Animal Laboratories Shall Meet the Following Criteria:

A. Facility Design
   The facility design of the laboratory should allow for compliance with federal, state, and local government safety requirements and meet relevant accreditation standards.
   1. Adequate space should be made available for storage of hazardous materials and for the collection, storage, and processing of wastes.
   2. Special consideration should be given to the ventilation system, space arrangement, layout, support areas, traffic patterns, and access to utilities and mechanical areas.
   3. The selection of mechanical systems and equipment should be based on reliability, operational integrity, projected length of service, and ease of maintenance.

B. Sharps
   The use of hypodermic needles and syringes is permitted only for parenteral injection and aspiration of fluids from laboratory animals and diaphragm bottles.
   1. Only needle locking syringes are permitted.
   2. Needles must not be bent, sheared, recapped, or removed from the syringe following use.
   3. Sharps must be discarded in accordance with UNMC Waste Handling and Disposal policy and procedure, Safety # 18.

C. Personal Protective Equipment
   Appropriate protective clothing must be worn in the work area and animal rooms. This may include laboratory coats, gowns, smocks, or uniforms. Protective clothing, including laboratory coats, gowns, smocks, uniforms, or other appropriate protective clothing shall be worn in the work area and animal rooms.
   1. This protective clothing must not be worn outside or removed from the work area, unless bagged for decontamination.
   2. Protective clothing must be decontaminated before laundering.
   3. Gloves must be worn when handling infected animals and when making hand contact with other potentially infectious materials.
   4. Special care must be taken to avoid skin contact and needle punctures.

D. Infectious Waste
   Before disposal, waste from work areas and animal rooms must be either incinerated or decontaminated by a method such as autoclaving.

E. Maintenance
   A program of preventive maintenance should be developed to ensure continued safe operation of the facility.

F. Barriers
   Barriers should be used to help confine potential contamination to areas where it is generated and to control access to these areas:
   1. Animal biosafety level 3 facilities should use barriers to isolate animal areas from other, adjacent areas.
2. Principal barriers that should be used include:
   a. Exhaust air ventilation systems, which provide directional air flow.
   b. Architectural barriers that control access to the animal facility and can prevent
      unauthorized people from accessing the animal facility.
   c. Airlocks that help to maintain air pressure differentials to ensure proper direction of
      airflow.

G. Ventilated Cages
   Ventilated caging systems which use exhaust fans to create a negative pressure gradient
   between the cage and the surrounding environment are useful in preventing the escape of
   bioaerosols from the animal environment when exhaust air is filtered with highly-
   efficiency-particulate-air (HEPA) filters.

H. Room Ventilation
   Room ventilation is an important engineering control used not only to maintain
   comfortable temperature and humidity in the work area, but also provides directional
   airflow and can prevent the migration of airborne contaminants to unprotected space in the
   facility.
   1. Changing air continuously can reduce the concentration of airborne contaminants but
      does not replace the need for such containment devices such as chemical fume hoods,
      biological safety cabinets, and filter top cages.
   2. High ventilation rates are important for providing acceptable environmental conditions
      for personnel. Cage cleaning and cage washing can result in high concentrations of
      particulate contaminates and very high heat loads from the cage washing equipment.
   3. Local exhaust can be used in controlling contaminates at the point of generation.
      Canopy hoods and flexible exhaust ducts should be properly engineered and used to
      reduce occupational exposures to such hazards as animal dander and excreta liberated
      during cage cleaning, aerosols, and vapors generated during anesthesia or necropsy,
      and heat emanating from cage cleaning or waste decontamination. Local exhaust
      devices are particularly useful for controlling emissions from equipment or procedures
      that cannot reasonably be contained in a hood.

I. Work Practice Controls
   Work practices are the most important element in controlling exposures.
   1. Employees must understand the hazards associated with the procedures that they are
      performing, recognize the way in which they are exposed to those hazards, be able to
      select work practices that minimize exposures, and acquire, by means of training and
      experience, the discipline and skills necessary to sustain proficiency in the conduct of
      safe practices.
   2. Categories of work practices to consider include:
      a. Practices to reduce the number of employees at risk of exposure:
         (1.) Restrict access to the work area.
         (2.) Provide warnings of hazards and advice about special requirements.
      b. Practices to reduce exposures by direct and indirect contact:
         (1.) Keep hands away from mouth, nose, eyes, and skin. Do not handle contact
             lenses while in the laboratory area.
         (2.) Wash hands when contaminated and when work activity is completed.
3. Decontaminate work surfaces before and after work and after spills of a hazardous agent.
3. Use appropriate methods to decontaminate equipment, surfaces, and wastes.
4. Substitute less-hazardous materials whenever possible.
5. Wear personal protection equipment (e.g., gloves, gowns, and eye protection).
   a. Practices to reduce percutaneous exposures:
      (1.) Eliminate the use of sharp objects whenever possible.
      (2.) Use needles with self-storing sheaths or those designed to protect the user.
      (3.) Keep sharp objects in view and limit use to one open needle at a time.
      (4.) Use appropriate gloves to prevent cuts and skin exposure.
      (5.) Select products with puncture-resistant features whenever possible.
      (6.) Use puncture-resistant containers for the disposal of sharps.
      (7.) Handle animals with care and proper restraint to prevent scratches and bites.
   b. Practices to reduce exposure by ingestion:
      (1.) Use automatic pipetting aids; never pipette by mouth.
      (2.) No smoking, eating, or drinking should be allowed in work areas used for the care and use of research animals.
      (3.) Keep hands and contaminated objects away from face and mouth.
      (4.) Protect mouth from splash and splatter hazards with mask and face shield when performing procedures that are likely to cause splatters or spraying.
   c. Practices to reduce exposure by inhalation:
      (1.) Use chemical fume hoods, biological safety cabinets, and other containment equipment to control inhalation hazards.
      (2.) Handle fluids carefully to avoid spills and splashes and the generation of aerosols.
      (3.) Use in-line HEPA filters to protect the vacuum system.

