



Safety and Risk Management

Q Fever Prevention Protocol

1. **OBJECTIVE.** To protect faculty, staff, students, volunteers, and visitors from exposure to the Q fever agent (*Coxiella burnetii*).
2. **PROTOCOL.** The following protocol applies to work with sheep, goats, and any other small ruminant/ ungulate animals utilized in research at the university.
 - a. All such animals utilized in research at VCU shall be exclusively males of less than one year of age. Any variance from this protocol requires preapproval from the Chemical/Biological Safety Committee (CBSC).
 - b. All animals must have tested negative for Q fever within one month prior to acceptance of the shipment by the university.
 - c. All newly arriving animals must be segregated from other animals until cleared by the Department of Animal Resources (DAR).
 - d. Access to isolated animals will be restricted to essential personnel (animal husbandry workers designated by DAR).
 - e. If the housing period extends beyond 30 days from date of arrival at VCU, DAR will select a sample of the population (number to be determined by Attending Veterinarian) which will receive a second Q fever titer test. The Principal Investigator shall be responsible for covering all expenses related to follow-up titer tests.
 - f. Animals confirmed titer-positive for *C. burnetii* will be euthanized and disposed of as biohazardous material; tissues/fluids may be collected from the affected animals by research staff donning proper PPE (refer to section III.B.) and following work methods specified below. Procedures involving any tissues/fluids collected from Q-fever positive titer animals will be conducted within a certified Class II Biological Safety Cabinet (BSC) utilizing BSL-2+ precautions.
 - g. Housing, research, and/or procedure areas for animals included under this protocol will be provided with directional (inward) air flow and single-pass air whenever feasible. Utilization of facilities not equipped with directional/single pass air will require submission of a risk assessment and preapproval.
 - h. Entrances to all housing, research, and/or procedure areas will be posted by the Principal Investigator (PI) with generic biohazard signage and a cautionary statement indicating that entry into vivarium is restricted to authorized personnel.



Safety and Risk Management

- i. Transfer of animals will be conducted under conditions designed to limit potential for release of aerosols and/or contamination of thoroughfares. Animals will be sedated and/or secured during transport, as well as fully draped to limit potential contamination. Any areas suspected of being contaminated will be disinfected utilizing agents/methods indicated in paragraph 4 (a spill kit with suitable disinfectants/cleaning materials should be available during the transit). All equipment used for transport of animals will be fully disinfected after use via methods indicated in paragraph 4.
- j. Employees, students, visitors, or university affiliates who develop febrile illness while working with the animals included under this protocol (or related tissues/ fluids) will be directed to seek immediate medical care from Employee Health (EH), or Student Health (SH), or their primary care provider.
- k. Initial training is required for all individuals working with the animals or accessing housing/ procedure/research areas associated with the animals. Training will cover information about
- l. Q fever and methods for reducing exposure, which will include, at a minimum, review of this protocol, corresponding DAR SOP(s), and the Coxiella burnetii safety data sheet.
- m. Appropriate personal protective equipment (PPE) will be required for entry into housing, research, and procedure areas (refer to paragraph 3).
- n. The IACUC will perform semi-annual facility compliance inspections of all animals regulated under this protocol. Work practices, PPE, and engineering controls will be reviewed during these inspections.
- o. Persons with a high risk for developing Q fever: The following conditions may indicate an increased risk for developing Q fever or complications from Q fever, and should be discussed with staff prior to assignment in affected housing/procedure areas:
 - 1) Valvular heart disease
 - 2) Pregnancy
 - 3) Prosthetic heart valves
 - 4) Liver disease
 - 5) Altered immune systemIf related concerns are disclosed, potentially at-risk staff/students should consult with Employee or Student Health prior to accessing restricted animal areas.
- p. Universal precautions are required for all handling of tissues and fluids collected from animals covered under this protocol (refer to Section III for required PPE).
- q. Failure to comply with this protocol may result in the rescinding of an investigator's animal use approval and ability to procure animals.
- r. This protocol shall be reviewed and updated annually or as required.



