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Q FEVER (Query Fever)
Fact Sheet

Agent: *Coxiella burnetii*, a rickettsial bacterium. This organism has two antigenic phases: phase I is found in nature and phase II is found after multiple laboratory passages in eggs or cell cultures.

Brief Description: Q fever is a zoonotic disease that is distributed globally. A single organism can cause disease in a susceptible person. Onset is sudden with high fever, chills, retrobulbar headache, weakness, malaise, and severe sweats. There is variation in severity and duration. Only about 50% of all people infected show signs of clinical illness. Fever lasts one to two weeks. Thirty to 50% of patients with symptomatic infection will develop pneumonia. Abnormal liver function tests are common. Following acute Q fever infection, the chronic form of Q fever can occur and is characterized by complications such as granulomatous hepatitis and endocarditis, predominantly in the aortic valve. Other neurologic syndromes have been described. The case-fatality rate in untreated acute Q fever cases is 1%. Among chronic cases that lead to endocarditis, the case fatality rate may approach 65%. In cases that lead to endocarditis, protracted courses of antibiotics and valve-replacement therapy are almost always necessary. Endocarditis usually occurs in individuals with pre-existing valvular heart disease.

Reservoir: Sheep, goats, and cattle are the primary reservoirs, although infection has also been noted in cats, dogs, wild rodents, and birds. Infected animals are usually asymptomatic but shed massive numbers of organisms in placental tissues at parturition. Organisms can also be shed in milk, urine, and feces of infected animals.

Mode of Transmission: Primarily airborne. Infected animals shed the organisms in milk, urine, feces, and placental tissues during parturition. Dust contaminated with these fluids becomes airborne and infects humans by the respiratory route. The organisms are resistant to heat, drying, and many disinfectants, enabling them to survive for long periods in the environment, especially in dusts. Consumption of raw milk from infected cows, sheep, and goats may also cause infection. Direct contact with animals or materials contaminated with animal fluids such as wool, straw, fertilizer, and laundry can also result in disease. Although the organism is transmitted between many animal species by ticks, ticks are not thought to commonly transmit disease to humans. Those at risk for occupationally-acquired infections include farmers,

abattoir workers, and laboratory personnel working with the organism.

Incubation Period: Depends upon the number of organisms that infect the patient, but is usually 2-3 weeks. However, incubation periods as short as two days have been reported.

Clinical Description:

- *Acute Infection:* A febrile illness usually accompanied by rigors, myalgia, malaise, and retrobulbar headache. Severe disease can include acute hepatitis, pneumonia, and meningoencephalitis. Clinical laboratory findings may include elevated liver enzyme levels and abnormal chest film findings. Asymptomatic infections may also occur.
- *Chronic Infection:* Potentially fatal endocarditis may evolve months to years after acute infection, particularly in persons with underlying valvular disease. A chronic fatigue-like syndrome has been reported in some Q fever patients.

Diagnostic Testing: Serology, PCR, and IHC is conducted at the Centers for Disease Control and Prevention (CDC) ONLY in coordination with the Georgia Public Health Laboratory (GPHL) and the Epidemiology Section.

Period of Communicability: Direct transmission from person to person occurs rarely, if ever.

Vaccination: A formalin-inactivated whole-cell vaccine is available for immunization of at-risk personnel on an investigational basis, but it is not available commercially in the United States. The vaccine causes severe reactions in individuals who have already been exposed to Q fever; therefore, anyone who wishes to be vaccinated must have a skin sensitization test to ensure no previous exposure.

Treatment: Doxycycline is the treatment of choice for acute Q fever and is most effective when initiated within the first three days of illness. The dose is 100 mg orally twice daily for 15 to 21 days. Quinolones are an acceptable alternative. Chronic Q fever endocarditis requires at least four years of treatment with a combination of doxycycline and a quinolone. Alternatively, a combination of doxycycline and hydroxychloroquine for 1.5 to 3 years leads to fewer relapses, but requires routine eye exams to detect accumulation of chloroquine. Surgery may be required to remove damaged valves.

Post-exposure Prophylaxis: Tetracycline or doxycycline given prophylactically after exposure can delay the onset of disease, or even prevent symptoms if administered late in the incubation period. If prophylaxis is started one day after exposure and continued for 5 days, clinical disease

has been shown to occur about three weeks after stopping therapy. If prophylaxis is begun 8 to 12 days post-exposure and continued for 5 days, clinical disease will not occur after treatment is discontinued.

