

Spotted Fever Rickettsiosis, including Rocky Mountain Spotted Fever

Agent: Tick-borne species of *Rickettsia* (bacteria). Spotted fever rickettsiosis (SFR) may be caused by several different tick-borne disease agents, including *Rickettsia rickettsii*, the cause of Rocky Mountain spotted fever (RMSF), and *Rickettsia parkeri*, the cause of Tidewater spotted fever. Cases may also be caused by exposure to other tick-borne species of *Rickettsia* that commonly occur in Virginia.

Mode of Transmission: Transmitted to humans by the bite of an infected tick. Ticks generally must be attached for 10 to 20 hours to transmit the bacterium.

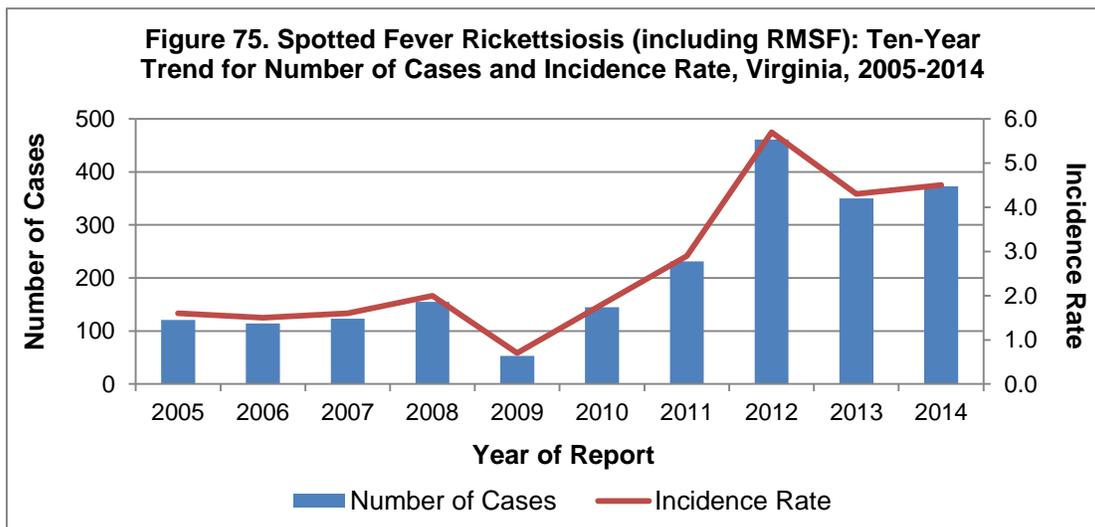
Signs/Symptoms: Persons with spotted fever rickettsiosis may have a sudden onset of fever, severe headache, muscle pain, nausea and vomiting and a rash. In the case of RMSF, a rash may develop three to five days after onset of illness. This rash starts on the wrists and ankles, and spreads to the rest of the body, and is seen in about 90% of RMSF cases.

Prevention: RMSF, the most serious SFR, may be transmitted by either the brown dog tick (*Rhipicephalus sanguineus*) or the American dog tick (*Dermacentor variabilis*). Bites by the brown dog tick can be avoided by vigilance for ticks when exposed to the bedding, floors or walls of kennels, dog houses or buildings where dogs have been kept. Bites by the American dog tick, and ticks in general, can be prevented by avoiding tick-prone habitats such as leaf litter or low vegetation in forests, old fields with early succession forest growth, and open fields with tall brush and weeds. Repellents containing DEET, Picaridin, BioUD, IR3535, or oil of lemon eucalyptus as active ingredients are effective against ticks and should be applied to exposed areas of skin before entering tick habitats. When in tick-prone habitats, light-colored clothing should be worn to make ticks more visible. Additionally, pants legs should be tucked into socks and shirts tucked into pants. Permethrin-based repellants should be applied to clothing, socks and shoes. After visiting tick habitats, a person should thoroughly check all body surfaces for ticks and, if found, attached ticks should be removed as soon as possible.

Other Important Information: Although the severity of infections attributable to spotted fever rickettsiosis varies greatly depending on the causative agent, all suspect patients should be treated as if they have RMSF. RMSF can be a serious illness, particularly in untreated patients and patients treated late in the course of illness. About 25% of all untreated RMSF cases are fatal and up to 3% of hospitalized patients die because treatment was provided too late in the course of illness. If tick exposure is noted or RMSF is suspected, treatment should be started based on suspicion of infection and not delayed pending the outcome of diagnostic tests. While SFR case numbers have increased in recent years, case-fatality rates have declined to less than 1% of reported cases. One possible explanation is prompt disease recognition and increased availability and appropriate use of effective antibiotics. Another explanation is the increasing prevalence of other spotted fever group *Rickettsia* (SFGR) species in Virginia's ticks. These other SFGR species may not cause illness in people, or may cause only a mild illness, but exposure to any SFGR causes cross-reactive positive results on blood tests for RMSF. Therefore, it is possible that most reported RMSF cases in recent years are actually due to exposure to non-pathogenic or mildly pathogenic SFGR, and/or to other Rickettsial illnesses such as ehrlichiosis, which cause acute symptoms similar to those of RMSF. Lone star ticks are the most common cause of tick bites in Virginia, and tick surveys have shown that the majority of lone star ticks in Virginia carry a non-pathogenic SFGR, as well as several agents of ehrlichiosis, but do not carry RMSF.

