Biological Safety

Animal & Vivarium Safety Program

Occupational Health Program for Personnel with Substantial Laboratory Animal Contact (LAOHP)

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Purpose

The purpose of this program is to protect the health of both personnel and laboratory/research animals, and it intends to identify, evaluate, manage, and reduce potential health risks associated with the care and use of animals. By assessing risk to an individual, recommendations to prevent illness related to laboratory animal research can be made. The information provided in this document will be beneficial in assessing one's own risk and avoiding potential health problems associated with working with laboratory animals. The requirements of this program are based on USDA and NIH guidelines.

Scope

The scope of the program will involve personnel having substantial animal contact, which is defined as contact with animals or animal tissue more than once a month. Specifically, this includes all Animal Facility (e.g. Vivarium) staff, investigators, laboratory assistants, and students involved in the direct care of animals and their living quarters. These individuals, also known as direct contact employees, will have direct contact with animals (live or dead), their viable tissues, body fluids, or wastes, and must be included in this program. All other staff that may occasionally work in areas where animals are used or housed will be considered indirect contact employees. However, all persons, including staff with Facilities Management, Housekeeping, safety officers, and visitors to Animal Facilities, who may have contact with laboratory animals or animal tissue should be aware of the personal protective procedures presented in this program. Vertebrate animals and their handling are the primary focus of the program; however, guidance in protecting health in work related to invertebrates is included.

Definitions

Activity: For purposes of part 2, subpart C of this subchapter, those elements of research, testing, or teaching procedures that involve the care and use of animals.

Animal: Any live or dead dog, cat, nonhuman primate, guinea pig, hamster, rabbit, or any other warmblooded animal, which is being used, or is intended for use for research, teaching, testing, experimentation, or exhibition purposes, or as a pet. This term excludes birds, rats of the genus *Rattus,* and mice of the genus *Mus,* bred for use in research; horses not used for research purposes; and other farm animals, such as, but not limited to, livestock or poultry used or intended for use as food or fiber, or livestock or poultry used or intended for use for improving animal nutrition, breeding, management, or production efficiency, or for improving the quality of food or fiber. This term also excludes falconry. With respect to a dog, the term means all dogs, including those used for hunting, security, or breeding purposes.

Attending veterinarian: A person who has graduated from a veterinary school accredited by the American Veterinary Medical Association's Council on Education, or has a certificate issued by the American Veterinary Medical Association's Education Commission for Foreign Veterinary Graduates, or has received equivalent formal education as determined by the Administrator; has received training and/or experience in the care and management of the species being

attended; and who has direct or delegated authority for activities involving animals at a facility subject to the jurisdiction of the Secretary.
Bird: Any member of the class Aves, excluding eggs, but including birds once the hatching process commences.

Cat: Any live or dead cat (Felis catus) or any cat-hybrid cross.

Committee: Institutional Animal Care and Use Committee (IACUC) established under section 13(b) of the Act. It shall consist of at least three (3) members, one of whom is the attending veterinarian of the research facility and one of whom is not affiliated in any way with the facility other than as a member of the committee, however, if the research facility has more than one Doctor of Veterinary Medicine (DVM), another DVM with delegated program responsibility may serve. The research facility shall establish the Committee for the purpose of evaluating the care, treatment, housing, and use of animals, and for certifying compliance with the Act by the research facility.

Dog: Any live or dead dog (*Canis familiaris*) or any dog-hybrid cross.

Dwarf hamster: Any species of hamster such as the Chinese and Armenian species whose adult body size is substantially less than that attained by the Syrian or Golden species of hamsters.

Endangered species means those species defined in the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and as it may be subsequently amended.

Euthanasia: The humane destruction of an animal accomplished by a method that produces rapid unconsciousness and subsequent death without evidence of pain or distress, or a method that utilizes anesthesia produced by an agent that causes painless loss of consciousness and subsequent death

Exhibitor: Any person (public or private) exhibiting any animals, which were purchased in commerce or the intended distribution of which affects commerce, or will affect commerce, to the public for compensation, as determined by the Secretary. This term includes carnivals, circuses, animal acts (including free-flighted bird shows), zoos, and educational exhibits, exhibiting such animals whether operated for profit or not. This term excludes retail pet stores, horse, dog, and pigeon races, an owner of a common, domesticated household pet who derives less than a substantial portion of income from a nonprimary source (as determined by the Secretary) for exhibiting an animal that exclusively resides at the residence of the pet owner, organizations sponsoring and all persons participating in State and country fairs, livestock shows, rodeos, field trials, coursing events, falconry, purebred dog and cat shows, bird fancier shows, and any other fairs or exhibitions intended to advance agricultural arts and sciences, as may be determined by the Secretary.

Exotic animal: Any animal not identified in the definition of “animal” provided in this part that is native to a foreign country or of foreign origin or character, is not native to the United States,

or was introduced from abroad. This term specifically includes animals such as, but not limited to, lions, tigers, leopards, elephants, camels, antelope, anteaters, kangaroos, and water buffalo, and species of foreign domestic cattle, such as Ankole, Gayal, and Yak.

Farm animal: Any domestic species of cattle, sheep, swine, goats, llamas, horses, or poultry, which are normally and have historically been kept and raised on farms in the United States and used or intended for use as food or fiber, or for improving animal nutrition, breeding, management, or production efficiency, or for improving the quality of food or fiber. This term also includes animals such as rabbits, mink, chinchilla, and ratites when they are used solely for purposes of meat, fur, feathers, or skin, and animals such as horses and llamas when used solely as work and pack animals.

Field study: A study conducted on free-living wild animals in their natural habitat. However, this term excludes any study that involves an invasive procedure, harms, or materially alters the behavior of an animal under study.

Handling: Petting, feeding, watering, cleaning, manipulating, loading, crating, shifting, transferring, immobilizing, restraining, treating, training, working and moving, or any similar activity with respect to any animal.

Housing facility: Any land, premises, shed, barn, building, trailer, or other structure or area housing or intended to house animals.

Hybrid cross: An animal resulting from the crossbreeding between two different species or types of animals. Crosses between wild animal species, such as lions and tigers, are considered to be wild animals. Crosses between wild animal species and domestic animals, such as dogs and wolves or buffalo and domestic cattle, are considered to be domestic animals.

Indoor housing facility: Any structure or building with environmental controls housing or intended to house animals and meeting the following three requirements: (1) It must be capable of controlling the temperature within the building or structure within the limits set forth for that species of animal, of maintaining humidity levels of 30 to 70 percent and of rapidly eliminating odors from within the building; and (2) It must be an enclosure created by the continuous connection of a roof, floor, and walls (a shed or barn set on top of the ground does not have a continuous connection between the walls and the ground unless a foundation and floor are provided); and (3) It must have at least one door for entry and exit that can be opened and closed (any windows or openings which provide natural light must be covered with a transparent material such as glass or hard plastic).

Inspector: Any person employed by the Department who is authorized to perform a function under the Act and the regulations in 9 CFR parts 1, 2, and 3.

Institutional official: The individual at a research facility who is authorized to legally commit on behalf of the research facility that the requirements of 9 CFR parts 1, 2, and 3 will be met.

Isolation: In regard to marine mammals means the physical separation of animals to prevent contact and a separate, noncommon, water circulation and filtration system for the isolated animals.

Licensed veterinarian: A person who has graduated from an accredited school of veterinary medicine or has received equivalent formal education as determined by the Administrator, and who has a valid license to practice veterinary medicine in some State.
Licensee means any person licensed according to the provisions of the Act and the regulations in part 2 of this subchapter.

Major operative procedure: Any surgical intervention that penetrates and exposes a body cavity or any procedure which produces permanent impairment of physical or physiological functions.

Nonconditioned animals: Animals which have not been subjected to special care and treatment for sufficient time to stabilize, and where necessary, to improve their health.

Nonhuman primate: Any nonhuman member of the highest order of mammals including prosimians, monkeys, and apes.

Outdoor housing facility: Any structure, building, land, or premise, housing or intended to house animals, which does not meet the definition of any other type of housing facility provided in the regulations, and in which temperatures cannot be controlled within set limits.

Paralytic drug: A drug which causes partial or complete loss of muscle contraction and which has no anesthetic or analgesic properties, so that the animal cannot move, but is completely aware of its surroundings and can feel pain.

Person: Any individual, partnership, firm, joint stock company, corporation, association, trust, estate, or other legal entity.

