A Culture of Care

A guide for people working with animals in research, testing and teaching.

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National Animal Ethics Advisory Committee

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Anyone responsible for the welfare of animals used in research, testing and teaching has a duty of care, which is defined under the Animal Welfare Act 1999 (the Act).

As well as complying with the Act (and particularly Part 6) using animals in research, testing and teaching involves more than simple basic animal care. It involves a genuine commitment to the welfare of the animals, a respect for the contribution they make to your work, and a desire to enhance their well-being beyond minimum standards: in short, a culture of care.

This guide is published by the National Animal Ethics Advisory Committee (NAEAC) for scientists, technicians and teachers who use animals in their work and are responsible for their welfare. It is also intended to be a useful reference document for members of the animal ethics committees that consider applications to use animals for research, testing and teaching.

The guide summarises the legal requirements and provides a framework of understanding for going beyond the legal minima. It is intended to help the reader stay in touch with, and respond to, society's rapidly evolving attitudes towards the relationships between people and animals.

Changing attitudes

Scientists, theologians, and philosophers have grappled for centuries with the relationship between humankind and other species. Things have come a long way since the 17th century when animals were thought to have no capacity for consciousness. Darwin's work in the 19th century, which placed humankind within the animal kingdom – not above it – gave further impetus to changing attitudes. By the 1870s, the first legislation to prevent cruelty to animals was enacted.

An important milestone was the introduction, in 1959, of the principles universally accepted as the Three Rs. The principles of replacement, reduction and refinement are the cornerstone of modern research and teaching practices involving animals.

In the more than 60 years since then, advances in information technology, scientific techniques and understanding animal behaviour and physiology have further enhanced the ability of researchers and scientists to implement these principles for the benefit of animals.

The principles of caring for the animals used in research, testing and teaching are based on providing the five freedoms (freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury, and disease; freedom to express normal and natural behaviour; and freedom from fear and distress), which were first described in 1979.

In the 1990s, the five freedoms were reformulated into the 5 Domains model, which has been widely adopted as a tool for assessing the welfare impacts of research procedures, pest animal control methods and other interventions in animals' lives. By assessing welfare compromise according to the 5 Domains, a distinction can be made between the physical and functional factors that affect an animal's welfare and the overall mental state of the animal arising from these factors. The domains of the most up-to-date model are nutrition, environment, health, behaviour, and mental state and includes human/animal interactions.

In 2015, animal sentience was explicitly recognised within the Act when it was amended. NAEAC understands animal sentience to mean that animals have emotions, feelings, perceptions, and experiences that matter to them. These can be negative (such as pain or boredom) as well as positive (such as pleasure or comfort). Because these matter to the animals that experience them, they should matter to those who have a duty of care for animals.

Relationships between people and animals

From the very earliest records of human civilisation, it is clear that people have always had strong relationships with animals. These relationships are not the preserve of pet lovers or the animal welfare movement. The mutual respect and dependence that develops between humans and other animal species can be felt just as keenly – and is just as valid – in the context of research, testing and teaching.

How animals are used in research, testing and teaching

The use of animals has been vital in the development of modern medicine and the battle against infectious diseases. Animal husbandry, veterinary medicine and environmental protection work have also benefited enormously. While the benefits are impressive, they do not confer unlimited rights to use animals.

The law in New Zealand allows animals to be used in a research, testing or teaching context, in a way that would not be allowed in other areas of animal use, such as agriculture. This is in recognition of the balance between the benefits to people and other animals, and the welfare impact on the animals involved. This is a privilege which is strictly monitored and regulated to ensure it is not abused.

In New Zealand, the largest single users of animals in research, testing and teaching are Crown Research Institutes, the Universities, and the commercial sector. Numbers and types of animals used vary from year to year the majority of which are cattle, sheep, fish, mice, and rats. Approximately one-third of animals used are killed during or after the process. The majority of these are rodents.

