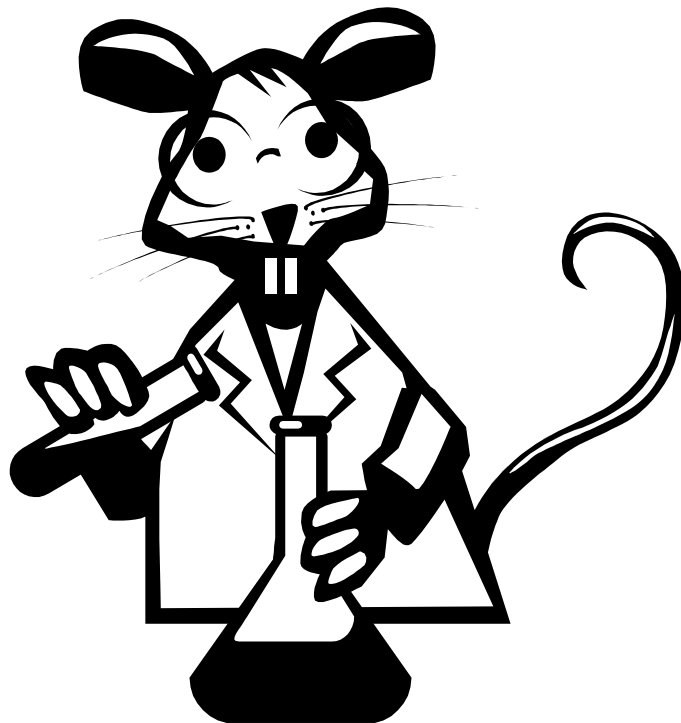


University of Maryland Baltimore
Occupational Health & Safety Program for
Personnel with Laboratory Animal Contact



Prepared by:

UMB Environmental Health and Safety in conjunction
with the UMB Veterinary Resources and
Office of Animal Welfare Assurance

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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 work in areas that house research animals. Employees that work directly with animals are referred to as “direct contact employees.” Direct contact employees include personnel who handle live animals, unpreserved tissues or body fluids, animal cages, cage accessories, animal waste or carcasses. Employees that work in areas where animals are used or housed 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 8th Edition of the Guide for the Care and Use of Laboratory Animals (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

Fax: (410) 706-6577

Veterinary Resources (VR)

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

Phone (410) 706-3540

Occupational and Environmental Medicine

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

Phone: (410) 706-7464

Program Elements

The Occupational Health and Safety Program for Personnel with Laboratory Animal Contact has several elements. These include:

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.

In addition, employees and students should seek prompt medical attention for any injuries or illnesses. Procedures for medical treatment and reporting injuries or illnesses can be found at: <https://www.umaryland.edu/ehs/risk-management-and-workers-compensation/workers-compensation/>. In addition, employees or students should report safety concerns or near miss accidents (incidents that had the potential for injury or illness) to their supervisor or Environmental Health and Safety at 410-706-7055.

Safety and Health Training Programs: Training is a critical component of an effective safety program. Employees who work with research animals must complete species specific training modules for the animal(s) with which they will work. The Collaborative Institutional Training Initiative (CITI) hosts this training. Directions for registering for this training can be found on the OAWA Website at: <https://www.medschool.umaryland.edu/iacuc/Education--Training/IACUC-Required-Training/>. This training includes modules on mice, rats, guinea pigs, hamsters, gerbils, ferrets, cats, dogs, swine, sheep, nonhuman primates, fish, zebrafish and amphibians.

Employees may need to complete additional safety training based on their work assignments. Courses include:

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

Employees can learn more about the training listed above by going to the following web link and registering with EHS's online training management system: <https://www.umaryland.edu/ehs/training/>.

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: The purpose of the medical surveillance program is to identify employees with conditions that could place them at risk when working with animals. The program requires an initial and annual update of an online exposure risk assessment form for employees with direct or indirect exposure to animals.

All personnel with animal contact, direct and indirect, must review the Occupational Health and Safety Program for Personnel with Laboratory Animal Contact and complete the medical evaluation questionnaire. Employees should contact their supervisor if they need additional guidance on whether to enroll in this program.

Employees may access and complete the online medical questionnaire at <https://www.medschool.umaryland.edu/iacuc/Education--Training/Laboratory-Animal-Exposure-Risk-Assessment-Program-LAERAP/>. Log in using your UMID and Password and complete the form. Once complete, click submit, verify that the submission was accepted (*confirmation message at top of page*) and close the web browser. You will also receive a confirmation email for documentation purposes. Please note that Occupational and Environmental Medicine will contact employees who disclose medical conditions that warrant further evaluation.

