

GUIDE TO THE CARE & USE OF ANIMALS IN RESEARCH & TEACHING

**Interfaculty Animal Ethics Committee
University of the Free State**



Contents

1. INTRODUCTION.....	1
2. PURPOSE	2
3. HUMANE CONSIDERATIONS IN THE USE OF EXPERIMENTAL ANIMALS	2
4. PAIN AND THE CLASSIFICATION OF PAIN	5
5. CATEGORIES OF INVASIVENESS IN ANIMAL EXPERIMENTS	7
6. SOUTH AFRICAN NATIONAL STANDARD: THE CARE AND USE OF ANIMALS FOR SCIENTIFIC PURPOSES. (SANS10386:200X)	9
7. ETHICS IN HEALTH RESEARCH. PRINCIPLES, PROCESSES AND STRUCTURES. DEPARTMENT OF HEALTH, REPUBLIC OF SOUTH AFRICA (2015)	10
8. SUBMITTING A PROTOCOL FOR ETHICS CLEARANCE.....	10
9. THE LAY SUMMARY	11
10. CONDITIONS FOR ANIMAL EXPERIMENTATION.....	11
11. GENERAL PROVISIONS	12
12. SPECIFIC PROVISIONS	12
13. ANIMAL SURGERY	13
14. SOME RECOGNISED STANDARDS, BODIES AND PUBLICATIONS ON THE CARE AND USE OF LABORATORY ANIMALS.....	13
15. LEGISLATION GOVERNING ANIMAL EXPERIMENTATION	13
16. REFERENCES.....	14
ACKNOWLEDGEMENT	14

1. INTRODUCTION

Experimentation with animals has made possible major contributions to biological knowledge and to the welfare of humans and animals, particularly in the treatment and prevention of diseases. Many important advances in medical science have had their origins in basic biological research not primarily directed to practical ends as well as from applied research designed to investigate specific medical or veterinary problems. There is still an urgent need for basic and applied research that will lead to the discovery of methods for the prevention and treatment of diseases for which adequate control methods are not yet available.

The use of animals for predicting the probable effects of procedures on human beings entails responsibility for their welfare. In both human and veterinary medicine animals are used for behavioural, physiological, pathological, toxicological, and therapeutic research and for experimental surgery or surgical training and for testing drugs and biological preparations. The same responsibility toward the experimental animals prevails in all of these cases.

The replacement of living animals by alternative methods is encouraged and will continue at an increasing pace, but the need for experiments on living animals will remain, principally for the following two reasons. Firstly, it is impossible to imitate in any other way the complex system of interactions between different organs that exist in every living animal; and second, in testing for the safety of medicines and other substances used in the home or work, specific tests on simplified systems will only detect the types of toxicity for which they have been designed, while there is an unlimited number of still unknown ways in which the substance may be poisonous and which can only be tested for by the administration to a living animal. Large numbers of animals are also used for non-invasive experiments which do not involve any kind of discomfort. These experiments include studies on the biology and ecology of animals for non-human purposes, often for conservation. Research is also done in the agricultural production field, such as feeding trials with farm animals to improve food production and food security for the local human population.

The vast benefits to both animals and humans which have arisen directly from past animal research, and the reasonable expectation that such research will be of equal or greater benefit to all forms of life in the future, serves to justify the continuation of animal experimentation in general. However, the scientific community must recognise that they have both a scientific and ethical responsibility for the humane care of animals, and all who care for and use animals in research, testing and education must assume responsibility for their general welfare. It is especially important to recognise that the intent of research is to provide data that will advance knowledge of immediate or potential benefit to humans and animals. Scientists have developed, and should continue to develop scientifically valid adjunct or alternative methods to animal experimentation.

The guiding principles underpinning the humane use of animals in scientific research are called the three Rs. Any researcher planning to use animals in research must first show why there is no alternative and what will be done to minimise numbers and suffering, ie:

- Replace the use of animals with alternative techniques, or avoid the use of animals altogether.
- Reduce the number of animals used to a minimum, to obtain information from fewer animals or more information from the same number of animals.
- Refine the way experiments are carried out, to make sure animals suffer as little as possible. This includes better housing and improvements to procedures which minimise pain and suffering and/or improve animal welfare.

