1. Background

**Good Research Practices**
It is important that the animals’ normal physiological state is maintained during and after surgery. This will ensure the highest chance of research success and maintain high research quality as well as maintenance of animal welfare standards.

The University recognises that in some instances alterations to standard practice must be made for scientific reasoning however, where these alterations come with an increased risk to animal welfare they must be well justified and go beyond the argument that it is consistent with historical approaches or published data.

**Definitions**

**AEEC**: ANU Animal Experimentation Ethics Committee. This is a committee convened by the ANU as per the Australian code for the care and use of animals for scientific purposes, whose responsibilities include review, approval and monitoring of the use of animals for scientific purposes and assess the evidence that the use of animals is justified. The committee also review and approve procedures, guidelines and provide advice and recommendations to the institution on animal based research.

**Surgical Procedure**: (as per NHMRC Guidelines): A surgical procedure is one that requires the incision of living tissue. In the scientific setting, the type of procedure will depend upon the scientific purpose but can range from a superficial cut-down to the penetration and exposure of a body cavity or extensive tissue dissection.

**Survival surgery**: Animal recovers from the procedure and anaesthesia.

**Terminal, acute, or non-survival surgery**: Animal is humanely euthanased while still under anaesthesia.

**Major surgical procedure**: Surgery that penetrates and exposes a body cavity or any procedure that permanently impairs physical or physiological functions (e.g., laparotomy, thoracotomy, craniotomy, amputations).

**Minor surgical procedure**: Surgery that does not penetrate or expose a body cavity or permanently impair physical or physiological functions (e.g., subcutaneous osmotic pump placement, skin biopsy).

**Sterilise**: To eliminate agents injurious to health on equipment and supplies used in aseptic surgery. Common methods include steam autoclaving.
**Disinfect/sanitise:** To make physically clean and to remove and destroy agents injurious to health, to the maximum degree that is practical. This is NOT the same as sterilisation.

**Aseptic technique:** An approach that limits microbial contamination during a procedure.

## 2. Considerations

### Species Differences
There are appreciable differences between anatomy and function across the different classes of animals, which will affect the surgical approach and technique to be performed. These will vary greatly in a mammal compared to an amphibian. The Primary Investigator and their team must be aware of the specific needs of the animal they will be undertaking surgery in and must seek appropriate training if required.

### Timing
Animals that undergo surgical procedures often require additional monitoring and the availability of research personnel and animal care staff to perform adequate checks and oversight must be taken into consideration. This can vary with the time of day, day of the week and the time of year. If procedures are undertaken late in the day or at the end of the week, it is the responsibility of the research team to ensure there is adequate monitoring after the procedure as per the approved ethics protocol.

The University requires that no high impact studies with significant risk are undertaken over holiday periods where support staff are limited, this includes the four-day weekend over Easter and the University Closure period at Christmas. Special approval for any such work must be sought from the ANU Research Ethics Team.

### Equipment Availability
If a research group wishes to engage in a program of work that requires surgery they must ensure, in advance, that:

**A)** They have adequate access to the required equipment to meet the standards listed above and;

**B)** That the equipment is up to date with any service or maintenance requirements.

Please note that the ANU does not support work undertaken if there is a lack of suitable equipment as it may jeopardise animal welfare and research quality. A lack of suitable equipment to provide veterinary standard care pre, during and post-operative is not acceptable.

Advice on suitable equipment may be sought from the ANU Veterinary Services Team.

### Field Work
The ANU recognises that some work is undertaken in the field and that aseptic standards are more difficult to maintain. In this instance it is required that standards are similar to those that would be undertaken by a veterinarian in the field. Further advice and training on how to achieve these standards can be sought from the ANU Veterinary Services Team.

## 3. Monitoring, Intervention and Reporting

### Animal Welfare Risks
Surgical procedures come with significant risk to the welfare of the individual animals. It is a requirement that these risks are recognised and minimised by all groups undertaking surgical practices.
The management of these risks includes providing adequate anaesthesia and analgesia using current practices as would be recognised in the veterinary profession. For standards on these practices please refer to the ANU Animal Anaesthesia and Analgesia Standards.

**Surgical Complications**
The ANU recognises that some surgical approaches come with a known element of risk and complication. Such risks must be identified in the approved animal ethics protocol, with measures to mitigate these risks also included.

If any complications occur that are not identified in an approved ethics protocol or at a rate higher than expected, then these must be reported to the ANU Research Ethics Team, via the Unexpected Adverse Events Procedure.

In addition, all complications, whether expected or not, must be recorded and included in your annual review documentation and available to the ANU Veterinarians for review at any time. This allows for review of common practices and complications and to assist the University in its continual improvement of animal experimentation.

### 4. Minimum Requirements

All surgical procedures must have appropriate AEEC approval.

All survival surgical procedures, whether major or minor, must be undertaken using aseptic technique to minimise the impact on the animal and ensure high quality research standards.

All protocols utilising major surgical procedures must be reviewed by a person nominated by the AEEC. In most instances this will be an ANU veterinarian.

Pre-operative and post-operative care of animals must be undertaken as per best practice veterinary approach.

Record keeping as part of pre-operative preparation, monitoring during surgery and post-operative care must be maintained and kept for reference for the life of the approved ethics protocol or as long as the animal is maintained (whichever is longer).

### 5. References and Resources

**ANU Training and Support for Surgical Standards**
The ANU Veterinary Services Team - Research Services Division, are available to provide advice and training in surgical procedures, pre-operative preparation, aseptic technique, monitoring and sterilisation of equipment.

**References**
- The Australian code for the care and use of animals for scientific purposes 8th edition. 2013
- Procedure for Managing & Reporting Unexpected Adverse Events.
- AEEC Approved Document 007: Animal Analgesia and Anaesthesia Standards
- Further information on managing the risks of surgical procedures in a research setting can be found in the NHMRC Guidelines to Promote the Wellbeing of Animals Used for Scientific Purposes.
  
  NB It is noted that these guidelines are listed as out of date but the information included is still relevant in many circumstances. Advice can be sought from the ANU Veterinary Services Team where required.