

ZOONOSES: OCCUPATIONAL HEALTH AND SAFETY

Zoonoses – diseases that can be transmitted from animals to humans – may be found in nearly all animal species. People can be exposed to zoonoses in the laboratory, farm, zoo, aquarium, home, veterinary hospital, field (wild), abattoir, etc. In an academic and research laboratory environment, non-human primates, wild animals, birds, and pregnant non-rodent mammals are the most common carriers of disease; while activities conducted in the field that place people in close proximity to wild animals, their dens, or harborage risk exposure to zoonoses. Use or exposure to these animals in research, teaching, animal husbandry, and veterinary care activities places faculty, staff, students, and volunteers at risk of diseases such as Brucellosis, Hantavirus, Herpesvirus simiae, Lyme disease, Plague, Psittacosis, Q- fever, Rabies, Rocky Mountain Spotted Fever, and other zoonoses.

This paper is intended to a) educate people about zoonoses; b) provide a guide to conducting a risk assessment; c) identify sources of information; d) suggest practices and procedures to minimize risks; e) discuss medical monitoring exams; f) draw attention to the risk of allergies to animals and suggest preventive measures; g) suggest steps to facilitate approval (by the Animal Subjects and Institutional Biosafety Committees) of projects involving animals that may carry zoonoses; and h) provide guidance for development of “standard operating procedures” (SOP) for safe conduct of projects that have unique conditions or health and safety challenges.

Sources of Information

There are many sources of information on zoonoses, some of those most pertinent to the needs of a research community, are:

1. CDC National Center for Infectious Diseases: Disease Information, Selected Prevention, and Program Areas <http://www.cdc.gov/ncidod/diseases/index.htm>
2. Daniel Shapiro’s Zoonoses Web Page: <http://medicine.bu.edu/dshapiro/zoo1.htm>;
or
3. University of California, Davis – Risk Analysis Tool
<http://ehs.ucdavis.edu/animal/risk/index.htm>
4. University of California, Santa Barbara, IACUC: Zoonotic Diseases:
<http://research.ucsb.edu/connect/acc/policy.html>
5. “Zoonoses or Everything I Didn’t Want to Know About Wildlife Diseases”,
<http://www.angelfire.com/nj/woundedknee/zoonoses.html>

Medical Monitoring

All persons working in conditions with a zoonoses risk must complete the *UCSD Risk Assessment Screening Questionnaire For People With Animal Contact* (http://oarweb/ucsdohsp/Page_4x.html). Most people will be required to participate in medical monitoring exams. Some people, after completing this confidential questionnaire, will recognize that they have a health-related condition that may increase the risk of acquiring or increase the severity of a disease associated with their animal contact. In each case, the person should contact UCSD Center for Occupational and Environmental Medicine (by calling (619) 471-9210) to schedule a visit with an occupational health professional.

Recognizing Risk Factors for Zoonoses

Every research project designed should incorporate practical health and safety concepts and procedures as necessary to make that project as safe as practicable. An early step toward that goal is conducting a simple risk assessment before the project begins.

When zoonoses may be present in the animals or their tissues or fluids, a risk assessment should be conducted. Examine each of the following issues to identify 1) how people may be exposed, injured, or placed at increased risk of exposure, 2) what environmental impact may occur, 3) possible violations of regulations, or 4) potential increased liability to the University:

1. *Learn about the animals with which you work. Evaluate all of the risks associated with that animal including: physical hazards (e.g.: bites, kicks), allergies (some animal are more likely to cause allergies), venoms/toxins and zoonoses;*
2. *What is the mode of transmission of the infectious agent;*
3. *Assess the nature of work in terms of potential for aerosolization, splash or contamination. Can less dangerous conditions, smaller numbers of animals quantities, or fewer people do the job;*
4. *Evaluate the waste handling and disposal steps in terms of safe collection, storage, handling, transport, and disposal;*
5. *Consider the working environment in terms of ventilation, containment equipment, and work pattern. Are facilities well maintained and designed for the type of work to be carried out;*
6. *Identify how emergencies, spills, or release may occur;*
7. *Look at hazardous material containment/packaging during transport or shipping;*
8. *How are people notified of the risks associated with the project;*
9. *People at increased risk of infection of serious disease (due to their own medical condition) are given the opportunity to assess their own risks (with the advice of a qualified occupational medical professional) and make decisions about the nature of their work and working environment.*

When the risk assessment is completed, use the "Preventive Measures" listed below and work with the safety specialist from EH&S to identify methods to reduce risks, identify safe practices and procedures, choose containment equipment, and select personal protective equipment.

