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## Common Tickborne Diseases in Georgia: Rocky Mountain Spotted Fever and Human Monocytic Ehrlichiosis

According to surveillance data collected by the Georgia Division of Public Health (GDPH), the most commonly reported tickborne diseases in Georgia are Rocky Mountain spotted fever (RMSF) and human monocytic ehrlichiosis (HME).

### Introduction

Rocky Mountain spotted fever (RMSF) has been a reportable disease in Georgia since 1933, and is the most commonly reported tickborne disease in the state. RMSF is caused by the bacterium *Rickettsia rickettsii* and vectored by *Dermacentor variabilis*, the American dog tick.

Human monocytic ehrlichiosis (HME) was first recognized in 1986, and became reportable in Georgia in 1999. HME is caused by the obligatory intracellular bacterium *Ehrlichia chaffeensis* and is vectored by the most common human-biting tick in Georgia, *Amblyomma americanum*, the lone star tick. Diagnoses of RMSF and HME are thought to be underreported in Georgia due to asymptomatic and mildly symptomatic cases, misdiagnoses, and limitations of confirmatory testing.

### Clinical presentation

The diagnosis of either RMSF or HME is difficult because it is often made solely on clinical and epidemiologic findings before laboratory confirmation is available. Patients initially present with a non-specific flu-like illness of 3 or 4 days duration, when classical diagnostic signs and symptoms are usually not present.

### Rocky Mountain Spotted Fever

Rocky Mountain spotted fever is characterized by fever (usually over 102°F), headache (sometimes severe), and a maculopapular or petechial rash that begins at the extremities (characteristically involving the palms and soles) and spreads to the trunk. Malaise, myalgias, nausea, vomiting, abdominal pain, and conjunctivitis are also common. However, the classic diagnostic triad of fever, rash, and history of tick exposure is present in only 3% of patients during the first three days of illness, when patients are likely to first seek medical care (1). Additionally, only 88% of patients eventually develop a rash, so absence of rash should not rule out the diagnosis of RMSF (1). Severe complications include disseminated intravascular coagulation, adult respiratory distress syndrome, skin necrosis, renal impairment, hypotension, altered mental status, myocarditis, seizures, coma, and even death. Differential diagnoses include gastroenteritis, measles, scarlet fever, ehrlichiosis, Lyme disease, leptospirosis, meningococemia, Epstein-Barr virus, cytomegalovirus infection, toxic shock syndrome, and bacterial sepsis. Without proper treatment, the mortality rate exceeds 20% and death can occur within 8 to 15 days after onset (2).

### Human Monocytic Ehrlichiosis

The spectrum of illness associated with HME can range from asymptomatic to life-threatening. After an incubation period of 1 to 2 weeks, patients develop fever, headache, myalgias, arthralgias, malaise, and nausea. Other less commonly reported symptoms include cough, pharyngitis, lymphadenopathy, diarrhea, vomiting, abdomi-

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nal pain, and changes in mental status. Symptoms are similar to those of RMSF, but only about one-third of patients develop a rash. Rash is more common in children, and can be maculopapular or petechial, but unlike RMSF rarely involves the palms and soles (3). Laboratory findings include mild to moderate leukopenia, thrombocytopenia, and elevated hepatic transaminase levels. In severe cases, acute renal failure, metabolic acidosis, respiratory failure, hypotension, disseminated intravascular coagulopathy, hepatic failure, adrenal insufficiency, neurological signs, and myocardial dysfunction can result, leading to death in 3% of cases. Advanced age, immunosuppression including HIV infection, and delay in treatment are associated with more severe disease and death (3). The differential diagnosis is broad and includes RMSF, Lyme disease, toxic shock syndrome, upper respiratory infection, pneumonia, meningoen­cephalitis, sepsis, and gastroenteritis.

#### Laboratory Testing

The most widely available confirmatory test in the diagnosis of RMSF and HME is the immunofluorescence antibody (IFA) test in acute- and convalescent-phase serum specimens (Figures 1 and 2). Caution should be used when interpreting acute-phase tests before receiving convalescent-phase results, as false positive and false negative results are common. The Georgia Public Health Laboratory provides IFA testing on acute and convalescent serum samples through the immunology laboratory.

