



IACUC Guidance:	<b>TAMU-G-018</b>	Title:	<b>Guidelines for Survival Surgical Procedures in Non-Rodent Mammals</b>
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Location	Effective Date	Review By
<b>College Station/Dallas/Galveston/Kingsville</b>	02/01/2023	01/31/2026
<b>Houston</b>	03/01/2023	01/31/2026

**1. PURPOSE**

- 1.1. This document provides information to be used when planning and performing survival surgical procedures on non-rodent vertebrate animals used for research, teaching, or other purposes at Texas A&M University.

**2. SCOPE**

- 2.1. Applies to non-rodent mammals undergoing survival surgical procedures at Texas A&M University
  - 2.1.1. Field conditions may require protocol-specific exemptions
  - 2.1.2.
- 2.2. Anesthesia/analgesia will not be discussed here, see TAMU-G-002
- 2.3. For non-survival surgery, see TAMU-G-022

**3. RESPONSIBILITY**

- 3.1. The **PI** is responsible for:
  - 3.1.1. Following these guidelines for approval of protocols which include surgery.
  - 3.1.2. Listing all locations where surgery will be performed in the AUP, including areas used for preparation and recovery of the animal; and amending the AUP to add/remove locations to ensure the list of surgical locations remain up to date.
  - 3.1.3. Listing participants, with their qualifications to perform the activities or procedures selected, on the AUP when initially submitted.
  - 3.1.4. Ensuring that AUP personnel complete all training and BOHP enrollment activities as outlined in TAMU-G-029 and maintaining documentation of training.
- 3.2. **Individuals** working with carnivores or bats should maintain current rabies immunization status.
- 3.3. The **IACUC** must inspect and approve all locations where surgery will be performed prior to use.
- 3.4. The **IACUC** and the **AV** are responsible for:
  - 3.4.1. determining the categorization of surgery as major or minor and the impact on the animal’s well-being; and
  - 3.4.2. reviewing the stated experience and qualification of protocol participants and identifying any needed additional training requirements.
- 3.5. The **PI** and the **AV** share responsibility for ensuring that postsurgical care is appropriate.
- 3.6. **PI** and **Surgeon**: Responsible for ensuring appropriate surgical preparation, technique, and monitoring for each animal, as well as oversight of the animal's post-operative recovery period.

**4. DEFINITIONS AND/OR ACRONYMS**

- 4.1. **Aseptic Surgical Techniques**: Well-established methods used to avoid the introduction of microbial contamination into tissues exposed and/or manipulated during surgery.
- 4.2. **AUP**: Animal Use Protocol. Document submitted by the PI indicating the housing and procedures involving animals.
- 4.3. **AV**: Attending Veterinarian. Individual designated by Texas A&M University to fulfil the regulatory role of AV. May also describe veterinary staff who report directly to, and have delegated authority from, the AV.
- 4.4. Centrally administered support service for animal research and teaching programs at Texas A&M University:
  - 4.4.1. **ARU**: Animal Resource Unit supports the School of Dentistry vivarium

