NEW YORK CITY DEPARTMENT OF
HEALTH AND MENTAL HYGIENE
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Commissioner

2016 DOHMH Advisory #26: 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:

- **Starting in 2014, Staten Island has had an increasing number of residents with Lyme disease who did not report travel outside New York City (NYC).**
  - **Isolated reports of suspected local transmission of Lyme and other tick-borne diseases (TBDs), including Rocky Mountain spotted fever (RMSF), have also been reported in the other boroughs.**
  - **In general, TBDs are associated primarily with travel outside of NYC.**
- **The following TBDs are reportable in NYC: Lyme disease, RMSF, babesiosis, ehrlichiosis, anaplasmosis, and Powassan disease.**
- **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://www1.nyc.gov/assets/doh/downloads/pdf/ehs/tick-borne-dx-physician.pdf .**

August 1, 2016

Dear Colleagues,

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 (TBD) in NYC and reminds clinicians of reporting requirements. Please 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://www1.nyc.gov/assets/doh/downloads/pdf/ehs/tick-borne-dx-physician.pdf or download the app developed by CDC http://www.cdc.gov/mobile/applications/mobileframework/tickborne-diseases.html.

Recent travel to areas such as upstate New York, Long Island, Connecticut, Massachusetts, Pennsylvania, or New Jersey should prompt consideration of TBDs. 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 being bitten by a tick. The following TBDs are reportable in NYC:

Disease	Organism	Vector	Endemic US States	Ticks in NYC
Lyme disease	*Borrelia burgdorferi*	*Ixodes scapularis* (blacklegged or deer tick)	Northeast and mid-Atlantic esp. CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT, VA, & MN, WI	Blacklegged tick found in limited numbers, mostly in Staten Island and the northern Bronx
Babesiosis	*Babesia microti*		Northeast & MN, WI	
Anaplasmosis	*Anaplasma phagocytophilum*		Northeast, esp. NY, CT, NJ, RI & MN, WI	
Ehrlichiosis	*Ehrlichia chaffeensis*	*Amblyomma americanum* (lone star tick)	Southeast and south-central	Lone star tick rare in NYC
Rocky Mountain spotted fever	*Rickettsia rickettsii*	*Dermacentor variabilis* (American dog tick)	Throughout US, esp. NC, OK, AR, TN, MO	Dog tick found in abundance in all 5 boroughs
Powassan disease	*Powassan or deer tick virus*	*Ixodes cookei (groundhog tick)* or *Ixodes scapularis*	Cases reported from MN, WI, NY, ME, MA, NH, NJ, PA, & VA since 2004	Groundhog tick not identified in NYC; Blacklegged tick found in limited areas

NYC Tick-borne Disease Epidemiology

In 2015, there was an overall increase in the number of TBD cases compared to 2014, except for ehrlichiosis (Figure and Tables 1-5). Overall, Lyme disease is the most commonly reported TBD in NYC. Rates of TBDs are typically significantly higher in residents of Manhattan compared with other boroughs. Most early Lyme disease cases (defined as presence of erythema migrans rash) report a history of travel outside the city during the incubation period, most commonly to upstate New York, Long Island, Connecticut, New Jersey, and Massachusetts. However, incidence rates of Lyme disease in Staten Island have been increasing since 2014, and the borough had the highest rate of Lyme disease in NYC in 2015 (Table 4a). In addition, over half of interviewed patients with early Lyme disease in Staten Island reported no history of travel during the incubation period (Table 4b). Locally-acquired RMSF cases have been reported most frequently from Brooklyn, the Bronx and Staten Island (Table 5).

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 2015. 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 in NYC is limited. Tick surveillance has been conducted in select parks periodically since 1995 and annually by the Health Department since 2009.

- ***Ixodes scapularis*** (blacklegged tick or deer tick) is not widely established in NYC but increasing numbers have been found in limited areas of NYC, including Clay Pit Ponds and High Rock parks in Staten Island and Pelham Bay Park in the Bronx, but could be present in any natural area.
    - 30% of the ticks collected from these areas tested positive for *Borrelia burgdorferi.*
    - Very small numbers have been found in Alley Pond Park in Queens and Floyd Bennett Field in Brooklyn, none of which were positive for *B. burgdorferi*.
    - Significant numbers of *I. scapularis* ticks are found in counties and states surrounding NYC. Testing of ticks collected in the Hudson Valley by the New York State Department of Health Department (NYSDOH) 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) has been detected in great abundance in all boroughs of NYC.
- ***Amblyomma americanum*** (lone star tick) is not widely established in NYC.

