Indiana State Department of Health

Indiana Health Alert Network Notification – **

UPDATE: Epidemiology, Diagnosis, and Management of Tick-borne Diseases in Indiana

This advisory provides information on the clinical presentation, diagnosis, and treatment of common tick-borne diseases in Indiana, along with some additional recommendations.

Key Points and Recommendations

- Reported cases of tick-borne disease continue to increase each year in Indiana. While cases of tick-borne disease can be reported year-round, in Indiana they typically peak in July and continue into the late summer and early fall months.
- Health care providers should ask about outdoor exposure in the history, including location and dates of exposure. However, tick-borne disease should not be ruled out if there was no recognized tick exposure.
- Health care providers should still consider tick-borne diseases in the differential even if other diagnoses are identified.
- It usually takes 24-36 hours of attachment before most diseases are transmitted from a tick to a person. People who have been bitten by a tick and are asymptomatic do not require treatment, but they should monitor their health closely and contact a physician if they feel unwell.
- Health care providers should use doxycycline as the first-line treatment for suspected ehrlichiosis and spotted fever group rickettsiosis in patients of all ages, including children.
- Health care providers are encouraged to consult CDC's "Tickborne Diseases of the United States: A Reference Manual for Healthcare Providers" for detailed guidance on tick-borne disease testing and diagnosis.
- Tick-borne diseases are reportable within 72 hours to the local health department of the county where the patient resides (410 IAC 1-2.5-75).
- The Indiana Department of Health (IDOH) requests that providers notify us if they have a patient with suspected tick-borne disease accompanied by a dark scab at the site of a tick bite (eschar). This will help improve our knowledge of the epidemiology of spotted fever group rickettsiosis (SFGR) in our state.

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Epidemiology

The most common tick-borne diseases reported in Indiana are Lyme disease, SFGR (including Rocky Mountain spotted fever), and ehrlichiosis. Ticks that can transmit disease are present throughout the state of Indiana. The distribution of tick-borne diseases varies geographically in the state, with increased prevalence of Lyme disease in northwest Indiana and increased prevalence of SFGR and ehrlichiosis in southern Indiana. Recent analysis also suggests that ehrlichiosis may be expanding northward into the central region of the state. However, health care providers are encouraged to consider tick-borne

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disease in patients throughout the state. For maps and statistics on tick-borne disease in Indiana, please visit https://www.in.gov/isdh/27820.htm.

Obtaining a thorough clinical history that includes questions about recent tick exposure, recreational or occupational exposure to tick habitats, and travel to areas where tick-borne diseases are endemic can provide critical information to make a presumptive diagnosis of tick-borne illness. However, the absence of one or more of these factors does not exclude a diagnosis of tick-borne disease. Absence of a reported tick bite is common and has been associated with delays in treatment. Activities such as playing in a backyard, visiting a park, and gardening should be considered as potential tick exposures.

Clinical Presentation

Many cases of tick-borne disease begin with nonspecific flu-like symptoms, including fever, headache, chills, and myalgia. The table on the next page lists signs and symptoms commonly seen with tick-borne disease as well as associated laboratory findings and recommended diagnostic testing. Lyme disease is the most frequently diagnosed tick-borne disease in Indiana; however, it is important to note that the number and combination of symptoms vary greatly from person to person. Some diseases such as ehrlichiosis and SFGR are diagnosed less frequently but can cause severe illness and often require hospitalization. The first sign of many spotted fevers (e.g., *Rickettsia parkeri*) is generally a dark scab at the site of a tick bite, known as an *eschar*. Eschars usually develop a few days to a week following the bite of an infected tick. The Indiana Department of Health Zoonotic and Vector-borne Disease program is interested in learning more about SFGR and would like providers to notify us if they have a patient with suspected tick-borne disease and an eschar.

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Diagnosis

The initial diagnosis of ehrlichiosis and SFGR (including Rocky Mountain spotted fever) should be made based on clinical signs and symptoms and can later be confirmed using laboratory tests. **Treatment should never be delayed pending the receipt of laboratory test results or be withheld based on initial negative findings.** For rickettsial diseases, IgM antibodies are less specific than IgG antibodies and are more likely to generate false positives. IgM results alone should not be used for laboratory diagnosis. For more information on diagnostic tests for tick-borne disease, please refer to the Tick-borne Diseases of the United States Reference Manual for Health Care Providers.