2. PURPOSE

This Guide has been prepared to give direction to the care and use of experimental animals by the research, teaching and technical personnel, undergraduate and postgraduate students of the University of the Free State. Attention is directed to the important ethical, legal and scientific responsibilities associated with animal experimentation, and guiding principles are stated to assist individual researchers. It is expected that all researchers who contemplate performing animal experiments should acquaint themselves with the contents of this Guide as well as the required reading specified in sections 6 and 7.

Experimental animals include all live, sentient non-human vertebrates, including eggs, fetuses and embryos, that is; fish, amphibians, reptiles, birds and mammals, and encompassing domestic animals, purpose-bred animals, farm animals, wildlife and higher invertebrates such as the advanced members from the *Cephalopoda* and *Decapoda* (SANS 10386). The immature forms of non-human vertebrates from the following stages of development are included:

- i) mammals, birds and reptiles: from halfway through gestation or incubation periods;
- ii) fish and amphibians: from the time at which they become capable of independent feeding.

3. HUMANE CONSIDERATIONS IN THE USE OF EXPERIMENTAL ANIMALS

Humans have a moral obligation to respect all animals and to have consideration for their capacity to be sensitive to pain, to suffer and to have a memory of such experience. The humane care and use of animal life is a prime responsibility of persons who use animals for experimental purposes.

It should be appreciated that humans are not naturally endowed with an instinct to be kind to animals. Animal experimentation should therefore be considered to be a discipline for which a special education programme is necessary.

Many animal experiments such as those concerned with nutritional studies, reproduction, animal behaviour, or parasitic infestation can be conducted without inflicting any pain on an experimental animal. The same cannot be said of many physiological and surgical experiments in which operative procedures have to be performed. Despite good anaesthetic and surgical techniques and post-operative care, the procedures are unavoidably unpleasant for the animal subjects on which they are performed. The use of large numbers of small animals for biological assay procedures, drug and vaccine development and testing, and toxicity testing in which substances are administered orally, topically or parenterally often produce extreme discomfort and death. In many instances food and drug standards are maintained by biological testing which is mandatory in terms of legislation.

No scientist who is well informed can therefore honestly claim that laboratory animals never experience pain and discomfort, or that the quality of animal care and treatment in all laboratories and institutions is optimal. The ethical position of the scientific community is weakened if it exhibits ignorance of these facts or attempts to conceal them. In the context of animal experimentation, humaneness is concerned with reducing the sum total of fear, discomfort and pain that may be caused to laboratory animals.

Such discomfort and pain may be caused directly by an experimental procedure or may be a contingent factor arising from methods of animal procurement, transportation, nutrition, handling and restraint or from exposure to injury, communicable disease or parasitism. Contingent inhumanity is almost always detrimental to the objectives of an experiment since it introduces psychological and physiological disturbances which are likely to confuse almost any biological investigation.

In reducing the sum total of discomfort and pain in an animal experiment both quantitative and qualitative aspects need to be considered. These concern the number of experimental subjects and the severity of distress and pain which a procedure may produce in the individual animal subject.

Reduction of the sum total of discomfort and pain may be accomplished by applying the following four approaches:

- i) **Replacement** of living animals where possible with scientifically valid alternative methods using insentient material.
- ii) **Reduction** of the number of animals in an experiment to the minimum number required to obtain information of a given degree of precision by the right choice of strategies in the planning and performance of research and by the application of statistical design and analysis.
- iii) **Refinement** of experimental techniques by:
 - a) improvisation and the application of technological advancements in order to reduce the severity of an experimental procedure on those animals which still have to be

used;

b) the elimination of contingent inhumanity which is associated with animal handling and husbandry in an animal facility.

iv) **Responsibility** of the user for the care and welfare of the animals under his/her control.

Principles regarding the ethics of animal experimentation are described by the *Canadian Council on Animal Care* and concern the humane treatment of animals. The University of the Free State ascribes to these principles which are as follows:

