



NEW YORK CITY DEPARTMENT OF
HEALTH AND MENTAL HYGIENE
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Commissioner

2015 DOHMH Advisory #12: Tick-borne Disease Advisory

Please share with your colleagues in Internal and Family Medicine, Pediatrics, Infectious Disease, Infection Control, Laboratory Medicine, Hematology, Cardiology, Neurology, Rheumatology, Critical Care and Emergency Medicine:

- **The following tick-borne diseases are reportable in New York City (NYC): Lyme disease, Rocky Mountain spotted fever (RMSF), babesiosis, ehrlichiosis and anaplasmosis.**
 - All with the exception of RMSF are associated primarily with travel outside of NYC.
- **New and updated resources for tick-borne diseases are available on the DOHMH website.**
 - Refer to the *Reference Manual for Physicians on Tick Borne Diseases in the New York City Area* for extensive details and guidance on identification, diagnosis, treatment and prevention <http://www.nyc.gov/html/doh/downloads/pdf/ehs/tick-borne-dx-physician.pdf>.

June 17, 2015

Dear Colleagues,

From May through November, New York City (NYC) clinicians should be on the alert for patients with tick-borne diseases. This advisory presents key epidemiologic findings regarding reportable tick-borne diseases in NYC and reminds clinicians of reporting requirements. Providers are encouraged to refer to the *Reference Manual for Physicians on Tick Borne Diseases in the New York City Area* for extensive details and guidance on identification, diagnosis, treatment and prevention (See <http://www.nyc.gov/html/doh/downloads/pdf/ehs/tick-borne-dx-physician.pdf>).

Recent travel to areas such as upstate New York, Long Island, Connecticut, Massachusetts, Pennsylvania, or New Jersey should prompt consideration of tick-borne diseases. A history of a tick bite is not a prerequisite for considering these diseases in the differential diagnosis for patients with compatible illness, since only a small proportion of patients with these diseases recall having been bitten by a tick. The following tick-borne diseases are reportable in NYC:

1. **Lyme disease:** caused by the bacterium *Borrelia burgdorferi* and transmitted by the *Ixodes scapularis* tick (black-legged or deer tick). This is the most common tick-borne disease affecting New Yorkers. (Table).
2. **Babesiosis:** caused by the parasite *Babesia microti* and transmitted by the *I. scapularis* tick
3. **Anaplasmosis:** caused by the bacterium *Anaplasma phagocytophilum* and transmitted by the *I. scapularis* tick
4. **Rocky Mountain spotted fever (RMSF):** caused by the bacterium *Rickettsia rickettsii* and transmitted by the *Dermacentor variabilis* (American dog) tick. Among reportable tick-borne diseases, only RMSF has been known to be transmitted by ticks within all five boroughs of NYC.
5. **Ehrlichiosis:** caused primarily by the bacterium *Ehrlichia chaffeensis* and transmitted by the *Amblyomma americanum* (lone star) tick
6. **Powassan disease:** caused by either Powassan virus, which is transmitted by *I. cookei*, or Deer Tick virus which is transmitted by *I. scapularis*

NYC Tick-borne Disease Epidemiology

In 2014, there was an overall decrease in the number of cases of tick-borne diseases compared to 2013, except for Lyme disease and anaplasmosis (Table and Figure). Rates of Lyme disease, anaplasmosis, ehrlichiosis, and babesiosis are significantly higher in Manhattan residents than in residents of the other boroughs. Most cases reported a history of travel outside the city during the incubation period. Patients with these diseases had

traveled most commonly to upstate New York, Long Island, Connecticut, New Jersey, and Massachusetts. Locally-acquired RMSF cases have been reported most frequently from Brooklyn, the Bronx and Staten Island.

Highly endemic areas for *B. microti* in the greater NYC region include Suffolk County (especially Fire Island and Shelter Island) and parts of Connecticut and New Jersey. Reports of transfusion-associated babesiosis continue, with 4 cases identified in 2014. The incubation period for transfusion-associated babesiosis is two to nine weeks. Consider babesiosis in the differential diagnosis for patients with febrile illnesses and/or hemolytic anemia who have received blood components or transplanted organs in the preceding three months. Because these patients often have co-morbidities, and the potential exists for infection with other pathogens, consideration of babesiosis as a possible etiology may be delayed.

NYC Tick Surveillance Data

Information on tick populations present in NYC is limited. Periodic tick surveillance in a small number of parks has been conducted since 1995 and annual surveillance by the Health Department started in 2009. .

- ***Ixodes scapularis*** (blacklegged tick or deer tick) is the vector for Lyme disease, babesiosis, anaplasmosis and Powassan disease. There is no evidence this tick is widely established in NYC. Surveillance from 2013 identified small numbers of *I. scapularis* ticks in Pelham Bay Park in the Bronx and Clay Pit Pond Park and High Rock Park in Staten Island; 13% of the ticks collected from these areas tested positive for *Borrelia burgdorferi*, suggesting that local transmission of Lyme disease could occur in these focal areas. Additionally, 2013 surveillance also identified very small numbers in Alley Pond Park in Queens and Floyd Bennett Field in Brooklyn, none of which were positive for *B burgdorferi*. More importantly, significant numbers of *I. scapularis* ticks are found in counties and states surrounding NYC. Testing of ticks collected in the Hudson Valley by the NYS DOH found infections rates as high as 40-50% for *Borrelia burgdorferi*, 1-3% for *Babesia microti* and 7-15% for *Anaplasma phagocytophilum*.
- ***Dermacentor variabilis*** (American dog tick) is the vector for RMSF, and has been detected in great abundance in all boroughs of NYC.
- ***Amblyomma americanum*** (lone star tick) is the vector for ehrlichiosis. This tick is not widely established in NYC.