People who have direct contact with animals must have had a tetanus vaccination within the past 10 years. Those who have contact with non-human primates must have an annual tuberculosis-screening (PPD skin test, chest x-ray or other test as directed by the UMB Occupational Health Physician). Rabies immunization is available for people working with animals that may be infected. Employees should contact their supervisor for assistance with setting up testing or vaccinations.

Risk for Those Who Directly Handle Animals and Their Tissues

Physical injuries can occur from bites and scratches by cats, dogs, non-human primates (NHPs), rabbits, rodents, swine, or 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 animal hair, dander, or protein allergens (i.e., the “Mu” protein excreted in mouse urine). Exposure may cause acute allergies to these (or similar allergens) or the development of allergies later in life. To reduce exposure, and therefore sensitization, to these allergens, workers should wear the PPE required for the species or procedure to be performed.

Zoonotic diseases are those that can be transmitted from animals to humans. Although zoonotic diseases are not common, there is a potential for exposure to such diseases when handling animals and/or tissues. 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. Use of appropriate PPE can help prevent this risk.

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:

- Not bringing food or drinks intended for human consumption into any animal husbandry or laboratory areas,
- Never applying cosmetics or contact lenses around animals, animal care areas, or in the laboratory, and

- Making a habit of washing your hands for at least 20 seconds with soap and water prior to consuming any food or beverages or applying cosmetics or contact lenses.

Non-disposable PPE such as lab coats or scrubs should be laundered on-site in specified laundry rooms or by a professional laundry service aware of potential hazards (not at your home).

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.

The following sections cover safety and environmental regulations and policies applicable to work with laboratory animals. At the University, EHS is the principal group responsible for ensuring that the University provides a safe workplace and complies with environmental regulations. A summary of services and contact information for EHS is at <https://www.umaryland.edu/ehs/>.

Chemical Safety

Occupational Exposure to Hazardous Chemicals in the Laboratory: The goal of the Occupational Safety and Health Administration's (OSHA) standard on Occupational Exposure to Hazardous Chemicals in Laboratories is to ensure that people who work with chemicals in a laboratory are properly trained on how to work safely with chemicals and are provided appropriate safety materials and PPE. The OSHA standard covers laboratories that are engaged in the use of chemicals. To meet the requirements of this standard, the University has developed a Chemical Hygiene Plan. The plan is a boilerplate document that will cover the major activities conducted at University laboratories. In some circumstances, special laboratory procedures will be developed and attached in an appendix to the University's Chemical Hygiene Plan. A copy of the *Chemical Hygiene Plan* can be found online at <https://www.umaryland.edu/ehs/research-safety/chemical-safety/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.

Hazard Communication Program: The goal of the Occupational Safety and Health Administration's (OSHA) Hazard Communication standard is to ensure that employees have access to information on 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. The written hazard communication program for the University can be viewed online at <https://www.umaryland.edu/policies-and-procedures/library/administration/policies/vi-1711a.php>

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

Anesthetic Gases: Anesthetic gases, such as halothane, isoflurane and sevoflurane, are hazardous chemicals. Exposure to halothane can cause severe irritation to the eyes, irritation of the skin, reduction of the blood pressure, dizziness, drowsiness, and unconsciousness. There is also evidence that it can increase the risk of spontaneous abortion and congenital abnormalities in the offspring of male and female workers. Though infrequent, halothane exposure has also been associated with liver damage.

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.
- Perform a pressure leak test of the anesthesia machine / breathing circuit prior to use to check for gas leak. Contact Veterinary Resources if guidance is needed.
- Verify the induction chamber and face mask / breathing circuit is connected to the charcoal scavenger canister or is vented directly to a chemical fume hood or Class II B2 biosafety cabinet.
- Select the optimal size endotracheal tube or face mask for the animal to reduce chance of anesthetic gases leaking into room air.
- Set O₂ flow meter to 0 L/min 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%, but continue flow of O₂ delivery (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).
- Do not use charcoal waste gas scavenger canisters past the recommended service life. Weigh and record weights on canisters at least weekly when in use.

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. Remember to 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.

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 <https://www.umaryland.edu/ehs/hazardous-material-management/hazardous-waste-management-guidelines-and-instructions/chemical-waste/>.

