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Q fever

Overview^{1, 2, 3, 5, 6, 7, 8}

Q fever is the resulting illness from the infection of an obligate gram-negative intracellular bacterium *Coxiella burnetii*. Q fever can be acute or chronic infection. The most common presentation of acute infection is a mild, self-limiting influenza-like illness, with pneumonia or hepatitis in more severe acute infections. Chronic infections occur primarily in patients with preexisting cardiac valvulopathies, vascular abnormalities, or immunosuppression. The most common manifestations of chronic disease are endocarditis and endovascular infections. Women infected during pregnancy are at high risk for adverse pregnancy outcomes unless treated.

C. burnetii causes reproduction problems in livestock. The disease can cause abortion in animals, but more frequently, the infection is subclinical. During birthing, infected animals shed large numbers of organisms, which can become aerosolized. Infection of humans usually occurs by inhalation of *C. burnetii* from air that contains airborne barnyard dust contaminated by dried placental material, birth fluids, and excreta of infected animals. Cattle, sheep, and goats are the primary reservoirs although a variety of species can be infected. Other less common modes of transmission to humans include tick bites, ingestion of unpasteurized milk or dairy products, and human-to-human transmission, which is rare. *C. burnetii* is highly infectious; a single organism can cause disease in a susceptible person. *C. burnetii* are resistant to heat, drying, and many common disinfectants.

The incubation period for Q fever varies depending on the number of organisms that initially infect the patient. Infection with greater numbers of organisms will result in shorter incubation periods. The incubation period for acute Q fever varies from 2-48 days; the average incubation period is 14 to 21 days.⁸ Chronic Q fever can occur (within 6 weeks) after acute infection, or can present years later. As many as 60% of infected persons of naturally-occurring acute Q fever are asymptomatic or develop a very mild illness, and remain unnoticed. In symptomatic patients, onset is typically abrupt and characterized by high fever, severe headache, malaise, myalgia, chills and/or sweats, non-productive cough, nausea, vomiting, diarrhea, abdominal pain, and chest pain. However, it is important to note that the combination of symptoms varies greatly from person to person.⁵ Although most persons with acute Q fever infection recover, others may experience serious illness with complications that may include pneumonia, granulomatous hepatitis (inflammation of the liver), myocarditis (inflammation of the heart tissue) and central nervous system complications. Pregnant women who are infected may be at risk for pre-term delivery or miscarriage.

Chronic Q fever is a severe disease occurring in < 5% of acutely infected patients. It may present soon (within 6 weeks) after an acute infection, or manifest years later. The three groups at highest risk for chronic Q fever are pregnant women, immunosuppressed persons and patients with a pre-existing heart valve defects. Endocarditis is the major form of chronic disease, comprising 60-70% of all reported cases. Transplant recipients, patients with cancer, and those with chronic kidney disease are also at risk of developing chronic Q fever. Other forms of chronic Q fever include aortic aneurysms and infections of the bone, liver or reproductive organs, such as the testes in males.

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In the United States, Q fever outbreaks have resulted mainly from occupational exposure involving veterinarians, meat processing plant workers, sheep and dairy workers, livestock farmers, and researchers at facilities housing sheep. Prevention and control efforts should be directed primarily toward these groups and environments. Currently, no licensed vaccine is available in the United States. **NOTE:** *Q fever is considered a potential Category B bioterrorism agent; the organism would most likely be disseminated via an infectious aerosol. Currently, all cases of Q fever reported in Missouri have been naturally-occurring or occupational.*

For a complete description of Q fever, refer to the following references:

- *Control of Communicable Diseases Manual (CCDM)*, American Public Health Association, 20th ed. 2015.
- American Academy of Pediatrics. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. 2012.
- *Principles and Practice of Infectious Diseases*, 7th ed., Pennsylvania: Churchill Livingstone Elsevier, 2010.

