Procedures for Animal Transportation

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1. **Purpose**

   Transportation of research or teaching animals within or between campus buildings is an essential component of the research enterprise. The integrity and well being of the animals being transported are necessary for the quality of the research and the welfare of the animals. It is important to maintain the animals' health status by avoiding exposure to potential pathogens, preventing injury, and reducing stressors such as temperature extremes, odors, excessive noise, and confrontations with other animals. Transporting research animals requires heightened attention to detail to ensure safety and well being for the animals as well as personnel in areas where the animals must pass. Human health concerns include allergies of animal origin, injury from escaped animals, and exposure to hazards such as microorganisms, chemicals, or radioactive materials.

   The *Guide for the Care and Use of Laboratory Animals* states that animal transportation "should provide an appropriate level of animal biosecurity ... while minimizing zoonotic risks, protecting against environmental extremes, avoiding overcrowding, providing for the animals' physical, physiologic, or behavioral needs and comfort, and protecting the animals and personnel from physical trauma." This document will expand upon these principles for the investigators and laboratory and technical staff at the University of Michigan.

2. **Procedures**

   1. **General Information**
      1. All methods of transporting animals must provide for the health and welfare of animals.
      2. Transportation of animals must be done in a direct and timely manner, avoiding public areas as much as possible. In selecting the route, care should be taken to utilize the least congested areas and to avoid human patient areas, whenever possible.
      3. Animals must not be transported with any other animal, substance, or device that may potentially cause injury to the animal being transported.
      4. Enclosures containing animals must be secure and carefully handled. The enclosures must be maintained in a manner that will prevent them from tipping or falling and must be handled in a manner that will minimize any physical trauma or distress to the animals.
      5. For aquatic species and amphibians, special considerations are required for transportation in an aqueous or sufficiently moist environment, and special attention should be given to avoiding temperature extremes for poikilotherms.
      6. Temperature extremes must be avoided when animals are transported. While the caging will insulate animals, exposure to extreme ambient temperatures can have adverse effects. When temperatures fall below 40°F (4.4°C) or above 85°F (29.4°C), special precautions (in addition to the environmentally controlled vehicles used by ULAM) may need to be taken. Consult the ULAM veterinarians for additional information regarding these precautions.
      7. The USDA regulations must be followed when transporting animal species covered under the Animal Welfare Act (AWA). These animals include: dogs, cats, non-human primates, calves, sheep, goats, pigs, rabbits, guinea pigs, hamsters, and other mammals not specifically excluded (exclusions are laboratory mice, rats and birds). Transportation of animals must also comply with the applicable local and state laws and regulations.
      8. Transport animals in covered or opaque cages, carriers, or containers. These primary enclosures must be constructed of materials that can either be sanitized or disposed of, and must be designed to prevent the spread of fomites, microorganisms, chemicals, or radioactive materials where indicated. The containers must:
         1. Be escape proof. This applies to transport within hallways as well as between buildings. If an animal has been administered a hazardous substance there **must** be a means to prevent unintended opening, see section 5.g in *Animals Administered a Hazardous Substance Requiring Containment* for more specific transport procedures concerning these circumstances.
         2. Provide adequate ventilation (Note: Using enclosed impermeable containers or trash bags/shrink wrap without air holes does not provide adequate ventilation)
         3. Provide food and a source of water if rodents will be held within the transport container for longer than 4 hours.
         4. Use the same density requirements for general animal housing as described in the Guide for the Care and Use of Laboratory Animals.
         5. Be able to be sanitized or disposed of after use to prevent possible cross-contamination animals of differing health status.
            1. Use of a transportation container for repeatedly moving animals of the same species and health status throughout the course of a day requires sanitation or disposal at the end of the day.
            2. Use of a transportation container for moving animals of differing species, from different investigators, or of health status requires sanitation or disposal after each use.
         6. Protect the transporter from exposure to licks, bites, scratches or other animal contact during transit.
9. Clean and disinfect cargo areas of vehicles used in the transportation of animals as needed to prevent contamination of future animal deliveries.
   1. Sanitation of the interior of the truck can occur either after transporting the contaminated animals/equipment or prior to transporting the next shipment of animals/equipment.
   2. Sanitation of the vehicle includes the interior floor and lower walls or any surface that could be in contact with the animals or equipment using an appropriate disinfectant.
10. Investigators may apply for an exception with the IACUC (Institutional Animal Care and Use Committee) office for the transportation, receipt and shipment of animals if they have requirements that differ from these guidelines.

