



The A.C.D. Quarterly

PHILADELPHIA DEPARTMENT OF PUBLIC HEALTH

JULY 2014

VOLUME 3, ISSUE 2

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Recognizing and Diagnosing Tickborne Infections in Philadelphia: What You Need to Know for the 2014 Season

Peak season for tick activity in Philadelphia and surrounding areas is upon us, and we can expect corresponding increases in tickborne infections now through October. In addition to diagnosing and reporting Lyme disease, the most common tickborne disease in the city, the Philadelphia Department of Public Health (PDPH) encourages area healthcare providers to become familiar with the recognition of other tickborne diseases that may occur among city residents—babesiosis, anaplasmosis, ehrlichiosis, and Rocky Mountain spotted fever (RMSF). These tickborne diseases cause acute febrile illness and need to be treated promptly to prevent complications and fatalities.

Babesiosis:

Surveillance data from neighboring states, particularly New York and New Jersey, have documented the emergence of babesiosis in recent years. In June 2013, the first locally-acquired infection in a Philadelphia resident was reported to PDPH. Since 2011, sporadic, locally-acquired case reports have also been documented among residents in other areas of Eastern Pennsylvania.

Babesiosis is a preventable and treatable disease that is caused by intraerythrocytic *Babesia* parasites and transmitted by black-legged or deer ticks (*Ixodes scapularis*), which also transmit Lyme disease and anaplasmosis. Transmission can also occur via blood transfusion from an infected donor. The incubation period is usually 1–3 weeks for tickborne transmission and up to several months long for transfusion-related exposures. The clinical spectrum ranges from asymptomatic to severe and life threatening, especially for individuals who are asplenic, immunocompromised, or elderly.

Similar to malaria, symptomatic illness is characterized by fever and hemolytic anemia. Likewise, microscopic examination of blood smears for intraerythrocytic *Babesia* parasites is used to confirm suspected infections. Symptomatic disease is treated with atovaquone and azithromycin for at least 7–10 days, while clindamycin and quinine is used for severe illness (parasitemia $\geq 10\%$, organ-system dysfunction).

Tickborne Rickettsial Infections (TBRI):

Anaplasmosis, ehrlichiosis, and RMSF are the most likely TBRI to occur among Philadelphia residents. Most often, these bacterial infections cause fever with headache, malaise, myalgia, nausea, blood abnormalities, or for those with RMSF or ehrlichiosis, rash. Despite clinical similarities, these infections have distinct etiologies, pathogenesis, and epidemiologic characteristics (Table 1).

Rapid, empiric treatment with doxycycline is necessary to prevent fatal outcomes from TBRI, especially for RMSF, and should not be delayed while awaiting laboratory results. Dosage recommendations vary by age, and course duration is usually longer for those with anaplasmosis, given the potential for co-infection with Lyme disease. TBRI IgG testing is widely available through commercial laboratories; however, a single positive titer only supports the diagnosis and does not confirm infection. Early in the course of infection, specialized testing including TBRI-specific Polymerase Chain Reaction testing can be coordinated through PDPH.

Tick Bite Prevention Tips

Encourage your patients to:

- ◆ Wear repellent ($\geq 20\%$ DEET)
- ◆ Check for ticks daily
- ◆ Shower soon after being outdoors
- ◆ Call your office if they develop a rash or fever

Please remember to report all suspected or confirmed cases of babesiosis, anaplasmosis, ehrlichiosis, RMSF, and Lyme disease (including erythema migrans without testing) within 5 days to PDPH by telephone at (215) 685-6748 or fax at (215) 238-6947. For assistance with laboratory confirmation of suspected tickborne infections, call Dana Perella, MPH, PDPH Vectorborne Disease Surveillance Coordinator at (215) 685-6742.

