VDH VIRGINIA DEPARTMENT OF HEALTH

Virginia Department of Health
Q Fever: Guidance for Healthcare Providers
Key Medical and Public Health Interventions after Identification of a Suspected Case

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1. Epidemiology

Q fever is a zoonotic bacterial disease caused by *Coxiella burnetii*, an obligate intracellular gram-negative bacterium. The organism can form a spore-like stage that is highly resistant to heat, drying and many commonly used disinfectants and can persist in the environment for years. *C. burnetii* is highly infectious when aerosolized and inhaled; a single organism might cause clinical illness. *C. burnetii* is designated as a Category B bioterrorism agent (i.e., the bacteria are moderately easy to disseminate or transmit and are associated with moderate morbidity and a lower rate of mortality than Category A agents). *C. burnetii* is also designated as a select agent or toxin which means that it could be developed for bioterrorism and that possession, use or transfer of these organisms requires registration with the Centers for Disease Control and Prevention (CDC) or the U.S. Department of Agriculture (USDA).

Cattle, sheep and goats are the natural reservoir for *C. burnetii*; however, a variety of other animals (e.g., wildlife, marine mammals, domestic mammals, birds, reptiles) can be infected. Most infected animals are asymptomatic. The highest number of organisms is shed by infected animals during birthing in amniotic fluids and the placenta; organisms are also excreted in milk, urine and feces of infected animals. *C. burnetii* has been isolated from approximately 40 tick species. Possible tickborne transmission to humans has been reported, but it is not thought to be a common mode of transmission to humans.

Q fever infections occur worldwide. In the United States, 212 cases (178 acute cases and 34 chronic cases) were reported to CDC in 2019. Infections occur year-round, but they typically peak in the spring (April and May), which coincides with the birthing season for livestock. The incidence of

disease in the United States increases with age and males tend to develop disease more often than females. In Virginia, an average of 2 cases of acute Q fever per year (range 0–6) were reported during 2018–2022, with 1 case of chronic Q fever reported in 2018 and again in 2022. (Note: At the time of this report, data from 2022 may still be incompletely reported.)

Q fever is an occupational hazard related to working with animals (e.g., livestock farms, meat processing plants, slaughterhouses, veterinary clinics, research facilities with pregnant sheep), or living in a rural area or near farms with livestock. Infection most commonly occurs through inhalation of the organism in fine-particle aerosols generated from birth products or fluids during birthing. Infection can also occur through inhalation of dust contaminated with infective birth products, milk, or excreta (e.g., urine and feces). While often associated with livestock contact, it is important to bear in mind that data collected from Q fever case report forms submitted to CDC during 2000–2010 indicate that 320 of 405 (79%) cases in patients who reported occupational status are recognized in patients who are not in previously defined high-risk occupations, and 243 of 405 (60%) cases are in patients who do not report livestock contact. Therefore, in patients with compatible clinical symptoms, Q fever should not be ruled out simply because a person lacks a history of animal exposure.

Less common routes include contact with the birth products, tissue, wool, or bedding from infected animals; laboratory exposure through parenteral inoculation or exposure to infectious aerosols or droplets; ingestion of unpasteurized dairy products from infected animals; transfusion of contaminated blood or bone marrow; and possibly tick bites. Airborne particles can travel for miles, generating sporadic cases or outbreaks without apparent animal contact. Person-to-person transmission of *C. burnetii* is rare, but has been reported with sexual contact, vertical transmission, blood transfusion or tissue transplantation, and healthcare-associated transmission during autopsies and obstetrical procedures.

2. Clinical Manifestations

Q fever can cause acute or chronic illness in humans and each of these forms is described below.