The purpose of research, testing and teaching involving animals covers a wide range of activities, including:

- basic biological research;
- environmental management and species conservation;
- commercial applications;
- medical and veterinary research;
- animal husbandry;
- teaching.

The shape of our economy is reflected in the type of research, testing and teaching done within New Zealand. Annual statistics on use of animals for these purposes can be found on the Ministry for Primary Industries (MPI) website at: **https://www.mpi.govt.nz/animals/animal-welfare/animals-research-testing-teaching/statistics-on-the-use-of-animals-in-research-testing-and-teaching/**

Legal responsibilities for animals in your care

Your responsibilities are covered in Part 6 of the Act. This legislation allows people flexibility in the way they deliver on their duty of care. However, the legal right to use animals comes with strict obligations.

The focus of the law is on prevention of undue pain or distress, rather than on punishment should this occur. The aim is to ensure:

- physical health and behavioural needs are met;
- illness or injury is treated to alleviate pain and distress.

Part 6 of the Act covers animals used in research, testing or teaching with the approval of an animal ethics committee and operating under a code of ethical conduct.

Humane killing of animals is covered under section 12(c) of the Act. It requires that whenever an animal is killed, it must be done without causing unreasonable pain or distress.

Definitions under the law

Three key sets of definitions influence your responsibilities:

1. **Animals:** As well as the traditional understanding of "animal", protection of animals in research, testing and teaching extends to some invertebrates such as octopus, lobster and crabs, mammalian foetuses and unhatched avian young in the second half of gestation or development.

2. **Manipulation:** This term is used throughout Part 6 of the Act. It means interfering in some way with the normal life of the animal. This can extend from the relatively benign (e.g. grazing trials) to the severe (e.g. research into pain thresholds). Killing an animal to use its body or tissues for research, testing or teaching is also considered a manipulation under the Act.

Not covered by "manipulation" are:

- normal veterinary therapy such as vaccination;
- (humane) killing of animals as an endpoint of research, testing or teaching.

In cases where practices become recognised as routine, the Minister has the discretion to remove these practices from the restrictive definitions of "manipulation" under the Act.

3. **Research, testing and teaching:** This covers any situation where animals are manipulated (as defined above) in some way. This could be for research, product testing, teaching or to produce biological products. It does not cover normal clinical veterinary work, or routine wildlife management.

Who can "manipulate" animals?

This can only be conducted in an institution that holds a code of ethical conduct approved by MPI or by individuals and institutions that have a notified arrangement in place to use an existing code of ethical conduct.

A code of ethical conduct is a licence to carry out the work. It does not cover specific procedures or species but sets out a framework for approval of projects by an animal ethics committee who oversees the use of animals for research, testing or teaching on behalf of the organisation who holds the code (termed the code holder).

A code of ethical conduct can include policies or procedures that go beyond what is required by the law (e.g. a policy to never kill animals or use certain species).

These voluntary measures need to be differentiated from mandatory requirements in the code.

This provision gives code holders the means to constantly improve the welfare of animals in their care, using principles such as the Three Rs, the driving force behind New Zealand's animal welfare policy and practice.

Offences in law – the consequences

There are three areas where offences can occur in research, testing or teaching where animals are used:

- working without a code of ethical conduct;
- carrying out a project that is not approved by an AEC, or goes against conditions set by an AEC;
- research using non-human hominids without the approval of the Director-General of MPI.

The maximum penalties are:

- **For an individual:** up to **6 months** imprisonment and/or a maximum fine of **$25,000**; and
- For **an organisation:** a fine of up to **$125,000**.

There are also Animal Welfare (Records and Statistics) Regulations 1999 and Animal Welfare (Care and Procedures) Regulations 2018 that must be complied with.

Animal Ethics Committees

Every code holder must establish an animal ethics committee (AEC). Large institutions may have more than one AEC to cover different sites or types of operation. At the other end of the scale, individuals or small organisations can choose to enter into an arrangement with another code holder to abide by its code and use its AEC.

