

What is Q fever?

Q fever is a rickettsial infection caused by *Coxiella burnetii*.

How common is Q fever and who can get it?

Veterinarians, meat processing plant workers, sheep and dairy workers, livestock farmers and others who work with pregnant cattle, sheep and goats are most at risk for exposure to *Coxiella burnetii*. Although it is hard to determine how many cases of Q fever occur every year, it is believed that the disease is underreported.

How is Q fever spread?

Sheep, goats and cattle are the main source of Q fever. It is spread from contact with excretions such as milk, urine, feces and the afterbirth of infected animals. Often the bacterium can exist for extended periods of time in soil and dust. Therefore, most human infections are thought to be caused by the inhalation of contaminated barnyard dust.

What are the symptoms of Q fever?

Most acute cases of Q fever begin with sudden onset of one or more of the following: high fevers (up to 104-105° F), severe headache, general malaise, myalgia, confusion, sore throat, chills, sweats, non-productive cough, nausea, vomiting, diarrhea, abdominal pain, and chest pain. Fever usually lasts for one to two weeks. Weight loss can occur and persist for some time. Thirty to 50 percent of patients with symptomatic infections will develop pneumonia. Only about half of those who are infected with the bacteria show clinical signs of the disease. Chronic illness such as endocarditis (heart disease) can occur after acute illness or in cases where infection does not cause an acute illness.

How soon after exposure do symptoms develop?

Most patients become ill two to three weeks following exposure. Chronic disease can develop up to two years after initial infection.

Can Q fever be spread person to person?

Direct, person-to-person infection occurs rarely, if ever.

How is it diagnosed?

Laboratory diagnosis is accomplished through the identification of specific antibodies to *Coxiella burnetii*.

What is the treatment for illness caused by Q fever?

Doxycycline is the treatment of choice for Q fever and should be administered for 15-21 days. Treatment of chronic infections like endocarditis require longer courses of antibiotic therapy.

Is there a way to prevent infection?

Exposure to *Coxiella burnetii* can be reduced on farms by avoiding direct contact with placenta and birth products of sheep, goats and cattle. Gloves, arm sleeves and protective eyewear should be routinely worn when assisting with animal births, especially in cases involving aborted fetuses. While vaccines exist for Q fever, none are readily available in the United States. Laboratory workers who routinely work with the organism are at highest risk of infection and should get vaccinated. In addition, only pasteurized milk and milk products should be *Consumed*

Jefferson Co. Board of Health mtg. 3/23/16--Sources, for more information:
Centers for Disease Control and Prevention (symptoms, statistics and epidemiology, in-depth information, and prevention) www.cdc.gov/qfever

Prevention and Control among Humans and Animals, 2013 (National Association of State Public Health Veterinarians and National Association of State Animal Health Officials) nasphv.org/Documents/Q_Fever_2013.pdf

Land-Applied Goat Manure as Source of Q-Fever
(studies show link between Q-fever positive farms/QFPF and community cases of human Q- fever)
<http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0096607>

Presence and persistence of bacterium in Q fever outbreak
<http://aem.asm.org/content/79/5/1697.full>

Q Fever during Pregnancy—A Risk for Women, Fetuses, and Obstetricians
<http://www.nejm.org/doi/full/10.1056/NEJM19940203300518>

Managing Q fever during pregnancy: the benefits of long-term cotrimoxazole therapy---<http://www.ncbi.nlm.nih.gov/pubmed/17682987>

Eurosurveillance-Q fever in humans and farm animals (2013)
www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20407

Q Fever Infection: An Overview of Public Health Response abga.org/wp-content/uploads/2016/01/Q-Fever-Murphy.pdf

Q-fever is underestimated in the U.S.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4347323/>



Risk Assessment on Q fever-Technical Report from European Centre for Disease Prevention and Control
ecdc.europa.eu/en/publications/Publications/1005_TER_Risk_Assessment_Qfever.pdf

Doctor-diagnosed health problems near high-density operations
ehjournal.biomedcentral.com/articles/10.1186/s12940-16-0123-2

Brucella melitensis of goats/California Department of Food and Agriculture
https://www.cdffa.ca.gov/ahfss/animal_health/pdfs/B_MelitensisFactSheet.pdf

The above list has been compiled by Ronni Monroe, R.N. and Anita J. Martin, B.S. This is a partial list of resources referred to when researching goats, goat-related human illness, public health and environmental risks. (<http://cbelm.weebly.com>; 920-285-0707 Citizens for a Better Environment Lake Mills)

Other health risks a 9,000-goat facility poses:

Other organisms goats can carry, which are infectious to humans, include brucellosis, CAE, Cryptosporidium, toxoplasmosis, and Orf virus (sore mouth).

Brucellosis (Malta Fever, Mediterranean Fever, Undulant Fever)

--When goats become infected with *Brucella melitensis* (*B. melitensis*), their milk, urine, feces, blood, semen, and birthing materials contain the bacteria as well. Like goats, people can become infected with *B. melitensis*, too. Goats can contract respiratory acquired infections when wind disturbs contaminated dust.