- 4.4.2. **CMP:** Comparative Medicine Program supports the Texas A&M College Station campus
- 4.4.3. **PAR:** Program for Animal Resources supports the Institute of Biosciences and Technology vivarium
- 4.4.4. **PRF:** Pharmaceutical Research Facility supports the Kingsville Pharmaceutical Science Facility vivarium
- 4.5. **Disinfection:** Reduces or eliminates unacceptable concentrations of microorganisms.
- 4.6. **Drape:** A sterile drape is a porous (cloth, paper) or non-porous (plastic) sheet that is used to provide a temporary sterile barrier.
- 4.7. **Major Surgery:** Usually penetrates and exposes a body cavity, and includes the potential for significant impairment of physical or physiologic functions, or involves extensive tissue dissection or transection. Examples: laparotomy, thoracotomy, joint replacement, and limb amputation.
- 4.8. **Minor Surgery:** Minor surgery usually does not expose a body cavity and causes little or no physical impairment; Examples include suturing superficial wounds, peripheral vessel cannulation, percutaneous biopsy, intracranial injection, subcutaneous osmotic pump implant, routine agricultural animal procedures such as castration.
- 4.9. **Multiple survival surgery:** Multiple anesthetic events or more than one survival surgery (major or minor) on a single animal.
- 4.10. **Non-survival Surgery:** A surgery in which animals are euthanized under general anesthesia prior to anesthetic recovery.
- 4.11. **Post-Operative Period:** The 7-10 days following the initial day of surgery.
- 4.12. **Rodent:** Of the order Rodentia
- 4.13. **Sanitation:** Is the maintenance of environmental conditions conducive to health and well-being.
- 4.14. **Sterile:** Free of all forms of life and biological agents, such as bacteria, viruses, and fungi.
- 4.15. **Surgery:** Cutting into the body through the use of a tool such as a scalpel blade, surgical scissors, laser, or other suitable device. May also refer to an invasive measurement under anesthesia.
- 4.16. **Survival Surgery:** A surgery in which animals are expected to recover from anesthesia following the procedure.
- 4.17. **USDA Covered Species:** A term that refers to animals whose care is governed by the Animal Welfare Act. USDA-Covered Species include all live or dead warm-blooded animals used in research except birds, rats of the genus *Rattus*, and mice of the genus *Mus* bred for research. This also excludes "cold-blooded" animals such as fish, reptiles, and amphibians.

## 5. GUIDELINES OR PROCEDURE

### 5.1. Preparation of the Surgical Area

- 5.1.1. Minor surgical procedures may be performed in a suitably located and equipped area.
- 5.1.2. Major surgery on USDA covered species, other than rodents, must be performed in a dedicated surgical suite, unless an approved exception is granted by the IACUC. The use of dedicated surgical space is encouraged for all other species.
- 5.1.3. The surgical area should be disinfected prior to and between surgeries and not be used for other purposes during the time of surgery.
  - 5.1.3.1. See TAMU-G-026 for guidelines on evaluating sanitation practices.

### 5.2. Preparation of Surgical Supplies

- 5.2.1. Surgical Instruments, Supplies, or Devices
  - 5.2.1.1. Must be sterilized before the surgery and handled and placed so that they remain uncontaminated until the surgery is completed.
  - 5.2.1.2. Clean instruments of organic material prior to sterilization, or use prepackaged sterile supplies.
  - 5.2.1.3. Methods used for sterilization may vary, but all must conform to established medical standards for complete sterilization. Options include:
    - 5.2.1.3.1. Steam sterilization at proper pressures and exposure times.
    - 5.2.1.3.2. Ethylene oxide gas (ETO) used in a specialty chamber.

5.2.1.3.3. Gas plasma sterilization

5.2.1.3.4. Dry heat sterilization at proper temperature and exposure time.

5.2.1.3.5. Prolonged immersion in a hospital-grade formaldehyde- or glutaraldehyde-based cold sterilant following label directions (alcohol immersion is NOT acceptable). Chemical sterilants are irritating to tissues and instruments must be rinsed with sterile water/saline before use on tissues.

5.2.1.4. If sterile packs are stored for later use, they are considered sterile until some event (e.g. tear in packaging, packaging becomes wet, seal is broken) causes the item to become contaminated.

#### 5.2.2. Drapes

5.2.2.1. Drapes are highly recommended to provide a sterile surgical field, as well as provide a sterile area on which to lay instruments.

5.2.2.2. Drapes can be cloth, paper, sterile stockinettes, or adhesive incise drape material

### 5.3. Preparation of the Animal

5.3.1. Recently shipped animals should be given a period to acclimate to their new surroundings. General practice is to allow a 3-7 day acclimation period, when possible.

5.3.2. Perform a pre-surgical evaluation to ensure the animal is not overtly ill. Animals displaying clinical signs of illness such as dehydration, diarrhea, ocular or nasal discharge should be passed over as surgical candidates.

5.3.3. Withholding food or water for more than 12 hours must be described in the AUP.

5.3.4. Administer antibiotics and analgesics (preemptive analgesia) as appropriate and approved in the AUP.

5.3.5. Unless in a non-haired area, remove hair from the surgical site(s) at a location removed from the surgery suite, or separate preparation and surgery by time.

