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Through: Kansas City, Missouri Health Department
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Subject: Emergency Room and Primary Care Providers' Reference Sheet on Ehrlichiosis and Rocky Mountain Spotted Fever



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Summary

The Missouri Department of Health and Senior Services (DHSS) alerts health care providers that reports of ehrlichiosis illnesses through July 14, 2009 are 157 percent higher than for the same period, on average, for the years 2004 through 2008. Ehrlichiosis is an acute febrile illness similar in initial presentation to Rocky Mountain spotted fever (RMSF). DHSS cautions that peak transmission of this tick-borne bacterium may continue into early August with transmission continuing in Missouri into late September or early October. As of July 14, 2009, reports of RMSF are also elevated at 73.5 percent higher than, on average, for the years 2004 through 2008.

Both infections can cause severe illness and death in otherwise healthy adults and children. Delay in diagnosis and treatment of ehrlichiosis is a particular concern for patients undergoing immunosuppressive therapy or with a preexisting immunosuppressive condition, which can lead to more severe and prolonged illness. Case-fatality rates for immunocompromised patients are characteristically higher than case-fatality rates reported for the general population.

Ehrlichiosis and RMSF are tick-borne rickettsial diseases (TBRD) transmitted primarily through the bite of the lone star and American dog tick, respectively. The rickettsial disease agents most frequently reported in Missouri are:

- *Ehrlichia chaffeensis* (ehrlichiosis)
- *Ehrlichia ewingii* (ehrlichiosis)
- *Rickettsia rickettsii* (RMSF)

Clinical, exposure and diagnostic assessment and antibiotic therapy for Missouri's TBRDs are summarized in the attached physicians' reference sheet. For detailed information, refer to: [Diagnosis and Management of Tick-borne Rickettsial Diseases: Rocky Mountain Spotted Fever, Ehrlichioses, and Anaplasmosis, United States – A Practical Guide for Physicians and Other Health-Care and Public Health Professionals](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5504a1.htm) at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5504a1.htm>.

Clinical Assessment

- Both ehrlichiosis and Rocky Mountain spotted fever (RMSF) are difficult to distinguish from viral infections
- Onset is frequently rapid; majority of patients experience high fever, shaking chills, severe headache, and generalized myalgias
- Some patients, especially children, suffer early from nausea, vomiting, and anorexia
- Approximately two-thirds of reported *Ehrlichia* illnesses are hospitalized

Routine Laboratory Tests

- Thrombocytopenia and/or leukopenia; mildly elevated hepatic transaminases
- In CSF, mild lymphocytic pleocytosis (<250 cells/mm³) and elevated protein levels
- In CSF, absence of low glucose levels (compared with other bacterial meningitides)

Rash

- Described in up to two thirds of children infected with *E. chaffeensis*
 - Vary in character from petechial or maculopapular to diffuse erythema
 - Typically late in the course of disease and can be transient
- The classic spotted or generalized petechial rash of RMSF
 - Usually not apparent until the fifth or sixth day of illness
 - Can signify serious progression of the disease

Tick Exposure Assessment

- Detailed history for occupational, recreational and residential exposure to ticks
- Most patients visit during first two to four days of illness
- Incubation of five to ten days following a tick bite
- Tick attachment often not recalled

Diagnostic Tests Assessment

- Treatment decisions must be empirical – based on epidemiologic and clinical clues
- Antibodies (IgM *and* IgG) via IFA not yet detectable when most patients present¹
 - IgG sometimes detectable before IgM
 - Increased IFA serology sensitivity with illness of seven to ten days
 - IFA estimated at 94% to 100% sensitive > 14 days illness
- PCR can identify infecting bacteria DNA; may not be timely
- **Never delay treatment decision waiting for laboratory confirmation of a diagnosis**

Specimens for PCR

- Whole blood useful for *Ehrlichia* species by PCR because of pathogen's tropism for circulating white blood cells
- Low numbers of *R. rickettsii* circulate in the blood; PCR more useful in a biopsy of the spotted rash than in acute blood sample

Treatment

- Doxycycline is drug of choice for TBRD infections in adults *and* children of any age
 - TBRDs can be life-threatening
 - Available data suggest that courses of doxycycline less than 14 days do not cause significant discoloration of permanent teeth²
- Refer to <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5504a1.htm> for dosing and management of patients with severe manifestations of TBRD

Diagnosis Confirmation

- PCR assays and/or paired acute and convalescent serology to retrospectively confirm a diagnosis can be obtained at no charge through the Missouri State Public Health Laboratory
- Specimen submission instructions and a link to the submission form are at: http://www.dhss.mo.gov/Lab/Virology/rickettsial_instructions.pdf or call (573) 751-3334

Public Health Disease Reporting

- Ehrlichiosis and Rocky Mountain spotted fever are reportable conditions in the State of Missouri
- Your local public health agency will assist in the public health investigations of TBRD cases
- Fax positive laboratory reports and case report forms to the Kansas City, Health Department (816-513-6316) or to the Local Public Health Agency in your area.

References

1. [Diagnosis and Management of Tick-borne Rickettsial Diseases: Rocky Mountain Spotted Fever, Ehrlichioses, and Anaplasmosis – United States. MMWR 2006: 55 \(Recommendation and Report 4\): 1-27. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5504a1.htm.](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5504a1.htm)
2. American Academy of Pediatrics. *Ehrlichia* and *Anaplasma* Infections. In: Pickering LK, ed. Red Book: 2009 Report of the Committee on Infectious Diseases. 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2009:284-287.
3. American Academy of Pediatrics. Rocky Mountain Spotted Fever. In: Pickering LK, ed. Red Book: 2009 Report of the Committee on Infectious Diseases. 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2009:573-575.

For More Information

Goodman, JL, Dennis, DT and Sonenshine, DE (Eds.) Tick-Borne Diseases of Humans (2005) Washington, D.C., ASM Press. Tick-Borne Diseases of Humans. ISBN 1-55581-238-4.

Clinical Pediatrics. *Absence of Tooth Staining With Doxycycline Treatment in Young Children*. Volovitz B., et al. 2007, Vol. 46, No. 2, 121-126.

Tick-borne Rickettsial Diseases – Ehrlichiosis Statistics, (CDC website),
<http://www.cdc.gov/ticks/diseases/ehrlichiosis/statistics.html>.

Tick-borne Rickettsial Diseases – RMSF Statistics, (CDC website),
http://www.cdc.gov/ticks/diseases/rocky_mountain_spotted_fever/statistics.html.