2009 Case Definition – Q fever⁴ - (5/15)

Exposure: Exposure is usually via aerosol, is broadly interpreted, and may be unknown (especially for chronic infection), but often includes the presence of goats, sheep, or other livestock, especially during periods of parturition. Direct contact with animals is not required, and variable incubation periods may be dose dependent.

Subtypes Case Definition

Acute

Chronic

Q fever, acute

Clinical Description

Acute fever usually accompanied by rigors, myalgia, malaise, and a severe 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. **NOTE:** Serologic profiles of pregnant women infected with acute Q fever during gestation may progress frequently and rapidly to those characteristics of chronic infection.

Clinical Criteria

Acute fever and one or more of the following: rigors, severe retrobulbar headache, acute hepatitis, pneumonia, or elevated liver enzyme levels.

Laboratory Criteria for diagnosis

Laboratory confirmed:

- Serological evidence of a fourfold change in immunoglobulin G (IgG)-specific antibody titer to *C. burnetii* phase II antigen by indirect immunofluorescence assay (IFA) between paired serum samples, (CDC suggests one taken during the first week of illness and a second 3-6 weeks later, antibody titers to phase I antigen may be elevated or rise as well), **or**
- Detection of *C. burnetii* DNA in a clinical specimen via amplification of a specific target by polymerase chain reaction (PCR) assay, **or**

(Continued on next page.)



- Demonstration of *C. burnetii* in a clinical specimen by immunohistochemical methods (IHC), **or**
- Isolation of *C. burnetii* from a clinical specimen by culture.

Laboratory supportive:

- Has a single supportive IFA IgG titer of $\geq 1:128$ to phase II antigen (phase I titers may be elevated as well).
- Has serologic evidence of elevated phase II IgG or IgM antibody reactive with *C. burnetii* antigen by enzyme-linked immunosorbent assay (ELISA), dot-ELISA, or latex agglutination.

NOTE: For acute testing, CDC uses in-house IFA IgG testing (cutoff of $\geq 1:128$), preferring simultaneous testing of paired specimens, and does not use IgM results for routine diagnostic testing.

Case Classification

Confirmed: A laboratory confirmed case that either meets clinical case criteria or is epidemiologically linked to a lab confirmed case.

Probable: A clinically compatible case of acute illness (meets clinical evidence criteria for acute Q fever illness) that has laboratory supportive results for past or present acute disease (antibody to Phase II antigen) but is not laboratory confirmed.

Q fever, chronic

Clinical Description

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.

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.

Laboratory Criteria for diagnosis

Laboratory confirmed:

- Serological evidence of IgG antibody to *C. burnetii* phase I antigen $\geq 1:800$ 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.

(Continued on next page.)



Laboratory supportive:

- Has an antibody titer to *C. burnetii* phase I IgG antigen $\geq 1:128$ and $< 1:800$ by IFA.

NOTE: Samples from suspected chronic patients should be evaluated for IgG titers to both phase I and phase II antigens. Current commercially available ELISA tests (which test only for phase II) are not quantitative, cannot be used to evaluate changes in antibody titer, and hence are not useful for serological confirmation.

IgM 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. Complement fixation (CF) tests and other older test methods are neither readily available nor commonly used.

Serologic test results must be interpreted with caution, because baseline antibodies acquired as a result of historical exposure to Q fever may exist, especially in rural and farming areas.

Case Classification

Confirmed: A clinically compatible case of chronic illness (meets clinical evidence criteria for chronic Q fever) that is laboratory confirmed for chronic infection.

Probable: A clinically compatible case of chronic illness (meets clinical evidence criteria for chronic Q fever) that has laboratory supportive results for past or present chronic infection (antibody to phase I antigen).

Information Needed for Investigation

Verify the diagnosis. Obtain demographic, clinical, laboratory information, and other epidemiological information necessary to complete the [Disease Case Report \(CD-1\)](#) and the [Q Fever Case Report Form](#) from the attending physician, hospital, and/or laboratory and patient or a knowledgeable family member.

