

# VIRGINIA STATE UNIVERSITY ANIMAL CARE AND USE HANDBOOK

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## REGULATIONS REGARDING LABORATORY ANIMAL CARE

### *PUBLIC HEALTH SERVICE (PHS) POLICY FOR THE HUMANE CARE AND USE OF LABORATORY ANIMALS*

**P**ublic Health Service Policy (also known as NIH Policy) applies to all live vertebrate animals, including mammals, amphibians, reptiles, fish, and birds used or intended for use in PHS supported research. Each institution receiving PHS funding is required to file an Animal Welfare Assurance Statement to the Office of Laboratory Animal Welfare (OLAW) and the National Institute of Health (NIH) for approval. The Assurance Statement indicates that the institution is committed to compliance with standards detailed in the Animal Welfare Act, the NIH Guide for the Care and Use of Laboratory Animals, and all other applicable laws and regulations. The Assurance Statement must describe the institution's program for care and use of all animals used in research, research training, and biological testing. It must also explain in detail the training available to scientists, technicians, and other personnel involved in animal care, treatment, or use.

Each awardee institution is subject to review (including unannounced site visits) at any time by PHS staff to assess the accuracy of the institution's compliance statement. Failure to comply

with PHS Policy can lead to various actions, including the termination of PHS service for all projects involving animals.

### ***THE ANIMAL WELFARE ACT***

The Animal Welfare Act (AWA) was enacted by Congress in 1966, and amended in 1970, 1976, 1985, 1990, and 2002. It is the basis for federal regulation of the purchase, transportation, care and treatment of animals used in research. Animals covered under the AWA include any live or dead dog, cat, nonhuman primate, guinea pig, hamster, rabbit, or any other warm-blooded animals used or intended for use in research, teaching, testing, experimentation or exhibition. Although the Act specifically excludes rats and mice bred for research, as well as birds, the USDA does inspect facilities and reviews programs of any institution registered to do animal research with federal support. The United States Department of Agriculture (USDA) is the government agency responsible for enforcing the regulations set forth in the AWA.

USDA veterinarians conduct unannounced inspections of research facilities at least twice a year to assure compliance with legal standards of care set forth in the Act. These standards regulate such factors as cage size, animal identification, and sanitation. Recent amendments address such issues as exercise for dogs, the psychological well-being of primates, the composition and duties of the IACUC, the duties of the attending veterinarian, and the training of personnel using animals in research.

Each research facility must employ an attending veterinarian to provide veterinary care, including the treatment, control and prevention of animal disease, advising investigators about the proper use of animals, and providing appropriate pre- and post procedural care in accordance with established veterinary practice.

Research institutions must file an annual report to the USDA listing the species and number of animals used for non-painful procedures, painful procedures performed after the administration of anesthetic or analgesic medications, and painful procedures performed without the use of such medications. Failure to comply with USDA standards can result in civil or criminal prosecution and suspension of animal research activities.

### **ROLE OF THE DEPARTMENT OF BIOLOGY ANIMAL WELFARE COMMITTEE**

The Animal Resource Center is a part of the Department of Biology with administrative offices in Owens Hall. The Department of Biology has a standing committee, Biology Animal Welfare committee, of trained faculty designated to oversee the use and management of this facility. This committee is responsible for:

1. Developing a manual for the use of existing animal facilities.
2. Procedures for reviewing and approving animal protocols prior sending to the IACUC committee.
3. Assign responsibility as related to maintenance of the facilities
4. Preparing a budget for feed, supplies, and chemicals for the facilities.

**Comment [I1]:** Does the BAWC have oversight for the IACUC?

**Comment [I2]:** This should be an IACUC function. It is okay to have the BAWC provide oversight for animal use and management, but the IACUC is charged with ultimate authority via USDA and PHS.

5. Determine the research priority as related to the animal use when there are several funded research projects are active at the same times.

The policies and guidelines will be developed to address the requirements set forth by the IACUC and the Federal and State governing bodies. The guidelines will also address the common methods used for many projects to ensure consistent animal well being and care.

The Biology Animal Welfare committee will act as a liaison between the IACUC and the Animal Resource Center. A member of the committee will attend the IACUC meetings and provide information to the IACUC as needed. When the IACUC develops a policy, it will be the task of the Biology Animal Welfare committee to ensure the policy is implemented at the Animal Resource Center.

The Principle Investigator (PI) will be required to submit a request for animal resources before submitting a grant proposal to ensure the project can be completed using the existing facilities. The PI will submit the complete, approved IACUC form and will need to address variances from the standard protocols and/or additional needs in the application. After review by this committee the application will be forward to the IACUC for final approval. The Biology Animal Welfare committee will only be using the application to assess the resource needs and the feasibility of the proposed project within the context of the Animal Resource Center and the IACUC approved protocols in this handbook. The IACUC will make final decisions on animal welfare issues related to the proposed project. **Proposals submitted to the IACUC using Animal Resource Center animals or facilities without approval of the Biology Animal Welfare committee will be returned to the committee before IACUC approval and delay the process of approval for the PI. If a protocol is not approved by the Biology Animal Welfare committee, it will be returned to the PI with a written explanation and with a copy forwarded to IACUC chair.** If possible, the Biology Animal Welfare committee will suggest alternative options for the proposal.

**Comment [13]:** I would add this as one of the check off items for the PI to complete before the protocol is forwarded for IACUC review.

### **PROGRAM AND FACILITY REVIEW**

**T**his committee is also charged with ensuring compliance by all personnel that use the Animal Resource Center with all IACUC and federal regulations. Any user that does not comply with the policies and regulations will be given a verbal warning, followed by a written warning and finally banning the user from using the facilities. Strict adherence to the policies and guidelines will be maintained at all times.

**Comment [14]:** Which committee are you referring to, IACUC or BAWC? Also would "this committee" be acting as a post-approval monitoring agent?

The committee will review the guidelines periodically to ensure they are meeting the IACUC policies and regulations. Additionally, the committee will inspect the facilities quarterly to ensure that **animal** users and personnel are following the policies and guidelines **as set by the IACUC.**

### **ANIMAL ENVIRONMENT AND MANAGEMENT**

## **STANDARDS OF ANIMAL HUSBANDRY**

**L**aboratory animal husbandry covers: (1) Facilities and operating procedures in facilities, including temperature and humidity, lighting, cage construction and maintenance, cage size, and waste disposal; (2) Animal health and husbandry, including feeding, water, sanitation, staffing, classification and separation, and veterinary care. **The following topics below provide a brief overview of husbandry procedures at the VSU animal research facility. A more complete review may be accomplished by reviewing the 2011 *Guide for the Care and Use of Laboratory Animals* (the *Guide*) and the USDA Animal Welfare Regulations for covered species.**

**Comment [15]:** I have room sheets that can be modified to fit VSU. They will include daily husbandry needs and daily health checks for the colony. We save these records as back-up to show inspectors that the animals are receiving care.

### ***Housing***

Animal housing systems should facilitate animal well-being, meet research requirements, and minimize experimental variables. Minimal space requirements are mandated in the Animal Welfare Act and recommended in the NIH Guide. Solid bottom caging, with bedding, is recommended for rodents by the Guide. IACUC review of this aspect of the animal care program should ensure that caging enhances animal well-being consistent with good sanitation and the requirements of the research project. Housing systems should provide sufficient space to allow freedom of movement and normal postural adjustments, contain a resting area appropriate to the species, confine the animal safely, provide easy access to food and water, be well-ventilated, allow the animals to stay dry and clean, and meet the biological needs of the species.

Cages should be sturdy and durable, with smooth impervious surfaces to facilitate servicing and sanitation. The design should allow cage occupants to be inspected without disturbing them. Housing systems should be kept in good repair to prevent accidental injury to the occupants and facilitate sanitation.

Attention should be given to providing appropriate social interactions, opportunities for exercise, and environmental enrichment appropriate to the species.

### ***Environment***

Animals should be maintained in an environment appropriate to the species. The environment within the cage (microenvironment) can differ substantially from the macroenvironment, or the environment in the room. The magnitude of these differences is largely influenced by cage design. For example, some caging systems for rodents incorporate a microbiological barrier that can expose the animals to significantly higher temperature, humidity, carbon dioxide, and ammonia levels than conventionally housed rodents. Exposure to such conditions can increase the susceptibility of rodents to infectious and toxic agents, and perhaps affect research results.

Recommended levels of temperature and relative humidity for various species have been published. These parameters must be carefully monitored and regulated in animal housing facilities because they can affect animal metabolism and behavior and thus can potentially alter research results. Effective ventilation is a critical factor in maintaining acceptable thermal conditions and in controlling chemical and microbial contaminants, as well as objectionable odors, in the primary enclosure. Published guidelines for room air changes appropriate to the species employed should be followed. Recycled air should be HEPA filtered before returning to general circulation.

### ***Bedding***

Sufficient bedding must be provided to keep animals dry between cage changes. Bedding should be absorbent, free of toxic chemicals, biologically inert, and unpalatable. Some types of bedding, specifically cedar and pine, produce aromatic hydrocarbons, which can induce significant alterations in hepatic enzyme systems, and thus can have a major impact on certain types of research. Consequently, other types of bedding are preferred (e.g. ground corncob). Sufficient bedding should be present to keep animals dry between cage changes. Bedding should be stored off of the floor on pallets, racks or carts.

### ***Room Light in Animal Enclosures***

Room light should be uniformly diffused and should provide sufficient illumination to allow daily observation and care of the animals and safe working conditions for the personnel. Lighting should meet the biological needs of the animals in terms of intensity and periodicity. Albino rats, for example, can develop retinal degeneration even when housed under “normal” light intensities. Timer systems can be used to provide a regular diurnal light cycle; however, timer performance should be periodically checked to insure proper cycling.

### ***Food***

Food must be fresh, palatable, uncontaminated with biological or chemical agents, and nutritionally adequate for the intended species. Feeders must allow easy access to food yet minimize contamination by feces and urine. Animals should be given enough food to permit normal growth, maintenance of adult body weight, reproduction, and lactation. Only specially formulated diets should be autoclaved, because these diets contain extra nutrients to correct for loss during the sterilization process. Food should be stored on pallets, racks, or carts and kept in designated restricted areas that are cool, clean, dry and free of vermin. Food containers must not be moved from room to room. Food containers should be properly labeled and include the milling or expiration date.

### ***Water***

Clean, fresh water must be available at all times; sipper tubes and automatic **watering systems** must be inspected regularly to insure their proper operation and must be accessible to immature animals. Empty water bottles should be replaced, not refilled.

### ***Sanitation***

Good sanitation is essential to maintaining healthy animal populations. Cages must be washed and sanitized before animals are placed in them, preferably using mechanical cage-washing devices. If cages are disinfected with chemicals, they should be thoroughly rinsed prior to use. Bedding must be changed as often as necessary to keep animals clean and dry. Dirty litter should be emptied in an area other than the animal room to avoid aerosol transmission of infectious agents.

Animal rooms, corridors, and other areas must be cleaned and disinfected often to keep them free of dirt, debris, and biological or chemical contaminants. Unnecessary equipment and clutter should be removed from these areas. Cleaning utensils must not be moved between animal rooms. Deodorizers should not be used to mask animal odors.

Waste disposal is subject to federal, state, and local ordinances. Wastes must be removed regularly and frequently. Infectious, radioactive or chemically hazardous wastes, including animal carcasses, should be placed in appropriately labeled containers for disposal according to institutional policies.

Unnecessary noise can be stressful to animals and should be minimized. Whenever possible, noisy activities, such as cage washing, and other loud equipment should be kept in areas separate from the animal rooms. Please keep noise in the hallways to a minimum.

### ***Animal Identification***

Animal identification is important to good animal care and science. Permanent individual identification of animals using methods such as tattoos, ear notches, ear tags, or microchips should be supplemented along with identification cards that include such information as stock or strain, vendor, responsible investigator, and protocol number. Individual clinical or research records can include such information as experimental use and pertinent clinical data.

### ***Care Outside of Normal Working Hours***

Emergency, holiday and weekend care must be available on a regularly scheduled basis. Emergency contact information should be posted on the door of animal rooms.