Safety and Risk Management

3. PERSONAL PROTECTIVE EQUIPMENT.

- a. Animal Housing Areas. The following PPE is required for access to housing areas for sheep, goats, and other animals included under this protocol:
 - 1) Disposable or onsite-laundered coveralls.
 - 2) Booties or dedicated footwear ("Wellington" boots or other protective footwear may be required for large-scale cleaning tasks).
 - 3) Bonnet/hair covering.
 - 4) Examination gloves.
 - 5) Safety glasses combined with face shield or splash-resistant goggles.
 - 6) An N-95 or other HEPA-filtered respirator is required for all entry.

 - b. Procedure/Research Areas: The following PPE is required when performing surgical procedures or working with tissues/fluids collected from sheep, goats and other animals included under this protocol:
 - 1) Disposable or onsite-laundered coveralls or scrubs.
 - 2) Booties or dedicated footwear.
 - 3) Bonnet/hair covering.
 - 4) Examination gloves.
 - 5) Safety glasses combined with face shield or splash-resistant goggles.
 - 6) An N-95 or other HEPA-filtered respirator is required for all entry.
 - 7) All disposable PPE shall be removed prior to exiting housing/procedure areas and disposed of in red biohazard bags. All reusable PPE shall be appropriately disinfected (suitable disinfectants are listed below).
4. **SUITABLE DISINFECTANTS.** *C. burnetii* is highly resistance organism and only a limited number of suitable disinfectants are known:
- a. Surgical and Laboratory Areas
 - 1) 70% EtOH (ethanol) may be utilized for disinfection of limited surfaces, equipment, and small quantities (< 20 ml) of contaminated liquids/cultures. Surfaces and equipment to be decontaminated should be misted until wet and allowed to air dry. Use of 70% EtOH should be confined to limited surface areas as the vapor is potentially flammable. Ignition sources should be removed from the immediate work area when using ethanol as a disinfectant.
 - 2) Enviro Chem™ (Rochester Midland, Ltd), Micro-Chem Plus™ (National Chemical Laboratories, Inc), Micro-Chem Plus™ (National Chemical Laboratories), Sani-Plex 128™ (Quip Laboratories Inc.) or similar products with dual quaternary ammonia composition and confirmed efficacy against *C. burnetii* should be utilized on larger surface areas.
 - 3) Autoclaving in accordance with the Bloodborne Pathogen - Infectious Waste Management protocol will effectively disinfect/sterilize contaminated materials.



Safety and Risk Management

b. Housing Facilities

- 1) For large-scale cleaning, Enviro Chem™ (Rochester Midland Limited), Micro-Chem Plus™ (National Chemical Laboratories), Sani-Plex 128™ (Quip Laboratories Inc.) or similar products with dual quaternary ammonia composition and confirmed efficacy against *C. burnetii* should be utilized following removal of gross materials (gross materials should be disposed of via university red or orange bagging procedures).
- 2) 70% EtOH may be utilized for limited disinfection of bench tops and equipment. If EtOH is used, the surface or equipment should be misted until thoroughly wetted and then allowed to air dry. Use of 70% EtOH should be confined to small surface areas as the vapor is potentially flammable. Ignition sources should be removed from the immediate work area when using ethanol as a disinfectant.
- 3) Autoclaving in accordance with the Bloodborne Pathogen - Infectious Waste Management protocol will effectively disinfect/sterilize contaminated materials.
Note: Several disinfectants commonly used in animal housing/laboratory settings are not effective for C. burnetii control and should not be utilized for disinfection. The list of inappropriate/ineffective disinfectants includes but is not limited to: chlorine dioxide (Clidox/MB10), bleach solution, 1% phenol, 1% formalin, quaternary ammonium compounds (dual quaternary compounds are more effective), Wexcide®, and Broadcide®. There is also limited data indicating that use of hydrogen peroxide as a gas sterilant may not be effective against C. burnetii under certain circumstances.
- 4) Contact the Biosafety Office prior to utilizing any disinfectant that is not listed in sections 4a or 4b above.

Any variance from this protocol will require development and submission of a hazard assessment and supporting documents providing justification for proposed change(s). The Biosafety Office will review variance requests on a case-by-case basis.

Questions regarding this protocol should be directed to the Biosafety Officer at 400-4984.