

DEPARTMENT OF VETERANS AFFAIRS
South Texas Veterans Health Care System
7400 Merton Minter Boulevard
San Antonio, Texas 78284

RESEARCH SERVICE
MEMORANDUM 06-17

May 11, 2006

ANIMAL CARE AND USE PROGRAM

Occupational Health and Safety for Research Personnel with Significant Animal Contact

1. **PURPOSE:** To provide guidelines designed to facilitate the provision of a safe workplace and safe work practices for personnel working in an animal research setting. These guidelines provide a basis for meeting the accepted occupational safety requirements for this type of work.

2. **POLICY:** All personnel engaged in the care and use of research animals will comply with a program for personal hygiene, protective safety measures, safe use of hazardous materials, and preventive medicine. All personnel

3. **PERSONNEL**

a. **Preventive Medicine Program:** All personnel need to participate in the PMP if they have exposure to animals or parts of animals. A determination of what constitutes animal contact needs to include consideration of such factors as animal species, microbiological status of the animals, and frequency of animal contact. Commercially bred virus antibody free rodents pose significantly less infectious disease risk than primates, ruminants, dogs, cats, and other animal species in which the microbiologic status is unknown. Key elements of a preventive medicine program for employees with animal contact includes:

(1) **Medical Evaluation.** A pre-employment physical exam to ensure that a prospective new employee is capable of the physical demands of the position.

(2) **Medical History.** A medical history that includes a record of allergies, immunizations, immunosuppressive diseases or the use of immunosuppressive medicaments, and physical limitations needs to be taken and held on file.

(3) **Annual Interview.** An annual review (questionnaire) of workers with animal contact to detect problems in the early stage and ensure that required immunizations are current.

(4) **Occupational Safety Training.** Personnel who have contact with experimental animals should receive training in the proper handling of the animals that they will work with. Most animal inflicted injuries occur because of inadequate training and experience, or because of carelessness. Personnel are instructed to avoid unnecessary risk when working with animals, and to seek expert assistance when in doubt. Training includes the use of protective clothing, equipment, and hygiene practices and Universal Precautions, where applicable. Personnel whose work responsibilities require that they lift heavy objects should be trained in the ergonomics of their tasks.

b. **Reporting Injuries and Illness.** Injuries, animal bites, animal scratches, and cuts sustained in the animal facility or research laboratory should be reported promptly to the employee's supervisor. The employee should then be referred to the Employee Health Physician, and a Report of Accident must be completed. Illness should routinely be reported to the employee's supervisor.

c. **Personal Hygiene.** An important factor in protecting the health of personnel engaged in animal care or research is personal hygiene. All employees need to understand the importance of personal hygiene and specific measures that are to be taken routinely to protect themselves against zoonotic agents found naturally in experimental animals as well as hazardous agents used experimentally in approved biomedical studies using animals.

Hand Washing. Hand washing is a crucial safety measure for safeguarding personnel in the animal facility. Although the proper use of disposable gloves provides an effective means of preventing hand contamination, hands can easily become contaminated during the removal of contaminated gloves. Hands should be washed with soap and water whenever they touch contaminated or potentially contaminated surfaces, liquids, or body fluids. Hands should be routinely washed before eating, drinking, applying cosmetics, before touching contact lenses, and before leaving the facility. Soap and paper towels should be located near the sink

4. PROTECTION

a. Employees are required to wear protective clothing provided. Uniforms and laboratory coats should be laundered to provide clean protective clothing daily. Disposable protective items such as gloves, masks, and head and foot covers, and gowns or other body cover will be worn when use of these items is required. Protective clothing may not be taken away from the work site.

(1) Veterinary Medical Unit Animal Care Personnel

(a) Uniforms. Upon arrival at the duty site, animal care personnel should change out of street clothing and into clean uniforms. Uniforms are to be changed whenever they become soiled. At the end of the work day, uniforms should be placed in the area designated for soiled clothing.