### ***Quarantine Programs***

The Animal Welfare Act mandates that the institution is responsible and accountable for animal purchases and annual reporting. Newly acquired animals can introduce disease into established colonies. The first step in the process of disease prevention is therefore the procurement of healthy animals. All animal sources must be approved by the IACUC. Special considerations may be made for animals obtained from nature or specialized non-commercial sources. Pet-store animals are generally unacceptable due to their unknown history and the potential for disease transmission. All incoming animals should be inspected on arrival and housed in a quarantine facility or in a room separate from acclimated animals until their health status has been established. Newly arrived animals should be permitted a stabilization period to allow them to physiologically and behaviorally adapt to their new environment before any experimental use is initiated. Studies of several laboratory species have indicated that various physiological parameters can be altered for several days following shipping. All animals should be allowed at least 72 hours after arrival to acclimate prior to any survival surgical procedure.

### ***Surveillance, Diagnosis, Treatment and Control of Disease***

All laboratory animals must be inspected daily by an individual trained to recognize signs of illness or injury in animals because spontaneous disease or injury is frequently detected in laboratory populations, and because some experimental paradigms could induce pain or distress. A record of the daily feeding and husbandry performed should be kept on site.

Sick or injured animals must receive immediate veterinary attention. Methods of diagnosis, therapy, and disease control should follow current standards of acceptable veterinary practice. If a contagious disease is suspected, appropriate measures must be taken to prevent spread of the infection to healthy animals. Animals that die unexpectedly should be examined to determine the cause of death.

Routine scheduled serological and histopathological monitoring of selected animals in the colony facilitates the early detection of disease, as well as the detection of sub clinical or latent infections that do not produce recognizable clinical signs of illness in animals, but nonetheless can have serious adverse effects on experimental data.

### ***Use of Animals in Field Research***

Animals that are to be used in field research (without requiring laboratory housing) must be reviewed through the appropriate IACUC protocol. Considerations as to alternatives to the use of animals and levels of discomfort need to be addressed. Animals that will undergo surgery in the field require analgesia or anesthetics appropriate to the species in question and the recovery or release of animals should be monitored. If required, an approved method of euthanasia and disposal of remains needs to be arranged.

### **References**

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### **GUIDELINES FOR SURVIVAL SURGERY**

All survival surgical procedures should incorporate aseptic technique. Perioperative care should be described. Pain and distress should be minimized through appropriate use of anesthetics,

analgesics, tranquilizers, nursing care and/or other treatment. The standards should be reviewed periodically and the effectiveness assessed using performance-based standards.

Separate spaces should be used for the following activities: (1) animal preparation/preoperative care, (2) surgery, and (3) postoperative recovery. The location of the area for major rodent surgery is not critical but should be located in a portion of the laboratory that **is clean and** not heavily traveled. (Please note: An investigator's laboratory may be used as a rodent survival surgery area provided such use is approved and certified by the IACUC.) The surgical "table" must be constructed of a material that can be washed with soap and water and then disinfected using appropriate agents (Table 1) or that can be heat sterilized. The immediate surgical area should be disinfected prior to, between, and after surgeries and should not be used for other purposes during the time of surgery.

Name	Examples	Comments
Alcohols	70% ethyl alcohol, 85% isopropyl alcohol	Contact time required is 15 minutes. Contaminated surfaces take longer to disinfect. Remove gross contamination before using. Inexpensive.
Quaternary Ammonium	Roccal®, Cetylcide®	Rapidly inactivated by organic matter. Compounds may support growth of gram negative bacteria.
Chlorine	Sodium hypochlorite (Clorox® 10% solution); Chlorine dioxide (Clidox®, Alcide®)	Corrosive. Presence of organic matter reduces activity. Chlorine dioxide must be fresh (<14 Days old); kills vegetative organisms within 3 minutes of contact.
Aldehydes	Glutaraldehyde (Cidex®, Cide Wipes®)	Rapidly disinfects surfaces. Toxic. Exposure limits have been set by OSHA.
Phenolics	Lysol®, TBQ®	Less affected by organic material than other disinfectants.
Chlorhexidine	Nolvasan®, Hibiclens®	Presence of blood does not interfere with activity. Rapidly germicidal and persistent. Effective against many viruses.

Surgical instruments must be sterile. Heat sterilization is ideal. Agents such as chlorine dioxide or glutaraldehydes can be used for cold sterilization (Table 2). Surgical instruments, gloves and other paraphernalia may be used on more than one animal. Any item used on multiple animals must be carefully cleaned and disinfected between animals (Table 3). **The use of a bead sterilizer is also strongly encouraged to sterilize surgical instruments between animals.** Alternating two or more sets of instruments is one way to allow time for instruments to sit in a disinfectant or sterilant solution for more than just a few minutes.

Name	Examples	Comments
Steam sterilization (moist heat)	Autoclave	Effectiveness dependent upon temperature, pressure and time (e.g., 121°C for 15 min. vs 131°C for 3 min).
Dry Heat	Hot Bead, Sterilizer, Dry Chamber	Fast. Instruments must be cooled before contacting tissue.
Ionizing radiation	Gamma Radiation	Requires special equipment.
Chlorine	Chlorine Dioxide	A minimum of 6 hours required for sterilization. Presence of organic



		matter reduces activity. Must be freshly made (<14 days). Instruments must be rinsed thoroughly with sterile water or saline before being used.
Aldehydes	Formaldehyde (6% sol.), Glutaraldehyde	For all aldehydes: many hours required for sterilization. Corrosive and irritating. Consult safety representative on proper use. Glutaraldehyde is less irritating and less corrosive than formaldehyde. Instruments must be rinsed thoroughly with sterile water or saline before being used.

**Table 3. Recommended instrument disinfectants.**

Instruments must be rinsed thoroughly with sterile water or saline to remove chemicals.

Name	Examples	Comments
Chlorine	Sodium hypochlorite (Clorox® 10% solution); Chlorine dioxide (Clidox®, Alcide®)	Corrosive. Presence of organic matter reduces activity. Chlorine dioxide must be fresh (<14 Days old); kills vegetative organisms within 3 minutes of contact.
Chlorhexidine	Nolvasan®, Hibiclens®	Presence of blood does not interfere with activity. Rapidly germicidal and persistent. Effective against many viruses.

The surgeon must thoroughly scrub his or her hands with a germicidal scrub (Table 4). Sterile surgical gloves, **face mask**, and a clean lab coat are mandatory. A surgical mask **must** be worn for surgeries that require invasion of the cranial, abdominal, or thoracic cavities.

**Table 4. Recommended skin sterilants.**

Name	Examples	Comments
Iodophores	Betadine®, Prepodyne®, Wescodyne®	Reduced activity in presence of organic matter. Wide range of microbicidal action. Works best in pH 6-7.
Chlorhexidine	Nolvasan®, Hibiclens®	Presence of blood does not interfere with activity. Rapidly germicidal and persistent. Effective against many viruses. Excellent for use on skin.

### **PREOPERATIVE CARE**

**P**erform a pre-surgical examination to insure your prospective patients are not overtly ill. Withholding food is not necessary in rodents unless specifically mandated by the protocol or surgical procedure. Water should NOT be withheld unless required by the protocol. Withholding food for more than six hours should be discussed with a veterinarian.

Preparation of the animal should include clipping or shaving the surgical site with a generous border (at least 1 cm) to keep hair from contaminating the incision. Animals should be properly anesthetized prior to prepping. The surgical site should be scrubbed with a germicidal scrub (Table 4), being careful to scrub from the center of the site toward the periphery. The site can then be rinsed with a 70% alcohol, sterile water, or sterile saline. Three alternating preps of germicidal scrub and rinse may be considered adequate. Finally, the area should be draped with sterile drapes, which not only helps prevent stray hair from entering the surgical field, but also provides a sterile area on which to lay sterile instruments during surgery.

### ***INTRAOPERATIVE CARE***

**T**he animal must be monitored carefully during the surgical procedure. Surgeons should pay close attention to the animal's respiratory rate and character, and response to noxious stimuli. Monitoring of respiratory rate and character may be facilitated by the use of transparent drapes. Heart beat should be checked periodically for significant changes in rate or rhythm. Heartbeat can be palpated through a sterile drape by the surgeon, or underneath the drape by a second person who is not performing sterile procedures. The surgical team should know the correct initial responses to the most common emergencies associated with the type of procedure they are performing. If surgeries will last more than 5 minutes, precautions to prevent hypothermia must be employed.

### ***POSTOPERATIVE CARE***

**P**ostsurgical care must include observing the animal to ensure uneventful recovery from anesthesia and surgery; administering analgesics as required; providing adequate care to surgical incisions and maintaining appropriate medical records. Animals must be monitored from the completion of surgery until recovery from anesthesia.

The most common complication that occurs during and after surgery is the development of hypothermia. Animals should be kept warm and dry to prevent hypothermia until they are fully recovered. Animals can be wrapped in a small piece of cloth or gauze square and placed under a heat source to speed recovery. If necessary, the cage may be placed on a bedded or padded surface and supplied with extra bedding. Be cautious with supplemental heat sources; they can cause thermal burns and hyperthermia if used inappropriately. Heat sources must be placed no closer than 12 inches from the animal, and positioned such that the animal can escape the heat source if it becomes too warm.

Many procedures entail the loss of body fluids either through bleeding or drying during surgery. Dehydration can be ameliorated by the administration of appropriate fluid therapy. Warm, sterile saline may be administered either subcutaneously or intraperitoneally.

If recovery from anesthetic will be prolonged (*i.e.*, over one hour), the animal should be rotated from side to side every 15-30 minutes to minimize hypostatic congestion of the lungs. This practice should be continued until the animal is able to maintain sternal recumbence or sit. To prevent cannibalism or suffocation, rodents should be monitored continuously or housed individually until they are ambulatory.

Post-surgical animals should be seen every day by a member of the investigator's staff until all sutures or wound clips have been removed. The animal's appearance, food and fluid intake, and waste output should be recorded. The surgical site should be monitored daily to insure that the surgical wound is healing properly and that complications have not occurred. Sutures and wound clips generally should be removed 7-14 days after surgery. Once sutures/wound clips are removed, animals must be monitored 3 times during the first week to ensure that complications have not occurred.

In the event that infections or complication occur, veterinary staff must be notified.

## **RECORDS**

The following information should be maintained from all surgeries:

- 1) Date of surgery
- 2) Type of animal
- 3) Type of procedure
- 4) Type of anesthetic including dose and route
- 5) Type of analgesic, if given, including dose and route
- 6) Type of antibiotic, if given, including dose and route
- 7) Postoperative monitoring (time, observations, etc.)
- 8) Complications
- 9) IACUC approved protocol number

The cage card should also indicate the date of surgery and procedure performed. A sample record is located in the Appendices.

## **GUIDELINES FOR ANESTHETICS AND ANALGESICS**

Animal welfare regulations require that procedures involving animals avoid or minimize discomfort, distress, and pain to the animals. If procedures involve more than momentary or slight pain and discomfort to animals, regulations require the appropriate use of sedatives, anesthetics, or analgesics, unless withholding of such agents is scientifically justified in writing and approved by the IACUC. Assessment of pain and distress in animals is difficult and can be subjective. As such, procedures that cause pain or distress in humans should be assumed to cause similar effects in animals, unless the contrary is established. The attending veterinarian has the authority to ensure the provision of adequate sedation, analgesia, or anesthesia.

## **ANESTHESIA**

Anesthesia is a state of unconsciousness induced in an animal. The three components of anesthesia are analgesia (pain relief), amnesia (loss of memory) and immobilization. The drugs used to achieve anesthesia usually have varying effects in each of these areas. Some drugs may be used individually to achieve all three. Others have only analgesic or sedative properties and may be used individually for these purposes or in combination with other drugs to achieve full anesthesia. Consultation with a veterinarian regarding the choice of drugs, dose range, etc. should be done prior to submission of an Animal Care protocol.