Pet animal means any animal that has commonly been kept as a pet in family households in the United States, such as dogs, cats, guinea pigs, rabbits, hamsters, and birds. This term also includes but is not limited to such birds as canaries, cockatiels, lovebirds, and budgerigar parakeets. This term excludes exotic animals and wild animals.

Positive physical contact: Petting, stroking, or other touching, which is beneficial to the well-being of the animal.

Poultry: Any species of chickens, turkeys, swans, partridges, guinea fowl, and pea fowl; ducks, geese, pigeons, and doves; grouse, pheasants, and quail.

Primary enclosure: Any structure or device used to restrict an animal or animals to a limited amount of space, such as a room, pen, run, cage, compartment, pool, or hutch.

Principal investigator means an employee of a research facility, or other person associated with a research facility, responsible for a proposal to conduct research and for the design and implementation of research involving animals.

Research facility: Any school (except an elementary or secondary school), institution, organization, or person that uses or intends to use live animals in research, tests, or experiments, and that (1) purchases or transports live animals in commerce, or (2) receives funds under a grant, award, loan, or contract from a department, agency, or instrumentality of the United States for the purpose of carrying out research, tests, or experiments: *Provided,* That the Administrator may exempt, by regulation, any such school, institution, organization, or person that does not use or intend to use live dogs or cats, except those schools, institutions, organizations, or persons, which use substantial numbers (as determined by the Administrator) of live animals the principal function of which schools, institutions, organizations, or persons, is biomedical research or testing, when in the judgment of the Administrator, any such exemption does not vitiate the purpose of the Act.

Sanitize means to make physically clean and to remove and destroy, to the maximum degree that is practical, agents injurious to health.

Secretary: The Secretary of Agriculture of the United States or his representative who shall be an employee of the Department.

Sheltered housing facility: A housing facility which provides the animals with shelter; protection from the elements; and protection from temperature extremes at all times. A sheltered housing facility may consist of runs or pens totally enclosed in a barn or building, or of connecting inside/outside runs or pens with the inside pens in a totally enclosed building.

Standards: The requirements with respect to the humane housing, exhibition, handling, care, treatment, temperature, and transportation of animals by dealers, exhibitors research facilities, carriers, intermediate handlers, and operators of auction sales as set forth in part 3 of this subchapter.

State: A State of the United States, the District of Columbia, Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, or any other territory or possession of the United States.

Study area: Any building room, area, enclosure, or other containment outside of a core facility or centrally designated or managed area in which animals are housed for more than 12 hours.

Transporting device: An interim vehicle or device, other than man, used to transport an animal between the primary conveyance and the terminal facility or in and around the terminal facility of a carrier or intermediate handler.

Transporting vehicle: Any truck, car, trailer, airplane, ship, or railroad car used for transporting animals.

Weaned: A mammal has become accustomed to take solid food and has so done, without nursing, for a period of at least 5 consecutive days; or that a bird has become accustomed to take food and has so done, without supplemental feeding from a parent or human caretaker, for a period of at least 5 consecutive days.

Wild animal: Any animal which is now or historically has been found in the wild, or in the wild state, within the boundaries of the United States, its territories, or possessions. This term includes, but is not limited to, animals such as: Deer, skunk, opossum, raccoon, mink, armadillo, coyote, squirrel, fox, wolf.

Wild state: Living in its original, natural condition; not domesticated.

Responsibilities

A. Environmental Health & Safety (EHS)

1. EHS will assist in spill cleanup, decontamination, and disposal as required.
2. EHS will provide safety training and information as required.
3. EHS will investigate and document all reported incidents that are related to laboratory animals and vivaria, making recommending corrective actions.
4. EHS will coordinate with personnel to seek medical surveillance as required.
5. EHS will test safety equipment as required.
6. EHS will review and revise the program as needed for compliance with applicable regulations and TU policy.

B. Institutional Animal Care and Use Committee (IACUC)

1. IACUC will provide oversight of animal care and use by vivarium laboratory personnel.
2. IACUC will review and approve protocols for animal research.
3. IACUC will inspect the animal facility on a semi-annual basis per USDA and NIH guidelines.

C. Institutional Biosafety Committee (IBC)

1. IBC will oversee, review, and approve animal research that involves biological agents and potentially infectious materials.

D. Vivarium Manager

1. The Vivarium Manager will work with personnel to maintain a safe environment for their work and animals, and ensure a clean, well-maintained facility.
2. The Vivarium Manager is responsible for training laboratory personnel in the specific procedures of their respective vivarium spaces.
3. The Vivarium Manager will work will laboratory personnel to develop standard operating procedures for their respective vivarium and relevant work areas.

E. Vivarium Laboratory Personnel

1. Laboratory personnel must use vivarium laboratories in a manner consistent with federal, state, and local regulations and TU Policy.
2. Laboratory personnel must report emergencies/severe illnesses/injuries to 911, TUPD, EHS, and if applicable, Facilities Management and seek immediate medical assistance.
3. Laboratory personnel must contact the Vivarium Manager, IACUC, Principal Investigator/Supervisor, and/or the attending veterinarian with concerns about animal health and welfare.
4. Laboratory personnel must report any other safety concerns or near miss accidents to their Supervisor and/or EHS.
5. Laboratory personnel must maintain a safe laboratory.
6. Laboratory personnel must attend relevant training and receive required immunizations related to their animal work.

Introduction

Risks exist for those who handle animals and their tissues. Working with animals involves planning, appropriate facilities, safe work practices, training, and the right tools and equipment, including personal protective equipment. Before understanding what is required for hazard control, one must understand the hazards involved. The hazards associated with handling animals can be loosely placed into three (3) categories: physical injuries, allergic reactions, and zoonotic diseases.

Physical injuries may occur from bites and scratches. Such injuries typically come by work with rodents, rabbits, dogs, cats, ferrets, swine, non-human primates, or any animals that have teeth and claws. Physical strain and trauma from working with larger animals (e.g., dogs, swine, sheep, non-human primates) may occur when lifting the animals improperly or using inadequate/improper restraint techniques. The key to prevention of these types of injuries is proper training of research personnel by the animal care staff or other qualified individuals.

There are serious allergic hazards associated with breathing or contacting animal hair/fur, dander, protein-based allergens associated with feces or urine, venom, and other biotoxins, among other hazards. Allergens may also be ingested or injected. Such hazards may occur due to most any animal, because all animals produce wastes and molt (or shed outer coverings) such as skin and hair, while some are able to sting and inject venom such as snakes, arachnids, or insects. Exposure may cause acute allergies to these or similar allergens or the development of allergies later in life. Typical symptoms and signs may be digestive (excess saliva, stomach cramps/abdominal pain, nausea, diarrhea, vomiting), respiratory (cough, wheezing, itchy nose, runny nose, nasal congestion, sneezing, sinusitis), ocular (itchy/watery eyes, redness), integumentary (itchy/irritated skin, rash/hives, blistering), or cerebral (headache, dizziness, confusion, fatigue). There are also more severe allergic reactions which may signal anaphylaxis: difficulty breathing, trouble swallowing, rapid heartbeat, low blood pressure, loss of consciousness, swelling of face, lips, tongue, and/or throat. The safest policy is to reduce

exposure by wearing protective equipment such as eyewear (e.g. splash goggles, safety glasses), respirators, gloves, and body protection (e.g. laboratory coat) when handling animals.

The possibility of zoonotic diseases must always be considered. 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 is a primary concern of the entire animal care staff. It is important to remember that zoonotic diseases can be transmitted not only by the animal, but by animal tissues, body fluids, and wastes as well.

Humans usually are not susceptible to infectious diseases suffered by animals. The potential for zoonotic disease has been greatly reduced in modern times due to the high quality of animals (excluding wild rodents) presently available through suppliers. However, there are some important exceptions. Infections of animals may, on some occasions, produce significant diseases in humans even when the animals themselves show little if any sign of illness. A bacterium in the normal flora of a healthy animal may cause a serious disorder in a person exposed to it because the animal has developed a "resistance" to these microorganisms, whereas humans with no previous exposure to the agent lack this protective immunity. Therefore, personnel should always be aware of possible consequences when working with each species of animals, and they should take appropriate precautions to minimize the risk of infection.

Some of the specific diseases and the animals associated with those disorders are described in this document. The scope of possible zoonotic infections is quite large, and only a few examples will be described here. However, all personnel should be aware that laboratory animals are sources of potent allergens to sensitized persons and the appropriate PPE should be used at all times when handling animals and related materials.