Based on the CDC case definition above, suspected laboratory results that are positive at a screening level only or are IFA Phase II IgG titers less than 1:128 will not likely yield valuable epidemiologic data, and therefore do not require investigation. Two exceptions, however, should be noted. WebSurv should be searched to assure that no clusters of patients in time or place exist. In addition, investigators should refer to instructions below to assure themselves that the potential for a terrorist act or the intentional or deliberate release of *C. burnetii* has been considered.

Establish the extent of illness. Determine if household or other close contacts are, or have been ill by contacting the health care provider, patient, or family member. Identify symptomatic household members, associates, or co-workers and strongly urge them to contact their physician for a medical evaluation.

Identify the source of infection. Determine the occupation of the index case since this information may help narrow the search for the route of exposure. Information to obtain:

- Do you work in a laboratory? If so, does the lab handle unidentified isolates or *C. burnetii* specimens?



- Are you a veterinarian, or meat processing plant worker, sheep, or dairy workers, livestock farmer? If not, do you live near a farm that raises sheep, goats or cattle or one that breeds exotic animals (e.g., camels, llamas, alpaca, buffalo)?
- Have you assisted animals giving birth? Determine if the case was exposed to abortive livestock or animal fetuses.
- Did you consume any unpasteurized dairy products?
- Determine if the case had a history of foreign or domestic travel. If so, where? Did they visit a farm? Collect the dates of travel.

COMMENTS: Infectious airborne particles can travel up to 11 miles. Viable organisms can be found for up to 30 days in dried sputum, 120 days in dust, and 49 days in dried urine from infected guinea pigs, for at least 19 months in tick feces, and 12 to 16 months in wool.⁸ Sometimes the source is not identified.

Contact the [District Communicable Disease Coordinator](#) if the case appears to have acquired the disease in Missouri. The District Communicable Disease Coordinator will alert the State Public Health Veterinarian who may need to alert the Missouri Department of Agriculture. Additional information may need to be collected (e.g. job duties, food histories, and unusual risk factors).

Provide information about Q fever to persons at risk for infection and the general public.

Efforts should be made to promote Q fever awareness and educate the public on sources of infection. 1) Educate high-risk workers (e.g., farmers, herders, wool-sorters, veterinarians, laboratory personnel working with the organism, rendering-plant, slaughterhouse and dairy workers) about the risk of Q fever and stress methods to reduce occupational exposure such as carefully disposing of animal products that may be infected and disinfect any contaminated areas. 2) Educate on potential hazards of drinking or eating unpasteurized dairy products. 3) Health-care providers should educate women of child-bearing age who receive a diagnosis of acute Q fever of potential risks to the fetus. **NOTE:** *Women infected with acute Q fever during pregnancy, including those who were asymptomatic or experienced no adverse pregnancy outcomes, might be at risk for recrudescent infection during subsequent pregnancies.* Therefore, pregnant women with a history of Q fever infection during a previous pregnancy should be monitored closely for recrudescent infection in all subsequent pregnancies.⁷ The Center for Food Security and Public Health at Iowa State University has developed technical and public awareness fact sheets on Q fever that can be provided to persons who have regular exposure to potential sources of the Q fever bacterium. Those documents can be downloaded at:⁸ http://www.cfsph.iastate.edu/Factsheets/pdfs/q_fever.pdf and http://www.cfsph.iastate.edu/FastFacts/pdfs/qfever_F.pdf. Additional information on Q fever prevention can be found on CDC's website at: <http://www.cdc.gov/qfever/prevention/index.html> or <http://www.bt.cdc.gov/agent/qfever/clinicians/prevention.asp> or [Diagnosis and Management of Q Fever – United States, 2013; Recommendations from CDC and the Q Fever Working Group. In: MMWR 2013; 62 \(No. RR-3\). \(5/15\)](#)

Q fever surveillance. Review WebSurv to determine whether there have been other cases in the same geographic area. When cases are related by person, place, or time, efforts should be made to identify a common source. Information obtained through the [Q Fever Case Report Form](#) is used to identify a possible source of infection and to characterize persons or geographic areas in which additional efforts may be needed to raise awareness and reduce disease incidence.



