, but no accompanying clinical data can be gathered. The 5-year average incidence rate of SFGR in North Carolina between 2016—2020 was 5.25 **confirmed and probable** cases per 100,000 residents, which is higher than the national average<sup>2</sup>. The incidence of **confirmed and probable** SFGR cases in North Carolina in 2021 was 1.77 cases per 100,000 residents (using 2020 population data).

#### **Diagnosis**

Delay in diagnosis and treatment is the most important factor associated with poor outcomes, and early treatment based on clinical impression is the best way to prevent RMSF progression. Both acute and convalescent serum specimens are needed to confirm the rickettsial infection. Serological tests are often negative during the acute phase of illness, however, physicians may diagnose patients based on the symptoms outlined above.

#### **Prevention**

Reducing exposure to ticks is the best defense against SFGR. There are a number of methods that can be used to prevent tickborne illness:

- Wear permethrin treated clothing (0.5%) when exploring the outdoors.
- Use EPA registered insect repellents containing DEET or picaridin to deter ticks.
- Avoid ticks in wooded/brushy areas with high grasses and leaf litter by walking in the center of trails.
- Check clothing and skin for ticks you may have encountered while outdoors; shower soon after returning indoors.

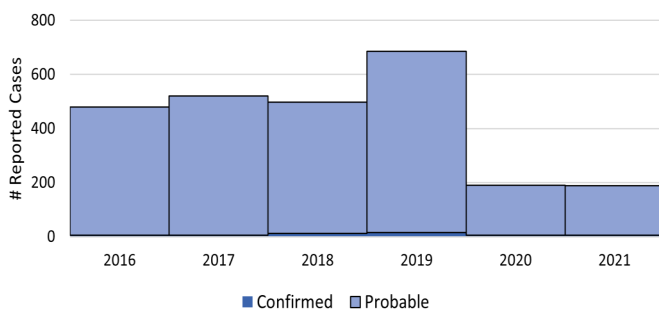
## Case Demographics

Sex	5 Year Avg (2016-20)		2021	
	No. of Cases	% of total	No. of Cases	% of total
Male	320	67.5%	130	69.0%
Female	154	32.5%	58	31.0%

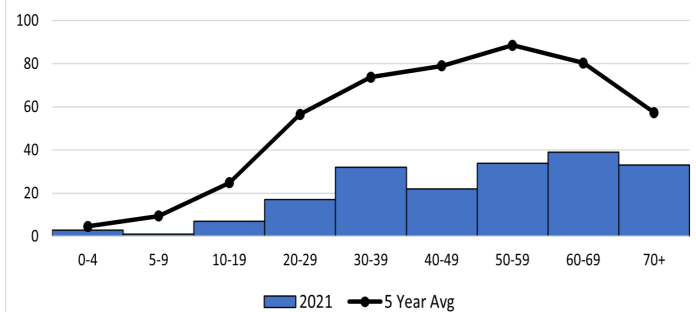
Race	5 Year Avg (2016-20)		2021	
	No. of Cases	% of total	No. of Cases	% of total
White	270.6	57.1%	128	68.1%
Black or African Amer.	27.2	5.7%	11	5.9%
Native Hawaiian or Pacific Islander	0	0.0%	0	0.0%
Amer. Indian or Alaskan	1	0.2%	1	0.5%
Asian	2.4	0.5%	3	1.6%
Other	8	1.7%	5	2.7%
Unknown	164.8	34.8%	37	19.7%

Hispanic Ethnicity	5 Year Avg (2016-20)		2021	
	No. of Cases	% of total	No. of Cases	% of total
Yes	14	3.0%	4	2.6%
No	254	53.6%	124	66.0%
Unknown	206	43.5%	60	31.9%

Confirmed and Probable Spotted Fever Group Rickettsiosis by Year, NC, 2016-2021; n = 2,561

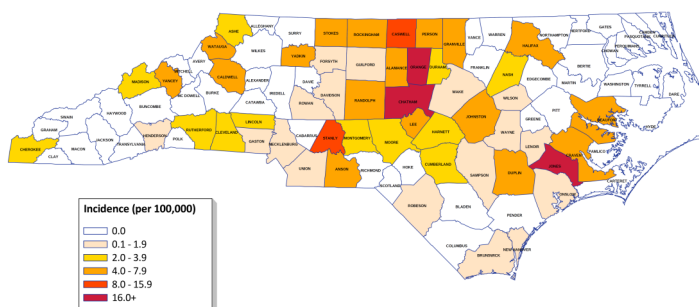


Confirmed and Probable Spotted Fever Group Rickettsiosis by Age Range, NC



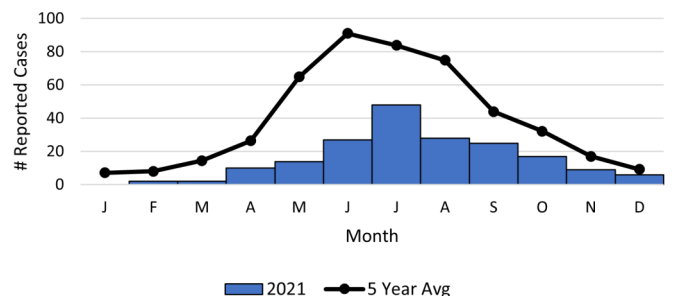
### Geographic Distribution

Confirmed and Probable Incidence of Spotted Fever Group Rickettsiosis Cases by County of Residence, NC, 2021



### Cases by Age

Confirmed and Probable Spotted Fever Group Rickettsiosis cases by Month of Illness Onset, NC



<sup>1</sup> Rocky Mountain Spotted Fever Facts: <https://www.cdc.gov/ticks/tickbornediseases/rmsf.html>

<sup>2</sup> Data are based on a national surveillance data found at: <https://wonder.cdc.gov/nndss/static/2019/annual/2019-table2p-H.pdf>

<sup>3</sup> CDC Spotted Fever Group Rickettsiosis Case Definition: <https://ndc.services.cdc.gov/case-definitions/spotted-fever-rickettsiosis-2020/>