VDH VIRGINIA DEPARTMENT OF HEALTH

Virginia Department of Health
Q Fever: Overview for Healthcare Providers

Organism	*Coxiella burnetii*: obligate intracellular bacterium, gram-negative coccobacillus which can persist in spore-like form in the environment for years
Reporting to Public Health	Suspected or confirmed cases require immediate notification to the local health department (LHD). See https://www.vdh.virginia.gov/health-department-locator/
Infectious Dose	1–10 organisms
Occurrence	• Occurs worldwide • In the United States, Q fever is rare, but likely under-recognized; 212 cases were reported in 2019 • In Virginia, an average of 2 acute cases per year (range: 0–6) were reported during 2018–2022; 2 chronic cases occurred during that 5-year period
Natural Reservoir	• Primarily sheep, cattle, and goats, but many other species (including cats, dogs, some wild mammals, and birds) can be infected • Tick vectors might be important for maintaining animal and bird reservoirs but are not commonly associated with transmission to humans
Route of Infection	• Most commonly by inhalation of contaminated airborne particles from birth products, excreta, or tissue. Also, by inhalation of contaminated airborne particles from dust, wool, straw, laundry, or bedding of infected animals. • Laboratory exposure through infective aerosols, droplets, or parenteral inoculation • Other reported routes: ingestion of unpasteurized dairy products from infected animals; transmission by blood or bone marrow transfusion; sexual transmission; laboratory transmission • Q fever should not be ruled out simply because a person lacks a history of animal exposure
Communicability	Person-to-person transmission is extremely rare, but has occurred (e.g., sexual contact, vertical transmission, autopsies and obstetrical procedures)
Risk Factors	• Working with animals (e.g., livestock farms, meat processing plants, slaughterhouses, veterinary clinics, animal research facilities), attending birth of infected animals, or living near livestock • Consuming unpasteurized dairy products • Handling infective laboratory specimens • Chronic Q fever is more likely in those with valvular disease, blood vessel anomalies, immunosuppression, or infections during pregnancy
Case-fatality Rate	• Acute Q fever: low (< 2%) in untreated infections; negligible in treated infections • Chronic Q fever endocarditis: fatal if untreated, 19% with appropriate treatment
Incubation Period	• Acute Q fever: depends on dose, but typically 2–3 weeks (range 3–39 days) • Chronic Q fever: months to years
Clinical Description	• Severity varies and approximately half of infections are asymptomatic • Acute Q fever: nonspecific febrile illness usually accompanied by rigors, myalgia, malaise, and severe headache. GI symptoms (e.g., diarrhea, vomiting) might occur, particularly in children. Severe disease can include acute hepatitis, pneumonia and meningoencephalitis. Fever usually lasts 5–14 days but may continue for as long as 2 months. Infection of the placenta, miscarriage, and preterm birth are possible. Post-Q fever fatigue syndrome may occur in up to 20% of patients. • Chronic Q fever (occurs in <5% of acute cases): endocarditis (60–78% of chronic cases), hepatitis, osteomyelitis
Differential Diagnosis	Variable depending on affected system

Radiography	• Chest x-ray might be normal or have nonspecific abnormalities, including segmental or lobar consolidation (unilateral or bilateral), involving upper or lower lobes, or feature multiple or single opacities; pleural effusions are present in ~35% of cases • Endocarditis may cause relatively small valvular vegetative lesions that are more easily visualized with transesophageal echocardiography than with a transthoracic echocardiogram
Specimen Collection and Laboratory Testing	• A serologic diagnosis of acute Q fever is made by testing paired sera (acute-phase serum collected as soon as possible after symptom onset and convalescent-phase serum collected 3–6 weeks later) to detect a 4-fold change or greater in phase II IgG antibodies • A serologic diagnosis of chronic Q fever is made by detecting elevated phase I IgG antibody ≥1:1024 (and is typically higher than phase II IgG) and an identifiable nidus of infection (e.g., endocarditis) • PCR (whole blood, environmental samples) and immunohistochemistry staining (tissue) may be used to facilitate diagnosis of acute or chronic Q fever; however, PCR has low sensitivity, and a negative result does not rule out Q fever • Culture is not recommended for routine diagnosis because it is difficult, time consuming, and requires Biosafety Level (BSL) 3 precautions • If Q fever is suspected, notify the LHD immediately to discuss the case and laboratory testing. Specimens may be sent to the Division of Consolidated Laboratory Services (DCLS) after VDH approves testing. For questions about specimen collection, the DCLS Emergency Officer can be reached 24/7 at 804-335-4617.
Treatment	• Doxycycline is the preferred treatment for Q fever in non-pregnant adults and children ≥8 years of age. For details, refer to CDC's Diagnosis and Management of Q Fever — United States, 2013 (http://www.cdc.gov/mmwr/pdf/rr/rr6203.pdf) and consult with package inserts. • Treatment is most effective at preventing severe complications if it is started within 3 days of symptom onset • Treatment of acute Q fever should be initiated when Q fever is suspected and should not be withheld while laboratory testing is pending. Serologic monitoring is recommended for patients with acute Q fever, especially those at high risk of developing chronic Q fever. • Treatment of chronic Q fever should be initiated after diagnostic confirmation • Treatment of asymptomatic patients or those who have already recovered from their infection is not usually recommended, but it might be considered for patients at high risk for developing chronic Q fever
Postexposure Prophylaxis (PEP)	• PEP following a known exposure to naturally occurring *C. burnetii* is not recommended; however, self-monitoring for symptoms and periodic serologic testing might be recommended • PEP (e.g., doxycycline) following an intentional release of *C. burnetii* can be considered for those at high risk for exposure • PEP is considered effective only if administered within 8-12 days of exposure
Vaccine	In the United States, a vaccine is not commercially available
Infection Control	• Use Standard Precautions for all patients • If splashes of infected material are anticipated (e.g., during infant delivery), a face mask and eye protection (goggles or face shield) are recommended. *C. burnetii* is easily aerosolized. If aerosol-generating procedures are performed or if exposure to infected birth fluids is anticipated, additional precautions are recommended, including use of a fit-tested N-95 respirator and goggles or a face shield for eye protection. Use of an airborne infection isolation room, or at least a private room, during such procedures is preferable. • During autopsies, use a BSL-3 facility or use the barrier precautions of BSL-2 and the negative airflow and respiratory precautions of BSL-3