Monitoring the Welfare of Experimental Animals

1. Purpose

The purpose of this standard operating procedure (SOP) is to ensure that the health and welfare of all animals involved in research or teaching in the UCT Faculty of Health Sciences (FHS) are monitored adequately and to ensure that the animals’ level of pain, suffering, distress or lasting harm does not exceed the permissible level specified in the FHS Animal Ethics Committee (AEC)-authorised protocol for the study.

This standard operating procedure has been prepared by consulting various international guidelines1-10.

2. Policy

The UCT Code of Ethics and procedures for the use of animals in teaching and research11 states:

- The optimal care of experimental animals is essential and in the interests of both animals and research.
- The University of Cape Town affirms that humans have an obligation to respect animals and to appreciate that they are sensitive to pain, respond to stress and may remember such experiences.
- The University requires that experimental animals should be appropriately monitored in order to keep discomfort, stress and distress to a minimum.

The South African National Standard for the care and use of animals for scientific purposes1 states:

- Researchers and teachers have direct and ultimate ethical and legal responsibility for all matters related to the welfare of animals used. They shall act in accordance with all the requirements of this standard.
- The responsibility of researchers and teachers extends over all facets of the care and use of animals in scientific studies and teaching activities approved by the AEC. This responsibility begins when the animal is sourced and allocated to the approved study or activity, and ends at the time of disposal of the animal.
- Researchers and teachers shall ensure that all intensively managed animals are observed daily (or more frequently if circumstances require it) in order to assess their health and welfare.
- Researchers and teachers shall ensure that records of the use and monitoring of animals in scientific studies and teaching activities are maintained.
- Researchers and teachers are responsible for the standard of animal care and use by all other persons involved in the study or activity. They shall ensure that the extent of supervision is compatible with the level of competence of each person and the responsibilities they are given.

Careful monitoring of experimental animals is required in order to establish when an animal has reached the humane endpoint in any study. The FHS AEC must approve the permissible level of morbidity for each study during its consideration of the protocol, i.e. the earliest scientifically-justified point at which pain, suffering, distress or lasting harm must be prevented, terminated, or relieved (i.e. the humane endpoint), while meeting the scientific aims of the study. The alleviation of such pain, suffering, distress or lasting harm must always take precedence over completing the study.

3. Responsibility

The ultimate responsibility for the welfare of experimental animals rests with the Principal Investigator. Unless otherwise specified in the FHS AEC-authorised protocol, welfare monitoring and taking the appropriate actions are the responsibility of the investigative staff, including over weekends and on public holidays.
The provision of daily animal husbandry, i.e. the cleaning of cages, providing food, water, bedding and environmental enrichment, is the responsibility of animal facility staff where the animals are housed, i.e. the core UCT Research Animal Facility (UCT-RAF) or Satellite animal facilities. Such provision of daily animal husbandry by the UCT-RAF or Satellite animal facility staff does not constitute welfare-monitoring as set out in this SOP, nor does it obviate the welfare-monitoring responsibility that must be fulfilled by the Principal Investigator.

4. Appropriate level of monitoring

The FHS AEC will approve appropriate welfare-monitoring schedules for all protocols, in consultation with the FHS veterinarian, laboratory animal technologists familiar with the condition being studied and the researchers. The frequency with which animals must be monitored for evidence of pain or distress will be determined for each individual study. All experimental animals must be monitored at least once per day, including weekends and public holidays, throughout the course of the study. Once an animal enters a potentially critical period with respect to welfare impairment, more frequent monitoring must be performed. Where possible, scheduling experimental procedures so that the animals’ critical period occurs during normal working hours will aid to ensure that appropriate monitoring is performed and welfare decisions made. The required frequency of, and interval between, monitoring observations will be guided by the known or expected nature and time-course of the condition being studied, and must be such that changes in any animal’s condition will be detected early. Genetically modified animals may require more frequent monitoring for unexpected outcomes that could affect animal wellbeing. The frequency of monitoring must be increased when animals exhibit any signs of morbidity as defined by the criteria in the FHS AEC-authorised protocol or any other signs of illness or adverse effects. A mechanism must be in place whereby regular feedback is provided to the FHS AEC regarding the actual morbidity observed in each study, so that monitoring frequency can be reassessed by the FHS AEC on a regular basis and monitoring schedules adapted as required. For further details of monitoring requirements, refer to Welfare monitoring per severity category of experiments, later.

Only appropriately trained FHS AEC-accredited personnel, who have successfully completed the UCT-RAF’s induction course for animal researchers, are permitted to monitor the health and welfare of all animals enrolled in experiments. Personnel who have not yet attended the UCT induction course, may perform specific procedures for which they have been adequately trained, and must attend the next available UCT induction course. Such personnel must be familiar with the normal behaviour of the animal species being studied and experienced in recognising clinical signs of morbidity in that species, such as: changes in expected behaviour or avoidance behaviour, decreased activity, isolation from the group, rough hair coat, discharge around the eyes or nose, decreased food or water intake, weight loss, dehydration, abnormal posture, arched back, abnormal breathing, weakness, lameness, paralysis, seizures, vocalising or self-mutilation. Where weight loss is used to determine the humane endpoint, body weight must be measured as part of welfare monitoring. Researchers should be mindful of the fact that young animals would normally continue to gain body weight during the study period, and this should be factored into the calculation of the amount of weight loss used to determine the humane endpoint. The FHS AEC must authorise the list of clinical signs that must be monitored for in each study, including any study-specific signs and the frequency of monitoring, during its consideration of the protocol.