AECs must have at least four members (three of these must be from outside, and independent of, the organisation) which include:

- a veterinarian nominated by the New Zealand Veterinary Association;
- a nominee from an approved animal welfare organisation (e.g. SPCA New Zealand);
- a nominee from a territorial authority or regional council; and
- at least one senior person from the code holder organisation who is capable of evaluating each proposal for a project.

AECs consider projects for approval and set detailed conditions. In considering a project application, the Committee looks at the balance between harm to the animals involved, and the potential benefits of the work.

Severe pain or suffering cannot be justified unless there are potential benefits from the research.

Some minor, routine work with animals (e.g. observations during routine handling that do not involving any additional manipulation) does not require specific approval by an AEC. A flowchart is available to help decide when a project requires AEC approval on the MPI Animal Welfare website. If there is any doubt at all the protocol should be discussed with an AEC Chair.

For each project, every person using animals should have read the application before it is submitted to the AEC. In some institutions all involved investigators and animal handlers are required to sign the application. Signing or reading the application however does not absolve investigators of their ongoing responsibility to continue to think and act humanely towards the animals in their care. It is not a case of "it's approved so I can do this now". Every person using animals must continue to act humanely and always ask the question in each situation "is this as humane as possible?"

Some exceptions – where AECs are not involved in approvals

Non-human hominids: chimpanzees, orangutang, gorillas and bonobos (collectively the "great apes") are given special protection under the Act. Only the Director-General of MPI can approve research using these animals, and approval may only be given if the work will potentially directly benefit the animal or its species, and the potential benefits are not outweighed by the harms.

National interest: The Minister responsible for animal welfare has the discretion to make approvals for research projects without the involvement of an AEC when the work is in the national interest for reasons of:

- biosecurity;
- international obligations;
- the protection of human or animal health.

Adding value to your duty of care

There are many ways you can enhance the welfare of animals in your care beyond the minimum standards required by your code of ethical conduct and the conditions set by your AEC.

For example, you can develop your own best practice guidelines in areas such as:

- the animals' environment;
- exercise;
- handling;
- nutrition;
- relationships between different species kept at the same site.

The Three Rs – a sound framework for developing a culture of care

The principles of the Three Rs provide an excellent framework for improving the welfare of animals used in research, testing and teaching. These are a few examples.

Replacement

Choice of organism: In some cases, it is possible to substitute less sentient or non-sentient organisms (e.g. worms, insects) in teaching experiments that might otherwise involve vertebrates.

In vitro techniques: Culturing cells or tissues can be used in some situations to study aspects of physiology. For example, cultures can be used to test the impacts of potentially toxic compounds, or to screen for potential anti-viral agents. These techniques also have the advantage of more easily controlled conditions.

Non-biological replacement alternatives: Mathematical modelling and computer simulation can be used to predict impacts on live tissue that would otherwise require live animals. For example, sophisticated computer simulations, physical models or audiovisual aids may be used instead of actual dissections or use of live animals.

Human studies: Use of human tissue for cell or tissue culture can obviate the need for animals. Within appropriate ethical guidelines, human volunteers can also play a role in situations such as medical research or pharmaceutical testing, where animals were previously used.

Reduction

Pooling resources: Collaboration and good communication within the scientific community can help eliminate unnecessary duplication of experiments.

Planning and design: Thorough searching of literature and peer review can help avoid the need to repeat experiments when similar work has been done elsewhere. The design of any research which may involve animals should be subjected to scrutiny. How many animals, what species, the procedures used, statistical techniques, the potential benefits, the need to use animals at all – each of these questions and more should be considered carefully before a project is submitted to your AEC.

The input of a statistician is especially important in planning research. It is important to avoid using more animals than is necessary for statistical validity. Equally importantly, if too few animals are used the results will

not be valid and the experiment will need to be repeated, using more animals.

