

University of Maryland Baltimore Occupational Health & Safety Program for Personnel with Laboratory Animal Contact



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Introduction

The goal of the **Occupational Health and Safety Program for Personnel with Laboratory Animal Contact** at the University of Maryland-Baltimore is to provide a safe working environment for employees who work with or around research animals. Employees who work directly with animals are referred to as “direct contact employees.” Direct contact employees include personnel who may handle live animals, unpreserved tissues or body fluids, cages and cage accessories, animal waste, or animal carcasses. Employees who work in areas where animals are housed or used in laboratories are referred to as “indirect contact employees.” Indirect contact employees include maintenance and housekeeping staff, security and other personnel who must perform job duties in animal research environments. The requirements of this program are based on guidelines found in *The Guide for the Care and Use of Laboratory Animals*, Eighth Edition (2011).

The University groups responsible for this program are:

Environmental Health and Safety (EHS)

<https://www.umaryland.edu/ehs/>

Phone: (410) 706-7055

Fax: (410) 706-8212

Office of Animal Welfare Assurance (OAWA)

<https://www.medschool.umaryland.edu/iacuc/>

Phone: (410) 706-7859 / 8470

Email: iacuc@umaryland.edu

Program in Comparative Medicine and Veterinary Resources (VR)

<https://www.medschool.umaryland.edu/vetmedicine/>

Phone (410) 706-3540

Division of Occupational and Environmental Medicine

<https://www.medschool.umaryland.edu/occupational/>

Phone: (410) 328-2637

Email: UMBOccupationalHealth@som.umaryland.edu

Enterprise Risk Management (ERM)—Worker’s Compensation

<https://www.umaryland.edu/about-umb/offices/enterprise-risk-management/>

Phone: (410) 706-3221

Email: EHSRiskManagement@umaryland.edu

Program Elements

Management Leadership: University leadership shall establish safety policies and procedures for work with animals. Providing a safe working environment for employees is the responsibility of the University. This responsibility includes reviewing audit reports and ensuring that corrective action is taken.

Hazard Identification, Prevention, and Control: The University proactively identifies, prevents, and controls hazards through ongoing safety audits and training; incorporating safety into the protocol approval process; testing safety equipment; and developing safe operating procedures.

Employee Involvement: Employees are encouraged to bring safety concerns to the attention of management. Employees are responsible for following established safety procedures and completing all required safety training.

Training: Training is a critical component of an effective safety program. Employees who work with research animals must complete species-specific training for those species listed on an approved animal use protocol (AUP). The Collaborative Institutional Training Initiative (CITI) hosts an online training site with courses covering basic information for animal species that are used on campus.

Training Requirements—described on the OAWA Website:

<https://www.medschool.umaryland.edu/iacuc/Education--Training/IACUC-Required-Training/>.

Register for the safety courses you need using the EHS online training management system:

<https://www.umaryland.edu/ehs/training/>

Courses include:

- Occupational Exposure to Hazardous Chemicals in Laboratories
- Bloodborne Pathogens
- Radiation Safety
- Hazardous Waste
- Infectious and Biological Material Shipping

Safety Audits: In conjunction with the Institutional Animal Care and Use Committee's (IACUC) semi-annual inspection process, EHS conducts comprehensive safety and health audits of university animal facilities. The goal of the audits is to identify safety hazards and to have them corrected in a timely manner.

Medical Surveillance: According to the IACUC, personnel with direct or indirect animal contact must:

- (1) Review this document: **Occupational Health and Safety Program for Personnel with Laboratory Animal Contact** and
- (2) Enroll in the **Laboratory Animal Exposure Risk Assessment Program (LAERAP)**

The purpose of the LAERAP is to identify employees with conditions that could place them at risk when working with animals or otherwise exposed to allergens from animals.

Employees may access the LAERAP as described on the web page of the [Office of Animal](#)

[Welfare Assurance \(OAWA\)/Education and Training/LAERAP](#) or by using [this form](#) to initiate an invitation to the program. All employees with exposure to animals are expected to enroll in this program and complete the online medical questionnaire. After successful submission of the form, a confirmation email is sent out for documentation purposes or for further instructions as needed. Please note that Occupational and Environmental Medicine will contact employees who disclose medical conditions that warrant further evaluation. Once enrolled, an email is generated as a reminder to resubmit the online medical questionnaire on an annual basis. The email will include a link to the form.

Medical Attention: Employees and students should seek prompt medical attention for injuries or illnesses.

[Workers' Compensation](#) is a type of insurance covering employees for injuries or illnesses sustained while performing job duties.

If an employee suffers a non-life-threatening injury or illness, he/she should notify the supervisor and then complete the [Employee's First Report of Injury](#) (EFROI) fillable form. Print the completed form and take it with you when reporting to UMIC. Also fax a copy of the form to EHS at (410) 706-8212 or submit the form [online](#). (Make sure all information on both forms are identical for insurance purposes).

Report safety concerns or near miss accidents (incidents that had the potential for injury or illness) to your supervisor or to Environmental Health and Safety at 410-706-7055.

Medical Emergencies: Call 911. Be prepared to provide your name and the phone number you are calling from, the victim's location, the nature of the emergency, the number of persons needing help, and a description of the victim's condition. Employees should survey the area to ensure it is safe before approaching the victim. After calling 911, if you are trained in First Aid and/or CPR you may begin to administer it.

Vaccines and Screening:

To obtain vaccinations, titers, or TB testing, get approval from your supervisor then contact University of Maryland Immediate Care (UMIC) at 667-214-1899 or use the [scheduling link](#) (disregard language about "student" services as UMIC will see employees too). Supervisors should provide a completed and signed [Journal Entry Authorization Form](#) for employee to take to UMIC for any service that is billable to the department. (See [VR Safety and Employee Health](#))

Hepatitis B Vaccine. Employees whose work involves contact with human blood or tissues must be vaccinated against Hepatitis B.

Tetanus Vaccine: It is important for animal-care personnel to be immunized against tetanus at least every 10 years.

Rabies immunization is available for people working with animals that have a potential for rabies infection (non-vaccinated, at-risk animals). Laboratory animals are procured from USDA-licensed Class A Dealers and are very low risk for harboring rabies virus.