Applicable Regulations

- 7 U.S.C. § 2131 - Animal Welfare Act
- 29 CFR 1910.132 **–** General Requirements
- 29 CFR 1910.133 **–** Eye and Face Protection
- 29 CFR 1910.134 **–** Respiratory Protection
- 29 CFR 1910.138 **–** Hand Protection
- 29 CFR 1910.1030 – Bloodborne Pathogens

Procedure

A. Research Submission & Approval

1. Principal investigators are to submit all animal research protocols to IACUC for review and approval.
2. In addition, principal investigators are to submit animal research protocols that contain any of the following factors to IBC for review and approval:

a) Agents that can infect and/or cause disease in humans, including bacteria; biological toxins, viruses, fungi, rickettsia, prions, protozoans, or parasites;
b) Genetically-altered organisms (including transgenics and knockouts);
c) Human cell lines, blood, bodily fluids, and tissues;
d) Recombinant/synthetic DNA, RNA, or cells that are transfected/transduced; or
e) Viral vectors.

B. Medical Surveillance & Reporting

1. The purpose of medical surveillance is to identify employees with conditions that could place them at risk when working with animals. Exposure risk shall be assessed for employees with direct or indirect exposure to animals.
2. The LAOHP Animal Use and Allergy Questionnaire shall be completed by Laboratory Personnel and others prior to initial work in the animal facility and annually thereafter.
   a) This form is used to identify health risks to personnel prior to animal work with regard to the following: animal exposure; hazardous material exposure that may exacerbate health conditions; allergy and immunization history; injuries and medical evaluations; planned animal work or activities; and any special equipment or precautions required.
   b) The form should be submitted by both direct and indirect contact employees.
   c) The form must be submitted to the Vivarium Manager and EHS upon completion.
3. Only a physician (e.g. PLHCP) or other medical professional may assess the health of laboratory personnel to do work. These care providers may also provide allergy monitoring, zoonosis surveillance, testing, and related medical care. EHS provides recommendations only, for seeking care and hazard reduction based on reported and observed data.
4. Immunizations/vaccinations as listed in Step A are the responsibility of the department and shall be made available for relevant laboratory personnel based on potential exposure.
5. Individuals shall report injuries, illnesses, allergic reactions, or other exposures related to animal work to assist in medical surveillance.
6. Medical surveillance, as provided under this program, will be performed by Concentra Urgent Care [Phone: (410) 252-4015] at 1830 York Road, Suite F, Timonium, MD 21093, and it is available at no cost to TU employees. Laboratory personnel may visit their own primary care provider for evaluation or immunization. Costs incurred for student medical surveillance (immunizations, titer checks, etc.) are the responsibility of the department. Appointments may be made directly with Concentra or by contacting EHS at (410) 704-2949 or safety@towson.edu.

C. General Precautions

1. There are general precautions that can be taken to lessen the risk of infection.

a) No eating, chewing gum, drinking, smoking, applying cosmetics, or applying contact lenses is allowed around animals, in animal care areas, nor in laboratories;
b) It is prohibited to bring food or drink intended for human consumption into the areas mentioned above;
c) Wear gloves when handling animals or their tissues;
d) Take care not to accidentally rub your face with contaminated hands/gloves; and
e) Wash hands after each animal and/or animal tissue contact, even if gloves are worn.
f) Loose items
    i. *Hair length (head, facial, body etc.) and jewelry (rings, watches, bracelets, earrings, necklaces, etc.) should be a length that does not pose a threat of entanglement in machinery, immersion in chemicals or any other obstruction of work duties. If such a length cannot be achieved, then any long hair and jewelry must be restrained or removed so that these threats no longer exist.*
    ii. *Jewelry such as rings, bracelets, watches, etc. pose a threat of electrocution when working with electrical equipment. If not safely covered, jewelry must be removed.*
    iii. *Avoid wearing loose clothing.*

2. Personnel can protect against accidental self-inoculation (needlesticks).
    a) Wear gloves;
    b) Substitute manually operated pipettes for needles and syringes;
    c) Take care and time to perform injections properly;
    d) Anesthetize animals prior to inoculation with infectious agents; and
    e) Use a two-person team to inoculate animals.
    f) Do not recap needles. Instead, discard them promptly in a biohazard "sharps" container. Containers can be obtained through EHS.
3. Personnel should practice thorough hand washing for at least 20 seconds and drying them prior to leaving the animal facility. This practice should also take place prior to consumption of food and beverages, or application of cosmetics or contact lenses.
4. Non-disposable cloth PPE (e.g. lab coat, scrubs) should be laundered onsite in dedicated laundry units or by professional laundry service that is aware of the potential hazards (never taken home to be washed).
5. For procedures such as necropsies, bedding changes, and tissue and fluid samplings, physical containment devices such as biological safety cabinets, full-face respirators, or other personal safety gear should be used as indicated. If respirators are required to be worn, the user must receive a respiratory fit test for the specific respirator through EHS, and an annual fit test, thereafter, if the work requiring the respirator continues (see Step R).

D. Immunization/Vaccination

1. Prior to working with animals, personnel having substantial animal contact **must** undergo a general physical examination, including a current tetanus vaccination (within the past 10 years).

2. Rabies pre-exposure immunization is available for personnel working with dogs, cats, or ferrets, if desired.
3. Toxoplasma serum titer checks are offered for women of childbearing age having contact with cats.
4. Hepatitis B virus vaccination per the OSHA Bloodborne Pathogens Standard, at no cost to TU employees. It is encouraged for non-employees to seek the vaccination through their primary care physician and their own health insurance.
    a) The employee must complete the BBP training prior to vaccination/titer. Employees are approved to get this vaccination at any Concentra Occupational Health Center. You should have your TU ID card you when you go as proof of employment, along with a printout of the forms found under the Bloodborne Pathogens header here: Forms Directory.
    b) The employee should take the vaccination/titer and consent forms with them. You can go there for vaccination or for checking titer, if you have received this vaccination in the past, to see if it should be boosted. The physician on staff at Concentra should fill in this form and either they or you can submit it to HR.
    c) In contrast, there is a declination form that can also be found at the above URL that should be filled out by the employee if they do not desire to receive the vaccination or titer (and have never had either the vaccination or titer in the past).

E. Personal Protective Equipment (PPE)

1. Laboratory/research animals pose hazards to personnel through all routes of exposure; conversely, personnel may pose health threats to animals. Thus, the appropriate PPE should be worn at all times while handling animals and their products. Dependent upon the hazard, personal protective equipment will include protective eyewear, gloves, and protective body covering.
2. Required PPE
    a) Eye Protection
        i. Eyewear (e.g. safety glasses, splash goggles, face shield) should be worn upon entry into any animal areas as hazards to the eyes exist work such work takes place. Where there is exposure to infectious agents that may splash from liquid or solid animal tissue, fluids, or other products, splash goggles are required at a minimum, while a face shield may be recommended.
    b) Body protection
        i. Body protection (e.g. lab coat, gown, scrubs, coveralls) must be worn over clothing.
        ii. Such clothing should only be worn while handling animals and their products.
        iii. If non-disposable, these must be laundered onsite or by professional vendor made aware of the hazards.
    c) Gloves
        i. The use of disposable latex, nitrile, or vinyl examination gloves reduces direct skin contact with animals and potential allergens. If allergic to latex or other material, find an acceptable alternative.

ii. *Gloves should be discarded after each use and only worn within the area the animal work is taking place. Do not wear the gloves outside of the facility nor throughout the facility.*

d) Respiratory Protection

i. *Respiratory Protection is not required for all activities within animal spaces; however, if employees are required to wear a respirator, they must enroll in the Respiratory Protection Program. To enroll in the program, contact EHS.*

ii. *Employees receive medical approval to wear a respirator and then are fit-tested to determine the appropriate respirator size and must complete Respiratory Protection training. Fit testing and training are done on an annual basis (See Step R).*

iii. *Respirators used must be approved by NIOSH.*

iv. *Mask use (e.g. surgical masks) is not regulated by OSHA and does not require program enrollment. Surgical masks are used to protect the environment (or animals) from the user, particularly aerosols or droplets from the wearer's mouth and nose.*

v. *Masks may not be used to circumvent required use of respirators to protect the user from infectious agents, contaminants, or allergens.*

vi. *N-95 particulate respirators do not protect against chemical vapors and are not for work that involves potential exposures to high levels of infectious aerosols. If employees require respiratory protection from chemicals or high levels of infectious agents, contact EHS for hazard assessment.*

3. Recommended PPE

a) Respiratory Protection

i. *Employees may voluntarily use a N-95 particulate respirator for work that does not involve infectious agents. Examples of use may include wearing this respirator to protect against allergens or when working in areas with low levels of nuisance dust. Employees that wear a N-95 particulate respirator on a voluntary basis do not need to enroll in the Respiratory Protection Program. However, they must read, sign, and return to EHS the following document: Voluntary Use of Respirator Fact Sheet and Waiver Form (PDF).*

b) Personnel may choose to wear protective gear for hair or shoe covers.