***Coxiella burnetii* is a potential Class B Bioterrorism Agent.** If Q fever is the result of a terrorist act or the intentional or deliberate release, *C. burnetii* would most likely be disseminated via an infectious aerosol and is an inhalation threat to humans and wild and domestic animals. A single *C. burnetii* organism can cause disease in a susceptible person. This agent has a past history of being developed for use in biological warfare and is considered a potential terrorist threat. Historically, 60% of acute infections have shown no clinical sign of disease. This may not hold true in an intentional release, as the exposed levels are potentially much higher. **NOTE:** Q fever infections in women that occur shortly before conception or during pregnancy might result in miscarriage, stillbirth, premature birth, intrauterine growth retardation, or low birthweight.⁷

None of the following clues alone constitute proof of intentional use of a biological agent, but together they can assist greatly in determining if further investigation is warranted.¹¹

1. The presence of a large epidemic, with greater case loads than expected, especially in a discrete population.
2. More severe disease than expected for a given pathogen, as well as unusual routes of exposure.
3. A disease that is unusual for a given geographic area, is found outside the normal transmission season, or is impossible to transmit naturally in the absence of the normal vector for transmission.
4. Multiple simultaneous epidemics of different diseases.
5. A disease outbreak with zoonotic as well as human consequences, as many of the potential threat agents are pathogenic to animals (death or illness among animals that precedes or accompanies illness or death in humans).
6. Unusual strains or variants of organisms or antimicrobial resistance patterns disparate from those circulating.
7. Higher attack rates in those exposed in certain areas, such as inside a building if the agent was released indoors, or lower rates in those inside a sealed building if an aerosol was released outdoors.
8. Intelligence that an adversary has access to a particular agent or agents.
9. Claims by a terrorist of the release of a biologic agent.
10. Direct evidence of the release of an agent, with findings of equipment, munitions, or tampering.

Even with the presence of more than one of the above indicators, it may not be easy to determine that an attack occurred through nefarious means. **NOTE:** *If Q fever is suspected to be the result of a terrorist act or the intentional or deliberate release thereof; the LPHA should:*

1. **Notify local law enforcement** and the [Senior Epidemiology Specialist](#) for the District, or the Missouri Department of Health and Senior Service's Emergency Response Center (ERC) at (800) 392-0272 (24/7) immediately.
2. Work with law enforcement and implement "Chain of Custody" procedures for all laboratory samples, as they will be considered evidence in a criminal investigation.
3. Work to define the population at risk which is essential to guide response activities. Public health authorities will play the lead role in this effort, but must consult with law enforcement, emergency response and other professionals in the process.

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4. Once the mechanism and scope of delivery has been defined, identify symptomatic and asymptomatic individuals among the exposed and recommend treatment and/or chemoprophylaxis.
5. Establish and maintain a detailed line listing of all cases and contacts with accurate identifying and locating information.

Notification

- Contact the [District Communicable Disease Coordinator](#), the [Senior Epidemiology Specialist](#) for the District, or the Missouri Department of Health and Senior Services (MDHSS) - BCDP, phone (573) 751-6113, Fax (573) 526-0235, or for afterhours notification contact the MDHSS/ERC at (800) 392-0272 (24/7).
- If a case(s) is associated with a child care center, BCDP or the LPHA will contact the BEHS, phone (573) 751-6095, Fax (573) 526-7377 and the Section for Child Care Regulation, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is associated with a long-term care facility, BCDP or the LPHA will contact the Section for Long Term Care Regulation, phone (573) 526-8524, Fax (573) 751-8493.
- If a case is associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center BCDP or the LPHA will contact the Bureau of Health Services Regulation phone (573) 751-6303, Fax (573) 526-3621.
- If a case(s) is associated with animal or animal product exposure within Missouri, OVPH will contact Missouri Department of Agriculture, Animal Health Division, phone (573) 751-3377, Fax (573) 751-6919.
- Contact the Department of Natural Resources, Public Drinking Water Branch, at (573) 751-1187, Fax (573) 751-3110 if cases are associated with a public water supply, or BEHS, phone (573) 751-6095, Fax (573) 526-7377, if cases are associated with a private water supply.