5.3.5.1. Use clippers, a razor, and/or the application and removal of depilatory cream.

5.3.6. Prepare the surgical site(s) with an appropriate skin disinfectant.

5.3.6.1. The skin should be cleaned in a manner that moves hair and debris from the cleanest location (incision site) to the dirtiest area (periphery) of the clipped site. A gradually enlarging circular pattern works well.

5.3.6.2. The scrubbed area is rinsed with alcohol, warmed sterile saline or water and the scrub/rinse cycle is repeated.

5.3.6.3. The incision site is wiped/painted with an antiseptic solution that is compatible with the surgical scrub solution (e.g. chlorhexidine solution with chlorhexidine scrub).

5.3.6.4. To prevent hypothermia, avoid excess wetting and minimize the use of alcohol.

5.3.7. Use a sterile surface (e.g. drape) to lay out instruments.

5.3.8. For animals under general anesthesia, apply sterile, non-medicated ophthalmic ointment to eyes to prevent corneal drying (e.g., Lacrilube).

5.3.9. Initiate thermoregulatory supportive care and fluid administration (primarily applies to animals under general anesthesia).

5.3.9.1. **CAUTION:** Use of heat lamps and non-thermoregulating electric heating pads can result in severe burns or hyperthermia in animals. The use of safer equipment such as a circulating water blanket or isothermic pad is recommended, whenever possible.

5.3.10. Anesthetize the animal, in accordance with the approved AUP.

### 5.4. Preparation of the Surgeon

5.4.1. A surgical cap and face mask is required and surgeons must change into a clean scrub shirt or wear a clean lab coat. A sterile gown is preferable for major surgeries.

5.4.2. When opening sterile gloves, consider using interior portion of packaging as a sterile field.

5.4.3. When opening sterile materials, do so without touching contents and place in sterile field (without touching sterile field).

- 5.4.4. Wash hands with a soap (minimal) or an antiseptic surgical scrub solution (optimal) prior to donning sterile gloves, or clean examination gloves (for tips only aseptic practices).
- 5.4.5. When donning sterile gloves, do so without touching the exterior of the glove surface.
- 5.4.6. Assistants working in the immediate vicinity must wear a clean garment, head cap, mask and gloves.

**5.5. Performing Multiple Surgeries in Series**

- 5.5.1. Begin with at least one set of sterile instruments.
  - 5.5.1.1. Between animals, clean instruments followed by disinfection using approved method/methods described in the AUP.
- 5.5.2. Use a new drape for each animal, if using drapes.
- 5.5.3. When performing surgeries on multiple animals during a single session, one pair of sterile gloves can be used provided that the gloves remain free of tears or punctures and are disinfected (by wiping with an appropriate disinfectant) between animals.
- 5.5.4. The surgical area should be cleaned with an appropriate disinfectant between animals.
  - 5.5.4.1. See TAMU-G-026 for guidelines on evaluating sanitation practices.
- 5.5.5. Even with the use of aseptic techniques, disinfection between animals, and the use of a sterile field, the instrument pack should be replaced with a new sterile instrument pack after being used on 4-5 animals.

**5.6. Intra-operative**

- 5.6.1. Establish and maintain a surgical plane of anesthesia.
  - 5.6.1.1. Anesthetic depth may be monitored in a number of ways (*e.g.*, respiration rate, corneal reflex, absence of a response from a toe pinch) and may vary depending upon the species and anesthetic agent used.
- 5.6.2. Handle tissue gently and prevent tissue from drying.
- 5.6.3. When closing surgical wounds, use appropriate techniques and materials.
  - 5.6.3.1. Multiple layer closure should be performed on thoracic and abdominal incisions and any other significant incision that may result in dead space detrimental to healing. Skin closure should be performed using noncapillary (monofilament) suture material, which may or may not be absorbable. The use of wound clips or staples to close a skin incision is acceptable in some cases but careful attention should be given to placement and spacing to promote proper healing and to prevent the clips from catching on anything in the primary enclosure.
- 5.6.4. Maintain sterility of gloves and instruments throughout the surgery.
- 5.6.5. Maintain sterile suture material within the sterile field at all times.

