

Tick-Borne Diseases in Arkansas

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Arkansas is well known for its abundance of ticks and its fair share of tick-borne diseases. Rocky Mountain spotted fever, ehrlichiosis, tularemia and Lyme disease are reported nearly every year in Arkansas. Of these illnesses, Rocky Mountain spotted fever and ehrlichiosis are the most frequently reported tick-borne diseases. Knowledge of tick-borne diseases and personal protective measures can help protect Arkansas residents from potential disease.

Rocky Mountain Spotted Fever

Rocky Mountain spotted fever (RMSF) is the most prevalent and severe tick-borne disease in Arkansas. The causal agent of RMSF is the rickettsial bacterium, *Rickettsia rickettsia*, which is transmitted through the bite of an infected American dog tick, *Dermacentor variabilis*. American dog ticks are prevalent in Arkansas and widely distributed east of the Rocky Mountains.

RMSF can be difficult to diagnose in the early stages and can be fatal without prompt and appropriate treatment. Early clinical symptoms of RMSF are nonspecific and may resemble a variety of other infectious and non-infectious diseases. These early symptoms may include fever, nausea, vomiting, severe headache, muscle pain and lack of appetite. A rash of small, flat, pink, non-itchy spots on the wrists, forearms and ankles

may (or may not) first appear two to five days after the onset of fever. Appropriate antibiotic treatment should be initiated immediately upon clinical or epidemiological suspicion of Rocky Mountain spotted fever.

Human Ehrlichiosis

Human ehrlichiosis, caused by the bacterium *Ehrlichia chaffeensis*, was first described in 1987. This rickettsial bacterium was given the *chaffeensis* species name because of its discovery in soldiers training at Fort Chaffee, Arkansas. The disease occurs primarily in the southeastern and south central regions of the country and is transmitted by the lone star tick, *Amblyomma americanum*. This is the most abundant tick found in Arkansas.

Human ehrlichiosis symptoms vary from mild to severe and may include fever, headache, malaise and muscle ache. Rashes are uncommon with adult ehrlichiosis patients; however, about 60 percent of pediatric patients may develop a rash. Nearly one-half of untreated ehrlichiosis patients may require hospitalization. An estimated 2 to 3 percent of patients infected with *E. chaffeensis* may die. Prompt antibiotic treatment is advised for ehrlichiosis patients.

Another species of *Ehrlichia* that causes human disease and is transmitted by the black-legged tick, *Ixodes scapularis*, is currently under study.

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Tularemia

Tularemia is another tick-borne disease occurring in Arkansas. Unlike other common tick-borne diseases, tularemia is also potentially spread through other means, such as deer fly bites, handling infected animal (rabbits, hares and rodents) carcasses, eating or drinking contaminated food or water and breathing in the causal bacterium, *Francisella tularensis*.

Lyme Disease

In Arkansas, Lyme disease is vectored by *Ixodes scapularis* (the black-legged tick). Lyme disease is caused by a spirochete bacterium, *Borrelia burgdorferi*, and is transmitted to humans and other animals through the bite of infected ticks. The tick bite is painless, so most victims do not know they have been bitten. Ticks have three life stages: larva, nymph and adult. Each stage takes a single blood meal that can come from a variety of hosts, including man, dogs, cats, horses, cows, deer, small mammals and birds. Small larval ticks usually acquire the causal agent for Lyme disease when they feed on infected hosts (commonly small rodents). The nymphal stage appears to be responsible for most Lyme disease cases transmitted to humans.

This disease was first diagnosed in the U.S. in 1975 in Old Lyme, Connecticut. The disease is reported worldwide and throughout the U.S, but most U.S. cases occur in the northeastern, mid-Atlantic and north central states. Lyme disease does occur in Arkansas but is not common. The total number of nationally reported cases by the Centers for Disease Control and Prevention (CDC) in 2005 was 23,305. Many cases go unreported or may be misdiagnosed. Lyme disease is now the most common tick-borne disease in the U.S.

Lyme disease is called the great imitator because its symptoms imitate the symptoms of so many other diseases. The symptoms of Lyme disease appear in stages. The classic sign of the early stage, which begins a few days to a few weeks after the bite of an infected tick, is a slowly expanding red rash (erythema migrans), which may fade in the center as it spreads away from the tick bite location. It is often described as looking like a bull's-eye with alternating light and dark rings. However, it can vary from a reddish blotchy appearance to red throughout.

