

FACT SHEET LYME DISEASE



WHAT IS LYME DISEASE (LD)?

Lyme disease is an infectious disease that often begins with a characteristic rash, and which can later involve the joints, nervous system and/or heart. It is caused by a spiral-shaped bacterium called a spirochete that is transmitted to humans by the bite of an infected tick.

WHERE IS LD FOUND?

In 1975, an investigation of geographic clustering of children with arthritis in Lyme, Connecticut led to the description of this newly recognized disease. It is now apparent that LD occurs over wide areas of the United States. These areas correspond to the distribution of the known tick species that carry the disease. Currently, the major affected areas are the Northeast from Massachusetts to Maryland, the Midwest around Wisconsin, and the West around California. Cases have been reported in most other states, however, as well as in many other parts of the world, particularly Europe and Asia.

HOW IS LD TRANSMITTED?

In the East and Midwest, the "black-legged tick" (*Ixodes scapularis*, also known as the "deer tick" or "bear tick"), and in the West, the "western black-legged tick" (*Ixodes pacificus*), are the known tick transmitters (or vectors) of the disease. In either case, the tick is very small (i.e., smaller than the well-known American dog tick, *Dermacentor variabilis*), or the Lone Star tick, *Amblyomma americanum*), and the immature stages are no larger than the period on a printed page. The ticks cling to vegetation and are most numerous in woods and leaf litter, high grass, weeds and brush. The tick's two year life cycle requires that the tick feed (take a blood meal) on three separate hosts. These hosts include a variety of animals, including birds, but white-footed mice and deer are preferred. The spirochete that causes LD, *Borrelia burgdorferi*, is acquired by juvenile ticks (larvae) that feed on an infected animal, usually a mouse. The next juvenile stage of the tick (nymph), attaches to vegetation and is transferred by direct contact to the skin of a passing animal or human. The bite of the infected nymphal tick can then transmit the infectious organism to the new host. Thus, the greatest chance of becoming infected by the bite of the tick occurs during May through July, the period of greatest nymphal tick activity in most areas. The adult tick (primarily the female) feeds mainly on deer but may also become attached to, and infect humans. Adults are active during the fall and early spring. It is important to remember that not all ticks carry Lyme disease. Thus, a tick bite does not necessarily mean that disease will follow, and prompt removal of a tick will lessen any chance of disease transmission.

WHAT ARE THE SYMPTOMS?

Early -- The first symptom of LD is usually a skin rash, called erythema migrans (EM), that occurs at the site of the tick bite. The actual tick may go unrecognized. The rash, which begins 3 days to one month after the tick bite, begins as a small red area which gradually enlarges, often with partial clearing in the center of the lesion so that it resembles a donut or bulls-eye. The skin lesion is occasionally described as burning or itching. Up to 40% of people with LD may not have the early skin rash, and symptoms may appear only in the later stages of the disease. Other common early signs of LD - with or without the rash - are flu-like symptoms such as fever, headache, stiff neck, sore and aching muscles and joints, fatigue, sore throat, and swollen glands. The eyes may sometimes be affected (conjunctivitis). If not treated, these symptoms may disappear on their own over a period of weeks; however, the rash may recur as multiple secondary lesions in about 50% of untreated people, and more serious problems may follow later. If treated with appropriate antibiotics, the skin rash goes away within days, and complications may be avoided.

Late -- Later symptoms of the disease can include complications of the joints, the nervous system, and the heart. They typically appear weeks to months after the initial symptoms.

Symptoms in the joints occur in up to 60% of untreated persons. This is an arthritis affecting the large joints, primarily the knee, elbow and wrist. Pain, swelling or stiffness can move from joint-to-joint, and can become chronic. Neurologic complications occur in 10-20% of infected persons. The most common symptoms include severe headache and stiff neck (aseptic meningitis), facial paralysis (Bell's palsy or other cranial nerve palsies), and weakness and/or pain in the chest or extremities (radiculoneuritis). These symptoms can persist for weeks, often fluctuate in severity, and may respond to intravenous antibiotics.

Heart symptoms occur in 6-10% of infected persons. The electrical conduction in the heart may be affected (heart block), and an inflammation of the heart muscle (myocarditis), may occur.

HOW IS LD DIAGNOSED?

Diagnosis is based primarily on recognition of the typical symptoms of LD such as the characteristic skin rash occurring in a person who lives in or has visited one of the areas mentioned earlier. PROMPT TREATMENT OF EARLY SYMPTOMS MAY PREVENT LATER AND MORE SERIOUS PROBLEMS.

Atypical cases, or cases presenting with only later stage complications, are difficult to diagnose. In these persons, a blood test looking for antibody to the causative bacteria is often helpful. It should be noted that early in the disease, this blood test can be negative even though disease is present; only with later disease does the test become reliably positive.

WHAT IS THE TREATMENT?

Oral antibiotic treatment is beneficial early in the illness and often prevents late complications. Doxycycline and amoxicillin are the most effective drugs. In children, amoxicillin is preferred (erythromycin may be substituted, although it may be less effective). For late stage complications, high-dose intravenous penicillin or ceftriaxone is often effective.

HOW CAN LD BE PREVENTED?

Knowledge of where these ticks are found, avoidance of such areas, and, if bitten, prompt removal of the tick, are the primary preventive measures. Persons living in areas where ticks are prevalent, particularly if the known tick vector species is present, should be aware of the following preventive measures:

If you walk in tick habitat (tall grass and weeds, scrubby areas, woods and leaf litter), wear a long-sleeved shirt, long pants, and high socks (with pants tucked tightly into the socks). Light colors will help with recognition of the tick on clothing.

Use a repellent containing permethrin on your clothing and a repellent containing deet (N,N-diethyltoluamide) on your exposed skin.

Conduct daily "tick checks". The ticks are most often found on the thigh, groin, arms, underarms, and legs, and immature ticks are very small. Look for new "freckles".

To remove a tick, use tweezers to firmly grip the tick's mouthparts as close to the skin as possible, and pull back slowly and steadily. Be patient - the tick's central mouthpart called the hypostome is covered with sharp barbs, sometimes making removal difficult. Don't pull back sharply, as this may tear the mouthparts from the body of the tick, leaving them embedded in the skin. If the mouthparts do break off, don't panic - the mouthparts alone cannot transmit LD because the infective body of the tick is no longer attached. However, to prevent secondary infection, remove the mouthparts as you would a splinter. DON'T SQUEEZE THE BODY OF THE TICK, as this may force infective fluid into the wound site.

After removal, wash the wound and apply an antiseptic. SAVE THE TICK in the event that symptoms arise, because identification of the tick may facilitate the physician's diagnosis and treatment. You can preserve the tick by placing it in a jar with a little alcohol, or by keeping the jar in your freezer.

Be aware of the symptoms of Lyme disease. IF YOU HAVE BEEN IN AN AREA WHERE THE TICK IS FOUND AND YOU DEVELOP SUCH SYMPTOMS, PARTICULARLY THE SKIN RASH AND/OR 'FLU' SYMPTOMS DURING THE PERIOD FROM MAY THROUGHOUT EARLY FALL, YOU SHOULD PROMPTLY SEE A PHYSICIAN FOR EVALUATION AND TREATMENT.

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