### ***General anesthesia using inhalable anesthetics (Table 1)***

Inhalation anesthesia is the preferred method at Virginia State University. Inhalation anesthesia is superior to most injectable forms of anesthesia in safety and efficacy. It is easy to adjust the anesthetic depth. Because the anesthetics are eliminated from the blood by exhalation, with less reliance on drug metabolism to remove the drug from the body, there is less chance for drug-induced toxicity. Inhalation anesthetics are always administered to effect, because the dosage can vary greatly among individual animals and different animal species. The disadvantages to inhalant anesthesia are the complexity and cost of the equipment needed to administer the

anesthesia, and potential hazards to personnel. All inhalant drugs are volatile liquids. They should not be stored in animal rooms because the vapors are either flammable or toxic to inhale over extended periods of time.

<b>Table 1 Recommended inhalable anesthetics</b>			
Drug	Response	Toxicity	Comments
Methoxyflurane	slow	nephrotoxicity- is potentiated by tetracyclines	good analgesic activity, but there is significant metabolism, respiratory depression and cardiac depression
Halothane	moderate	hepato- and nephrotoxicity if the animal is hypotensive	Induces cardiopulmonary depression, and a risk of malignant hyperthermia in some breeds/strains
Isoflurane	fast	none	Induces respiratory depression and cardiovascular depression
Enflurane	fast	none	Induces cardiopulmonary depression and minimal respiratory depression
Nitrous Oxide	very fast	hepatotoxic	Cannot be used as a sole anesthetic agent. Do not exceed a 50% mix w/ oxygen and other inhalant agent to prevent hypoxia. Moderate analgesia is provided by nitrous. In general, use of nitrous oxide in animals is discouraged.
Carbon Dioxide	very fast	cerebral anoxia	Can be used as an anesthetic for brief procedures and as a euthanasia agent. It has antinociceptive activity and causes unconsciousness prior to hypoxia. It is necessary to monitor carefully and work quickly, as animals die quickly (1-2 min) after losing consciousness, and likewise they wake up quickly when exposed to room air. Appropriate for quick procedures such as tail snipping, ear marking and orbital bleeding. Poses minimal hazard to personnel and can be used in laboratories or animal room

### ***General anesthesia using injectable anesthetics***

Some of injectable anesthetics do not possess all three criteria for an anesthetic and must be used in combinations to achieve full anesthesia or may be administered individually for restraint, sedation or analgesia. These drugs tend to have synergistic effects; therefore, mixing them can significantly reduce the dosage needed for any individual drug. As with inhalation anesthesia, injectables are given to effect. If a drug is scheduled by the Controlled Substances Act of 1970, licenses are required to purchase them, and written records must be kept of their use. Anesthetic drugs that have exceeded their expiration date may not be used, even for terminal procedures.

Injectable anesthetics are, in general, metabolized by the liver and excreted by the kidneys. Animals with liver or kidney disease should not be anesthetized with these agents. Inhalation anesthetics are safer for use in sick or debilitated animals, because there is minimal metabolism, the amount of anesthetic administered can be controlled and one can cease administration as the situation dictates. Injectable anesthetics offer the advantage of requiring less expensive equipment.

### ***Local anesthetics***

The generic and brand names of local anesthetics often have the suffix "caine". Common local anesthetics are procaine (Novacaine), bupivacaine, lidocaine (Xylocaine) and proparicaine. Considerable experience and skill are necessary in the administration of local anesthetics to

animals, and aseptic techniques must be employed. Some animals must be sedated before local anesthetics are injected. Anesthetic effects are seen within 15 minutes of administration and may last from 45 minutes to several hours, depending on the drug used.

An additional use of local anesthetics is for amphibian and fish anesthesia. Tricaine and benzocaine can be added to water at a dose of from 25-100 mg/L, depending on the depth of anesthesia required. When the fish loses equilibrium (floats belly up) or an amphibian becomes inactive, it can be handled. For longer procedures, intermittent supplementation of anesthetic treated water to the gills or skin may be required. The animal is recovered in fresh water.

### ***ANALGESIA***

**A**nalgesics are pain relievers most often given after a surgery. Administration of analgesics for postoperative care is required for a minimum of 48 hours. It is best if analgesia can be provided to animals preemptively, or prior to the painful procedure, rather than waiting until after clinical signs of pain are observed. Consultation with a veterinarian regarding the choice of drugs, dose range, etc. should be done prior to submission of an Animal Care protocol.

### ***RECORDS***

**F**or surgical procedures requiring anesthesia, an intra-operative anesthetic record must be included as part of the animal's records. This record must indicate the following:

- Investigator name
- Surgeon name
- Date
- IACUC protocol number
- Type of animal
- Pre-medication (include dosage, time, and route)
- Procedure performed
- Heart rate measurements every 15 min
- Respiration rate measurements every 15 min

A sample record is located in the Appendices.

### **GUIDELINES FOR EUTHANASIA**

**A**nimals are normally euthanized at the end of a study for the purpose of sample collection or post-mortem examination. Animals may be euthanized because they are experiencing pain or distress. Euthanasia is defined as a pain-free or stress-free death. In general, investigators should follow current guidelines established by the American Veterinary Medical Association Panel on Euthanasia (2000; [http://www.avma.org/issues/animal\\_welfare/euthanasia\\_report.pdf](http://www.avma.org/issues/animal_welfare/euthanasia_report.pdf)).

### ***CRITERIA FOR EUTHANASIA***

**E**uthanasia of animals is expected if animals demonstrate the conditions listed below, whether the animal has been manipulated or not. Additional criteria may be specified on the Animal

Usage Form. Fulfillment of one criterion can constitute grounds for euthanasia. Exceptions are permitted only if approved by the IACUC as part of the protocol review process (i.e. the clinical signs listed below are expected as part of the experiment and appropriate measures are taken to minimize pain or discomfort in the animals).

1. **Weight loss:** loss of 20-25% (depending on attitude, weight recorded at time of arrival, and age: growing animals may not lose weight, but may not gain normally) or if not measured, characterized by cachexia and muscle wasting.
2. **Inappetance:** complete anorexia for 24 hours in small rodents, up to 5 days in large animals; partial anorexia (less than 50% of caloric requirement) for 3 days in small rodents, 7 days in large animals.
3. **Weakness/inability to obtain feed or water:** Inability or extreme reluctance to stand which persists for 24 hours, assuming that the animal has recovered from anesthesia.
4. **Moribund state:** depression coupled with decreased body temperature, or non-responsive to stimulation, assuming that the animal has recovered from anesthesia.
5. **Infection:** infection involving any organ system which fails to respond to antibiotic therapy within an appropriate time and is accompanied by systemic signs of illness.
6. **Signs of severe organ system dysfunction non-responsive to treatment, or with a poor prognosis as determined by a veterinarian.**

#### ***RECOMMENDED METHODS FOR EUTHANASIA (Table 1)***

**E**uthanasia by inhalation of a general anesthetic or carbon dioxide inhalation is the preferred method at Virginia State University.

#### **Euthanasia by use of general anesthesia**

Induction of general anesthesia with a volatile gas (i.e. isoflurane, methoxyflurane) followed by death without regaining consciousness is the preferred method at Virginia State University. After anesthesia is induced, euthanasia may be completed by any of the following procedures:

- continued exposure to anesthetic for 5-30 minutes after breathing has stopped (newborn of most species are more resistant than adults to hypoxia and will require exposure times 2-3 times as long to assure death.);
- thoracotomy;
- cervical dislocation (in small animals less than 200 gm);.

#### **Carbon dioxide inhalation**

Carbon dioxide inhalation can be suitable for all species, provided acceptable equipment is used. Practically, its use is limited to rodents and other mammals weighing less than about 500 grams. Compressed CO<sub>2</sub> from cylinders is the only acceptable source. Dry ice is not permitted as a CO<sub>2</sub> source.

The chamber method of CO<sub>2</sub> inhalation euthanasia employs a top-opening chamber into which the animal(s) are introduced. After the animal(s) are placed in the chamber, a slow flow of CO<sub>2</sub> is initiated for a few minutes to slowly establish a high concentration at the bottom of the chamber. It is an unacceptable practice to pre-charge the chamber with CO<sub>2</sub> prior to placing the

animals in the chamber. After breathing has stopped and the animal(s) are unconscious, euthanasia may be completed by any of the following procedures:

- continued exposure to CO<sub>2</sub> for 5-30 minutes after breathing has stopped (newborn of most species are more resistant than adults to CO<sub>2</sub> and will require exposure times 2-3 times as long to assure death.);
- cervical dislocation;
- thoracotomy

### Cervical dislocation

Cervical dislocation, dislocation of the neck, is a simple and humane method of killing mice and small rats (<125 g). The use of sedation or anesthesia prior to euthanasia is encouraged. If sedation or anesthesia prior to cervical dislocation is not used the investigator must provide scientific justification for its exclusion **along with level of experience performing the procedure**. Cervical dislocation may only be performed by properly trained personnel.

<b>Table 1. Acceptable methods of euthanasia.</b> A = Acceptable; AWJ = Acceptable only with scientific justification, in writing, on the Animal Protocol Form; UNA = Unacceptable; N/A = Not applicable or not specifically addressed by the AVMA panel									
<b>Method</b>	Animals <125g	Rodents 125g-1kg	Rodents 1kg-5kg	Birds	Dogs	Cats	Non human primates	Farm animals	Reptiles, amphibians, fish
<b>CO<sub>2</sub></b>	A	A	A	A	UNA	UNA	UNA	UNA >40kg	A
<b>Anesthesia and Exsanguination</b>	A	A	A	A	A	A	A	A	A
<b>Anesthesia and IV KCl (1-2 meq/kg)</b>	A	A	A	A	A	A	A	A	A
<b>Anesthesia and Decapitation</b>	A	A	AWJ	A	UNA	UNA	UNA	UNA	A
<b>Anesthesia and Cervical Dislocation</b>	A	A	UNA	A	UNA	UNA	UNA	UNA	N/A
<b>Decapitation w/o anesthesia</b>	AWJ	AWJ	AWJ	AWJ	UNA	UNA	UNA	UNA	AWJ
<b>Cervical Dislocation w/o anesthesia</b>	AWJ	UNA	UNA	AWJ	UNA	UNA	UNA	UNA	N/A
<b>IV barbiturate overdose/ euthasia solution</b>	A	A	A	A	A	A	A	A	A
<b>IP barbiturate overdose/ euthasia solution</b>	A	A	A	A	UNA	A	UNA	UNA >10 days of age	A
<b>Immersion</b> Reptiles, amphibians, and Fish	Tricaine methanesulfonate (MS222) can be used either as an injectable agent (200- 300 mg/kg of a 1% buffered solution) or as an immersion bath (2 mg/ml in H <sub>2</sub> O) for amphibians and fish. The immersion time needed to assure death can range from 20 minutes to three hours, so it may be advantageous to use MS222 as an anesthetic followed by a physical method of euthanasia								

## **RECORDS**

Upon the completion of the euthanasia procedure, document the following information:

- Date
- Time
- Number of animals euthanized
- Method of euthanasia used
- How death was confirmed (*e.g.*, absence of heartbeat, thoracotomy, removal of vital organ)

A sample record is located in the Appendices.

## **ROLE OF THE VETERINARIAN**

The University contracted veterinarian will administer and/or guide the veterinary care surgical procedures, post-surgical care, anesthesia and analgesia, euthanasia, and husbandry of the animals, and ensuring the appropriate training of personnel working with animals in accordance with all relevant regulations and guidelines governing the humane care and use of animal. The specific duties of the veterinarian will be defined by the IACUC policy documents.

The address and phone number of the current contracted veterinary for the Animal Resource Center will be available from the Office of Sponsored Programs, Department of Biology administrative offices, and posted outside the lab animal facility.

## **OCCUPATIONAL HEALTH AND SAFETY**

### ***ANIMAL RESEARCH INVOLVING HAZARDOUS MATERIAL POLICY AND PROCEDURES***

The Biology Animal Welfare committee that oversees the management of the lab animal facility pay particular attention to animal use proposals using potentially hazardous materials, including, radioactive substances, infectious microorganisms and hazardous chemicals. Each of these substances has the potential to cause harm to animals as well as those caring and working with the animals.

