

2024 Health Advisory #13 Tick-borne Disease Advisory

- Lyme disease is the most reported tick-borne disease (TBD) among New Yorkers, followed by babesiosis and anaplasmosis.
- Most New Yorkers acquire TBDs while outside of New York City (NYC). Locally acquired cases of Lyme disease and babesiosis are reported from Staten Island, with sporadic cases of anaplasmosis and ehrlichiosis. Rarely, locally acquired TBDs are reported from the Bronx.
- Blacklegged, lone star, and Gulf coast ticks are present in Staten Island and the Bronx, all of which have tested positive for several TBD pathogens.
- Find detailed guidance on how to identify, [diagnose](#) and treat TBDs:
 - The [Centers for Disease Control and Prevention \(CDC\)](#), with [free continuing education](#) on the assessment, evaluation, and clinical implications of Lyme disease and other TBDs
 - The Infectious Disease Society of America practice guidelines (IDSA) for [Lyme disease](#) and [babesiosis](#)
 - The NYC Department of Health and Mental Hygiene [Tick-borne Disease Diagnostic Reference: Poster for Providers](#) and information about [ticks](#), [Lyme disease](#), [anaplasmosis](#), [babesiosis](#) and other TBDs

May 13, 2024

Dear Colleagues,

With the weather warming, be on the alert for tick-borne diseases (TBDs) as people spend more time outside in tick habitats. [Ticks](#) emerge when snow melts and stay active until temperatures fall below freezing. Warmer average temperatures driven by climate change has led to longer warm seasons, earlier spring seasons, and shorter and milder winters, extending the geography and seasonality of ticks. This advisory presents key epidemiologic findings and updates on reportable TBDs and tick surveillance in NYC.

Recent travel to tick endemic areas (such as upstate New York, Long Island, other parts of the northeast, the mid-Atlantic region, and the upper Midwest) or residency in Staten Island should prompt consideration of TBDs in people with a compatible clinical presentation. A known history of a tick bite is not a prerequisite for consideration, as only a small proportion of people with TBDs recall being bitten by a tick.

NYC TBD Epidemiology and 2023 Overview

Lyme disease is the most reported TBD among New Yorkers, followed by anaplasmosis and babesiosis, which are all transmitted by the blacklegged tick.

Manhattan and Brooklyn have the highest number of TBD reports, with most people reporting a history of travel outside NYC during the exposure period. Tick species that are vectors for TBD pathogens are uncommon in NYC with the exception of Staten Island and focal areas of the northern Bronx. Local transmission of TBDs is reported in Staten Island but is rare in the Bronx likely due to the limited presence of ticks.

Cases of TBDs have been trending upward. In 2023, NYC preliminarily reported **3,323 cases of Lyme Disease** (2,482 newly diagnosed cases and 741 new positive results for cases from prior years), **116 cases of babesiosis**, **77 cases of anaplasmosis**, 7 cases of ehrlichiosis, 5 cases of Rocky Mountain spotted fever, and 0 cases of rickettsialpox (see Figures 1 and 2 below). Changes in the national Lyme disease case definition implemented in 2022 led to a substantial, though expected, increase in cases, which persisted in 2023.

Local Transmission of TBDs in NYC

Tick surveillance by the NYC Health Department continues to find the blacklegged tick widely established in Staten Island and focal areas of the Bronx, including Pelham Bay Park and Hunter Island. It is not known to be established in other areas of NYC. Tick testing has detected TBD pathogens, most commonly *Borrelia burgdorferi*, and to a lesser extent *Anaplasma phagocytophilum*, *Babesia microti* and *Borrelia miyamotoi* (Tables 1, 2, and 3).

- Among Staten Island cases, 25% (2) of Lyme disease cases (with a reported Erythema migrans rash) and 62.5% (5) of babesiosis cases reported no history of travel during the incubation period, suggesting local transmission.
- The Bronx had 16.7% (2) of babesiosis cases with no history of travel.
- Locally acquired cases of spotted fever group rickettsioses, including rickettsialpox and RMSF, while rare, have been reported in the past from all five boroughs.