Acute Q Fever

- Incubation period: Dose-dependent, but typically 2–3 weeks (range: 3–39 days) after exposure
- Signs and Symptoms: Variable presentation. Up to half of infected persons are asymptomatic.
- A common presentation of acute Q fever is a self-limited febrile influenza-like illness lasting 2–14 days. Fever lasts a median of 10 days in untreated patients (range: 5–57 days); most cases defervesce within 72 hours of doxycycline administration. Given that fever may last up to 2 months in untreated individuals, acute Q fever may be the source in a person with prolonged fever of unknown etiology. In addition to fever, signs and symptoms can include abrupt onset of fatigue, cough, malaise, chills, sweats, myalgia and headache. The headache may be severe, debilitating, retroorbital, and accompanied by photophobia. Nausea, vomiting, chest pain, diarrhea, sore throat and rash have been less frequently reported.
- Another presentation of acute Q fever is pneumonia. This may appear as atypical pneumonia, rapidly progressive pneumonia (mimicking Legionnaire's disease), or most commonly, pneumonia with fever but no pulmonary symptoms. When present, pulmonary symptoms can include a nonproductive cough, hemoptysis, or pleuritic chest pain. Signs are often minimal and might include inspiratory crackles or splenomegaly.

- Less common presentations of acute Q fever can include hepatitis (fever, abdominal pain, anorexia, nausea, vomiting, diarrhea and jaundice), myocarditis, pericarditis, meningitis, encephalitis or nonspecific skin rash. Q fever in pregnant women mainly causes infection of the placenta; cases may be asymptomatic, but generally present with fever. Q fever in pregnancy may increase risk of miscarriage, stillbirth, pre-term delivery, or low infant birth weight.
- Acute Q fever in children is typically characterized by abrupt onset of fever, and is often accompanied by chills, headache, weakness, cough, and other nonspecific systemic symptoms. Illness typically is self-limited, although a relapsing febrile illness lasting for several months has been documented in children. Gastrointestinal tract symptoms, such as diarrhea, vomiting, abdominal pain, and anorexia, are reported in 50–80% of children. Skin rash is also more common in children than adults.
- The estimated case-fatality rate of acute Q fever is low (<2%). Treatment with an appropriate antibiotic can shorten the course of illness for acute Q fever.
- Although most people with acute Q fever recover completely, a post-Q fever fatigue syndrome may occur in up to 20% of patients. This syndrome is characterized by constant or recurring fatigue, night sweats, severe headaches, photophobia, pain in muscles and joints, mood changes, and difficulty sleeping. No consensus has been reached in the medical community on the pathogenesis or treatment of post Q fever fatigue syndrome.

Chronic Q fever

- Incubation period: Months to years after initial exposure. Chronic Q fever can present within weeks after an acute infection or manifest many years later.
- Signs and Symptoms: Variable presentation
- Chronic Q fever is a severe disease occurring in <5% of acutely infected patients. Although anyone with acute Q fever is at risk of developing chronic Q fever, the groups at highest risk for chronic Q fever are pregnant women, immunosuppressed persons and patients with pre-existing heart valve defects, arterial aneurisms, or vascular grafts.
- Endocarditis, the major clinical presentation of chronic Q fever, comprises 60–78% of all reported chronic cases, and is fatal if untreated. Patients with endocarditis require early diagnosis and long-term antibiotic treatment (at least 18 months) for a successful outcome. With treatment, the case-fatality rate is 19%.
- The second most common form of chronic Q fever is infection of aneurysms or vascular prostheses (3-year mortality of 25%), followed by chronic Q fever infections after pregnancy.
- Nonspecific presentations of chronic Q fever may include a generalized illness characterized by a low-grade fever, often remittent and well tolerated, which may be associated with malaise, weakness, fatigue, weight loss, chills, anorexia or night sweats. Manifestations may include digital clubbing, purpuric rash (extremities and mucosa), splenomegaly, hepatomegaly, chronic renal insufficiency, microscopic hematuria and/or embolic manifestations (stroke, arterial embolism, pulmonary embolism, deep venous thrombosis). Cases may also present with symptoms of heart failure or cardiac valve dysfunction (dyspnea, acute pulmonary edema, angina, palpitations, and heart murmur).
- Other manifestations of chronic Q fever include chronic hepatitis, vasculitis, osteomyelitis, osteoarthritis, chronic pulmonary infection (fibrosis), or infections of the reproductive organs.
- Chronic Q fever is rarely reported in children, and most commonly manifests as chronic relapsing or multifocal osteomyelitis, blood-culture–negative endocarditis, or chronic hepatitis.

