Pretest Probability of Lyme Disease

Pretest probability can help inform when testing for Lyme disease is most helpful.

Clinical Questions to Determine Pretest Probability

1. Has the patient been in an area where Lyme disease is common?
   Areas where Lyme disease is common include the Northeast, the Mid-Atlantic, and the Upper Midwest (especially Minnesota and Wisconsin). Some states that neighbor these areas have emerging Lyme disease, with increasing numbers in recent years. Some local transmission of Lyme disease also occurs in areas of the Pacific coast, like northern California and some parts of western Washington and Oregon.

2. Was the patient likely exposed to ticks?
   Exposure to ticks might occur during outdoor activities in places where ticks live, or through exposure to pets that spend time outdoors. It's important to remember that up to half of all people bitten by a tick do not recall the bite. Patients who are active outdoors have a higher probability of exposure.

3. Does the patient have symptoms characteristic of Lyme disease?
   Manifestations of Lyme disease can include erythema migrans, cranial neuritis, radiculoneuritis, meningitis, carditis, and acute arthritis. Lyme disease can also present like an acute flu-like syndrome with fever, myalgia, arthralgia, and headache.

Answers to these questions help a healthcare provider determine the pretest probability that a patient has Lyme disease.

What is the pretest probability?

- Low: Testing not likely helpful
- Moderate to High: Testing might be helpful

Pretest probability for Lyme disease is moderate to high when the following conditions are met:

- The patient has been in an area where Lyme disease is common. **AND**
- The patient had possible exposure to ticks. **AND**
- The patient has symptoms characteristic of Lyme disease.

Pretest probability for Lyme disease is lower when ANY of these conditions are met:

1. The patient has not been in an area where Lyme disease is common. **OR**
2. The patient had no possible exposure to ticks. **OR**
3. The patient is asymptomatic or has nonspecific symptoms that are not characteristic of Lyme disease.
CDC recommends a two-step process using Food and Drug Administration (FDA)-cleared serologic tests for Lyme disease. Both steps are required and can be performed on the same blood sample.

**FIRST TEST**

Enzyme Immunoassay (EIA) OR another test cleared by the FDA as a first test

- **Positive or Equivocal Result**
  - If the first step is negative, no further testing is recommended.
  - If the first step is positive or indeterminate (sometimes called “equivocal”), the second step should be performed.

- **Negative Result**

**SECOND TEST**

Western blot assay OR another test cleared by the FDA as a second test

- **Positive or Equivocal Result**
- **Negative Result**

**OVERALL TEST POSITIVE**

The overall test result is positive only when the first and second tests are positive (or for some tests, equivocal).

**OVERALL TEST NEGATIVE**

Consider alternative diagnoses.
Note that antibodies take several weeks to develop. Patients infected recently, including patients with erythema migrans, may test negative.

CDC recommends using only FDA-cleared assays performed in CLIA-certified laboratories. Some laboratories, including some with CLIA-certification, offer laboratory-developed tests that are not FDA-cleared. CDC recommends against using these tests as there is less assurance regarding their clinical accuracy.

Lyme disease serologic testing is recommended only for patients with moderate to high pretest probability (i.e., patients with symptoms characteristic of Lyme disease and with possible exposure to ticks in areas where Lyme disease is common). Patients with low pretest probability for Lyme disease have a higher risk of a false positive test result.