University of Maryland, Baltimore County
Laboratory Animal Facility
Occupational Health & Safety Plan

Revised January 2025

Table of Contents

1. Purpose & Scope

The purpose of the Laboratory Animal Facilities Occupational Health & Safety Plan (OH&S Plan) is to educate and promote safe practices and personnel safety as well as prevent occupational injury and illness for those animal care personnel who work with laboratory animals at UMBC.

Animal Care Personnel (ACP) are individuals who handle live laboratory animals, animal cages, cage accessories or have contact with animal tissues, body fluids or wastes in which a potential personal exposure may exist. This plan is written in accordance with the University of Maryland, Baltimore County's Animal Welfare Assurance of Compliance with the Public Health Service Policy on Humane Care and Use of Laboratory Animals (# A3784-01) and consistent with the principles of the Guide for the Care and Use of Laboratory Animals (*the Guide*). In addition, this program follows guidance and requirements for promoting occupational safety on campus under UMBCs Policy on Environmental Safety and Health Management and Enforcement.

2. Responsibilities

Groups responsible for aspects of this program are:

- Office of Research Protections and Compliance (ORPC)
- Environmental Safety and Health (ESH)
- Retriever Integrated Health
- Third Party Occupational Medical Provider

Furthermore, responsibilities of the program are extended to:

The Principle Investigator (PI) or faculty for:

1. Assuring compliance with the OH&S Plan;
2. Assuring that appropriate care and housing needs are met, consistent with the principles of *the Guide,* in facilities under the PI's control;
3. Identifying and supervising employees, students and volunteers in UMBC animal facilities who are considered ACP
4. Performing hazard assessments of tasks and activities by identifying potential hazards and implementing applicable controls, e.g., the use of a lab hood or personal protective equipment (PPE), to reduce the risk of personal exposures; and
5. Reporting safety incidents to Environmental Safety and Health (ESH).

The Institutional Animal Care and Use Committee (IACUC), via the Office of Research Protections and Compliance, for:

1. Monitoring adherence with the OH&S Plan while conducting facility reviews and audits;
2. Providing the ESH office with up-to-date lists of all ACP working with laboratory animals;
3. Assuring training is available for all ACP; and
4. Collecting information from investigations of incidents impacting ACP and submitting reports, when applicable, to the Office for Laboratory Animal Welfare.

Animal Care Personnel (ACP) for:

a. Complying with the OH&S Plan; and

b. Reporting concerns and incidents to PI and/or the ACP supervisor and the Office of Research Protections and Compliance
c. ACP are principal investigators (faculty), staff (technicians and animal care workers), students (graduate and undergraduate) and/or volunteers who participate in lab activities.

3. Program Overview

Campus Commitment

UMBC is committed to providing a safe working environment for employees and establishing safety policies and procedures for work with animals. This commitment includes the creation of this plan, offering training and education of occupational health issues while working with animals, providing technical assistance to investigators on identifying hazards, performing hazard incident investigations impacting personnel and providing an opportunity for medical surveillance, as needed, for risk review and assessment.

Personnel Involvement

ACP are encouraged to bring safety concerns to the attention of their managers or supervisors but also to UMBC Environmental Safety and Health. ACP are responsible for following established safety procedures, completing all required safety training, completing all required risk assessment forms, and adhering to recommendations set forth by an occupational medical provider.

Occupational Safety and Health Education and Training

Training is a critical component of an effective occupational health and safety program for ACP. Training provides a means of educating and promoting safe practices and personnel safety as well as preventing occupational injury and illness. Individuals that work with or work in areas where there are research animals **are required** to complete the web-based training program offered through CITI. Webnet online training titled "Working Safely with Animals - Parts 1 & 2" is also available. All individuals who work with or have the potential to be exposed to blood or potentially infectious materials are required to complete Bloodborne Pathogen training annually. Training must be completed by ACP when they are included as personnel at the time of submission of a new IACUC study, the renewal of an expiring study, or when ACP are added to a study that have not completed training previously. Training must be repeated every three (3) years.

Additional laboratory or animal protocol specific on-line training options, as required by supervisors or specific animal work functions, are available. In addition to above occupational safety education program, additional on-line training options are provided by ESH and the ORPC.

Risk Assessment

The purpose of risk assessment is to identify ACP with conditions that could place them at risk when working with animals. All ACP that have frequent and substantial animal contact (contact with animals or animal materials more than once a month) as well as peripheral contact (no direct contact with animals or animal materials) **are required** to complete a UMBC Laboratory Animal Risk Assessment Form. The form will assess if ACP may be “at risk” by working with potential hazards in the lab animal environment. The form is reviewed by medical professionals to determine the required degree of inclusion in the Occupational Health and Safety Plan.

ACP that identify issues that would medically affect their capability of performing the job in the facility may

require additional assessments to determine their ability to work with lab animals. UMBC has an agreement with an on campus medical provider to review assessments and provide select services. UMBC also has a service agreement with a third party medical provider to provide additional employee health screening and related health services. Additional services include physical examinations, immunizations, laboratory testing and return-to-duty medical evaluations for ACP who have been on medical leave due to an on-the-job injury or illness that occurred in the animal facility. These services will be billed directly to the responsible ACP UMBC department.

