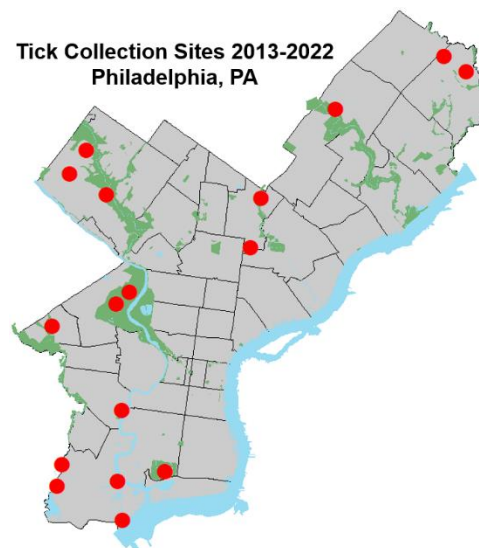


Health Advisory

Tickborne Diseases in Philadelphia: Recognition, Reporting, and Prevention May 31, 2023

The height of the 2023 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 2022, over 50% of blacklegged ticks collected in City parks tested positive for Lyme disease. Since 2013, blacklegged ticks were found at 10 of 17 sites sampled in the City.

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, though they were likely infected in another PA county. *B. miyamotoi* has been detected in ticks in PA and causes a relapsing febrile illness. Lone Star ticks, capable of transmitting Heartland and Bourbon viruses, were first identified in Philadelphia in 2020. As of 2022, Gulf Coast ticks infected with *Rickettsia parkeri* have been identified in two Philadelphia parks.



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 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 (≥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 DISEASE | RELAPSING FEVER (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) | 1-4 weeks after tick bite, longer after blood transfusion | 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 ^a | -- | 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, encephalomyopathy, mononeuropathy multiplex | Hepatosplenomegaly, thrombocytopenia, hemolytic anemia, death (5% in untreated cases infected with <i>B.microti</i>) | Respiratory failure, renal failure, DIC-like coagulopathies, peripheral neuropathies, rhabdomyolysis, hemorrhage, death (<1% in untreated cases) | Renal failure, respiratory failure, cardiac failure, sepsis; most severe in young and elderly, immunocompromised | Altered mental status, coma, cerebral edema, ARDS, necrosis requiring amputation of extremities or limbs, paralysis, multiorgan failure, death (30% in untreated cases) | Meningo-encephalitis, 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 | Two-Tier test including enzyme immunoassay (EIA) or immunofluorescent assay (IFA) followed by an IgM or IgG western immunoblot (WB) for Lyme disease if EIA or IFA is positive OR Modified Two-Tiered Testing with two immunoassays ^{b,c} | Microscopy (blood smear) PCR in whole blood <i>Babesia</i> -specific antibody titer by IFA testing for total immunoglobulin (Ig) or IgG | PCR in whole blood during first week of illness onset IgG-specific antibody testing by IFA demonstrating a four-fold change in paired serum samples Immunohistochemical (IHC) staining of organism from skin, tissue, or bone marrow biopsies | PCR in whole blood during first week of illness onset IgG-specific antibody testing by IFA demonstrating a four-fold change in paired serum samples IHC | IgG-specific antibody testing by IFA demonstrating a four-fold change in paired serum samples PCR in whole blood during first week of illness onset or in skin biopsy of rash lesion IHC | Virus-specific IgM antibody test in serum or CSF, confirmed by plaque reduction neutralization test (primarily available at CDC) RT-PCR in acute CSF specimens or tissues | PCR in blood or CSF Serologies |
| Treatment | Doxycycline, Cefuroxime axetil, Amoxicillin ^d Prophylaxis after tick bite: single dose of Doxycycline | Atovaquone PLUS Azithromycin; OR Clindamycin PLUS Quinine | Doxycycline ^d | Doxycycline ^d | Doxycycline ^d | Supportive Care | Doxycycline, Amoxicillin |

^aPatients presenting with EM rash should be diagnosed clinically and treated without diagnostic testing

^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/diagnostictesting/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.