- i. For experimental purposes, animals should be used only if the researcher's best efforts to find an alternative have failed, and should entail a continuing review of the literature. Scientists have a responsibility to share research information with other scientists, methodology and experience.
- ii. Those using animals should recognise the need to use the best methods on the smallest number of appropriate animals required to obtain valid information. Proposed experiments must be justifiable in terms of the declared objectives. The experimental design must offer every practicable safeguard to the animal.
- iii. There must be reasonable expectation that studies involving animals will contribute significantly to knowledge which may eventually lead to the protection and improvement of the health and welfare of either humans or animals, or the conservation of the latter. Expert opinion must attest to this premise in particular before undertaking the following procedures, which are restricted:
 - Prey killing and fighting.
 - Burns, freezing injuries, fractures, and other types of trauma investigation. These require anaesthesia during procedures, and must include acceptable veterinary practices for the relief of pain.
 - Animals are not to be subjected to unnecessary pain or distress. Their physical and mental well-being are paramount.
 - If pain or distress are necessary concomitants to the experimental study, these should be minimised both in intensity and duration.
- iv. An informed assessment of the probable degree of pain and its duration is required, in order to relate these to acceptable, or unacceptable, limits. Investigators, animal care committees, grant review committees and referees must be especially cautious in evaluating the proposed use of the following procedures:
 - experiments that involve withholding pre- and post-operative pain-relieving medication;
 - paralysing and immobilising experiments where there is no reduction in the sensation of pain;
 - electric shock as negative reinforcement;
 - extreme environmental conditions such as low or high temperatures, high

- humidity, modified atmospheres, etc., or sudden changes therein;
- stress and pain research.
- v. An animal observed to be experiencing severe, unrelievable pain should immediately be humanely euthanised, using a method providing initial rapid unconsciousness.
 - vi. Acute (non-recovery) procedures involving animals anaesthetised and insensitive to pain during an entire study are considered acceptable, as are studies which involve no pain or distress.
 - vii. The following experimental procedures are known to inflict excessive pain and are thus unacceptable:
 - utilisation of muscle relaxants or paralytics (curare and curare-like) alone, without anaesthetics, during surgical procedures;
 - traumatising procedures involving crushing, burning, striking or beating in un-anaesthetised animals.
 - viii. Studies such as toxicological and biological testing, cancer research and infectious disease investigation may, in the past, have required continuation until the death of the animal. However, in the face of distinct signs that such processes are causing irreversible pain or distress, alternative end points should be sought to satisfy both the requirements of the study and the needs of the animal.
 - ix. In test procedures, cost and ease of application should not overrule the need to prevent pain and distress.
 - x. Experiments involving the withholding of food or water should entail only short- term deprivation and have no detrimental effect on the health of the animal.
 - xi. Physical restraint should only be used after alternative procedures have been fully considered and found inadequate. Animals so restrained must receive exceptional care and attention, in compliance with species specific and general requirements as set forth in the *"Guide to the Care and Use of Experimental Animals"*.
 - xii. Painful experiments or multiple invasive procedures on an individual animal, solely for the instruction of students in the classroom or for the demonstration of established scientific knowledge in e.g., exhibits, conferences or seminars, cannot be justified. As a replacement, audio-visual techniques should be employed to convey such information.

4. PAIN AND THE CLASSIFICATION OF PAIN

All animals from protozoa to mammals are living organisms that respond to stimuli. These stimuli may be extreme or prolonged and cause discomfort, distress/stress or pain to the animal. The concept of pain and distress in animals is subjective and difficult to define and the human assessment therefore tends to be anthropomorphic. It is difficult to distinguish between nociception and pain in animals, however there is sufficient scientific evidence that pain, or the threat of noxious stimuli causes fear and/or anxiety in animals. It should therefore be assumed that if a procedure is

likely to cause pain in humans, it will produce a similar degree of pain in animals. (National Research Council (US) Committee on Recognition and Alleviation of Pain in Laboratory Animals. Recognition and Alleviation of Pain in Laboratory Animals. Washington (DC): National Academies Press (US); 2009. 1, Pain in Research Animals: General Principles and Considerations. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK32655/>).

It is, however, important to recognise the three states of suffering which may be described as follows:

i. Discomfort

characterised by negative signs of poor condition, torpor, diminished appetite.

ii. Stress/Distress

is an undesirable physical or mental state resulting from pain, anxiety, or fear. Its acute form may be relieved by tranquillisers. Sustained distress, however, requires environmental change and behavioural conditioning and does not respond to drug therapy.

iii. Pain

Acute Pain resulting from a traumatic surgical or infectious event that is abrupt in onset and relatively short in duration. It is generally alleviated by analgesics.

Chronic Pain results from a long-standing physical disorder or emotional distress that is usually slow in onset and has a long duration. It is seldom alleviated by analgesics but frequently responds to tranquillisers combined with environmental and behavioural conditioning.

