  
*University of Central Missouri*

**Occupational Hazards Associated with the Care and Use of Research Animals**

**(Level A)**

University faculty, staff and students who work with research animal’s face a number of occupational risks, the extent of which

can vary widely. The diversity of hazards associated with animal research is tremendous. This brochure is designed to acquaint you with the risks associated with animal experimentation. When used in conjunction with the ***Occupational & Health Risk Assessment***, it gives you the opportunity for a thorough medical evaluation and risk assessment customized to your individual needs. Participation in the ***Occupational Health and Safety Program*** is mandatory. Please note that this brochure alone does not supply you with all the information needed to completely assess the occupational risks associated with animal care and use. Rather, it is a brief summary of some of the hazards you may encounter along with some important health and safety tips.

**Allergies**

**Laboratory Animal Allergies (LAA).** Allergic reactions

to animals are among the most common and most important of the occupational hazards associated with the care and use of laboratory animals. Allergic symptoms (including respiratory and skin disorders; eye, nose and throat irritation; and skin hives) are present in an estimated 10 – 40% of animal care workers, which often develop within 2 years of working with laboratory rodents. Up to 10% of laboratory workers will develop occupation-related asthma. If you already have hay fever or other allergies, chances that you will eventually develop an allergy to laboratory animals are high. **Occupational asthma** can be a serious condition and presents as coughing, wheezing, and shortness of breath. Occupational asthma can be severe, disabling, and persistent. It can lead to permanent disability and may require removal of all exposure sources or even a career change.

Laboratory rodents (rats and mice) are a primary source

of LAA. Activities that generate aerosols, such as handling soiled bedding in areas with low levels of local ventilation, increase the likelihood of exposure.

Prevention of exposure via engineering

controls, e.g., working in a HEPA- filtered station or using dust collection systems, are preferred over personal protective equipment (PPE). That said, removal of PPE worn in the animal areas upon exiting the vivarium also reduces allergen exposure.

**Preplacement screening** can be helpful in identifying and alerting persons who might be at

risk for developing LAA or asthma and educating them to take protective measures. In persons who are chronically exposed, **annual screening** can help detect those who are developing allergic symptoms so that appropriate intervention can be

taken to prevent long-term difficulties. A worker who has developed asthma symptoms often improves or recovers completely if he or she immediately stops being exposed to the offending allergens. However, the longer the exposures continue, the more likely the illness will persist, even after all contact with animals has ceased. The ***Occupational & Health Risk Assessment*** has been designed to help identify at-risk persons. Medical monitoring of exposed workers and remedial

actions for workers with symptoms can reduce the risk of permanent adverse health effects. With timely and appropriate action, many cases of animal-related asthma can be prevented. A respiratory protection program is also available for individuals identified by the University Health Center (UHC) who are at high risk for animal-related allergies.

**Latex Allergy.** Latex gloves have proved effective in preventing transmission of many infectious diseases and are widely used in research. But for some workers, exposure to latex may result in allergic reactions. Latex allergy is a reaction to certain proteins in latex rubber. Symptoms may begin within minutes of exposure or can occur hours later. Mild reactions to latex involve skin redness, hives or itching.

More severe reactions may involve respiratory symptoms such

as runny nose, sneezing, itchy eyes, scratchy throat, and asthma. Detecting symptoms early, reducing exposure to latex, and obtaining medical advice are important to prevent long- term health effects. Once a worker becomes allergic to latex, special precautions are needed to prevent exposures.

**Bites, Scratches, & Related Hazards**

Bites, scratches, and kicks are ubiquitous hazards associated with laboratory animal contact. They are largely **preventable through proper training** in animal-handling techniques. People working with large animals such as ruminants or pigs should be especially careful as they can sustain crushing injuries when the animals

kick, fall, or simply shift their body weight.

Be aware of factors or situations that

might precipitate a traumatic event in a research animal. High pitched noises, quick movements, and inappropriate handling can frighten an animal and result in an unexpected response that injures the animal handler. **Knowledge of animal behavior** is important in reducing risks.

Dogs are the species most likely to bite,

followed by cats and then rodents. Even

though an animal bite may appear inconsequential, personnel

should be aware a host of diseases that can be spread by this mechanism. Complications can result from contamination of the wound by the normal oral flora of the animals involved.