Risk assessments must be completed by ACP when they are included as personnel at the time of submission of a new IACUC study, the renewal of an expiring study, when ACP are added to a study that have not completed an assessment previously, or if the ACP health status changes. Risk assessments must also be completed by support staff to include facilities personnel, health and safety professionals, and security personnel. The assessment will be valid for three (3) years unless directed by the medical provider.

The UMBC IACUC will withhold approval of animal research protocols until the above steps are followed and documented. The medical service provider will maintain all respective information associated with risk assessment and medical surveillance in accordance with current regulatory, privacy, and confidentiality requirements.

4. Hazards associated with handling animals and their tissues

a. **Biological hazards** include allergies and zoonotic diseases caused by the animal. Zoonotic diseases are diseases transmitted between animals and humans. Zoonotic diseases are typically uncommon but the early detection, eradication, and prevention of these diseases should be a primary concern of all ACP. It is important to note that zoonotic disease can be transferred not only from the animals themselves but also from unfixed tissues and animal waste materials. Listed below are common research animals, their respective zoonotic diseases, and other potential associated hazards. The proper use of PPE, engineering controls, and following SOPs can reduce the risks associated when working with these animals.
    i. Rodents - Purchased laboratory mice and rats are typically specified as pathogen free and should be accompanied by a health certificate or assurance when procured from a university approved source. This decreases the risk of zoonotic transmission; however, standard precautions and SOPs should be maintained.
        i. Rat Bite Fever, caused by *Streptobacillus moniliformis* or *Spirillum minus*, is a bacterial infection of rodents that is transmitted through bites, scratches, direct contact with animals and their urine, saliva and feces or ingestion of contaminated food or water. Infected rodents typically exhibit no symptoms of disease.
        ii. Tularemia, caused by *Francisella tularensis*, is another bacterial infection of rodents. Infected rodents appear lethargic, but they may shed bacteria before showing illness. Tularemia is transmitted to people in the same manner as rat bite fever but in addition can be transmitted through the bite of an infected tick and via airborne transmission if feces, urine or body fluids are aerosolized.
        iii. Hantavirus, lymphocytic choriomeningitis virus (LCMV), other arenavirus infections, and leptospirosis usually do not exhibit signs of disease. The disease agents are typically shed in the urine of infected animals and people acquire the infection by inhalation, accidental ingestion and direct contact with contaminated urine or feces. These are occasionally transmitted from bite wounds and *Leptospira* can infect people through abraded skin.
        iv. Salmonellosis, pathogenic *E. coli* infections, campylobacteriosis, and giardiasis are acquired by contact and accidental ingestion of fecal material from infected rodents. Animals infected with these diseases may have diarrhea, but some may show no

symptoms of disease. Any animal with diarrhea should be suspected of having a zoonotic disease.

v. Allergies, which are the result of hypersensitive reaction to a chemical or physical substance, are a common health hazard caused by exposure to laboratory rodents. Symptoms may include runny nose, watery eyes, sneezing, shortness of breath, and asthma. Hives or skin rashes have also occurred from direct contact with animal hair or skin. ACP who have a history of allergies are at a higher risk of developing symptomatic reactions.

ii. Birds - Much like rodents, birds in a laboratory/teaching setting are usually closely managed and free of disease. The likelihood of a person contracting a disease from those birds is low; however, standard precautions and SOPs should be maintained. Wild species can carry organisms that may cause infection and disease in humans and may be transmitted either directly (e.g., through handling live or dead birds) or indirectly (e.g., through exposure to feces or airborne organisms).

i. Avian tuberculosis, caused by *Mycobacterium avium* complex (MAC), is found world-wide in soil and droppings of infected birds. Transmission of MAC occurs primarily through aerosolization and inhalation of the agent in dried bird droppings and contaminated soil.

ii. *Cryptococcus neoformans* is a fungus frequently found in pigeon droppings and in soil in many parts of the world. Immunodeficient persons have increased susceptibility to cryptococcosis and disseminated MAC infection.

iii. Histoplasmosis, caused by *Histoplasma capsulatum*, is a fungal disease that is spread to people by breathing in dust contaminated with the fungus from pigeon or bat droppings. Birds do not get sick from exposure to histoplasmosis and infections in humans are rare. ACP should avoid activities such as disturbing material where there are bird or bat droppings.

iv. Erysipelas, caused by streptococcus bacteria, is a bacterial infection of chickens that is transmitted through direct contact with animals, tissues and droppings. The risk of infection increases if persons have unprotected cuts or abrasions on their hands.

v. Ornithosis is a bacterial disease caused by *Chlamydophila psittaci* and is found in parrots, parakeets, turkeys, geese, ducks, pigeons and other birds. Birds may become ill or show no symptoms of disease. Transmission is usually by inhalation of dried droppings, secretions and feather dust of infected birds.

