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HUMAN EHRLICHIOSIS AND ANAPLASMOSIS FACT SHEET

(updated April 2014)

Agents: *Ehrlichia chaffeensis* (human monocytic ehrlichiosis)*, Anaplasma phagocytophilum* (human granulocytic anaplasmosis), *Ehrlichia ewingii* (ehrlichiosis ewingii), and other *Ehrlichia* spp.

Brief Description: Ehrlichioses are tick-borne infections caused by organisms of the family *Anaplasmataceae,* which range from subclinical or mild illness to severe, potentially fatal disease. The disease is often characterized by fever, headache, myalgia, leukopenia, thrombocytopenia, elevated liver enzymes, anorexia, nausea, vomiting, and, infrequently, rash. In the United States there are at least three distinct forms of ehrlichiosis, which are clinically similar but serologically distinguishable.

	Human Monocytic Ehrlichiosis (HME)	Human Granulocytic Anaplasmosis (HGA)	Ehrlichiosis Ewingii
Causative Agent	*Ehrlichia chaffeensis*	*Anaplasma phagocytophilum*	*Ehrlichia ewingii*
Primary Distribution	Southeastern U.S.	Northeastern & Midwestern U.S.	Eastern U.S.
Primary Vector	*Amblyomma americanum*	*Ixodes scapularis*	*Amblyomma americanum*
Major Reservoirs	white-tailed deer, dogs	ruminants, cervids, field rodents	white-tailed deer, dogs
Incubation Period	7-10 days	7-14 days	7-10 days
Notes	Most common Ehrlichiosis in Georgia	Previously classified as *Ehrlichia phagocytophila*, *E. equi*, and the HGE agent	Primarily causes disease in immunocompromised

Mode of Transmission: By the bite of an infected tick. It is estimated that the tick must be attached to the host for 24-48 hours before transmission occurs.

Diagnostic Testing:

1. **Specimen:** Serum/blood. Acute and convalescent specimens should be collected approximately 21 days apart. Because of overlapping geographic ranges, testing for all 3 species may be indicated.
2. **Outfits:** Other serology outfit, order #0504.
3. **Form:** CDC Form 50.34.
4. **Lab Test Performed:** Serology titers, IFA test. (Whole blood may be submitted for PCR for *E. ewingii*.) **Note:** Current commercially available ELISA tests are not quantitative, cannot be used to evaluate changes in antibody titer, and hence are not useful for serological

confirmation. Furthermore, IgM tests are not always specific and the IgM response may be persistent. Therefore, IgM tests are not strongly supported for use in serodiagnosis of acute disease.

5. **Lab Performing Test:** CDC. **Note**: All specimens and cultures destined for the CDC must be submitted through the Georgia Public Health Laboratory.

Period of Communicability: No person-to-person transmission has been documented. The tick remains infective for life.

Treatment: Doxycycline is the treatment of choice for all patients, including young children. Treatment should continue for 7 to 10 days, or at least 3 days after fever subsides. Empiric therapy is indicated for any patient suspected of having ehrlichiosis, but prophylactic treatment after a tick bite before symptoms develop is not recommended. Treatment should never be delayed while awaiting laboratory results; delay in treatment has been associated with severe and fatal cases.

Case Classification Chart:

***Ehrlichia chaffeensis* infection**		
Confirmed	**Probable**	**Suspect**
A **confirmed** case meets the clinical criteria* and the following laboratory criteria: ▪ Serological evidence of a fourfold change in immunoglobulin G (IgG)-specific antibody titer to *E. chaffeensis* antigen by IFA between paired serum specimens (one taken in the first week of illness and a second 2-4 weeks later), **or** ▪ Detection of *E. chaffeensis* DNA in a clinical specimen by PCR assay, **or** ▪ Demonstration of ehrlichial antigen in a skin lesion (biopsy) or organ tissue (autopsy) specimen by IHC, **or** ▪ Isolation of *E. chaffeensis* from a clinical specimen in cell culture.	A **probable** case meets the clinical criteria* and the following laboratory criteria: ▪ Serologic evidence of elevated IgG or IgM antibody reactive with *E. chaffeensis* antigen by IFA, ELISA, dot-ELISA, or assays in other formats, **or** ▪ Identification of morulae in the cytoplasm of monocytes or macrophages by microscopic examination.	A **suspect** case has laboratory evidence of past or present infection but no clinical information available (e.g. a laboratory report).