Pilot studies: Pilot studies using small numbers of animals can test the logistics of a proposed larger study and gain some preliminary information. Such studies can be used to estimate variability and evaluate procedures and effects thereby reducing sample size for final experimental protocols.

Using genetics to reduce animal numbers: By using animals with known genetics, the number of animals required for some experimental protocols can be reduced. For example, by using inbred mice, the sample size can often be substantially reduced. Inbred strains are phenotypically uniform and genetically stable and can therefore reduce variability between animals.

Conversely, selecting two genetically divergent groups (e.g. animals that are resistant or susceptible to a specific heritable disease trait; or animals that display divergent phenotypic characteristics for the same physiological trait) can reduce numbers of animals by ensuring known wide genetic variation.

Refinement

Refinement refers to the modifications that can be made to minimise pain or distress. There are three main areas where you can apply this principle.

Improved animal husbandry: Careful handling and improving the animals' environment can help reduce the stress on animals being held for research work. Exercise, light, ventilation, temperature, diet, bedding, noise, disturbance by visitors, cleaning, the skills of technicians, care during

weekends, the presence of other species, environmental enrichment, providing social as opposed to individual housing where appropriate – are all factors that can have a significant positive impact on the welfare of animals before any particular manipulation even starts.

Analgesia and anaesthesia: Objective measurement of pain in animals is difficult. A precautionary approach is best. There are various signs that an animal is in pain. These include impaired activity, behavioural changes such as aggression, restlessness, changes in food and water intake, abnormal vocalisation or posture, or self-mutilation. Tranquillisers, analgesics, or anaesthetics should be used to prevent or reduce pain, as appropriate, with veterinary advice.

Humane endpoints: Where possible, experiments should be ended before acute pain or distress are caused. Some alternatives are now available, which can avoid the need to take an experiment through to a painful endpoint (e.g. ending a test when an animal reaches specified thresholds on certain parameters such as temperature or weight loss or observing behaviours such as changes in movement or hunching). Where it is known that these measurements or observations indicate the approach of a painful endpoint the experiment can be terminated.

Where it is not possible to intercede, every effort should be made to minimise the duration and severity of suffering, using pain relief where possible and euthanasia rather than allowing an animal to die slowly or painfully. If euthanasia is required, it should be performed from the philosophical perspective of ensuring a "good death".

Use of remote monitoring: Technologies are rapidly evolving to enable animals to be monitored without overt human contact (e.g. remote cameras, electronic data loggers, RFID switching of electronics, microchips). By limiting human interference and therefore reducing animal stress and/or by providing a much richer set of data, information can be gathered with less welfare impact, using fewer animals or by taking measures over a shorter time.

Managing adverse events

Despite the best of intentions and the most conscientious adherence to good practice, animals that are housed and used for research, testing and teaching are also at risk of negative welfare impacts from adverse events.

An adverse event may occur during a procedure or be due to uncontrollable external factors. Every code of ethical conduct should describe procedures to be followed should an adverse event occur.

Every project should describe a contingency plan for managing adverse events. An adverse event for an individual animal can be anything from an unexpected reaction to a manipulation or treatment, to an equipment malfunction during a manipulation that threatens the life of an animal.

All animal facilities should have an adverse event/disaster management strategy in place. Such a strategy should cover managing the welfare of the animals in the face of natural disaster, responding to a catastrophic event such as fire or a situation where human help is precluded from accessing the premises as the result of a disease/sickness outbreak – either inside the facility involving the animals or outside the facility involving the human carers.

Building a culture of care

Society's expectations about the welfare of animals, and the means for enhancing it, are constantly evolving. It is your job to keep abreast of these changes and help to constantly improve the culture of care within your own workplace. This guide is a brief overview of your responsibilities and presents some ideas for developing better animal welfare practices. To find out more, we recommend the following websites:

MPI Animal Welfare
https://www.mpi.govt.nz/animals/animal-welfare/

ANZCCART
https://anzccart.org.nz/

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