2. Personal Protective Equipment (PPE) During Animal Transport

1. When transporting animals, wear appropriate PPE as described in the OSEH protective clothing chart. The appropriate use of PPE reduces the risk of pathogen contamination of either animals or people through contact or aerosolization.
   1. Dispose of PPE appropriately to prevent creation of fomites for transmitting pathogens.
   2. For example, if PPE is worn while disinfecting incoming shipping containers, the PPE should be disposed of before moving on to other tasks.
2. Additional information including species-specific information is located on the Environment, Health and Safety website at: https://ehs.umich.edu/research-clinical-safety/animals/protective-equipment/.

3. Interfacility Animal Transport Requests

1. ULAM provides interfacility animal transport for all species in an environmentally-controlled truck upon request by research personnel.
2. These requests are made by research personnel through direct communication (e-mail, phone) with the originating animal vivarium husbandry supervisors at least 3 business days prior to the requested date of transport.
3. Special requirements for USDA-covered, non-rodent mammal species –
   1. Animal(s) undergoing active post-procedural monitoring on the requested day of transport must be evaluated and cleared for transport by the veterinary staff.
   2. Animal(s) must have concluded the post-procedural analgesic regimen prior to transport.
3. The vivarium husbandry supervisor must contact the vivarium veterinary technician, veterinary resident, and animal husbandry supervisor with the transport request details 2 business days prior to the scheduled transport.
4. The veterinary staff must conduct an examination of the animal(s) either the afternoon prior or the morning of the scheduled transport.
5. Interfacility animal transport can be delayed at the discretion of the veterinary staff based on health assessment of the animal.
6. If a transport delay is required, the veterinary staff is responsible for posting a sign on the cage/pen communicating this delay to the animal husbandry staff. Direct communication of the delay to the area husbandry supervisor and the research personnel must also occur.
7. This communication should describe the noted health concerns and an approximated release date for rescheduling transport.
8. The research staff are responsible for rescheduling the interfacility transport request with the vivarium husbandry supervisor.
9. Research personnel are responsible for ensuring ongoing animal medical records are brought to the destination facility the day of transport.
10. Animals may be held after transportation in a species appropriate holding location and provided species specific food/water supplement. Refer to section 2.a.vii and 2.A.ix for environmental requirements as well as a description of ensuring cages are escape proof. Animals are housed within 4 hours following transport. Contact ULAM for additional information 764-0277.