An animal in pain, regardless of species, usually displays one or more of the following signs:

- attraction to the area of pain
- increased skeletal muscle tone
- altered electroencephalogram response
- increased blood pressure and heart rate
- pupillary dilation
- change in the respiratory pattern

It is the view of the Animal Ethics Committee that animals should **always** be given the benefit of any doubt concerning pain relief. The following principles apply:

- I. Every animal user shall take effective precautions to prevent or reduce to a minimum any pain or other distress or discomfort in the animals used.
- II. Procedures which are likely to cause fear, stress, discomfort or pain should be performed under anaesthesia unless the effect of the procedure on the animal's well-being is less than that caused by anaesthesia.
- III. At the end of an experiment, animals should be euthanised if they are likely to remain in discomfort and pain.

- IV. In no case shall any animal be subjected to severe pain which endures or is likely to endure.
- V. Experiments which cannot be performed without unrelieved pain and distress should be abandoned.

In an attempt to assess the degree of pain inflicted on research animals, a pain classification system developed by the *Canadian Council on Animal Care* is used as a reference. This system categorises pain on the degree of invasiveness in animal experiments. The researcher is requested to refer to this pain classification system which should be applied to all research as part of the protocol design and review process.

5. CATEGORIES OF INVASIVENESS IN ANIMAL EXPERIMENTS

i. Studies or experiments on most invertebrates, or on non-entire living material – Category A

These might include: tissue culture, tissues obtained at autopsy, necropsy or from the slaughterhouse; eggs, protozoa and related single celled organisms; studies or experiments involving containment, incision or other invasive action on metazoa. It is acknowledged that cephalopods and decapods have nervous systems as well developed as some vertebrates and therefore Categories of Invasiveness B, C, D, and E may apply.

ii. Studies or experiments on vertebrates causing little or no discomfort or stress – Category B

These might include: domestic flocks or herds being maintained in simulated or actual commercial production management systems; the short-term and skilful restraint of animals for purposes of observation or physical examination; blood sampling; removing less than 0.5mm of tissue from the tip of the tail of an animal to identify its genotype provided that it is carried out between the ages of 3-4 weeks; injection of material in amounts that will not cause adverse reactions by the following routes: intravenous, subcutaneous, intramuscular, intraperitoneal, or oral, **but not intrathoracic or intracardiac** (Category C); acute non-survival studies in which the animals are completely anesthetized and do not regain consciousness; approved methods of euthanasia following rapid unconsciousness, such as anaesthetic overdose, or decapitation preceded by sedation or light anaesthesia; short periods of food and/or water deprivation equivalent to periods of abstinence in nature.

iii. Studies or experiments on vertebrates involving minor stress or pain of short duration – Category C

These might include: cannulation or catheterisation of blood vessels or body cavities performed under anaesthesia; minor surgical procedures under anaesthesia, such as biopsies, laparoscopy; short periods of restraint consistent with minimal distress; overnight food and/or water deprivation; protocols involving oral gavage (tube feeding);

behavioural experiments on awake animals that involve short-term stressful restraint. These would not cause significant change in coat appearance, ocular or nasal discharges, abnormal respiratory or cardiac rate, reduction of faecal or urinary output, isolation or crowding.

Comment: During or after Category C studies animals must not show self-mutilation, anorexia, dehydration, hyperactivity, increased recumbency or dormancy, increased vocalisation, aggressive-defensive behaviour or demonstrate social withdrawal and self-isolation.

iv. Studies or experiments on vertebrates that involve moderate to severe distress or discomfort – Category D

These might include: major surgical procedures conducted under anaesthesia, permitting recovery, with adherence to acceptable veterinary practices, adequate post-operative analgesia, fluid therapy and required veterinary nursing practices; exposure of animals to noxious stimuli for periods not above the minimal level required to demonstrate the required clinical effect; prolonged (several hours or more) periods of physical restraint applied in compliance with standard guidelines; induction of behavioural stresses such as maternal deprivation, aggression, predator-prey interactions, procedures which alter perceptual or motor functions which consequently affect locomotion and behavioural activity; immunisation employing Freund's complete adjuvant administered subcutaneously or intramuscularly; induction of an anatomical or physiological deficit that will result in pain or distress; application of noxious stimuli from which escape is impossible; procedures that produce pain in which anaesthetics are not used, such as toxicity testing with death as an end point; production of radiation sickness; certain injections, and stress and shock research that would result in pain approaching the pain tolerance threshold.

