



Rocky Mountain Spotted Fever and other Spotted Fever Group Rickettsioses in the United States

FACT SHEET 18-004-0618

Spotted fever group rickettsioses (SFGR) occur world-wide and impact animal and human health. In the United States, there are three common tick-borne SFGR: Rocky Mountain spotted fever (RMSF), Tidewater spotted fever, and Pacific coast tick fever. RMSF is the most commonly reported SFGR in the U.S., and is caused by the bacterial organism *Rickettsia rickettsii*. *Rickettsia parkeri* causes Tidewater spotted fever, while *Rickettsia philipii* causes Pacific coast tick fever.

How does a person get a spotted fever group rickettsiosis (SFGR) disease?

You can get RMSF or another SFGR if you are bitten by a tick infected with *Rickettsia rickettsii* or another pathogenic *Rickettsia*. Bacteria in the tick's saliva are transmitted to you while the tick is feeding. An infected tick must be attached to you for several hours for disease transmission to take place.

Do all ticks transmit these diseases?

No, only certain species of ticks are capable of transmitting *Rickettsia*. There are four primary vectors (transmitters) of RMSF in the U.S.: the American dog tick (*Dermacentor variabilis*), the Rocky Mountain wood tick (*Dermacentor andersoni*), the Pacific coast tick (*Dermacentor occidentalis*), and the brown dog tick (*Rhipicephalus sanguineus*). The American dog tick is responsible for transmitting the majority of RMSF cases. This tick is widely distributed throughout the Eastern U.S., and in limited areas along the Pacific Coast. The Rocky Mountain wood tick and the Pacific coast tick are only found in the Western U.S. The brown dog tick is distributed globally, and has been associated with outbreaks of RMSF in Arizona and Mexico. The Gulf Coast tick (*Amblyomma maculatum*) is primary vector of the agent of Tidewater spotted fever, and is distributed throughout the southeastern and Mid-Atlantic U.S. The Pacific coast tick can also transmit Pacific coast tick fever.



Dermacentor variabilis (American dog tick) female (left) and male (right)



Rhipicephalus sanguineus (brown dog tick) female (left) and male (right)

How common are these diseases?

According to the Centers for Disease Control and Prevention (CDC), the number of cases of SFGR reported to the CDC per year increased annually from 424 cases in 1993, to 4470 cases reported in 2012. Although RMSF was first recognized in 1896 in Idaho, and was a serious illness in the Rocky Mountain states in the early 1900s, it soon became apparent that RMSF is widely distributed throughout most of the U.S. The majority of cases occur in the southeastern and south central states today. North Carolina and Oklahoma report the highest incidences of RMSF. *Rickettsia rickettsii* only exists in the western hemisphere, and outside of the U.S., RMSF has been documented in southern Canada, Central America, Mexico, and parts of South America. However, there are other tick-borne SFGR that cause can cause human illness worldwide. Tidewater spotted fever and Pacific coast tick fever are relatively new *Rickettsia*, and are underreported. Evidence suggests they are often confused with RMSF.

How serious are these diseases?

Prior to discovering tetracycline and chloramphenicol antibiotics in the late 1940s, 20-80% of people infected with *R. rickettsii* died. Today, despite advances in medical care and effective drug treatments, the disease still has a fatality rate of 5% to 10%, making RMSF the most lethal tick-borne disease in the U.S. The majority of patients with RMSF must be hospitalized. There are no known fatalities attributed to infection with *R. parkeri* or *R. philipii*, which have milder symptoms than true RMSF.

What are the symptoms of Rocky Mountain spotted fever?

Symptoms usually appear 3-12 days after a tick bite, and rapidly worsen. Initial symptoms can include moderate-to-high fever, severe headache, nausea, vomiting, muscle pain, chills, and extreme exhaustion. In 2 to 4 days after the onset of fever, a red-spotted rash often appears, starting on the extremities (wrists, forearms, ankles, soles and palms), and then quickly spreading to cover much of the body, including the face. Abdominal pain, diarrhea, and joint pain may also develop. RMSF can be confused with other illnesses, and proper diagnosis may be delayed if the rash is absent, slow to develop, or does not appear.

How is Rocky Mountain spotted fever diagnosed?

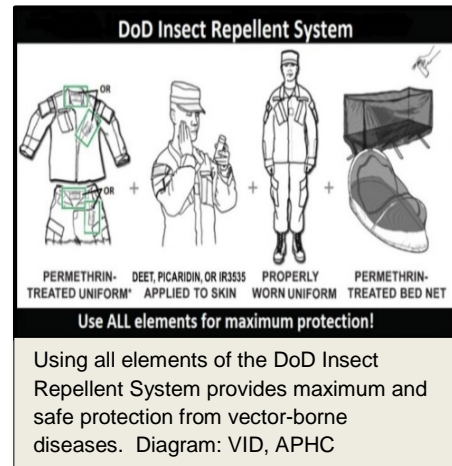
The signs and symptoms of RMSF are similar to those of many other diseases. See your health care provider if you develop any of the signs or symptoms of RMSF. Be sure to tell your health care provider if you become ill and have recently been bitten by a tick or have spent time in areas where ticks may be found. Your health care provider may order certain blood tests to look for evidence of RMSF.