<table>
<tr><th colspan="3">Anaplasma phagocytophilum infection</th></tr>
<tr><th>Confirmed</th><th>Probable</th><th>Suspect</th></tr>
<tr>
<td>A confirmed case meets the clinical criteria* and the following laboratory criteria:
Serological evidence of a fourfold change in immunoglobulin G (IgG)-specific antibody titer to A. phagocytophilum antigen by IFA between paired serum specimens (one taken in the first week of illness and a second 2-4 weeks later), <u>or</u>
Detection of A. phagocytophilum DNA in a clinical specimen by PCR assay, <u>or</u>
Demonstration of anaplasmal antigen in a skin lesion (biopsy) or organ tissue (autopsy) specimen by IHC, <u>or</u>
Isolation of A. phagocytophilum from a clinical specimen in cell culture.</td>
<td>A probable case meets the clinical criteria* and the following laboratory criteria:
Serologic evidence of elevated IgG or IgM antibody reactive with A. phagocytophilum antigen by IFA, ELISA, dot-ELISA, or assays in other formats, <u>or</u>
Identification of morulae in the cytoplasm of neutrophils or eosinophils by microscopic examination.</td>
<td>A suspect case has laboratory evidence of past or present infection but no clinical information available (e.g. a laboratory report).</td>
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<tr><th colspan="3">Ehrlichia ewingii infection</th></tr>
<tr><td colspan="3">Because the organism has never been cultured, antigens are not available. Thus, laboratory confirmation is by PCR only.</td></tr>
<tr><th colspan="3">Human ehrlichiosis/anaplasmosis--undetermined</th></tr>
<tr><td colspan="3">An undetermined probable case may occur when a case meets the clinical criteria* and has laboratory evidence to support ehrlichia/anaplasma infection, but not with sufficient clarity to definitively place it in one of the categories previously described. This may include the identification of morulae in white cells by microscopic examination in the absence of other supportive laboratory results.</td></tr>
<tr><td colspan="3">*Clinical Criteria: Any reported fever PLUS one or more of the following: rash, headache, myalgia, anemia, leukopenia, thrombocytopenia, or any hepatic transaminase elevation.</td></tr>
<tr><td colspan="3">Abbreviations: IFA—indirect immunofluorescence assay, PCR—polymerase chain reaction, EIA—enzyme-linked immunosorbent assay.</td></tr>
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Reporting: Report all cases **WITHIN 7 DAYS** to the local health department, District Health Office, or the Epidemiology Section electronically through the State Electronic Notifiable Disease Surveillance System (SENDSS) at http://sendss.state.ga.us, or complete and mail CDC Form 55.1 (revised Jan. 2008), ***Tick-Borne Rickettsial Disease Case Report*** http://dph.georgia.gov/sites/dph.georgia.gov/files/related_files/document/ADES_trdrform.pdf for each reported case.

Reported Cases of Ehrlichiosis & Anaplasmosis in Georgia, 1998-2007*

Year	*E. chaffeensis*	*A. phagocytophilum*	Other *Ehrlichia* sp.
1998	0	0	0
1999	1	0	0
2000	5	0	0
2001	4	0	0
2002	3	0	0
2003	20	0	0
2004	11	2	0
2005	8	2	1
2006	14	2	0
2007	13	1	0

*Ehrlichiosis became nationally notifiable in 1998, and notifiable in Georgia in 1999. Therefore, there are no reported cases before 1999.

References:

1. Heymann D.L., ed. Ehrlichiosis. In: Control of Communicable Diseases Manual. 18th ed. Washington, DC: American Public Health Association, 2004: 187-190.
2. Centers for Disease Control and Prevention. Ehrlichiosis/Anaplasmosis 2008 Case Definition. http://wwwn.cdc.gov/nndss/ (search for ehrlichiosis or anaplasmosis under "Search Conditions")