#### Treatment

Doxycycline is the treatment of choice for all patients with RMSF or HME, including young children. Chloramphenicol is appropriate for treatment of RMSF (but not HME) when tetracyclines are contraindicated (as in pregnancy), but studies have shown that patients treated with chloramphenicol are more likely to die from RMSF than those treated with a tetracycline (4). 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 RMSF or HME, but prophylactic treatment after a tick bite before symptoms develop is not recommended (5). Treatment should never be delayed while awaiting development of a rash or laboratory results; delay in treatment has been associated with severe and fatal cases (5).

#### Surveillance Highlights

##### Rocky Mountain Spotted Fever

There were 17 confirmed and 48 probable cases of RMSF reported to GDPH in 2003. All cases met laboratory and clinical criteria, as required by the CDC case definition (Table 1).

**Table 1.**

**Surveillance Case Definitions and Laboratory Criteria—RMSF**

A **confirmed** case of Rocky Mountain spotted fever (RMSF) is defined as a **clinically compatible case that is laboratory confirmed** using the following criteria:

- Fourfold or greater rise in antibody titer to *Rickettsia rickettsii* antigen by immunofluorescence antibody (IFA) test in acute- and convalescent-phase specimens ideally taken 3 weeks apart, or
- Positive polymerase chain reaction assay to *R. rickettsii*, or
- Demonstration of positive immunofluorescence of skin lesion (biopsy) or organ tissue (autopsy), or
- Isolation of *R. rickettsii* from clinical specimen

A **probable** case is a **clinically compatible case with a single IFA serologic titer** of 64.

Of the 65 cases of confirmed and probable RMSF in Georgia in 2003, none were fatal. Fifty-six percent of cases were male, and the median age was 42 (range 4-89). Of 46 cases where both race and ethnicity were known, 40 (87%) were non-Hispanic whites. Eighty-one percent of cases had onsets during May-September. Counties with the most confirmed cases were Henry (2) and Jasper (2). Counties with the most confirmed and probable cases were Cobb, Gwinnett, and Newton, each with 4. The North Central Health District (serving Baldwin, Bibb, Crawford, Hancock, Houston, Jasper, Jones, Monroe, Peach, Putnam, Twiggs, Washington, and Wilkinson counties) had more confirmed cases (5) than any other health district. Eighty-four percent of cases resided north of the Piedmont Fall Line (the dividing line between the Piedmont and the Coastal Plain stretching across the state roughly from Columbus to Macon to Augusta), and most (63%) cases were residents of the 28 county Atlanta Metro Statistical Area.

GDPH received 330 reports of single positive antibody tests to *Rickettsia rickettsii* in 2003. Reports came largely from reference laboratories, but a small percentage were reported by clinicians. Convalescent titers were obtained for 40% of probable cases. Barriers to obtaining convalescent titers included: patient unwilling to return to physician's office after feeling better, patient unwilling to pay another copay, physician unwilling to draw another serum sample, and untimely case investigation. Case confirmation requires paired acute and convalescent sera since a single titer does not exclude the possibility of a false positive or previous infection. In fact, 63% of cases with a convalescent serum sample tested proved not to be confirmed cases. This indicates that a large percentage of the population has been exposed to *Rickettsia rickettsii* earlier in life, but the organism is not responsible for their acute illness. Therefore, it is important to obtain a convalescent sample whenever possible.

Although there was a large increase in confirmed and probable cases in 2003 (compared to a recent 5-year average of 13 cases per year) the number of cases of RMSF in Georgia in 2003 is comparable with numbers seen in the 1970s and 1980s, which averaged about 60 cases per year. We were able to detect and confirm more cases of RMSF in 2003 than in recent years due to an increase in epidemiologic capacity at both the State and District levels.

##### Human Monocytic Ehrlichiosis

Since HME became a reportable disease in 1999 there have been only a handful of recognized cases. However, due to increased epidemiologic capacity across the state, we were able to recognize and confirm more cases during 2003, a total of 20 (6 confirmed, 14 probable). All cases met CDC's case definition (Table 2). While HME is likely still underreported in Georgia, we estimate that this is a more accurate picture of the disease burden in the state.