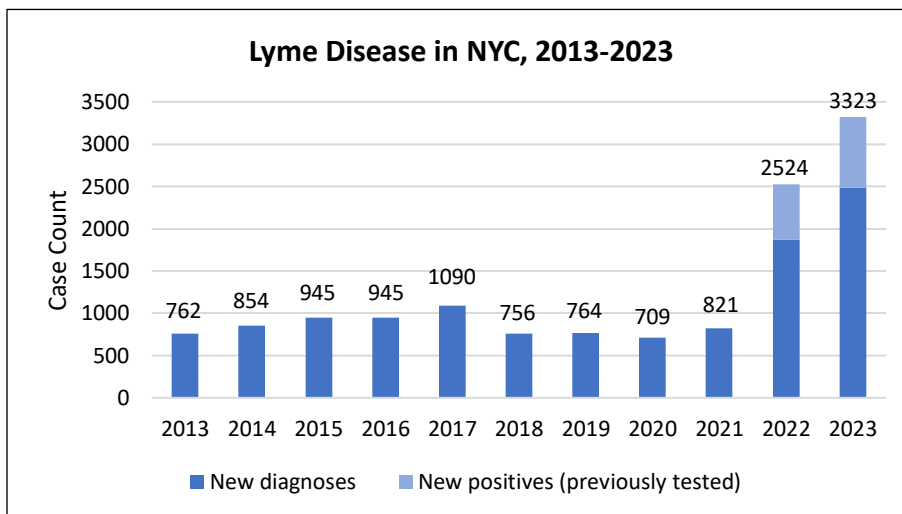


Figure 1 to the left shows Lyme disease case counts in NYC for 2013-2023. Each year has the corresponding case count above. Years 2022 and 2023 are split to show new diagnoses and new positive results for cases who previously tested positive in a prior year.

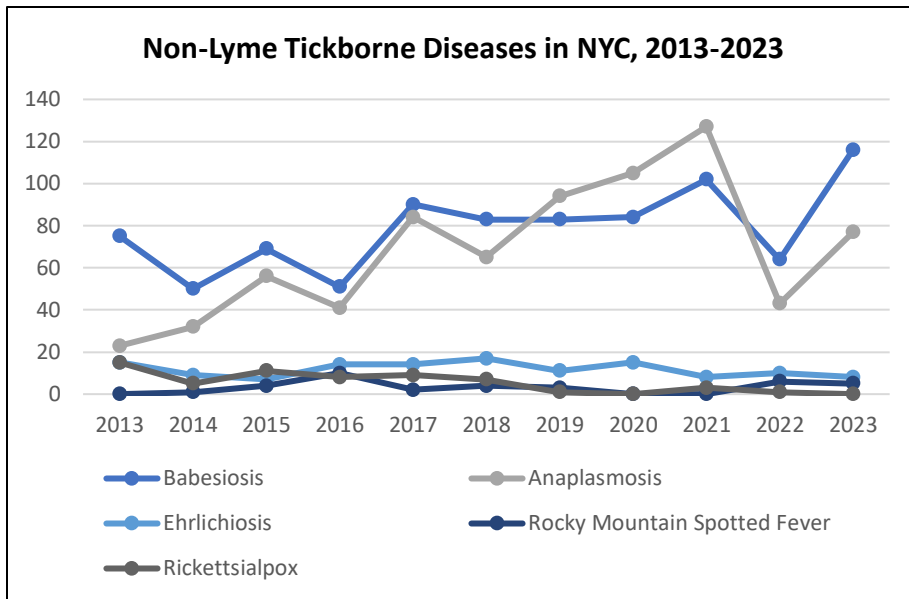


Figure 2 to the left shows tickborne disease case counts for babesiosis, anaplasmosis, ehrlichiosis, Spotted fever rickettsiosis (e.g., Rocky Mountain spotted fever), and rickettsialpox in NYC for 2013-2023.