Tuberculosis Screening: Personnel who will have contact with non-human primates must have an annual tuberculosis (TB) screening which includes a questionnaire, tuberculin skin test or blood test, and/or chest X-ray depending on screening results and recommendations of the Occupational Health provider. Employees will email TB screening results to umboccupationalhealth@som.umaryland.edu

Risk for Those Who Directly Handle Animals and Their Tissues

Physical injuries can occur through bites and scratches from any animal with claws and teeth. Physical strain/trauma from working with larger animals (e.g., dogs, NHPs, swine, sheep) may occur when lifting the animals improperly or using inadequate/improper restraint techniques. The key to prevention of these types of injuries is training of research personnel by Veterinary Resources Staff or other qualified individuals that have a background in performing restraint with the species and procedures to be performed.

Allergic hazards are associated with breathing or contacting dander, fur, saliva and/or urine while working with laboratory animals. There is a wide range of severity of clinical signs from mild rhinitis through chronic asthma to life-threatening asthma or anaphylaxis. Using PPE will reduce exposure and sensitization to these allergens. Workers must follow the PPE requirements for each species as noted on the animal room doors in each facility (See Appendix 4). Those with worsening allergy symptoms should avoid further contact with the related species of animals. Follow up with Occupational Health service is necessary regarding ongoing work exposure. Workers with a prior history of anaphylaxis to animals, when working with or in close proximity to that species (i.e., sharing a lab space with others using animals) must carry an EpiPen with them at all times and avoid contact with the animals to which they are allergic.

Zoonotic diseases are those that can be transmitted from animals to humans. Although zoonotic diseases are not commonly transmitted from laboratory animals, there is a potential for exposure to such diseases when handling animals, waste materials and/or unfixed animal tissues. The prevention, detection, and eradication of zoonotic diseases in the animal facility are a primary concern of the entire animal care staff. Use of appropriate PPE is an important way to decrease the risk of spreading diseases if they are present.

Basics that apply to all research activities

Many simple steps can be taken to lessen the risk of infection or contamination from animals. These include, but are not limited to:

- Use personal protective equipment (PPE) appropriately.
- Don't apply cosmetics or contact lenses around animals, animal care areas, or in the laboratory
- Don't eat or drink in any animal housing or animal laboratory areas
- Always remove your gloves and other PPE prior to consuming any food or beverages or applying cosmetics or contact lenses
- Wash your hands for at least 20 seconds with soap and water after removing gloves.

Environmental Health and Safety

The following sections cover safety and environmental regulations and policies applicable to work with laboratory animals. At UMB, the mission of [Environmental Health & Safety](#) (EHS) is to enhance the safety of our community through education and service.

[EHS Training](#) is offered online and in-person to employees, students, and visitors who will be working in campus laboratories. Contact EHS at 410-706-7055.

Chemical Safety

1. Occupational Exposure to Hazardous Chemicals in the Laboratory:

The [Occupational Safety and Health Administration](#) (OSHA) is a federal government agency with regulations that are designed to protect people who work with chemicals in a laboratory. OSHA guidelines require proper training on ways to work safely with chemicals.

To meet the requirements of OSHA's regulations on [Occupational Exposure to Hazardous Chemicals in Laboratories](#), EHS has developed a [Chemical Hygiene Plan](#). The plan is a boilerplate document that covers the major activities conducted in university laboratories. In some circumstances, special laboratory procedures will be developed and attached in an appendix to the university's Chemical Hygiene Plan. Employees who work with animals in laboratories are required to complete the Occupational Exposure to Hazardous Chemicals in Laboratories training offered by EHS.

2. Hazard Communication Program:

The goal of OSHA's requirement for a "Hazard Communication" standard is to ensure that employees have access to information on the hazardous chemicals they may encounter in their working environment. The elements of the OSHA Hazard Communication standard include a [written hazard communication program](#), proper labeling of chemical containers, access to Material Safety Data Sheets (MSDS or SDS), and employee training.

Chemicals normally found in university animal facilities include formaldehyde, cleaners, disinfectants, animal pharmaceuticals, and anesthetic gases. SDSs are located in the break room or supervisor's office for each building. The rooms are as follows:

- Howard Hall and Bressler Research Building (BRB) Facility: HH Room 619
- Health Science Facility I (HSFI), Room 636
- Medical School Teaching Facility (MSTF), Room G-03
- Maryland Psychiatric Research Center (MPRC), Room A22

3. Anesthetic Gases:

Anesthetic gases, such as isoflurane and sevoflurane, are hazardous chemicals. Exposure to isoflurane or sevoflurane can cause irritation and redness in eyes, dryness and irritation of skin, and irritation of the mouth and throat. If inhaled, it can cause headaches, dizziness, drowsiness, unconsciousness, and in rare cases death. Animal studies have not indicated it is a reproductive hazard.

Procedures for using an anesthetic gas machine include:

- Use appropriately tested and calibrated anesthetic gas machines in rooms with adequate ventilation.
- If an induction chamber is used, verify the gasket or seal is in place
- Perform a pressure leak test of the anesthesia machine / breathing circuit prior to use to check for gas leak.
- Select the optimal size endotracheal tube or face mask for the animal to reduce chance of anesthetic gases leaking into room air.
- Turn O₂ flow meter off (zero flow) when opening the induction chamber or when the breathing circuit / face mask is not connected to the animal. Restart O₂ flow when face mask is positioned on the animal or connected to the endotracheal tube to reduce chance of personnel exposure to anesthetic gases.
- At the end of procedure, set the vaporizer to 0% (no anesthetic) while continuing flow of O₂ (or medical air, etc.) for 30-90 seconds for rodent use or 2 minutes for large animal use to flush residual anesthetic from the breathing circuit / face mask before disconnection from the animal.
- If a re-breathing bag / circuit is used, compress the bag slowly to empty gas present into the scavenging system (while O₂ is flowing).
- Weigh and record weights on charcoal waste gas scavenger canisters at least weekly when in use. Discard canisters when past the recommended service life.

4. Compressed Gas Cylinders:

If handled improperly, compressed gas cylinders can become fast moving projectiles. Secure cylinders appropriately and keep valve caps on when not in use. Use a cylinder cart with a chain restraint when moving gas cylinders. Do not drop cylinders. Do not roll or carry cylinders in a horizontal position. Do not transport smaller E cylinders on carts unless secured to the cart (in case of tip over).

