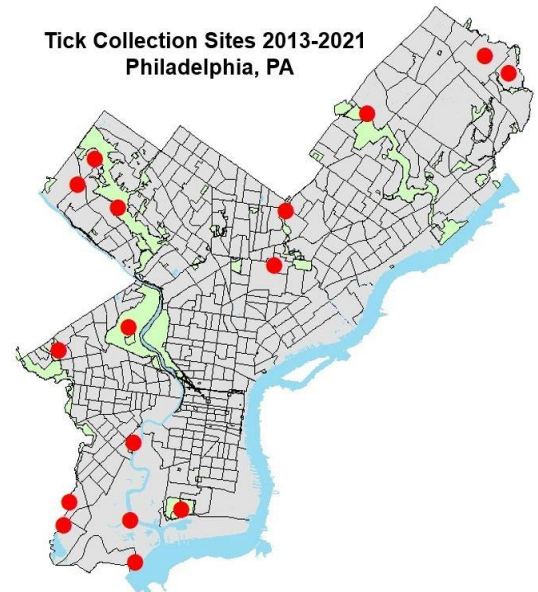


Health Advisory

Tickborne Diseases in Philadelphia: Recognition, Reporting, and Prevention June 24, 2022

The height of the 2022 season for tickborne infections in Philadelphia and surrounding areas is quickly approaching. While Lyme disease is the most frequently diagnosed tickborne illness in Philadelphia residents, cases of babesiosis, anaplasmosis, ehrlichiosis, and Rocky Mountain spotted fever (RMSF) are reported every year. Between 2013 and 2020, over 50% of blacklegged ticks collected in City parks tested positive for Lyme disease. In 2021, blacklegged ticks were identified at four of ten sites sampled from April through August. Of these four sites, two had ticks test positive for Lyme and babesiosis.



Providers should also be aware of emerging tickborne infections, like Powassan virus and *Borrelia miyamotoi* that are transmitted by blacklegged ticks. In Philadelphia, Powassan was first identified in ticks collected in November 2019. In May 2020, the first Powassan virus infection was diagnosed in a resident of the City. This resident was likely infected in another PA county. *B. miyamotoi* has been detected in ticks in PA and causes a relapsing febrile illness. As of 2020, Lone Star ticks, capable of transmitting Heartland and Bourbon viruses, have been identified in Philadelphia.

Many tickborne diseases have symptoms similar to COVID-19. During months of increased tick activity (now through October), patients presenting with rash, “flu-like” symptoms, including fever, fatigue, and lymphadenopathy, or altered mental status should also be evaluated for tickborne illnesses. See Table 1 for further details on tickborne disease symptoms and diagnostic testing. Please remember to report all suspected or confirmed cases of babesiosis, anaplasmosis, ehrlichiosis, RMSF, and Lyme disease (including clinically-diagnosed erythema migrans) within 5 days to PDPH by telephone at (215) 685-6748 or fax at (215) 238-6947. For uninsured and underinsured patients, free Lyme disease testing is available through the Pennsylvania Department of Health’s Bureau of Laboratories. For tickborne disease testing inquiries, call PDPH at (215) 685-6742.

Tick Bite Prevention

Providers should advise patients to take the following tick bite prevention tips when spending time outdoors:

- Wear insect repellent that contains DEET ($\geq 20\%$) or another EPA-approved repellent and reapply as directed. Wearing clothing and gear that have been treated with permethrin will also help repel ticks.
- Walk in the center of trails and stay away from wooded or brushy areas with high grass and leaf litter.
- Conduct a full-body tick check and shower or bathe within two hours of returning indoors. Remove attached ticks with fine-tipped tweezers.
- Place clothes in a dryer on high heat for 10 minutes to kill ticks.
- Check pets for ticks daily, especially after spending time outdoors, and use tick repellent products.