vi. Salmonellosis, cryptosporidiosis and campylobacterosis are acquired by contact and accidental ingestion of fecal material or consumption of undercooked meat and egg products from infected birds. Birds infected with these diseases may have diarrhea and discolored droppings, but some birds may show no symptoms of disease. Free-ranging or wild-caught animals are more likely to carry these infections than those raised and housed in a laboratory setting. Any animal with diarrhea should be suspected of having a zoonotic disease.

vii. *Escherichia coli* are bacteria that naturally occur in the gastrointestinal tract of animals and people. Some types of *E. coli* are harmful and can cause disease especially in people with compromised immune systems. *E. coli* infections can result from accidental ingestion of fecal material or consumption of contaminated, undercooked foods. Infected birds usually do not show any signs.

viii. West Nile virus, eastern equine encephalitis virus and other related arboviruses do infect poultry and other birds but transmission to people is via the bite of an infected mosquito and not by contact with infected birds.

iii. Fish/amphibians - The overall incidence of transmission of disease-producing agents from fish and amphibians to humans is low. There are, however, a few agents found in amphibians and

aquarium water that have the potential to be transmitted. In general, humans acquire these diseases through ingestion of infected tissues or aquarium water, or by contamination of lacerated or abraded skin. Any person with open skin sores, wounds or scrapes should avoid direct fish contact and should not immerse or splash wounded skin with aquarium water. Gloves and/or protective sleeves should be worn and when possible use brushes, tubing or other means to work around the fish tank and housing area.

i. *Mycobacterium* species including *Mycobacterium marinum, M. fortuitum* and *M. chelonei* and others can be found in a diverse variety of fish species. All can be associated with acute or chronic disease in fish, but most fish are long-term carriers before clinical disease is detected. These diseases can be transmitted to people via direct contact with fish (live or dead) or contaminated water in ponds or aquaria, where bacterial penetration can be facilitated by skin wounds or damage.
ii. *Streptococcus iniae* is a gram-positive bacterium carried by freshwater and marine species which can cause cellulitis, arthritis, endocarditis, meningitis, or death in infected persons. Most persons have been infected via an existing wound or fresh puncture wound while handling live or dead fish.
iii. *Erysipelothrix rhusiopathiae* is a common soil and water pathogen which may also be acquired by fish contact on an existing or fresh skin wound.
iv. *Campylobacter*, *Aeromonas*, *Vibrio*, *Edwardsiella, Escherichia, Salmonella and Klebsiella* are other pathogens which may be transmitted by contact with abraded skin or wounds or accidental ingestion of contaminated water, food, or other materials.

iv. Reptiles - The overall incidence of transmission of disease-producing agents from reptiles to humans is relatively low. In general, humans acquire these diseases through poor personal hygiene. The following are some of the zoonotic diseases that can be acquired by handling reptiles.

i. *Salmonella* is a bacterium that inhabits the intestinal tract of many animals and humans. Salmonella occurs worldwide and is easily transmitted through ingestion of contaminated material, either directly or indirectly. Common symptoms of the illness are acute gastroenteritis with sudden onset of abdominal pain, diarrhea, nausea, and fever. The use of antibiotic treatment is standard treatment for this illness.
ii. *Aeromonas Hydrophila* is a species of bacterium that is present in all freshwater environments and in brackish water. Infection is acquired through open wounds or by ingestion of contaminated food or water. Common symptoms are those associated with gastroenteritis (nausea, vomiting, and diarrhea) and wound infections.
iii. *Edwardsiella tarda* is a gram-negative rod bacteria usually found in the intestines of cold-blooded animals and in fresh water. It is an opportunistic pathogen occasionally causing acute gastroenteritis (nausea, vomiting, and diarrhea) and can be associated with meningitis, septicemia, and wound infections. Mode of transmission is via the fecal/oral route or ingestion of contaminated food.
iv. *Melioidosis*, also called Whitmore's disease, is an infectious disease caused by the bacterium *Burkholderia pseudomallei.* Melioidosis is clinically and pathologically similar to glanders disease, but the ecology and epidemiology of melioidosis are different from glanders. Melioidosis is predominantly a disease of tropical climates. The bacteria causing melioidosis are found in contaminated water and soil and are spread to humans and animals through direct contact with the contaminated source. Illness from melioidosis can be categorized as acute or localized infection, acute pulmonary infection, acute bloodstream infection, and chronic suppurative infection. Inapparent infections are also possible. The incubation period (time between exposure and appearance of clinical symptoms) is not clearly defined, but may range from 2 days to many years.

v. Allergies to reptiles, which are the result of a hypersensitive reaction, are rare in the laboratory setting. It remains possible however, to become sensitized to reptile proteins through inhalation or direct skin contact.

v. Field Studies - All wild animals are potentially dangerous to researchers from either traumatic injury due to direct contact or from infectious diseases that are carried by the animals or their parasites. Researchers working with wild-caught animals in the field or in the laboratory should work under the assumption that the animals they are handling pose risk to their health and safety.

b. **Chemical hazards** depend on numerous factors, including the chemical toxicity, the amount used, physical properties, i.e., vapor pressure, flammability, and application. Exposure can result from inhalation or skin contact and can cause various health effects depending on toxicity. All individuals handling hazardous chemicals are required to take all applicable training outlined on the UMBC ORPC website and the UMBC ESH website.