Employees should never stick anything into the cylinder cap holes in an attempt to loosen the cap. To loosen a tight cap, use an adjustable strap wrench. If the cap is still difficult to remove, attach a tag or label to the cylinder identifying the problem and return the cylinder to the supplier. Do not use wrenches on valves equipped with a hand wheel. The supplier should be contacted if the valve is difficult to operate or faulty.

If a cylinder or cylinder valve is leaking, call EHS at (410) 706-7055. If after hours or during a weekend or holiday, call UMB Police at (410) 706-6882.

5. Disposal of Hazardous Materials:

Hazardous chemicals and hazardous laboratory waste must be disposed of according to established university procedures. Hazardous waste may not be disposed of in the regular trash or flushed down a laboratory drain.

For more information on what constitutes hazardous chemical waste and how to manage it, visit [EHS: Chemical Waste](#)

NOTE: All employees who dispose of hazardous material are required to take Hazardous Waste training on an annual basis.

Safety Equipment and Safe Work Practices

1. Personal Protective Equipment (PPE):

Working with laboratory animals exposes research personnel to risks including injury from bites and scratches and contracting disease from the animals. Research personnel also pose a threat to the health of research animals on campus, as humans carry a number of infectious organisms that can be harmful to animals. In addition, allergies to laboratory animals are rapidly becoming one of the most common conditions adversely affecting personnel involved with the care and use of research animals.

[UMB Policy on Personal Protective Equipment](#)

To safeguard both research personnel and laboratory animals, all personnel with direct animal contact must wear the following PPE:

Required PPE

a. Gowns and Lab Coats

- Disposable isolation gowns are worn as an outer layer that is removed when leaving the animal room. A gown should be worn over scrubs and lab coats when entering rodent rooms.
- Lab coats, scrubs and other non-disposable clothing must be laundered on-site or by a commercial laundry service aware of potential hazards (such as those handling hospital laundry)
- Remove PPE as soon as possible after leaving the animal area to prevent circulation of allergens in public hallways.

b. Face Mask

Wear a disposable face mask when entering an animal room—No Exceptions! Face masks reduce the amount of airborne particulate and allergens that may be inhaled by individuals working with laboratory animals. N-95 masks provide a higher level of protection than surgical masks. More information is provided in the *Respiratory Protection* section below.

c. Gloves

- Wearing disposable examination gloves reduces direct skin contact with animals and their allergens as well as reduces the injury from scratches or small animal bites.
- Double gloving for some procedures (ex. large animal necropsies) provides added protection.
- Gloves should be discarded after each use and not worn throughout the facility. NOTE: Remove one glove (even when wearing unused gloves) to open common or public area doors, push elevator buttons etc. to prevent contamination of items used by members of the public.

d. Eye Protection

- Protective eyewear (laboratory safety glasses and/or face shields) must be used in any area where there is reasonable probability of eye injury. This includes

use of corrosive liquids, injurious radiation (lasers), chemicals, and when there is possibility of exposure to secretions, sputum or splashes of infectious agents.

- If the potential exists for infectious or toxic matter to drip from above, eye protection must include a visor or other barrier.
- Contact EHS or Veterinary Resources for assistance in selecting appropriate eye protection.
- **Note:** *Areas requiring the use of eye protection will have a sign posted at the entrance. The sign should indicate "EYE PROTECTION REQUIRED."*)

Recommended PPE

Disposable shoe covers and hair covers are recommended (and sometimes required in specific animal rooms) when working with laboratory animals. Use of these items limits the risk of transmitting infectious agents into the animal facility and further limit contact with animal allergens.

NOTES:

- An employee's supervisor can provide them with more information on the appropriate PPE required for the type of work or research being performed.
- Always follow PPE signage at the entrance to an animal facility or animal room.
- Replace PPE when torn or soiled.
- Shoes that completely cover the feet provide the best protection. Don't wear sandals or perforated shoes in the animal facility.
- Additional or specialized PPE may be required depending on the work performed, *e.g., working with biohazards or monkeys*
- Latex allergy is a reaction to certain proteins in latex rubber. Its symptoms include mild reactions such as skin redness, rash, hives, or itching. Some people may also have more severe reactions that involve respiratory symptoms such as runny nose, sneezing, itchy eyes, scratchy throat, or anaphylaxis, a potentially life-threatening condition. If an employee has an allergy to latex, they should use vinyl or nitrile gloves. If an employee does not have a latex allergy and chooses to wear latex gloves, they should only use powder-free gloves with reduced protein content and wash hands with a mild soap and thoroughly dry before use. Do not use oil-based hand creams or lotions with latex gloves since they can cause glove deterioration.

2. Respiratory Protection:

a. Surgical Mask

The use of a surgical mask does not fall under the regulatory requirements of the OSHA standard. The use of surgical masks by staff entering animal areas is only to **help reduce exposure** to animal allergens or bedding dust particles and help control bacteria shed in liquid droplets and aerosols from the wearer's mouth and nose. OSHA does not allow surgical masks for protection from infectious aerosols.

b. Required Use of an N95 Respirator Mask

When working with infectious aerosols, employees may be required to use a N95 respirator mask approved by NIOSH. N95 respirator masks are not for work that involves

potential exposures to high levels of infectious aerosols or chemical vapors. If employees need additional respiratory protection, contact EHS to have a hazard assessment done.