Provider Resources

- Tickborne diseases of the United States. *A Reference Manual for Health Care Providers*: <https://www.cdc.gov/ticks/tickbornediseases/TickborneDiseases-P.pdf>
- Tickborne disease continuing education opportunities through CDC Train: Ehrlichiosis and Anaplasmosis, Lyme disease, RMSF, and Viral Tickborne Diseases (*Free CME*): https://www.cdc.gov/ticks/tbd_education/index.html
- PA-DOH: Lyme and Other Tickborne Diseases Overview for Providers: <https://pa.train.org/pa/course/1087944/>
- Free prevention education materials for patients from the CDC: <https://www.cdc.gov/lyme/toolkit/>

Table 1. Epidemiologic and Clinical Characteristics of Tickborne Infections

| | LYME DISEASE | BABESIOSIS | ANAPLASMOSIS | EHRlichiosis | RMSF | POWASSAN VIRUS | B. MIYAMOTOI |
|--------------------------|---|---|---|---|--|--|---|
| Main Vector | Blacklegged (deer) tick | Blacklegged (deer) tick | Blacklegged (deer) tick | Lone Star Tick | American Dog Tick | Blacklegged (deer) tick | Blacklegged (deer) tick |
| Incubation Period | 3-30 days (from tick bite to rash development, if rash develops) | 1-9+ weeks | 5-14 days | 5-14 days | 3-12 days | 1-4 weeks | Days to weeks, range unknown |
| Rash | Erythema migrans in 70-80% of patients | -- | Rare (<10%) | 30% | Spotted rash ~ 90% of patients | -- | <10% |
| Complications | Early-disseminated disease: A-V block, Bell's palsy, cranial neuritis, lymphocytic meningitis/ encephalitis/ encephalomyelitis, multiple erythema migrans Late-onset: arthritis, radiculoneuropathy | Hepatosplenomegaly, thrombocytopenia, hemolytic anemia, death (5% in untreated cases infected with <i>B.microti</i>) | Difficulty breathing, hemorrhage, thrombocytopenia, leukopenia, LFT increases, renal failure, neurological problems, death (<1% in untreated cases) | Difficulty breathing, bleeding disorders, thrombocytopenia, leukopenia, LFT increases, death (1% in untreated cases) | Hearing loss, thrombocytopenia, leukopenia, mild LFT increases, amputation of extremities or limbs, paralysis, mental disability, death (30% in untreated cases) | Meningitis, confusion, loss of coordination, seizures, death (10% of cases with severe disease) | Fever, chills, and headache lasting 3 days, followed by 7 days without fever, followed by another 3 days of fever. If left untreated, this process can repeat several times |
| Laboratory Tests | A positive Two-Tier test (positive or equivocal enzyme immunoassay(EIA) or immunofluorescent assay (IFA) followed by a positive IgM or IgG western immunoblot (WB) for Lyme disease) ^a OR Modified Two-Tiered Testing with two immunoassays ^{a,b} | Microscopy PCR in whole blood | PCR IgG antibody titer to <i>A.phagocytophilum</i> antigen by IFA demonstrating a four-fold changes in paired serum samples Identification of morulae in the cytoplasm of monocytes or macrophages by microscopic examination | PCR IgG antibody titer to <i>E. chaffeensis</i> antigen by IFA demonstrating a four-fold change in paired serum samples Identification of morulae in the cytoplasm of monocytes or macrophages by microscopic examination | PCR in whole blood during first week of illness onset AND IgG antibody testing by IFA demonstrating a four-fold changes in paired serum samples | PCR IHC IgM and neutralizing antibody testing (<i>neutralizing antibody testing only available at CDC</i>) | PCR Serologies <i>Testing only available at CDC</i> |
| Treatment | Doxycycline, Cefuroxime axetil, Amoxicillin ^c | Atovaquone PLUS Azithromycin; OR Clindamycin PLUS Quinine | Doxycycline ^d | Doxycycline ^d | Doxycycline ^d | None, Supportive Care | Antibiotics and dosages used for Lyme disease |

^aA positive IgM test alone in a patient with illness duration of more than 1 month is not reliable for diagnosing current disease.

^bAPHL Guidance and Interpretation of Lyme Disease Serologic Test Results: <https://www.cdc.gov/lyme/diagnostesting/index.html>

^cFor disseminated Lyme disease, refer to IDSA or Red Book treatment guidelines.

^dClinical suspicion is sufficient to begin treatment. Delay in treatment may result in severe illness and death.