UMBC Policy: The UMBC policy for identification of hazardous chemicals is in compliance with 29 CFR 1910.1200 (f) and 1910.1450 (h). UMBC faculty and staff shall ensure that all hazardous chemicals on campus are properly labeled with the chemical identity and appropriate hazard warnings. Safety Data Sheets (SDS) will be maintained for all hazardous chemicals used on campus. This information is available to any UMBC employee. In addition to providing relevant information concerning the hazardous chemical, training in the safe use of hazardous chemicals will be provided by the using department. The Environmental Safety and Health Department will assist with training materials as necessary.

Upon receipt of hazardous chemicals, and prior to their transfer to storage locations or the requesting laboratory, the receiving department will check all containers for accuracy in labeling: chemical identity, pictograms, danger and warning statements, and the name and address of the chemical manufacturer, distributor or importer. All labels and other forms of warning must be legible, in English, and prominently displayed on the container. If the labeling is found to be inadequate, the proper identity and/or hazard label will be permanently affixed to the container by the receiving department. All old labeling must be removed or permanently defaced if new labeling is affixed.

As part of the receiving procedure for hazardous chemicals, a receipt log shall be maintained by each department. This log will include the date of receipt, chemical identity, quantity and initials of receiver. These logs are subject to review by University auditors as well as State and Federal officials. The ordering department is responsible for maintaining a SDS for each hazardous chemical in its inventory.

Chemicals normally found in University animal facilities include formaldehyde, cleaners, disinfectants, animal pharmaceuticals, and anesthetic gases.

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 exposed male and female workers. Though infrequent, halothane exposure has also been associated with liver damage. Exposure to isoflurane or sevoflurane can also 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. Any procedure utilizing anesthetic gases should abide by facility approved SOPs and utilize

standard precautions (adequate ventilation, use of engineering controls such as fume hood or anesthetic gas machine, etc.)

Compressed Gas Cylinders: Compressed gas cylinders can become fast moving projectiles if handled improperly. 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 (to prevent tipping over). Do not 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 ESH at (410) 455-2918. If after hours or during a weekend or holiday, call UMBC Police at (410) 455-5555.

Toxic and Pharmaceutical materials: Toxic and Pharmaceutical materials should be handled according to the procedures outlined in the manufacturer's SDS. All PPE, engineering controls, and any other precaution outlined in the SDS must be utilized.

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

c. **Radiological hazards** may be present from the use of radioisotopes or by radiation producing machines. The associated hazard depends on the amount used and the type of emitter. All radioactive material and radiation producing machines must be registered with MDE and ESH. All radioactive work must be conducted under the University of Maryland, Baltimore's Broad Scope License and all individuals are required to take applicable training provided by UMB. All work with and disposal of radioactive material will be conducted in accordance with the user's approved radiation permit. All individuals planning to conduct work with radioactive material must apply and be approved through the UMB EHS Radiation Safety office. For further assistance on working with radioactive material, please call UMBC ESH (410) 455-2918 or UMB EHS Radiation Safety (410)706-7055 or visit UMB EHS. Standard Precautions for working with radioactive materials are as follows:
    - At a minimum, PPE 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 radioisotopes 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

according to permit. This includes absorbent material, bedding, food, urine, feces, and animal carcasses. Freeze radioactive carcasses and biological material until they can be disposed of. Additional questions about disposing radioactive materials can be directed to UMBC ESH (410) 455-2918 or UMB EHS Radiation Safety (410)706-7055

- Survey potentially contaminated material (cages, feed trays, water bottles, etc.) prior to moving from the controlled area.

d. **Physical hazards** include animal bites or scratches. Exposure to these hazards can cause adverse health effects, including pain, respiratory distress, infection, or disease transmission. 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. The use of sedation or anesthesia can also be used to prevent bites or scratches. Since certain animals can easily bite through latex gloves additional PPE or work practices may be required. Thick over gloves can be used to protect against bites or a two person team can be used to perform complex procedures.

5. Hazard Controls

a. **Engineering controls** – Engineering controls are used to reduce or prevent hazards from coming into contact with personnel. In the research laboratory and animal facility this typically includes fume hoods, cage dump stations, biosafety cabinets (BSC), splash guards, safety interlocks, emergency showers/eyewashes, etc.