Overview of Diagnosis

Detailed guidance on identifying, diagnosing and treating TBDs can be found online in reference manuals for health care providers from the NYC Health Department, the Centers for Disease Control and Prevention (CDC), and the Infectious Diseases Society of America (IDSA) (see links below). 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 is followed by a Western blot test (if negative, no further testing is needed).

Tick Bite Management and Lyme Prophylaxis

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

- 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

Resources on the DOHMH and other websites

DOHMH – http://www1.nyc.gov/site/doh/health/health-topics/zoonotic-and-vectorborne-diseases.page
http://www1.nyc.gov/site/doh/health/health-topics/ticks.page

Includes links to:

- *Tick-Borne Diseases in the NYC Area, A Physician's Reference Manual, 2nd edition*
- *All About Ticks: A Workbook for Kids and Their Parents* (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

Includes links to:

- CDC Tick-borne Diseases of the United States, A Reference Manual for Health Care Providers
- Webinar on novel and emerging tick-borne diseases
- Updated MMWR recommendations for tick-borne rickettsial diseases

Download app: **http://www.cdc.gov/mobile/applications/mobileframework/tickborne-diseases.html**

IDSA http://cid.oxfordjournals.org/content/43/9/1089.full.pdf+html

Tick Encounter Resource Center of the University of Rhode Island http://www.tickencounter.org/

NYS DOH – https://www.health.ny.gov/diseases/communicable/lyme/

- 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 can be reported to DOHMH by logging into **Reporting Central** via NYCMED, by mailing or faxing to 347-396-2632 the paper Universal Reporting Form, or by calling the Provider Access Line at **(**1-866-692-3641**).** If a provider does not already have a NYCMED account, he or she will need to register at the NYCMED link above. Once logged in, Reporting Central can be found in the 'My Applications' section. See the Reporting Central New User Guide (PDF).

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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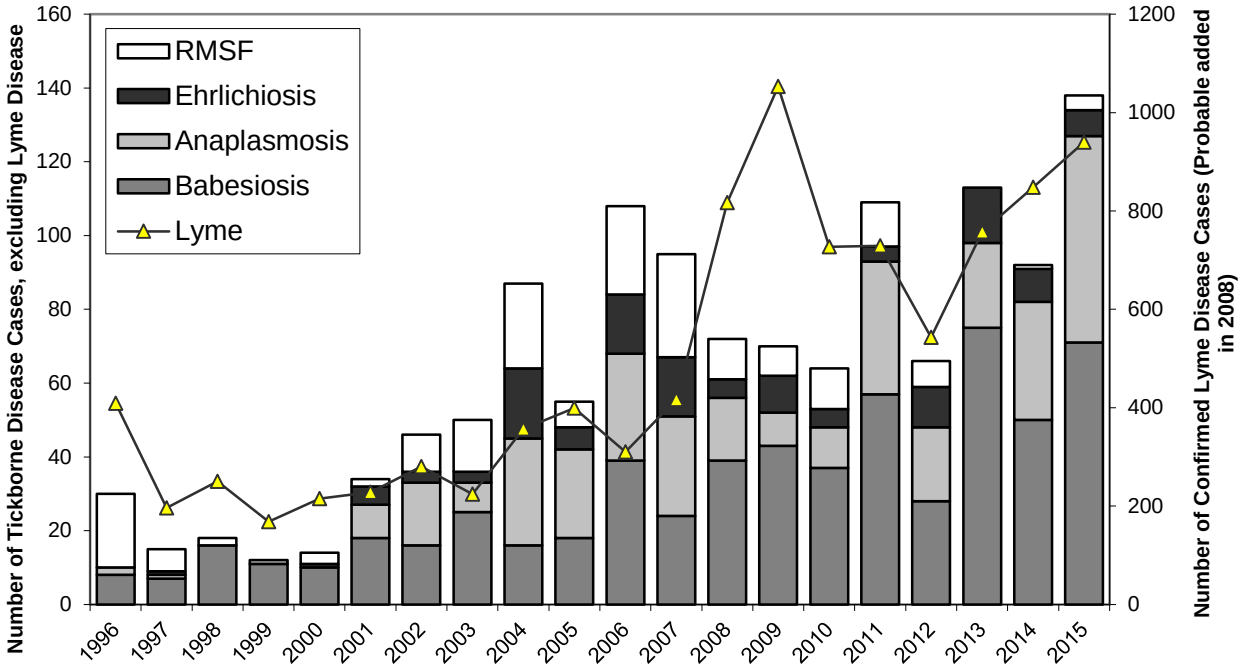
FIGURE. Tick-borne Diseases in New York City Residents by Year of Diagnosis