4. Species Specific Instructions

1. Rodents
   1. SPF Rodents
      1. Required PPE for transport from animal rooms: None, unless posted otherwise (UM Protective Clothing Chart).
      2. Transport SPF rodents in a micro-isolation style cage (one with a filtered top). Reverse the position of the water bottle to avoid flooding.
      3. Upon return to a housing area, transfer the rodents to a clean cage with the water bottle correctly placed, with the sipper tube located inside the cage and below the wire bars.
      4. Do not return the transport cage to the rack. Bring it to the soiled side of the cage wash facility for sanitation.
      5. For animals inoculated with infectious or chemical hazards, transfer the animals to a clean transport cage while in the room. Leave the dirty cage within the housing room.
   2. Conventionally Housed Rodents
      1. Required PPE for transport from animal rooms: None, unless posted otherwise (UM Protective Clothing Chart).
      2. Transport rodents in a clean cage. Reverse the position of the water bottle to avoid flooding.
      3. Upon return to a housing area, transfer the rodents to a clean cage with the water bottle correctly placed, with the sipper tube located inside the cage and below the wire bars.
      4. Do not return the transport cage to the rack. Bring it to the soiled side of the cage wash facility for sanitation.
2. Nonhuman Primates (NHP)
   1. Required PPE for transport from animal rooms: The individual handling the NHP transport container should be clothed in the appropriate personal protection equipment per the OSEH document "Minimally Required Personal Protective Equipment for Animal Care and Use". Minimize mucous membrane exposure through the use of PPE that will prevent droplet splashes to eyes, mouth, and nasal passages.
   2. For transporting NHPs in corridors, these animals should be sedated and maintained in an enclosed cart to minimize exposure to aerosol contamination.
1. Monitor the sedated animal in accordance with the Anesthesia and Sedation Monitoring Guidelines.

3. When transporting NHPs, bring spare gloves, a bottle of disinfectant (in case of animal fluid or waste spills) and additional anesthetic (see #6 below).

4. Ideal transport arrangements for NHP involves two individuals: one person to transport the NHP (in a modified transport cage that can be secured) while wearing appropriate PPE, and one person to stay “clean” (no PPE) to assist with transport as needed by opening doors, summoning elevators, etc.
   1. The individual wearing PPE should change to a clean set when leaving the NHP housing room with the animal.
   2. If a person must transport a NHP alone, they must keep one hand ungloved to open doors and summon elevators, but need to have spare gloves available in the event of a NHP health emergency.

5. Animals should not remain in the corridors except when being transported directly to another room. Transport carts (obtained through ULAM) must be used to transport these animals through public corridors and on elevators.

6. Anesthetic Re-administration: Individuals transporting NHPs that have been anesthetized for movement need to carry supplemental anesthetic, a needle, and syringe in order to provide additional anesthetic to the animal in the event of an unanticipated prolongation of the transportation process (e.g., power outage, broken elevator).

7. Zoonotic Diseases: The pathogen of greatest concern is Macacine herpesvirus 1, or B virus. Transmission to humans occurs through exposure to contaminated animals (scratches, bites, splashes to mucosal membranes, contact with infected animal tissues) or contaminated equipment (needle sticks, sharp cage parts) and may be fatal. Progression of the disease involves symptoms attributed to central nervous system infection, including alterations in vision, seizures, and respiratory failure.

3. Dogs
   1. Required PPE for transport from animal rooms: None, unless posted otherwise (UM Protective Clothing Chart).
   2. Minimize Noise: Dogs can be quite vocal during transportation. Attempt to transport at times when public encounters would be minimized (e.g., before 7:00 AM). If necessary, sedation can be provided prior to transportation. Monitor the sedated animal in accordance with the Anesthesia and Sedation Monitoring Guidelines. Contact the ULAM veterinary service for additional information. 764-0277

4. Cats
   1. Required PPE for transport from animal rooms: None, unless posted otherwise (UM Protective Clothing Chart).
   2. Minimize Noise: Cats can be quite vocal during transportation. Attempt to transport at times when public encounters would be minimized (e.g., before 7:00 AM). If necessary, sedation can be provided prior to transportation. Monitor the sedated animal in accordance with the Anesthesia and Sedation Monitoring Guidelines. Contact the ULAM veterinary service for additional information. 764-0277

5. Livestock Species (Calves, Sheep, Pigs)
   1. Required PPE for transport from animal rooms: None unless posted otherwise (UM Protective Clothing Chart).
   2. Minimize Noise: Livestock species can be quite vocal during transportation. Attempt to transport at times when public encounters would be minimized (e.g., before 7:00 AM). If necessary, sedation can be provided prior to transportation. Monitor the sedated animal in accordance with the Anesthesia and Sedation Monitoring Guidelines. Contact the ULAM veterinary service for additional information. 764-0277

