I. Purpose: Brown University’s Institutional Animal Care and Use Committee (IACUC) acknowledges that physical restraint of an awake, un-anesthetized animal may be necessary due to the scientific goals of certain studies. It is sometimes necessary to restrain animals for husbandry and research purposes, both to accomplish treatment or scientific objectives and to ensure the safety of the animal and human handler. However, because prolonged restraint can be stressful and has the potential to cause harm to the restrained animal under certain circumstances, it is critical that considerable care and training be employed. Prolonged restraint should be utilized only when other means are not feasible and only following determination by the IACUC that the objectives justify the procedures. Convenience alone is not normally deemed sufficient justification for prolonged restraint. The IACUC has adopted the following guidelines to outline the minimally acceptable standards for physical restraint of laboratory animal species for experimental purposes.

II. Definitions:

- Physical restraint is the use of manual or mechanical means to limit some or all of an animal’s normal movement for the purpose of examination, collection of samples, drug administration, therapy, or experimental manipulation (Guide). Personnel safety may also necessitate restraint of an animal. If routine restraint is not prolonged and does not cause distress or discomfort to the animal, a detailed description is NOT required in the IACUC protocol.

- Prolonged restraint is defined as physical restraint of a conscious animal lasting longer than 15 minutes. Prolonged restraint, including chairing of non-human primates, should be avoided unless it is essential for achieving research objectives and is specifically approved by the IACUC (see NRC 2003).

III. Introduction: The Guide for the Care and Use of Laboratory Animals (2011) (“the Guide”) provides the following definition for physical restraint: "Physical restraint is the use of manual or mechanical means to limit some or all of an animal's normal movement for the purpose of examination, collection of samples, drug administration, therapy or experimental manipulations. Animals are restrained for brief periods, usually minutes, in many research applications" (p. 29)

Restraint is assumed to involve immobilization and some limitation of normal postural adjustments. Although the criteria for prolonged restraint vary according to species and type of restraint, it is generally considered to involve periods more than 15 minutes.

Restraint that does not require justification in an animal use protocol
For the purposes of an animal use protocol, the following types of restraint do not require justification or description in the protocol:
• Brief (<15 minutes) physical restraint that is part of normal animal-handling practices (e.g., moving mice from one cage to another).
• Brief manual restraint (<15 minutes) for procedures such as substance administration or sample collection (e.g., restraint of an animal to draw a blood sample).

For the purposes of the animal use protocol the following do not require justification but do require description in the protocol:
• Brief mechanical restraint (<15 minutes) of animals by personnel trained in the use of the device (e.g., restraint of a sheep in a squeeze chute by trained personnel to give a vaccination).

Prolonged restraint
For the purposes of identifying a quantifiable departure from the Guide during protocol review for semi-annual reporting to the Institutional Official, Brown University defines "prolonged" restraint as restraint over 15 minutes.

Certain types of housing conditions for large agricultural animals require additional clarification because some may involve limits of free movement over long periods of time. The Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching (2010) addresses the use of confining devices, such as stanchions and squeeze chutes, but also emphasizes several important guidelines: 1) they should be approved by the IACUC when used for experimental purposes, 2) animals should be well-acclimated and monitored, and 3) continuous confinement should be limited if not needed and not considered to be normal housing.

IV. Guidelines:
• Alternatives to physical restraint should be considered. Systems that do not limit an animal’s ability to make normal postural adjustments (e.g., subcutaneous implantation of osmotic pumps in rodents, backpack-fitted infusion pumps in nonhuman primates, and free-stall housing for farm animals) should be used when compatible with protocol objectives.
• The period of restraint should be the minimum required to accomplish the research objectives.
• Animals to be placed in restraint devices should be given training to adapt to the equipment and personnel. Nonhuman primates and many other animals can be trained through the use of positive reinforcement techniques, to cooperate with research procedures or remain immobile for brief periods. Animals that fail to adapt to training should be removed from the study in consultation with a veterinarian.
• Brief physical restraint of agricultural animals for examination, collection of samples, and a variety of other experimental and clinical manipulations can be accomplished manually or with devices such as stocks, head gates, stanchions, or squeeze chutes.

a. Protocol Requirements: When prolonged restraint is proposed in an animal use protocol, the protocol must include:
• A description of the restraint device
• The duration the animal will be restrained
• A description of how the animal will be acclimated and trained prior to the procedure
• A description of how the animal will be observed during the procedure
• If the duration of prolonged restraint limits the ability of the animal to access food and water ≥6 hours, the protocol must also include:
  ▪ Description of when food and water will be given
  ▪ How body weight will be monitored
  ▪ How hydration status will be monitored
b. **Training:** Any person using restraint procedures, even if for brief periods of time, must have received formal training and demonstrate proficiency (to someone who has already been trained) prior to carrying out these techniques unsupervised. If mechanical restraint devices are employed, they must be appropriate for the species, employ designs of known safety, and be in good working order. The device should be appropriate for the stated objectives; e.g., to minimize self-inflicted harm if utilized to prevent grabbing of catheters or instrumentation. Training must include practice in putting an animal into the device, as well as removing it safely.

c. **Monitoring:** If the restrained animal can potentially hurt itself while restrained, or if restraint is employed to prevent possible interference with potentially dangerous catheters or other instrumentation, then the monitoring must be continuous. Notations documenting this monitoring should be recorded each hour, at a minimum. In general, continuous monitoring may be advisable if the period of restraint exceeds 4 hours. Even for shorter periods between 1-4 hours, monitoring at periodic intervals may be required to ensure the wellbeing of the animal. Indirect monitoring by camera may be utilized if the observer can respond to an emergency in a timely manner. A description of the monitoring procedures, including a statement about the frequency and duration of monitoring, must be included in a protocol approved by the IACUC.

d. **Sustained restraint:** Restraint for periods longer than 12 hours, especially overnight, requires special justification and should be conducted only when the scientific goals or treatment exigencies do not allow for other options. In general, it is recommended that animals be released for at least 1 hour after every 12-hour restraint period, unless the IACUC and Attending Veterinarian (AV) concur that it would be ill-advised for safety reasons (e.g., in the case of animals where the catheter or instrumentation cannot be easily removed and safely reinstalled). Continuous monitoring of the restrained animals is required for this type of protocol, and close oversight of the project must be maintained by the IACUC and AV.

e. **Complications:** Regardless of the length and frequency of restraint, close attention should always be given to the possibility of complications arising from restraint procedures. These problems could initially seem relatively minor, such as small abrasions or edema, but care must be given to preclude the possibility of exacerbation or infection. Food and water intake between periods of prolonged restraint should be monitored, and body weight records should be maintained, especially in young or growing animals. The AV or his/her designee have the authority to terminate the restraint procedures at any point should there be signs of complications compromising the animal's wellbeing. Records of any complications must be maintained and be available to the IACUC upon request. The investigator must notify the AV to evaluate any clinical concerns, and should treatment be deemed necessary, it would take precedence over experimental objectives.

V. **References:**