Comment: Animals used in Category D studies should not have signs of prolonged clinical distress, such as marked abnormalities in behavioural patterns or attitudes; lack of grooming, dehydration, abnormal vocalisation, prolonged anorexia, circulatory collapse, or decreased cardiac activity, increased signs of infectious processes (peritonitis, pleurisy, pneumonia, diarrhoea, etc.). If the clinical abnormalities cannot be alleviated, the animals should be destroyed using an acceptable method of euthanasia.

v. Procedures that involve inflicting severe pain near, at, or above the pain tolerance threshold of un-anaesthetised, conscious animals – Category E

Such studies may not be confined to surgical practices, but may include exposure to noxious stimuli or agents whose effects are unknown; protocols where death is the end point and where the animals may experience pain and distress that cannot be alleviated; intradermal or foot pad injection using Freund's complete

adjuvant; completely new biomedical experiments which have a high degree of invasiveness; behavioural studies about which the effects of the degree of distress are not known; use of muscle relaxants or paralytic drugs without the use of anaesthetics; burn or trauma infliction on un-anaesthetised animals; a euthanasia method not approved by the South African Veterinary Council or related bodies.

Comment: Category E experiments are considered highly questionable or unacceptable, irrespective of the significance of anticipated results. Many of these procedures are specifically prohibited because of conflict with internationally accepted Ethics of Animal Experimentation.

6. SOUTH AFRICAN NATIONAL STANDARD: THE CARE AND USE OF ANIMALS FOR SCIENTIFIC PURPOSES. (SANS10386:2008)

The standard encompasses all aspects of the care and use of, or interaction with, animals for scientific purposes in medicine, biology, agriculture, veterinary and other animal sciences, industry and teaching studies in South Africa. It includes animal usage in research, teaching, field trials, product testing, diagnosis, the production of biological substances and environmental studies. The purpose of the standard is to ensure the ethical and humane care of animals used for scientific purposes, as well as for teaching activities. Its aims are to:

- a) emphasise the responsibilities of researchers, teachers and institutions using animals;
- b) ensure that the welfare of animals is always considered;
- c) ensure that the use of animals is justified by the establishment of Animal Ethics Committees (AECs) so as to ensure adherence to the principles of Replacement, Reduction and Refinement (the 3 Rs);
- d) prevent or minimize pain or distress, where possible, for each animal used in scientific studies and teaching activities;
- e) ensure minimum uniform national standards regarding animal care and use;
- f) minimize the number of animals used in scientific studies and teaching activities in such a way that this does not jeopardise the validity of the studies or activities; and
- g) promote the development and use of techniques which adhere to the principles of Replace, Reduce and Refine animal use in scientific studies and teaching activities .

The researcher or teacher wishing to perform any animal studies are required to read the Standard up to and including 7.5.7 as well as the species specific housing requirements in section 7.6.

In addition:

all researchers working with wild life are required to read section 8

all researchers working with farm animals are required to read section 9

all lecturers using animals to demonstrate knowledge or techniques in scientific disciplines are required to read section 9

7. ETHICS IN HEALTH RESEARCH. PRINCIPLES, PROCESSES AND STRUCTURES. DEPARTMENT OF HEALTH, REPUBLIC OF SOUTH AFRICA (2015)

Health research is vital for the advancement of health care services for the people of South Africa. Because of its excellent health care and research infrastructure, skills and expertise, South Africa provides a rich arena for health and health-related research. These Guidelines are intended for use by researchers who involve human participants in their research or who use animals, RECs, health care practitioners, health facility administrators, policy makers in government departments, and community representatives. This is consistent with the understanding that research means a systematic collection and analysis of new information undertaken with the goal of producing generalisable knowledge or improved understanding of the human condition in its environment or context. This assists with the project of ensuring that research is conducted in accordance with the highest ethical norms and standards.

The researcher or teacher wishing to perform any animal studies are required to read the entire document as background.