Employees that are required to wear a respirator (i.e., N95, powered air purifying respirator-PAPR) need to enroll in the University respiratory protection program. The program requires that employees be medically approved to wear a respirator, get fit-tested to determine appropriate size, and complete training on how to use the respirator. To enroll in the program,

- Have your supervisor send an email to [Marc Ridgely](#) (cc the employee) asking for:
 - The 3M link to fill out the OSHA mandated medical questionnaire
 - An appointment with Marc for the fit test, assuming the questionnaire responses do not raise any need for medical review
- Bring your own N95 mask(s)—some suggestions below:
 - 3M™ Particulate Respirator [8210](#), N95
 - 3M™ Health Care Particulate Respirator and Surgical Mask [1860](#), N95
 - 3M™ Aura Particulate Respirator [9205+](#), N95

To view the complete written respiratory protection program, go to the following website and search under respiratory protection: <https://www.umaryland.edu/ehs/fire-and-occupational-safety/occupational-safety/>

c. Voluntary Use of N95 Respirator Masks:

Employees may voluntarily use a N95 respirator. Examples of use may include wearing a N95 to protect against allergens or when working in areas with low levels of nuisance dust. Employees that wear a N95 respirator on a voluntary basis do not need to enroll in the University respiratory protection program. However, they must be provided a copy of OSHA's "*Information for Employees Using Respirators When Not Required under the Standard*" handout. This handout is available online at: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppD>

3. Biological Safety Cabinet (BSC):

Use a BSC for work with an infectious agent that is an airborne hazard. BSCs use a High Efficiency Particulate Air (HEPA) filter to capture the airborne particles. When working with bedding, it is important to clean the front grill of all bedding material. A HEPA filter will not capture chemical vapors. If your work involves the use of both infectious aerosols and chemicals, you should contact EHS at (410) 706-7055 for assistance.

[Certification of biosafety cabinets](#) are performed annually and/or each time they are moved or relocated.

4. Chemical Fume Hood (CFH):

Employees should use a CFH for work with chemicals. CFHs remove chemical vapors from the air so that people do not breathe them. To ensure a CFH functions properly, keep them free of excess storage, do not raise the sash higher than 18", and work at least 20 centimeters inside the hood. EHS tests CFHs on an annual basis.

5. Emergency Showers:

The University provides emergency safety showers in case a person needs to remove a chemical contaminant from their body. To use a safety shower stand under the shower, pull the handle, and then remove all contaminated clothing. Employees should stay under the shower as long as possible and alert emergency medical personnel. The Department of Operations and Maintenance tests safety showers on an annual basis.

6. Eyewash Stations:

The University provides eyewash stations for eye contamination. Remove contact lenses while flushing eyes. Eyes are positioned between the eyewash nozzles as the water is turned on. The eyes should be flushed for at least 15 minutes or until emergency help arrives. Eyewash stations are tested weekly and logged on the eyewash hang tag or in a logbook. Report eyewash station malfunctions to the Department of Operations and Maintenance at (410) 706-7570.

7. Electrical Safety:

Do not use damaged electrical equipment or equipment with damaged electrical cords. Keep sources of electricity away from water and maintain adequate access space in front of electrical panels. All repairs to electrical equipment must be handled by authorized personnel. If electrical breaker boxes are present in your work area, do not block access. The National Fire Protection Association (NFPA) requirement is 36 inches in front of the cabinet from the floor to a height of 6'6" or the height of the equipment, whichever is higher.

8. Sharps Safety:

Sharps include needles, broken glass, syringes, pipettes, and scalpels. Sharps must be disposed of in an appropriate disposal container. **Do not manually recap needles.** Consider ["recapping stations"](#). Broken glassware or other sharp objects should be picked up using a dustpan/broom, leather gloves large tweezers, forceps, or "grabber tools" (like those that are used to pick up trash). Please don't use bare hands.

9. Safe Lifting Techniques:

Back injuries can occur when handling heavy material such as feedbags or larger animal species. To help prevent back injuries, employees should follow these basic practices when handling feedbags or other heavy items.

- Material should be stored to limit the need to lift the object directly from the floor.
- Material should not be stacked higher than the shoulder height of the shortest person moving the material.
- When lifting the load, bend at your knees and use your legs, not your back, to lift the material.
- Use a cart to move the material over an extended distance.
- For sedated animals, use a soft commercial sling with multiple handles along its sides or a commercial lift table.
- Ask for assistance when moving heavy objects.

10. Cage-Washing Safety.

Employees tasked with washing animal cages or using autoclaves should adhere to the following safety procedures:

1. Lockout/tagout: You must follow any applicable lockout/tagout protocols when using the rack washers and/or autoclaves to ensure that the machines cannot be activated when not safe to do so.
2. You must wear adequate skin PPE to prevent burn injuries from the tunnel washers, rack washers, and autoclaves. This includes a disposable gown or impermeable apron, full-length protective sleeves, heat-resistant gloves, and disposable shoe covers
3. To protect your face and eyes from splashes, wear a face shield (a chemical resistant-style face shield provides the most protection) or approved safety glasses. The eyewear should cover the front, top, bottom, and sides around your eyes for full protection from splashes.

Use of Radioactive Materials

All research with radioactive material must be under the University's Broad Scope license. The license is under the authority of the Maryland Department of the Environment (MDE) and administered at the University by EHS. Radiation producing machines must be registered with MDE and EHS.

Employees must work with radioactive material under the direction of an individual permitted to use radioactive material at the University. To become a permitted user, an individual must submit a basic research application to EHS. Directions for submitting an application are at <https://www.umaryland.edu/ehs/research-registration/radiation-safety-committee-rsc/>.

All employees who work with radioactive material must complete radiation safety training. To register for training go to the following site and follow the instructions provided: <https://www.umaryland.edu/ehs/training/>

For further assistance on working with radioactive material, please call (410)706-7055.

Safe work practices when using radioactive material with animals include:

- Have employees wear adequate PPE. At a minimum, this includes protective gloves, lab coat or apron, and eye splash protection (preferably a face shield), and a dosimeter.
- Ensure that syringes containing radioisotopes are handled and disposed of properly. Do not clear needles contaminated with radioactive material by spraying into the air.
- Use proper absorbent material to capture spills of radioactive material, blood, urine, or feces.
- Label potentially contaminated areas and equipment with the radiation-warning symbol.
- Maintain proper container inventories of all radioisotope used during the experiment.
- Use a fume hood or other approved ventilation when working with volatile radioisotopes.
- Properly post and control access to all rooms where radioactive material work is being done.
- Maintain adequate spill clean-up supplies.

- Properly dispose of all material that may be contaminated with radioactive material. This includes absorbent material, bedding, food, urine, feces, and animal carcasses. Freeze radioactive carcasses and biological material until they can be disposed of. More information on disposing of radioactive material is at: <https://www.umaryland.edu/ehs/hazardous-material-management/hazardous-waste-management-guidelines-and-instructions/radioactive-waste/>.
- Survey potentially contaminated material (cages, feed trays, water bottles, etc.) prior to moving from the controlled area.