Some hazardous materials are strictly controlled by federal, state and local regulations and often an institution has specific committees concerned with all instances of hazardous material use. Virginia State University has established specific safety committees composed of professional staff and faculty with expertise in handling chemical, biological and radiological agents. These committees include the Institutional Biosafety Committee and the Radiation Safety Committee. These committees will review and assess potential hazards associated with animal use.

The Principal Investigator is responsible for complying fully with the policy on biohazardous use involving animals.

**Comment [16]:** Allergies to rodents are the number 1 occ health hazard in lab animal facilities. So we need to come up with a plan for how we will monitor the folks working with rodents and what will be required in the way of an occ health exam to clear folks to work in the facility.



### **1. Radioactive Materials and Radiation Sources**

Review of any animal research protocol involving the use of specified radioactive materials and X-ray procedures must be coordinated between the Radiation Safety Committee and the IACUC. It is the Principal Investigator's responsibility to submit the appropriate forms for review to the Radiation Safety Committee as well as to complete the appropriate section in the animal use protocol form. The PI must attach final approval from the Radiation Safety Committee to the IACUC form. Final approval of the animal use protocol is dependent on receipt of Radiation Safety Committee approval.

### **2. Recombinant DNA Experiments**

Review of any animal research protocol involving the use of Recombinant DNA must be coordinated between the Institutional Biosafety Committee and the IACUC. It is the Principal Investigator's responsibility to submit the appropriate forms for review to the Institutional Biosafety Committee as well as to complete the appropriate section in the animal use protocol form. The PI must attach final approval from the Institutional Biosafety Committee to the IACUC form. Final approval of the animal use protocol is dependent on receipt of Institutional Biosafety Committee approval.

### **3. Infectious Agents and Hazardous Chemicals**

Review of any animal research protocol involving the use of infectious agents and hazardous chemicals must be coordinated between the Institutional Biosafety Committee and the IACUC. It is the Principal Investigator's responsibility to submit the appropriate forms for review to the Institutional Biosafety Committee as well as to complete the appropriate section in the animal use protocol form. The PI must attach final approval from Biological Safety Committee for biohazards to the IACUC form. Final approval of the animal use protocol is dependent on receipt of the approval.

### **4. Hazardous Waste**

Animal wastes contaminated with radioactive materials, infectious agents or hazardous chemicals must be carefully managed to avoid human exposure or damage to the environment. Hazardous waste material must be conducted in accordance with the guidelines established by the Radiation Safety and the Institutional Biosafety Committee. The principal investigator will assume any associated expense.

### **5. Principal Investigator's Responsibilities**

The Principal Investigator will provide those personnel under his/her supervision with knowledge of hazards to which they may be exposed and safety procedures to be followed. This will be accomplished by the PI:

- Being knowledgeable of good laboratory safety practice and a positive safety attitude.
- Making available to the laboratory staff, copies of protocols that describe potential biohazards and the precautions to be taken. These protocols as well as biosafety concerns should be produced in the form of a standard operating procedure (SOP) for the work.
- Providing laboratory staff with formal and informal instruction and training in the practices and techniques required to ensure safety.

- Informing the laboratory staff of the reasons and provisions for any precautionary medical practices (e.g., medical examinations, serum collection, vaccinations, etc.)
- Supervising the performance of staff to ensure that required safety practices and techniques are employed.
- Making available to the laboratory staff, copies of the emergency plans covering accidental spills and personnel contamination resulting from hazardous research.

### **GENERAL ANIMAL RESEARCH POLICY AND PROCEDURES**

**T**hese guidelines have been established to ensure a safe working environment for the personnel utilizing the Lab Animal Facility. Personnel working in the Animal Resource Center must adhere to the following guidelines:

**1. Always wash your hands when entering and leaving the Animal Resource Center.**

The most common way to contract a zoonotic infection is place the infectious material directly in your own mouth. Always wash your hands after handling an animal or anything that the animal has touched. Never smoke, drink, or eat in the animal room or before washing your hands.

**2. Absolutely no eating and drinking will be allowed within the Animal Resource Center.**

Eating and drinking are not permitted in the Animal Resource Center and in laboratories where animals are used.

**3. Always wear protective clothing.**

Personnel working in an animal facility will wear proper protective clothing at all times as determined by Occupational Health & Safety officer, IACUC, and the facility manager. For some workers, protective clothing will consist of a lab coat; for others it may be a dedicated set of work clothing. Protective clothing will be provided by the University. Personnel working in the cage wash area are required to wear protective shoes in addition to other protective clothes requirements. Personnel working in the animal facilities are required to wear closed toe shoes (no sandals). Other persons entering into an animal facility or working with animals will wear protective clothing appropriate for the species and level of involvement. Protective clothing must be laundered either at the research facility or by a commercial laundry service. Never take protective clothing home with you. Protective clothing insures that you won't bring potentially contaminated material home with you.

**4. Additional usage of personal protective devices may be necessary.**

Some types of work require personal protective devices such as gloves, face shields, masks, respirators, etc. Always use the protective devices where required, and follow the facility manger's instructions scrupulously.

**5. Immunizations must be kept up to date.**

All personnel having substantial contact with laboratory animals should have current immunization against tetanus. Personnel with potential exposure to human blood-born pathogens (including those working with cell lines of human or chimpanzee origin) should receive hepatitis B immunization.

**Comment [17]:** I would include tetanus as a required vaccine as well. We don't need TB testing since we are not housing monkeys.

**6. If an accident occurs, seek medical attention promptly.**

If you are injured on the job, you must promptly report the accident to your supervisor, even if it seems relatively minor. You will then report to employee health services for evaluation of the injury.

**7. Tell your physician you work with animals.**

Whenever you're ill, even if you're not certain that the illness is work related, always mention to your physician that you work with animals. Many zoonotic diseases have flu-like symptoms, and your physician needs this information to make an accurate diagnosis.

**8. The PI is responsible for teaching their workers what they need to know to perform their job safely and effectively.**

Laboratory workers and animal care personnel should know how to recognize hazard warning signs, how to protect themselves and their coworkers against each recognized hazard, and how to react properly in the event of emergencies.

Training should be appropriate for the employee's education, experience, and language skills. Training sessions should be documented by the PI. Everyone in the workplace should be aware of their own safe work practices and those of others. Safety is everyone's business.

**ANIMAL RESOURCE CENTER PERSONNEL**

A trained animal technician will be hired as the Animal Resource Center manager. This person will have the responsibility of ensuring that **established policies and** guidelines set forth by the Biology Animal Welfare committee, **IACUC**, and the University contracted veterinarian are followed and maintained on a daily basis. The manager will be charged with daily animal care, facility maintenance, guidance for the completion of procedures and protocols, and maintenance of records on animals and the facility. The manager will also have a primary role in ensuring the proper training of all users of the facility.

**ANIMAL RESEARCH AND CARE TRAINING**

Virginia State University provides training to all those who use or care for animals. Any individuals listed on a protocol, including Principle Investigators, Research Fellows, Technicians/Assistants, and any individual involved in the design and implementation of research studies using laboratory animals.

Initial training will be conducted by utilizing the University of Arizona training modules. All users of the Animal Resource Center will be required to complete the training module related to the species they will use. These training modules cover species specific issues related to procedures, occupational health and safety, and handling. Additionally, the facility manager will provide local training sessions and develop Virginia State University specific training modules for future training needs.

All training records will be maintained by the Animal Resource Center manager and the IACUC. All individuals using animals will be expected to renew their training every year to ensure compliance with all IACUC and Animal Resource Center policies and guidelines.

**Additional training information can be found at the following locations:**

Office of Laboratory Animal Welfare (formally the Office for Protection from Research Risks' Division of Animal Welfare) - National Institute of Health

Guide for the Care and Use of Laboratory Animals - National Research Council - 1996. You can get a FREE hardcopy of this document by contacting the Institute for Laboratory Animal Research (ILAR) by calling 202-334-2590 or by visiting their web site at <http://www4.nas.edu/cls/ilarhome.nsf/web/publications?OpenDocument>

United States Department of Agriculture - Animal Welfare Act and the USDA Animal Welfare Policy Manual

Public Health Service Policy on Humane Care and Use of Laboratory Animals

Institute of Laboratory Animal Research (ILAR) - Founded in 1952, ILAR prepares authoritative reports on subjects of importance to the animal care and use community, serves as a clearinghouse for information about animal resources, develops and makes available scientific and technical information on laboratory animals and other biological research resources to the scientific community, institutional animal care and use committees (IACUCs), the federal government, science educators and students and the public

AVMA Panel on Euthanasia - To download the PDF version of the 2000 AVMA Panel on Euthanasia; go to the AVMA web site at <http://www.avma.org/resources/euthanasia.pdf> )

Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching - 1999 - Federation of Animal Science Societies publication. This publication is not currently available on-line. To order the Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching, please contact FASS via mail at: 1111 North Dunlap Avenue, Savoy, IL 61874; phone at 217.356.3182; fax at 217.398.4119; or e-mail at [fass@assochq.org](mailto:fass@assochq.org)

Occupational Health and Safety in the Care and Use of Research Animals - 1997 - National Research Council

Lab Animal magazine - This is a FREE publication that comes out every other month which has informative articles on animal health and husbandry issues, research and technical procedures, occupational health & safety, changing regulation and laws pertaining to animal care and use, vendor information, etc. If you work with animals on a routine basis, it is highly recommended you subscribe to this publication.

## **EMERGENCY PROCEDURES**

### ***Objective:***

The purpose of this manual is to offer guidelines for personnel on site at the time of an emergency or disaster and to suggest possible and likely approaches to protecting both human and animal health after the primary response teams (e.g., fire department, police, and safety offices) have responded. Professional judgment is essential in these situations.

### ***EMERGENCY PHONE CONTACTS***

#### **FOR EMERGENCIES AND DISASTERS SUCH AS FIRE, FLOOD, CHEMICAL SPILLS, SECURITY, ETC.**

VIRGINIA STATE UNIVERSITY POLICE	524-5411
FIRE DEPT	911
AMBULANCE	911

#### **HAZARDOUS MATERIALS**

##### **RESPONSE TEAM**

Veterinarian (On Call)

**Dr. Murray: 508-221-1924**

**Dr. Rodriguez:**

Manager, Animal Resource Center

Office: xxx-xxxx

Home: xxx-xxxx

Biology Animal Care Committee Chair

Office: 524-6990

Home: 943-8717

Department of Biology, Chair (Building Manager)

Office: xxx-xxxx

Home: xxx-xxxx

IACUC Chair

Office: xxx-xxxx

Home: xxx-xxxx

Physical Plant

xxx-xxxx

(After Hours)

xxx-xxxx

### **GENERAL PRINCIPLES FOR ALL EMERGENCIES**

**Responsibilities:** The individual with overall responsibility in an incident is the Chair of the Biology Animal Welfare Committee or the (AWC) Chair's designee (e.g., supervisor or animal caretaker). The AWC Chair or designee coordinates the overall response in an emergency or disaster consulting, when possible, with the principle investigators (PI) affected.

**Facilities Covered:** All animal housing in the Animal Resource Center (vivarium or other specified location) is covered. The Chair (or designee) directly manages responses to centrally-

**Comment [18]:** I can provide a "disaster plan" to cover emergencies and will spell out what needs to be done.

operated facilities.

**Communications:** In the event of an emergency or disaster, the individual who discovers or is advised of the situation immediately reports the problem to the Head of their Section or immediate supervisor. If that person cannot be contacted, then any Section Head available should be contacted. In an acute emergency endangering human life, staff communicates to each person on site to protect co-workers. In a less acute emergency, the ranking Supervisor takes charge until the threat to human life has been addressed. As soon as possible, the problem is then reported to the AWC Chair or the Chair's designee, who then determines additional communications. Individuals encountering human life-threatening conditions where time is critical, such as a fire or hazardous materials spill, must immediately notify the unit responsible for handling the emergency (e.g., University Police at 524-5411; then they notify their Supervisor or the AWC Chair/designee. If the problem arises after normal hours, then the Veterinarian on-call and AWC Chair are notified.

**Security:** As soon as safe conditions have been established and animal welfare addressed, security will be given a high priority. University Police units are notified if normal animal facility security has been breached and they, along with facility personnel, will formulate a plan to restore or supplement compromised security.