3. Laboratory Testing and Diagnosis

Notification when Q Fever is Suspected

If Q fever is suspected, the healthcare provider should immediately report the case to the local health department per Virginia's disease reporting regulations. The local health department will discuss options for public health testing. If VDH approves public health testing, specimens may be sent to the Division of Consolidated Laboratory Services (DCLS). The health department will facilitate notification and shipment to DCLS. Specimens potentially containing *C. burnetii* should **never** be shipped to DCLS without prior approval.

Laboratory Biosafety

If Q fever is suspected, laboratory personnel **must** be alerted to ensure safe specimen processing and selection of appropriate diagnostic tests. Routine bacteriologic testing will not detect *C. burnetii*. *C. burnetii* is highly infectious and presents a significant risk of laboratory infection because of the potential for inhalation of organisms. Biosafety Level 2 practices and facilities are appropriate for non-propagative laboratory procedures, including serologic testing and staining of impression slides. However, Biosafety Level 3 practices are necessary for activities involving culture, necropsy of infected animals, generation of aerosols or any manipulation of infected tissues. BSL-3 precautions include wearing personal protective equipment (PPE) (e.g., gown, gloves, face/eye protection, and respiratory protection). Because *C. burnetii* can grow in a variety of cell lines, it might be inadvertently cultured if infected specimens are placed into routine viral culture.

Sample Collection

Sample collection instructions for testing at DCLS (and potentially at CDC) are shown in Table 1 on the next page. Because of the highly infectious nature of this organism, consultation with DCLS about specimen collection and handling is strongly recommended. The DCLS Emergency Officer can be reached 24 hours a day/7 days a week at 804-335-4617.

Table 1. Sample collection instructions for suspected Q fever*

Test and Turnaround Time	Acceptable samples	Amount	Instructions
Coxiella burnetii serology (indirect fluorescence assay, performed at CDC) Estimated turnaround time: 6 weeks upon specimen receipt	Serum (acute and convalescent)	2–3 mL	Collect acute serum (during active stage of illness as close to onset as possible) and convalescent serum (2–4 weeks after acute stage). Collect in red top or tiger top tube. Remove serum and place in sterile tube. Acute and convalescent specimens can be shipped together (refrigerate acute specimen until convalescent specimen has been collected and is ready for shipment; ship both specimens refrigerated on cold packs); if specimen(s) was previously frozen, then ship frozen on dry ice.
Coxiella burnetii molecular detection (PCR, performed at DCLS) Estimated turnaround time: 1 business day upon specimen receipt	Whole blood (acute sample) - collect before antimicrobial therapy, if possible Environmental samples For other specimen types, DCLS is required to consult with the CDC/Laboratory Response Network (LRN)	10 mL	Collect blood in purple top (EDTA) blood collection tube. Ship refrigerated on cold packs. Note that negative test result does not rule out infection.
Immunohistochemistry assay (performed at CDC) Estimated turnaround time: 8 weeks upon specimen receipt	Fresh tissue (e.g., heart valve)	N/A	Biopsy tissue should be delivered as fresh tissue to laboratory; CDC accepts formalin-fixed, paraffin-embedded tissues for testing

*Adapted from American Society for Microbiology's Sentinel level clinical laboratory guidelines for suspected agents of bioterrorism and emerging infectious diseases: Coxiella burnetii (2016). If Q fever is suspected, notify the local health department immediately to discuss the case and laboratory testing. If VDH approves public health testing, specimens may be sent to Division of Consolidated Laboratory Services (DCLS) with the DCLS Test Request Form; include the name of the test on the form (e.g., Q fever serology). For questions about collecting specimens or for notifying DCLS when submitting specimens, contact the DCLS Emergency Officer available 24/7 at 804-335-4617. Of note, culture of blood or fresh tissue requires a biosafety level 3 (BSL-3) laboratory and is not recommended for routine diagnosis.

