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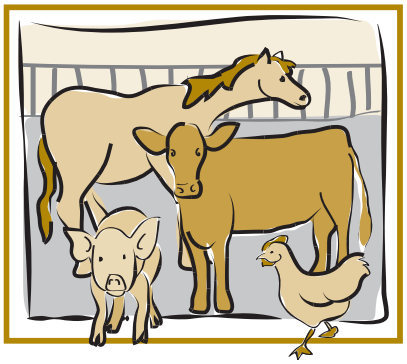

Q Fever

Fact Sheet No. **8.022** Livestock Series | **Health**

by D. Van Metre*

Q fever is an infectious disease of animals and humans caused by a species of bacteria called *Coxiella burnetii*. This organism is very durable – it can survive for months in the environment. Sheep, goats, and cattle can carry the organism. The bacteria can be shed by these animals in feces, urine, milk, and in the birthing fluids and membranes. Animals that carry this organism and shed it into the environment usually do not show any signs of disease.

Q Fever in Animals

Coxiella burnetii is most frequently found in ruminants (cattle, sheep, and goats) but can also be detected in wildlife and pets. Sheep appear to be infected most frequently, followed by goats and less frequently, cattle. Ticks can carry the disease, but ticks are considered to be of minor importance in transmission of Q fever among animals and people.

Coxiella burnetii can be shed in feces, urine, and milk of infected animals. However, the vaginal secretions and uterine fluids released from infected ewes and does during birthing carry the highest number of *Coxiella burnetii*. Shedding of *Coxiella burnetii* in the vaginal secretions can continue for days to weeks after birthing. It is important to note that the dam, the offspring, and the birthing membranes and fluids can appear perfectly healthy while the organism is being shed in these materials.

Occasionally, infection does result in visible signs of **disease,** usually in **sheep and goats.** Infected ewes and does may **abort** or give birth to w**eak offspring**, and Q fever should be considered as a possible cause of outbreaks of abortion in flocks and goat herds. When ewes or does abort because of Q fever, the causative organism is present in

extremely high numbers in the uterine fluids, placenta, and aborted fetuses. Aborted fetuses lack any characteristic findings, but the placenta may be visibly thickened in cases of Q fever abortion.

Diagnosis of Q fever abortion requires testing of the fetuses and placentas from aborted animals. Veterinary diagnosticians typically identify the organism by the use of special stains applied to microscopic sections of these tissues, and/or through the use of tests to detect the presence of the organism's DNA.

Abortions caused by Q fever typically do not recur in sheep, but goats may abort again in subsequent pregnancies if infection recurs. There is currently not a licensed vaccine to prevent Q fever in livestock in the United States. Once Q fever is confirmed as a cause of abortion in a herd or flock, treatment of pregnant animals with tetracycline may reduce the risk of further abortions, but is unlikely to eliminate the problem entirely.

Prevention of Q fever in animals is difficult, since infected animals may show

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Quick Facts

- Q fever is an infectious disease of animals and humans caused by a species of bacteria called *Coxiella burnetii*.
- Sheep, goats, and cattle can carry the organism.
- Animals that carry this organism and shed it into the environment usually do not show any signs of disease.

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no signs of infection with the organism. Isolation of any newly purchased animals from pregnant ewes or does is advised until all pregnant animals have birthed. Isolate any animals that abort from the remainder of the herd, and consult a veterinarian to discuss diagnostic testing. Dispose of bedding and equipment contaminated with tissues and fluids from an abortion in a sealed trash bag, buru, or burn. Individuals handling these materials should take protective precautions (see below). Clean contaminated equipment and facility surfaces with soap and water and disinfect with a phenolic disinfectant (e.g. Lysol®). More precautions for people are described below.

Q Fever in Humans

Infection in humans occurs most often in those individuals who come into contact with cattle, sheep, and goats on a regular basis. Therefore, occupational exposure to *Coxiella burnetii* is a common source of infection for humans; this occurs most often in farmers, veterinarians, livestock workers, slaughter plant personnel, and individuals who work with sheep, goats, and cattle in a research setting. Occasionally, however, Q fever develops in individuals with no known exposure to livestock. Wind-borne transmission of the organism and contact with contaminated soil or clothing are other potential routes for people to become infected.