What can I do to reduce my risk of becoming infected with RMSF?

There is no vaccine to protect against RMSF. Therefore, you can help prevent RMSF and other tick-borne diseases by protecting yourself from ticks. Using the DoD Insect Repellent System provides the best protection from ticks when in tick habitat (tall grass, weeds, scrubby areas, woods and leaf litter). It incorporates permethrin repellent on the uniform; DEET, picaridin or IR3535[®] repellent on exposed skin; a properly worn uniform; and sleeping inside a permethrin-treated bed net.

How do I know if my uniform is treated with permethrin repellent?

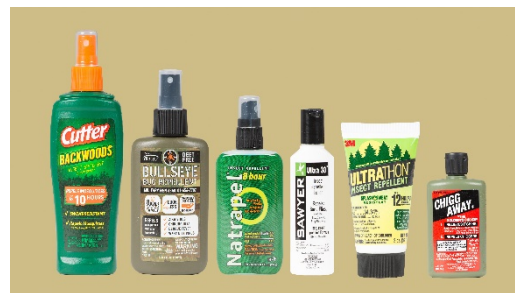
Factory-treated permethrin Army Combat Uniforms (ACU) and Occupational Camouflage Pattern (OCP) uniforms are now available to all Soldiers. The ACU/OCP trouser and coat will have a sewn-in label indicating the uniform is factory-treated with permethrin. Untreated ACUs can be permanently treated with the IDA kit (NSN 6840-01-345-0237), which can last up to 50 washings, or temporarily treated using the 0.5% aerosol spray can (NSN 6840-01-278-1336), which can be reapplied after 6 weeks and the sixth washing. Never retreat uniforms that have been factory-treated, treated with an IDA kit, or treated using a 2-gallon sprayer. Always read and follow the label directions when applying permethrin. Permanently mark the uniform label with the permethrin treatment date. NEVER APPLY PERMETHRIN TO THE SKIN! Civilians can purchase commercially available 0.5% permethrin aerosol products and permethrin factory-treated clothing.



What standard military insect repellent products are available for exposed skin?

Approved military insect repellents for use on exposed skin come in a variety of formulations. Always refer to the label to determine frequency of repellent application based on activity. **Do not apply repellent to eyes, lips, or to sensitive or damaged skin.** Available military repellents are:

- Cutter[®] pump spray (NSN 6840-01-584-8598) contains 25% DEET; one application protects for up to 10 hours.
- Bullseye[™] Bug Repellent pump spray (NSN 6840-01-656-7707) contains 20% IR3535[®]; provides protection for up to 8 hours.
- Natrapel[®] pump spray (NSN 6840-01-619-4795) contains 20% picaridin; one application protects for up to 8 hours.
- Ultra 30[™] Insect Repellent Lotion (NSN 6840-01-584-8393) contains 30% Lipo DEET; one application protects up to 12 hours.
- Ultrathon[™] (NSN 6840-01-284-3982) contains 34% controlled-release DEET lotion; one application protects for up to 12 hours.
- Chigg-Away[®] lotion (NSN 6840-01-137-8456), contains 10% precipitated sulfur and 5% benzocaine, repels chiggers.



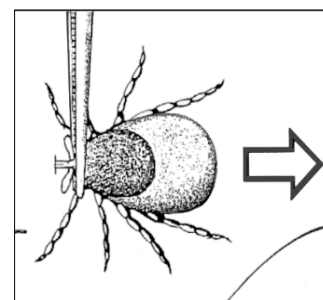
What is considered a “properly worn” combat uniform?

Military combat uniforms act as a physical barrier against insects, ticks and other disease transmitters and biting nuisance pests when worn properly. Wear uniforms with the sleeves rolled down and tuck pants into boots and undershirt into pants. A permethrin-treated uniform does not provide protection to exposed skin; protect exposed skin with an approved insect repellent.

What do I do if a tick is biting me?

Reduce exposure to tick-borne diseases by promptly removing ticks. Unattached ticks do not present a threat by crawling on you. See the picture to the right about effectively removing an embedded tick from your skin. For more information on tick removal, view

https://www.youtube.com/watch?v=3bl37ceSZ_s, and <http://www.tickcounter.org/>. Ticks removed from military personnel, their dependents, or DOD Civilians can be submitted for identification and disease testing through the APHC’s DoD Human Tick Test Kit Program: <http://phc.amedd.army.mil/topics/envirohealth/epm/Pages/HumanTickTestKitProgram.aspx>



Ticks should be removed as soon as possible to prevent disease transmission. To effectively remove a tick, use pointed tweezers to grab the tick close to skin, and pull the tick out with a slow, steady motion.

Reference: U.S. Centers for Disease Control and Prevention: <https://cdc.gov/RMSF>