(b) Lifting. Employees should always practice safe lifting techniques. Back braces should be available to employees who perform lifting tasks on a daily basis, and tasks should be made as ergonomically efficient as possible.

(c) Foot Injuries. Employees who are at risk of crushing foot injuries from heavy objects will wear steel-toed footwear.

(d) Soiled Clothing. Soiled clothing is not be worn outside the animal facility, and never worn or carried home. Soiled clothing laundry should be placed in receptacles for soiled clothing.

(2) Research and Other Personnel with Animal Contact. Protective clothing needs depend on the procedures that will be performed, but as a minimum, clean lab coats and gloves should be worn by all personnel while handling animals or animal tissues. For those with allergies to animals, a respirator with appropriate cartridges may be worn in place of a surgical-type mask only following evaluation through the medical center Respirator Program. Reassignment to duties that prevent exposure is recommended if possible.

(3) General Considerations

(a) Disposable Gloves

(1) Disposable gloves are useful to prevent the transmission of diseases between animal rooms, and to limit the possibility of disease transmission between animals and humans. They are also useful to limit staff exposure to contact allergens. Disposable gloves are available for caretakers and research personnel who contact animals, animal tissues, or soiled animal cages during their duties.

(2). Disposable gloves should be discarded when they are visibly soiled, torn, punctured, or otherwise damaged such that their ability to act as a barrier is compromised. Prior to leaving an animal room or anteroom, personnel should discard their gloves and wash their hands. Care is needed to prevent contamination of door knobs, faucet handles, paper towel dispensers, refuse container lids, and similar objects by personnel with contaminated gloves. Some personnel may develop contact dermatitis allergy to the absorbent material that is used to lubricate disposable gloves; however, alternative lubricants are available.

(b) Hearing Protection. The noise level in animal facility areas may reach potentially damaging levels, particularly in cage washing areas and dog housing rooms. Ear protection should be provided whenever noise levels exceed those permissible levels established by the Occupation Safety and Health Administration (OSHA) regulations or whenever requested by an employee. If protective headset-style protectors are too bulky or uncomfortable, inexpensive disposable foam ear plugs may be used. The animal facility supervisor shall enforce use of required ear protection.

(c) Eye Protection. Protective eyewear should be used by employees who handle Old World nonhuman primates or corrosive or otherwise dangerous liquids or vapors. Goggles or other devices that completely shield the eyes should be used.

(d) Other Precautions. Personnel should be trained to avoid hand contact with their eyes, face, mouth, or other body surfaces with contaminated gloves or hands.

(e) Special Circumstances. Special equipment and clothing may be required when personnel are engaged in studies that involve hazardous agents. The specific measures needed are to be appropriate for the agents used, as determined by the Safety Officer in consultation with the investigator and the Veterinary Medical Consultant (VMC).

b. Smoking, Eating, Drinking, and Cosmetic Application. Smoking, eating, applying cosmetics, installing contact lenses and similar procedures are prohibited within the animal facility or in animal study areas except in designated areas that are free of potentially contaminated materials. Employee food should be stored only in refrigerators and/or freezers designated exclusively for such use, U235, T202. Smoking is prohibited in the building except in designated smoking facility. Personnel who smoke should wash their hands prior to smoking.

5. HAZARDOUS AGENTS

a. Work with Hazardous Agents

(1) Scope. Additional safety measures may be needed to protect personnel who use or work in the animal facility when research involving biological, chemical, or radiological agents is being conducted. The specific measures needed are dependent on the risk to human and animal health represented by the agent, and the difficulty involved in containing the agent.

(2) Objective. The objective is to prevent exposure of the animal care staff and other animal workers to hazardous agents present in animal tissues, animal secretions, soiled bedding, and elsewhere in the animal environment. The key elements to safety when working with hazardous agents are:

(a) Trained, knowledgeable personnel to perform the study, and

(b) Prior review and approval of the proposed use of hazardous agents by qualified personnel.

(3) Procedure

(a) Before experimental animals are treated with any hazardous agent, an approved copy of the Animal Component of Research Protocol with written safety precautions needs to be on file in the Research Office. This should include instructions on handling the animals, caging, and animal waste are available.

