Signs and Symptoms of Lyme Disease

If you had a tick bite, live in an area known for Lyme disease or have recently traveled to an area where it occurs, and observe any of these symptoms, you should seek medical attention!

Early localized stage (3-30 days post-tick bite)

- Red, expanding rash called erythema migrans (EM)
- Fatigue, chills, fever, headache, muscle and joint aches, and swollen lymph nodes

Some people may get these general symptoms in addition to an EM rash, but in others, these general symptoms may be the only evidence of infection.

Some people get a small bump or redness at the site of a tick bite that goes away in 1-2 days, like a mosquito bite. This is not a sign that you have Lyme disease. However, ticks can spread other organisms that may cause a different type of rash. For example, Southern Tick-associated Rash Illness (STARI) causes a rash with a very similar appearance.

Erythema migrans (EM) or "bull's-eye" rash

- Rash occurs in approximately 70-80% of infected persons and begins at the site of a tick bite after a delay of 3-30 days (average is about 7 days).

  Rash gradually expands over a period of several days, and can reach up to 12 inches (30 cm) across. Parts of the rash may clear as it enlarges, resulting in a “bull's-eye” appearance.
- Rash usually feels warm to the touch but is rarely itchy or painful.
- EM lesions may appear on any area of the body.

Early disseminated stage (days to weeks post-tick bite)

Untreated, the infection may spread from the site of the bite to other parts of the body, producing an array of specific symptoms that may come and go, including:

- Additional EM lesions in other areas of the body
- Facial or Bell's palsy (loss of muscle tone on one or both sides of the face)
- Severe headaches and neck stiffness due to meningitis (inflammation of the spinal cord)
- Pain and swelling in the large joints (such as knees)
- Shooting pains that may interfere with sleep
- Heart palpitations and dizziness due to changes in heartbeat

Many of these symptoms will resolve over a period of weeks to months, even without treatment. However, lack of treatment can result in additional complications, described below.

Bell's (facial) palsy

Loss of muscle tone on one or both sides of the face is called facial or "Bell's" palsy.

Late disseminated stage (months-to-years post-tick bite)

Approximately 60% of patients with untreated infection may begin to have intermittent bouts of arthritis, with severe joint pain and swelling. Large joints are most often affected, particularly the knees. Arthritis caused by Lyme disease manifests differently than other causes of arthritis and must be distinguished from arthralgias (pain, but not swelling, in joints).

Up to 5% of untreated patients may develop chronic neurological complaints months to years after infection. These include shooting pains, numbness or tingling in the hands or feet, and problems with short-term memory.

Arthritis

Pain and swelling in the large joints (such as knees) can occur.

Lingering symptoms after treatment (post-treatment Lyme disease syndrome)

Approximately 10-20% of patients with Lyme disease have symptoms that last months to years after treatment with antibiotics. These symptoms can include muscle and joint pains, cognitive defects, sleep disturbance, or fatigue. The cause of these symptoms is not known, but there is no evidence that these symptoms are due to ongoing infection with *B. burgdorferi.* This condition is referred to as Post-treatment Lyme disease syndrome (PTLDS). There is some evidence that PTLDS is caused by an autoimmune response, in which a person's immune system continues to respond, doing damage to the body's tissues, even after the infection has been cleared. Studies have shown that continuing antibiotic therapy is not helpful and can be harmful for persons with PTLDS.

Laboratory Testing

Laboratory testing can be an important aid in the diagnosis of Lyme disease. Proper use and interpretation of laboratory tests requires an understanding of the type of test, the stage of illness, and the underlying likelihood that the patient has the disease.

Like blood tests for many other infectious diseases, the test for Lyme disease measures antibodies made by white blood cells in response to infection. It can take several weeks after infection for the body to produce sufficient antibodies to be detected. Therefore, patients tested during the first few weeks of illness will often test negative. In contrast, patients who have had Lyme disease for longer than 4-6 weeks, especially those with later stages of illness involving the brain or the joints, will almost always test positive. A patient who has been ill for months or years and has a negative test almost certainly does not have Lyme disease as the cause of their symptoms.