J. Animal Handling
   Safety precautions are necessary for animal handling and transport to prevent transmission of zoonotic agents to employees.
   1. Employees should wear appropriate personal protective equipment specific to the potential exposures that may be associated with the animal being handled or transported.
   2. These safety concerns apply to those who have access to the animal being transported as well as those who receive and use them, (refer to The Nebraska Medical Center Animal Policy).

K. Housekeeping
   Special attention must be made to housekeeping details. All animal care areas, including areas in which hazardous materials are used and stored, should be kept clean in order to prevent clutter from becoming contaminated, thus leading to employee exposure.
   1. Work surfaces should be wiped with disinfectant before work begins, immediately after any spill, and at the end of the work day.
   2. Floors should be disinfected or decontaminated daily or weekly, as appropriate to the potential hazards.
   3. Appropriate dust suppression methods should be routinely used such as wet mopping and the use of a HEPA-filtered vacuum cleaner.
L. Waste Disposal
Waste disposal should occur at scheduled intervals based on the amount of waste generated and the risk posed by the hazardous agents in the waste material.
1. Adequate space should be available for on-site collection, storage, treatment, and disposal of waste.
2. The disposal of hazardous wastes is subject to federal, state, and local regulations, which change frequently.
3. Environmental health and safety staff must keep all generators of hazardous waste informed of disposal procedures to ensure compliance with current requirements.

M. Cage Cleaning
When cleaning cages, contaminated shavings, feces, urine, and other potentially biohazardous, contaminated, or allergenic materials should be removed with methods that protect workers (refer to National Research Council, 1996 p. 43-44).
1. Biological safety cabinets are designed as bedding dump stations to protect workers from hazardous aerosols that could be generated during cage cleaning.
2. Protective clothing will protect workers from contact and percutaneous exposure.
3. Eyes, face, and body must be protected when working with hazardous chemicals.
4. Sharp edges on cages and ancillary equipment should be identified and eliminated.
5. Changes may need to be made in ventilation and work practices to avoid excessive heat exposure in cage washing areas.
6. Appropriate footwear should be worn to prevent accidents on wet, slippery surfaces. Likewise, protective shoes should be worn when moving carts and other heavy objects.
7. Personal protective equipment will protect the part of the body that is reasonably expected to come into contact with hazardous agents. Selection should be based on specific knowledge of the potential hazards, experience, and sound professional judgment.
   a. Nonpowdered latex, vinyl, or other appropriate protective gloves should be worn for handling potentially contaminated animals or hazardous materials.
   b. Care must be taken to ensure that the glove material provides an adequate barrier against the expected hazard.
   c. Glove length is selected to protect the area at risk.
   d. Disposable vinyl or nonpowdered latex examination or surgical gloves will not be reused.
   e. Heavy duty rubber gloves are commonly used for washing cages as these gloves hold up well when cleaning and disinfecting.
8. Uniforms, gowns, or laboratory coats should be worn to protect workers from animal urine and feces.
   a. Such garb should not be worn outside the work area (unless it is covered).
   b. Protective clothing should be selected so that it provides an adequate barrier against the type and extent of exposure expected (e.g., cage washing personnel should wear heavy rubber aprons and gloves to wash cages).
c. Decontamination verses disposal of protective equipment is an important consideration as prices for reprocessing contaminated laundry can be more expensive than providing disposable gowns.

9. Safety glasses should be considered minimal eye protection and worn to prevent injury from projectiles, minor splashes, or contact of contaminated hands with eyes.
   a. Goggles or face shields should be used for tasks involving infectious or hazardous liquids and especially when disinfectants and cleaning agents are used under pressure.
   b. Surgical masks can provide some protection of the mouth from splashes.

10. Employees who need respiratory protection from exposure to aerosols should be enrolled in a respiratory program that is in compliance with OSHA standards. The selections and use of proper respiratory protection equipment should be coordinated through The Nebraska Medical Center Employee Health. Managers must supply The Nebraska Medical Center Employee Health with a job description and a statement of necessity for fit testing for the position.