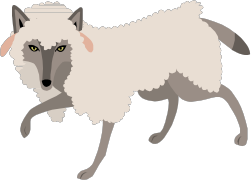
Immediate intervention can limit the progression of a localized infection and avert the more serious complications of wound infection, which could include cellulitis, abscessation, septic arthritis, tenosynovitis, osteomyelitis, sepsis, endocarditis, and meningitis. Personnel who have sustained an animal bite should report it to their supervisor and seek medical attention immediately. Rabies, cat-scratch fever, tularemia, rat-bite fever, brucellosis, and orf (“contagious pustular dermatitis”) are among the specific diseases that can be transmitted by animal bites with profound consequences.

**Zoonoses**

The risk of acquiring infectious agents from

contemporary laboratory animals is extremely low. However, because many zoonotic agents can be quite serious or even life threatening, the hazard posed to personnel working with research animals should not be minimized.

One of the most frequently cited laboratory infections is **Q Fever**. In humans the illness is generally mild or even asymptomatic. Transmission of the causative agent, *Coxiella burnetii,* occurs by inhalation of infectious aerosols, by direct contact with infectious tissues or fluids, or by contact with contaminated bedding. Although all ruminants can potentially

spread Q-Fever, sheep during pregnancy and birth are by far the most frequent source of infection. Their birth tissues and fluids are considered highly infectious, requiring use of protective clothing and equipment where contact may

occur. *Please note the institution maintains a Q-fever policy*

*with special training and medical surveillance for those working with sheep and goats*.

Another zoonotic disease of concern is **toxoplasmosis**. Although the actual risk of infection from exposure to cats is

much less than that from consumption of undercooked meat, protective measures are still warranted, especially for at-risk

persons. Of particular concern are immunodeficient individuals and females just prior to or during pregnancy,

where infection is associated with spontaneous miscarriage and birth defects. At-risk persons should avoid contact with

litter pans or cats with an unknown dietary history. Alternate assignment to duties that do not include contact with cats may

also be considered.

While human **rabies** is now a rare

disease in the U.S., it is almost invariably fatal and thus needs to be considered when working with animals. Transmission occurs when the virus is introduced into open cuts or wounds. Exposure may be from bites or, much less frequently, through scratches, abrasions, open wounds, or mucous

membranes contaminated with saliva or other infectious material. Vaccination is the most valuable preventive measure. Personnel working with carnivores not specifically bred for research may receive a vaccination or have their serological titer checked.

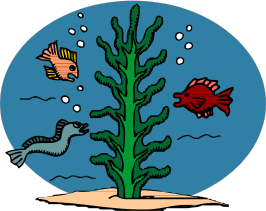
**Cat Scratch Disease** (Cat-Scratch Fever) is a systemic

infection that can occur following a cat scratch, cat bite, or abrasion from an object contaminated by cats. When it occurs

it is seen as a lesion that develops 3-10 days after the initial injury, with a fever and other symptoms following 2 weeks later. Similarly, **Rat Bite Fever** may be spread by bites from wild rodents. Fever, chills and other symptoms usually occur about 10 days after the incident, followed shortly by a rash.

The number of additional zoonotic diseases to which

animal workers may be exposed is potentially endless. They include mild illnesses such as the **ringworm** fungus from cats, rats, cattle and guinea pigs; *Erysipelothrix* sp. (“fish rose”) from swine and fish; and *Mycobacterium* sp. from fish and aquarium environments. Severe and potentially fatal zoonotic diseases include Hantavirus from wild rodents and *Macacine herpesvirus* (Herpesvirus B, Monkey B virus) from non-

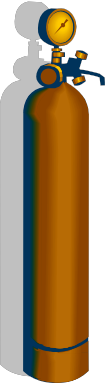
human primates.

**Physical Hazards**

“**Sharps**” are ubiquitous in animal care facilities and laboratories, and include needles, broken glass, syringes, pipettes,

and scalpels. ***Avoid recapping used needles***; dispose of them

in designated puncture proof containers. When disposing of sharps remember to segregate them away from regular trash so that custodial staff is not exposed to cuts, puncture wounds, infectious agents, or hazardous chemicals. Locate sharps disposal containers as near the point of use as possible. Traveling across a room to dispose of a scalpel, needle, or syringe is one of the most common causes of accidental needle stick/puncture.

