Surveillance Case Definition
Q Fever
(*Coxiella burnetii,* Query Fever)

Clinical description

Acute infection: A febrile illness (up to 105°F) usually accompanied by rigors, myalgia, malaise, and retrobulbar headache. Fatigue, night sweats, dyspnea, confusion, nausea, diarrhea, abdominal pain, vomiting, non-productive cough, and chest pain have also been reported. Severe disease can include acute hepatitis, atypical pneumonia with abnormal radiograph, and meningoencephalitis. Pregnant women are at risk for fetal death and abortion. Clinical laboratory findings may include elevated liver enzyme levels, leukocytosis, and thrombocytopenia. Asymptomatic infections may also occur.

Chronic infection: Infection that persists for more than 6 months. Potentially fatal endocarditis may evolve months to years after acute infection, particularly in persons with underlying valvular disease. Infections of aneurysms and vascular prostheses have been reported. Immunocompromised individuals are particularly susceptible. Rare cases of chronic hepatitis without endocarditis, osteomyelitis, osteoarthritis, and pneumonitis have been described.

Laboratory criteria for diagnosis

Laboratory diagnosis is made by demonstration of the presence of antibodies to *C burnetii* antigens using indirect immunoflourescent assay (IFA), or enzyme-linked immunosorbent assay (ELISA) methods. Organisms can also be identified in the tissues using immunohistochemical (ICH) staining, DNA detection methods by polymerase chain reaction (PCR), or electron microscopy. Recovery of the organism from blood is diagnostic but poses a hazard to laboratory workers.

C burnetii exists in 2 antigenic phases called phase I and phase II. In acute cases of Q fever (QF), the level of antibodies to phase II antigens is usually higher than the level of antibodies to phase I antigens, often by several orders of magnitude, and generally is first detected during the second week of illness. In chronic QF, the reverse situation is true. Antibodies to phase I antigens of *C burnetii* generally require longer to appear and indicate continued exposure to the bacteria. Thus, high levels of antibody to phase I in later specimens in combination with constant or falling levels of phase II antibodies and other signs of inflammatory disease suggest chronic QF. Antibodies to phase I and II antigens have been known to persist for months or years after initial infection.

IgM-specific antibody tests are not strongly supported for use in serodiagnosis of acute disease, as the response may not be specific for the agent (resulting in false positives) and the IgM response may be persistent. For acute testing, CDC uses in-house IFA IgG testing (cutoff of >1:128), preferring simultaneous testing of paired specimens, and does not use IgM results for routine diagnostic testing.

Serologic test results must be interpreted with caution, because baseline antibodies acquired as a result of historical exposure to QF may exist, especially in rural and farming areas. Healthy asymptomatic individuals may have IgG phase II titers of 1:128 or below and would not be considered case-patients.

Case classification

Acute Q fever confirmed

A clinically compatible case **AND**

- Fourfold or greater change in IgG-specific antibody titer to *C burnetii* phase II antigen by IFA between paired serum specimens ideally taken 3 to 6 weeks apart; **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 (**NOTE:** hazard to laboratory workers).

Probable

A person with clinically compatible criteria for acute disease, who does not meet any of the laboratory criteria for acute Q fever but has a single IFA IgG titer of 1:128 or greater.

Possible

Not used.

Chronic Q fever confirmed

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 in the absence of other known etiology **AND**

- Serological evidence of IgG antibody to *C. burnetii* IFA phase I IgG antigen titer of 1:800 or greater (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. (**NOTE:** hazard to laboratory workers).

Probable

- A person with clinically compatible criteria for chronic disease, who does not meet any of the laboratory criteria for chronic Q fever but has an antibody titer to *C. burnetii* phase I IgG antigen greater than 1:128 and less than 1:800 by IFA.

Note: Samples from suspected chronic patients should be evaluated for IgG titers to both phase I and phase II antigens.