Biosafety

Register all work with potentially hazardous biological materials (infectious agents, recombinant or synthetic DNA or RNA, toxins, and material of human origin) with the Institutional Biosafety Committee (IBC). Use the online research registration form to register research and development activities with the following categories of work:

- Recombinant or synthetic DNA or RNA: If the proposed work involves recombinant or synthetic nucleic acid molecules, the Principal Investigator (PI) should review the NIH "*Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules.*" These guidelines are at: https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.pdf
- Human Pathogens
- Human Materials (research manipulation of human blood, tissue, cell culture or tumor grafts)

Researchers may access the online research registration system by going to CICERO at <http://cicero.umaryland.edu>.

1. Bloodborne Pathogens:

The goal of OSHA's Bloodborne Pathogens standard is to minimize or eliminate occupational exposure to blood or other potentially infectious materials. The standard covers employees with reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials. To comply with the standard, the university has developed an exposure control plan and offers a free [Hepatitis B vaccination](#) program to all covered employees. All University staff that has potential exposure to human blood, body fluids, unfixed human tissues, or animal with human tissue or tumor implants or grafts must take Bloodborne Pathogens training on an annual basis. For more information on the University Bloodborne Pathogens Program, please see <https://www.umaryland.edu/ehs/research-safety/biosafety/bloodborne-pathogens/>.

2. Animal Bites and Scratches:

To protect from animal bites or scratches, employees should utilize sedation, anesthesia, or a restraining device as indicated in your Animal Use Protocol (AUP). They should also use the proper animal handling procedures for the species. Be aware of the animal's comfort zone and how far it can reach out to bite or scratch.

Since animals can bite through latex gloves, employees should use a thicker over-glove when appropriate. Employees should also consider using a two-person team for complex procedures. When working with NHPs, employees should avoid wearing loose fitting clothes, such as ties, or having exposed long hair.

If injured, immediately scrub or irrigate wounds from animal bites, scratches, or exposures to animal fluids for 15 minutes with appropriate soap. Irrigate splashes to the eyes, nose, or mouth for 15 minutes with rapidly flowing water.

Macaque monkey bite or scratch: The required procedures to follow for exposure incidents involving a bite, scratch, or splash of fluid from a Macaque monkey are listed on the next page in the Zoonotic Disease section. ****All employees working with or around macaques must carefully read and follow these procedures****

3. Shipment of Biological Materials:

Anyone who ships infectious or biological materials must complete EHS's online Department of Transportation (DOT) Infectious and Biological Material Shipping training course. This course covers International Air Transport Association (IATA) manual of International Civil Aviation Organization (ICAO) regulations and Department of Transportation (DOT) regulations and guidelines that pertain to shipment of biologic products, diagnostic specimens, or dangerous goods such as infectious substances, dry ice, or other chemicals. This shipping training course is required every two years for anyone who ships this material. Employees may register and take this training by going to: <https://www.umaryland.edu/ehs/training/>

4. Disposal of Special Medical Waste:

Biological waste is material contaminated with infectious agents, human or animal tissues, or body fluids and is referred to by EHS as "Special Medical Waste" or "Pathological Waste". Special medical waste must be disposed of in accordance with university policy.

Zoonotic Disease

Zoonotic diseases are those that can be transmitted from animals to humans. Although zoonotic diseases are not common, the prevention, detection, and eradication of zoonotic diseases from the animal facility are a primary concern of the entire animal care staff. It is important to remember that unfixed animal tissues, animal waste materials, as well as the animals themselves may also transmit zoonotic diseases. Below are examples of risks of getting diseases associated with common research animals. Use of proper PPE can reduce these risks.

1. *Non-Human Primates (NHP, monkeys)*: Monkeys pose special zoonotic risks as many of their diseases are often transmissible to humans and can be a serious health hazard. The tuberculosis bacterium (TB) may be transmitted from animals to humans and from humans to animals. TB testing of monkeys and the personnel working with them is required. All personnel who will be exposed to monkey **must first** have a negative TB screening with annual testing as long work with monkeys continues.

Shigella, Campylobacter, and Salmonella may cause bacterial dysentery in NHP species and can cause similar problems in humans exposed to primate excrement. Parasites such as Entamoeba histolytica can also be transferred to humans. Precautions such as wearing PPE and thorough handwashing after removal of PPE will reduce the risk of monkey to human cross-contamination.

Macaque monkeys: Monkeys of the genus *Macaca* (macaques), or their unfixed tissues, can carry a virus known as *Macacine herpesvirus 1*, formerly known as *Cercopithecine herpesvirus 1* and commonly referred to as “**Herpes B**”. Herpes B is frequently carried by rhesus and cynomolgus macaques, as well as other macaques. It can cause fatal encephalitis when transmitted to humans, yet only mild disease signs occur in infected macaques. As with other Herpes viruses, it can lie dormant and be shed without visible lesions on the animal.

All individuals planning to work with or around macaques and/or their tissues must complete the macaque safety “[Initial in-person training](#)” given by a Veterinary Resources Veterinarian. This training must be completed **prior to first potential** exposure to macaques. Do not enter a macaque room until this training is complete.

An annual online refresher certification: [UMB Macaques and Herpes B](#) is required thereafter.

- Direct exposure to objects contaminated with macaque monkey body fluids, tissues, or excrement or wounds caused by macaque monkeys require immediate medical attention.
- Copies of the *Personal Protection Equipment Training Working with Macaques or Their Unfixed Tissues* as well as associated handouts should be readily available in all laboratories working with macaques or macaque tissues.