**Electrical hazards** are found throughout animal and laboratory facilities. Electrical outlets should be covered and/or ground-fault protected. Pay particular attention to use of electrical equipment in wet areas such as the cage-washing facility or rooms housing aquatic species. Equipment that has frayed or damaged cords should not be used. Electrical cord splices and repairs made with electrical tape are not acceptable, as the tape does not check current flow. Substitute outlet strips for extension cords and octopus-

type plug extenders. Follow lockout/tag-out

procedures during maintenance and repair of energized equipment.

**Compressed gas cylinders** are found routinely in laboratories and animal facilities.

These cylinders are not only heavy, presenting a physical hazard, but also are under high pressure

and contain enormous amounts of energy. An uncontrolled release of energy from a typical

five-foot compressed gas cylinder can easily propel the cylinder through a concrete block

wall. Such an uncontrolled release can occur

when a cylinder is knocked over. To protect against this

potential, secure all compressed gas cylinders, even those marked “empty,” by a wall chain, bracket, or base. Replace the protective valve stem cap when the cylinder is not in use.

Working with heavy animals and equipment can stress

muscles and joints. **Cumulative trauma injuries** including carpal-tunnel syndrome, tennis elbow, and bursitis are possible from repetitive motions associated with animal husbandry.

**Wet floors** in animal rooms and cage wash areas increases the

risk of slips and falls. The risk of **back injury** is real in animal care; reducing the risk is imperative. This includes proper

lifting technique, not lifting excessively heavy, bulky or difficult loads. Moving large loads often requires two people -

- get help when needed. Animal care technicians are provided

Back Safety training to help them

avoid back injury.

In addition to back injuries, hand,

finger and arm injuries are experienced in animal care, commonly due to moving large equipment and racks through narrow doorways and down narrow hallways. Placing hands on the front of the rack, rather than the sides

of the rack where they are not protected, can help avoid

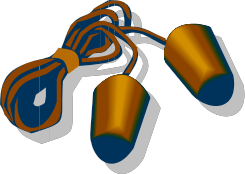
“knuckle busters”.

Conveyer belts, sanders, floor polishers, cage washers, room washing equipment, and other **machinery** have potential to cause injury. The most common types of hazards presented by machinery occur where there are exposed moving parts. Machine guarding is important even when workers know that they are not to place their hands in a dangerous area. When possible, install guards over exposed moving parts. Do not operate machinery that has had its guarding removed.

Exposure to excessive **noise** over several years may result in permanent hearing loss. This is rarely an issue in rodent facilities; however, animal rooms housing dogs or pigs are another situation entirely. These animals in particular are known for their persistent and loud vocalizations that can

reach intense levels inside the confines of the holding facility.

Equipment such as cage washers, high-pressure air cleaning equipment, and wet vacuum systems may also produce excessive sound levels. A useful way of assessing whether a noise exposure might be excessive is to try to carry on a conversation in the area. The noise may be excessive if normal speech or talking is difficult or impossible. Animal care staff who work in areas where excessive noise levels have been identified (*i.e.,* cage wash areas) are enrolled in a **hearing conservation program** that includes

hearing protection, training, and

annual hearing tests. Proper use of hearing protectors when working in these areas is essential to avoid hearing loss over a working lifetime.

**Toxic Chemicals**

In the laboratory, hazardous agents are encountered as a matter of course. Use of **carcinogens**, **reproductive toxins**, and other highly **toxic agents** are part-and-parcel of modern research. During routine analyses and assays and in the administration of hazardous agents to animals, hazardous agents tend to be present in very low concentrations, significantly lowering an individual’s risk. It is during the preparation of **stock solutions**, however, when highly toxic chemicals are manipulated in their pure or concentrated state that the greatest potential for a significant exposure resides.

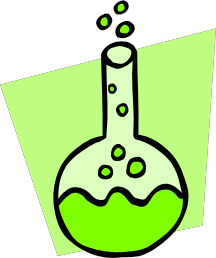
When hazardous chemicals are used in a laboratory, the Principal Investigator is responsible for implementing the University of Central Missouri-Chemical Hygiene Plan (CHP) and chemical inventory. The Occupational Safety and

Health Administration (OSHA) requires laboratories using hazardous chemicals to develop and implement a written CHP, which may include Standard Operating Procedures (SOPs).