--*B. melitensis* is found in goats in Mexico, other Latin American countries, southern Europe, the Middle East, Central Asia, and Africa. The last recorded U.S. goat outbreak was in southern Texas in 1999. (Source: "Brucella melitensis of Goats and Sheep: An Important Public Health Issue, Jan. 2015 fact sheet—California Department of Food and Agriculture)

--People can become infected through raw milk, inhaling contaminated dust and aerosols, and contact with carcasses.

--The bacterium, *Brucella*, is highly infective by aerosol and can survive for 6 weeks in dust, nearly 8 weeks in water, and up to 10 weeks in soil.

--The disease resembles flu or malaria and as a result, is often difficult to diagnose. If untreated, brucellosis can be fatal due to endocarditis. At the present time, no safe and effective vaccine exists for people.

Cryptosporidium

--Three species of *Cryptosporidium* parasite have been found in goats—*C. xiaoxi*, *C. parvum*, and *C. hominis*. Goats are thought to serve as reservoirs of *Crypto* for human infections. (Prevalence in small ruminants varies—72.5% from one study in Vera Cruz/Mexico, 19.1% -30% in goats in Spain, 24%-39.4% in goats in Romania, 83% in Northern Greece study of 54 goat herds with a total of 22,890 adult animals)

--*Crypto* can be found in goats and their manure, basically anywhere fecal contamination occurs, such as animal bedding, food and water containers, and on gates and pens. (Source: Upper Midwest Agricultural Safety and Health Center/Acute Disease Investigation and Control-Minnesota Department of Health)

--The parasite has been detected in water and soil. In one Botswana study, 7.4% of the soil samples and 4.5% of the water tested from a 200-goat farm tested positive.

--Children under age 5, people older than 65, pregnant women are at higher risk of contracting the illness. People with weakened immune systems may have more trouble recovering from *Crypto* infection than folks with healthy immune systems.

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Summary on Q-fever/goat flu-Jefferson Co. Board of Health 3/23/16

Note: If the 9,000-goat farm goes forward, it would be the largest known goat facility—by number of goats—in the entire world. Most U.S. goat farms have less than 500 goats. We have not found evidence of any facilities anywhere with more than 5,000 goats. Given the information we have compiled from reliable sources, this raises public health/safety questions. No one has shown having 9,000 goats indoors in a high-density setting is safe.



--Q fever (query fever or "goat flu") is caused by the bacteria, *Coxiella burnetii*. Goats infected with Q fever excrete the organism in their milk, urine, feces, birthing material, vaginal fluids & semen. About 60% of herds have at least one goat infected with goat flu.

--One of a number of diseases goats carry and can spread to humans, Q fever has significant morbidity. Symptoms include fever (can be as high as 104-105 degrees), headache, sweats, cough, myalgia, abdominal pain, chest pain, jaundice, and rash.

--As few as 10 microbes can cause infection. *Coxiella burnetii*, which also has a spore form, is highly resistant to heat, drying, and common household disinfectants, and survives on surfaces such as clothing. Bacterium may live in soil, dust, and manure for up to 10 months, possibly much longer according to more recent studies.

--While most people fully recover from Q fever within weeks or months, for about 1 to 2% of folks, goat flu proves fatal.

--Goat flu can be quite serious, with complications such as endocarditis (affecting the heart valves), pneumonia, pregnancy complications (stillbirths, miscarriages, and intrauterine growth retardation), meningitis, hepatitis, and osteoarthritis. In children with chronic Q fever infection, they may present with osteomyelitis.

---Those at most risk for complications include pregnant women, folks w/existing heart valve disease or vascular grafts, people w/ renal disease, older adults, & those whose immune systems are weakened by HIV/AIDS, chemotherapy, or long-term steroid therapy.

--The American Society of Hematology linked the microbe that causes Q fever to increased risk of lymphoma. (The study w/1, 468 patients treated for Q fever in France; those w/ Q fever were 25% more likely to develop large B-cell lymphoma than those w/o the infection.)

---Human infection usually springs from inhalation of airborne barnyard dust contaminated by infected animals. (<http://www.cdc.gov/qfever/>) The modes of human to-human transmission (rare) are through sexual contact or maternal-child/baby to unborn child.



--The largest human outbreak of Q fever on record involved 4,000 cases in the Netherlands (2007-2010), believed to have been spread through wind. The Dutch used an 18K surveillance radius, & also banned spreading manure on fields and visiting infected farms.

---Studies show the highest risk for Q fever infection is within 5K of a goat facility, with rates of infection greatest in settings with a higher density of goats.

--Contaminated dust becomes airborne through wind, dry sweeping, straw/hay, manure, high-pressure hosing, culling goats, and dressing and/or incinerating carcasses.

--No vaccines for goats or humans are currently readily available in the United States.

--The CDC classifies the Q fever bacteria and *Brucella Melitensis* (see other side) as potential bioterrorism agents. This raises concerns about biosecurity risks on the large-scale farm.

* Placenta from infected goats contain ~100 million *C. burnetii* organisms, per gram of placenta (W. S. U. College of Vet. Medicine) Goat placentas weigh ~500 grams