

NECROPSY BIOSAFETY

Scope

This SOP provides general biosafety considerations for necropsy areas, with the intent of minimizing the potential for zoonotic infection. It is not intended as a substitute for facility-specific procedures. However, facility-specific procedures must meet or exceed the safe practices described in this document.

References

Centers for Disease Control and Prevention. *Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories*. MMWR 2012;61 (Suppl).

Baszler, Timothy and Graham, Tanya. 2017. *Veterinary Diagnostic Laboratories and Necropsy*, p 619-646. In Wooley, Dawn P. and Byers, Karen B. (ed), *Biological Safety: Principles and Practices*, Fifth Edition.

Containment Considerations

- At a minimum, necropsy must be conducted in accordance with BSL-2 containment principles and practices. In addition, prior to conducting any necropsy procedures, the attending pathologist must review the animal's history to determine if biosafety practice enhancements are recommended based on the likelihood of Risk Group 3 (RG-3) zoonotic agents (i.e., Anthrax, Q fever, Rabies virus, *Chlamydophila psittaci* (Psittacosis), West Nile Virus, Equine encephalomyelitis viruses, etc.).
- Necropsy of small animals should be conducted within a biosafety cabinet.
- Unessential personnel and others should not be allowed in the necropsy area.

Personal Protective Equipment Considerations

- A rear-closing gown or coveralls are recommended for any necropsy conducted outside of a biosafety cabinet. A lab coat is acceptable when working inside of a biosafety cabinet. The gown must be of impervious construction (provides penetration protection from fluids, blood & viruses) or supplemented with an impervious apron when working with animals of a size that body fluids are present in a quantity that could lead to soak-through of the gown.
- Impervious gloves must be worn at all times. Gloves must be changed when damaged or compromised. Consider also using cut-resistant gloves when using sharp instruments.

- Safety glasses with side shields are acceptable eye protection when conducting necropsy within a biosafety cabinet or when worn in combination with a face shield outside of biosafety cabinet.
- Impervious disposable shoe covers or rubber boots must be worn when working outside of a biosafety cabinet.
- Respiratory protection is **required** when conducting procedures that could generate aerosols and work is conducted outside of a biosafety cabinet.
 - Use of a respirator must be approved by EHS and users are not allowed to use respiratory protection equipment until they are enrolled in the UNL Respiratory Protection Program (RPP).
 - Persons who perform necropsy procedures are encouraged to contact EHS to enroll in the UNL RPP upon initial assignment to necropsy tasks.
 - Under the UNL RPP, participants must complete annual training and fit testing, and are subject to medical qualification.
- All PPE must be removed before entering clean areas. Disposable PPE must not be washed or otherwise disinfected for the purpose of re-use.
- PPE should be provided for personnel present in the necropsy suite, but not directly participating in the necropsy. Observers should wear the same PPE as those conducting the necropsy.

Required PPE for Necropsy

Area protected	Inside a BSC	Outside a BSC
Body	Lab coat with elastic cuffs or use of Tyvek sleeves	Rear-closing gown or coveralls
Hands	Impervious gloves (layer over cut resistant based on risk)	Impervious gloves (layer over cut resistant based on risk)
Eyes	Safety glasses with side shields	Safety glasses with side shields and a face shield
Feet	N/A	Impervious disposable shoe covers or rubber boots
Nose and Mouth	None	Fluid Resistant mask (RG-2) Respirator (N-95 or equivalent) (RG-3)

Procedural Considerations

- Similar to the approach taken with bloodborne pathogens, all necropsies should be approached with “universal precautions.” That is, all specimens should be handled and treated as though they were known to present risk of zoonotic disease exposure.
- No eating, drinking, grooming, or other activities that are a means of exposure are permitted in necropsy areas.
- To limit the risk of unexpected or unknown exposure, all workers handling unpreserved tissues must be offered vaccination for rabies. Departments must pay expenses for vaccinations. Workers can decline vaccinations after being apprised of the risk. Records of declination shall be maintained. Vaccinations shall be in accordance with current CDC guidelines and updated as guidelines change. Employees shall also be informed that risk of exposure is greater if their immune systems are compromised or suppressed.