(b) Instructions should be posted outside the animal room where they are readily visible for the duration of the experiments.

(c) Personnel who work with animals exposed to hazardous agents are to be trained in proper procedures to work with the animals and related waste and equipment. Documentation of such training needs to be made before employees manipulate experimental animals treated with hazardous agents.

b. Biological Agents. The Centers for Disease Control and Prevention (CDC)/National Institutes of Health (NIH) handbook, Biosafety in Microbiological and Biomedical Laboratories, describes the minimum containment requirements that are to be followed when microbial pathogens are used in the laboratory and in the animal facility. A copy of the most recent edition of this manual is available in the local Research Office and on the CDC web site.

(1) Special Considerations

(a) Immunologically compromised rodents such as the nude mouse and the severe combined immunodeficient (SCID) mouse, that receive human xenografts, body fluids, blood, or human infectious agents and related materials, present a potentially unique and poorly understood (xenozoonosis) risk. These rodents may develop

persistent infections while remaining otherwise healthy. For this reason, such animals injected with these materials need to be handled with caution, following Biosafety Level 2 or 3 practices in accordance with the recommendation of the Safety Officer.

(2) Universal Precautions. Universal Precautions is an approach to infection control in which all human blood and certain human body fluids are treated as if known to be infectious for Human Immunodeficiency Virus (HIV), Herpes B Virus (HBV), and other bloodborne pathogens. Intended primarily for personnel working directly with human blood components, other body fluids and excreta, and unfixed tissues, Universal Precautions is relevant to all personnel working with potentially infectious materials in animal studies. Personnel working with animals treated with such materials should receive annual training in Universal Precautions to comply with the Bloodborne Pathogen Standard.

c. Chemical Agents and the Material Safety Data Sheet

(1) Although all chemicals and drugs are potentially dangerous, special concern is necessary when working with known carcinogens, mutagens, immunosuppressive agents, toxic drugs, potent steroids, agents of unknown pharmacological activity, and other chemicals listed as hazardous waste by the Environmental Protection Agency (EPA).

(2) All chemical agents purchased commercially are to have a Material Safety Data Sheet (MSDS) that accompanies the shipment of the chemical. Purchasing offices should forward the MSDS immediately to the Research Office from where it should be distributed to the using investigator and the animal facility. MSDS books are maintained in S202 and in the VMU office U235.

d. Radioactive Agents. The safety principles for work with radionuclides are similar to those for work with other hazardous agents with some important additions:

(1) The Radiation Safety Officer must review and approve, or require specific procedures that are to be followed when using radionuclides in animals.

(2) Personnel working with radionuclides must be trained specifically for work with these materials.

(3) All acquisition and disposition of radionuclides must be in accordance with the Nuclear Regulatory Commission (NRC) regulations covering these materials.

e. Procedures for the Animal Care Staff

(1) Warning Signs and Safety Protocol for Animal Rooms that Contain Hazardous Agents

(a) A complete copy of the safety protocol for the hazardous agents found in an animal room (with biosafety class, if applicable) should be posted on a bulletin board adjacent to the entrance of the animal room. The safety protocol should contain all relevant information necessary to identify the personnel, procedures, safety precautions, waste disposal, carcass disposal, and related information about the hazardous study.

(b) The following information should be posted on the animal room door for the duration of the experiments:

1. Large biohazard, chemical hazard, or radiation hazard sign, as appropriate, and a limited access warning sign.
2. Name and telephone number of individual to contact in event of an emergency involving the agent.
3. Name of the hazardous agent(s).
4. Dress code for entrance into the room.

(2) Separation of Animals Treated with Hazardous Agents. Animals receiving hazardous agents should be

housed separately from other animals to prevent cross contamination and simplify isolation of contaminated wastes. The use of negative-pressure ventilated racks, laminar flow units, and other similar high efficiency particulate air (HEPA)-filtered devices are helpful in isolating small animals exposed to hazardous agents. Properly managed cubicles are suitable for confining experiments with hazardous agents to small areas.

