

Lyme disease prevention and treatment



Education and early detection lead to the best outcomes.



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SCENARIO: *When you meet your patient Tom for the first time, he reports fever, headaches, a rash on his stomach, and muscle aches. As you perform your assessment, he says, “I’m not sure what’s wrong with me. It just came on a few days ago. At least it didn’t interfere with my camping trip.”*

Staying healthy through outdoor exercise and other activities includes certain risks, including Lyme disease. Exposed skin outdoors provides an opportunity for black-legged or deer ticks to attach and transmit the disease to humans. (See *Lyme disease by the numbers*.)

If not diagnosed and treated early, initial Lyme disease, which is caused by the bacterium *Borrelia burgdorferi*, can lead to chronic disease. Patients with chronic Lyme disease experience a substantial decline in health and quality of life, similar to patients with heart failure and type 2 diabetes, and they may require symptom management for many years. Currently, no Lyme disease vaccine is commercially available, making early recognition and treatment crucial to positive outcomes.

Prevention and tick removal

Preventing tick bites is the key to decreasing the occurrence of Lyme disease. (See *Steps to prevention*.) Nurses in endemic areas (the Northeast United States and upper Midwest) are in a prime position to offer education to patients, family, and friends. Topics to cover include pre-

venting tick bites, inspecting for ticks, and safely removing ticks.

Locating ticks can be difficult; adult ticks are the size of a sesame seed, while nymph ticks that infect most humans are the size of a poppy seed. To transmit bacteria, the tick must be attached longer than 36 to 48 hours.

Instruct patients to remove ticks as soon as they’re found. Explain the importance of removing the head of the tick (which is typically embedded in the skin) and not just the body protrusion. (See *Safe tick removal*.) Patients who don’t want to remove a tick themselves should contact their healthcare provider.

Assessment and testing

Lyme disease is categorized into three stages, with stage one being early and stage three being late and most severe. Symptoms of early Lyme disease include fever, chills, and the bull’s-eye rash. (See *Lyme signs and symptoms*.) However, some cases don’t present with obvious symptoms, so your interviewing and assessment skills are key to early detection and treatment.

Ask patients about recent activities (for example, camping or hiking), travel (for example, in the Northeast or upper Midwest regions of the United States), and exposure to or interaction with animals, including household pets that have been in wooded areas or open fields. Also, ask patients if they’ve experienced headaches, rashes, joint pain, or other recent onset symptoms. Be es-

Lyme disease by the numbers

38,069 total (confirmed/probable) cases of Lyme disease in the United States reported in 2015 to Centers for Disease Control and Prevention (CDC)

28,453 confirmed cases in the United States reported in 2015 to CDC

9,616 probable cases in the United States reported in 2015 to CDC

300,000—estimated number of people diagnosed with Lyme disease yearly in the United States, according to the CDC

5th ranked nationally among notifiable diseases in the United States (surpassing AIDS, which is ranked 6th)

5 to 9 and **55 to 59**—the ages at which the CDC says the highest percentage of Lyme disease cases occur

> 50% of reported cases are men

50—the number of states in which Lyme disease is present, although it occurs most frequently in the Northeast and upper Midwest regions

96% of confirmed Lyme disease cases in 2015 were reported in 14 states: Connecticut, Delaware, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and Wisconsin

May through **early fall**—when most outbreaks are seen. People who enjoy outdoor activities, live near wooded areas, or who have pets that spend time both in the home and outside are at increased risk of infection.

Source: Centers for Disease Control and Prevention.

Steps to prevention

Share these prevention tips with your patients to help reduce their risk for Lyme disease.

Human prevention

- Avoid wooded and brushy areas with high grass and leaf litter known to have a high concentration of ticks. (The Centers for Disease Control and Prevention has a graphic at their website showing the areas of the United States with the highest concentration of ticks that carry Lyme disease: www.cdc.gov/ticks/geographic_distribution.html)
- Walk in cleared trails and avoid deep woods.
- Use tick repellents that contain 20% to 30% DEET.
- Wear permethrin-treated clothing when in wooded areas.
- Cover exposed skin by wearing long pants and long-sleeve shirts.
- Inspect your body for ticks:
 - Use a mirror to see your back.
 - Pay attention to hair and armpits and behind the ears, neck, and knees.
 - Ask a partner to help with the inspection.
- Examine gear for ticks before bringing it into the house.
- Shower as soon as you come indoors.
- Tumble-dry clothes on high heat for 1 hour to kill any remaining ticks.

Animal prevention

- Regularly check pets for ticks.
- Remove ticks immediately.
- Consider applying tick repellent or pesticide to dogs, but first check with your veterinarian.