4. Personnel must wear long pants and closed-toe shoes.
5. Hearing protection may be worn on the occasion where there is loud or continuous noise.
6. PPE shall be obtained through your department.

F. Injuries/First Aid

1. Personnel

a) If bitten/scratched by an animal, cut/scratched on an animal cage, injected with venom, or experiencing unusual disease symptoms, immediately wash the area with soap and water. Contact your Supervisor and seek medical attention immediately. Call 911, TUPD at 410-704-4444, or Poison Control at 1-800-222-1222, in case of emergency.

b) In case of needlestick, cut from sharps, or accidental injection, wash the area with soap and water. Then, contact your Supervisor and seek medical attention immediately. Call 911, TUPD at 410-704-4444, or Poison Control at 1-800-222-1222, in case of emergency.
c) If animal materials have splashed into eyes/onto clothing, the vivarium is equipped with eyewashes/safety showers in specific rooms. Personnel should be familiar the devices, how to use them, and their locations prior to an emergency. Call 911, TUPD at 410-704-4444, or Poison Control at 1-800-222-1222, in case of emergency.
d) In case of chemical exposure, follow its safety data sheet (SDS). Call 911, TUPD at 410-704-4444, or Poison Control at 1-800-222-1222, in case of emergency.
e) First aid kits may be utilized for minor injuries with relevant supplies. Personnel should be familiar with such kits, how to use them, and their locations prior to an emergency.
f) After cleaning per instructions
    i. *If bleeding, apply firm pressure. Dry and wrap appropriately (use antibiotic ointment, bandages).*
    ii. *If not bleeding, wrap the area by bandage or use place marker for identification of the site at follow-up evaluation.*
g) In the event that you do become ill with a fever or some other sign of infection, it is important to advise your physician that you work with animals.
h) Employees should also file a First Report of Injury with Human Resources, and submit an Environmental Health & Safety Incident Report Form within 24 hours of the injury.
i) For further guidance in first aid and reporting, see Appendix B.

2. Animals
    a) Contact your Supervisor and make others in your area aware of any hazards related to injured animals.
    b) Try to keep the animal comfortable or in minimal pain, if possible.
    c) Contact the attending veterinarian as soon as possible for further guidance.

G. Pregnancy (Personnel)

1. When planning to become pregnant or if you are pregnant, you should contact your primary care physician to discuss your work environment as to potential hazards that could affect your developing baby.
2. Thorough hand washing after handling any potential source of infection is also necessary.
3. Working with hazardous materials in general and toxic chemicals in particular is discouraged during the first trimester of pregnancy. Consultation with your primary care physician is highly recommended.
4. Toxoplasma is an infectious agent found primarily in cat feces. It can infect the unborn baby in women exposed during pregnancy who do not already have immunity to the agent. Asymptomatic toxoplasma infection is common before

childbearing years and many women have elevated antibody levels indicative of immunity. To help assess your level of immunity against this agent, serum samples can be tested prior to pregnancy. Cat feces should be avoided, and gloves should be worn when working in areas potentially contaminated with cat feces.

H. Work with Reptiles or Amphibians (including Wild Species)

1. Salmonella is frequently harbored in turtles, in other reptiles, and in amphibians and is transmitted through fecal material (oral route).
2. Leptospirosis is transmitted through nonintact skin and mucous membranes and is often related to direct contact with urine or tissues of infected animals. Inhalation and ingestion may be possible routes.
3. Psittacosis is transmitted by direct contact or inhalation of infectious materials from exudates, secretions, or desiccated feces.
4. Other possible zoonotic diseases associated with wild animal species include:
    a) Crytosporidiosis (fecal-oral route),
    b) Tularemia (direct contact of skin with blood or tissues of infected animals, bite from an infected ectoparasite or animal, ingestion of contaminated meat or water, campylobacteriosis (fecal-oral route),
    c) Dermatomycosis (direct skin-to-skin contact with infected animals or indirect contact with contaminated equipment or materials),
    d) Giardiasis (fecal-oral route),
    e) Pasteurellosis (animal bite or scratch, inhalation, non-intact skin contamination from infected materials, and ingestion), and
    f) Tuberculosis (aerosols from infected animals or tissues, ingestion, or wound contamination).

5. The skin glands of some amphibians (dendrobatid frogs and salamanders) produce toxic secretions.
6. Most amphibian skin toxins are complex nitrogenous compounds that affect the victim in different ways:
    a) Some toxins can cause local irritation only;
    b) Others provoke hallucinations or act as vasoconstrictors, ones that contract blood vessels.
    c) There are also neurotoxins, which affect the nervous system.
        i. Batrachotoxin, in particular, is a nerve poison and one of the strongest toxins in the animal world. Only a drop of this substance that has entered the victim's body can block transmission of nerve impulses and the heart may stop functioning.

7. The salamander (salamandra salamandra species) also secretes poison through the skin like amphibians. The animal secretes a defensive poisonous liquid which contains salamandrin and steroid alkaloids.
    a) Salamandrin is a strong neurotoxin, so the poisoning is usually characterized by convulsions.

b) The salamander to worked with cannot be dangerous for humans.

8. Finally, if you deal with venomous snakes, such as North American pit vipers (rattlesnake, moccasin, and copperhead), make sure you have or know where to locate a supply of specific anti-venom for the species in which you are involved.
   a) If you come across any snakes in the field and cannot positively identify what it is or is not, do not approach it, do not try to examine it, nor to photograph it. Move away from it as expediently as possible.
   b) If you work with venomous snakes in a public or private collection or in a museum or university laboratory, never open the cage or attempt to handle them without at least one trained companion present who is familiar with snakebite first aid. A telephone should always be located in the room.
9. Appropriate skin protection (gloves, lab costs, etc.) must be worn when handling these reptiles and amphibians. Disease transmission can be avoided by the use of protective clothing, respirator, and good hygiene.

I. Work with Rabbits or Rodents (including Wild Species)

1. Development of allergies to these species is probably the most common health hazard. Laboratory animal allergy (LAA) may develop when susceptible persons are exposed to allergens produced by laboratory animals.
   a) LAA is most associated with exposure to fur, saliva, and urine of rats, mice, guinea pigs, and rabbits.
   b) As a precaution, personal protective equipment (gloves, lab coat, coveralls, etc.) that completely covers your street clothes should be worn. This PPE should be removed when leaving an animal room and should be laundered or replaced before you wear it again.

2. Some of the potential zoonoses include salmonellosis, tapeworms, lymphocytic choriomeningitis (LCM) virus, plague, leptospirosis, dermatomycosis (ringworm), tropical rat mites, rat bite fever, campylobacteriosis, cryptosporidiosis, erysipeloides, giardiasis, hantavirus, pasteurellosis, psittacosis, rabies, tularemia, and tuberculosis.
3. Modes of transmission include fecal-oral routes, bites or scratches, direct skin-to-skin contact with infected animals or indirect contact with contaminated equipment or materials, direct contact with pharyngeal or intestinal lymphoid tissue, lesions (especially skin), or contaminated fomites including soil, inhalation of infectious aerosols, ingestion of contaminated meat or water, conjunctival contamination, non-intact skin, and mucous membranes with direct contact with urine or tissues, parenteral inoculation, or direct contact of intact skin with blood or tissues of infected animals.
4. Disease transmission can be avoided by the use of protective clothing, respirator, and good hygiene.
5. The occurrence of laboratory rodent-transmitted diseases is rare; nevertheless, it is recommended that gloves be worn.