Instructions for exposure management “[How to Handle a Macaque Injury or Exposure](#)” are included in the bite/scratch boxes located in the hallways near each macaque housing room

2. *Swine*:

Swine influenza is caused by influenza viral strains which primarily infect swine but can be transmitted to people in close contact with infected pigs. Animals with the virus may not have any signs of illness, but if they do, these include fever, nose or eye discharge, depression, lack of appetite, coughing, sneezing, and difficulty breathing. Symptoms in people are also typical flu-like ones, such as fever, coughing, lack of appetite, and fatigue, but can also have gastrointestinal ones like nausea, vomiting, abdominal pain, and diarrhea. The disease can progress to more serious complications, including inflammation of organs like the heart and brain as well as organ failure. Transmission occurs by aerosolization or direct exposure to respiratory secretions from infected animals

Ascariasis is the infestation of swine by the roundworm, *Ascaris suum*, which can cause pneumonia, hepatitis, and ill thrift. Humans can be infected by pig roundworm (*Ascaris suum*). People with ascariasis often show no symptoms. If symptoms occur, they can be mild and include initial coughing, shortness of breath, or wheezing as the eggs hatch in the

small intestine and the larvae migrate through the bloodstream into the lungs. In 10-14 days, the larvae get coughed up and swallowed and go back to the GI tract where they mature into adult worms. At this time, abdominal discomfort or pain may occur. Heavy infections can block the intestines. Ascariasis is treatable with medication prescribed by your healthcare provider. Transmission is by the fecal oral route.

Other diseases associated with swine include ringworm, erysipelas, leptospirosis, streptococcosis, campylobacteriosis, salmonellosis, cryptosporidiosis, giardiasis, balantidiasis, pathogenic *E. coli*, and brucellosis

3. *Sheep:*

Q Fever, a potentially serious human disease caused by the rickettsia *Coxiella burnetii*, and historically was common in those drinking unpasteurized milk or working in slaughterhouses handling animal carcasses (cattle, sheep, and goats). It is now known that the organism is shed abundantly from the placental membranes of infected sheep. The aerosol route of exposure has been the cause of more recent cases of Q fever pneumonia and other associated symptoms in laboratory workers. Infected persons can be effectively treated.

Sheep used in UMB research are purchased from Q Fever-negative herds, reducing, but not eliminating the risk of exposure to this disease. See **Appendix 2** for more information on Q fever.

Contagious ecthyma (“Orf”) from the mouth of an infected sheep or goat can be transmitted to humans causing focal skin lesions on the hands. When working where exposure is possible, wear disposable gloves over sleeves.

Minimum PPE is required for individuals working with sheep: Disposable gowns over scrubs, animal facility clothes, face mask and latex or nitrile gloves. Shoe covers or facility specific boots are required to work in sheep husbandry rooms. Discard disposable PPE or launder and/or launder non-disposable clothing to prevent possible infection to others.

4. *Dogs and Ferrets:*

Rabies: Dogs and ferrets can be carriers of rabies, however the risk of exposure to rabies is very low because research animals of these species are vaccinated and housed such that they are unlikely to have been exposed to rabies. However, if your work should ever require any contact with these species, rabies vaccination is available to personnel if desired.

5. *Rabbits, Guinea Pigs, and Rodents:*

Development of allergies to these species is the most common health hazard associated with their use. Limit your exposure to their dander and soiled bedding by using the minimum required PPE (indicated on animal room husbandry doors).

NOTE: *If you must handle Rabbits and Guinea Pigs on the same day, handle Guinea Pigs first then Rabbits. Rabbits may carry Bordetella bronchiseptica, which is very contagious and harmful to Guinea Pigs. Be sure to change PPE between species.*

6. *Amphibians and Fish:*
Salmonella is frequently harbored in amphibians.

Fish and amphibians may carry and transmit atypical “Mycobacteriosis” caused by Mycobacteria organisms. Mycobacteriosis typically presents as single or multiple sometime ulcerated, cutaneous and subcutaneous nodules or swellings of granulomatous dermatitis and cellulitis. Use Minimum PPE (gloves, lab coat, eye protection) when working with these species. See **Appendix 3** for more information on mycobacterial infection from fish.

7. All species:

Zoonotic diseases that almost any species may carry include ringworm infection of the skin (fungus), sarcoptic mange (a skin parasite), and roundworms (an intestinal parasite) that may cause visceral larval migrans. However, as with rabies, the risk is very low as animals used in research today are purchased from colony-bred sources with disease control programs in place.

NOTE: See Appendices - Tables 1.1 and 1.2 for other examples of laboratory animal zoonotic diseases associated with research animals.

Pregnancy:

If you are PREGNANT or planning on becoming pregnant, contact your personal physician to discuss your work environment as to potential hazards that could affect your developing baby.

Working with hazardous agents and toxic chemicals is discouraged, especially during the first trimester of pregnancy. Check with your physician as to chemicals you commonly use so they are aware of potential problems, or you may wish to contact Occupational and Environmental Medicine for a consultation with an occupational health physician as they may have more experience / knowledge as to the common toxins/chemicals utilized on this campus. Write to UMBOccupationalHealth@som.umaryland.edu to schedule a consultation.

Appropriate PPE should be worn when working in areas potentially contaminated by laboratory animals or their waste. Thorough hand washing after handling any potential source of infection is also necessary and should always be performed prior to leaving the animal or laboratory facilities and prior to consuming any food or beverages.

Emergency Procedures

The University will post emergency information on the campus alert section of the University’s web page and on the emergency information phone line. Listed below are the number and web link.

- Emergency information phone number: 410.706.8622 (UMAB)
- Campus alert webpage: <https://www.umaryland.edu/emergency/alerts/>

Evacuation Procedures:

In case of fire inside a building, activate the manual alarm pull station. Pull stations are located near emergency exits in the building. Once an employee is a safe distance away from the emergency, they should call emergency dispatch at 911.

Evacuate buildings when the fire alarm is activated. Obey Fire Wardens and emergency response officials and evacuate in an orderly manner. Walk, do not run, and stay in a single file in the stairways. Staying in a single file allows the fire department to use the stairs to go up to the fire. Do not use elevators to evacuate the building. They can get stuck and leave you trapped in the building. If an employee requires evacuation assistance, they should go to the designated area for rescue assistance on the floor and await further instructions.

APPENDIX 1.