3. Zoonotic Diseases: Sheep commonly can carry two zoonotic diseases – Q fever (Coxiella burnetii) and Orf (contagious ecthyma or poxvirus). Documentation about safe practices to prevent Q fever exposure can be accessed under the IACUC Occupational Health and Safety - Zoonotic Disease Prevention at animalcare.umich.edu/animal-use/animal-use-occupational-safety. These animals should be transported in an enclosed cart to minimize exposure to aerosol contamination. Animals should not be allowed to remain in the corridors except when being transported directly to another room. Transport carts (obtained from ULAM) must be used to transport these animals through public corridors and on elevators.

6. Aquatic Species
   1. Required PPE for transport from animal rooms: None, unless posted otherwise (UM Protective Clothing Chart).
   2. Be sure that the transporting environment is appropriate for the species – aquatic frogs and fish need to be transported in water, or in such a way that they do not suffer respiratory difficulty during transport.

5. Special Instructions Regarding Movement of Animals Off-Campus
   1. Unless the Principal Investigator (PI) transfers shipment responsibility to ULAM (see below), the PI is responsible for the transport of animals from the Ann Arbor campus to other locations, be it an intra-state, interstate, or international destination. When animals are moved to off-campus locations, the containers must be labeled "Live Animals." Containers must meet applicable laws and standards, e.g., those from the International Air Transport Association (IATA) at http://www.iata.org or the Animal Welfare Act, as appropriate.

2. Transportation of animals in vehicles not specifically designated for such purposes (e.g., personal cars) is highly discouraged and is only possible in extenuating circumstances with appropriate justifications. If transportation in such vehicles is necessary, the following additional requirements must be met:
   1. Any PI who has plans for transport in such vehicles must have a complete description of this method in their approved IACUC application.
   2. All shipments must be in escape-proof primary enclosures, which must provide adequate ventilation and be sanitized after use. Contact a ULAM shipping coordinator at 764-0277 for enclosures.
   3. All primary enclosures must be placed in the vehicle on, or in, waterproof materials/containers that can be either immediately discarded or immediately disinfected upon completion of the shipment. Such materials will protect the vehicle from contamination by animal-based fluids. These containers must not inhibit proper ventilation.
   4. All shipments must be quarantined in some fashion upon arrival at the destination so as not to be a risk to other animals in the facility.
   5. Live animal shipments cannot be placed in the trunk, or another non-ventilated enclosed space, of such a vehicle. The animals must be able to receive the benefit of the climate control systems available in the vehicle.
3. ULAM services can be used for transporting animals between the Ann Arbor campus and the remote locations. Contact the ULAM Shipping Coordinator to request shipment of animals at least 3 weeks in advance of the desired shipping date at 764-0277.

6. **Special Instructions Regarding Animals with Experimental Hazards**

   1. Refer to *Animals Administered a Hazardous Substance Requiring Containment* for transport of live or dead animals that may pose a hazard risk.

7. **Handwashing**

   1. Washing of hands following transport of a live animal or carcass is an important step for prevention of the spread of infectious organisms or other contaminants to both personnel and animals. While the use of exam gloves will greatly decrease the spread of contaminants from a person's hands, they will not completely eliminate this transfer due to micro-breaks in glove materials, regardless of type (latex, vinyl or nitrile). For effective hand washing, antimicrobial soaps or alcohol-based hand rubs (60-95% alcohol) are recommended for use.

3. **Related Documents**

   1. Protective Clothing Chart – IACUC/EHS
   2. *Animals Administered a Hazardous Substance Requiring Containment*
   3. *Procedures to Reduce Human Exposure to Orf and Q Fever*
   4. *Anesthesia and Sedation Monitoring Guidelines*

4. **References**

   2. Cornell University. Cornell Center for Animal Resources and Education. (IACUC approved)