Diagnosis

Diagnosis of Q fever requires specific testing because clinical manifestations are highly variable and nonspecific. Diagnosis of acute and chronic Q fever is based mainly upon serologic testing or detection of *C. burnetii* organisms or DNA (via PCR) in blood or tissue samples. The reference standard is indirect immunofluorescence antibody (IFA) using *C. burnetii* antigen, performed on paired serum samples that demonstrate a significant (fourfold or more) rise in antibody titers. The first sample should be taken as early as possible, preferably in the first week of symptoms, and the second sample should be taken 3 to 6 weeks later. Therefore, storing the acute phase serum until a convalescent specimen has been collected (2–4 weeks after the acute stage) is recommended so that simultaneous testing at the same laboratory can be performed.

In most cases of Q fever, the first IgG IFA titer is typically low, or "negative," and the second typically shows a fourfold or greater increase in IgG antibody levels. A negative test during the first week of illness does not rule out Q fever as a cause of illness. There are two distinct antigenic phases (phase I and phase II) to which humans develop antibody responses. In acute infection, an antibody response to *C. burnetii* phase II antigen is predominant and is higher than antibody levels to phase I antigen; the reverse is true in chronic infection which is associated with a rising phase I IgG titer that may be higher than phase II IgG.

IgM antibodies usually rise at the same time as IgG, near the end of the first week of illness, and remain elevated for months or longer and therefore provide limited diagnostic value on their own. Furthermore, IgM antibodies are less specific than IgG antibodies and more likely to result in a false positive. For these reasons, physicians requesting IgM serologic titers should also request concurrent IgG titers. Antibodies might remain detectable for many months, for years, or for life.

PCR of whole blood can be positive early after symptom onset (acute phase of illness) and is most sensitive during the first week of symptom onset, but sensitivity rapidly decreases as the antibody titer increases and after administration of antibiotics. Of note, a negative PCR result does not rule-out a Q fever diagnosis and treatment should not be withheld based on a negative result. Paired serum samples for serologic testing (as described above) should be performed if the PCR is negative.

Culture is not recommended for routine diagnosis because the process is difficult, time-consuming, and requires a BSL-3 laboratory. In certain circumstances, culture might be performed at CDC after consultation with the local health department, DCLS, and CDC.

Chronic Q fever is diagnosed by identifying a nidus of chronic infection (e.g., endocarditis, vascular infection, osteomyelitis, etc.) and laboratory confirmation. The laboratory diagnosis is primarily made through serologic IFA testing. In contrast to acute Q fever infection, chronic infection is associated with an increase in phase I IgG titer, which is typically ≥1:1024 (and often higher) and more elevated than concurrent phase II antibody titers. PCR testing of whole blood or serum from suspected chronic Q fever patients may be helpful in establishing a diagnosis as patients can experience a recurrent bacteremia, similar to early acute infection. However, PCR of whole blood has low sensitivity in patients with chronic Q fever endocarditis, so serum antibody titers should also be tested. Infected tissue (e.g., heart valve in Q fever endocarditis) may be tested by PCR, immunohistochemistry, or culture (with appropriate consultation). Immunohistochemistry assays at CDC are available to detect *C. burnetii* antigens in formalin-fixed, paraffin-embedded tissues (e.g., heart valve specimens).

Case Definitions used by Public Health

The current CDC case definition for acute and chronic Q fever is available at: https://ndc.services.cdc.gov/conditions/q-fever/. Note that a case definition is a set of uniform criteria used to define a disease for public health surveillance. Case definitions enable public health to classify and count cases consistently across reporting jurisdictions and they should not be used by healthcare providers to determine how to meet an individual patient's health needs.