- Avoid recapping needles. If necessary, use one-handed scoop technique or a mechanical device to assist with recapping.
- Tools should be used to the extent feasible to manipulate tissues to avoid cut hazards (i.e., forceps).
- Hand tools are preferred to power tools. Use of power tools should be reserved only when there are no other alternatives. Use of power tools must be treated as an aerosol-generating activity.
- Transport unfixed tissues in leak-proof containers.

Potentially Infectious Aerosols

Manipulation of infectious tissue during necropsy of carcasses with suspected zoonotic agents can result in both airborne particles in a size (<5 μm) that floats on air currents for extended periods and can subsequently reach the lungs and small-droplet particles (>5 μm) that settle more quickly. Typical bacterial cells and spores range from 0.3 to 10 μm , fungal spores range from 2-5 μm and viruses range from 0.02 to 0.3 μm .

Contamination may occur from a variety of sources including: fluid-aspirating hoses, spraying the carcass, operation of oscillating saws, and scraping dried blood from surfaces during cleanup. These airborne particles stay within the necropsy area and can result in subsequent contact with mouth and eyes, through inhalation or ingestion, and can contaminate inanimate surfaces such as computers, telephones and camera equipment.

Disinfection and Disposal Considerations

- Necropsy areas and tools must be disinfected at the end of each work shift. The disinfectant must be approved for such use and used in accordance with label directions, including but not limited to recommended contact time.
- Remove solid chunks prior to applying disinfectant. Remove in a manner that avoids production of aerosols.
- Avoid high-pressure wash until after the disinfectant has remained in contact with surfaces for the prescribed contact time.
- Carcasses and tissues from necropsy of animals with known or suspected zoonotic agents must be incinerated or autoclaved.
 - Carcasses and large pieces of tissue **must** be incinerated.
 - Small pieces of tissue can be autoclaved. Autoclave cycle settings must be at least 121°C and 15 psi for 60 minutes.
- Carcasses free from known or suspected zoonoses may be sent for rendering.
- Contaminated, reusable PPE must not be removed from the necropsy area unless sealed in a sturdy bag. PPE known to be used with animals harboring a zoonotic agent should be autoclaved, if feasible; chemically disinfected if autoclaving is not feasible. When zoonoses are not likely, standard washing in detergent and warm or hot water is adequate. Laundering should not be conducted at home or at a Laundromat.
- Always wash hands thoroughly with soap and water after removing PPE and before exiting the necropsy area.

Select Agent Considerations

Identification of a regulated select agent or toxin from a clinical specimen must be reported to the appropriate federal agency (APHIS or CDC) within 7 days after identification by the laboratory that confirms the agent. However, confirmatory identification of any of the following human or animal select agent pathogens requires immediate (i.e., within 24 hours) notification to the appropriate federal agency:

- *Bacillus anthracis*
- *Bacillus cereus* Biovar *anthracis*
- Botulinum neurotoxins
- Botulinum neurotoxin producing species of *Clostridium*
- *Burkholderia mallei*
- *Burkholderia pseudomallei*
- Ebola virus
- Foot-and-mouth disease virus
- *Francisella tularensis*
- Marburg virus
- Rinderpest virus
- Variola major virus (Smallpox virus)
- Variola minor virus (Alastrim)
- *Yersinia pestis*

Listed above are only those select agents requiring **immediate** notification to the appropriate federal agency. For a complete list of select agents, refer to Federal Select Agent Program (selectagents.gov). See also EHS SOP, **Select Agents and Toxins – Clinical and/or Diagnostic Laboratory Activities**, for additional information.

Suspected Exposures and Occupational Injuries/Illnesses

Seek immediate medical attention for any known or suspected cut or wound, or other potential exposure to infectious agents or aerosols incurred during the necropsy procedure. Procedures are described in the EHS SOPs, **On-the-Job and Student Injuries** and **Spill and Exposure Response for Biohazardous Materials**.



Suspected or known occupational exposures to a select agent, even in the context of a diagnostic/clinical laboratory, may be considered a “**release**” and therefore reportable to APHIS/CDC. **ALL** such situations must be reported to EHS immediately.

In the event that a select agent is not suspected at the time of exposure, but later confirmed, contact EHS immediately if the necropsy or subsequent specimen handling may have resulted in an occupational exposure.