All employees that dispose of hazardous material are required to take Hazardous Waste training on an annual basis. To register for training, go to the following site and follow the instructions provided: <https://www.umaryland.edu/ehs/training/>

Safety Equipment and Safe Work Practices

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.

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

Required PPE

1. Dedicated Clothing
 - Disposable gowns or surgical scrubs and/or a laboratory jacket.
 - Dedicated clothing should be worn only while working with the animals and non-disposables must be laundered on a routine basis.
2. Gloves
 - The use of disposable nitrile, vinyl, or latex examination gloves reduces direct skin contact with animals and their allergens.
 - Gloves should be discarded after each use and not worn throughout the facility.
 - Use of protective gloves may be needed to protect against scratches, bites, and for procedures with an increased risk of serious injury (i.e., necropsy of non-human primates).
3. Eye and Face 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.
 - Contact EHS or Veterinary Resources for assistance in selecting appropriate eye protection. (**Note:** *Areas requiring the use of eye protection should have a*

sign posted at the entrance. The sign should indicate "EYE PROTECTION REQUIRED.")

Recommended PPE

1. Respiratory Protection
 - The use of disposable masks is recommended to reduce the amount of airborne particulate and allergens that may be inhaled by individuals working with laboratory animals.
 - Once individuals develop allergic symptoms, disposable surgical-style masks are usually NOT effective, and it is recommended that National Institute of Occupational Safety and Health (NIOSH) certified dust-mist respirators or filtered airhood devices be used. Effective use of these devices requires annual fit testing by EHS.
 - Contact EHS for assistance with selection of proper respiratory protective equipment.
2. Miscellaneous Safety Equipment
 - Disposable shoe covers and hair covers are recommended when working with laboratory animals. Use of these devices limits the risk of transmitting infectious agents into the animal facility and further limit contact with animal allergens.

An employee's supervisor can provide them with more information on the appropriate PPE required for the type of work or research being performed. In addition, at the entrance to certain animal facilities there may be specific requirements for PPE posted. Damaged PPE must be replaced. Sandals or perforated shoes may not be worn in animal facilities.

NOTES:

- PPE, in addition to that noted above, may be required for the type of work or research being performed, *e.g., there are additional PPE requirements for those individuals working with non-human primates; there may be additional PPE requirements for those individuals working with hazardous agents, etc.*
- 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 a non-latex glove such as those made of nitrile. 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. Do not use oil-based hand creams or lotions with latex gloves since they can cause glove deterioration.
- The campus policy on PPE can be found online at:
<https://www.umaryland.edu/policies-and-procedures/library/administration/policies/vi-1713a.php>

Respiratory Protection: Employees that are required to wear a respirator need to enroll in the University respiratory protection program. Employees receive medical approval to wear a respirator. Employees are fit-tested to determine appropriate size and must complete training on how to use the respirator. To enroll in the program, contact EHS at (410) 706-7055. To view the complete written respiratory protection program, go to the following website: <https://www.umaryland.edu/ehs/fire-and-occupational-safety/occupational-safety/>.

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 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.

When working with infectious aerosols, employees may be required to use a N95 respirator approved by NIOSH. N95 respirators do not protect against chemical vapors and are not for work that involves potential exposures to high levels of infectious aerosols. If employees need respiratory protection from chemicals or high levels of infectious agents, contact EHS to have a hazard assessment done.

Voluntary Respirator Use of N95 Respirators: Employees may voluntarily use a N95 respirator for work that does not involve infectious agents. 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>

Biological Safety Cabinets: Use a biological safety cabinet for work with infectious agents that are an airborne hazard. Biological safety cabinets use a High Efficiency Particulate Air (HEPA) filter to capture the aerosols. However, 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. When working with bedding, check for excess bedding before and after the work is finished. It is important to make sure to clean the front grill of all bedding material. An outside vendor must certify biological safety cabinets once a year. Recertify moved or relocated biological safety cabinets. Information on certification vendors can be found online at: <https://www.umaryland.edu/ehs/research-safety/biosafety/biological-safety-cabinets/certification-of-biosafety-cabinets/>.

Fume Hoods: Employees should use a fume hood for work with chemicals. Fume hoods remove chemical vapors from the air so that people do not breathe them. To ensure they function properly, employees should keep them free of excess storage and work at least 20 centimeters inside the fume hood. EHS tests fume hoods on an annual basis.