Investigation: Search for a history of contact with sheep, cattle, or goats on farms or in research facilities, contact with parturient cats, consumption of raw milk, or direct or indirect association with a laboratory that handles *C. burnetii*. Because of the very low infectious dose and relative resistance of the organism to heat and drying, Q fever is a potential agent of bioterrorism as well. In outbreak situations, local and state health departments should be notified immediately, so that the proper authorities can be notified.

Reporting: Report cases **IMMEDIATELY** to the local health department, District Health Office, or Epidemiology Section at 404-657-2588. If calling after regular business hours it is very important to report cases through the Epidemiology Section answering service (770-578-4104). After a verbal report has been made, please transmit the case information 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 Feb. 2008), ***Q Fever Case Report*** http://dph.georgia.gov/sites/dph.georgia.gov/files/related_files/site_page/ADES_qfever.crf_.02.pdf for each reported case.

Case Classification:

<table>
<tr><td colspan="2">Acute Q fever clinical criteria: Acute fever PLUS one or more of the following: rigors, severe retrobulbar headache, acute hepatitis, pneumonia, or elevated liver enzyme levels.</td></tr>
<tr><td>Confirmed Acute</td><td>Probable Acute</td></tr>
<tr><td>A confirmed case of acute Q fever is defined as a case that: a.) meets the clinical criteria of acute Q fever or is epidemiologically linked to a laboratory confirmed case; and b.) meets the following laboratory criteria:

● Serologic evidence of a fourfold change in IgG-specific antibody titer to Coxiella burnetii phase II antigen by IFA between paired serum specimens (one taken in the first week of illness and a second 3-6 weeks later, phase I titers may be elevated as well), or
● Detection of C. burnetii DNA in a clinical specimen by PCR assay, or
● Demonstration of C. burnetii antigen in a clinical specimen by IHC, or
● Isolation of C. burnetii from a clinical specimen by culture.</td><td>A probable case of acute Q fever is defined as a case that: a.) meets the clinical criteria of acute Q fever and b.) meets the following laboratory criteria:

● Has a single supportive IFA IgG titer of ≥1:128 to phase II antigen (phase I titers may be elevated as well), or
● Has serologic evidence of elevated IgG or IgM antibody reactive with C. burnetii antigen by ELISA, dot-ELISA, or latex agglutination.</td></tr>
<tr><td colspan="2">Chronic Q fever clinical criteria: Newly recognized, culture-negative endocarditis, particularly in a patient with previous valvulopathy or compromised immune system, suspected infection of a vascular aneurysm or vascular prosthesis, or chronic hepatitis, osteomyelitis, osteoarthritis, or pneumonitis in the absence of other known etiology.</td></tr>
<tr><td>Confirmed Chronic</td><td>Probable Chronic</td></tr>
<tr><td>A confirmed case of chronic Q fever is defined as a case that: a.) meets the clinical criteria of chronic Q fever; and b.) meets the following laboratory criteria:

● Serologic evidence of IgG antibody to C. burnetii phase I antigen ≥1:800 by IFA (while phase II IgG titer will be elevated as well, phase I titer is higher than the phase II titer), or
● Detection of C. burnetii DNA in a clinical specimen via amplification of a specific target by PCR assay, or
● Demonstration of C. burnetii antigen in a clinical specimen by IHC, or
● Isolation of C. burnetii from a clinical specimen by culture.</td><td>A probable case of chronic Q fever is defined as a case that: a.) meets the clinical criteria of chronic Q fever and b.) meets the following laboratory criteria:

● Has an antibody titer to C. burnetii phase I IgG antigen ≥1:128 and <1:800 by IFA.</td></tr>
<tr><td colspan="2">Abbreviations: IFA—indirect immunofluorescence assay, PCR—polymerase chain reaction, IHC—immunohistochemistry.</td></tr>
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Reported Cases of Q Fever in Georgia, 1993-2008

Year	Number of Cases
1993	0
1994	0
1995	0
1996	0
1997	0
1998	0
1999	0
2000	0
2001	1
2002	1
2003	1
2004	0
2005	1
2006	1
2007	3
2008	3

References:

1. Chin J, Ed. Q Fever. In: Control of Communicable Diseases Manual. 17th Ed. Washington, DC: American Public Health Association, 2000: 407-411.
2. U.S. Army Medical Research Institute of Infectious Diseases. Q Fever. In: Medical Management of Centers for Disease Control and Prevention. Q Fever 2009 Case Definition: http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/q_fever_2009.htm.

Links:

- CDC Q Fever Fact Sheet - http://www.cdc.gov/qfever/