Biosafety Cabinets (BSC): A Biological Safety Cabinet (BSC) is a specific engineering control used in the biological laboratory or animal facility to prevent exposure to or the contamination of biohazardous agents. BSCs should be used whenever there is a risk of splash or aerosol formation of biohazardous or potentially biohazardous materials. BSCs work by manipulating air flow surrounding the area where work is being done such that the majority of biohazardous aerosols generated inside the BSC remain in containment while the majority extraneous laboratory aerosols remain outside of containment. All BSCs are required to be re-certified annually. Most BSCs do not provide protection from chemical vapors, contact UMBC ESH for assistance if laboratory procedure requires the use of volatile chemicals. General BSC guidelines are as follows:

- All individuals working with a BSC must be trained in the proper operation, disinfection, and safe practices before starting work.
- Never store items on top of the biological safety cabinet or inside the BSC that impede or otherwise disrupt the airflow. BSCs may not be used for storage of materials when not in use.
- Always wear proper PPE as determined by a risk assessment such as a gown, face/eye protection, a surgical mask, and a double set of gloves when working in a BSC.
- Never put your head inside the BSC, utilize mechanical devices to reach far areas.
- The BSC should be turned on at all times when working inside or when biohazardous agents are inside.
- The UV light should be turned off when working in the BSC as it can cause skin or eye damage.
- Always clean the BSC and other equipment before and after use. Note that a UV light, if present, does not provide adequate disinfection. All BSC disinfection procedures require the use of a facility approved disinfectant as determined by the risk assessment.
- Always disinfect items (including gloved hands) before placing into or removing from the BSC. This applies even when items are within proper containment such as a leak proof container or other facility approved containment.

- Place all disinfected items required for the experiment, including biological waste containers within the biological safety cabinet before starting the experiment in order to minimize the movement of hands.
- Utilize aseptic technique at all times.
- Move arms using straight in and straight out movements, as opposed to sweeping arms in a sideways motion which displaces more airflow, creating turbulence.
- Flames in the cabinet can damage the HEPA filter, use flame with pilot light for momentary activation if absolutely necessary or use a micro-incinerator.
- Collect waste/sharps within the cabinet using facility approved containers.
- If a spill occurs within the BSC, keep the unit running and immediately implement spill clean up procedures.

Cage dump stations: Cage dump stations come in different variations but they typically utilize high efficiency particulate absorbing (HEPA) filtered laminar flow to pull airborne particulates from the cages and into the air intake on the front edge of the workbench. This reduces personnel exposure to particulate escaping from cages, helps protect animals from personnel, and prevents cross contamination between cages. All cage dump stations should be utilized and maintained according to the facility approved SOP that is congruent with manufacturer recommendations.

Chemical Fume Hoods: A Chemical Fume Hood (CFH) is a piece of equipment used to control the ventilation of the work area contained within. CFHs are designed to mitigate volatile toxic chemicals by pulling vapors away from the user. The two major designs of CFHs are ducted and ductless, the later recirculates filtered air back into the laboratory space while the former dispenses filtered air to the outside. The vast majority of CFHs at UMBC are ducted and require an annual inspection to ensure compliance. Annual inspections include average face value readings, sash operation, and qualitative smoke testing as necessary. General Chemical Fume Hood guidelines are as follows:

- Individuals must be trained in the proper operation, cleaning, and safe practices before starting work.
- Wear appropriate PPE such as gloves, aprons, etc. If a respirator is needed then the hood should be inspected as it may require service, a respirator should not be necessary if the equipment is functioning properly.
- Only use a fume hood that has been inspected within one (1) year of the date listed on the orange inspection sticker. Contact ESH at 5-2918 or esh@umbc.edu if the fume hood requires inspection.
- Operate the hood using the proper sash height. During operation keep the sash at or below the height listed on the orange inspection sticker. The sash may be set above the listed height only for experimental set up if required.
- Minimize pedestrian traffic or other sources of air turbulence such as air conditioners or fans.
- Keep the hood clean and organized. Do not block airflow by placing large items in the hood or by blocking the vents. If large items are required, raise them up ~2 inches from the work surface to allow for better airflow.
- Do not remove any panels located on the inside or outside of the hood. Older fume hoods are documented to have fireproofing on panels; also, the removal of panels can interfere with proper airflow.
- Conduct experiments in the middle of the hood at least 6 inches from the sash opening to decrease the likelihood of material escaping.
- Do not use perchloric acid unless the hood and ducting is specifically designed for such use. Perchloric acid can severely damage regular fume hoods and its associated ducting.

- Close sash when done with the experiment/leaving the hood. This prudent practice conserves energy as well as provides additional containment.

Emergency Shower and Eyewash Stations: Emergency shower and eyewash stations are used as a form of emergency first aid and are directed at limiting the effects of accidental exposure to harmful materials. These pieces of equipment can be found in the majority of research laboratories and animal facilities throughout campus. It is paramount for all laboratory staff to be familiar with the location(s) and proper use of this equipment. Each type of shower/eyewash is operated differently but all follow a similar process. The switch, lever, handle, or paddle must be pushed or pulled to start the flow of water, and the reverse action must be performed to stop the flow. Following accidental exposure it is important to note that the safety shower or eyewash should be used for at least 15 minutes to ensure the adequate removal of harmful chemicals. Eyewash stations should be tested on a weekly basis by ACP/laboratory staff. Emergency showers should be tested annually by UMBC ESH. Report problem with emergency showers and eyewash stations to UMBC ESH.

b. **Safe practices** – Animals will be monitored for infection or anomalies. ACP will comply with established laboratory facility rules, SOPs, and practice appropriate personal hygiene.