Rare and Emerging TBDs

- **Powassan virus** has been detected in a small number of blacklegged ticks in Staten Island and the Bronx. There has been only one reported case of **Powassan virus** disease in a NYC resident; the individual was infected while in the Hudson Valley in 2018.
- ***Borrelia miyamotoi*** has been detected in blacklegged ticks from Staten Island and the Bronx. There are commercially available tests for *B. miyamotoi*. The disease is not reportable, though the number of human infections is believed to be low.
- ***Rickettsia parkeri*** has been detected in Gulf Coast ticks in Staten Island; however, there have been no reports of *R. parkeri* rickettsiosis among NYC residents.
- **Heartland and Bourbon viruses** have been detected in lone star ticks collected in parts of New York State but have not been detected among ticks collected in NYC or among NYC residents.
- **Alpha-gal syndrome (AGS)** is a potentially life-threatening allergic reaction to meat and other mammalian products, associated with the bite of a lone star tick. AGS is reportable by laboratories to the NYC Department of Health and Mental Hygiene (Health Department) as of November 2023.

Clinical and Testing Considerations for TBDs

Detailed guidance on how to identify, [diagnose](#), and treat TBDs is available in reference manuals for healthcare providers from the [NYC Health Department](#), the [CDC](#), and from the IDSA guidelines for [Lyme disease](#), and [babesiosis](#).

Diagnostic testing can help guide clinical management, but do not delay treatment if a TBD is suspected in order to prevent severe disease. Coinfection is uncommon but more likely associated with TBDs caused by blacklegged ticks. **Symptoms** may be nonspecific and include **fever, headache, myalgia, and gastrointestinal manifestations**. An **erythema migrans rash**

occurs in 70-80% of Lyme disease cases and can be an early indicator. Appearance of the rash can vary widely; find images on the [CDC website](#).

- **Lyme disease: Modified two-tier test (MTTT)** is the preferred method (EIA of IFA followed by another EIA). Standard two-tier test can still be performed (EIA or IFA followed by a Western Bot for IgG and IgM).
- **Human Anaplasmosis and babesiosis: PCR** (and blood smear for babesiosis) on whole blood within the first week of illness is the preferred method.
- Testing for **rare or emerging TBDs**, particularly viral diseases including Heartland and Bourbon viruses, may not be available at commercial labs. For diagnostic assistance, call The NYC Health Department Provider Access Line at 866-692-3641.

Tick Removal and Lyme Disease Prophylaxis

If ticks are found crawling and unattached on skin, they are not considered a risk for TBD transmission. **Unattached ticks** can be killed by placing in rubbing alcohol. **Attached ticks** should be removed promptly with fine-tipped tweezers, as demonstrated in the [New York State Department of Health \(NYSDOH\) tick removal tutorial](#). Advise patients to watch for symptoms including fever and rash.

A single [prophylactic dose of doxycycline](#) (200 mg for adults or 4.4 mg/kg for children of any age weighing less than 45 kg) given **within 72 hours of removing an engorged blacklegged tick** (typically attached for at least 36 hours) may be used to reduce the risk of Lyme disease for people bitten **while in a highly endemic area** (this would include Staten Island and the surrounding northeastern states). To help determine eligibility for Lyme disease prophylaxis, advise patients to save the tick in a sealed bag or container for identification. Prophylaxis has not been shown as effective in preventing other tickborne diseases.

Testing ticks for pathogens is generally not recommended. Ticks with a positive test result may not have been attached long enough to transmit the pathogens, and even with a negative test result the patient might have unknowingly been bitten by a different tick.

Reporting Cases

Laboratories report all positive results for Lyme disease, babesiosis, spotted fever group rickettsioses, ehrlichiosis, anaplasmosis, and alpha-gal syndrome to the NYC Health Department. Report suspected cases based on clinical suspicion for rickettsialpox. Cases of transfusion-associated TBDs must also be reported to the NYSDOH Blood Resources Program by completing an [Incident Form](#) and submitting it via email to brp@health.ny.gov. Report cases to the NYC Health Department via [Reporting Central](#) (preferred), mailing or faxing a [Universal Reporting Form](#), or calling the Provider Access Line at 866-692-3641.