Clinical Description and Guidance on the Laboratory Diagnosis of Tick-borne Diseases

Detailed guidance on identifying, diagnosing and treating tick-borne diseases can be found in two new online reference manuals for health care providers about tick-borne diseases from the NYC Health Department and the CDC (see links below). Additionally, the Infectious Diseases Society of America treatment guidelines are available online at <http://cid.oxfordjournals.org/content/43/9/1089.full.pdf+html>.

Blood smear and polymerase chain reaction (PCR) should be used to diagnose babesiosis. Anaplasmosis and ehrlichiosis are best diagnosed using PCR during the first week of illness as antibodies may not be detectable for up to 10 days after illness onset. Paired serology demonstrating a four-fold change in IgG by immunofluorescence assay (IFA) can be used to diagnose anaplasmosis, ehrlichiosis and RMSF. A clinical diagnosis of Lyme disease can be made in patients who present with an erythema migrans (EM) rash, which is often present before antibodies are detectable. Serologic testing for Lyme disease should adhere to the CDC recommended two-step process in which an initial enzyme immunoassay (EIA) that is positive or equivocal (if negative, no further testing is needed) should be followed by a Western blot test.

Tick Bite Management

Attached ticks should be removed promptly with fine-tipped tweezers, ensuring that mouthparts have not been left in the skin. Guidelines developed by the Infectious Diseases Society of America support limited use of a single dose of doxycycline as prophylaxis for Lyme disease when all of the following conditions are met:

- The patient has traveled to a Lyme-endemic region
- Tick has been attached for ≥36 hours, based on engorgement or history
- Prophylaxis can be started within 72 hours of tick removal
- Tick can be reliably identified as *I. scapularis*
- Patient does not have any contraindications to treatment with doxycycline

Additional Resources Available on the DOHMH and other websites

**DOHMH - <http://www.nyc.gov/html/doh/html/diseases/zoo.shtml>
<http://www.nyc.gov/html/doh/html/environmental/ticks.shtml>**

- *City Health Information Bulletin on Preventing and Managing Lyme and Other Tick-Borne Diseases*
- *Tick-Borne Diseases in the NYC Area, A Physician's Reference Manual NEW-UPDATED!*
- *How to Prevent Tick Bites* brochure from the Health Department is available in English and Spanish. Copies may also be ordered by calling 311.
- Information on ticks, tick bite prevention and repellents

CDC – <http://www.cdc.gov/ticks/index.html>

- For links to the CDC Tick-borne Diseases of the United States, A Reference Manual for Health Care Providers, Webinar on novel and emerging tickborne diseases, and disease specific information
 - Download the app at <http://www.cdc.gov/mobile/applications/mobileframework/tickborne-diseases.html>

TICK ENCOUNTER RESOURCE CENTER OF THE UNIVERSITY OF RHODE ISLAND- <http://www.tickencounter.org/>

NYS DOH - <http://www.health.ny.gov/diseases/communicable/lyme/tickfree/>

- Tick removal video

Reporting Cases

Clinicians and laboratories must report all cases of Lyme disease, babesiosis, RMSF, ehrlichiosis, anaplasmosis, and Powassan disease to the NYC Health Department. Cases of transfusion-associated babesiosis must also be reported to the NYSDOH Blood and Tissue Resources Program at 518-485-5341 and your hospital's transfusion service.

Cases may be reported by telephone (347-396-2600), mail (Bureau of Communicable Disease, 2 Gotham Center, CN# 22A, 42-09 28th Street, Queens, New York 11101-4132), or fax (347-396-2753) using the Universal Reporting form (URF), or the electronic URF. The URF and instructions may be downloaded from the Health Department website at <http://home2.nyc.gov/html/doh/html/hcp/hcp-urf.shtml>. Visit <http://home2.nyc.gov/html/doh/html/hcp/hcp.shtml> to join NYC-MED to submit a URF online.

As always, we appreciate your continued collaboration with our efforts to monitor trends in these diseases in New York City.

Sincerely,

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TABLE. Tick-borne Diseases in NYC Residents by Year of Diagnosis*

	2002	2003	2004	2005	2006	2007	2008*	2009	2010	2011	2012	2013	2014
Babesiosis	16	25	16	18	39	24	39	43	37	57	28	75	50
Anaplasmosis	17	8	29	24	29	27	17	9	11	36	20	23	32
Ehrlichiosis	3	3	19	6	16	16	5	10	5	4	11	15	9
RMSF	10	14	23	7	24	28	11	8	11	12	7	0	1
Lyme Disease*	280	224	357	399	310	416	817*	1053	727	729	543	758	848

**Probable cases of Lyme disease were added to the total case count starting 2008*

FIGURE. Tick-borne Diseases in NYC Residents by Year of Diagnosis