Safe lifting techniques: Lifting heavy items improperly can lead to back and other musculoskeletal injuries. Basic lifting practices that can reduce the chance of injury are as follows:

- 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.
- If you need to move the material over an extended distance, use a cart.
- Ask for assistance when moving heavy objects.

Sharps Safety: Sharps are mechanical devices that are used for or have the potential to cut or puncture membranes such as skin. Sharps include but are not limited to needles, scalpels, razor blades, broken glass, scissors, and lancets. Whenever possible ACP should find a substitute for all sharps used in the laboratory or engineer this hazard out of current procedures. When sharps must be utilized in the laboratory, it is imperative that individuals are trained on their proper use and disposal. General sharps safety guidelines are as follows:

- Needles must not be bent, broken, sheared, or otherwise removed prior to disposal
- Disposable needles may not be reused or recapped. If a specific laboratory procedure requires multiple uses of the same needle then specific SOPs must be adopted in conjunction with the use of an approved re-sheathing needle with a retractable guard.
- Broken glass should be handled with a mechanical device (e.g. tongs, forceps, plastic scoop), never handle broken glass directly with hands or absorbent towel.
- Never cut, inject, or otherwise inoculate towards your body or hand.
- When disinfecting reusable sharps use a mechanical device such as tongs. Place sharps in a labeled, unbreakable, leak proof container filled with a facility approved disinfectant. Ensure

appropriate contact time.

- After disinfection, place reusable sharps in a clean, labeled, unbreakable, leak proof container. Never store unprotected reusable sharps in a location where they could cause injury. Always store sharps in a protective container as outlined above.
- Promptly dispose of all non-reusable sharps immediately after use in an appropriate sharps container. Sharps must be disposed of in a puncture resistant, facility approved sharps container located in the immediate vicinity of the work being performed. Sharps containers may not be used for any other waste disposal and must be properly labeled.
- Sharps containers that are set for disposal should have the lid securely closed by either tape or other mechanical means.
- Contact UMBC ESH at 5-2918 or esh@umbc.edu to schedule a pick up 3/4 full of partially full sharps containers. Never dispose of sharps or sharps containers in the regular trash!

c. **Institutional programs** –
Chemical Hygiene Plan: The UMBC Chemical Hygiene Plan (CHP), which has been implemented in accordance with the Occupational Safety & Health Administration (OSHA) regulation, Occupational exposure to hazardous chemical in laboratories, 29 CFR 1910.1450 provides for appropriate control measures for chemical hazards for laboratory workers. This plan establishes general procedures and work practices that are designed to reduce exposure to the hazardous chemicals used in laboratories. Compliance with these guidelines will reduce the health and safety hazards associated with working with such chemicals. The UMBC Chemical Hygiene Plan can be found on the ESH website.

Radiation Safety Program:The UMB Radiation Safety Officer (RSO) oversees radiological hazards issues including personnel training and the use and disposal of radioisotopes. Contact the UMB Radiation Safety Office at (410) 706-7055 or visit the UMB EHS website for more information.

Respiratory Protection Program:The UMBC Respiratory Protection Program ensures that employees who require a respirator to conduct their duties receive the proper medical approval and training. Employees will be fit-tested and trained on the proper wear, donning, and doffing procedures. To enroll in the program or request a hazard assessment please contact ESH at 5-2918 or esh@umbc.edu.

Please note that surgical masks are not considered to provide respiratory protection and do not fall under the regulatory requirements of OSHA. The use of surgical masks by ACP is primarily to control the droplets generated from the wearer's mouth and nose from dispersing into laboratory or animal areas. Surgical masks do not require a fit test to wear but it is recommended to have the mask cover the nose and mouth completely.

Respirators such as N95s may be required when ACP are working with infectious aerosols. Enrollment in the respiratory protection program and a fit test are required for ACP to wear any respirator, including N95s. It is important to note that N95 respirators do not provide chemical protection, have decreased effectiveness when wet, and are not effective for work that involves potential exposure to high levels of infectious aerosols. ACP that need protection from chemicals or high levels of infectious aerosols should contact ESH so a hazard assessment can be done.

Voluntary Use of Respirators: Employees may voluntarily use N95 respirators for work that does not pose an airborne hazard (as determined by the employer, UMBC). An example of voluntary respirator use would be to reduce exposure and increase comfort when working in a non-hazardous but dusty situation such as sweeping a floor. ACP who wear N95 respirators on a voluntary basis are not required to enroll in the respiratory protection program but are required to notify ESH at 5-2918 or at esh@umbc.edu and complete the applicable form provided that reviews 29 CFR 1910.134 Appendix D.