Preventive Measures

Once the risks are identified, measures can be planned and put in place to eliminate or mitigate the risks. Normally, the project can proceed safely by implementing a combination of

- a. Eliminating higher hazard materials or practices, or replacing them with safer alternatives;
- b. A combination safety practices and procedures;
- c. Appropriate facilities;
- d. Employee education;
- e. Safety equipment;
- f. Personal protective equipment;

- g. Environmental risk management
- h. Laboratory director oversight and enforcement of required preventive measures.

When animals with a zoonoses risk are involved, eliminating that risk factor is not usually possible. A list of suggested practices and procedures follows. This list is divided into three parts: Precautions that apply broadly to most situations, precautions that are pertinent to work in the laboratory or vivarium, and precautions that are suggested for fieldwork. Since allergies to animals are a significant issue in research involving animals, a subset of the precautions listed below is marked with an asterisk (*) to denote precautions that are also advised to limit the risk of developing animal allergies.

Precautions for All Situation

- Inform all who enter areas with possible zoonoses of their potential for exposure and the associated risks;
- Become knowledgeable about the zoonotic agents to which you may be exposed and are advised to review such sources as those listed above in “Sources of Information”;
- Engineering controls are used whenever possible;
- Wear disposable nitrile or latex gloves and outer clothing (such as coveralls, lab coat, or surgical gown) and shoes or shoe covers that are worn only when working with animals;
- Wash hands after removing your gloves;
- Don’t wear the clothing or shoes worn around animals anywhere else. Change clothing and shoes before getting into your vehicle;
- Never eat or drink in areas where animals, their wastes, or body products are present;
- Although a normal, healthy adult person may have only mild symptoms of a zoonotic disease, that person may unknowingly spread the disease to others. Unfortunately, animal handlers have “carried home” zoonotic diseases to their infants with fatal consequences. Therefore, good hygiene is not only to protect the person working directly with animals; but for all persons with whom they have contact.
- Report all suspected sick animals as soon as possible, so that a veterinarian may determine the cause of illness and protective steps may be implemented;
- When seeking medical advice for any illness, inform your physician of your work with animals.
- *Launder your protective clothing at work, or have it cleaned by a professional service. Don't take your protective clothing home with you.
- *Wash your hands frequently. Avoid touching your hands to your face while working in the vivarium.
- *Keep transport carriers out of labs/offices/public areas;
- *Reduce your skin contact with animals by wearing gloves and long-sleeved lab coats.

* A protective measure particularly important in limiting allergy risks.

- *Use disposable supplies whenever possible;
- *If you suffer from allergies to a species you must work with, consider wearing an approved, NIOSH certified N95 respirator when in the animal facility. Respirators are, in general, less effective than the other methods shown above and should not be used as a substitute for good workplace hygiene. If you decide to wear a respirator, you must enroll in the UCSD Respiratory Protection Program (contact Daphne (41075)).
- Any zoonoses exposure is reported to the Principal Investigator or instructor and Biosafety Officer.

Precautions for the Laboratory or Vivarium

- *When possible, perform animal manipulations in a ventilated hood or a biosafety cabinet.
- *When you're not working in a hood or cabinet, make sure that the animal room or other work area is adequately ventilated and that all the air handling equipment in the room is in good order. If there is doubt, your supervisor can ask Facilities to measure the number of air changes in the room. Animal rooms should deliver at least 10 air changes per hour.
- *Don't wear your street clothes when working with animals. Wear dedicated, protective clothing.
- *Keep cages and your work area clean.
- *Use beddings that are not dusty. Most commercial beddings are not dusty. Wood shavings may be dusty or not depending on their source and quality.