8. SUBMITTING A PROTOCOL FOR ETHICS CLEARANCE

- a. In these Guidelines, “researchers” refers to the person named as Principal Investigator in an application (whether for research or for teaching) which has been approved by the AEC.
- b. All researchers who wish to undertake any research projects involving animals, or teachers who require the use of animals in teaching must obtain ethics clearance before commencing the study.
- c. Postgraduate or other students involved in animal research may not be listed as a Principal Investigator on an application submitted to AEC, but they must be mentioned in the application as students.
- d. Although students may upload the application and supporting documents, the responsibility for ethics compliance rests with the supervisor or principal investigator. Applications therefore require approval of submission by the Supervisor and Departmental Head before ethics review of the project will take place.
- e. If a project involves collaboration with another institution, the UFS investigator must apply as the principal investigator. Proof of ethical clearance for the project or a letter delegating ethical clearance to the UFS, from the collaborating institution is required.
- f. The instructions for using the RIMS online submission are available on the RIMS help screen and instructions for completing the submission are given in the e-form. Each field must be completed. If it is not applicable indicate with N/A.
- g. Protocols for approval are submitted electronically on the RIMS online system (<https://ufs.rims.ac.za/>). Online submission requires that the user be registered as a RIMS

user. Contact the RIMS administrator, Mrs. M van Rooyen by e-mail (VanRooyenM2@ufs.ac.za) or telephonically at 051 4019451 for registration.

9. THE LAY SUMMARY

The application makes provision for including a lay summary. This should be completed using non-technical language and avoiding jargon. The summary should include:

- a. A summary of the objectives and potential benefits i.e. why the project is important.
- b. Outline the sequence of the work, indicating how the different procedures will contribute towards answering the questions.
- c. Explain why a specific type of animal (species, strain, stage of development) is to be used.
- d. Indicate why alternative methods cannot be used.
- e. Motivate why the number of animals are to be used.
- f. Provide a summary of the main adverse effects likely to be caused to the animal.
- g. State the level of suffering that the animal will endure and its duration.
- h. Outline efforts to minimise adverse effects and suffering, for example improvement of techniques and special arrangements for caring for the animals
- i. Briefly explain how it is judged that the benefits outweigh the harms and why the research is justified.

10. CONDITIONS FOR ANIMAL EXPERIMENTATION

- a. Scientific and teaching activities must not commence until written approval has been obtained from the AEC.
- b. All experiments involving live animals shall be carried out under the supervision of a member of staff with appropriate training and experience. Students should complete an appropriate training course.
- c. The researcher must strictly adhere to the experimental procedures approved by the AEC, if during the course of an experiment the procedures are changed; the researcher must immediately notify the Chair in writing. Members of the AEC may request to view daily activity logs during any site inspection. Where possible approval must be obtained prior to continuation of the experiment.
- d. All researchers and animals facility managers should promptly notify the AEC of any unexpected, adverse events that may impact on the well-being of an animal in their care. Notification is to include details of the steps taken to address the problem. In serious cases no further experimentation are to be undertaken until the protocol has been reviewed by the AEC.
- e. All researchers must make reports to the AEC as requested, including prompt notification of any adverse events that impact on animal wellbeing, advice when a project is completed or discontinued and the information required for the annual report of any on-going project.

- f. A final report must be submitted on completion of all projects.

11. GENERAL PROVISIONS

- a. Daily animal care records should be kept, in order to determine the duration of problems, should they arise, concerning the animals wellbeing, and to monitor the efficiency of husbandry practices. A Daily Activity Log must be maintained and displayed where the animals are held. A template for the log may be obtained from the manager of the Animal Unit. The log must be made available any time for members of the AEC to inspect.
- b. On completion of experiments, researchers shall ensure that animals return to grazing paddocks or animal houses are clearly identified and that the exact nature of the experiment is recorded on individual animal records. Individual animal records must be maintained for animals that are used for more than one research protocol. The records must also be available anytime should the members of the AEC require them. Researchers and teachers can make use of the Animal Welfare Score Sheet available from the animal unit manager.
- c. Any unforeseen sign of pain, suffering or distress in any animal must be reported promptly to the Emergency Contact listed on the Authority and/or the Animal House Manager.
- d. Researchers in doubt as to their responsibilities should seek guidance from the AEC Chair.
- e. The justification for continuing or repeating experiments must be on the basis of the results obtained as well as the potential effects on the welfare of the animals, and must be constantly subject to review.
- f. Researchers should note that, apart from legal and moral considerations, activities involving the use of animals that produce undue pain, distress or discomfort may result in data that are unsatisfactory or misleading when extrapolated to normal conditions.