Surveillance for HME poses the same challenges as surveillance for RMSF in that clinical compatibility and a four-fold change between acute- and convalescent-phase sera are required for confirmation of cases. Of 68 reports of single positive antibody tests to *Ehrlichia chaffeensis* received by GDPH, 20 were found to be probable or confirmed cases. None were fatal. All cases occurred during May-September, with 80% of cases having onset during May-July. The median age of cases was 50, with a range of 16-73. Eleven of the 20 cases (55%) were female. Of 14 cases for which both race and ethnicity were known, 12 (86%) were non-Hispanic whites. Most

**Table 2.**

**Surveillance Case Definitions and Laboratory Criteria—HME**

A **confirmed** case of human monocytic ehrlichiosis (HME) is defined as a **clinically compatible case that is laboratory confirmed** using the following criteria:

- Demonstration of a four-fold change in antibody titer to *Ehrlichia chaffeensis* antigen by indirect immunofluorescence assay (IFA) in paired serum samples, ideally taken 4 weeks apart, or
- Positive polymerase chain reaction (PCR) assay and confirmation of *E. chaffeensis* DNA, or
- Identification of morulae in leukocytes, and a positive IFA titer to *E. chaffeensis* antigen, or
- Immunostaining of *E. chaffeensis* antigen in a biopsy or autopsy sample, or
- Culture of *E. chaffeensis* from a clinical specimen.

A **probable** case is a **clinically compatible case with either a single positive IFA titer** or the visualization of morulae in leukocytes.

cases were residents of LaGrange (6) or North Central (5) health districts, and 55% of cases resided in the 28 county Atlanta Metro Statistical Area.

**How to Report a Case of RMSF or HME**

RMSF and HME are reportable to Public Health within 7 days after diagnosis. To report a case electronically, log on to Georgia's State Electronic Notifiable Disease Surveillance System (SENDSS) at <http://sendss.state.ga.us>. Alternatively, complete a Notifiable Disease Report Form (form 3095) and mail to your County Health Department, District Health Office, or State Health Office. When reporting cases of RMSF or HME, be sure to include clinical signs and symptoms in addition to laboratory results, as clinical compatibility is a requirement of the surveillance case definitions.

**Other Tickborne Diseases**

Human granulocytic ehrlichiosis (HGE) is a disease closely related to HME, causing similar symptoms and laboratory findings. It is caused by *Anaplasma phagocytophila*, and vectored by *Ixodes scapularis*, the same tick that carries Lyme disease. HGE is most common in the Northeast and upper Midwest, and has not been reported in Georgia. Other tickborne diseases that occur less frequently in Georgia include Lyme disease, southern tick-associated rash illness (STARI), and tularemia.

**Prevention**

Help educate your patients about prevention of tickborne diseases. Educational brochures are available on our website at <http://www.health.state.ga.us/epi/vbd/tick.shtml> and from GDPH by calling 404-657-2588.

**References**

1. Helmick CG, Bernard KW, D'Angelo LJ. Rocky Mountain spotted fever: clinical, laboratory, and epidemiological features of 262 cases. *The Journal of Infectious Diseases* 1984;150:480-488.
2. Stallings SP. Rocky Mountain spotted fever and pregnancy: a case report and review of the literature. *Obstetrical and Gynecological Survey* 2001;56:37-42.
3. Paddock CD, Childs JE. *Ehrlichia chaffeensis*: a prototypical emerging pathogen. *Clinical Microbiology Reviews* 2003;16:37-64.
4. Holman RC, Paddock CD, Curns AT, et al. Analysis of risk factors for fatal Rocky Mountain spotted fever: evidence for

superiority of tetracyclines for therapy. *The Journal of Infectious Diseases* 2001;184:1437-44.

5. O'Reilly M, Paddock C, Elchos B, et al. Physician knowledge of the diagnosis and management of Rocky Mountain spotted fever. *Annals New York Academy of Sciences* 2003;990:295-301.

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**1-866-PUB-HLTH  
Georgia's Notifiable Disease Emergency Reporting System  
Information for Healthcare Providers**

**What is 1-866-PUB-HLTH?**

1-866-PUB-HLTH, also called the Notifiable Disease Emergency Reporting System, is a statewide service that facilitates better communication among Georgia health care providers, health departments, and emergency response personnel. **This telephone number is used to report public health emergencies and immediately notifiable diseases.** This includes clusters of illness as well as diseases that could result from a bioterrorism event. The Notifiable Disease Emergency Reporting System is available 24 hours a day, 7 days a week through the combined efforts of the Georgia Department of Human Resources Division of Public Health (GDPH), the Georgia Emergency Management Agency (GEMA), and District Public Health Offices.

**Who should use 1-866-PUB-HLTH?**

Clinicians, laboratory personnel, and public health professionals should use the number to report immediately notifiable diseases. Private citizens should NOT use this number.