Online Resources for Healthcare Providers:

- CDC's *Tickborne Diseases of the United States. A Reference Manual for Healthcare Providers:* www.cdc.gov/lyme/resources/TickborneDiseases.pdf
- *Tickborne Diseases: A Springtime Review of Diagnosis, Treatment and Prevention* (Free CME Available!): http://emergency.cdc.gov/coca/calls/2014/callinfo_041014.asp

Table 1. Epidemiologic and Clinical Characteristics of Tickborne Rickettsial Infections

	Anaplasmosis <i>(Anaplasma phagocytophilum)</i>	Ehrlichiosis <i>(Ehrlichia chaffeensis)</i>	RMSF <i>(Rickettsia rickettsii)</i>
Main Vector	Black-legged or Deer Tick <i>(Ixodes scapularis)</i>	Lone Star Tick <i>(Amblyomma americanum)</i>	American Dog Tick <i>(Dermacentor variabilis)</i>
Geographic Distribution	Northeastern and Upper Midwestern US, Pacific Coast <i>(I. pacificus)</i>	Southcentral and Eastern US	East of the Rocky Mountains and Certain Pacific Coast Areas
Incubation	1–2 weeks	1–2 weeks	2–14 days
Pathogen Target	Granulocytes	Monocytes	Endothelial cells
Rash	Rare	Up to 30% of adult cases Up to 60% of pediatric cases	80–90% of cases
CBC Abnormalities	Thrombocytopenia, leukopenia, LFT increases	Thrombocytopenia, leukopenia, LFT increases	Thrombocytopenia, mild LFT increases, hyponatremia
Fatality Rate	<1%	1.8%	20%–80% without treatment

Healthy Swimming Practices for Preventing Recreational Water Illnesses

Summer 2014 is here and outdoor pools throughout Philadelphia are now open. Swimming provides many health benefits, but also carries some risks in addition to drowning. Recreational water illnesses (RWIs) are most commonly caused by swallowing contaminated pool (or fresh) water, resulting in diarrheal illness, but RWIs can also be caused by having contact with or by breathing in aerosolized contaminated water and result in respiratory, eye, ear, wound, and other infections. Injuries from improper usage and storage of pool chemicals can occur as well and send thousands to the emergency departments across the US every year¹.

Diarrheal RWIs can be caused by a variety of pathogens including *Cryptosporidium* (Crypto), *Giardia lamblia*, *Shigella*, norovirus, and shiga toxin-producing *E. coli*. While maintaining proper chlorine and pH levels of pool water is an essential part of keeping swimmers healthy, some pathogens are resistant to chlorine disinfection and can survive for days even in a properly chlorinated pool. Crypto is one such pathogen, with its thick-walled oocysts that render it resistant to chlorine. Crypto is frequently implicated in outbreaks associated with pools or spray-parks (interactive fountains) and only requires ingesting a small dose (i.e. one mouthful of water) to become infected. Furthermore, when an infected person has a fecal accident in a pool, up to 10⁸ oocysts can be released into the water².

Tips to discuss with patients about staying healthy when swimming:

- ◆ Don't swim when you have diarrhea and refrain from swimming for two weeks after symptoms stop
- ◆ Don't swallow the pool water
- ◆ Take bathroom breaks every hour and check diapers every 30-60 minutes
- ◆ Change diapers in a bathroom or a designated diaper changing station; do not change diapers poolside where germs can rinse into the water
- ◆ Wash your hands after using the toilet or changing diapers
- ◆ Shower with soap before entering a pool; parents should make sure they wash the "bottoms" of their children

For more information on healthy swimming, please visit <http://www.phila.gov/health/DiseaseControl/HealthySwimming.html>

References:

¹CDC. Pool Chemical-Associated Health Events in Public and Residential Settings United States, 2003-2012, and Minnesota, 2013. MMWR 2014; 63(19): 427-430.

²CDC. Promotion of Healthy Swimming After a Statewide Outbreak of Cryptosporidiosis Associated With Recreational Water Venues-Utah, 2008-2009. MMWR 2012; 61(19): 348-352.

REPORT OUTBREAKS AND REPORTABLE DISEASES AND CONDITIONS TO PDPH

PHONE: (215) 685-6748

FAX: (215) 238-6947

Reporting requirements and forms are posted online at hip.phila.gov