Control Measures^{5, 7, 8, 9}

Q fever presenting as endemic disease.

Whenever possible, the placenta and associated fluids from sheep, goats, and cattle should be immediately removed and burned or buried to reduce the spread between animals. Pens should be cleaned. In a recent outbreak, a pregnant sheep that gave birth at a market was responsible for nearly three hundred human cases. The authors recommend not displaying sheep in public places during the third trimester, and testing susceptible animals in petting zoos for *C. burnetii*. It is important to be aware that *C. burnetii* infections in animals may be unapparent. Because ingestion is a potential route of exposure, unpasteurized milk and milk products should be avoided. Manure from contaminated farms should not be spread in suburban areas and gardens. Facilities that study susceptible ruminants should use good laboratory practices, and the animals should be negative for *C. burnetii*. Biosafety level 3 is required for the manipulation of contaminated specimens and cultivation of this organism.

In the United States, Q fever outbreaks have resulted mainly from occupational exposure involving veterinarians, meat processing plant workers, sheep and dairy workers, livestock farmers, and researchers at facilities housing sheep. Prevention and control efforts should be directed primarily toward these groups and environments. The following measures should be used in the prevention and control of Q fever:

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- Educate the public on sources of infection.
- Immediately and appropriately dispose of placenta, birth products, fluid-soaked soil, fetal membranes, and aborted fetuses from sheep, goats, and cattle. Pens should be cleaned.
- Encourage workplace hygiene; to include thoroughly washing hands.
- Restrict access to barns and laboratories used in housing potentially infected animals.
- Use only [pasteurized](#) milk and milk products.
- Use appropriate procedures for bagging, autoclaving, and washing of laboratory clothing.
- Quarantine imported animals.
- Ensure that holding facilities for sheep should be located away from populated areas. Animals should be routinely tested for antibodies to *C. burnetii*, and measures should be implemented to prevent airflow to other occupied areas.
- Counsel persons at highest risk for developing chronic Q fever, especially persons with pre-existing cardiac valvular disease or individuals with vascular grafts.
- If assisting in the delivery of newborn animals, wear gloves, masks and eye protection.

Live-birthing exhibits, usually involving livestock (e.g., cattle, pigs, goats, or sheep), are popular attractions for children at community fairs and special events. One large Q fever outbreak described in epidemiologic literature was linked to goats and sheep giving birth at petting zoos in indoor shopping malls. Local public health officials wishing to assure adequate prevention practices against Q fever and other zoonotic pathogens in their oversight of live-animal exhibits should consult the National Association of State Public Health Veterinarians (NASPHV) [Compendium of Measures to Prevent Disease Associated with Animals in Public Settings](#), which is available online. This 2013 NASPHV Report is an update to the previous 2011 Report and standardizes recommendations for public health officials, veterinarians, animal venue operators, animal exhibitors, visitors to animal venues and exhibits, and others concerned with control of disease and with minimizing health risks associated with animal contact in public settings. This NASPHV Compendium also contains links to posters that can be downloaded and displayed at these kinds of events to alert the public of common sense prevention practices like limiting direct contact with manure and encouraging hand washing.

People at high risk for chronic Q fever, such as those who are immunosuppressed, should consider staying away from susceptible ruminants, particularly parturient ruminants. It may be advisable to avoid all animals that have recently given birth, as cases have also resulted from exposure to cats and other species.