TABL

1. Anaplasmosis

	2010	2011	2012	2013	2014	2015
Bronx	1	0	0	1	2	0
Brooklyn	0	6	6	2	7	9
Manhattan	9	28	12	19	19	43
Queens	1	2	0	1	4	4
Staten Island	0	0	1	0	0	0
Total	11	36	19	23	32	56

2. Babesiosis

	2010	2011	2012	2013	2014	2015
Bronx	1	4	1	12	7	4
Brooklyn	5	10	5	5	6	9
Manhattan	21	28	16	45	24	40
Queens	9	14	6	12	12	16
Staten Island	1	1	0	1	1	2
Total	37	57	28	75	50	71

3. Ehrlichiosis

	2010	2011	2012	2013	2014	2015
Bronx	0	0	0	0	0	0
Brooklyn	0	0	1	1	1	2
Manhattan	4	3	9	13	7	4
Queens	0	1	1	1	1	0
Staten Island	1	0	0	0	0	1
Total	5	4	11	15	9	7

4. Lyme disease (confirmed cases*)

	2010	2011	2012	2013	2014	2015
Bronx	34	25	19	36	32	27
Brooklyn	100	107	73	159	203	214
Manhattan	190	217	148	195	211	197
Queens	70	70	62	76	66	77
Staten Island	19	20	28	29	55	89
Total	413	439	330	495	567	604

*Confirmed Lyme disease case has 1 or more of the following symptoms: erythema migrans or > 1 episode of arthritis/joint effusion, neurologic or cardiac manifestations and laboratory results meeting the Centers for Disease Control and Prevention (CDC) criteria (Antibody and Western blot IgM or Western blot IgG if test > 30 days after onset of symptoms)

4a. Incidence Rate (per 100,000 persons) of Confirmed Lyme Disease Cases by Borough and Year

	2010	2011	2012	2013	2014	2015
Bronx	2.6	1.8	1.4	2.6	2.3	2.0
Brooklyn	4.1	4.3	2.9	6.4	8.1	8.5
Manhattan	12.4	13.7	9.3	12.3	13.3	12.4
Queens	3.1	3.1	2.8	3.4	3.0	3.5
Staten Island	4.3	4.3	6.0	6.2	11.7	19.0
Total	5.2	5.4	4.0	6.1	6.9	7.4

4b. Lyme disease erythema migrans study cases by travel history**

	2011		2012		2013		2014		2015	
	No Travel	Travel	No Travel	Travel	No Travel	Travel	No Travel	Travel	No Travel	Travel
Bronx	0	4	3	6	2	16	0	9	5	12
Brooklyn	3	47	0	28	1	70	9	72	5	98
Queens	3	24	4	23	2	38	2	32	2	34
Staten Island	3	9	5	11	3	9	11	13	24	15
Total	9	84	12	68	8	133	22	126	36	159

**Residents of outer boroughs diagnosed with erythema migrans Apr. 1-Oct. 31 interviewed about travel during 3-30 day incubation period prior to onset. Manhattan residents excluded based on 2005-2007 study results (97% traveled) and having fewer potential blacklegged tick habitats.

5. Rocky Mountain spotted fever

	2010	2011	2012	2013	2014	2015
Bronx	2†	3††	0	0	0	0
Brooklyn	6†	3	3†	0	1	3†
Manhattan	2	4†	2	0	0	1
Queens	1	1†	0	0	0	0
Staten Island	0	1	2	0	0	0
Total	11	12	7	0	1	4

†1 case did not report travel outside NYC during incubation period
††2 cases did not report travel outside NYC during incubation period