

**QUICK LINKS****Rickettsial Infections—TRAVELER INFORMATION**

- [Introduction](#) • [Transmission](#) • [Risk Areas](#) • [Risk Factors](#) • [Symptoms](#) • [Prevention](#)
- [Need for Medical Assistance](#) • [Rickettsial Infections and Vectors](#)

## Traveler Information

**RICKETTSIAL INFECTIONS**

This article discusses African tick-bite fever, Mediterranean spotted fever, Rocky Mountain spotted fever, rickettsialpox, flea-borne spotted fever, other spotted fever group rickettsioses, murine typhus, louse-borne typhus, and scrub typhus. See also the table at the end of this article for species-specific information on human disease, geographical distribution, and vectors.

**INTRODUCTION**

Rickettsial diseases have been estimated to be the fourth most common cause of febrile illnesses (after malaria, dengue, and enteric fevers) among returned travelers.

Rickettsial infections are caused by bacterial organisms that are found throughout the world. Rickettsiae live in arthropods (invertebrates such as ticks, fleas, mites, and lice) and can infect mammals, including humans. Rickettsiae cannot survive for any significant period of time outside a mammal or invertebrate host.

The table at the end of this article summarizes the main features of the most common species of rickettsiae.

**TRANSMISSION**

Most rickettsial diseases are transmitted to humans by the bite or feces of fleas, ticks, mites, or lice while feeding on a human host.

Ticks require a blood meal to go from one life stage to the next, so even the smallest forms, such as larvae, can transmit the infection to humans. Consequently, many infected individuals do not recall a tick bite before symptoms appear.

Incubation periods vary: 2-14 days for Rocky Mountain spotted fever (RMSF), 6-10 days for Mediterranean spotted fever (MSF), 4-10 days for African tick-bite fever (ATBF), about 1 week for epidemic typhus, and 6-18 days for scrub typhus.

**RISK AREAS**

With a few exceptions, each species of rickettsial organism has a relatively unique geographic niche that follows the distribution of its arthropod vector (see table).

- Tick-borne rickettsioses are often acquired in rural settings within the endemic areas; however, urban transmission also occurs.
- Conversely, epidemic typhus, murine typhus, and rickettsialpox characteristically are acquired in urban and suburban settings, where the vectors are found in close contact with humans. Scrub typhus is transmitted by the larval stage of a mite associated with transitional vegetation in the area between forest and clearing, known as scrub.

**RISK FACTORS**

- Camping, hiking through wooded areas or trails lined with high vegetation, and other outdoor activities increase the possibility of exposure to ticks and therefore the risk of acquisition of tick-borne rickettsioses.
- Safaris and other recreational activities in the wilderness in Africa, especially southern Africa, are associated with a higher risk of tick exposure.
- The frequency of reported cases of RMSF is highest among males, Caucasians, and children. Individuals with frequent exposure to dogs and those who reside near wooded areas or areas with high grass may also be at increased risk of infection.
- Poor hygiene and overcrowding are the perfect settings for infestation by body lice and for acquisition of epidemic typhus; epidemics often arise in areas of the world affected by famine, war, and displacement of large populations.
- Contact with rodents carrying lice, fleas, or mites can also lead to exposure to rickettsial infections.

Tick-borne rickettsioses are typically acquired during late spring and summer, when the vectors are most active. Epidemic typhus, on the other hand, is more common during the winter months, when cold weather discourages bathing and changing of clothes, thus enhancing the chance of infestation with body lice.

## SYMPTOMS

Rickettsial diseases have been divided into a spotted fever group and a typhus group, according to the main clinical syndrome. Most rickettsial diseases include fever, headache, and some form of rash.

### Spotted Fever Group

RMSF, the prototypical disease of the spotted fever group, presents as an acute illness with fever, muscle aches, and severe headache; rash usually appears several days after the beginning of symptoms. Neurologic deterioration can occur several days into the illness. Involvement of many other organ systems, including the GI tract and the lungs, is also common. Without early treatment, RMSF carries a case fatality ratio of about 20%.

The other members of the spotted fever group, including ATBF, MSF, rickettsialpox, Japanese spotted fever, North Asian tick typhus, and Queensland tick typhus, feature a necrotic, black eschar (lesion) at the site of the infecting bite in many patients.

- Among a large groups of travelers with *R. africae* infection, most presented with fever and influenza-like symptoms, and 95% had eschars. ATBF is the only tick-borne rickettsiosis in which multiple eschars often are found, and swollen lymph glands can occur. Less than one-half of patients with ATBF develop a rash, and the mortality rate among travelers is extremely low.
- The initial presentation of MSF is similar to other diseases in this group, and a single eschar is present in most cases. A typical rash is found almost universally, and the fatality rate among hospitalized patients can be as high as 5%. Thrombotic complications can occur in up to 10% of patients.

### Typhus Group

Epidemic typhus is the prototypical disease of the typhus group, and its initial symptoms are similar to other rickettsioses, with high fever and prostration, but there is no eschar. A rash appears around the fifth day of illness, and various respiratory and neurologic symptoms, notably a confused state, are frequently present. The disease has a relatively benign course in well-nourished hosts after removal from the adverse conditions related to transmission of this disease.

