

**PENNSYLVANIA DEPARTMENT OF HEALTH
2022 - PAHAN-618-01-05-ADV**

Lyme Disease Surveillance Changes and Testing Recommendations

DATE:	January 05, 2022
TO:	Health Alert Network
FROM:	Keara Klinepeter, Acting Secretary of Health
SUBJECT:	Lyme Disease and Other Tickborne Diseases in Pennsylvania
DISTRIBUTION:	Statewide
LOCATION:	Statewide
STREET ADDRESS:	Statewide
COUNTY:	Statewide
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Summary

- On January 1, 2022, the surveillance case definition for Lyme disease will change for all high incidence states including Pennsylvania.
- A modified two-tier test for Lyme disease has been approved by the FDA.
- The Pennsylvania Department of Health continues to recommend the standard two-tier test or the modified two-tier test for suspected Lyme disease cases.
- These changes are for surveillance purposes only, and do not have any impact on clinical care of patients presenting with symptoms of Lyme disease.
- For questions, please call 1-877-PA-HEALTH (1-877-724-3258) or your local health department for more information.

Pennsylvania, along with 14 other states and the District of Columbia, report approximately 95% of all Lyme disease (LD) cases in the United States. Pennsylvania regularly reports several thousand cases of LD a year, up to nearly 12,000 cases in the peak year of 2017.

In June 2021, the Council of State and Territorial Epidemiologists (CSTE) met to discuss and approve changes to the LD surveillance case definition. The previous case definition relied on both laboratory evidence reported to the states, districts and territories and symptom and physician diagnosis information from healthcare providers (HCP). In high incidence states like Pennsylvania, collecting clinical information is labor intensive and, since the presence of LD has been well established in these states and district, the HCP information does not contribute to the knowledge base in these areas. On January 1, 2022, Pennsylvania and other high incidence LD states will shift to a lab-only surveillance case definition. This is not intended to capture every case of LD reported in Pennsylvania and other high incidence states, rather to monitor long term trends in a sustainable way. This will allow states to compare case counts in a more standardized way since some high incidence states modified LD surveillance practices due to staffing resources and competing priorities.

PENNSYLVANIA SURVEILLANCE CASE DEFINITION

On January 1, 2022, Pennsylvania and other high incidence LD states will transition to a lab-only surveillance case definition. Pennsylvania Department of Health (PADOH) will cease contacting HCP to inquire about symptoms and physician diagnosis in persons for whom PADOH has received positive laboratory results. Case counts will rely on the laboratory evidence only.

High incidence states will no longer report confirmed LD cases.

The following reports will count as a probable case:

1. Positive results of a standard two-tier test (STTT) for LD. Both a serum antibody screening test and a Western immunoblot for either IgM or IgG must be conducted, positive, and reported to PADOH.*
2. Positive results of a modified two-tier test (MTTT) for LD.
3. Isolation of *Borrelia burgdorferi* in culture.
4. Detection of *Borrelia burgdorferi* via group-specific nucleic acid amplification test (NAAT) assay.
5. Detection of *Borrelia burgdorferi* group-specific antigens by immunohistochemical assay on biopsy or autopsy tissue.

*Of note, a positive IgG Western immunoblot without a preceding serum antibody test will not be counted as a case.

These reflect changes to the surveillance case definition only and do not reflect any changes in the determination of clinical cases of LD or the treatment of patients presenting with symptoms of LD.

The change in the LD case definition will not affect reporting for other tickborne diseases (i.e., anaplasmosis, babesiosis, spotted fever rickettsiosis, etc.). All other tickborne diseases, confirmed or suspected, should be reported to the PADOH web-based electronic disease surveillance system, PA-NEDSS:

<https://www.nedss.state.pa.us/nedss/default.aspx>

MODIFIED TWO-TIER TEST FOR LYME DISEASE

In 2019, the Food and Drug Administration (FDA) approved a modified two-tier testing (MTTT) approach for LD. The MTTT platform is a test in which two enzyme immunoassay

(EIA) tests are run concurrently or sequentially. A positive result will provide sufficient laboratory evidence in the diagnosis of LD. A Western immunoblot is not required.

“The FDA reviewed data from clinical studies of the ZEUS ELISA *Borrelia* VlsE1/pepC10 IgG/IgM Test System, ZEUS ELISA *Borrelia burgdorferi* IgG/IgM Test System, ZEUS ELISA *Borrelia burgdorferi* IgM Test System, and the ZEUS ELISA *Borrelia burgdorferi* IgG Test System that showed this alternative approach, referred to as a modified two-tier test, is as accurate as current methods for detecting antibodies for assessing exposure to *Borrelia burgdorferi*, the causative agent of Lyme disease, over current methods.”