(3) Warning Signs on Animal Cage Cards. The name of the hazardous agent should appear on the cage cards of animals treated with the agent. Each cage should display a Biohazard sign (tape or label).

(4) Cleaning, Feeding, and Watering Animals Treated with Hazardous Agents

(a) If both treated and untreated animals are housed in the same room, the untreated animals should be cleaned, fed, and watered first to reduce the possibility of accidental contamination of untreated animals. Rooms housing treated animals should be cleaned last and animals in these rooms fed, watered, and manipulated after these procedures have been completed in other rooms.

(b) Upon completion of a study involving use of infectious or other hazardous material, the room housing animals exposed to such agents should be decontaminated before introduction of new animals. The Safety Officer should be consulted to determine the best method to decontaminate the room. This will vary with the hazardous agent in use, and cannot be generalized. It is important that personnel performing the decontamination be informed about their task, and provided the protective clothing indicated by the Safety Officer.

(5) Use of a Bedding Change Station or Biocontainment Hood to Change Bedding

A device that draws aerosols away from the caretaker, such as an air filtered change station should be used when soiled, contaminated bedding is removed from animal cages. The caretaker should wear protective clothing, including a mask and gloves when removing soiled bedding from cages. Ordinarily soiled bedding should be removed from cages in the cage wash room rather than in the animal rooms.

f. Waste Disposal

(1) Bedding. Bedding contaminated with hazardous agents may present one of the most difficult management problems. Contamination with infectious agents may require that bedding be sterilized before being transported to the cage wash room for dumping. If soiled bedding containing hazardous material cannot be rendered harmless prior to transporting to the cage wash room, it may be necessary to bag, or double bag the bedding for direct transportation to an incinerator, or other disposal system. Regardless of the nature of the contamination, the methods of disposal should be determined by the Safety Officer. Use of disposable cages is highly recommended.

(2) Carcass Disposal. Contaminated carcass disposal is often similar to disposal methods for other contaminated materials, but in this case needs to reflect the nature of the hazardous agent in use. Upon completion of the necessary work with the carcass, it should be bagged, labeled, and disposed of in accordance with accepted practice. Holding, when necessary, should be accomplished in a refrigerator or freezer reserved for carcass disposal.

g. Miscellaneous Safety Procedures for All Personnel

(1) Needle and Syringe Disposal. Needles should not be recapped. Dispose of needles and syringes by dropping them into puncture proof containers, which should be located in every room in which sharps are used. In some instances, neutralization of the hazardous agent prior to discarding of the syringe containing such material may be necessary.

(2) Adequate Animal Restraint. The chance of accidental needle sticks is reduced if animals are anesthetized or chemically restrained before being injected with hazardous agents. Manually restrained, unanesthetized animals are often capable of jarring needles and redirecting their path, or by struggling, causing spills.

(3) Prevention of Aerosol Formation. Whenever possible, hazardous agents should be prepared or purchased in rubber-topped vials so that the aerosols associated with open tube manipulations can be minimized. Solutions containing hazardous agents should never be expressed through a needle into disposal containers or disinfectant pans because of the aerosols produced; rather the syringe with solution should be discarded directly into an appropriate

puncture proof sharps container.

(a) When infectious agents are used, the sharps container should be sterilized in a steam autoclave before disposal.

(b) When hazardous agents require disposal by incineration immediately after use, the sharps container should be included in the disposition.

(4) Use of Hoods. Hazardous agents should be injected or otherwise administered within an appropriate biocontainment or chemical hood. When technical considerations make such a practice impossible, exceptions are to be justified and approved by the local VA Safety Committee.

(5) Manipulating Animals. When manipulating animals, the fewer manipulations that a single individual performs when handling hazardous agents, the better. Should an accident occur, it is much safer to have a second person available to assist in decontamination procedures, and to audit the accident. People working alone are often reluctant to acknowledge mistakes or accidents.