Only 50 to 80 percent of infected individuals develop this rash. Other early manifestations that some people experience include flu-like symptoms such as mild headaches, sore throat, swollen lymph nodes, stiff and painful muscles and joints, fatigue and low fever. If left untreated, the rash usually

fades spontaneously over a period of a few days to months, although the spirochetes remain. If any of these symptoms appear, seek prompt medical attention. Since the rash may fade before medical attention is sought, a photograph of the rash can aid proper diagnosis.

If ignored, the early symptoms may disappear, but more serious problems can develop months to years later. The latter stages of Lyme disease can be severe and chronic. Muscle pain and arthritis, usually of the large joints, is common. Neurological symptoms include meningitis, numbness, tingling and burning sensations in the extremities, Bell's palsy (loss of control of one or both sides of the face), severe pain and fatigue (often extreme and incapacitating) and depression. Eye, heart, gastrointestinal and respiratory problems may develop. Symptoms are often intermittent, lasting from a few days to several months and sometimes years. Chronic Lyme disease, because of its diverse symptoms, mimics many other diseases and can be difficult to diagnose.

Early diagnosis of Lyme disease is based on finding a tick and the rash or, if there is no rash, the severe flu-like symptoms. A highly reliable ELISA-based antibody test and other blood tests can sometimes confirm infection. Antibiotics given during the early stage can eliminate or decrease the severity of the latter-stage symptoms. Antibiotics are also used to treat latter-stage symptoms. Persons in areas with Lyme disease must be alert to ticks found on their bodies and to rashes or severe flu-like symptoms in the summer. Prompt medical attention can prevent or lessen the long-term effects of Lyme disease. Lyme disease is not considered to be fatal, but the arthritis and other latter-stage symptoms may be severe and chronic.

A vaccine developed to prevent Lyme disease was approved in December 1998 by the FDA, but according to the CDC, this vaccine is no longer available. The vaccine manufacturer discontinued production in 2002, citing insufficient consumer demand. Protection provided by this vaccine diminishes over time. Therefore, anyone who received the Lyme disease vaccine before 2002 is probably no longer protected against the disease.

Southern Tick-Associated Rash Illness (STARI)

Southern tick-associated rash illness (STARI) is a newly recognized tick-borne disease that produces a rash very similar to the one caused by Lyme disease (erythema migrans). Most cases of STARI occur in the southern and south central U.S., where lone star ticks, *Amblyomma americanum*, are most prevalent.

Because of the similarities to Lyme disease, STARI is often referred to as “Lyme-like disease.” Unlike Lyme disease, STARI is associated with the bite of the lone star tick, *Amblyomma americanum*. Symptoms of STARI are milder than those of Lyme disease and include fatigue, headache, stiff neck, occasionally fever and an expanding red ring-like rash with a clearing central area at the site of a lone star tick bite. Also, unlike Lyme disease, STARI has not been associated with any arthritic, neurological or chronic symptoms. Although no specific recommendations for treating STARI have been published, the rash and other accompanying symptoms are resolved after treating with specific antibiotic therapy.

The bacterium associated with STARI is thought to be the spirochete bacterium *Borrelia lonestari*. DNA analysis of a patient biopsy and the associated lone star tick revealed *B. lonestari*. Researchers from CDC and other organizations continue studies to gain additional information on STARI.

Precautions and Prevention

1. Avoid tick-infested areas when possible.
2. Use tick repellents and apply according to label instructions. Insect repellents containing DEET and **clothing only** repellents containing permethrin are used most commonly.
3. Wear light-colored clothing when in tick-infested areas, as dark ticks are more easily spotted against a light background. Check yourself and your children frequently for ticks.
4. Promptly remove ticks when found. If a tick is removed within a few hours after attachment, there are usually no adverse consequences. Remove a tick promptly with tweezers where its mouthparts enter the skin. Clean the tick bite with a disinfectant.
5. Be aware of tick-borne disease symptoms.
6. Insecticide application and habitat modification are methods used to reduce tick populations around the home. Consult your local Cooperative Extension office for more information.

Pets and Livestock

Tick-borne diseases can also cause serious illness in domestic animals. Pets allowed to come in contact with ticks may become infected with Lyme disease, so frequently inspect pets and remove any attached or unattached ticks. With pets and livestock, use tick control products recommended by veterinarians.

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