J. Work with Birds or Fish (including Wild Species)

1. Zoonotic Agents of Concern
    a) Campylobacteriosis (fecal-oral route),
    b) Cryptosporidiosis (fecal-oral route),
    c) Erysipeloides (direct contact with pharyngeal or intestinal lymphoid tissue, feces of carrier animals, lesions [especially skin], or contaminated fomites including soils),
    d) Listeriosis (vertical transmission, either transplacental or milk-borne [ingestion], or by direct contact),
    e) Pasteurellosis (animal bite or scratch, inhalation, non-intact skin contamination from infected materials, and ingestion),
    f) Psittacosis (direct contact or inhalation of infectious materials from exudates, secretions or desiccated feces),
    g) Salmonellosis (fecal-oral route),
    h) Tuberculosis (aerosols from infected animals or tissues, ingestion or wound contamination,
    i) Tularemia (direct contact of skin with blood or tissues of infected animals, bite from an infected ectoparasite or animal, ingestion of contaminated meat or water, inhalation),
    j) Vibriosis (ingestion of raw or undercooked fish, exposure to untreated water, and often associated with trauma such as penetrating fish spine), tetanus (through a puncture wound contaminated with soil, dust, or animal feces),
    k) West Nile Virus (mosquito bite-blood meal from an infected bird; no evidence it is transmitted from handling live or dead infected birds), and
    l) Histoplasmosis (fecal-inhalation or oral routes).

2. Disease transmission can be avoided by the use of protective clothing, respirator, and good hygiene.

K. Work with Dogs, Cats, or Ferrets (including Wild Species)

1. The risk of exposure to rabies is very low because most dogs and cats used for research have been previously vaccinated or have unlikely exposure to rabies. However, rabies vaccination is available to personnel, if desired. The rabies risk with ferrets depends on their source and vaccination status.
2. Toxoplasma serum titer checks for all women of childbearing age having contact with cats are also recommended to assess the risk of complications that could result from exposure to toxoplasmosis during pregnancy.
3. Cat scratch disease is a zoonotic infection characterized by regional lymphadenitis that follows a scratch from a cat. While the prognosis is usually excellent and the disease in most cases is self-limiting, an examination by a physician is recommended.
4. Other diseases with zoonotic potential include dermatomycosis (ringworm), sarcoptic mange, visceral larva migrans from roundworms, campylobacteriosis,

cryptosporidiosis, giardiasis, hantavirus (cats may serve as a reservoir), orf, pasteurellosis, leptospirosis, psittacosis, salmonellosis, tularemia, and tuberculosis.

a) Modes of transmission include fecal-oral routes, bites or scratches, direct skin-to-skin contact with infected animals or indirect contact with contaminated equipment or materials, direct contact with pharyngeal or intestinal lymphoid tissue, lesions (especially skin), or contaminated fomites including soil, inhalation of infectious aerosols, ingestion of contaminated meat or water, conjunctival contamination, non-intact skin and mucous membranes with direct contact with urine or tissues, parenteral inoculation, or direct contact of intact skin with blood or tissues of infected animals. Transmission can be avoided by the use of protective clothing, respirator, and good hygiene.

L. Work with Cattle, Goats, or Sheep* [Ruminants] (including Wild Species)

1. Q fever, a potentially serious human disease caused by the rickettsia Coxiella burnetii was formerly quite common in those drinking unpasteurized milk and in slaughterhouse workers exposed to freshly slaughtered ruminants (cattle, sheep, and goats).
    a) The organism is shed abundantly from the placental membranes of sheep and this route of exposure has been the cause of recent Q fever pneumonia and other associated symptoms in laboratory workers.
    b) Personnel working where exposure is possible should take extra precautions. Gloves, respirators, and protective clothing are recommended for individuals working with pregnant sheep and goats. Infected persons can be effectively treated.

2. Contagious ecthyma ("orf") from the mouth of an infected sheep, goats, or wild ungulates, can be transmitted to humans by direct contact with virus-laden lesion exudates, or by fomites, causing focal skin lesions on the hands, arm or face.
3. Disease transmission can be avoided by the use of protective clothing and good hygiene.

*** Animal species currently not utilized for research at TU.**

M. Work with Non-Human Primates* (including Wild Species)

1. There are potentially serious health hazards associated with working with nonhuman primates. Diseases of nonhuman primates may be transmitted to humans and may include *Herpesvirus simiae* (or B-virus), Simian Immunodeficiency Virus (SIV), tuberculosis, shigella, campylobacter, and salmonella. They may also transmit through blood or bodily fluids hepatitis B, measles, mumps, or rubella.

*** Animal species currently not utilized for research at TU.**

N. Work with Arachnids or Insects (including Wild Species)

1. Arachnids (Mites, Scorpions, Spiders, etc.) & Insects (Ants, Bees, Wasps, etc.)
    a) Arachnids and insects may bite or sting when contacted, leaving puncture marks, stinging sensation, and blister(s).

b) If the spider is venomous, it may inject venom through the bite causing skin necrosis and other toxic effects, up to death (though rare).
c) Bite symptoms may vary from minor to severe: anxiety; itching/rash; muscle pain/cramp; sweating, fever, or chills; nausea/vomiting; high blood pressure; and difficulty breathing; and anaphylaxis, the latter two requiring emergency medical attention.
d) Exposure may be prevented through training on how to identify the species, avoiding habitats (e.g. hives, mounds, tall grasses) when possible, removing debris/rubble around outdoor work areas, and wearing appropriate use of protective clothing (e.g. long-sleeved shirt, long pants, boots, hat, gloves).
e) For those who have a history of severe allergic reactions to arachnid/insect bites, it is recommended to carry an EpiPen and a medical identification necklace or bracelet.

2. Ticks
a) Ticks can transmit several diseases, including Lyme disease and Rocky Mountain spotted fever. Early treatment can prevent serious consequences such as arthritic, cardiac, and neurological problems, which are more difficult to cure.
b) To prevent tick bites
i. Wear long pants and long-sleeved shirts when outdoors in tick-infested areas.
ii. Tuck your shirt into your pants and your pant legs into your boots or socks.
iii. A tick repellent may also be used on clothing and skin.
iv. *Inspect yourself often and promptly remove any embedded ticks with forceps or fingers protected by tissue.*
v. *If possible, avoid tall grasses and wooded areas.*
c) If you experience a bullseye rash 3-30 days after a tick bite, or joint pain, fever, chills, headache, or malaise after being bitten by a tick, immediately seek medical assistance.

O. Work with Gastropods or Marine Invertebrates (including Wild Species)

1. Gastropods (e.g. snails, slugs)
a) Gastropod-borne parasitic diseases are due to parasitic organisms in gastropods such as nematodes (roundworms) and trematodes (flukes).
b) Diseases are typically acquired by exposure that may take place by ingestion or accidental contact with them.
c) Schistosomiasis and trematodiases are the most significant group of diseases, though there are several such diseases.
d) Diseases may be minor to severe, including diarrhea, nausea/vomiting, abdominal pain, fever, or cause more serious health complications such as jaundice, inflammation of organs (brain, liver, etc.) and body tissues.
e) Disease transmission can be avoided by the use of protective clothing and good hygiene.

2. Marine Invertebrates
    a) Marine invertebrates are varied, with exposure to injuries and diseases varying by species, including bacteria, virus, fungi, or parasites.
    b) Cnidarians (e.g. anemones, coral, jellyfish)
        i. *Cnidarians may stab/sting individuals and inject venom, leading to immediate pain in the area struck. There may be other symptoms such as itching, lesions, or systemic symptoms such as weakness, nausea, headache, or muscle ache.*
        ii. *Immediate care may be necessary if the sting covers a large area, if the sting is infected, or severe pain does not subside/improve after two hours.*
    c) Crustaceans (e.g. crabs, shrimp, lobsters, barnacles, etc.) & Mollusks
        i. *Crustaceans may clamp/cut an individual hand or other body part when in close contact while some mollusks (e.g. cephalopods) may bite, inject/release biotoxins such as venom or slime, have toxic skin, or have sharp hooks on the suckers featured on their tentacles.*
        ii. *Crustaceans and most mollusks have shells (or exoskeletons) that tend to be sharp, which could lead to stabs/cuts.*
        iii. *These animals also carry parasites and other microbes.*
        iv. *Symptoms will vary based on the injury type.*
    d) Disease transmission can be avoided by the use of protective clothing and good hygiene.