Additional Resources

NYC Health Department

- [Lyme Disease in NYC, 2021 and 2022](#)
- [Tick-borne Diseases in NYC, 2021 and 2022](#)

- [Zoonotic and Vector-borne Provider Information](#)
- [Tick-borne Disease Diagnostic Reference: Poster for Providers](#)
- [Ticks webpage](#), or call 311 or the Provider Access Line at 866-692-3641 to order free copies:
 - [NYC Tick ID and Removal Wallet Card](#) (also in [Spanish](#), [Russian](#), [Italian](#))
 - [Ticks taking over? Take back your yard](#) (also in [Spanish](#))
 - [All About Ticks: A Workbook for Kids and Their Parents](#) (also in [Spanish](#))

CDC and APHL (Association of Public Health Laboratories)

- [CDC Information about Ticks](#)
- [CDC Tickborne Disease Continuing Education](#)
- [CDC Clinical Practice Guidelines](#)
- [APHL Suggested Reporting Language, Interpretation and Guidance Regarding Lyme Disease Serologic Results](#)

Appendix

	2018	2019	2020	2021	2022	2023
Staten Island	5.7	1.5	2.1	4.0	4.2	3.9
The Bronx	22.9	6.1	2.9	4.2	7.5	7.0

	The Bronx	Staten Island
<i>Borrelia burgdorferi</i>	53.8%	35.7%
<i>Anaplasma phagocytophilum</i>	3.1%	2.9%
<i>Babesia microti</i>	8.5%	6.7%
<i>Borrelia miyamotoi</i>	1.5%	4.4%

Table 3. Tickborne Disease Summary Table

Disease	Pathogen	Tick Vector	Tick Vector Presence in NYC
Lyme disease	<i>Borrelia burgdorferi</i>	Blacklegged tick (<i>Ixodes scapularis</i>)	Blacklegged tick is widely established in Staten Island, and focal areas of the Bronx, including Pelham Bay Park and Hunter Island. It is not known to be established in other areas of NYC.
Babesiosis	<i>Babesia microti</i>		
Anaplasmosis	<i>Anaplasma phagocytophilum</i>		
Powassan virus disease	Powassan or deer tick virus	Blacklegged tick and Groundhog tick (<i>Ixodes cookei</i>)	Groundhog tick has not been found in NYC.
Ehrlichiosis	<i>Ehrlichia chaffeensis</i>	Lone star tick (<i>Amblyomma americanum</i>)	Lone star tick found in Staten Island and northern Bronx. In 2023 the tick density in Staten Island decreased from 2.4 ticks/1000m ² in 2022 to 1.9 ticks/1000m ² , and remained about the same in the Bronx, with 0.1 ticks/1000m ² in 2021 and 2022, and 0.4 ticks/1000m ² in 2023. Ticks with BRBV and HRTV have been detected in Kansas, Oklahoma, Missouri, and Long Island, New York.
Bourbon and Heartland virus diseases	Bourbon virus (BRBV) and Heartland virus (HRTV)		
Spotted fever group rickettsioses (SFGR)*	Several <i>Rickettsia</i> species, primarily <i>R. rickettsii</i> and <i>R. parkeri</i>	American dog tick (<i>Dermacentor variabilis</i>) for <i>R. rickettsii</i> in NYC	American dog tick found in all boroughs. The tick density has been about 1.0 ticks/1000m ² in Staten Island and 2.0 ticks/1000m ² in the Bronx in 2021 and 2022, in 2023 in the Bronx population decreased to 0.4 ticks/1000m ² . The Gulf Coast tick was first detected in Staten Island in 2020 and is now considered established.
		Gulf Coast tick (<i>Amblyomma maculatum</i>) for <i>R. parkeri</i>	
	Currently, there is no evidence this tick transmits TBD pathogens to humans in the US, but research is ongoing	Asian longhorned tick (<i>Haemaphysalis longicornis</i>)	This tick is widespread with increasing population densities in Staten Island and certain areas of the Bronx. In 2023 tick density in Staten Island measured at 17.8 ticks/1000m ² in comparison with 2022, with 42.4 ticks/1000m ² and 2021 with 23.7 ticks/1000m ² . In the Bronx, the 2023 tick density measured at 56 ticks/1000m ² density, a decline from 2022 with 181 ticks/1000m ² and more comparable to 41 ticks/1000m ² in 2021.

**Rickettsia akari*, the causative agent of rickettsialpox, is transmitted by the mouse mite, not a tick. It is part of the SFGR and can cross react on serologic assays with other SFGR. Rickettsialpox often presents as an acute febrile illness often accompanied by headache, myalgia, and rash and an ulcerated, necrotic eschar at the site of tick or mite attachment. The eschar often appears before the onset of fever.