**Emergency Evacuation:** In the event of an evacuation of an animal facility during working hours (such as due to a fire, hazardous material spill, or other emergency) the following principles apply:

1. Personnel are not to endanger themselves or others by delaying an ordered evacuation.
2. Personnel should do their best to alert others as they evacuate the premises.
3. To the extent they can do so without delaying their evacuation, personnel quickly turn off or shut down equipment as they leave. This avoids creating additional hazards of unattended equipment.
4. On-site personnel employ their professional judgment for handling animals which are anesthetized, or undergoing surgery or nonsurvival procedures from which they might awaken if left unattended. Animals undergoing surgical procedures can be evacuated (small animals) along with the personnel, or they can be euthanized, or they can be left on anesthesia machines, however, every reasonable effort should be made to ensure animals will not awaken in severe pain and that personnel are not delayed from evacuating the premises promptly.

***EMERGENCIES COVERED BY THE PLAN (details given in Appendices):***

1. Air handling problems: loss of supply or exhaust
2. Bomb threat
3. Break in
4. Chemical/radiation spill

5. Electrical power outage
6. Fire
7. Flood
8. Phone or Paging System outage
9. Protests/picketing/strike
10. Snow storm/blizzard/Ice storm
11. Temperature problems (hot or cold)
12. Hurricane, Tornado or Other Severe Storm
13. Water supply interruption
14. Miscellaneous other emergencies or disasters

***OVERVIEW OF ANIMAL CARE AND SUPPORT NEEDS (see specific emergency for details)***

1. ***Animal health checks and health maintenance.*** Animals should be checked daily to confirm they are healthy. These observations may be performed by qualified personnel. Observations of abnormalities or treatment of sick animals must be handled by consultation by the veterinarian.
2. ***Food and water supplies.*** Food and water are critical to maintaining animal health. The appropriate food for the species and research needs, in adequate quantities, in unadulterated form, is the goal of this plan. If the usual food is not available, professional judgment must be applied to identify acceptable substitutes which are available. Water is especially important, as most animals can survive for several days with little food, but may succumb within 1-2 days without water. Water must be potable and, ideally, delivered in the same form (acidified, autoclaved, etc.) as normal. Some species are especially sensitive to food or water deprivation (e.g. immature animals) and should be given special attention.
3. ***Sanitation.*** For purposes of animal health, animal welfare, and support of research, adequate sanitation must be provided. Cages of some species must be changed often (e.g., large animals like dogs, cats, monkeys) while others may go several days without inducing health or environmental problems. The goal of this plan is to approximate normal sanitation schedules with available resources. Increasing cage change intervals, spot cleaning instead of whole-cage changes, changing bedding instead of cage changes, hand washing of some equipment, or deferring activities such as floor mopping may be required. The AWC Chair/designee decide which sanitation activities are performed in order to provide the greatest benefit to the animals if it is not possible to perform all normal activities due to unusual conditions.
4. ***Environmental support (ventilation, temperature control, utilities).*** Maintenance of an appropriate environment is essential to the well-being of animals and for many research projects. Ventilation problems may include loss of or diminished air supply or exhaust, loss of pressure differentials in critical areas, unacceptable temperature variations, contamination with agents such as chemicals or smoke, or loss of utilities such as electricity needed for lights or powered equipment (e.g., hoods, autoclaves, ventilated racks). Ventilation problems

will be dealt with by AWC Chair and/or designee, with goals of: maintaining at least some air movement in animal housing spaces, and keeping temperatures as close to the acceptable range as is possible. The minimal standard is to prevent animal deaths or contamination of the environment.

5. **Personnel to provide animal care.** Personnel with adequate training are essential to maintaining animal colonies. They may be unable to work in facilities due to damage or dangerous conditions, physical obstructions (snow storm or chemical spill nearby), or interruption of work (bomb threat, picketing, etc.). The AWC Chair or designee will coordinate the response. Personnel may be asked to perform duties outside the scope of their normal responsibilities in order to protect animal health or well-being.

**OTHER EMERGENCIES AND DISASTERS**

Other emergencies and disasters not specifically discussed in this document are handled by the staff on-site at or after the emergency, employing measures consistent with the University Guide for the Care and Use of Animals and support needs above, and professional judgment for the maintenance of animal health and safety.

*Initial version: June 2006*

*Approved by IACUC:*

**APPENDICES**

**DESCRIPTION OF ANIMAL RESOURCES CENTER FACILITIES AT VIRGINIA STATE UNIVERSITY**

<b>Room</b>	<b>Size (square feet)</b>	<b>Function</b>
Cage Cleaning Room	142	Cage wash room with automated cage washer, sinks and autoclave
Entry Room	131	Entry/gown room
Animal Holding Room 1	70	Animal holding/isolation room with light timer
Animal Holding Room 2	145	Main animal holding room with light timer
Surgery Room	202	Surgical/procedure room with cabinets and sink
Research Lab	290	Research lab for experimental work with fume hood and sink
<b>Total</b>	<b>980</b>	



**VIRGINIA STATE UNIVERSITY PROTOCOL  
FOR USE OF VERTEBRATE ANIMALS**

Leave Blank Proposal #:  Approval Date:  Expiration Date:
--

**PLEASE TYPE.**  
*USE ADDITIONAL SHEETS AS NECESSARY.*

**A. ADMINISTRATIVE DATA**

Department:

Principal Investigator:

Mailing Address:

Telephone:

Fax:

Email:

Project Title:

Initial Submission     Renewal     Modification

Existing IACUC No. (for renewals or modifications)

List the names of all individuals authorized to conduct procedures involving animals under this proposal and identify their role (e.g., principal investigator), providing their department, telephone, fax, and email:

**B. TYPE OF STUDY: (Check all applicable categories and complete appropriate sections)**

\_\_\_\_\_ **BEHAVIORAL STUDY** - COMPLETE SECTION M

\_\_\_\_\_ **COLLECTION OF BLOOD/TISSUE** - COMPLETE SECTION J

\_\_\_\_\_ **FIELD STUDIES/BIOLOGICAL SURVEYS** - COMPLETE SECTION Q

\_\_\_\_\_ **HAZARDOUS MATERIALS** - Check all applicable categories below and COMPLETE SECTION L

\_\_\_\_\_ **Biological Hazards** (Any fungi (live or dead), bacteria (live or dead), viruses, prions, clinical samples, known infected human tissue samples, or any biotoxins (e.g., Tetrodotoxin, botulinum toxin) used in live animals and that may have an adverse effect on health adult humans. Also include any replicative deficient viruses.

\_\_\_\_\_ **Recombinant DNA** (As specified by the NIH Guidelines available at <http://www4.od.nih.gov/oba/rac/guidelines/guidelines.html>. These include use of fungi, bacteria, viruses or gene transfers in live animals, which may have an adverse effect on healthy adult humans)

\_\_\_\_\_ **Chemical Hazards** (Please underline any that apply: Highly/Acutely Toxic, Highly/Acutely Carcinogenic, Highly/Acutely Mutagenic.)

\_\_\_\_\_ **Radiological Hazard** (Radiolabeled material injected in live animals or exposure of animals to ionizing radiation using a research irradiator or other radiation-producing devices.)

\_\_\_\_\_ **NON-INVASIVE STUDY** (i.e., physiological responses to materials administered) - COMPLETE SECTION J

\_\_\_\_\_ **SURGICAL-NON-SURVIVAL** (surgical procedures in which the animal is euthanized without recovery from anesthesia) - COMPLETE SECTION N

\_\_\_\_\_ **SURGICAL-SURVIVAL** (surgical procedures in which the animal is allowed to recover from anesthesia) - COMPLETE SECTION N

**C. ANIMAL REQUIREMENTS**

Genus: [e.g., *Mus*]

Species: [e.g., *musculus*]

Strain, subspecies, or breed: [e.g., *C57BL*]

Common name: [e.g., *black laboratory mouse*]

Approximate age, weight or size:

Sex:

Bacteriological status: [e.g., *germfree (axenic), defined flora (gnotobiotic), specific pathogen free, conventional*]

Viral status: [e.g., *simian immunodeficiency virus, simian retrovirus*]

Source(s): [e.g., *name of vendor or breeder, bred in-house*]

Primary housing location(s): [Facility manager must certify below that facility has the resource capability to support the study. If animals will be housed in lab or anywhere else outside central facility for more than 12 hours, provide building and room number.]

Location(s) where manipulation will be conducted:

Number of Animals to be Used:

Year 1:

Year 2:

Year 3:

Total:

**D. TRANSPORTATION**

Transportation of animals must conform to all institutional guidelines/policies and federal regulations. If animals will be transported on public roads or out of state, describe efforts to comply with USDA regulations. If animals will be transported between facilities, describe the methods and containment to be utilized. If animals will be transported within a facility, include the route and elevator(s) to be utilized.

**E. STUDY OBJECTIVES**

Briefly explain in language understandable to a layperson the aim of the study and why the study is important to human or animal health, the advancement of knowledge, or the good of society.

**F. RATIONALE FOR ANIMAL USE.**

Justify the selection of the proposed animal species, strain, and numbers (include statistical or other criteria for animal numbers). The rationale should include reasons why non-animal models cannot be used. Cost is not a valid justification. Please provide a justification of the appropriateness of the species selected and of the number of animals used. Include a table if it will help simplify your explanation. Use additional sheets if necessary.

**G. DESCRIPTION OF EXPERIMENTAL DESIGN AND ANIMAL PROCEDURES**

Describe specifically what will be done with the animals, and indicate the expected results. Discuss the procedures in the order they are performed and give time intervals (use tables to indicate uses of animals in complex protocols) occurring between procedures. This description should allow the IACUC to understand the experimental course of an animal from its entry into the experiment to the endpoint of the study. Use additional sheets if necessary.

**H. PAIN OR DISTRESS CLASSIFICATION AND CONSIDERATION OF ALTERNATIVES**

**H.1. PAIN OR DISTRESS CLASSIFICATION** See <http://www.aphis.usda.gov/ac/policy/policy11.pdf> for definition of pain categories.

Species (common name)	USDA Classification* B, C, D or E	Number of animals used each year			3 year total number of animals
		Year 1	Year 2	Year 3	
Total number of animals (should equal total from Section C):					

\* If Category "E" applies, Sections O and T must be completed

**H.2. CONSIDERATION OF ALTERNATIVES**

If any procedures fall into USDA's Classification D or E, causing more than momentary or slight pain or distress to the animals, describe your consideration of alternatives and your determination that alternatives are not available. Delineate the methods and sources used in the search. Database references must include databases searched, the date of the search, period covered, and the keywords used. Alternatives include methods that (1) refine existing tests by minimizing animal distress, (2) reduce the number of animals necessary for an experiment, or (3) replace whole-animal use with in vitro or other tests.

**I. VETERINARY CARE**

Indicate desired plan of action in case of animal illness (e.g., initiate treatment, call investigator prior to initiating treatment, euthanize).

**J. MATERIALS TO BE ADMINISTERED TO ANIMALS AS PART OF EXPERIMENTAL PROTOCOL:**

Do not include hazardous materials, which you have listed and described on page IV.

Species	Antigen/Drug	Dose (mg/kg)	Route	Frequency	Total Number of Animals Treated
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Describe potential effects of material(s) administered on the animals:

Indicate how long individual animals will be on the study (from time of arrival at VSU until time of sacrifice):

Location where experimental procedures will be conducted: Building \_\_\_\_\_ Room # \_\_\_\_\_

**K. BLOOD/TISSUE COLLECTION:**

Describe technique used to collect blood or tissue (include route of collection and anesthetic, sedative or tranquilizing agents administered prior to specimen collection).