12. SPECIFIC PROVISIONS

- a. Other than in exceptional circumstances, any large mammals may not be tethered as part of a research protocol. Any large mammals may not normally be tethered in metabolism cages. Alternatives to tethering in terms of conditioning are to be investigated, and researchers are advised to seek advice from the AEC. The maximum time that sheep may be held in metabolism cages is 28 days.
- b. Wild animals can suffer severe stress on their first contact with humans and new surroundings. Researchers must use the most effective techniques for minimizing stress during restraint, capture, marking, transport, maintenance and killing of wild animals. In appropriate instances prior permission to carry out these procedures on wild vertebrates must have been granted by the appropriate Governing Authorities. The relevant permits/licenses must be obtained from the Free State Department Economic development, Tourism and Environmental Affairs.

- c. Domestic farm animals should be healthy, well grown, adequately vaccinated and treated for internal and external parasites, unless this specifically affects the research proposed, before entry on to any UFS property.

13. ANIMAL SURGERY

- a. In these Guidelines, chronic surgical experiments are those in which a surgically manipulated animal is allowed to recover from anesthesia, while acute experiments are those in which it is not.
- b. Persons undertaking chronic surgical experimentation will normally be required to have satisfactorily completed appropriate training or have an equivalent amount of practical experience in undertaking surgical techniques.
- c. Acute surgical experiments may be carried out by persons without surgical training provided the animal is suitably anaesthetized and the operation is supervised by a suitably qualified person.
- d. The AEC may on application grant exceptions to the above where it is satisfied that the reason given and the supervision and training provided are adequate.
- e. Neither this Section nor the AEC Constitution applies to surgical operations on University property which are considered a normal part of routine husbandry practices.

14. SOME RECOGNISED STANDARDS, BODIES AND PUBLICATIONS ON THE CARE AND USE OF LABORATORY ANIMALS

- Canadian Council on Animal Care: Guide to the Care and Use of Experimental Animals. Vol 1 (1993). Ernest D. Olfert, DVM; Brenda M. Cross, DVM; and A. Ann McWilliam
- Council for International Organizations of Medical Sciences (CIOMS). W.H.O. Distribution and Sales Service, 1211 Geneva 27, Switzerland. *International Guiding Principles for Biomedical Research Involving Animals* (1985).
- Council of Europe. Strasbourg, France. *European Convention for the Protection of Vertebrate Animals used for Experimental and Other Purposes* (1985).
- U S Governmental Principles for the Care and Use of Laboratory Animals. Federal Register 50 (97) 20864-20865 (May 20th 1985).
- International Air Transport Association (IATA): *Live Animal Regulations*, 11th Edition

15. LEGISLATION GOVERNING ANIMAL EXPERIMENTATION

The use of a wide range of wild and domesticated animals for teaching and research is subject to the following laws:

- Animals Protection Act, 1962 (Act No. 71 of 1962)

- Animal Diseases Act, 1984 (Act No. 35 of 1984)
- Veterinary and Paraveterinary Professions Act, 1982 (Act No. 19 of 1982) and the subsequent Notice 1445 of 1997, published in the Government Gazette 18313 of 3 October 1997: *“Rules relating to the practising of the Paraveterinary professions of Laboratory Animal Technologists”*
- Animal Health Act, 2002 (Act No. 7 of 2002)
- Medicines and Related Substances Control Act, 1965 (Act No. 101 of 1965)
- Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947)

16. REFERENCES

1. The UFAW Handbook on the Care and Management of Laboratory and Other Research Animals, Eighth Edition (2010) Editors: Robert Hubrecht and James Kirkwood.
2. Ingle D J (1966), Scientific and Ethical Responsibilities associated with the Use and Care of Animals. Federation Proceedings 25 - 1465.
3. Canadian Council on Animal Care: Guide to the Care and Use of Experimental Animals. Vol 1 (1993). Ernest D. Olfert, DVM; Brenda M. Cross, DVM; and A. Ann McWilliam
4. Russel W M S, Burch R L.: The Principles of Humane Experimental Technique. Charles C Thomas, Springfield, Il. 1992. (http://altweb.jhsph.edu/pubs/books/humane_exp/het-toc).
5. Guide for the care and use of laboratory Animals. Eighth Edition. (2011), National Academy of Sciences, USA. (<https://grants.nih.gov/grants/olaw/Guide-for-the-Care-and-use-of-laboratory-animals.pdf>).
6. South African National Standard: The care and use of animals for scientific purposes. (SANS10386:2008)
7. Ethics in Health Research. Principles, Processes and Structures. Department of Health, Republic of South Africa (2015).

ACKNOWLEDGEMENT

Acknowledgement is given to the University of Kwazulu-Natal for allowing the use of their Guide as basis for this publication.