Precautions for the Field

- Wear gloves when handling wild animals;
- Hand washing methods are developed;
- The project SOP may require protective clothing or other personal protective equipment;
- A first aid kit is immediately available;
- Procedures are developed to respond to a bite, cut, puncture or other injury that results in possible zoonoses exposure;
- Special disinfection procedures are developed for equipment, samples, cages, and traps;
- Procedures to prevent cross-contamination.
- Do not use personal vehicles for transporting live animals;

ALLERGIES

One of the most significant occupational health risks that people face when working with animals are allergic reactions – about 20% of workers involved with research animals will develop allergies to the animals. If you're allergic to a species, it can be quite debilitating. If you suffer from asthma, working with a species to which you are allergic can be a significant health risk. Various small wild mammal proteins have been identified as sources of antigens involved in both allergic reactions and hypersensitivity

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pneumonitis. Hypersensitivity pneumonitis is a lung condition with symptoms that mimic pneumonia. Symptoms develop after repeated exposure to a specific antigen found in small wild mammals. Signs of an allergic reaction after exposure to small wild mammals are rhinitis and asthma symptoms. Signs and symptoms of both allergic reactions and hypersensitivity pneumonitis usually occur several hours after exposure.

The most effective way to control and prevent allergies is to minimize exposure to the allergens. If you work with animals in an animal facility or laboratory setting, the practices marked with asterisk (*) above are the most important steps to reduce your exposure to animal allergens

Project Approval

Research projects involving animals likely to be vectors of zoonoses must be reviewed and authorized by the UCSD Animal Subjects Committee and approved by the UCSD Institutional Biosafety Committee (IBC) before the work may commence. Submit the completed forms for project approval well before the project is scheduled to begin. Requests for IBC approval should be submitted to EH&S by means of the Biohazardous Materials Use Authorization (BUA) process. (The BUA form is available on line at <http://www-ehs.ucsd.edu>.) Requests for approval by the Animal Subjects Committee should be submitted through the Animal Subjects Program office. (See Animal Subjects Program web site at <http://medicine.ucsd.edu/asp/>.) In most cases, the Institutional Biosafety Committee will require that the laboratory adopt the pertinent conditions set forth in this document and may require that a standard operating procedure be developed to address the specific conditions of the project.

Standard Operating Procedures (SOP)

The researcher, in collaboration with EH&S Biosafety staff, should create standard operating procedures (SOP) to address the unique situations posed by the project. The SOP should address:

- 1) A description of the project and how animals will be used/handled;
- 2) A listing of the risk factors including signs and symptoms of disease most likely to be encountered;
- 3) Access restrictions;
- 4) Signs and labeling;
- 5) Personal protective equipment (PPE):
 - a) Specific circumstances requiring PPE
 - b) Specific personal protective equipment to be used
 - c) When the PPE is to be removed;
- 6) Safety practices and procedures to be employed when dealing with the animals;
- 7) Waste disposal;
 - a) Potentially infectious trash
 - b) Animal waste products
 - c) Animals
- 8) Sanitation/disinfection practices and procedures for the facilities, cages, traps, etc.; personal protective clothing; hand washing; etc. State what disinfectants will be used and when, where, and how the disinfectants are to be used;

- 9) Transportation of animals;
- 10) Medical Surveillance;
- 11) Emergency & Urgent procedures;
 - a) Bites & injuries;
 - b) Probable exposures;
 - c) Spills;
 - d) Persons with symptoms of illness indicative of infection by zoonotic agent.
- 12) Special considerations;
- 13) Documentation / recordkeeping.
- 14) Educating staff and others about the elements of this SOP

Additional Information on birds, small mammals and primates

The following resources are provided as an aid in the development of standard operating procedures and for the information of all persons involved in these projects:

- 1) UCSD Occupational Health and Safety Information for People Who Have Substantial Contact with Birds or
- 2) UCSD Occupational Health and Safety Information for People Who Have Substantial Contact with Small Mammals