Because all laboratory tests can sometimes give falsely positive results, it is important when faced with a positive result to consider the underlying likelihood that a patient has the disease. If a patient has not been in an area where Lyme disease is common or their symptoms are atypical, positive results are more likely to be false positives. Similarly, if a patient is tested numerous times and only rarely tests positive, it is likely that the positive result is a false positive.

Several laboratories offer "in-house" testing for Lyme disease using their own assays or testing criteria. Such in-house assays do not require evaluation or approval by the Food and Drug Administration. Because of the potential for misleading results, CDC and FDA recommend against using in-house assays whose accuracy and clinical usefulness have not been adequately validated and published in the peer-reviewed scientific literature. Ask your care provider about the validation of the tests being used.

Two-step Laboratory Testing Process

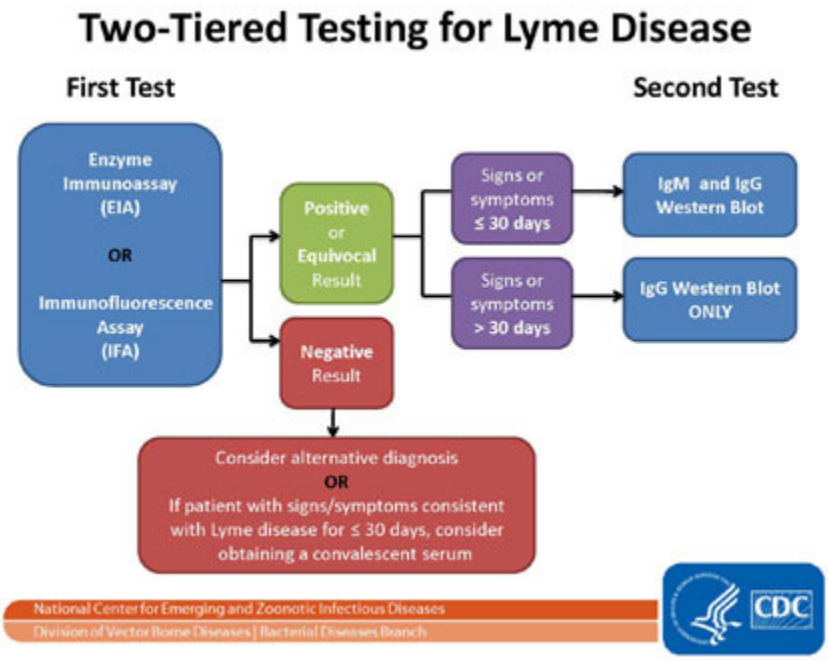
CDC currently recommends a two-step process when testing blood for evidence of antibodies against the Lyme disease bacteria. Both steps can be done using the same blood sample.

The first step uses a testing procedure called “EIA” (enzyme immunoassay) or rarely, an “IFA” (indirect immunofluorescence assay). If this first step is negative, no further testing of the specimen is recommended. If the first step is positive or indeterminate (sometimes called "equivocal"), the second step should be performed. The second step uses a test called an immunoblot test, commonly, a “Western blot” test. Results are considered positive only if the EIA/IFA and the immunoblot are both positive.

The two steps of Lyme disease testing are designed to be done together. CDC does not recommend skipping the first test and just doing the Western blot. Doing so will increase the frequency of false positive results and may lead to misdiagnosis and improper treatment.

New tests may be developed as alternatives to one or both steps of the two-step process. Before CDC will recommend new tests, their performance must be demonstrated to be equal to or better than the results of the existing procedure, and they must be FDA approved.

For more details, see “Recommendations for Test Performance and Interpretation from the Second National Conference on Serologic Diagnosis of Lyme Disease” at:
http://www.cdc.gov/mmwr/preview/mmwrhtml/00038469.htm



Two-tier testing decision tree

For additional information, please see the CDC's website at: http://www.cdc.gov/lyme/