The majority of acute Q fever cases resolve spontaneously within 2–3 weeks, even without treatment. Symptomatic patients with confirmed or suspected acute Q fever, including children with severe infections, should be treated. Prompt treatment can prevent early Q fever from becoming chronic. Treatment for acute Q fever is not routinely recommended for asymptomatic persons or for those whose symptoms have resolved, although it might be considered in those at high risk for developing chronic Q fever.⁷ An overview of Q fever treatment information for clinicians is available at:

<http://www.bt.cdc.gov/agent/qfever/clinicians/treatment.asp>.

Any symptomatic patient with serologic evidence of chronic Q fever (phase I IgG antibody titer $\geq 1:1024$) should be given a thorough clinical assessment to identify potential organ infection.⁷



Patients at risk for chronic Q fever should be serologically monitored and receive a physical examination at intervals of 3, 6, 12, 18, and 24 months following diagnosis of *C. burnetii* infection. This population includes patients with cardiovascular risk factors for chronic disease (e.g., heart valve defect, vascular graft, or aneurysm) and women infected during pregnancy. Additional detailed information on the medical management of Q fever is available at: [Diagnosis and Management of Q Fever – United States, 2013; Recommendations from CDC and the Q Fever Working Group. In: MMWR 2013; 62 \(No. RR-3\).](#)

Q fever suspected to be the result of a terrorist act or intentional / deliberate release.

If the source of infection cannot be determined and cases are presenting as multiple cases, temporally/spatially clustered; and/or the [epidemiologic clues](#) discussed above suggest an intentional or deliberate use of a biological agent – **law enforcement must** be involved in the investigation. Even if no conclusive answer can be derived quickly, the means employed in determining the cause of an attack will still provide medical personnel with information that may prevent illness and death.¹¹

Because the laboratory confirmation could be delayed, specific epidemiological, clinical, and microbiological findings that suggest an intentional release of *C. burnetii* should result in the issue of a health alert. Additional information on Q fever can be found at: [U.S. Army Medical Research Institute of Infectious Diseases; Medical Management of Biologic Causalities Handbook; 7th Ed. Sep. 2011.](#)

Laboratory Procedures

Testing for Q fever is available through commercial clinical laboratories. **NOTE:** *The Missouri State Public Health Laboratory (MSPHL) does not routinely perform C. burnetii testing.* However, Polymerase chain reaction (PCR) testing of whole blood or serum is available under certain circumstances. Questions regarding PCR testing by the MSPHL should be directed to your [District Communicable Disease Coordinator](#) in consultation with the MSPHL- Molecular Unit at 573-751-3334.

Summary of Q fever Diagnosis⁷

- Polymerase chain reaction (PCR) of whole blood or serum provides rapid results and can be used to diagnose acute Q fever in approximately the first 2 weeks after symptom onset but before antibiotic administration.
- A fourfold increase in phase II immunoglobulin G (IgG) antibody titer by immunofluorescent assay (IFA) of paired acute and convalescent specimens is the diagnostic gold standard to confirm diagnosis of acute Q fever. A negative acute titer does not rule out Q fever because an IFA is negative during the first stages of acute illness. Most patients seroconvert by the third week of illness.
- A single convalescent sample can be tested using IFA in patients past the acute stage of illness; however, a demonstrated fourfold rise between acute and convalescent samples has much higher sensitivity and specificity than a single elevated, convalescent titer.
- Diagnosis of chronic Q fever requires demonstration of an increased phase I IgG antibody ($\geq 1:1024$) and an identifiable persistent infection (e.g., endocarditis)
- PCR, immunohistochemistry, or culture of affected tissue can provide definitive confirmation of infection by *C. burnetii*.



- Test specimens can be referred to CDC through following instructions on the MSPHL “CDC Referral Serology” webpage at <http://www.health.mo.gov/lab/virologyadditionaltests.php>. (The MSPHL Virology Unit has responsibility for shipping all referral serologies, including Q fever, to CDC.)