(6) Reduce Distractions. When hazardous agents are being manipulated in the animal facility, distraction should be minimized. Research personnel should schedule with the animal care staff a time for manipulations so that routine cleaning and husbandry procedures can be avoided, postponed, or rescheduled. Loud noises should be minimized.

6. SPECIAL CONSIDERATIONS

a. Special Health Considerations for Female Employees. Occupational hazards that are significantly detrimental to pregnant women and the unborn child are to be considered. Women who are pregnant and work with animals that are exposed to hazardous agents should declare their pregnancy as early as possible, and are to be made aware of potential risks in consultation with the Occupational Health Physician, and/or the medical center Safety Officer, and Radiation Safety Officer (Murnane, T.G. and J.S. Morris, 1989. *Special Health Considerations for Women Veterinarians, in Health Hazards in Veterinary Practices, 2nd edition*).

b. Special Zoonotic Animal Diseases. Some zoonotic diseases that may pose a risk for animal workers in the typical animal facility are described briefly in the following. Work with primates requires special attention to occupational health and safety requirements. Protective clothing plus masks, gloves, head and face shield or goggles should always be worn when personnel are in primate housing rooms or when working with primates.

(1) Rabies. While human rabies is now a rare disease in the United States, it is almost invariably fatal and thus needs to be considered when working with animals that pose a potential threat to workers. Rabies is usually transmitted only when the virus is introduced into open cuts or wounds in skin or mucous membranes. Exposure may be from bites by an infected animal or much less frequently through scratches, abrasions, open wounds, or mucous membranes contaminated with saliva or other infectious material.

(a) Vaccination is the most valuable preventive measure with local wound treatment and vaccination following potential exposure next. Historically, dogs are the most common vector of rabies infection to humans. The incidence of rabies in dogs in the United States is now very low, while rabies in wild animals - especially skunks, raccoons, and bats - is much more commonly recognized. Personnel who have contact with dogs, cats, other carnivores, wild mammals, and susceptible species of bats (or their tissues) should be advised to receive pre-exposure immunization against rabies.

(b) Pre-exposure immunization does not eliminate the need for prompt post-exposure prophylaxis (CDC. Rabies Prevention - United States, 1991. Recommendations of the Immunization Practices Advisory Committee. MMWR, 1991; 40:1-19. No.RR-3., Compendium of Animal Rabies Control, 1993. National Association of State Public Health Veterinarians, in J. Am. Vet. Med. Assoc., 20:199 - 202).

(2) Rat Bite Fever. Two causes are recognized: *Streptobacillus moniliformis* and *Spirillum minus*. The disease is usually associated with wild rodent bites, rarely with laboratory bred rodents. In humans, the disease is characterized by an abrupt onset of chills and fever, headache and muscle pain, followed shortly by a maculopapular or sometimes petechial rash. The primary wound usually heals promptly, but after an incubation period of about 10 days,

systemic signs appear. A 7 to 10 day course of penicillin or tetracycline is recommended for treatment of the disease.

(3) Dermatomycoses. The most common causes of dermatomycosis in humans acquired from animals are *Trichophyton* spp., and *Microsporum canis*. Cats, rats, cattle, and guinea pigs are the most common sources, and may not exhibit clinical signs of disease. Personnel who develop circumscribed, intensely itching lesions that are non-responsive to ordinary household remedies on exposed parts of their bodies, should be examined for dermatophytes.

(4) Other Zoonotic Diseases. Other zoonotic diseases to which animal workers may be exposed are potentially endless, but includes:

(a) Bacterial diseases such as: Tularemia, Salmonellosis, Shigellosis, Brucellosis, *Campylobacter*, *Helicobacter*, and many others.

(b) Examples of virus diseases that occasionally infect animal workers include: Hantavirus (wild rodents), Hepatitis A (some primates and great apes), Lymphocytic Choriomeningitis (hamsters, rats and possibly mice), and Contagious Ecthyma (sheep).

(c) Miscellaneous other zoonotic diseases that should not be overlooked include: Psittacosis, Amoebiasis, Cryptosporidiosis, and Arthropods.