P. Work with Wild Animals (Animals in General)

1. Many wild animals (e.g., bats, skunks, raccoons, foxes, wolves, coyotes, other carnivores) may transmit rabies. Bats are the primary source of rabies infection in the United States. Personnel working with animals in the wild are advised to have a pre-exposure rabies vaccination. Anyone whose work involves a risk of bites from these animals should consider immunization against rabies. All bite or scratch wounds involving wild animals require prompt medical evaluation and treatment.
2. Urine and feces from various animals may contain bacteria such as leptospirosis, Escherichia coli (commonly known as E. coli), Staphylococcus (Staph), Enterococcus, and Streptococcus; less common bacterial organisms that may cause infection include Klebsiella, Proteus, and Pseudomonas.
3. Larger animals may harbor their own particular hazards in their handling such as muscle strain, biting, striking, hazardous bodily fluids, or specific zoonotic diseases.
4. Disease transmission can be avoided by the use of protective clothing, good hygiene, and proper handler training.

Q. Work with Hazardous Agents

1. Methods for monitoring and handling hazardous biological/infectious, chemical, radioactive, and physical agents detailed in TU's Chemical Hygiene Plan (Laboratory Safety Manual) and Radiation Protection Program should be followed. Protective equipment and other practices consistent with current guidelines should be utilized.

2. Hands should be washed after handling any of these materials, animals, and before leaving the laboratory, even if gloves are worn. A biological safety cabinet should be used when handling infectious materials and a fume hood when handling toxic materials. All work surfaces and contaminated materials should be decontaminated daily by either sterilization (autoclave) or chemical disinfection prior to washing, reusing, or discarding. For additional information on working with hazardous agents, contact EHS at 410-704-2949 or safety@towson.edu.

R. Training

1. Personnel involved with animal care and use must be qualified, through experience and/or training, to perform their research, teaching, husbandry, and support responsibilities.
   a) Animal care and use includes husbandry (including non-contact feeding and observations), handling, manipulating, or performing procedures on animals, whether in a laboratory, in the field or in an animal facility.
   b) Duties also include touching dirty animal caging and accessories, animal waste, or carcasses.
2. All animal users must complete required training prior to starting animal work. Principal Investigators and Vivarium Managers are responsible for ensuring the proper training and proficiency of all personnel assigned to their facility. Training should be specific to the species and animal use procedures.
3. Any employee or student working with animals shall receive training. The training shall include online training and specific departmental training.
   a) Animal researchers should enroll in CITI Training, which may be arranged through the TU Office of Sponsored Programs and Research at ospr@towson.edu.
   b) Specific departmental training may include laboratory specific training, animal facility-specific training, hands-on animal handler training, and technique/operation-specific trainings.
4. For training in Bloodborne Pathogens, Chemical Lab Safety, Personal Protective Equipment, or Respiratory Protection, it may be assigned/accessed virtually through Vector Solutions SafeColleges found at the following URL: https://towsonehs-md.safecolleges.com/training/home. Workers shall request training by emailing safety@towson.edu or by calling the Environmental Health & Safety (EHS) office at 410-704-2949. If respiratory protection is required for use of respirators, a respiratory fit test is also required and may be scheduled through EHS. Refer to the Respiratory Protection Program for more information.
5. Re-training for specific safety programs shall take place as required, typically on an annual basis. However, re-training may also take place on an as-needed basis, such as violations or noncompliance with policies and procedures, when the need is determined by Supervisor or oversight parties, and/or suspension of animal activities.

Resources

A. CDC-NIH

1. Office of Laboratory Animal Welfare Resources
2. Guide for the Care and Use of Laboratory Animals, 8th Edition
3. Insects and Scorpions
4. Venomous Spiders

B. OSHA

1. Laboratory Safety Guidance (pages 15-21, 45)
2. Laboratory Safety: Working with Small Animals
3. Rodents, Snakes, and Insects
4. Rescuers of Animals

C. USGS

1. Safe Work Practices for Working with Wildlife

D. Towson University/Environmental Health & Safety

1. Animals on Campus Policy
2. Guidelines for Animals in University Buildings
3. Towson University Institutional Animal Care & Use Committee (IACUC)
4. Vivarium Safety Program
5. TU Health Center Information
6. To request guidance, training, or for general inquiries, contact EHS by emailing safety@towson.edu or by calling the Environmental Health & Safety (EHS) office at 410-704-2949.

E. Concentra Occupational Health (COH)

TU is contracted with COH to provide immunizations/vaccinations. Vaccination/ declination forms must be submitted to EHS prior to work. COH also provides physical examinations, drug testing, urgent care, and workplace injury services for employees. COH has several Maryland locations; the closest to the TU main campus is 1830 York Road, Suite F, Timonium, MD 21093. Contact COH staff at 410-252-4015. Complimentary transportation is available for work-related injuries. You may also make a telemedicine visit by: Concentra Telemed.

Appendix A: Emergency Contact Telephone Numbers

FIRE - RESCUE - EMERGENCY MEDICAL SERVICE : 911

At the emergency blue-light and yellow phones located around campus, press the emergency button to be connected to the University Police who can contact 911 for you, or dial 911 on the keypad to be connected directly to the 911 Center. Give the dispatcher all of the requested information.

Towson University Police Department [TUPD]: (410) 704-4444
For Other Emergencies

Department of Environmental Health and Safety: (410) 704-2949

Concentra Urgent Care [Timonium, MD]: (410) 252-4015
For Occupational Health, Medical Consultation and Evaluation

Facilities Management - Work Control Center: (410) 704-2481

Appendix B: First Aid & Reporting Instructions

Note: The following are suggested medical care facilities. Individuals may choose their own providers for medical care.

For major, immediate illness/injuries: Call 911 and/or go to the nearest hospital (UMD St. Joseph Medical Center, 7601 Osler Dr, Towson, MD 21204)

For minor injuries/illnesses and chronic/ongoing work-related injuries:
Employees: Concentra Occupational Health is open on Monday-Friday, 7:30AM-6:00PM (Concentra Occupational Health, 1830 York Road, Suite F, Timonium, MD 21093). Complimentary transportation is available for work-related injuries. You may also make a telemedicine visit: by visiting Concentra Telemed.

Students: TU Health Center is open on Monday-Friday, 8:00AM-5:00PM. (Ward West, University Avenue; TU Shuttle Bus service stops here, check schedule for times/stops). Please note that when Towson University is closed, the Health Center is also closed. There is an after-hours answering service and on-call physician available when the center is closed.

Other Nearby Medical Facilities:
MedStar Urgent Care Facility (MHUC) at the following locations:

- Towson at Hillside Avenue is open on Monday-Friday, 8:00AM-8:00PM (MedStar Urgent Care, 7825 York Road, Towson, MD 21204; Phone: 855-910-3278)
- Towson at Anneslie is open on Monday-Friday, 8:00AM-8:00PM (MedStar Urgent Care, 6317 York Road, Towson, MD 21212; Phone: 833-735-1958)

Please see next page for First Aid & Reporting Instructions table.

	Hazard Class:	Biological, Chemical	Biological, Chemical	Biological	Biological, Chemical	Chemical Physical	Chemical, Physical, Radiological	Biological		All	
Personnel Action	**Incident Type:**	Severe Allergic Reaction, Anaphylaxis	Accidental Ingestion	Animal Contact (Bite, Scratch, Other Contact) Biotoxin/ Venom	Accidental Inhalation	Burns/ Contact Exposure	Burns > 3 inch diam., deep/ all skin layers; covers hands, feet, face, groin, buttocks, or major joint/ encircles arm or leg	Injection Needlestick, Sharps Exposure		*If victim is unconscious/ not breathing/ no pulse:	**If victim is conscious, but not breathing normally:
	Severity:	Major	Major	Major	Major	Minor	Major	Minor	Major	Major	Major
Reduce Danger		Stop work immediately.								Stay with victim, if safe to do so. Ensure area is secure.	
		Exit the area, if possible. Seek fresh air.								Keep calm.	
Contact Emergency Medical Services		Call 911 or TUPD at (410) 704-4444					Call 911 or TUPD at (410) 704-4444		Call 911 or TUPD at (410) 704-4444		
		Consult Poison Control Center at 1-800-222-1222 or Safety Data Sheets (SDS) for the chemical [find Section 4: First Aid Measures].							Consult Poison Control Center at 1-800-222-1222 or Safety Data Sheets (SDS)		
Use First Aid		Use EpiPen/ equivalent. *See Right **See Right	Wash affected area (foaming soap & water, or for chemicals – use water only; 15-minute minimum) and/or use eyewash/shower (15-minute minimum) Flush splashes to the nose, mouth, or skin with water. Do not induce vomiting unless instructed.							*Use CPR/AED until assistance arrives.	**Use CPR only.
		If bleeding, apply firm pressure and wrap. Dry, use first aid kit for ointment and bandage as required, and/or mark area for post-exposure identification/treatment.									
Alert Others		Warn/seek assistance from other personnel, if necessary. Notify Supervisor or have other personnel do so, after commencing first aid.									
Seek Immediate Medical Treatment		Minor Incident: Students – TU Health Center during the times, dates, and address listed. Employees – Concentra Occupational Health during the times, dates, and address listed. Other nearby providers are listed, if the above are not available. Major Incident: UMD St. Joseph Medical Center, Emergency Room, 24 hours/day, 7 days/week.								**Drive self, drive other(s), or request transport.**	
Report Injury/Incident		File a First Report of Injury with Human Resources, and submit an Environmental Health & Safety Incident Report Form within 24 hours of the injury (or your Supervisor may do this on your behalf). For fatal accident or hospitalization, report to EHS within 8 hours (or TUPD at 410-704-4444 after office hours).									
Seek Post-Exposure Care		Seek medical advice from your primary care physician after initial treatment and advise them that you work with animals. Employees may go to Concentra for follow-up, post-exposure treatment as required.									