Species	Blood/Tissue	Amount/Size	Frequency	Total Number of Animals Used
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If the nature of your project makes it difficult to complete the above table, include a bleeding or collection schedule:

Indicate methods for the prevention of anemia:

Location where collection procedures will be conducted: Building \_\_\_\_\_ Room \_\_\_\_\_

**L. USE OF HAZARDOUS MATERIALS**

Use of hazardous agents requires the approval of the institutional Biosafety Office/Committee. Attach documentation of approval for the use of recombinant DNA or potential human pathogens. For additional information, access the CDC website at <http://www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4toc.htm>

**L.1. ANIMAL EXPERIMENTATION INVOLVING BIOLOGICAL HAZARDS:**

List hazardous material(s) or agent(s) and the amount to be used:

<i>Species</i>	<i>Material/Agents</i>	<i>Dose (if you using toxins)</i>	<i>Route</i>	<i>Frequency</i>	<i>Total Number of Animals</i>
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Indicate the role of biohazardous material(s) or agent(s) in the proposed study:

Potential Hazard (Describe potential adverse effects on man (**lab personnel, animal caretakers**) or animals and indicate the degree and nature of the risk to the personnel):

Safety Precautions (Describe the containment protocol to be followed to protect other animals, personnel and the environment from the hazardous agents; include monitoring methods and frequency and the name of the person responsible for monitoring. Also include Biosafety Level as per CDC Guidelines):

Storage and Disposal of Hazardous Material (Describe waste and animal storage and disposal requirements):

Location where experimental procedures will be conducted: Building \_\_\_\_\_ Room # \_\_\_\_\_

**L.2 ANIMAL EXPERIMENTATION INVOLVING RECOMBINANT DNA:**

Indicate species of animal to which rDNA will be introduced:

Indicate sources of DNA (species, organ or tissues, etc.):

Describe nature of the inserted DNA sequence (i.e., What does it code for and what are you trying to accomplish?):

Describe vectors and hosts and potential hazards associated with them:

Describe safety precautions (as per NIH guidelines and CDC biosafety levels):

Describe procedures for storage, transport (both within and outside VSU), and disposal:

Location where experimental procedures will be conducted: Building\_\_\_\_\_ Room #\_\_\_\_\_

**L.3. ANIMAL EXPERIMENTATION INVOLVING CHEMICAL HAZARDS:**

Indicate hazardous chemical(s) and the amount to be used:

<i>Species</i>	<i>Chemical(s)</i>	<i>Dose(mg/kg)</i>	<i>Route</i>	<i>Frequency</i>	<i>Total Number of Animals</i>
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Indicate the role of the hazardous chemical(s) in the proposed study:

Potential Hazard (Describe potential adverse effects on man [**lab personnel, animal caretakers**] or animals and indicate the degree and nature of the risk to the personnel):

Safety Precautions (Describe the containment protocol [i.e., Chemical Hygiene Plan] to be followed to protect other animals, personnel and the environment from the hazardous chemical(s) including monitoring methods and frequency and the name of the person responsible for monitoring.

Storage and Disposal of Hazardous Material (Describe waste and animal storage and disposal requirements):

Location where experimental procedures will be conducted: Building \_\_\_\_\_ Room # \_\_\_\_\_

**L.4 ANIMAL EXPERIMENTATION INVOLVING RADIOLOGICAL HAZARDS:**

Indicate radioactive material(s) and the amount to be used or dose from irradiation:

<i>Species</i>	<i>Isotope and Chemical Form</i>	<i>Dose (mCi or cGy)</i>	<i>Route</i>	<i>Frequency</i>	<i>Total Number of Animals</i>
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Indicate the role of the radioactive material(s) or exposure from ionizing radiation in the proposed study:

Potential Hazard (Describe potential adverse effects on man [**lab personnel, animal caretakers**] or animals and indicate the degree and nature of the risk to the personnel):

Safety Precautions (Describe the containment procedures to be followed to protect other animals, personnel and the environment from exposure to radioactive materials or radiation-producing devices; include monitoring methods and frequency and the name(s) of the persons responsible for radiation monitoring):

Storage and Disposal of Radioactive Material (Describe waste and animal storage and disposal requirements):

Indicate where these studies will be performed and who is authorized to perform these procedures, if radiographic or fluoroscopy procedures will be performed on live animals:



**M. BEHAVIORAL PROCEDURES AND PHYSICAL RESTRAINT**

**M.1 BEHAVIORAL STUDIES:**

Describe methods and procedures (include description of any deprivation or stimulation that might be involved in the study):

Will animal(s) be fasted (food &/or water) or placed on a limited diet? Yes\_\_\_\_\_ No\_\_\_\_\_  
If yes, please justify and describe restriction and measures for monitoring of animal health.

Will electrical or other forms of stimulation be used to modify animal behavior (include light and sound)?  
Yes\_\_\_\_\_ No\_\_\_\_\_

If yes, describe.

Will pain or discomfort be induced? Yes\_\_\_\_\_ No\_\_\_\_\_  
**If yes. describe and justify.**

Location where behavioral procedures will be conducted: Building\_\_\_\_\_ Room #\_\_\_\_\_

**M.2 PHYSICAL RESTRAINT IN UNANESTHETIZED ANIMALS (i.e., use of restraint devices [other than brief manual restraint], special test chambers, treadmills):**

Justify use of restraint:

Describe device (include dimensions):

Indicate duration (hours) animal will be confined to device:

Indicate observation intervals during confinement:

List qualified faculty or staff making observations (include office or lab and emergency numbers, if not previously given):

Will analgesics, sedatives, or tranquilizers be used to provide additional restraint? Yes \_\_\_\_\_ No \_\_\_\_\_

**If yes, list drug, route and frequency of administration.**

**N. SURGICAL PROCEDURES**

Consult the VSU Animal Care Committee handbook for guidelines on Surgical Procedures.

List name(s) and qualifications of surgeons (include office and emergency phone numbers, if not previously given):

Location where surgical procedures will be conducted: Building \_\_\_\_\_ Room # \_\_\_\_\_

Indicate the expected duration of anesthesia and surgery:

**N.1 PREOPERATIVE CARE:**

Describe preoperative care (include physical examinations, lab tests, preconditioning to apparatus, and fasting or withholding of water):

List preoperative medications (preanesthetic agents, antibiotics, etc.):

Species	Drug	Dose	Route	Frequency	Number of Days
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**N.2 SURGERY:**

Specify both initial and supplemental anesthetic regimens.

Species	Agent	Dose/%	Route	Frequency
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If gas anesthesia will be used, indicate precautions (i.e., hood, scavenger units, masks) taken to protect personnel from anesthetic fumes:

Will paralyzing drugs be used during or after surgery? Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, describe (include drug, dose, route of administration, justification and monitoring methods used to ensure that the animal does not experience pain). **Note: Paralytic drugs may not be used alone; only when covered by adequate anesthesia.**

### **N.3 SUPPORTIVE CARE AND MONITORING:**

How will the level of anesthesia be monitored and how often (e.g., absence of toe pinch or corneal reflex at 15 min intervals)?

What method will be used to prevent dehydration and hypothermia during surgery?

### **N.4 SURGICAL MANIPULATION:**

Describe surgical procedures (sterile instruments and aseptic surgical techniques **MUST** be used in all survival surgeries):

### **N.5 POSTOPERATIVE CARE (SURVIVAL STUDIES ONLY):**

Post surgical care should include observing the animal to ensure uneventful recovery from anesthesia and surgery; administering supportive fluids, analgesics, and other drugs as required; providing adequate care for surgical incisions; and maintaining appropriate medical records.

Post-anesthesia Recovery Describe frequency and type of observations that will assure that the animals are stable and have returned to a safe level of recovery from anesthesia:

Supportive Care Postoperative recovery: Include frequency of examination, frequency and type of lab tests, monitoring and management of pain when indicated, observations and management of potential experimentally-related disease, wound care, parenteral fluids, special diet, etc:

Describe criteria for the assessment of post-surgical pain:

Postoperative medications (analgesics, anti-inflammatory drugs, antibiotics, etc.):

Species	Drug	Dose	Route	Frequency
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Indicate the expected duration of anesthesia and surgery:

Indicate the length of time the animal will be kept alive postoperatively:

Indicate person(s) responsible for postoperative care records:

Note location of Records: Room # \_\_\_\_\_

Describe long-term care of chronically instrumented animal(s):

**O. EXPERIMENTAL ENDPOINT CRITERIA** (e.g., tumor size, percentage body weight gain or loss, inability to eat or drink, behavioral abnormalities, clinical symptomatology, or signs of toxicity). This information must be provided when the administration of tumor cells, biologics, infectious agents, radiation or toxic chemicals are expected to cause significant symptomatology or are potentially lethal. List the criteria to be used to determine when euthanasia is to be performed. Death as an endpoint must always be scientifically justified.

**P. METHOD OF EUTHANASIA OR DISPOSITION OF ANIMALS AT END OF STUDY**

Indicate the proposed method of euthanasia. If a chemical agent is used specify the dosage and route of administration. If utilizing CO<sub>2</sub> for euthanasia, please include location of CO<sub>2</sub> exposure system and means of ensuring termination. Techniques for euthanasia shall follow current guidelines established by the Animal Welfare Committee and the American Veterinary Medical Association Panel on Euthanasia (2000; available at [http://www.avma.org/issues/animal\\_welfare/euthanasia\\_report.pdf](http://www.avma.org/issues/animal_welfare/euthanasia_report.pdf)). If other than approved methods are needed, provide scientific justification why such methods must be used.

**Q. FIELD/BIOLOGICAL SURVEYS AND/OR LABORATORY USE OF WILD CAPTURED VERTEBRATES**

Indicate species or species assemblage to be studied:

Will the study involve species on State or Federal lists of threatened or endangered species?

Yes \_\_\_\_\_ No \_\_\_\_\_

**If yes, describe the listing.**

Are State and/or Federal permits required for collections and/or the survey work? Yes \_\_\_\_\_ No \_\_\_\_\_

**If yes, name them and give permit number, expiration date and/or other appropriate details of your permit.**

Describe the sampling method(s) to be used (include kind of net or trap and whether it is a kill or live type sampling apparatus):

If kill-type sampling devices are used, indicate the time interval from capture to death and describe the pain or discomfort involved:

Will specimens be kept? Yes \_\_\_\_\_ No \_\_\_\_\_

**If yes, where will they be accessioned?**

If live trapped animals are to be released, describe kind of handling, sampling and marking or tagging methods that will be used:

If live animals are to be euthanized in the field following live-capture, describe the method of euthanasia:

**R. PRINCIPAL INVESTIGATOR CERTIFICATIONS**

1. I certify that I have determined that the research proposed herein is not unnecessarily duplicative of previously reported research.
2. I certify that all individuals working on this proposal who are at risk are participating in the Institution's Occupational Health and Safety Program.
3. I certify that the individuals listed in Section A. are authorized to conduct procedures involving animals under this proposal, have attended the institutionally required investigator training course, and received training in: the biology, handling, and care of this species; aseptic surgical methods and techniques (if necessary); the concept, availability, and use of research or testing methods that limit the use of animals or minimize distress; the proper use of anesthetics, analgesics, and tranquilizers (if necessary); and procedures for reporting animal welfare concerns.
4. I certify that considered alternatives to the animal models used in this project and found other methods unacceptable.
5. I certify that I will obtain approval from the IACUC before initiating any significant changes in this study.
6. I certify that I will notify the IACUC regarding any unexpected study results that impact the animals. Any unanticipated pain or distress, morbidity or mortality will be reported to the attending veterinarian and the IACUC.
7. I certify that I am familiar with and will comply with all pertinent institutional, state, and federal rules and policies.

**Principal Investigator:**

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**S. SIGNATURES**

**PROPOSAL NUMBER** \_\_\_\_\_ (leave blank)

Supervisory concurrence as applicable. Department Chairperson's signature is required prior to initiating work on any protocol which is not subject to review from a recognized extramural body (i.e. NIH Study Section, VAMC Review Board, NSF Review, American Heart Association, etc.). The Chairperson's signature indicates that he/she takes responsibility for scientific review of the protocol. \_\_\_\_\_ :

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Institutional Biosafety Committee Certification of Review: (Required of all studies utilizing hazardous agents.)