**5.7. Post-Operative Monitoring**

- 5.7.1. Ensure uneventful recovery from anesthesia (see TAMU-G-002).
- 5.7.2. Keep animal warm and dry in an environment that doesn't pose a risk of injury.
- 5.7.3. Provide, and document, analgesics, fluids, antibiotics etc., as specified in the AUP or as directed by the AV/designee.
- 5.7.4. Once animals have recovered from anesthesia, they may be returned to the housing area.

**5.8. Post-Operative Care**

- 5.8.1. Keep surgical wounds clean.
- 5.8.2. Monitor the animal daily to ensure that there are no surgical complications.
- 5.8.3. Remove nonabsorbable sutures or wound clips in 7-10 days, or as approved in the AUP. If animals are sedated or anesthetized for removal, this must be described in the AUP.
- 5.8.4. Contact the AV/designee if the animal appears ill, or if the surgical wound appears abnormal.

- 5.9. **Records.** Records are required for every animal that has undergone surgery, must be maintained for the duration of AUP approval, or life of the animal (for animals not returned to the wild), whichever is longer, and should contain a complete description of preoperative, intraoperative, recovery and postoperative activities:
- 5.9.1. **Pre-Operative/Surgery**
- 5.9.1.1. Date of procedure
  - 5.9.1.2. Protocol number
  - 5.9.1.3. Identification of the type of surgery performed; e.g. "laparotomy"
  - 5.9.1.4. Species and animal or cage identifier
  - 5.9.1.5. The name of the surgeon and any assistants
  - 5.9.1.6. Pre-surgical assessment
  - 5.9.1.7. Pre-op preparation, as applicable
    - 5.9.1.7.1. Ophthalmic ointment applied
    - 5.9.1.7.2. Hair/fur removal
    - 5.9.1.7.3. Surgical scrub or site preparation
  - 5.9.1.8. Event times or total time under anesthesia
  - 5.9.1.9. Vital parameters monitored and times of monitoring
  - 5.9.1.10. A notation of any complication or abnormality identified
  - 5.9.1.11. Drugs administered: dose, route and frequency of administration
  - 5.9.1.12. When DEA controlled substances are used, the date and drug usage volumes recorded in the controlled substance log and the dates and amounts recorded in the animal surgery records should match.
- 5.9.2. **Recovery/Post-Operative**
- 5.9.2.1. Date and time of monitoring, which matches or exceeds description in AUP
  - 5.9.2.2. General observations which may include assessment of wound closure(s), signs of pain/discomfort, complications, or abnormalities including need for early performance of euthanasia
  - 5.9.2.3. Drugs administered: dose, route, date and time of administration
  - 5.9.2.4. Date of wound closure removal (if applicable)
- 5.10. **Multiple Survival Surgery (in same animal)**
- 5.10.1. The PI must describe in the AUP when multiple survival surgical procedures are performed on the same animal to meet the objectives of the study, project, or class, including the interval between surgeries
  - 5.10.2. The performance of multiple major survival surgery (MMSS) on a single animal is acceptable when included on a single project and scientifically justified by the PI in the AUP
    - 5.10.2.1. Cost savings alone is not an adequate reason for performing MMSS
    - 5.10.2.2. The conduct of MMSS on a single animal used in separate projects or AUPs is discouraged and must be clearly indicated in the AUPs impacted (requires additional review and approval by the USDA for covered species)
    - 5.10.2.3. Some procedures characterized as minor may induce substantial postprocedural pain or impairment and should similarly be scientifically justified if performed more than once in a single animal
- 5.11. **Special Considerations for Performing Surgery in Free-Living Wild Species in the Field**
- 5.11.1. Sterile procedures may not be achievable in field settings. At a minimum, surgical preparation of the incision site and the use of sterile gloves and instruments as described above is required.
  - 5.11.2. The location where field surgery is performed, if possible, should be sheltered, free of organic material, protected from contamination and disinfected.
  - 5.11.3. The AUP must describe efforts taken to support the return to normal behavior, such as the selection of a short-acting anesthetic, wound closure that does not require recapture, and holding of the animal until it is fully recovered.