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, first remove all contaminated clothing, then stand under the shower and pull the handle. Employees should stay under the shower until emergency medical personnel arrive. The Department of Operations and Maintenance tests safety showers on an annual basis.

Eyewash Stations: The University provides eyewash stations in case an employee needs to flush contamination from their eyes. If a contaminant gets into an employee's eyes, they should go to the eyewash station and place their eyes between the eyewash nozzles and push or pull the handle for water. The eyes should be flushed for at least 15 minutes or until emergency help arrives. The group responsible for the area in which the eyewash stations are located should test the stations weekly. After testing them, initial and note the date of the test on the tag attached to the eyewash. Report problems found with eyewash stations to the Department of Operations and Maintenance at (410) 706-7570.

Electrical Safety: Do not energize damaged electrical equipment or equipment with damaged electrical cords. It is also important to keep sources of electricity away from water and to maintain adequate access space in front of electrical panels. Authorized personnel must do all repairs to electrical equipment.

Sharps Safety: Sharps include needles, broken glass, syringes, pipettes, and scalpels. Sharps must be disposed of in an appropriate disposal container. **Do not recap needles.** If an employee needs to pick up broken glassware or other sharp objects, they should use leather gloves and mechanical devices.

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.
- If you need to move the material over an extended distance, use a cart.
- 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.

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>.

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 covered employees the Hepatitis B vaccination. 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/>.

Animal Bites and Scratches: To protect from animal bites or scratches, employees should utilize sedation, anesthesia, or a restraining device when possible. They should also use the proper animal handling procedures for the species. Also, 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.

Below are the procedures to follow for exposure incidents involving a bite, scratch or splash of fluid from a Macaque monkey. Exposures involving Macaque monkeys require prompt medical care. To assist with caring for NHP bites and scratches, bite and scratch kits are located in the main hallways near the NHP rooms. The kits contain instructions on how to clean the wound, a soap solution that contains Chloroxynol, and surgical scrubs.

AFTER the exposed area is thoroughly decontaminated as described above:

Seek medical care and assessment.

During Working Hours – Monday through Friday (7AM to 5 PM):

1. Report **ANY** incident during normal working hours, by calling Veterinary Resources at 410-706-3540. Provide the following information: *your phone number, involved monkey's ID number (if possible) and location (building and room number)*. If no answer, call the on-call Veterinarian at 443-835-9841. If no immediate answer, leave a voice mail with the above information and then send a text: "Macaque Exposure" and your name. The on-call veterinarian will return your call when available.
2. Contact your supervisor.
3. To expedite medical treatment: If possible, call ahead to the UMaryland Immediate Care (UMIC) at 667-214-1899. Request that the clinician on duty be notified that you are coming to UMIC for evaluation related to a macaque exposure incident.
4. Complete the "Employee's First Report of Injury" – **SEE LINK BELOW**
5. Proceed directly to the UMaryland Immediate Care (UMIC) located at 408 W. Lombard Street. No appointment is necessary. Immediately upon arrival to the UMIC, inform them that you have experienced a macaque exposure. Present the

UMB Macaque Exposure Alert Card and the Employee's First Report of Injury form.

After Hours – Monday through Friday (5PM to 7AM), Weekends and Holidays:

1. Notify the on-call Veterinarian at 443-835-9841. If no answer, leave a voice mail with the following information [*your phone number, involved monkey's ID number (if possible) and location (building and room number)*] and then send a text: "Macaque Exposure" and your name. The on-call veterinarian will return your call when available.
2. Contact your supervisor.
3. Complete the "Employee's First Report of Injury" form – **SEE LINK BELOW**
4. Seek medical care at the **UMMC Emergency Room** and present your UMB Macaque Exposure Alert Card and the First Report of Injury form to the staff at the ER Reception desk.
5. The following day or as soon as possible, proceed to the UMaryland Immediate Care (UMIC) located at 408 W. Lombard Street for a follow-up visit.