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Animal Welfare Committee certification of resource capability in the indicated facility to support the proposed study:

Name \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Attending Veterinarian certification of review and consultation on proper use of anesthetics and pain relieving medications for any painful procedures:**

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Certification of review and approval by the Institutional Animal Care and Use Committee:

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_



**T. JUSTIFICATION FOR USDA CLASSIFICATION E.**

Name of investigator:

Animal Study Proposal Title:

Species and number of animals listed in Classification E for each year:

Species:

Number of animals:

Year 1 -

Year 2 -

Year 3 -

Total:

Description of project including reason(s) for species selection:

Provide a scientific justification to explain why the use of anesthetics, analgesics, sedatives or tranquilizers during and/or following painful or distressing procedures is inappropriate in your research project. Define the earliest point at which the animal can be humanely euthanized. Indicate how the number of animals undergoing procedures listed in Category E will be minimized. Please be sure to include a description of monitoring procedures.

Signature of investigator:

Date:

Signature of IACUC Chairperson:

Date:





**VIRGINIA STATE UNIVERSITY ANIMAL EUTHANASIA RECORD**

**Date:** \_\_\_\_\_ **Species:** \_\_\_\_\_

**Investigator:** \_\_\_\_\_ **Protocol #:** \_\_\_\_\_

Date	Time	Species	Number	Method	How was death confirmed?	Initial

## ***GUIDELINES FOR HANDLING SPECIFIC EMERGENCIES:***

### ***Air Handling Problems (loss of supply or exhaust)***

The primary goal is to restore adequate supply and/or exhaust as rapidly as possible. The AWC Chair or his/her designee contacts the Physical Plant (see Emergency Phone contacts for a list of contact numbers). After the appropriate group has been informed so that repairs can proceed, the AWC Chair or designee is notified and coordinates all activities related to the emergency/disaster. The AWC Chair or designee may delegate responsibility for handling and later reporting resolutions of minor or non-life-threatening problems. (See also 11. Temperature Problems below.)

1. *Animal health checks:* These should be increased, if possible to confirm that animals have adequate air supplies, with special attention to animals in specialized cages such as microisolators or ventilated racks.
2. *Food and water supplies:* Should not be affected.
3. *Sanitation:* Should not be affected; some cage changes may need to be deferred to avoid disseminating odors and particulate matter from cage changing, and some cleaning (e.g. floor mopping) may also be deferred to avoid humidity problems.
4. *Environmental support:* While repairs are underway, the Chair/designee evaluates the availability of and necessity for additional equipment such as fans or other measures such as opening doors. Animals may need to be moved if their lives are endangered, but every effort should be made to prevent contamination outside of the facility.
5. *Personnel:* Personnel should be able to work as usual, under the considerations indicated above. Loss of air supply, exhaust, or pressure differentials may require consideration of additional personal protective measures (e.g. if gas anesthetics were being vented into exhaust ducts.)

### ***Bomb Threat/Bombing***

If a bomb threat is received by Animal Facility (AF), the call should be immediately reported to the University Police. The University Police and Security will determine what action should be taken in the event of a bomb threat (evacuation of building, etc.). AF Supervisors of personnel working in the affected building should be notified and placed on stand-by alert for further instructions. If facilities are evacuated, AF personnel should meet at the designated regrouping area. In the event of an actual bombing, animal issues will be handled as under the section for Fire (below).

1. *Animal health checks and health maintenance:* All animals will be checked as soon as access to the facility is permitted by the fire and police safety personnel.

2. *Food and water supplies:* Food and water should not be a problem for the short term while the threat is being evaluated.
3. *Sanitation:* If a bombing or a bomb threat occurs during normal working hours, all employees must vacate the facilities immediately and report to a predetermined place and wait for further instructions. If a bombing occurs after regular operating hours an attempt will be made to notify all employees to report to work. The AWC Chair or designee and veterinarian on call will be notified of any bombing and report to assess any resulting damage.
4. *Environmental support:* Environmental support should not be affected by a bomb threat. If utilities are lost or facilities are searched by individuals who are not familiar with animal care systems, AF will advise those in charge of precautions to be taken, if possible, while these conditions persist. For handling effects of a bombing or other explosion, see the specific section: 4. Chemical Radiation/HazMat Spill; 5. Electrical Power Outage; 6. Fire; 7. Flood; 11. Temperature Problems; 13. Water Supply Interruption.
5. *Personnel:* Personnel must follow instructions from authorities to evacuate buildings where bomb threats have been received. Supervisors are responsible to communicate these orders to their staff members involved. Personnel will not re-enter buildings until the all-clear is officially announced by the authorities.

### ***Break Ins***

1. *Animal health checks:* Any animals loose in the facility will be captured, identified (if not individually marked, they will be held in cages labeled with the room in which they were found), and returned to their home cages or euthanatized depending on their condition. Any animals killed as a result of vandalism will be disposed of. If the animal morgue is damaged by vandalism, the dead animals will be taken to a cold room in another facility. All animals in the affected facility will be evaluated by the veterinary staff for health status and usefulness for research and treated as their condition warrants.
2. *Food and water supplies:* If animal feed is destroyed or contaminated by an act of vandalism, an order will be placed immediately with the local vendor for replacement. Feed will be shipped in by overnight delivery if needed, or obtained from another facility. If the water supply is interrupted, water will be obtained from other facilities.
3. *Sanitation:* Routine sanitation will be resumed as soon as possible, assuming equipment is functional. If equipment such as cagewashers or autoclaves are not available, they will be repaired as soon as possible and in the interim alternate arrangements made (hand washing, deferring some activities, using equipment in other facilities) at the judgment of the AWC Chair or designee .
4. *Environmental support:* Following a break-in, the AWC Chair or designee will evaluate the environment in each affected space and determine the action to be taken (see instructions for

the following emergencies as applicable: 4. Chemical Radiation/HazMat Spill; 5. Electrical Power Outage; 6. Fire; 7. Flood; 11. Temperature Problems; 13. Water Supply Interruption). In cases of serious damage to environmental systems, animals may have to be relocated to alternate facilities as determined by the Director/designee.

5. *Personnel:* Personnel will have access to the facility as permitted by authorities. Extra personnel may be called upon to deal with damage to the facility. Care should be taken to not disturb any evidence at the site.

### ***Chemical/Radiation/Hazardous Materials Spill***

Contamination of the environment within an animal facility is reported by the AF staff member who observes or discovers the problem. In an acute emergency, any staff member at the scene must warn co-workers, evacuate to a safe location, and notify the Hazardous Materials Response Team () and the Supervisor. If AF is notified of a contamination in adjacent space, we will follow instructions from the appropriate Safety Office.

1. *Animal health checks:* Animal health checks and treatments resume after the all-clear is declared by the Hazardous Materials Response Team. Animals which may have been exposed to any hazardous agents are evaluated for health and research usefulness by the veterinarian.
2. *Food and water supplies:* Food or water which is exposed to hazardous agents is discarded. It is replaced with supplies from other facilities or new supplies ordered for the specific facility.
3. *Sanitation:* Normal sanitation resumes after the all-clear is announced by the Hazardous Materials Response Team. Facilities and equipment which have been exposed to hazardous agents may require special handling as determined by the appropriate Safety Office.
4. *Environmental support:* Environmental changes created by or necessitated by the emergency (such as cutting off supply air or altering air-pressure differentials) should be corrected as soon as the hazard is over.
5. *Personnel:* AF personnel leave the area as soon as an incident occurs (see Emergency Evacuation above). Personnel return only after an all-clear is received from the responsible safety office.

### ***Electrical Power Outage***

Loss of electrical power may create problems such as: loss of lighting; loss of electrical equipment such ventilated cage racks, cagewashers, sterilizers, surgery/intensive care equipment, sump pumps, and communication systems. Top priority is given to addressing critical animal needs. Additional emergencies should be handled as addressed in other sections: 1. Air Handling Problems; 7. Flood; 8. Phone/Paging System Outage; or 11. Temperature Problems.

1. *Animal health checks:* Animals in ventilated cages or racks, aerated tanks, or who are otherwise dependent upon power for life support should be supported by alternate means as necessary, including extension cords (connected to outlets supported by generator backup) or relocation to other sites.
2. *Food and water supplies:* For the short term, these should be unaffected. Portable lights or flashlights may be deployed to accomplish feeding and watering in dark rooms. If power remains out long enough to create shortages of sanitized food receptacles, water bottles, or the processing of food or water, supplies may be brought in from other facilities after supplies on-hand are exhausted.
3. *Sanitation:* Loss of power to automatic equipment may alter sanitization schedules. This could affect the level of sanitation by allowing bacteria and viruses to accumulate on the equipment. Other strategies such as hand washing equipment may be used. Also, cage changing intervals may need to be extended, cage pan changes substituted for whole-cage changes, spot-cleaning employed instead of cage/pan changes, etc. The AWC Chair or designee will determine how to provide the optimum sanitization under the prevailing conditions. All operating equipment (autoclaves, washers, etc.) should be turned off when power is lost. When the power returns - RESET all equipment. Check for partially processed loads. Lack of lights in facilities may also require alterations of normal activities.
4. *Environmental support:* See other sections of this document if additional environmental systems are affected. All operating equipment (autoclaves, washers, etc.) should be turned off. When power returns, check all equipment to assure that previous settings are still being implemented. If not - RESET. Check all operating equipment (including ventilation fans) to ensure that they have restarted. If not - contact Physical Plant. Check all processing equipment for partially processed loads.
5. *Personnel:* Animal Husbandry personnel are deployed in affected facilities as directed by the AWC Chair or designee. Facility entry orders should be observed. In the event of a prolonged city-wide outage, AF personnel may be required to perform duties outside their normal work responsibilities in order to prevent animal death or distress.

### ***Fire***

In the event of an evacuation of animal facilities, AF personnel are to gather at the predetermined regrouping site.

1. *Animal health checks:* All animals will be checked as soon as access to the facility is permitted by the fire safety personnel. Dead animals will be removed from cages and placed in the animal morgue or alternate cold rooms. Animals that need to be relocated due to fire damage to the facility will be relocated to another suitable housing facility. The health and suitability for research of surviving animals is evaluated by the veterinarian.



2. *Food and water supplies:* Any food or water which might have been damaged in affected areas will be discarded. If fire or water damage destroys any or all of the feed supply, the feed vendor or distributor will be contacted for immediate replacements. Any feed that cannot be obtained from the local vendor will be ordered for overnight delivery from the distributor. Spoiled or contaminated feed will be immediately discarded. Feed may also be obtained from another facility.
3. *Sanitation:* Normal sanitation resumes after the all-clear is announced by the Safety Office or Fire Department personnel on site. Facilities and equipment which have been exposed to fire, smoke, fumes, or water may require special handling as determined by the Operations Manager. Special equipment may be needed to remove odors or smoke damage. If cagewashing equipment has been damaged, equipment may be sanitized by hand washing; this is decided by the AWC Chair or designee and veterinarian for the facility.
4. *Environmental support:* Effects on environmental systems are evaluated when occupancy is allowed. If gross outages or abnormalities are detected (e.g., loss of air supply, exhaust, or temperature control) these are reported to the Physical Plant or Engineering Department for the building. Actions are taken as described in the sections: 1. Air Handling Problems; 5. Electrical Power Outage; 7. Flood; 11. Temperature Problems; and/or 13. Water Supply Interruption. If the environmental problems are severe, animals may need to be evacuated and relocated; this is the decision of the AWC Chair or designee in consultation with the veterinarian for the area.
5. *Personnel:* If a fire occurs during working hours all employees must vacate the facilities immediately and report to a predetermined place and wait for further instructions (see Personnel Evacuation section above). If a fire occurs after regular operating hours an attempt will be made to notify key employees to report to work at the discretion of the AWC Chair or designee.

### ***Flood***

The following indicates actions to be taken if animal facilities are flooded. If flooding affects the surrounding area, but not the facilities themselves, actions should follow those outlined under Section 7: Snowstorm/Blizzard.

1. *Animal health checks:* If flooding occurs in an animal facility or part of an animal facility, animals in the affected area should be checked more frequently under the direction of the AWC Chair or designee. Animals in danger, especially in lower cages, may be relocated to higher shelves/cages within the room or to other rooms or other facilities. Following a flood in an animal facility, all animals in the affected area are examined to determine their health status and suitability for research. Animals suffering ill effects may be treated or euthanized at the discretion of the veterinarian.
2. *Food and water supplies:* If flooding occurs in an animal facility or part of an animal facility, food and water supplies should be kept safe from contamination. Contaminated (wet) food

should be discarded and replaced from other facilities or from vendors. The City Water Department will be consulted to determine that suitable (potable) water is available to the facility affected. If the water supply is compromised, bottled water will be sought.