Appendix C: Laboratory Animal Care and Use Regulations & Standards

7 U.S.C. § 2131: Animal Welfare Act
https://www.aphis.usda.gov/media/document/17164/file

29 CFR 1910.132: General Requirements
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.132

29 CFR 1910.133: Eye and Face Protection
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.133

29 CFR 1910.134: Respiratory Protection
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134

29 CFR 1910.138: Hand Protection
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.138

29 CFR 1910.1030: Bloodborne Pathogens
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1030

Appendix D: Biological Safety Forms

A. Form for Animal Use

1. LAOHP Animal Use and Allergy Questionnaire

B. Forms for Experiment Registration (Biohazardous Materials)

1. Registration for Recombinant DNA Experiments
2. Registration of Materials (Potentially) Infectious for Humans

C. Forms for Bloodborne Pathogens (HBV)

1. Hepatitis B Virus (HBV) Vaccination Declination Form
2. DHMH Informed Consent
3. Hepatitis B Vaccination Record
4. Medical Release of BBP Source Testing

Appendix E: LAOHP Summary

Purpose

The purpose of the program is to identify, evaluate, manage, and reduce potential health risks associated with the care and use of animals. By assessing an individual's risks, recommendations to prevent illness related to laboratory animal research can be made.

Introduction

Working with laboratory animals can present risks to the health and well-being of research personnel and other individuals that may have animal contact or even casual exposure. Examples of health risks may include:

- Zoonotic diseases (infectious agents shared by humans and animals)
- Allergies to laboratory animals, particularly rodents
- Bites, scratches, and other injuries
- Manipulation of hazardous materials in animals

Only a physician (e.g. PLHCP) or other medical professional may assess the health of laboratory personnel to do work. These care providers may also provide allergy monitoring, zoonosis surveillance, testing, and related medical care. EHS provides recommendations only, for seeking care and hazard reduction based on reported and observed data.

General Guidelines

Enrollment in the Program

All personnel with contact or exposure to laboratory animals must enroll in the Occupational Health Program via submission of the online LAOHP questionnaire. Submission of the form is mandatory; however, for those that prefer not to participate in the program, they may opt out of the health-related questions on the questionnaire*. All completed LAOHP questionnaires are reviewed by Environmental Health and Safety (EHS), during which they make recommendations to prevent illness and/or recommend referrals for additional medical care based on the information provided.

Towson University is contracted with Concentra Occupational Health to provide immunizations/vaccinations, which may be recommended for work with laboratory animals. The appropriate forms for vaccination or declination must be submitted to EHS prior to work. Concentra Occupational Health also provides physical examinations, drug testing, urgent care, and workplace injury services for employees. Concentra has several locations in the State of Maryland; the closest to Towson University's main campus is 1830 York Road, Suite F, Timonium, MD 21093.

All individuals working with animals or listed on IACUC protocols must enroll* in the LAOHP. This includes:

- Anyone listed on an IACUC protocol as research personnel.

- Anyone working with animals for research, testing, or teaching purposes.
- Anyone having contact or exposure to laboratory animals (including casual exposure); and
- Anyone entering Vivarium facilities

***Note: Enrollment consists of annual submission of the LAOHP questionnaire, but you do not have to provide personal health information if you do not wish to do so.**

Everyone involved with laboratory animals must submit a new LAOHP form:

- Before being added to or listed on an IACUC protocol.
- Before first contact with laboratory animals.
- Whenever there is a change in health status (e.g., worsening allergies, pregnancy, diagnosis of an immune disorder, etc.).
- Whenever exposure information changes (e.g., a new animal model is introduced in the lab).
- At least once per year.

Individuals shall report injuries, illnesses, allergic reactions, or other exposures related to animal work to assist in medical surveillance. Personnel will enroll in appropriate training for their performed tasks. Individuals will also use general precautions, engineering controls, other administrative controls, and personal protective equipment to reduce their risk of exposure to illness, injury, or other incidents. In case of emergency, individuals will follow instructions for first aid and reporting contained in the LAOHP.

Resources

For more information about the risks associated with exposure to laboratory animals, contact EHS at (410) 704-2949. Information related to laboratory hazards can be found by visiting the EHS webpage.

Note: The following are suggested medical care facilities. Individuals may choose their own providers for medical care.

For major, immediate illness/injuries: Call 911 and/or go to the nearest hospital (UMD St. Joseph Medical Center, 7601 Osler Drive, Towson, MD 21204)

For minor injuries/illnesses and chronic/ongoing work-related injuries:
Students:
TU Health Center is open on Monday-Friday, 8:00AM-5:00PM. (Ward West, University Avenue; TU Shuttle Bus service stops here, check schedule for times/stops). Please note that when Towson University is closed, the Health Center is also closed. There is an after-hours answering service and on-call physician available when the center is closed.

Employees:

Concentra Occupational Health is open on Monday-Friday, 7:30AM-6:00PM (Concentra Occupational Health, 1830 York Road, Suite F, Timonium, MD 21093; Phone: 410-252-4015). Complimentary transportation is available for work-related injuries. You may also make a telemedicine visit: by visiting Concentra Telemed.

Other Nearby Medical Facilities:
MedStar Urgent Care Facility (MHUC) at the following locations:

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- Towson at Anneslie is open on Monday-Friday, 8:00AM-8:00PM (MedStar Urgent Care, 6317 York Road, Towson, MD 21212; Phone: 833-735-1958)

Appendix F: Hierarchy of Controls for Animal Allergen Exposure & Injuries

A. Elimination

1. The best hazard control is eliminating the hazard. This is best done by not bringing a particular animal or their products to the campus.
2. Do not use animals or agents that cause severe hazard to humans. This may harm laboratory personnel as well as the greater campus community. Currently, the vivarium facilities are kept to Biosafety Level 1 (BSL-1), so animal work and risk level should remain at that level, although there are BSL-2 laboratories on campus.
3. Have the poisonous animal parts or toxic products removed prior to receiving the animal (i.e. defang or declaw, if appropriate).
4. Avoid use of animals where hazards are not well-understood.
5. Avoid introduction of hazardous agents or methods into the animal experiment/research where possible.
6. Reduce or eliminate the use of radiation (radionuclides, X-ray, laser) on animals or their products.

B. Substitution

1. Consider animal research that involves less hazardous animals or less hazardous species of a particular animal type, if possible.
2. Use animals or species that produce less allergens or exposure or are bred to not have a specific allergen.
3. Use domesticated animals instead of wild animals for experiments.
4. Use non-invasive or less invasive research methods to reduce exposure to animal tissues.
5. Use less hazardous chemicals or materials to conduct an experiment (e.g. approved use of an attenuated strains of a biological agent).
6. Use animal bedding that does not produce dust (e.g. corncob) or absorbent padding (e.g. cage liners).