****Complete the "Employee's First Report of Injury" form located at <https://www.umaryland.edu/ehs/risk-management-and-workers-compensation/workers-compensation/> and take it with you to the UMaryland Immediate Care practice or the UMMC Emergency Room (after hours only). Be sure a copy is sent to EHS as soon as possible after treatment (fax to 6-8212). This will ensure timely processing and issuance of claim number and prescription authorization if appropriate.**

****If a witness was present to the exposure, have them complete the *Accident Witness Statement* form located at <https://www.umaryland.edu/ehs/risk-management-and-workers-compensation/workers-compensation/>**

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/>

Disposal of Special Medical Waste: Employees must handle material contaminated with infectious agents, human or animal tissues, or body fluids as special medical waste. Special medical waste must be disposed of in accordance with University policy. For information on disposal of special medical waste, visit: <https://www.umaryland.edu/ehs/hazardous-material-management/hazardous-waste-management-guidelines-and-instructions/biological-waste/>.

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 diseases associated with common research animals. Use of proper PPE can reduce these risks.

Non-Human Primates (NHP): NHPs pose special zoonotic risk 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 NHPs and the personnel working with them is required. All personnel who are exposed to NHPs must have annual tuberculosis screening.

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 and provide further reason for careful hand washing after removal of PPE after exposure to primates. Precautions should be taken to prevent either human or NHP cross-contamination.

Although there are a number of NHP viruses that can cause disease in humans, monkeys of the Genus *Macaca*, or their unfixed tissues, can carry the Herpes B-virus, also known as *Macacine herpesvirus 1*, formerly known as *Cercopithecine herpesvirus 1*. Herpes B-virus is frequently carried by rhesus and cynomolgus macaques, as well as other members of the genus *Macaca*. It can cause fatal encephalitis in humans, yet only mild disease signs in macaques. Being a herpes virus, it can be shed by animals without visible lesions on the animal.

Direct exposure to objects contaminated with their body fluids, tissues, or excrement or wounds caused by these animals 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 are laminated and posted on macaque housing room doors for rapid review if needed.

All individuals planning to work with or around macaques and/or their tissues must complete the training *Personal Protection Equipment Training Working with Macaques or Their Unfixed Tissues* given by a Veterinary Resources Veterinarian. This training must be completed prior to first potential exposure to macaques, their unfixed tissues, or entering their husbandry rooms. To schedule training, please email VRTraining@som.umaryland.edu or contact a VR Veterinarian at (410) 706-3540. An annual refresher training is required thereafter and is available online through EHS: <https://www.umaryland.edu/ehs/training/>.

Appropriate PPE must be worn by all personnel entering macaque husbandry rooms, working with contaminated caging, equipment, or when working with the animals or their unfixed tissues. Sedation is required for working with all macaques to prevent personal trauma, prior to handling animals outside of their husbandry cages unless otherwise permitted by an IACUC approved protocol or under direction of an attending veterinarian.

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 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 University research are purchased from “Q Fever Negative” herds reducing but not eliminating the risk of exposure to this disease.

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, consider wearing disposable over sleeves.

Minimum PPE is required for individuals working with pregnant sheep. Use disposable sleeves to cover gaps between gloves and lab coat, scrubs, gown. Proper handling/ laundering of non-disposable clothing must be followed to prevent possible infection to others.

Dogs and Ferrets: 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.

Other zoonotic diseases that these 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.

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. Consider using over sleeves to cover any exposed forearm areas.

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.*

Amphibians and Turtles: Salmonella is frequently harbored in turtles and amphibians. They may carry and transmit atypical “Mycobacteriosis” caused by Mycobacteria organisms. Use Minimum PPE as required when working with these species.

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

If you are PREGNANT or planning on becoming pregnant

When planning to become pregnant or if you are pregnant, you should 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.

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: If an employee discovers a fire or emergency inside a building, they should 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.

Medical Situations: If an employee discovers a person experiencing a medical emergency, they should call emergency dispatch at 911 for help. When they call 911, they should be prepared to provide them with their name and the phone number they 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 an employee is trained in First Aid and/or CPR they may begin to administer it.

If an employee suffers a non-life threatening injury or illness, they should notify their supervisor and then complete the Employee's First Report of Injury form. The form can be found at <https://www.umaryland.edu/ehs/risk-management-and-workers-compensation/workers-compensation/>.

Employees should take the completed form with them to UMIC. A completed copy of the Employee's First Report of Injury form also needs to be faxed to EHS at (410) 706-8212.

APPENDIX

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	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. spp.	Cats	Low / Moderate	Cat scratch or bite	Erythematous papule at inoculation site followed by l 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, mengioencephalitis. Nearly 100% FATAL!! With out early treatment.
Pasteurellosis	<i>Pasteurella</i> spp 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
Tetanus (Lockjaw)	<i>Clostridium tetani</i> <i>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</i> <i>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.