4. Treatment

Treatment recommendations for acute and chronic Q fever are summarized in Table 2 and Table 3. Doxycycline is the treatment of choice for non-pregnant adults with Q fever. When tetracyclines are contraindicated (i.e., pregnant women, children aged <8 years), other antibiotics, such as trimethoprim/sulfamethoxazole, may be used. Treatment is most effective if given within the first 3 days of illness. Because of the delay in seroconversion often necessary to confirm diagnosis, antibiotic treatment of acute Q fever should not be withheld pending laboratory tests or discontinued on the basis of a negative acute specimen. If the patient is treated within the first 3 days of the disease, fever generally subsides within 72 hours. Severely ill patients may require longer periods before their fever resolves.

In addition to treatment, serologic monitoring is recommended following acute Q fever infection to assess possible progression to chronic infection. The recommended schedule for monitoring is based on the patient's risk for chronic infection (i.e., considering vascular and heart valve defects, immunosuppressive conditions, and pregnancy status). For more information, refer to CDC's Diagnosis and Management of Q Fever — United States, 2013.

CDC recommends that treatment of chronic Q fever should be initiated only after diagnostic confirmation. For chronic Q fever infections, management by an infectious disease specialist is recommended because of long-term antibiotic therapy, serologic monitoring and periodic diagnostic testing.

Treatment of asymptomatic or resolved infections is not routinely recommended by CDC, but it might be considered in patients with risk factors for developing chronic Q fever infections (refer to CDC's Diagnosis and Management of Q Fever — United States, 2013 for more information).

Table 2. Recommended treatment regimens for acute Q fever*

Population	Drug and Dosage	Duration
Adults	Doxycycline[†] 100mg twice a day	14 days
Children ≥8 years	Doxycycline[†,‡] 2.2mg/kg/dose twice a day (max 100mg per dose)	14 days
Children <8 years with high-risk criteria[§]	Doxycycline[†,‡] 2.2mg/kg/dose twice a day (max 100mg per dose)	14 days
Children <8 years with mild or uncomplicated illness	Doxycycline[†,‡] 2.2mg/kg/dose twice a day (max 100mg per dose)	5 days[¶]
	OR	
	Trimethoprim/sulfamethoxazole[**] 4–20 mg/kg/24 hours (dose based on trimethoprim component) in equally divided doses every 12 hours (max 320 mg trimethoprim per 24 hours)	14 days
Pregnant Women[††]	Trimethoprim/sulfamethoxazole 160 mg/800 mg twice a day	Throughout pregnancy, but not beyond 32 weeks gestation[††]

Sources: CDC's Diagnosis and Management of Q Fever — United States, 2013. MMWR 2013; 62(No. RR-03):[1–29] and CDC's Q Fever Information for Healthcare Providers: Treatment.

*All drug dosages are oral regimens. Prophylactic treatment after a potential Q fever exposure is not recommended; treatment is not recommended for asymptomatic infections or after symptoms have resolved, although it might be considered in persons at high risk for development of chronic Q fever. People with life-threatening allergies to doxycycline may need to consider alternate antibiotics such as moxifloxacin, clarithromycin, trimethoprim/sulfamethoxazole and rifampin. For additional information on dosing, please consult with the package inserts.

[†]Patients may take doxycycline with food to avoid stomach upset but should have no dairy products within 2 hours (before or after) of taking medication. Doxycycline should not be taken with antacids or bismuth-containing products, and patients should avoid taking it immediately before going to bed or lying down. Doxycycline might cause photosensitivity and can decrease the efficacy of hormonal contraceptives.

[‡]Doxycycline is the drug of choice for treatment of Q fever in adults and patients of any age with severe illness. Short courses (≤5 days) for treatment of rickettsial infections have not been shown to result in significant dental staining in children; however, whether a 2-week course will cause permanent tooth discoloration in children is unknown. Health-care providers should use their clinical judgment to determine appropriate therapy in children aged <8 years and may consider treatment with trimethoprim/sulfamethoxazole or a shorter duration of doxycycline (5 days) in children with a mild or uncomplicated illness.

[§]Children aged <8 years who are considered high risk and should therefore receive the full 14-day treatment with doxycycline include those hospitalized or with severe illness, children with preexisting heart valvulopathy, children who are immunocompromised, or children with delayed Q fever diagnosis who have experienced illness for >14 days without resolution of symptoms.