C. Engineering Controls

1. Barriers & Containers
   a) Use self-locking doors for entry/exit to the vivarium and animal laboratories.
   b) Use animal cages to house animals.
   c) Install barriers/enclosures for animals as required.
   d) Use self-capping needles/syringes. Do not recap needles/syringes.
   e) Place needles and other sharps waste into sharps containers.
   f) Use appropriate storage containers (e.g. flammables cabinet, compatible bottles) for chemicals and use secondary containment.
   g) Use appropriate animal transports to move animals within facility.
   h) Use odor control absorbents to reduce/neutralize exposure to airborne odors.

2. Ventilation
    a) Use biosafety cabinets to conduct work that generates hazardous aerosols and droplets when appropriate.
    b) Increasing the ventilation rate and humidity in animal rooms may reduce allergens.
    c) Direct airflow away from workers and toward the backs of the animal cages.
    d) Install ventilated animal cage racks or filter-top animal cages.
    e) Filtration
        i. *Use ventilation and/or laboratory-grade filtering air purifier (not ozone-producing or electronic/ionizing) with a HEPA filter to remove hazardous aerosols within the laboratory.*
        ii. *Care in maintaining/disposing HEPA filters would be required.*

3. Restraints
    a) Use animal restraints and muzzles to avoid bites.
    b) Use bracket/restraints for gas cylinders in animal laboratories.

D. Administrative Controls/Work Practices

1. Authorization, Oversight, & Reporting
    a) Limited access for the vivarium and animal laboratories to relevant personnel only.
    b) Do not conduct experiments that have not be approved by the appropriate oversight parties.
    c) Conduct inspections of animal facilities on a periodic basis.
    d) Notify Supervisors of any potential or known exposures to animals or their products in the course of animal work.
    e) Report injuries, illnesses, incidents, and near misses to the Supervisor and appropriate oversight parties.

2. Animal Treatment
    a) Maintain animal health to reduce the instance of disease transmission.
    b) Decrease animal density to reduce allergen production rate.
    c) Provide adequate spacing between animals.
    d) Keep animals and their products separated from others as required.
    e) Practice vigilance when working with animals. Be aware of your surroundings and their whereabouts.
    f) Always try to keep animals calm or less agitated to avoid unpredictable or aggressive behaviors.
    g) Reduce noise and vibration where possible.

3. Facility Maintenance & Disinfection
    a) Housekeeping

i. *Avoid cross-contamination between clean and dirty areas.*
ii. *Keep animal areas clean. Disinfect as required.*
iii. *Avoid creating aerosols or droplets from animals and their products, or distributing animal allergens.*
iv. *Clean up spills promptly.*
v. *Maintain floors by keeping floors free of containers, debris, and liquids. Disinfect as required. Use a wet mop instead of a dry mop to reduce dust/aerosol production. Wet floors can be hazardous, so use a wet floor sign as appropriate until dry.*

b) Equipment & Tool Maintenance
   i. *Conduct maintenance on equipment (e.g. biosafety cabinet, cage washer, animal cages) on a scheduled basis.*
   ii. *Use the autoclave to sterilize glassware and compatible tools.*
   iii. *Use the cage washer to sterilize animal cages.*
   iv. *Disinfect and decontaminate equipment as required.*

c) Storage
   i. *Do not store porous materials in animal laboratories.*
   ii. *Store boxes in an appropriate location.*
   iii. *Practice proper lifting techniques.*

d) Waste Disposal
   i. *Dispose of all wastes in appropriate waste containers (e.g. animal food, bedding, carcasses, broken glass, sharps, other biohazardous materials, chemicals, used PPE).*
   ii. *Dispose of animal wastes and bedding in sealed containers.*

4. <u>Policies, Written Program, Signage</u>
   a) Hazard Communication
      i. *Label all hazardous materials (e.g. chemicals) and store properly, in appropriate area away from incompatible materials.*
      ii. *Label all biological samples and chemicals.*
      iii. *List and track chemical inventory and wastes.*
      iv. *Understand safety data sheets.*
   b) Read and follow all signs and labels for laboratories, equipment, and tool, and regard warnings and alarms appropriately.
   c) Follow all policies, standard operating procedures/manuals, emergency response planning, and training.
      i. *Become educated in risk reduction and avoiding animal-derived injury/illness from physical injuries, allergens, or zoonotic disease from trainings and procedures.*

ii. Trainings that apply include, but are not limited to, the following: biological safety, CITI Training/animal handling, respiratory protection, and personal protective equipment.

5. Personal Hygiene & Behavior
    a) Participate in medical surveillance and reporting to avoid potential animal allergies and in post-exposure monitoring to minimize recurrence and additional exposure.
    b) Receive the appropriate immunizations/vaccinations based on the hazards.
    c) When pregnant or planning to be pregnant, take the appropriate measures to protect oneself.
    d) Wash hands with soap and water for 20 seconds after handling any potentially hazardous materials or animals, even if gloves are worn.
    e) Never touch hands to your face while working in the vivarium.
    f) No horseplay.
    g) Do not bring food or drink meant for human consumption into the vivarium; do not consume food or drink in these areas, apply cosmetics, contact lenses, smoke, or chew gum around animals, in animal care areas, nor in laboratories (smoking is not allowed on the TU campus).
    h) Avoid wearing loose hair, clothing, or jewelry.
    i) Handle animals, bodily fluids, and tissues carefully. Do not act hastily.
    j) Avoid direct animal contact where possible.
    k) Avoid putting hands or body parts near the mouth, anus, or mucous membranes of animals.

6. Scheduling
    a) Reduce time in the animal area.
    b) Take breaks outside of the vivarium.
    c) Make schedule adjustments as necessary.
    d) Rotate job duties to reduce exposure.
    e) Use the buddy system when working in the laboratory to avoid being alone in case of an emergency.

E. Personal Protective Equipment (PPE)

1. Always wear the appropriate protective eye protection, body protection, and gloves when performing animal work. Personnel should wear protective clothing that is dedicated to animal work (not only wear street clothes that will be worn elsewhere); wearing street clothes elsewhere may expose others outside the vivarium, including sensitive individuals.
2. Personnel must wear long pants and closed-toe shoes in animal areas.
3. Wear particulate respirators as required, after training and fit test.

4. Wear covers for hair and shoes as required.
5. Hearing protection may be worn on the occasion where there is loud or continuous noise.
6. Remove PPE prior to exiting the laboratory.
7. Dispose of soiled garments or launder. Non-disposable cloth PPE (e.g. lab coat, scrubs) should be laundered onsite in dedicated laundry units or by professional laundry service that is aware of the potential hazards (never taken home to be washed).

Appendix G: Vivarium Research Requirements Flowchart for Principal Investigators

Step 1: Provide Research Protocols & Obtain Approvals	Complete/Submit Protocols to IACUC for Review; if Hazardous Agents Involved, Complete/Submit to IBC for Review, upon Approval, Submit to IACUC for Review	Complete/Submit EHS Forms for Infectious Materials and/or work with Recombinant DNA
Step 2: Complete General, Project-Specific & Animal Handling Training	Receive General Workplace Training through SafeColleges/Vector Solutions Receive CITI Training	Receive Hazardous Waste Generator & CIDB Trainings
Step 3: Obtain Health Clearance	Complete/Submit BBP Forms Receive HBV Vaccination, Titer Data, or Complete/Submit Declination Form	Complete/Submit LAOHP Questionnaire Visit PLHCP for Physical Examination Receive Other Relevant Vaccinations
Step 4: Request Space Arrangement	Complete/Submit Vivarium Space Request	Obtain Approval for Vivarium Space Use
Step 5: Complete Facility- & Equipment-Specific Trainings	Complete Vivarium Orientation Complete Equipment-Specific Training	Review Vivarium SOPs Review Relevant Sections of LAOHP & Vivarium Safety Program
Step 6: Organize Laboratory	Purchase/Obtain & Configure Equipment Create/Review Laboratory-Specific Standard Operating Procedures (SOPs)	Purchase/Obtain & Acclimate Animals Purchase/Obtain Chemicals & Other Consumables
Step 7: Obtain Personnel Approvals & Training	Obtain Access Authorization to Vivarium for Laboratory Personnel Provide Personnel Training & Orientation	Obtain Personnel Signatures Upon Completion of SOPs Review and Required Trainings
Step 8: Execute Post-Approval Responsibilities	Conduct Research and Maintain Area Assist Post-Approval Monitoring Continue Medical Surveillance Complete/End Research	Submit Research Protocol Amendments as Required Report Issues, Seek Assistance as Required