Additional information can be found on CDC’s website at:

- <http://www.cdc.gov/qfever/symptoms/index.html>, for more in-depth information on the diagnosis of Q fever, visit: <http://www.bt.cdc.gov/agent/qfever/clinicians/diagnosis.asp>, or
- [Centers for Disease Control and Prevention. *Diagnosis and Management of Q Fever – United States, 2013; Recommendations from CDC and the Q Fever Working Group.*](#)

The [CDC SPECIMEN SUBMISSION FORM: SPECIMENS OF HUMAN ORIGIN](#) is needed when submitting specimens to CDC for testing.

Reporting Requirements

Q fever is a Category 2 (A) disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services (MDHSS) within one (1) day of first knowledge or suspicion by telephone, facsimile or other rapid communication. The MDHSS can be contacted afterhours through the MDHSS/ERC by calling (800) 392-0272 (24/7).

As a Nationally Notifiable Condition, **confirmed** and **probable** Q fever cases; *appearing to be naturally occurring* are a **STANDARD** report to the Centers of Disease Control and Prevention (CDC). **STANDARD** reporting requires the Missouri Department of Health and Senior Services (MDHSS) to report to CDC by electronic transmission via WebSurv within the next normal reporting cycle.

Instances of Q fever that appear to be the result of a terrorist act or the intentional or deliberate release of a biological agent is a Category 1(B) disease and shall be reported to the local health authority or to the MDHSS **immediately** upon of first knowledge or suspicion by telephone, facsimile or other rapid communication. The MDHSS can be contacted afterhours through the MDHSS/ERC by calling (800) 392-0272 (24/7).

MDHSS will call the CDC EOC at 770-488-7100 within 24 hours *for multiple cases temporally/spatially clustered*; followed by submission of an electronic case notification via (WebSurv) in the next regularly scheduled electronic transmission.

1. For confirmed and probable cases, complete a “[Disease Case Report](#)” (CD-1) and “[Q Fever Case Report Form](#)” and send the completed forms to the [DHSS District Health Office](#).
2. Entry of the completed CD-1 into the MOHSIS database negates the need for the paper CD-1 to be forwarded to the District Health Office.
3. MDHSS will report to CDC following the above reporting criteria (see boxes).
4. All outbreaks or “suspected” outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the [Missouri Outbreak Surveillance Report \(CD-51\)](#).
5. If an outbreak is associated with animal contact or environmental contamination other than food/water, a [National Outbreak Reporting System Form](#) (CDC 52.13) is to be completed and submitted to the District Communicable Disease Coordinator at the conclusion of the outbreak.

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6. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.