Most people become infected by inhalation of *Coxiella burnetti* that become aerosolized (airborne) when an infected animal gives birth or experiences a spontaneous abortion. Ingestion of the causative bacteria can occur if people ingest non-pasteurized milk or milk products derived from infected animals – remember, infected animals can appear normal. Pasteurization eliminates the organism from milk and milk products. Aging non-pasteurized milk into cheese may not inactivate all *C. burnetti* bacteria.

Many people infected with Q fever develop no symptoms of infection and eliminate the infection with an effective immune response. If symptoms do develop, most people experience flu-like illness within one to three weeks after exposure to the organism. Affected individuals may have a fever, headache, tiredness, muscle aches, cough, vomiting, and diarrhea. Pneumonia and rarely, liver infection are potential complications. Most cases resolve spontaneously or respond to treatment with particular antibiotics. Fatalities are uncommon when complications are not present.

People who have impaired immune systems – for example, those receiving chemotherapy for cancer, pregnant women, recipients of organ transplants, and those infected with the HIV virus – are more likely to develop more serious disease with potential complications. Further, people with abnormal heart valves or coronary vascular grafts are at particularly high risk of developing endocarditis, which is infection of the interior lining of the heart and heart valves. Endocarditis often does not arise until several months after the infection is established.

Q fever can be treated with certain antibiotics. Consult your health care provider if you have symptoms that might indicate Q fever. Ill individuals who work with sheep and goats must communicate clearly with their health care provider about their previous exposure to these animals and their facilities, bedding, or manure. This crucial step – communicating about potential exposure – very important in helping your health care provider to make a diagnosis.

Prevention

1. Eat and drink only pasteurized milk and milk products from cattle, sheep, and goats.
2. Limit exposure to sheep and goats during birthing. People who are at high risk of serious complications from Q fever include pregnant women, organ transplant recipients, abnormal heart valves, individuals on medications that suppress immunity, and individuals suffering from immune deficiency diseases. Such individuals should seriously consider avoiding contact with sheep and goats, particularly during lambing or kidding time. Consult with your health care provider to determine if you are at high risk for contracting Q fever.
3. Protect yourself. Gloves, eye protection, and a protective mask can be worn when handling sheep or goats, their manure, bedding, or soil from premises where these animals have been kept. Given that the organism can be shed by otherwise healthy sheep and goats at birthing, wearing this protective gear may be warranted when administering obstetrical assistance to these animals, or when handling the bedding, birthing fluids, or birthing membranes.

Consult your physician or health care provider to determine if you are able to wear an "N95" mask to limit the chances that you might inhale the organism when working with sheep or goats. These masks are available at most hardware stores. Particular care must be taken when handling aborted fetuses or birthing membranes from sheep or goats that are known to be infected, as these materials can contain large numbers of the organism. These materials should be burned, buried, or disposed of as hazardous infectious waste. Work clothes contaminated with birthing fluids or manure from sheep and goats should not be handled by people at high risk for Q fever and its complications.

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Resources

Rodolakis, A. Q Fever in Dairy Animals. Ann NY Acad Sci 1166: 90–93, 2009.

Cutler, S.J., Bouzid M., Cutler R.R. Q Fever. J Infect 54: 313-318, 2007.

Hartzell, J.D., Wood-Morris R.N., Martinez L.J., et al. Q Fever: Epidemiology, Diagnosis, and Treatment. Mayo Clinic Proc 83: 574-579, 2008.

McQuiston, J.H., Childs, J.E. Q Fever in Humans and Animals in the United States. Vector Borne Zoonotic Dis 2: 179–191, 2002.

Kim, S.G., Kim, E.H., Lafferty, C.J., Dubovi, E., Coxiella burnetii in Bulk Tank Milk Samples, United States. Emerg Infect Dis April, 2005.