Table 1.1				
Passively Transmitted Zoonotic Diseases/Organism				
Common name	Organism	Animals of concern	Risk/concern	Human Symptoms of Infection
Brucellosis	<i>Brucella</i> sp.	Dogs, Sheep, Cattle, Goats Swine	low/moderate-high	Gradual onset, undulating fever, chills, sweats, headache, myalgia, fatigue, backache, weakness, Weight loss, can be chronic with recurrent fevers. And associated symptoms
Coli bacillosis	<i>Escherichia coli</i>	Vertebrates	Low / moderate	Pneumonia, urinary tract disease, watery diarrhea, abdominal pain, +/- short period of fever
Haantan Virus (Korean Hemorrhagic Fever)	Hantaan virus	Wild or unscreened rodents	Low / high	Incubation from 5-35 days post exposure. Subtle onset; malaise, fever with neurological disturbances, common renal shutdown, headache, tremors of tongue and extremities, shock. 30-40% fatality rate
Leprosy	<i>Mycobacterium leprae</i>	Armadillo	Low	Range from single, localized lesion to diffuse, generalized Infiltrations of skin
Lymphocytic choriomeningitis	LCM virus	Rodents	Low / high	Fever, myalgia, malaise, occasional stiff neck, headache, sleepiness, unusual skin sensations (paresthesia), paralysis; usually self-limiting. Some fatalities!
Plague (Bubonic and Pneumonic)	<i>Yersinia pestis</i>	Ground squirrels, wild caught rodents	Low / high	<i>Bubonic</i> - fever, chills, nausea, diarrhea or constipation, headache, meningitis, tachycardia, coma, regional lymphadenopathy. 60% fatality rate if untreated! <i>Pneumonic</i> - cough and dyspnea with mucoid to bright red sputum; may progress to Septicemic form, with vascular collapse, hemorrhagic rash. 95% fatality rate in these two forms if untreated!
Pneumocystis pneumonia	<i>Pneumocystis carinii</i>	Rodents, guinea pigs, Rabbits, dogs, cats, cattle, sheep, swine, monkeys	High for immunocompromised Individual	Generally seen only in those with serious underlying disease, or suppressed immune system; pneumonia, dyspnea, nonproductive cough, moderate fever, tachypnea
Q-Fever	<i>Coxiella burnetti</i>	Sheep, cattle, goats	Moderate	Sudden fever, retrobulbar or frontal headache, chills Sweating, myalgia, weakness, pneumonitis, endocarditis hepatitis
Ringworm	<i>Microsporium</i> and <i>Trichophyton</i> spp.	Rabbits, dogs, cats	High / low	Generally, scaling, hair loss or breakage; occasional itching; less frequently, erythema, induration, crusting, suppuration
Salmonellosis	<i>Salmonella</i> spp.	Most species can carry	Low / moderate	Diarrhea, vomiting, low-grade fever; may progress to dehydration, prostration, death; very high fever, to septicemia, splenomegaly, headache in humans
Simian Hemorrhagic Fevers (Ebola, Marburg)	Rhabdovirus	Non-human primates (NHPs)	Low / very high	Fever, malaise, headache, sore throat myalgia, vomiting, diarrhea, conjunctivitis, hemorrhages. High % fatalities even with therapy
Toxoplasmosis	<i>Toxoplasma gondii</i>	Cats, Cat feces	Moderate	Usually, lymphadenopathy, fever, headache, myalgia, stiff neck, anorexia; occasional arthralgia, maculopapular rash, mental confusion, if pregnant: still born, abortion of Fetus!
Tuberculosis	<i>Mycobacterium</i> spp.	NHPs, cattle, birds, fish and amphibians	Moderate- high	Pulmonary - productive cough, fever, weight loss, fatigue, night sweats, chest pain, hemoptysis Extrapulmonary- cervical lymphadenitis, meningitis, osteomyelitis, pericarditis, infections of most other organs
Yaba Virus (Yaba Monkey tumor virus)	Pox virus	NHPs	Moderate	Papulae develop to subcutaneous tumors on limbs, Pox lesions hands, feet, face, ears; regional lymphadenopathy

TABLE 1.2

Actively Transmitted Zoonotic Diseases/ Organisms

Common name (s)	Organism	Carried By	Risk / Concern Level	Common mode / method of transmission	Human Symptoms of infection
Cat Scratch Fever Fever	<i>Bartonella</i> spp.	Cats	Low / Moderate	Cat scratch or bite	Erythematous papule at inoculation site followed by I regional lymphadenopathy; malaise, anorexia, myalgia, nausea
Herpes B, B- Virus	<i>Cercopithecine herpesvirus 1</i>	Non-human Primates	Moderate to HIGH	Contact with infected NHP Saliva, Tissues, Needle sticks!	Vesicle / Blister at site of entry, regional lymphadenopathy, possible paresthesias, pruritus, fever, headache, flu like symptoms, meningoencephalitis. Nearly 100% FATAL!! With out early treatment.
Pasteurellosis	<i>Pasteurella</i> spp.	Dogs rabbits, ruminants cats, birds	Low/moderate	When involving dogs or cats, Oral cavity of animal is often contaminated with spp.	Manifest in one or more of the following Syndromes: wound infections, upper / lower respiratory tract infection, abdominal / pelvic infections, fatal sepsis
Rabies	Rabies virus	Any mammal	Low / Moderate Up to High in wildlife	Primarily bite from infected animal; any salivary contamination to open skin on a human	Incubation in humans varies, 10 days to months. May produce: Nausea, vomiting, headache or mild fever. Paresthesia and pain at site of bite wound or inoculation site. Neurological changes cause furious / aggressive behavior or general paralysis Nearly always fatal
Rat Bite Fever (Haverhill)	<i>Strep. moniliformis</i>	Rats	Moderate/moderate	Rat bite	May cause high fever, chills, vomiting, sore throat myalgia, headache, backache and / or possible disturbances of consciousness
Rat Bite Fever (Sodoku)	<i>Spirillum minus</i>	Rats	Moderate	Rat bite, contamination during oral surgery	Bite wound may heal initially then develop pain, edema to firm swelling, turn purple or ulcerate up to several weeks post original bite. Other symptoms: Headache, diarrhea, vomiting, myalgia, myocarditis, hepatitis, meningitis are possible
Swine Flu	Influenza virus, type A trH1N1, trH3N2 trH1N2	Pigs	High	Aerosolization or direct exposure to swine respiratory secretions from infected animals	Symptoms in people are also typical flu-like ones, such as fever, coughing, lack of appetite, and fatigue, but can also have gastrointestinal ones like nausea, vomiting, abdominal pain, and diarrhea.
Tetanus (Lockjaw)	<i>Clostridium tetani</i>	Mainly herbivores	Low / very high	Puncture wound, bite or scratch transmission Via contact with contaminated soil, GI flora of Herbivores.	Intermittent to continuous tonic muscular spasms; terminal asphyxia due to inability to move the diaphragm muscle
Septicemia from dog or cat bite	<i>Capnocytophaga Canimorsus</i> and <i>C. cynodegmi</i>	Dog, cats	High in Immuno-compromised or Splenectomized individuals	Bite, even minor bite	1- 8 days (5 on avg) from time of bite to onset of symptoms which may include: Fever, chills, myalgia, vomiting, diarrhea, abdominal pain, mental confusion, seizures, gangrene. Greater than 30% fatality rate.