- Brill-Zinsser disease is a relapsing form of epidemic typhus that occurs among individuals infected years or decades prior to current symptoms, despite previous effective treatment.
- Similarly, murine typhus also lacks an eschar. Murine typhus presents initially with fever, headache, and muscle aches, followed by a rash. More severe symptoms can affect the lungs and can also cause hepatitis, renal failure, and encephalitis. Patients often require hospitalization.
- Scrub typhus also shares all the common early clinical features of other rickettsioses; swollen lymph glands occur in many cases, and confusion and infectious mononucleosis can occur. An eschar is found in almost half of the cases, and a rash occurs in only about 35% of cases. Mortality is very low.

## PREVENTION

The main prevention strategy is to avoid exposure to ticks and other arthropod vectors.

- Use standard insect precautions and avoid direct contact with known animal reservoirs whenever possible, typically dogs and cats. (See *Insect Precautions*.)
- Avoid overcrowded, unsanitary conditions to decrease the risk of infestation with body lice, fleas, or rodents.
- Persons who engage in outdoor activities in endemic areas should practice personal protective measures.
  - Wear long sleeves and pants tucked into socks.
  - Treat outer clothing with pyrethroids such as permethrin.
  - Apply tick repellents containing DEET (although DEET is only partially effective against *Amblyomma* ticks in southern Africa).
  - Perform regular body checks for ticks, including hairy parts of the body, and promptly remove any ticks found, as

recommended in *Infestations in Travelers*.

## NEED FOR MEDICAL ASSISTANCE

Rickettsial diseases can be difficult to diagnose; complications, even fatal ones, can arise at any time during the course of the illness.

Seek medical attention if symptoms arise. In extreme situations when medical care is not expected to be available within a reasonable period of time, travelers with fever, headache, rash, and potential exposure to ticks, fleas, mites, or rodents may consider antibiotic self-treatment with doxycycline as a temporary measure until they can be evaluated by a healthcare provider; this option should be discussed with a travel health care provider before travel.

## RICKETTSIAL INFECTIONS AND VECTORS

<p style="text-align: center;"><b>Spotted Fever Group (SFG)</b> Often present with an eschar, but rash can occur. <i>R. rickettsii</i> typically presents with a rash.</p>				
Species	Human disease	Geographic distribution	Vector	Comments
<i>R. africae</i>	African tick-bite fever (ATBF)	Southern Africa (especially Botswana, Zimbabwe, and South Africa), Guadeloupe	Ticks	The most common travel-associated rickettsial disease; particularly common in travelers returning from safaris in southern Africa. Also found in the Caribbean. Only recently differentiated from <i>R. conorii</i> .
<i>R. conorii</i>	Mediterranean spotted fever (MSF), boutonneuse fever	Southern Europe, sub-Saharan Africa, Middle East, Black and Caspian Seas, India	Ticks	The most common rickettsial disease in returning U.S. and U.K. travelers.
<i>R. rickettsii</i>	Rocky Mountain spotted fever (RMSF)	In the U.S., mostly in the south Atlantic states and the South Central region; areas of Central and South America	Ticks	Often unrecognized or misdiagnosed as other febrile rashes outside of North America.
<i>R. akari</i>	Rickettsialpox	Urban areas in the U.S., South America, South Africa, Korea, Russia, Balkan countries, Turkey	Mites	Contact with rodents that carry the mites can lead to infection.
<i>R. felis</i>	Flea-borne spotted fever	U.S., South America, sub-Saharan Africa, Asia	Fleas	Contact with rodents can lead to infection.
<i>Other species</i>	Variable syndromes	Localized foci worldwide	Ticks	New species continue to be identified worldwide.
<p style="text-align: center;"><b>Typhus Group</b> Rash Scrub typhus: eschar (45%); rash (35%)</p>				
Species	Human disease	Geographic distribution	Vector	Comments
<i>R. typhi</i>	Murine typhus	Localized foci worldwide; in the U.S.: Texas and southern California	Fleas	Appears to be an emerging rickettsial disease in travelers, typically acquired in Southeast Asia. Contact with rodents can lead to infection.
<i>R. prowazekii</i>	Louse-borne	South American highlands	Body	Ongoing outbreak in Burundi. Foci in the U.S.

	(epidemic) typhus, Brill-Zinsser disease	(especially Peru), Africa (especially Nigeria, Ethiopia, and Burundi), Russia, Asia, Central America	lice	associated with flying squirrels. Rarely reported in travelers.
<b><i>Orientia tsutsugamuchi</i></b>	Scrub typhus	Southeast Asia, Indian subcontinent, South Pacific, North Queensland (Australia)	Mites	The scrub typhus group has been reclassified as a different genus though often still included under rickettsial diseases. Travel-associated cases have been reported, mostly with exposure in SE Asia.

Travax content represents decision-relevant, expert synthesis of real-time data reconciled with new and existing available advice from authoritative national and international bodies. Recommendations may differ from those of individual countries' public health authorities.

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