When the condition of an animal indicates that there is a potential need for intervention to prevent, terminate or relieve pain, suffering, distress or lasting harm, the Principal Investigator must be informed immediately. Actions that may be taken include an increase in the frequency of welfare-monitoring, appropriate nursing care, transferring the animal to an individual cage if injury from other
animals is possible, administering analgesia (i.e. painkillers) or other appropriate therapy in consultation with the FHS veterinarian, or euthanasia (link to SOP for euthanasia). Animals not likely to survive until the next scheduled observation must be euthanased. In cases where an animal is not immediately euthanased, designated personnel from the UCT-RAF must make an assessment of the animal’s condition as soon as possible, inform the Principal Investigator, and an appropriate plan of action must be established by the Principal Investigator in consultation with these designated RAF personnel.

All animals that are found dead must be promptly removed from their cage and the death reported to the UCT-RAF without delay (link to SOP for reporting animals found dead), and a post-mortem examination performed by a laboratory animal technologist or veterinarian (link to SOP for post-mortems). In studies where animals are often found dead, closer and more frequent welfare monitoring must be performed.

Detailed written records must be maintained of all welfare monitoring performed. Welfare-monitoring records must be filed in the dedicated cabinets in the area where the animals are housed, and may not be removed from this location for the full duration of the study (i.e. until expiry of the FHS AEC-authorised protocol). Welfare-monitoring records must contain the name and current contact details (including cellphone numbers) of all personnel responsible for monitoring the welfare of the animals as well as the Principal Investigator.

If researchers’ resources cannot meet these welfare-monitoring requirements, the Principal Investigator must submit an alternative welfare-monitoring plan to the FHS AEC. Alternative plans should ensure that all welfare-monitoring requirements as set out in this SOP are met, and must be approved by the FHS AEC prior to implementation. Principal Investigators remain responsible for all costs associated with implementing AEC-approved alternative welfare-monitoring plans. In cases where qualified personnel from the UCT-RAF perform such welfare monitoring on behalf of researchers, the Principal Investigator is expected to ensure that they receive feedback at appropriate frequency so that the Principal Investigator remains adequately informed of all welfare outcomes and concerns. The Principal Investigator remains ultimately responsible for all ethical and legal aspects of the study and should act appropriately and timeously to modify any experimental procedures when required, based on the above feedback.

5. Welfare monitoring per Severity Category of experiments

5.1. Animals not yet enrolled in experiments

- Animals that have already been issued to a research project, but that have not yet entered an experiment (i.e. prior to any experimental procedures or treatments being performed), must be monitored for general health once per day.
- Monitoring must be performed by the UCT-RAF animal husbandry staff (for animals housed in the UCT-RAF) or by Satellite animal facility husbandry staff (for animals housed in Satellite animal facilities), or by the research team.

5.2. Category A studies (no discomfort; e.g. purely observational studies)

- Animals must be monitored once per day.
- Monitoring must be performed by the UCT-RAF animal husbandry staff (for animals housed in the UCT-RAF) or by Satellite animal facility husbandry staff (for animals housed in Satellite animal facilities), or by the research team.

5.3. Category B studies (mild discomfort)
- Animals must initially be monitored once per day. Following any experimental procedures, animals must be monitored more frequently for a defined period if the experimental interventions could compromise the welfare of the animal. If animal welfare is not compromised during this period, animals must be monitored once per day thereafter. If any compromise in animal welfare develops, monitoring frequency must be increased. The FHS AEC must approve this monitoring schedule during its consideration of the protocol.
- Only appropriately trained, FHS AEC-authorised personnel may perform the welfare monitoring.

5.4. **Category C studies (moderate discomfort)**

- Animals must initially be monitored once per day. Following any experimental procedures, animals must be monitored more frequently for a defined period if the experimental interventions could compromise the welfare of the animal. If any compromise in animal welfare develops, monitoring frequency must be further increased. The FHS AEC must approve this monitoring schedule during its consideration of the protocol.
- Only appropriately trained, FHS AEC-authorised personnel may perform the welfare monitoring.

5.5. **Category D studies (severe discomfort)**

- Category D1 (acute models): Animals must initially be monitored once per day. Following any experimental procedures, animals must be monitored more frequently if the experimental interventions could compromise the welfare of the animal. If any compromise in animal welfare develops, monitoring frequency must be increased. The FHS AEC must approve this monitoring schedule during its consideration of the protocol.
- Category D2 (chronic models): Animals must initially be monitored once per day. Following any experimental procedures, animals must be monitored more frequently for a defined period if the experimental interventions could compromise the welfare of the animal. If animal welfare is not compromised during this period, animals must be monitored once per day thereafter. Monitoring frequency must be increased from the time point where the potential for compromise in animal welfare is known to be significantly increased. If any compromise in animal welfare develops, monitoring frequency must be increased. The FHS AEC must approve this monitoring schedule during its consideration of the protocol.
- Only appropriately trained, FHS AEC-authorised personnel may perform the welfare monitoring.

**References**

8. National Centre for the Replacement Refinement and Reduction of Animals in Research (NC3R’s), Biotechnology and Biological Sciences Research Council, the Department for Environment Food and Rural Affairs (Defra), the Medical Research Council (MRC), the Natural Environment Research Council (NERC) and the Wellcome Trust. Responsibility...
in the use of animals in bioscience research: Expectations of the major research council and charitable funding bodies. (2010).


11 University of Cape Town. Code of Ethics and Procedures for the use of Animals in Teaching and Research. [http://www.researchoffice.uct.ac.za/research_information/policies/animals/].