**How does it work?**

When you call 1-866-PUB-HLTH, a GEMA communications officer answers the phone. The communications officer fills out a report, and then contacts the District Health Office of the patient's residence either by phone or fax, depending on the disease reported. **You can request that someone from the health department return your call 24 hours a day, 7 days a week.** The communications officer has no clinical or formal public health training and cannot answer questions directly, but will put you in contact with someone who can.

**When should I use 1-866-PUB-HLTH versus other methods of reporting?**

When you have a public health emergency or diagnose an immediately notifiable disease, including clusters of any illness and potential agents of bioterrorism. To report other notifiable diseases, you may: call your County or District Health Office, OR report cases electronically through the State Electronic Notifiable Disease Surveillance System (SENDSS) at <http://sendss.state.ga.us>, OR complete a Notifiable Disease Report Form (#3095) and mail in an envelope marked CONFIDENTIAL to your County, District, or State Health Department.

**If I report a case using 1-866-PUB-HLTH, should I also report using additional (redundant) mechanisms?**

No. There is no need to report a case through multiple channels.



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**Reported Cases of Selected Notifiable Diseases in Georgia Profile\* for February 2004**

Selected Notifiable Diseases	Total Reported for February	Previous 3 Months Total Ending in February			Previous 12 Months Total Ending in February		
	2004	2002	2003	2004	2002	2003	2004
Campylobacteriosis	36	106	120	103	632	671	618
<i>Chlamydia trachomatis</i>	399	8329	8915	3891	33361	35138	31027
Cryptosporidiosis	22	33	20	50	160	114	147
<i>E. coli</i> O157:H7	1	6	7	3	48	46	26
Giardiasis	51	165	207	172	929	940	829
Gonorrhea <sup>‡</sup>	238	4543	4423	2001	18481	18826	15382
<i>Haemophilus influenzae</i> (invasive)	9	38	18	29	116	77	87
Hepatitis A (acute)	33	142	152	114	926	519	761
Hepatitis B (acute)	40	87	134	142	412	514	685
Legionellosis	1	3	5	1	12	22	30
Lyme Disease	0	1	3	1	2	7	8
Meningococcal Disease (invasive)	1	9	12	11	44	37	32
Mumps	0	0	0	0	7	2	3
Pertussis	1	3	7	7	24	31	32
Rubella	1	0	0	1	0	0	1
Salmonellosis	52	260	247	271	1707	1954	2056
Shigellosis	49	364	448	158	886	1902	1033
Syphilis - Primary <sup>‡</sup>	8	33	28	26	103	105	128
Syphilis - Secondary <sup>‡</sup>	17	58	100	78	300	370	435
Syphilis - Early Latent <sup>‡</sup>	28	207	174	108	709	713	669
Syphilis - Other <sup>**‡</sup>	31	209	207	122	875	776	749
Syphilis - Congenital <sup>‡</sup>	0	6	5	1	25	13	7
Tuberculosis	14	148	122	86	535	577	484

\* The cumulative numbers in the above table reflect the date the disease was first diagnosed rather than the date the report was received at the state office, and therefore are subject to change over time due to late reporting. The 3 month delay in the disease profile for a given month is designed to minimize any changes that may occur. This method of summarizing data is expected to provide a better overall measure of disease trends and patterns in Georgia.

\*\* Other syphilis includes latent (unknown duration), late latent, late with symptomatic manifestations, and neurosyphilis.

‡ Note: Due to activities to ensure completeness and timeliness of reporting, STD data in this edition of the GER are not current. STD data will be updated and complete in the next GER.

**AIDS Profile Update**

Report Period	Total Cases Reported*			Percent Female	Risk Group Distribution (%)						Race Distribution (%)		
	<13yrs	>=13yrs	Total		MSM	IDU	MSM&IDU	HS	Blood	Unknown	White	Black	Other
Latest 12 Months: 05/03-04/04	5	2,090	2,095	27.4	33.8	6.3	1.6	14.8	1.5	41.9	21.4	74.9	3.7
Five Years Ago: 05/99-04/00	11	1,427	1,438	26.8	33.2	14.2	3.5	20.7	1.5	26.9	19.2	77.8	3.0
Cumulative: 07/81-04/04	216	28,143	28,359	18.6	46.6	16.4	5.2	14.4	1.9	15.5	32.7	64.7	2.6

**MSM - Men having sex with men      IDU - Injection drug users      HS - Heterosexual**

\* Case totals are accumulated by date of report to the Epidemiology Section