

I. DESCRIPTION

Animal Biosafety Level 2 (ABSL-2) refers to the practices and procedures required to work with animals infected with agents associated with human disease. These infectious agents are typically moderately hazardous and can be contracted by direct exposure through ingestion, percutaneous injury, and mucous membrane exposure.

II. SIGNAGE

A sign that incorporates the universal biohazard symbol (pictured right) must be posted on the door of every ABSL-2 room. This sign must include the following information:

1. The universal biohazard symbol.
2. The Animal Biosafety Level (ABSL-2).
3. Personal Protective Equipment (PPE) requirements.
4. Principal Investigator(s) (PIs) responsible for the project.
5. Laboratory contact person(s) and emergency contact number(s).
6. Infectious agent(s) used in the room (on second page).

To request ABSL-2 signs, please contact your ULAR manager.



III. TRAINING

Access to ABSL-2 rooms is limited to researchers and support staff who have been adequately trained.

ULAR Training: All ULAR training requirements must be completed before access to ABSL-2 labs is granted. Please visit the ULAR training website for more information.

EHRS Training: All research personnel must take the Introduction to Laboratory Safety Training and subsequent annual updates before working in ABSL-2 containment. Additional EHRS training may be required depending on the agents used. Please visit the EHRS training website for more information.

It is the PI's responsibility to inform ULAR staff of the hazards and any special procedures required for work with their animals housed at ABSL-2. PI's are also responsible for the hands-on training of their research staff regarding the hazards of working with specific infectious agents.

Contact ULAR Management to schedule a HAZARD BRIEFING prior to working with Risk Group 2 organisms or human material.

IV. ROOM ENTRANCE & EXIT PROCEDURES

Before entering any ABSL-2 room, the following PPE must be worn:

- 2 pairs of foot covers
- 2 pairs of gloves
- 1 surgical gown, securely tied in the back
- 1 face mask covering both the mouth and nose
- Eye protection if there are procedures generating a splash risk



After all work is complete, the following steps must be taken before exiting individual ABSL-2 rooms:

- Remove the outer shoe covers and the outer pair of gloves (in that order).
- Step through door to main hallway.
- Wash hands with soap and water OR with an alcohol based hand sanitizer prior to leaving facility or performing other task.
- Put on a new second pair of gloves and foot covers before entering another animal room.

When preparing to exit the facility, remove all PPE except for the initial pair of shoe covers, which should be worn to exit the facility and then removed and thrown out.

V. EQUIPMENT

Animal Cages: All rodents housed in ABSL-2 rooms must be kept in filter-top cages. These cages may only be opened inside a functioning biosafety cabinet. These rodents must remain in ABSL-2 designated containment at all times, including transport. Larger animals may be housed in regular cages, however additional PPE may be required to work in the room.



Biosafety Cabinets: Biological Safety Cabinets must be used for all manipulations of small animals housed in ABSL-2 rooms, including the following procedures:

- Opening rodent cages
- Changing rodent cages
- Transferring rodents to new cages
- Injecting small animals with infectious agents
- Any other procedure that may generate infectious aerosols

Biosafety Cabinets must be certified annually and after being moved. **Do not** use the cabinet if it is out of certification or not functioning properly. Notify the facility manager to schedule any needed maintenance and repairs. Maintenance and repairs may only be performed by a designated service provider identified by the university.

For more information regarding biosafety cabinets, including maintenance/repair information, contact a biosafety officer at EHRS (215-898-4453) or visit the EHRS website.



Note: Animal cage change stations and clean benches are **never** appropriate to use when manipulating animals housed at ABSL-2. This equipment does not protect personnel or the environment from infectious agents.

VI. WASTE

All waste generated in the manipulation of animals housed in ABSL-2 rooms is considered biohazardous. All animal carcasses must be bagged and returned to the ULAR facility for disposal.