These documents include provisions for protecting employees from the health hazards associated with chemicals in the laboratory and maintaining employee exposure to chemicals below the Permissible Exposure Limits (PELs).

Chemical exposures can occur during procedures that involve the use of disinfectants and detergents, pesticides, anesthetic gases, and chemicals for preserving tissues. Exposure sources can include animals that have been intentionally exposed to highly toxic chemicals, contaminated bedding, and other waste materials from experimental

procedures. By following standard operating procedures for use of these materials, with special attention to *Special Animal Safety Protocols* (SASPs, see below) in place for cytotoxic drugs and carcinogens, the risk of an injurious chemical exposure

can be minimized.

**Anesthetic agents** are frequently used in animal experimentation.

Based on the results of epidemiological studies of operating room personnel and other exposed persons, inhalation anesthetics as a class have been identified as

reproductive toxins. An increased risk of spontaneous abortion and other reproductive effects have been observed in both exposed women and wives of exposed men. In addition to

their assumed reproductive effects, individual anesthetics may be carcinogenic or toxic to major organ systems such as the liver or kidneys. **Proper ventilation must be maintained** by use of a scavenging device, a fume hood or other local exhaust ventilation. EHS will conduct leak detection to ensure ambient concentrations of anesthetic gases remain as low as possible.

**Infectious Agents & Biological Hazards**

Biological hazards include pathogenic **microorganisms**; experimentally and naturally infected **animals**; tissues of infected animals; human **tissues**, blood and body **fluids**; human **cell lines** (including established cell lines); cell lines from non-human primates; and **recombinant or synthetic nucleic acid molecules**. Infectious agents are classified on a scale of 1 to 4, in increasing risk as per the CDC/NIH publication Biosafety in Microbiological and Biomedical Laboratories (BMBL; 5th edition).

Because of their potential for direct contact with concentrated stocks of infectious agents, laboratory personnel are at the greatest risk for occupationally acquired infections. Researchers may be exposed during the care,

propagation, and maintenance of infectious organisms; when injecting experimental animals with infectious agents; and during examination of infected tissues. Investigators

wishing to conduct research activities involving experimentally or naturally infected animals should review the BMBL for a thorough review of appropriate safety practices and procedures.

Animal care technicians face a much lower risk of occupational infection. Nonetheless, they may still be exposed through direct contact with infected animals, from animal bites or scratches, or through contact with contaminated bedding or its dust.

Personnel who may be exposed to potentially infectious organisms, either through direct contact or through contact with infected animals, may benefit from a discussion of risk factors and infection potential with a health care professional. Vaccinations or other pre-exposure precautions may be appropriate for infectious agents like Borrelia burgdorferi, the causative agent for Lyme Disease. Personnel with reasonably anticipated exposure to blood borne pathogens (BBP) must complete initial and annual training and a hepatitis B declaration form offering employer-paid hepatitis B vaccination. This includes persons working with human blood, human tissues, human cell lines (including established cell lines), and certain body fluids. The Occupational & Health Risk Assessment can identify personnel in need of these services so that a confidential medical consultation can be arranged**.**

**Reporting Work Related Injury/Illness**

Personnel who have sustained a work-related injury or illness such as animals bites, physical injuries, exposure to chemicals, biohazardous agents, recombinant/synthetic nucleic acid or radiation, should report to their immediate supervisor (so that paperwork can be initiated) and seek medical attention as soon as possible. University Health Services are available to provide evaluation and treatment:

|  |  |  |
| --- | --- | --- |
| **UHC** | 600 S College St, UHC 204 | 660.543.4770 |



Work–related injuries and illnesses are covered under worker’s compensation and must be reported on the Student or Visitor Accident/Injury Report Form**.** It is the responsibility of the Project Director or supervisor to complete the appropriate paperwork and submit it to Environmental Health & Safety. For additional information regarding

worker’s compensation contact Human Resources at 660-543-4255.

**Additionally, employees must report all accidents and injuries involving animals and personnel exposures to recombinant or synthetic nucleic acid molecules, Blood- Borne Pathogens, and/or infectious agents to EHS, and/or radiation immediately at 660-543-4123**.