3. *Sanitation:* During a flood in a facility, sanitation procedures will be continued in unaffected areas if possible. However, care must be taken to avoid touching or operating electrical equipment in standing water (see Environmental Support below). If cagewashing equipment has been affected or transport is not possible, the AWC Chair or designee will decide on how to maintain minimal sanitation. This may involve deferring cage changes, spot cleaning cages, manual washing, or routing to other facilities. After a flood subsides, all rooms and areas which were flooded will be thoroughly decontaminated using cleaning/disinfection materials. If available, emergency pumps (from Physical Plant) may be deployed to move water out of animal areas.
4. *Environmental support:* During a flood, efforts will be made to relocate animals if possible, or to leave them in place if they are not in imminent danger and their welfare would be compromised by moving them. Personnel must take care not to touch or operate electrical equipment (e.g., cagewasher, biosafety cabinets, etc.) in standing water. Areas where such equipment is in use should be avoided or breaker switches pulled or equipment unplugged if this can be done safely. After a flood, all equipment which may have been affected will be checked and serviced, calibrated, or replaced as necessary. Other effects of a flood will be handled as indicated under the appropriate sections of this document (see 1. Air handling problems; 4. chemical/radiation/haz-mat spill; 5. Electrical power outage; 6. Fire; 11. Temperature problems; 12. Tornado or severe storm; 13. Water Supply Interruption).
5. *Personnel:* Personnel must exercise caution when working in an area with standing water. The AWC Chair or designee will determine where personnel will enter in conjunction with the Safety Office. Extra personnel may be needed to clean up after a flood subsides. If transportation is limited due to area flooding, on-site personnel may be required to perform duties outside their normal responsibilities to maintain the animals.

### ***Phone/Paging System Outage***

Loss of communication systems may interfere with animal ordering, recordkeeping, and notification of emergencies. In the event of a communications system loss, priority is given to communications which directly effect animal health or well-being. Alternatives which may be considered include use of other systems which are functioning (if the paging system is down but phones are working, phone calls or emails may temporarily substitute). For extreme animal health crises (e.g., reporting a seriously ill animal) hand-delivered messages can be used.

1. *Animal health checks:* Health checks should proceed normally. However, communication about sick animals may have to be routed via alternate methods. Animal Health/Death Forms are hand delivered to the appropriate veterinarian. Veterinarians may use alternate methods to communicate with investigators (e.g., hand-delivered memo, sending someone to the investigator's office).

2. *Food and water supplies:* These supplies should not be affected short-term. If loss of phone service is prolonged, ordering of animals, feed, and supplies may be affected. Also, cellular phones owned by the AF personnel may be employed.
3. *Sanitation:* Sanitation should proceed as usual.
4. *Environmental support:* It is anticipated that the environment will not be affected. Communications about environmental system problems may be affected in a prolonged communications outage, but alternate methods (see 1. and 2. Above) may be employed.
5. *Personnel:* Communications with AF personnel, such as calling in additional staff or reporting animal emergencies on weekends may be affected. In that event, alternate methods (e.g., cellular phones) may be used.

### ***Protests/Picketing/Strikes***

In the event of protests or picketing (by animal rights groups, for example) or a work stoppage, all AF personnel are to report to work as usual. In doing so, they are to avoid confrontations if they pass through picket lines or protest marchers. The University Public Relations specialists handle the dissemination of information and answer questions about our research. University Police handle security. AF should request increased security measures for all animal housing and support facilities and may participate in keeping all facilities secure.

1. *Animal health checks:* If the number of employees on site is decreased, priority is given to activities which directly affect animal health and welfare: health checks and treatments, feeding, watering, and maintaining minimal sanitation
2. *Food and water supplies:* Food and water supplies on-site should not be affected. Closing the receiving dock and deferring deliveries may be considered for some activities such as animal rights protests. Similarly, if the normal waste pick-up procedure is disrupted, waste may be taken out by a different dock, or kept in cold-storage temporarily.
3. *Sanitation:* Sanitation should proceed normally, assuming sufficient personnel are present. If staff shortages occur, sanitation will be prioritized as described in 1. Animal Health Checks above.
4. *Environmental support:* Environmental systems are not expected to be affected. If the environment is altered, as by sabotage, for example, the specific problem will be addressed as described in the section for that emergency (see: 1. Air handling problems; 2. Bomb Threat; 3. Break-ins; 4. chemical/radiation/haz-mat spill; 5. Electrical power outage; 6. Fire; 8. Phone or Paging System Outage; 11. Temperature problems).
5. *Personnel:* AF personnel are expected to report to work. AF personnel may be required to perform duties outside their usual responsibilities in order to preserve animal health.

### ***Snow Storm/Blizzard/Ice Storm***

The major problems to be overcome in the event of a severe snowstorm or blizzard are related to receiving animals and supplies, and having sufficient personnel get to the campus to care for animals. Other effects of snow storms are handled as indicated in Sections 1. Air handling problems; 5. Electrical Power Outage; 7. Flood; 8. Phone or Paging System Outage; 11. Temperature Problems, or 13. Water Supply Interruption, which should be consulted.

1. *Animal health checks:* Animal health is checked by on-site personnel. In the event that some personnel are unable to reach the AF due to weather, others who are closer to the campus may be contacted. The AWC Chair or designee may be contacted to assist in locating suitable individuals.
2. *Food and water supplies:* Several days' supply of food is kept on hand at all times, so re-supply should be possible within a reasonable time. If stocks are running low before normal transportation is likely to be restored, supervisory personnel will decide on the most appropriate course of action. If it is necessary to save animals' lives, feed may be obtained from the nearest source, including grocery or pet stores. Efforts should be made to keep animals on species-specific diets if possible.
3. *Sanitation:* Sanitation may be compromised by a lack of personnel. On-site personnel, under the direction of the AWC Chair or designee, attempt to approximate normal sanitation schedules with available resources. Increasing cage change intervals, spot cleaning instead of whole-cage changes, changing bedding instead of cage changes, hand washing of some equipment, or deferring activities such as floor mopping may be required. Decisions must be made by the professionals on-site to perform sanitation activities which benefit the animals most if all activities are not possible due to unusual conditions.
4. *Environmental support:* It is not expected that the environment will be affected. If it is, see the appropriate section for handling the specific problem: 1. Air handling problems; 5. Electrical Power Outage; 7. Flood; 8. Phone or Paging System Outage; or 11. Temperature Problems.
5. *Personnel:* Personnel are expected to make significant efforts to report to work. If staff shortages occur due to transportation problems or street blockage, available staff may be pressed into service to perform duties outside their normal job descriptions in order to provide for essential animal care needs. The AWC Chair or designee makes this decision.

### ***Temperature Problems***

Temperature problems include animal rooms which are too hot or too cold, as defined by the parameters for housing each species. Minor temperature variances (which are not a short-term threat to animal health) are dealt with by the on-call Supervisor. Serious variances (which

involve large portions of facilities, endanger animal health, or are likely to be prolonged) are communicated to the AWC Chair or designee.

1. *Animal health checks:* Animals are checked more frequently in affected areas. Overheating is more likely to cause serious health problems for most species, and the temperature should be monitored closely in rooms where the temperature has risen beyond the set limits. Health checks may include use of thermometers inside such cages to check the intra-cage temperature. If animals are overheating (the point at which this occurs varies with species and length of the temperature rise) they are moved to a cooler area or one where more air flows over the cages. Portable fans or portable coolers may be considered. Animals experiencing cold conditions may benefit from having the air supply stopped so the environment can be heated by the animals body heat. In extreme conditions, portable heaters may be employed. Additional nesting or bedding material placed in cages may help animals conserve heat, and placing a covering on some cages (e.g., cat paper on top of the top cages in a rack) may also help. Animals which are found to be affected by extreme heat or cold are removed from the environment and then treated or euthanized at the discretion of the veterinarian for the area.
2. *Food and water supplies:* Animals may drink more in warm conditions so water supplies are checked often. Animals in cooler than normal conditions may eat more, so food is also checked more often.
3. *Sanitation:* Sanitation may be suspended if the activities are judged by the AWC Chair or designee to increase the stress experienced by the animals. In extended warm conditions, bacterial growth may be enhanced so sanitation may need to be increased to control contamination and odors.
4. *Environmental support:* While repairs are underway, the AWC Chair or designee evaluates the availability of and necessity for additional equipment such as fans, space heaters, or other measures such as opening doors. Animals may need to be moved if their lives are endangered.
5. *Personnel:* Sufficient personnel are mobilized in the affected area to follow this plan.

#### ***Hurricane, Tornado or Other Severe Storms***

1. *Animal health checks:* All animals will be checked as soon as access to the facilities is permitted by the safety personnel. Dead animals will be removed from cages and put into a cold room. If the animal morgue is damaged by the storm, dead animals may be taken to a refrigerator in another facility and stored until arrangements for pick-up and disposal can be made. Animals to be relocated due to storm damage to a facility will be moved as soon as possible to another suitable facility. Animals suffering from injury will be examined as quickly as possible and treated or euthanized as necessary.
2. *Food and water supplies:* If a storm or subsequent water damage destroys any or all of the

feed supply, the supplier or a local vendor will be contacted for replacements. If needed, feed will be shipped by overnight delivery or obtained from another facility. Spoiled or contaminated feed will be discarded and replaced as soon as possible. In a case where a tornado disrupts the water supply to a facility, water will be transported in from other facilities on campus.

3. *Sanitation:* Normal sanitation is resumed as soon after the tornado as possible. If the facility is intact but utilities are compromised, see Section 4. below.
4. *Environmental support:* Damage to environmental systems is assessed by the staff on site. If the animal facility is undamaged but environmental systems are compromised, decisions are made by the AWC Chair or designee, or ranking on-site Animal Resource Center employee based on professional judgment of how to minimize animal distress (see the sections which apply: 1. Air handling problems; 4. Chemical/radiation/haz-mat spill; 5. Electrical power outage; 6. Fire; 11. Temperature problems; 13. Water Supply Interruption). In the event of major environmental problems (such as severe structural damage) which cannot be restored in a short time, the goal is to preserve animal life or to humanely euthanize animals. Animals may be relocated to other facilities if possible.
5. *Personnel:* If a storm occurs during working hours all employees seek shelter in a safe area immediately. Employees in below-ground facilities should remain there unless instructed otherwise. If a storm damages animal facilities after regular working hours, personnel will have access to the facility as permitted by authorities. The AWC Chair or designee and veterinarian for the area will be notified of any storm damage and will make an assessment. Employees will be contacted to report to work as needed.

### ***Water Supply Interruption***

Animals must have a continuous supply of potable water. The water supply to all animal facilities on campus is obtained from the local chlorinated/fluorinated water supply. Water bottles are used to provide water to most species. Water bottles and sanitized containers may be used to transport water from one facility that has water to another that does not. Facility entry orders should be observed whenever possible. If the entire campus is without water, potable water should be obtained from a commercial source. Cage changing frequency should be extended to the maximum extent practicable.

1. *Animal health checks:* Animals are checked as usual, with special attention to ensure that they have adequate water supplies, especially if bottles have been allowed to remain on cages for a longer than normal period.
2. *Food and water supplies:* Food supplies should be unaffected. Water bottles are used to provide water to most species. Water bottles and sanitized containers may be used to transport water from one facility that has water to another that does not. Facility entry orders should be observed whenever possible. If the entire campus is without water, potable water should be obtained from a commercial source.

3. *Sanitation:* Cage changing frequency should be extended to the maximum extent practicable due to loss of cagewashing capability. Some equipment may be transported to other facilities which have water available for sanitizing.
4. *Environmental support:* Toilets and sinks will not be operational. Hands may be cleaned using 70% ETOH. Personnel may be allowed to travel from one facility that does not have operable toilet facilities to another that does.
5. *Personnel:* Toilets and sinks will not be operational. Hands may be cleaned using 70% ETOH. Personnel may be allowed to travel from one facility that does not have operable toilet facilities to another that does. Facility entry orders should be observed although showers may not be available in all facilities.