APPENDIX 2

Q FEVER (*Coxiella burnetii*)

What is Q Fever?

Q fever, a zoonotic disease caused by the bacterium *Coxiella burnetii*, can cause acute or chronic illness in humans. The disease was first recognized in Australia among slaughterhouse workers. The causative bacterium was not known at the time, so it was called Q or “query” fever. The bacteria was discovered in 1937.

How can I get it?

People get infected by breathing in dust that has been contaminated by infected animal feces, urine, milk, and birth products that contain *Coxiella burnetii*. Birth products are the most likely to transmit as the highest numbers of bacteria are shed in amniotic fluids and placenta. It can also, rarely, be transmitted via a tick bite, ingesting unpasteurized milk or cheese, and person-to-person. It is also resistant to heat, drying, and many common disinfectants. This enables it to survive for a long time in the environment.

What are the symptoms?

Q fever can cause both acute and chronic illness. The symptoms of acute illness are very nonspecific and vary from person to person. They include:

- High fever (up to 105F)
- Fatigue
- Severe headache
- General malaise
- Muscle aches and pains
- Chills or sweats
- Cough
- Nausea
- Vomiting
- Diarrhea
- Abdominal pain
- Chest pain

How can I keep myself from getting it?

Almost half of people who are infected don't have any symptoms. People at greatest risk for chronic illness are those with a history of heart valve problems, arterial aneurysms, or vascular grafts. Pregnant women and those whose immune system is suppressed are also at increased risk. If you have any of these risk factors, you should avoid high risk exposures such as farm animal birthing.

If you are otherwise healthy, you should wear gloves and a mask with face shield (standard precautions) when participating in an animal birth, clearing birthing materials or any close handling of an animal. You should shower and change clothes at the end of the day before leaving the work facility. If you suspect an animal has Q fever (a common symptom is early abortion of a fetus), you should isolate the animal and contact veterinary personnel to consider diagnostic testing.

Source: Centers for Disease Control website. “Information for Healthcare providers”.

<https://www.cdc.gov/qfever/healthcare-providers/index.html>. Jan 2019. Accessed on July 10, 2019.

Anderson A, et al. “Diagnosis and Management of Q Fever — United States, 2013: Recommendations from CDC and the Q Fever Working Group.” MMWR. March 29, 2013. 62(RR03);1-23.

APPENDIX 3

Fish Tank Granuloma

Occupational Skin Infection from Handling Fish

What is Fish Tank Granuloma (FTG)?

A rare skin infection caused by *Mycobacterium marinum*, a non-tuberculosis mycobacterium. The organism is found worldwide in stagnant freshwater and saltwater environments including lakes, inadequately chlorinated swimming pools, and aquariums, including laboratory aquariums

How does infection occur?

Infection occurs when water containing *M. marinum* enters through a break in the skin. A thorough history from infected individuals usually reveals an injury associated with cleaning fish tanks, changing aquarium water, or trauma from fishhooks. The skin infection is not spread from person to person.

What are the symptoms?

Fish tank granuloma presents as a slow growing, inflamed red bump (nodule or plaque) at the trauma site. The lesion is often painful and may become ulcerated or crusted. Skin changes usually appear about two to four weeks after the aquatic exposure. The most common location for infection is the back of the dominant hand.

How do I prevent it?

Use of proper PPE, such as disposable gloves, will help prevent contamination of skin surfaces. Thorough hand washing is very important to further reduce potential for infection.

How is it treated?

FTG responds to antibiotics, but treatment may need to be prolonged.

Learn more:

<https://www.aaalac.org/pub/?id=DCA7747C-FBCC-D8B2-F93C-F9249E530DCA>

<https://www.aocd.org/page/FishTankGranuloma>

<https://www.fda.gov/media/80637/download>

Contact UMBOccupationalHealth@som.umaryland.edu if needed



Fish.docx

Fish Tank Granuloma info sheet

PPE SIGNS in ANIMAL FACILITIES TO AVOID SPREADING ANIMAL ALLERGENS



Gloves may become contaminated during research or animal procedures.

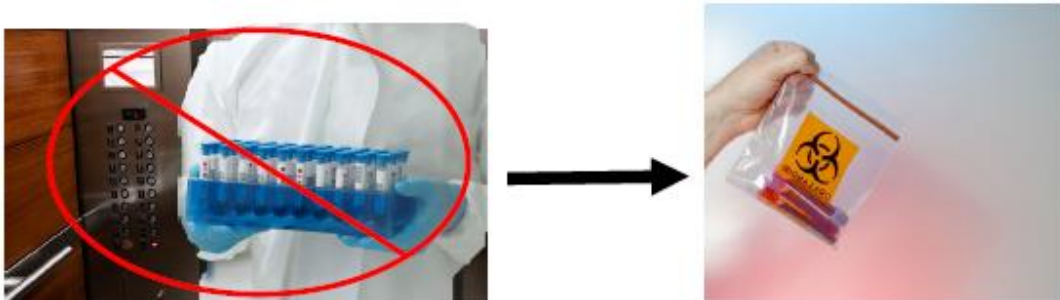


Wearing gloves in public areas may lead to cross-contamination.



As a routine safety precaution, gloves should be removed prior to entering any public areas such as elevators, break rooms, and offices.
Please be considerate and protect both the safety and peace of mind of others.

When transporting specimens, use secondary containers to eliminate the need for gloves.



Used PPE may be contaminated with pathogens or allergens.



Animal allergens are from a glycoprotein in saliva, urine, and fur dander. These allergens adhere to PPE easily during laboratory work.

Cloth lab coats are prohibited in the animal facility.

Remove all PPE before leaving the animal facility to prevent the spread.



When transporting animals beyond housing areas, cover cages with disposable drape.