In the yard

- Keep grass trimmed.
- Clear tall grasses and brush.
- Keep patio equipment away from yard edges.
- Eliminate areas for rodents to hide, as they can carry ticks.

Safe tick removal

Follow these steps for safe tick removal and disposal.

- 1 Use fine-tipped tweezers or a gloved hand. Don't remove ticks with bare hands.
- 2 Grasp the tick as close to the skin's surface as possible.
- 3 With steady movement, pull the tick upward. Don't twist or jerk, which can cause mouth parts to break off in the skin.
- 4 If mouth parts break off, remove them with clean tweezers. If you're unable to remove them easily with tweezers, leave them alone and let the skin heal. The parts will eventually come out on their own.
- 5 After tick removal, clean the bite area and your hands with alcohol or soap and water.
- 6 Dispose of a live tick by placing it in alcohol, putting it in a sealed bag or container, and putting it in the trash, or by flushing it down the toilet. Never crush a tick with your fingers.



With fine-tipped tweezers, grasp the tick close to the skin and pull it out using a steady upward movement. (Artwork by D. Stagg.)

pecially attentive to patients who present during the warm months because of increased risk of tick bites. Next, carefully inspect the patient's skin for any possible ticks or a rash.

If signs and symptoms point to possible Lyme disease, the provider may recommend testing, which includes two steps. First, an enzyme immunoassay (EIA) or indirect immunofluorescence assay (IFA) is performed. If this test is negative, no further testing is required. However, if the test is positive or inconclusive, the next step is an immunoblot test, which detects immunoglobulin M and G classes of antibodies. Results are considered positive only if both the EIA/IFA and immunoblot are positive.

Treatment

Treatment of Lyme disease begins

as soon as a diagnosis is made. Most patients recover rapidly and completely when treated with oral antibiotics, such as doxycycline or amoxicillin, in the early stages of the disease. If treatment begins in the later stages when neurological or cardiac symptoms are present, patients also may require I.V. medications, such as ceftriaxone or penicillin, to manage symptoms. About 28% of those infected with Lyme disease experience residual symptoms after treatment.

Tom's rash, combined with his other symptoms, lead you to consider that he might have Lyme disease. Mention of the camping trip prompts you to ask where he went camping so you can determine if he was in a high-concentration area and how long he was there.

You also ask if he noticed any insect bites. You then begin a thorough search of Tom's skin, looking for a bull's-eye's mark, an infected area, or an embedded tick. You see a reddened area on Tom's abdomen and detect swollen lymph glands. You share your findings with the provider and begin serological testing as ordered.

Education provider

As trusted members of the health-care profession, nurses have the

Lyme signs and symptoms

Knowing the signs and symptoms of Lyme disease aids in early detection and treatment.

Stage 1 (early, localized) Symptoms begin 1 to 4 weeks after tick bite.

- Bull's-eye rash at location of bite (erythema migrans)
 - Occurs 70% to 80% of the time and starts at tick bite after 3 to 30 days (average 7 days)
 - Grows over days, reaching up to 12 inches or more across
 - May feel warm to the touch, but rarely itchy or painful
 - Sometimes clears as it expands, resulting in a target or bull's-eye appearance
 - May appear on any area of the body



- Headache with or without facial rash
- Joint or muscle pain

Stage 2 (early dissemination) If not found and treated, these symptoms may occur 1 to 4 months after tick bite.

- Additional bull's-eye rashes on other areas of body
- Facial or Bell's palsy
- Heart palpitations or irregular heartbeat (Lyme carditis)
- Inflammation of the brain and spinal cord
- Joint pain and swelling, especially knees and other large joints
- Nerve pain
- Periods of dizziness, shortness of breath
- Recurrent pain in tendons, muscles, joints, and bones
- Severe headaches and neck stiffness
- Shooting pains, numbness, or tingling in hands or feet
- Short-term memory loss

Stage 3 (chronic) If not promptly or effectively treated, problems can occur months to years after tick bite.

- Arthritis, most commonly in the knee
- Dementia
- Memory loss
- Pain in joints and soft tissues
- Peripheral neuropathy

Sources:

CDC. Signs and symptoms of untreated Lyme disease.

www.cdc.gov/lyme/signs_symptoms/index.html

WebMD. Stages of Lyme disease—Topic overview. www.webmd.com/arthritis/tc/stages-of-lyme-disease-topic-overview

you're in a unique position to share your knowledge with patients and their families. Increasing community awareness of Lyme disease is the first step to prevention. ★

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opportunity to provide education about the prevention of Lyme disease, the best way to remove ticks, and how to spot early symptoms.

When assessing patients, engage them in conversation about the spread of the disease. If you're a bedside or home health nurse,