Biohazards waste is divided into three categories:

1. Biohazardous liquid waste: All infectious liquid waste must be disinfected in one of two ways:
 - Add bleach the liquid for a final volume of 10% bleach and let sit for 30 min. Pour down drain.
 - Autoclave the waste for the appropriate time and temperature. Pour down drain.
2. Biohazardous sharps waste: Sharps include razors, scalpels, needles, syringes (with or without needle attached), broken glass, broken plastic, pipette tips, serological pipettes, Pasteur pipettes, and anything else that could poke through a bag. Any of these items that have been used in research involving infectious agents must be disposed of in a hard sided, lidded container labeled with the universal biohazard symbol (pictured right).
3. Biohazardous "red-bag" waste: Any non-liquid or non-sharp waste such as PPE, rodent bedding, etc. must be thrown away in red or orange biohazard bags.



All infectious waste removed from the ABSL-2 rooms must be autoclaved and subsequently disposed of through the infectious waste stream. Autoclaves must be monitored by ULAR for proper function by using biological indicators.

NEVER dispose of sharps containers, red/orange biohazard bags, or any other biohazardous materials in the regular trash!!!

VII. RODENT CAGE CHANGING PROCEDURES

Rodent cages must be changed inside a certified biosafety cabinet using these procedures:

1. Turn on the biosafety cabinet and fluorescent light.
2. Let the cabinet run for 5-10 minutes before use to ensure adequate air exchange.
3. Wipe down inside surfaces with an appropriate disinfectant.
4. Load the cabinet with only a few animal cages at a time. Over-crowding the cabinet may disrupt airflow and expose you to infectious agents.
5. DO NOT cover the front and back air grilles. Blocking these air grilles may disrupt airflow and expose you to infectious agents.
6. Dirty cages containing used bedding should be removed from the cabinet and stacked upright inside a red biohazard bag.
7. When all cages have been changed, remove all materials from the biosafety cabinet.
8. Wipe down all inside surfaces with an appropriate disinfectant.

9. Let the biosafety cabinet run for 5-10 minutes to remove suspended particles.
10. Turn off the cabinet and the fluorescent light.
11. The biohazard bag containing the dirty cages must be loaded onto a cart in an upright position and taken to the autoclave for decontamination of bedding.
12. After all cages have been autoclaved, the bedding and cages are no longer considered infectious and can be handled according to standard procedures.

VIII. ANIMAL TRANSPORT

All rodents transported outside of the ABSL-2 room or the animal facility must be transported in filter-top rodent cages. If cages are changed in a lab outside of the animal facility, the same cage change procedures outlined above must be followed. Empty cages must be returned to the facility of origin.



IX. EMERGENCY PROCEDURES

If an exposure to a mucous membrane (i.e. splash to eyes, nose, or mouth) occurs:

- Irrigate the exposed area with running water at an eyewash station for 15 to 20 minutes.

If a penetrating wound (i.e. bite, cut, puncture, needle-stick, etc.) occurs:

- Thoroughly wash the injured area with soap and water for 15 to 20 minutes.

Immediately report ALL exposures or possible exposures to the facility manager and proceed to:

- Occupational Medicine (for Penn employees ONLY)
Hospital of the University of Pennsylvania RAVDIN Building, 2nd floor
- Student Health (for Penn students)
ProMed Building, 3535 Market St., Suite 100
see website for hours (<http://www.vpul.upenn.edu/shs/>)
- **Hospital of the University of Pennsylvania Emergency Department** (ALL after work hours and non-university affiliates)
The Pavilion, 1 Convention Avenue
Penn Presbyterian Hospital, Myrin Building, 51 N 39th Street

X. ADDITIONAL RESOURCES

Non-human primates (NHPs): NHPs are housed in ABSL-2 containment. For additional information concerning work with NHPs, please see the ULAR Policy and EHRS Policy for work with non-human primates.

ABSL-2 Practices and Procedures: *The Biosafety in Microbiological and Biomedical Laboratories*, 6th Edition outlines further details on features of an ABSL-2 laboratory.