<https://www.fda.gov/news-events/press-announcements/fda-clears-new-indications-existing-lyme-disease-tests-may-help-streamline-diagnoses>

In accordance with this approval, the Centers for Disease Control and Prevention (CDC) have updated testing recommendations to include the MTTT as an acceptable alternative to the STTT. https://www.cdc.gov/mmwr/volumes/68/wr/mm6832a4.htm?s_cid=mm6832a4_w

LYME DISEASE DIAGNOSIS

Pennsylvania is endemic for LD. *Borrelia burgdorferi*, the bacteria that causes LD, is carried by the *Ixodes scapularis* tick (deer tick, black-legged tick). *I. scapularis* ticks are found in every county of Pennsylvania, even urban counties. A recent analysis of Pennsylvania LD cases in 2019 indicated that only 17% recalled a tick bite in the month prior to their LD symptom onset. Therefore, anyone presenting with symptoms consistent with LD in a highly endemic area such as Pennsylvania, should be considered at risk for LD regardless of whether the patient recalls a tick bite.

In persons presenting with symptoms consistent with LD, HCPs should consider a LD diagnosis.

Erythema Migrans Rash

In patients who present with an erythema migrans (EM) rash, an immediate diagnosis of LD may be made. Testing is not necessary and may not be helpful in making the diagnosis. An EM rash may have an appearance resembling a bull’s eye with a dark center, a clearing skin tone ring around it and a darker ring around that. However, the rash may not have a typical appearance. EM rashes may be round or oval and may be up to 12 inches (30 cm) in diameter. They may appear red, blue or purple on lighter skin tones and brown or dark on darker skin tones. One EM rash may appear in the early stages, and multiple EM rashes may appear anywhere on the body as the disease progresses.

Since LD testing relies on the production of antibodies to *B. burgdorferi*, testing in the earliest stages of disease may produce false negative results. Therefore, diagnosis and treatment may begin with the presence of an EM rash; testing may be negative in this stage of disease. It may take up to 4 to 6 weeks after the tick bite for LD test results to appear positive.

Non-specific LD Symptoms

Many early signs and symptoms of LD are non-specific and may include fever, chills, myalgia and headache. Lacking an EM rash, symptoms may resemble influenza or COVID-

19. However, acute onset of most LD cases occurs in the summer, when influenza is not circulating. In persons presenting with flu-like illness, especially in the summer when flu is not circulating, a high degree of suspicion for LD is recommended. Since COVID-19 may circulate at any time of year, COVID-19 should also be ruled out.

Late Stage LD Symptoms

Late stage LD symptoms may include arthritis, radiculopathy, heart palpitations, dizziness, Lyme carditis, facial palsy, short term memory loss, and rarely meningitis or encephalitis. LD testing is highly specific and sensitive in the later stages of diseases and should be conducted in patients presenting with compatible symptoms.

LYME DISEASE TESTING RECOMMENDATIONS

Antibody Testing

In most cases, serum testing is recommended. For persons presenting with compatible symptoms, the following tests may be conducted.

1. Standard two-tier test (STTT)
 - a. The first tier is a serum antibody test and may be an (EIA) or immunofluorescence assay (IFA) for IgM and/or IgG.
 - b. If the EIA/IFA is positive, this will reflex to a Western immunoblot. If this is positive, the STTT is considered positive.
2. Modified two-tier test (MTTT)
 - a. Recently approved MTTTs will run two EIA tests concurrently or sequentially. A positive result on both is considered a positive test result.
 - b. The FDA has approved some MTTT testing platforms at commercial labs.

Antibodies normally persist in the blood for months or even years after the infection is gone; therefore, the test cannot be used to determine if a person no longer has LD. Regular IgG immunoblot testing in persons who have previously been cases is not recommended.

Culture

Less commonly, *B. burgdorferi* may be isolated in culture, however, this may not yield positive results in persons who have LD as *B. burgdorferi* is difficult to isolate in culture.

NAAT Testing

A group-specific NAAT test may also be conducted, however, this has been shown to be less useful for LD caused by *B. burgdorferi* (the predominant cause in Pennsylvania) and more useful in LD caused by *B. mayonii* (the establishment of *B. mayonii* has yet to be documented in Pennsylvania).

Immunohistochemical Assay

In cases in which biopsy or autopsy tissue is obtained, immunohistochemical assays to detect *B. burgdorferi* group-specific antigens may be conducted.

Laboratory Tests that are Not Recommended

- Capture assays for antigens in urine
- Culture, immunofluorescence staining, or cell sorting of cell wall-deficient or cystic forms of *B. burgdorferi*

- Lymphocyte transformation tests
- Quantitative CD57 lymphocyte assays
- “Reverse Western blots”
- In-house criteria for interpretation of immunoblots
- Measurements of antibodies in joint fluid (synovial fluid)
- IgM or IgG tests without a previous ELISA/EIA/IFA

For further information on LD testing and the interpretation of test results, please see [APHL Guidance and Interpretation of Lyme Disease and Serologic Test Results](#) (PDF, 17 pages).

RESOURCES

<https://www.health.pa.gov/topics/disease/Vectorborne%20Diseases/Pages/Tick%20Diseases.aspx>

<https://www.health.pa.gov/topics/disease/Vectorborne%20Diseases/Pages/Lyme.aspx>

For questions, please call your local health department or the Pennsylvania Department of Health at 1-877-PA HEALTH (1-877-724-3258).