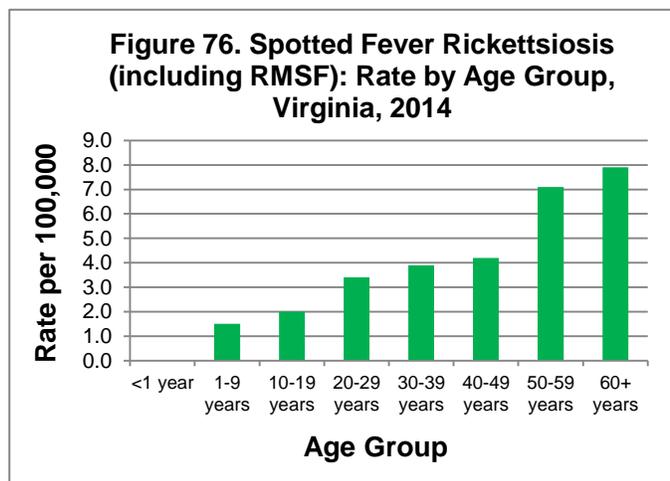
Spotted Fever Rickettsiosis: 2014 Data Summary	
Number of Cases:	373
5-Year Average Number of Cases:	248.0
% Change from 5-Year Average:	+50%
Incidence Rate per 100,000:	4.5

In 2014, 373 cases of spotted fever rickettsiosis were reported in Virginia. This represents a 7% increase from the 350 cases reported in 2013, and is 50% higher than the five-year average of 248.0 cases per year (Figure 75).

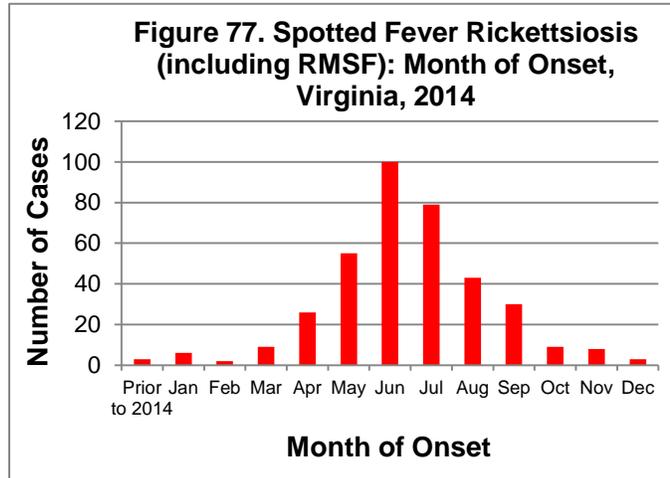


In 2014, spotted fever rickettsiosis incidence rates increased with age from an incidence rate of 0.0 per 100,000 in the less than one year age group to a rate of 7.9 per 100,000 in the 60 year and older age group (Figure 76). Although previous U.S. studies have shown higher incidence for RMSF in children under age ten years, more recent U.S. data indicate a shift in the age distribution, with the highest incidence among adults 40 years and older. This is the general pattern observed in Virginia since 2004, and is consistent with the age distribution of Rickettsial diseases other than RMSF, such as ehrlichiosis or anaplasmosis.

Race was not provided for 57% of reported cases. Among cases with a known race, the incidence rate for the white population (2.5 cases per 100,000) was five times higher than incidence in the “other” and black race populations (0.5 and 0.4 per 100,000, respectively). Incidence among males was more than double the rate among females (6.4 and 2.7 per 100,000, respectively).



The southwest region had the highest incidence rate at 7.4 per 100,000 followed closely by the central and northwest regions with 7.1 and 6.2 cases per 100,000, respectively. Incidence rates in the eastern and northern regions were lower (3.0 and 1.6 per 100,000, respectively). The northwest and central regions have had high incidence rates since 2009, but the incidence rate in the southwest region increased substantially during 2012 and remained high in 2014. Incidence rates by locality can be viewed in the map below.



Spotted fever rickettsiosis displays a distinctly seasonal pattern. For 74% of cases, symptom onset occurred from May through August, with a peak in June (Figure 77). This is consistent with the peak activity periods for the most common human-biting tick species in Virginia. One death attributed to spotted fever rickettsiosis occurred among the 373 cases reported in 2014. This fatality was definitively diagnosed as a case of RMSF by its distinctive clinical presentation and confirmation by specific laboratory assays at the CDC.

Spotted Fever Rickettsiosis, including RMSF Incidence Rate by Locality, Virginia, 2014