[¶]Children who remain febrile past 5 days of treatment with doxycycline can be treated with 14 days of trimethoprim/sulfamethoxazole

**Trimethoprim/sulfamethoxazole is contraindicated in children aged <2 months

[††]Limited data are available on treatment of Q fever during pregnancy. Consultation with an expert in infectious diseases is recommended. Trimethoprim/sulfamethoxazole should be discontinued for the final 8 weeks of pregnancy because of the risk for hyperbilirubinemia. Women treated during pregnancy for acute Q fever should be monitored similarly to other patients who are at high risk for progression to chronic disease (e.g., serologic monitoring at 3, 6, 12, 18, and 24 months after delivery).

Table 3. Recommended treatment regimens for chronic Q fever*

Population	Drug and Dosage	Duration[†]
Adults with endocarditis or vascular infection	Doxycycline 100mg twice a day[‡]; AND Hydroxychloroquine 200mg three times a day[§]	≥18 months
Adults with noncardiac organ disease	Doxycycline 100 mg twice a day[‡]; AND Hydroxychloroquine 200 mg three times a day[§]	Limited reports of treatment for chronic Q fever unrelated to endocarditis or vascular infection (e.g., osteoarticular infections or chronic hepatitis.) Duration of treatment is based on serologic response and evidence of clinical improvement. Serologic monitoring should be done in consultation with an infectious disease specialist.
Children	Recommend consultation with expert in pediatric infectious disease[¶]	N/A
Pregnant Women	Recommend consultation with expert in infectious diseases and obstetrics[**]	N/A
Postpartum women with titers elevated >12 months after delivery[††]	Doxycycline 100 mg twice a day[‡]; AND Hydroxychloroquine 200 mg three times a day[§]	12 months
Post-Q fever fatigue syndrome in adults, children, and pregnant women	No current recommendations. Reports of treatment studies are rare. Although limited success has occurred with long-term or pulsed tetracycline-class antibiotics, evidence to guide patient management is weak.	N/A

Adapted from CDC's Diagnosis and Management of Q Fever — United States, 2013. MMWR 2013; 62(No. RR-03):[1–29] and CDC's Q Fever Information for Healthcare Providers: Treatment.

*All drug dosages are oral regimens. People with life-threatening allergies to doxycycline may need to consider alternate antibiotics such as moxifloxacin, clarithromycin, trimethoprim/sulfamethoxazole and rifampin. For additional information on dosing, please consult with the package inserts.

[†]Duration of treatment for chronic Q fever is based on serologic response and evidence of clinical improvement. Serologic monitoring of a patient with chronic Q fever should be done in consultation with an infectious disease specialist.

[‡]Patients may take doxycycline with food to avoid stomach upset but should have no dairy products within 2 hours (before or after) of taking medication. Doxycycline should not be taken with antacids or bismuth-containing products, and patients should avoid taking it immediately before going to bed or lying down. Doxycycline might cause photosensitivity and can decrease the efficacy of hormonal contraceptives. Target serum levels for optimal efficacy during chronic Q fever treatment is ≥5 µg/mL.

[§]Take with food or milk. Should not be used by persons with glucose-6-phosphate dehydrogenase deficiency. Monitor for retinal toxicity. Target serum levels for optimal efficacy is 1.0+0.2 µg/mL. The safety of long-term treatment in children has not been evaluated.

[¶]Limited data are available on treatment of chronic Q fever in children.

[**]The safety of long-term doxycycline or hydroxychloroquine treatment in pregnant women and fetal risk has not been evaluated.

[††]Women should only be treated postpartum if serologic titers remain elevated >12 months after delivery (immunoglobulin G phase I titer ≥1:1024).

5. Postexposure Prophylaxis

Postexposure prophylaxis (PEP) following an exposure to naturally occurring *C. burnetii* and before symptom onset is **not** recommended by CDC. A daily fever monitoring log should be kept for a minimum of 3 weeks after exposure and routine serologic screening to monitor high-risk persons (e.g., immunosuppression, pregnancy, and valvulopathies) might be recommended. If a fever occurs within 6 weeks of exposure, immediate medical evaluation and treatment with doxycycline (ideally within 24 hours of fever onset) and testing are recommended. See CDC's Diagnosis and Management of Q Fever — United States, 2013 for additional information.