NOTE: Consideration to these possibilities should be given to animal workers with vague or otherwise poorly defined infectious disease.

7. Infectious Disease Risk Table

Specific procedures required for the Occupational Safety and Health Program for the animal facility are dependent upon the degree and type of exposure to laboratory animals as well as the nature of the work being done. The following table summarizes a PMP with suggested procedures for four risk categories. Additional risk categories may be added by the medical center:

Risk Category	Definition	Pre-Employ-ment Physical	Annual Question-naire	TB Skin Test or Chest Radio-graph	Rabies Vaccine or Sero-logy	Tetan-us Toxoid	Pre-Employ-ment and Annual Serum Banking	Toxo-plasma Sero-logy	Rube-ola Vaccine	Q Fever Vac-cine
1	Exposure to rodents or rabbits	++	++	o	o	++	o	o	o	o
2	Exposure to Carni-vores (dog, cat, ferret)	++	++	o	+++	++	o	F + M o	o	o
3	Exposure to ruminants	++	++	o	+	++	o	o	o	+
4	Exposure to Primates	++	+++	+++	+	++	+	o	+	o

Key: o: Not ordinarily required. M: Male
 +: May be advisable in some circumstances. F: Female
 ++: Usual practice.
 +++: Essential component of an effective program.

NOTE: The occupational health program outlined in Table 5 of NIH Publication No. 92-3415 entitled Institutional Animal Care and Use Committee Guidebook may be a useful reference.

8. OTHER CONSIDERATIONS

a. Work with Anesthetic Gases

(1) Non-Explosive Gases. Virtually all non-explosive anesthetic gases carry some degree of health risk to animal workers. Provision should be made to protect workers by the use of gas scavenging devices, or where appropriate, ventilated hoods or other systems that prevent exposure to the worker.

(2) Explosive Gases. The use of explosive anesthetic gases such as ether, needs to be approved up to the level of the Regional Safety Officer. Proper storage for these gases is to be provided, and the location of use needs to provide adequate ventilation and freedom from ignition sources.

(3) Personnel working with anesthetic gases are initially monitored by VapoTrak and then quarterly.

b. Transportation. Transporting animals into or through areas used by patients or visitors is not appropriate. VMU supervisor should be contacted regarding appropriate transportation.

9. REFERENCES

- a. Barkley, W.E. and J.H. Richardson, "Control of Biohazards Associated with the Use of Experimental Animals," Laboratory Animal Medicine, J.G. Fox, B.J. Cohen, and F.W. Loew, editors, 595 - 602. (New York: Academic Press, 1984).
- b. Benenson, A. S., Control of Communicable Diseases in Man, 15th edition. (Washington, D.C.: American Public Health Association, 1990).
- c. Biosafety in Microbiological and Biomedical Laboratories, 4th edition, Dept of Health and Human Services, CDC, NIH, 1999.
- d. Title 10 Code of Federal Regulations (CFR) Chapter 1, Parts 0-171, Nuclear Regulatory Commission. See Part 20, Standards for Protection Against Radiation.
- e. Guide for the Care and Use of Laboratory Animals, National Research Council, 1996, and subsequent revisions.
- f. Title 29 CFR Parts 1900-1910, Occupational Safety and Health Administration.
- g. Occupational Health, Institutional Animal Care and Use Committee Guidebook. U.S. Department of Health and Human Services, Public Health Service, (Washington, DC: NIH Publication No. 92-3415, 1992).
- h. Title 40 CFR Part 261 Subpart D, Lists of Hazardous Wastes. Environmental Protection Agency.
- i. VHA Handbook 1200.7.
- j. VA Manual MP-3, Part III, Safety, Occupational Health and Fire Protection (or superseding document).

10. RESPONSIBILITY: Investigators are responsible for insuring all employees adhere to guidelines.

11. RESCISSION: Research Service Memorandum 05-17, April 14, 2005.



PETER MELBY, M.D.

DISTRIBUTION: VMU, Investigators