**Personal Medical Conditions That May**

**Increase Risk**

Every employee or student who works with animals at the

University of Central Missouri is required to participate in the Occupational Health and Safety Program, which includes completion of a medical evaluation form, the Occupational and Health Risk Assessment. The purpose of the medical evaluation is to identify any pre-existing conditions that might increase their risk of an occupationally acquired illness or injury. This **individual risk assessment** is an extremely important component of a successful environmental health and safety program.

An example is a technician who is planning on becoming pregnant. As noted previously, cats may carry an organism

called *Toxoplasma* sp. that can infect the mother and harm the baby. It would be appropriate to educate the employee who wanted to become pregnant about the dangers of toxoplasmosis, have the employee consult with the University Health Center, and/or also make reasonable accommodations for the employee by reassigning them to an area without cats until the baby is delivered.

Some medical conditions may increase an individual’s risk of developing an occupationally acquired infection.

These include radiation therapy, immunosuppressive drugs such as prednisone, chemotherapy agents, and immune system

modifying drugs such as methotrexate used to treat rheumatoid arthritis. Any given individual’s risk will depend

on a **combination of factors** including the individual’s health history, type of research animals, and type of chemical agents

and biological agents used. Individuals who are immunocompromised, such as patients receiving

chemotherapy or radiation for a cancer, are at greater risk of acquiring an occupational illness. A patient with HIV,

leukemia, organ transplants, kidney failure or certain medications that make their immune systems weak should work closely with the UHC and their supervisor to find reasonable accommodation. The UHC can educate the employee and their supervisor regarding the individual’s risk and actions that would reduce that risk. Employees should also be aware that some conditions such as animal allergies develop over long periods of time. Employees should be educated to recognize the symptoms and seek medical advice should they develop.

**Medical Surveillance Questionnaire**

Completion of the attached Occupational and Health Risk Assessmentensures your personal medical history is on file in with the University Health Center in case of occupational injury or illness. This is a mandatory part of the Occupational Health and Safety Program for Animal Handlers. The survey also provides the opportunity for an individual, personalized risk assessment based on your potential exposures and personal health history. After a confidential review of your health survey by a physician you will receive a written health risk assessment based on your type of exposure. A new assessment should be submitted whenever your health status or workplace exposures change; *the form* ***must*** *be re-submitted annually as a component of re-enrollment in this* *Occupational Health and Safety Program*.

**Completing Enrollment in the OHSP for Animal Handlers**

Enrollment in the OHSP described in this document includes two steps:

1. ***Training***. All participants must read the provided training brochures and complete the required modules of CITI training. Once you have completed all training, please notify the Research Compliance Officer in the Office of Sponsored Programs & Research Integrity at 660-543-8562 or at researchreview@ucmo.edu.

2. ***Individual Risk Assessment***. Complete the Occupational and Health Risk Assessment and contact the University

Health Clinic for an appointment. To maintain confidentiality, the *assessment* **must** be returned

to the University Health Center. **Be sure to legibly fill in your full name and other**

**identifying information.**

***For More Information, Contact*:**

[*Office*](http://louisville.edu/research/medicine/researchservices/) *of Sponsored Programs and Research Integrity (Research Resources Facilities & Institutional Animal*



*Care and Use* *Committee),* **660-543-8562.**

 [*Department of Environmental Health and Safety*](https://louisville.edu/dehs/) (EHS) **660-543-4123.**

 [*University Health Services*](https://louisville.edu/campushealth/) **660-543-4770.**

**Bibliography & Recommended Reading**:

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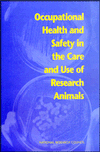
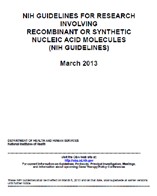
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[*Acid Molecules*](http://oba.od.nih.gov/rdna/nih_guidelines_oba.html) (a.k.a. *“NIH Guidelines”*).



***Produced by:***

*Environmental Health and Safety,*

*Office of Sponsored Programs and Research Integrity, & the University Health Center*

***University of Central Missouri, Warrensburg, MO***

**Level A Training Completion**

By signing this document, I certify that I have read, understand, and agree to comply with the information presented in the Level A training brochure.

(Project Title)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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