Treatment

Doxycycline is the first line of treatment for adults and children of all ages with suspected ehrlichiosis or SFGR (including Rocky Mountain spotted fever) and should be initiated immediately upon suspicion of illness. The use of doxycycline to treat suspected tick-borne illness in children is standard practice recommended by both the Centers for Disease Control and Prevention (CDC) and the American Academy of Pediatrics (AAP) Committee on Infectious Diseases. Unlike older tetracyclines, the recommended dose and duration of doxycycline needed to treat tick-borne illness have not been shown to cause staining of permanent teeth. Treatment is most effective at preventing death from Rocky

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Mountain spotted fever if doxycycline is started in the first five days of symptoms. For information on the treatment of Lyme disease and other tick-borne illnesses, please refer to the Tick-borne Diseases of the United States Reference Manual for Health Care Providers.

Condition	Incubation Period	Signs and Symptoms	Cutaneous Signs	Laboratory Findings	Recommended Diagnostic Testing
Ehrlichiosis *Ehrlichia chaffeensis* *Ehrlichia ewingii*	1 – 2 weeks	• Fever • Headache • Chills • Malaise • Muscle pain • Nausea • Vomiting • Diarrhea • Confusion	• Rash – More commonly reported in children	• Thrombocytopenia • Leukopenia • Anemia • Mild to moderate elevations in hepatic transaminases	• Detection of DNA by PCR of whole blood. • Demonstration of a fourfold change (typically rise) in IgG-specific antibody titer in paired serum samples. The first sample should be taken within the first week of illness, and the second should be taken 2 – 4 weeks later. • Immunohistochemical (IHC) staining of organism from skin, tissue, or bone marrow biopsies.
Lyme disease *Borrelia burgdorferi*	3 – 30 days	• Malaise • Headache • Fever • Myalgia • Arthralgia • Lymphadenopathy • Transient arthritis and effusion in one or multiple joints • Cardiac and neurologic manifestations	• Erythema migrans (EM) – red ring-like or homogenous expanding rash • Not present in all cases	• Elevated erythrocyte sedimentation rate • Mildly elevated hepatic transaminases • Microscopic hematuria or proteinuria	• Detection of IgM or IgG antibodies in serum using a two-stage testing algorithm including a confirmatory Western Blot. • Isolation of organism from a clinical specimen.
Rocky Mountain spotted fever *Rickettsia rickettsii* *Rickettsia parkeri*	2 – 14 days	• Fever • Chills • Severe headache • Malaise • Myalgia • Nausea • Vomiting • Anorexia • Abdominal pain • Diarrhea • Photophobia • Focal neurologic deficits	• Eschar – dark scab at the site of a tick or mite bite, usually appears within a few days to a week after the bite occurred. • Maculopapular rash – initially appears on wrists, forearms, and ankles and spreads to trunk. Not present in all cases. • Petechial rash – considered a sign of progression to severe disease.	• Thrombocytopenia • Mildly elevated hepatic transaminase levels • Hyponatremia	• Demonstration of a fourfold change (typically rise) in IgG-specific antibody titer in paired serum samples. • Detection of DNA in a skin biopsy specimen of a rash lesion by PCR assay or in an acute phase whole blood specimen. • Immunohistochemical (IHC) staining of organism from skin or tissue biopsy specimen.

Additional resources for health care providers

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- Tick-borne Diseases of the United States: A reference manual for healthcare providers: https://www.cdc.gov/ticks/tickbornediseases/index.html
- Diagnosis and Management of Tick-borne Rickettsial Diseases: Rocky Mountain Spotted Fever and Other Spotted Fever Group Rickettsioses, Ehrlichioses, and Anaplasmosis – United States, A Practical Guide for Health Care and Public Health Professionals: https://www.cdc.gov/mmwr/volumes/65/rr/rr6502a1.htm?s_cid=rr6502a1_w
- Clinical Practice Guidelines by the Infectious Diseases Society of America (IDSA), American Academy of Neurology (AAN), and American College of Rheumatology (ACR): 2020 Guidelines for the Prevention, Diagnosis and Treatment of Lyme Disease: https://www.idsociety.org/practice-guideline/lyme-disease/
- Rocky Mountain spotted fever (RMSF) — Health Care Providers: https://www.cdc.gov/rmsf/healthcare-providers/index.html
- MMWR: Emergency Department Visits for Tick Bites — United States, January 2017–December 2019 — https://www.cdc.gov/mmwr/volumes/70/wr/mm7017a2.htm?s_cid=mm7017a2_w
- Indiana Communicable Disease Rule: http://www.in.gov/isdh/files/Final_Rule_LSA_.pdf

For questions, please contact Kira Richardson, Zoonotic and Vector-Borne Epidemiologist, at kirrichardson@isdh.in.gov or 317-234-9727.