Bloodborne Pathogen Exposure Control Plan: Certain research activities have a potential for exposure to human blood and/or body fluids. Human blood, other body fluids, and unfixed human tissues are potential sources of harmful and lethal diseases such as Hepatitis B and Acquired Immunodeficiency Syndrome (AIDS). The UMBC Bloodborne Pathogen Exposure Control Plan has been developed in accordance with the Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard, 29 CFR 1910.1030. The exposure control plan aims to minimize the risk of occupational exposure to potentially contaminated blood and body fluids using a combination of education, personal protective equipment (PPE), vaccinations, engineering controls, and application of recommended work practices. All APC that have the potential to be exposed 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. The UMBC Bloodborne Pathogen Exposure Control Plan can be found on the ESH website information on training can be found on the UMBC ORPC website.

d. **Personal Protective Equipment** (PPE) – ACP will use PPE such as face masks, aprons, smocks, and impervious gloves, as needed. Disposable shoe covers and hair covers are recommended when working with laboratory animals. These devices can limit the risk of introducing infectious agents into animal facilities.

   Respiratory Protection shall be used in accordance with the manufacturer's recommendations as well as the respiratory protection program outlined in the above section. Disposable masks (not to be confused with respirators) are recommended to reduce the amount of airborne particulates or allergens that may be inhaled or distributed by ACP working within animal facilities. Filtering facepieces or respirators may be required following a thorough risk assessment and as determined by a medical professional.

   Supervisors and/or animal facility managers can provide specific information on the appropriate PPE required for the type of work being performed. Additional PPE may be required for handling specific animals or for high hazard agents, etc. Contact ESH for questions or assistance with hazard assessments.

   Please note that latex gloves can cause an allergic reaction in some people. If ACP choose to wear latex gloves, care should be taken to use only powder-free gloves with reduced protein content and hands should be washed thoroughly after use. Oil based hand creams and lotions should be avoided with latex gloves since they can cause glove degradation.

6. Basic Health and Safety

Many simple steps can be taken to lessen the risk of infection or contamination from animals.

These include but are not limited to:

- Not allowing food or drinks intended for human consumption into any animal husbandry or laboratory areas.
- Making a habit of properly washing hands prior to consuming any food or beverages outside of animal husbandry or laboratory areas. Always thoroughly wash hands prior to leaving the animal or laboratory facilities.
- Never applying cosmetics or contact lenses around animals, animal care areas, or in the laboratory.
- Always wear appropriate PPE that can include but is not limited to: Laboratory coat, gloves, gowns, goggles, or masks to reduce the potential for contact with contaminated tissues and being bitten or scratched
- Never wear open toed shoes in the laboratory or animal facility.
- Non-disposable PPE should be laundered on-site or by a professional laundry service (not at your home).
- Single use PPE items (over sleeves, gloves, disposable gowns, facemasks) should be disposed of in receptacles in the facility and **not** in a trash can in a hallway or office.

Questions about standard precautions should be directed to
UMBC Environmental Safety and Health (410) 455-2918

Change in Medical Status: If ACP have a change in medical status such as a lapse of vaccination(s) or any other issues that may impede safe completion of their duties, then an additional risk evaluation should be performed by a medical provider. A risk evaluation should also be conducted by a medical professional if ACP are planning to become or are pregnant. Working with hazardous materials when pregnant has the potential to negatively impact the development of babies.

7. Biosafety

Biological safety refers to the use of specific practices, policies, and safety equipment intended to protect laboratory workers, the public, and the environment from the unintentional release of biohazardous materials. Biohazardous material being defined as any biological material capable of causing harm to humans, animals or plants, including biohazardous agents, non-replicating materials such as toxins, and may also be used to refer to material that harbors a biohazardous agent. Examples of biohazardous material include but are not limited to: bacteria, rickettsia, fungi, viruses, prions, parasites, recombinant nucleic acid, human or animal cells and blood products, toxins, animals inoculated with a potentially infected material, animal bedding and waste material, and other biohazardous agents as defined by state and federal regulations.

All work with biohazardous or potentially biohazardous material should be registered with the UMBC Institutional Biosafety Committee (IBC). Research with recombinant or synthetic DNA/RNA, human pathogens, human materials (blood, cell culture, etc), or any material outlined in the latest edition of the *NIH Guidelines For research Involving Recombinant or Synthetic Nucleic Acid Molecules* should be registered with the IBC. Registration instructions can be found on the UMBC ORPC website

Shipping Biological Materials: Anyone who offers to ship biological or hazardous materials must complete an approved DOT and IATA training course. Contact ESH at esh@umbc.edu for questions about shipping hazardous materials. An alternative option to training is to use a third party shipper.

Disposal of Biohazardous waste: ACP must be able to differentiate between the different biohazardous wastes and proper disposal techniques for each of the following:

- Special Medical Waste - This waste typically includes solid material contaminated with infectious agents, human or animal tissues, or body fluids. This waste is collected in properly labeled cardboard bio-boxes that are lined with a leak proof bag. Full bio-boxes will be picked up by ESH
- Animal carcasses or tissues - This waste is stored in a designated freezer that is properly labeled and will be picked up at regular intervals for disposal by UMB EHS.
- Liquids and cultures - This waste typically includes human or animal blood or other bodily fluids, growth media, and tissue culture. This waste can be decontaminated according to the facility SOP which is most commonly chemical treatment.
- Sharps - Sharps should be disposed of exclusively in a properly labeled sharps container. Sharps contaminated with biohazardous material should be disposed of in a red sharps container labeled with the universal biohazard symbol. Sharps that are not contaminated with biohazardous material should be disposed of in a different color sharps container that is not labeled with the universal biohazard symbol. All sharps containers should be picked up by UMBC ESH when they are ¾ full.
- Reusable autoclavable items - These materials should be collected in a puncture resistant, leakproof container that is facility approved and autoclaved according to facility SOPs.