References

1. American Public Health Association. *Q Fever (Query fever)*. In: D. Heymann, (Ed.), *Control of Communicable Diseases Manual*. 20th ed. Washington, D.C. American Public Health Association, 2015: 493-497.
2. American Academy of Pediatrics. *Q Fever*. In: Pickering LK, Baker CJ, Kimberlin DW, Long SS, eds. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 28th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012: 599-600.
3. Churchill Livingstone Elsevier. *Coxiella burnetii (Q Fever)*. Marrie, TJ and Didier, R In: Mandell GL, Bennett JE, Dolin RD, eds. *Mandell, Douglas, and Bennett's Principles and Practices of Infectious Diseases: Vol. 2*. 7th ed. 2010: 2511-2519.
4. Centers for Disease Control and Prevention's (CDC) National Notifiable Diseases Surveillance System (NNDSS) and Case Definitions. <http://wwwn.cdc.gov/nndss/> (5/15).
5. Centers for Disease Control and Prevention. National Center for Emerging and Zoonotic Infectious Diseases, Division of Foodborne, Waterborne, and Environmental Diseases. In: *Q Fever and Q Fever: Information and Guidance for Clinicians*. <http://www.cdc.gov/qfever/> and <http://www.bt.cdc.gov/agent/qfever/clinicians/index.asp> (5/15).
6. Centers for Disease Control and Prevention. *Q Fever*. Anderson, A and McQuiston, J In: *CDC Health Information for International Travel 2014*. New York: Oxford University Press; 2014. <http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/q-fever> (5/15).
7. Centers for Disease Control and Prevention. *Diagnosis and Management of Q Fever – United States, 2013; Recommendations from CDC and the Q Fever Working Group*. In: MMWR 2013; 62 (No. RR-3): http://www.cdc.gov/mmwr/PDF/rr/rr6203.pdf?s_cid=bb-rzb-QfeverNationalRecommendations-001&utm_source=external&utm_medium=banner&utm_content=rzb-QfeverNationalRecommendations-001&utm_campaign=glqb (5/15).
8. The Center for Food Security and Public Health, Iowa State University, College of Veterinary Medicine, Ames, IA. In: *Home; Animal Disease Information; Technical Factsheet; and Fast Facts Disease Summary*. http://www.cfsph.iastate.edu/Factsheets/pdfs/q_fever.pdf and http://www.cfsph.iastate.edu/FastFacts/pdfs/qfever_F.pdf (5/15).
9. National Association of State Public Health Veterinarians. *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2013*. In: Journal of the American Veterinary Medical Association, Vol 243, No. 9, 2013; 1270-1288. <http://nasphv.org/Documents/AnimalContactCompendium2013.pdf> (5/15).
10. Department of Health, Victoria, Australia. *Q Fever* In: *Blue Book – Guidelines for the Control of Infectious Diseases*. Communicable Disease Prevention and Control Unit Victorian Department of Health. <http://ideas.health.vic.gov.au/bluebook/qfever.asp> (5/15).
11. Canadian Centre for Occupational Health & Safety, Hamilton, Ontario Canada. *Q Fever* In: *Home; OSH Answers; Biological Hazards; Diseases, Disorders & Injuries*. <http://www.ccohs.ca/oshanswers/diseases/qfever.html> (5/15).



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12. Pavlin JA. Epidemiology of Bioterrorism. *Emerging Infectious Diseases*, Volume 5, Number 4- August 1999. Available from: <http://wwwnc.cdc.gov/eid/article/5/4/99-0412.htm> (5/15).
13. U.S. National Library of Medicine, Bethesda, MD, U.S. Department of Health and Human Services, National Institutes of Health. *Q fever*. In: MedlinePlus. <http://www.nlm.nih.gov/medlineplus/ency/article/001337.htm> (5/15).
14. U.S. Army Medical Research Institute of Infectious Diseases. *Q Fever*. In: *Medical Management of Biologic Casualities Handbook*. 7th Ed. September 2011. Fort Detrick, Maryland. <http://www.usamriid.army.mil/education/bluebookpdf/USAMRIID%20BlueBook%207th%20Edition%20-%20Sep%202011.pdf> (5/15).
15. U.S. National Response Team. *Q fever*. In: *Home; Guidance, Technical Assistance & Planning; Hazards; Biological Hazards; Bacterials*. <http://nrt.org/Production/NRT/NRTWeb.nsf/PagesByLevelCat/Level3BiologicalHazards?Opendocument> (5/15).
16. The Merck Manual. Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc, Whitehouse Station, NJ. *Q Fever*. In: *The Merck Manual Professional Edition; Merck Manual; Health Care Professionals; Infectious Diseases; Rickettsiae and Related Organisms*. http://www.merckmanuals.com/professional/infectious_diseases/rickettsiae_and_related_organisms/q_fever.html (5/15).
17. Pan American Health Organization. *Q fever*. In: Acha PN, Szyfres B, eds. *Scientific and Technical Publication No. 580: Zoonoses and Communicable Diseases Common to Man and Animals*. 3rd ed. Vol. II Chlamydioses, Rickettsioses, and Viroses. Washington, DC: Pan American Health Organization, World Health Organization; 2003: pp 16-27.
18. Missouri Department of Health and Senior Services, Jefferson City, MO. *Q Fever* In: *Home; Disaster and Emergency Planning; Emergency Response and Terrorism; Medical*. <http://health.mo.gov/emergencies/ert/med/qfever.php> (5/15).