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Tickborne Diseases in Philadelphia: Recognition, Reporting, and Prevention

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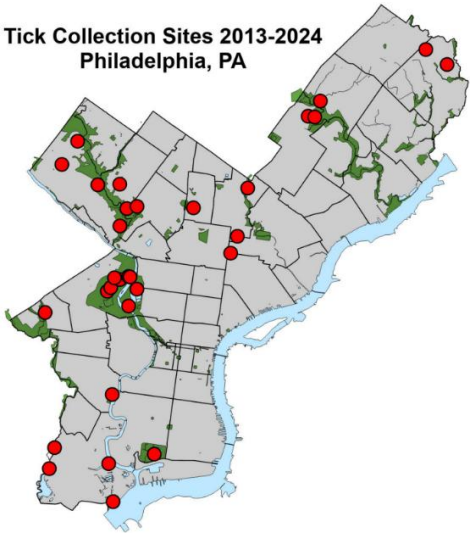
The height of the 2025 season for tickborne infections in Philadelphia and surrounding areas is here. While Lyme disease is the most frequently diagnosed tickborne illness in Philadelphia residents, cases of babesiosis, anaplasmosis, ehrlichiosis, and Rocky Mountain spotted fever (RMSF) are reported every year. Since 2013, blacklegged ticks were found at 22 of 32 sites sampled in the City. Approximately 50% of pooled blacklegged tick samples collected at these sites between 2013 and 2024 tested positive for Lyme disease.



Providers should also be aware of emerging tickborne infections, like Powassan virus and *Borrelia miyamotoi*, that are transmitted by blacklegged ticks. Both pathogens have been identified in ticks collected in the City and across the state. In recent years, Pennsylvania has reported human cases of both annually. A Philadelphia resident was diagnosed with Powassan virus in May 2020, though it was believed to have been acquired in another PA county. *B. miyamotoi* has caused relapsing febrile illness among fewer than 35 residents outside Philadelphia. As the range of Lonestar ticks expands, the risk of infections like Alpha-gal Syndrome (AGS, red meat allergy), and Heartland and Bourbon viruses increases. Lonestar ticks were first identified in Philadelphia in 2020 and continue to be identified annually. With an increase in voluntary reporting, the role of blacklegged tick bites in Alpha-gal Syndrome is also being assessed. As of 2022, Gulf Coast ticks infected with *Rickettsia parkeri* have been identified in two Philadelphia parks. Asian longhorned ticks, first identified in Philadelphia in 2019, are also expanding with ongoing evaluation of their potential to carry and spread diseases including RMSF, Heartland virus and Powassan virus.

Many tickborne diseases have initial symptoms similar to respiratory viruses. 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 report all confirmed, probable, and suspect cases of babesiosis, anaplasmosis, ehrlichiosis, RMSF, and Lyme disease through routine electronic laboratory reporting, fax at (215) 238-6947, or telephone at (215) 685-6748. 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 and suspected emerging tickborne infections, call PDPH at (215) 685-6741 during business hours.

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 to help repel ticks.
- Walk in the center of trails. 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*
- Tickborne Disease Continuing Education Opportunities through CDC Train: Ehrlichiosis (*Free CME*)
- PADOH: Lyme and Other Tickborne Diseases Overview for Providers
- PADOH 2025-PAHAN-791-04-21-ADV: Lyme Disease and Other Tickborne Diseases in Pennsylvania
- Free prevention education materials

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 tick	Blacklegged tick	Blacklegged tick	Lone Star tick	American dog tick	Blacklegged tick	Blacklegged 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	3 days to 6 weeks, exact range unknown
Rash	Erythema migrans in 70-80% of patients[a]	--	Rare (<10%)	30%	Spotted rash ~90% of patients	--	Rare (<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 *B.microti*)	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, immuno-compromised	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 can relapse in 10-40% of patients. 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 and IgG western immunoblot (WB) for Lyme disease if EIA or IFA is positive[b] OR Modified Two-Tiered Testing with two immunoassays[b,c]	Microscopy (blood smear)[e] PCR in whole blood[e] *Babesia*-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 with 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 with 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[e] IHC	Virus-specific IgM antibody test in serum or CSF, confirmed by plaque reduction neutralization test[e] RT-PCR in acute CSF specimens or tissues[e]	PCR in blood or CSF[e] Serologies[e]
Treatment	Doxycycline, Cefuroxime axetil, Amoxicillin[d] Prophylaxis after tick bite: single dose Doxycycline	Atovaquone & Azithromycin; OR Clindamycin & Quinine	Doxycycline[f]	Doxycycline[f]	Doxycycline[f]	Supportive Care	Doxycycline, Amoxicillin

[a]Patients presenting with EM rash should be diagnosed clinically and treated without diagnostic testing.
[b]A positive IgM test alone in a patient with illness duration of more than 1 month is not reliable for diagnosing current disease.
[c]CDC and APHL Guidance and Interpretation of Lyme Disease Serologic Test Results: https://www.cdc.gov/lyme/hcp/diagnosis-testing/index.html.
[d]For disseminated Lyme disease, refer to IDSA or Red Book treatment guidelines.
[e]Diagnostic assistance through the PADOH Bureau of Laboratories (BOL) and CDC is available including confirmatory PCR or microscopy (e.g., malaria vs *Babesia*). Contact PDPH to coordinate.
[f]Clinical suspicion is sufficient to begin treatment. Delay in treatment may result in severe illness and death.