If an intentional release of *C. burnetii* is suspected, PEP (doxycycline 100 mg twice a day for 5–7 days) can be considered in those determined to be at high risk for exposure. PEP would be considered effective only if administered within 8–12 days of the exposure.

6. Vaccination

In the United States, a Q fever vaccine is not commercially available.

7. Infection Control

For infection control, Standard Precautions are adequate for routine care of patients with Q fever. Additional precautions should be used in certain situations. If splashes of infected material are anticipated (e.g., during delivery of an infant from an infected woman), then a face mask and eye protection (goggles or face shield) are recommended. If aerosol-generating procedures are performed, then a fit-tested N-95 respirator (or equivalent) and either goggles or a face shield for eye protection are recommended. Aerosol-generating procedures should be performed in an airborne infection isolation room, if available, or at least in a private room. If an autopsy is being conducted on a person who died of Q fever, then a BSL-3 facility should be used, or barrier precautions of BSL-2 and the negative airflow and respiratory precautions of BSL-3 should be used. See CDC. Diagnosis and Management of Q Fever — United States, 2013 for additional information.

8. Decontamination

C. burnetii can survive for months or years in its spore form and can resist heat, desiccation and many commonly used disinfectants (e.g., bleach). Therefore, special decontamination procedures are necessary for surfaces potentially contaminated with *C. burnetii*. Minor spills should be covered with absorbent paper, such as paper towels, and then flooded with 70–95% ethanol or 5% MicroChem-Plus (a dual quaternary ammonium/detergent compound which should be allowed to act for 30 minutes before cleanup). Spills that involve high concentrations of organisms, including organic matter, or occur in areas of lower temperatures (e.g., refrigerators or freezers), should be exposed to disinfectant solution for 1 hour before cleanup. Proper personal protective equipment (PPE) should be worn during cleaning and disinfection.

Hospital rooms of patients with Q fever should receive terminal cleaning consistent with the above precautions, and clothing or linens should be handled to minimize aerosolization and disinfected according to hospital protocol.

9. Postmortem Practices

If Q fever is suspected as a cause of death, the regional Office of the Chief Medical Examiner should be immediately notified. Consultation should occur regarding whether an autopsy should be conducted, parties responsible for conducting the autopsy, and proper personal protective procedures to follow.

10. Public Health Measures

- Suspected or confirmed Q fever cases should be reported immediately to the local health department
- Laboratory specimens should be sent to the state public health laboratory (DCLS) for confirmation of agent and other studies after VDH consultation and approval
- Designated public health authority should begin an epidemiologic investigation
    - Collect detailed information from the patient to attempt to identify the source of the exposure
    - Investigate contacts of the case-patient for compatible illness to investigate a potential common exposure
    - Suspected food items (e.g., milk) might be collected for testing. VDH's Office of Epidemiology will work with the Food and Drug Administration if commercially prepared food is implicated.
    - If animal exposures are identified, the Virginia Department of Agriculture and Consumer Services will be notified
    - Implement control measures to prevent disease and additional exposures. For laboratorians or others potentially exposed who might have worked with the agent before identification as *C. burnetii,* postexposure monitoring might be recommended based on a risk assessment. PEP may be considered for high-risk individuals in the setting of a suspected intentional release.
    - VDH will work with the CDC, Federal Bureau of Investigation (FBI), and other state or federal agencies as necessary

11. References and Resources

American Society for Microbiology (ASM). Sentinel level clinical laboratory guidelines for suspected agents of bioterrorism and emerging infectious diseases: *Coxiella burnetii*. Revised March 2016. Available at https://www.asm.org/ASM/media/Policy-and-Advocacy/LRN/Sentinel%20Files/Coxiella-burnetii.pdf (Accessed April 25, 2023).

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