Q Fever

Q fever is a zoonotic disease caused by *Coxiella burnetii*. In humans, infection can result in mild to severe illness and sometimes chronic disease. Many animals are susceptible to Q fever, though the primary reservoirs are cattle, goats, and sheep. The infection is rarely diagnosed in humans or animals in the United State, but Q fever may be more common than many veterinarians and physicians realize.

**Epidemiology of Q Fever**

*C. burnetii* can be found in most regions of the world. The bacteria are hardy and can survive in the environment for prolonged periods. Infections in livestock tend to be asymptomatic but may cause abortions, decreased fertility, weak newborns, and other primarily reproductive issues. Once infected, animals may intermittently shed viable bacteria in varying amounts in milk, feces, and reproductive secretions. The highest volume of shedding occurs during parturition and in the placenta and birthing fluids.

Transmission is primarily inhalational. People are typically exposed to the bacteria while assisting animals with birthing, through close contact with infected animals or their birthing products, or by breathing in contaminated barnyard dust. Contact with animals and or their contaminated environments are recognized as activities that increase risk for Q fever, but direct contact is not necessary as the organism has the potential to become airborne and be carried by wind currents. Less common routes of exposure include consumption of unpasteurized dairy products, tick bites, and sexual transmission.

Roughly half of exposed persons remain asymptomatic. Others develop mild flu-like illness, pneumonia, or hepatitis within a few weeks of exposure. Long-term fatigue has also been associated with 15-20% of human infections. The case-fatality rate for acute disease is 1-2% in untreated cases. Chronic disease develops in less than 5% of all infected persons, manifesting primarily as endocarditis but also as rare vascular...
infections, granulomatous infections of bone and liver, or recurrent miscarriages. Mortality rates can be as high as 60% for chronic sequelae. Pregnant women and people with heart valve disorders or immunosuppressive conditions are at increased risk for developing chronic Q fever.

A four-fold rise in IgG phase II antibody titer by immunofluorescence assay (IFA) between acute and convalescent sera taken 2-4 weeks apart is the gold standard for diagnosis of acute infection in humans. Increased phase I IgG titers are indicative of chronic illness. When ordering serologic testing, request IFA phase I and II titers for *C. burnetii* IgG and IgM antibodies. Polymerase chain reaction (PCR) is useful for whole blood samples taken in the first week of illness and prior to initiation of antibiotic therapy, and in conjunction with immunohistochemistry (IHC) on tissue specimens obtained from surgery or autopsy. The recommended treatment for acute Q fever is doxycycline; additional treatment guidance is available at: www.cdc.gov/qfever/symptoms/index.html.

### 2011 Outbreak

During 2011, a goat-associated outbreak of Q fever occurred in Washington and Montana. Human infections are usually infrequent in both states (0-3 cases per year). In April 2011, *C. burnetii* was detected in a placenta collected from a goat farm in Washington, where the herd had experienced an increased number of abortions. Soon afterwards, infections were diagnosed among persons who had purchased goats. An outbreak investigation involving 21 farms in Washington, Montana, and Oregon identified 21 human cases, including goat owners, farm visitors, and neighbors. Four cases were hospitalized, though none were fatal. Evidence of infection in goats was detected in 16 of 17 herds tested.

A herd management plan was implemented to control Q fever. Goat owners were advised to: wear protective clothing and boots while working with animals and remove contaminated or soiled clothing prior
to entering their homes; use good hand hygiene and thoroughly wash hands after farm work; disinfect birthing areas; compost manure instead of spreading it on the field; segregate newly acquired animals; maintain a detailed animal registry including purchases, sales, and adverse pregnancy events; and report animal abortions to their veterinarians.

**Routine Surveillance and Response**

Q fever cases are reported about every other year in Washington, including three cases to date in 2012, two of which were fatal. None were connected to the goat-associated outbreak, and only one case had a clear history of animal contact. A patient history of living or working in an agricultural community, an occupation such as a farmer or veterinarian, or other specifically reported contact with livestock may be helpful in triggering the provider to consider Q fever. However, many cases report no animal contact, particularly those with chronic disease. This is one of many reasons why Q fever can be challenging for healthcare providers to diagnose.

Continued community awareness is essential for prevention and control of Q fever. Although the outbreak last year was associated with goats, many animals are susceptible and the infection can be spread between species. The documented presence of *C. burnetii* in livestock and in the environment in our state warrants awareness of the possibility for exposures to occur especially during the birthing (lambing, kidding, calving) season. Spring fairs, petting zoos, livestock sales, and other venues allowing close contact with animals present the potential for human exposure to many zoonotic agents including Q fever.
Investigation and surveillance of Q fever by both animal health and public health authorities relies on recognition, diagnosis, testing, and reporting by veterinarians, physicians, and other veterinary and healthcare professionals. Human cases are reportable to local health jurisdictions and animal cases to the Washington State Department of Agriculture. Identifying either human cases with livestock exposure or infections in animals, even in the absence of known human cases, warrants collaboration between public health officials and agriculture authorities to investigate potential human cases, advise owners about the risk of human disease, and provide recommendations for reducing exposure.

**Resources:**

Washington State Department of Health: [http://www.doh.wa.gov/notify/nc/qfever.htm](http://www.doh.wa.gov/notify/nc/qfever.htm)


CDC (pets): [http://www.cdc.gov/healthypets/diseases/qfever.htm](http://www.cdc.gov/healthypets/diseases/qfever.htm)