Animal Bites and Scratches: ACP should wear appropriate PPE and utilize safety practices to prevent injury from animal bites and scratches. It is good practice to understand proper animal handling procedures and to be aware of an animal's comfort zone and how far it can reach out to bite or scratch. ACP should consider utilizing a two person team when performing complex procedures.
Following a bite, scratch, or exposure to animal fluids, ACP should immediately irrigate and scrub the impacted area with soap and water for 15 minutes. Splashes to the nose, eyes, or mouth should be irrigated with running water for 15 minutes.

Exposures

Following an exposure to biohazardous material ACP should notify their supervisor and seek appropriate medical attention. Affected individuals can utilize a medical provider of their choice, UMBC maintains a contract with a third party occupational medical provider who can apply care. It is important that ACP and their supervisor complete their respective First Report of Injury forms found on the UMBC ESH website https://safety.umbc.edu . Please report any exposure or near miss to UMBC ESH at esh@umbc.edu or (410) 455-2918.

8. Emergency Procedures

When an emergency occurs after the campus has opened, information about early closing will be disseminated via the UMBC homepage, myUMBC, the hotline number, and the media outlets listed below. During the day, everyone should continue to check the homepage for updates. E2Campus subscribers will get an emergency alert text message.

- Emergency information phone number: 410-455-6789 (or ext. 5-6789 from on campus).
- Campus alert webpage: my.umbc.edu/go/alerts.

UMBC has developed a plan to enable faculty, staff, and students to successfully cope with campus critical incidents and emergencies. The overall ability of University personnel to respond to any incident will rely primarily upon pre planned procedures, Incident Action Plans, business continuity plans, and university building or facility Emergency Action Plans. In terms of animal facilities, this plan offers guidelines for personnel on site at the time of an emergency or disaster and to suggest possible and likely approaches to protecting both human and animal health after the primary response teams (e. g., fire department, police, and safety officers) have responded.

UMBC's Emergency Response plan may be found at
http://www.umbc.edu/police/Emergency_Response_Plan/UMBC_Emergency_Response_Plan.pdf

Evacuation Procedures: If an employee discovers a fire or emergency inside a building that necessitates evacuation, they should activate a manual pull station located near one of the emergency exits in the building. Once an employee is a safe distance away from the emergency, they should call UMBC Police at (410)-455-5555

- Evacuate buildings when the fire alarm is activated.
- Obey emergency response officials and evacuate in an orderly manner.
- Walk, do not run, and stay in a single file in the stairways.
- 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 a medical emergency occurs, UMBC Police should be notified at (410) 455-5555. Callers should be prepared to provide 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. Callers should survey the area to ensure it is safe before approaching the victim. After calling UMBC Police, 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, seek medical attention if needed, and then complete the Employee's First Report of Injury form. The form can be found on the UMBC ESH website https://safety.umbc.edu.

9. Additional Information & Resources

For further information, contact:

UMBC Environmental Safety and Health
http://www.umbc.edu/safety/
410-455-2918

Office of Research Protections and Compliance
http://research.umbc.edu/occupational-safety-health-program/
410-455-2737

UMB Environmental Health and Safety
https://www.umaryland.edu/ehs/
410-706-7055

Contacts

Persons to notify:

Maintenance Emergency

Breakdown or interruption in: air handling system, water supply, heating/cooling system, or power supply.

Biological Sciences Building Manager	Sam Williams swilli3@umbc.edu	5-3130
ILSB Vivarium Facilities Manager	Dennis Cuddy cuddy@umbc.edu	5-2455
UMBC Facilities Management	5-2550	

Emergency Due to Safety Hazards

Fire, Flooding, Bomb Threat, Hazmat Contamination, Animal Activist Threat, Break-in, etc.

Fire	5-5555
University Police	5-5555

Animal Care

Director Veterinary Management	Dr.Sridhar Samineni samineni@umbc.edu	5-3428
Emergency pager number:	410-748-4569	

Follow contact instructions at *http://medschool.umaryland.edu/vetmedicine/contact.asp*

Facility Contacts

ILSB Animal Facility	Dennis Cuddy- Cuddy@umbc.edu	5-2455
Biological Sciences Building Manager	Sam Williams swilli3@umbc.edu	5-3130

Campus Contacts

UMBC Facilities Management	John Zahor	5-3260
Environmental Safety and Health	Michael Pound	5-2918
Vice President for Research	Karl Steiner	5-5636
Associate Vice President for Research	Dean Drake	5-5642
Office of Research Protections and Compliance	Andrew Glenn	5-5610