**6. EXCEPTIONS**

- 6.1. The PI may request an exception to the above standards by describing the departure in the AUP
- 6.2. For programmatic exceptions, the facility director or manager may submit a request for the exception using TAMU-F-013

**7. REFERENCES, MATERIALS, AND/OR ADDITIONAL INFORMATION**

7.1. References

- 7.1.1. [Animal Welfare Act](#) of 1966 (P.L. 89-544) as amended in 1970 (P.L. 91-579), 1976 (P.L. 94-279) and 1985 (P.L. 99198).
- 7.1.2. National Research Council. 2011. [Guide for the Care and Use of Laboratory Animals](#). National Academies Press, Washington, D.C. 220p.
- 7.1.3. American Society of Animal Science [Guide for the Care and Use of Agricultural Animals in Research and Teaching](#), 4<sup>th</sup> edition
- 7.1.4. Centers for Disease Control and Prevention. 2008. [Sterilizing Practices: Guideline for Disinfection and Sterilization in Healthcare Facilities](#).
- 7.1.5. Eshar, D and M. Weinberg. 2010. Venipuncture in Bats. Lab Animal. Volume 39, No. 6.
- 7.1.6. [ACLAM Position Statement – Medical Records for Animals Used in Research, Teaching, and Testing](#)
- 7.1.7. Centers for Disease Control – [Sterilization Practices](#)
- 7.1.8. AAALAC International – [Alcohol as a disinfectant](#)

7.2. Resources

- 7.2.1. [CMP Training Workshops](#)
- 7.2.2. For more information concerning the planning and performance of surgical procedures, please contact:
  - 7.2.2.1. [CMP](#) at 979-845-7433
  - 7.2.2.2. [ARU](#): at (214) 828-8149
  - 7.2.2.3. [PAR](#): at (713) 677-7471
  - 7.2.2.4. [PRF](#): at (361) 221-0770

7.3. [IACUC/AWO Referenced Documents](#): (requires TAMU NetID authentication)

- 7.3.1. TAMU-F-013 Request for Programmatic Exception from Animal Welfare Standards (**available upon request**)
- 7.3.2. TAMU-G-002 Guidelines on the use of Anesthesia and Analgesia
- 7.3.3. TAMU-G-022 Guidelines on the Performance of Non-Survival Surgery
- 7.3.4. TAMU-G-026 Guidelines for the Evaluation of Sanitation Practices
- 7.3.5. TAMU-G-029 Guidelines for Animal Protocol Participation and Handling

7.4. Acknowledgements

- 7.4.1. This document contains content that was adapted from materials obtained from the University of Texas at Austin.

**8. HISTORY**

Effective Date	Version #	Description
07/18/2019	000	College Station/Galveston: New Document
05/21/2020	001	College Station/Galveston: Updated definitions, 5.3.8, and 5.7.3 to be congruent with iRIS and other Guidance documents; updated fasting time in 5.3.2; added 3.2, 5.2.1.1., 5.3.5.1, 5.6.3.1., 6.5, 6.7. Clarified: 5.1.2, 5.2.1, 5.8.3. Reviewed and approved via email.
07/01/2020	002	Houston/Kingsville: New Document; reviewed and approved by email.
07/21/2020	003	Dallas: New Document.
03/24/2022	004	College Station/Dallas/Galveston: Merging of Dallas animal care and use program with College Station/Galveston



10/20/2022	005	College Station/Dallas/Galveston/Kingsville: Merging of Kingsville animal care and use program with College Station/Dallas/Galveston.
02/01/2023	006	College Station/Dallas/Galveston/Kingsville: Renewal; change in scope to address survival surgery only, expansion of PI, IACUC and AV responsibility, updated definitions, modification to procedure to provide additional detail and include multiple survival surgery in the same animal, addition of exceptions section, updated and expanded references. Reviewed and approved via email.
03/01/2023	007	Houston: Renewal; change in scope to address survival surgery only, expansion of PI, IACUC and AV responsibility, updated definitions, modification to procedure to provide additional detail and include multiple survival surgery in the same animal, addition of exceptions section, updated and expanded references. Reviewed and approved via email.