Purpose
The purpose of this document is to provide guidelines for research protocols that directly or
indirectly cause a body weight deficit in animals used for scientific purposes at The
University of Western Australia. They are designed to assist researchers, animal care
technicians and the Animal Ethics Committee (AEC) to ensure that the scientific aims of a
proposal are achieved with the least possible discomfort for the animals involved.

Policy
All scientific procedures carried out on animals must comply with the eighth revision of
the Australian Code for the Care and Use of Animals for Scientific Purposes (NHMRC, 2013). Unless a weight deficit is a consequence of approved scientific experimentation, the
NHMRC Code requires that animal nutrition will be sufficient to develop and maintain a
normal body weight (paragraph 3.2.24). The Code also gives emphasis to the need to monitor
body condition and body weight in animals subject to tumour induction [3.3.23(vi)] and those
on protocols involving restrictions of food or water (3.3.29):

3.2.24 Animals must receive, and be able to access, appropriate, uncontaminated, nutritionally
adequate food of a quantity and composition that maintains normal growth of
immature animals and normal weight of adult animals, and meet the requirements of
pregnancy, lactation or other conditions.

3.3.23(vi) [Induction of Tumours] Monitoring and assessing animals for signs of pain and
distress, including changes in body condition and body weight; ulceration; adverse
effects of procedures used for induction of the tumour; signs of growth, invasion and
metastases of the tumour; and toxic effects of therapeutic agents.

3.3.29 Projects involving the withholding or restriction of food or water must be designed so
that the animal experiences no continuing detrimental effect. Changes in fluid balance
or body weight must be monitored, recorded and maintained within the limits approved
by the AEC.

The Guidelines to Promote the Wellbeing of Animals Used for Scientific Purposes (NHMRC,
2008) refer in section 2.2.1 to body weight and, in immature animals, rate of weight gain as one
of several indicators of an animal’s state of health. The NHMRC Guidelines describe changes
in body weight as a general sign of abnormality (4.7.2); and describe weight loss as a species-specific sign of pain or distress in cattle, ferrets, reptiles, sheep and goats (Table 4.2). The NHMRC Guidelines pay particular attention to limits of acceptable weight loss in experiments involving behavioral modification, where dietary restrictions are used to increase the value to the animal of food as a reward. Animals on restricted food or fluid access in behavioural modification experiments with a long-term weight loss of more than 15% are to be removed from the research protocol (Table B1, p B5).

Neither the NHMRC Code nor NHMRC Guidelines contain specific provisions on quantitative limits of body weight loss in research animals used in models of disease or related biomedical research.

**Guidelines**

**General**

When performing research activities that induce a body weight deficit in animals, the overriding consideration must be to minimise the pain and distress experienced by the animals. It is expected that researchers will follow the *Guidelines to Promote the Wellbeing of Animal Used for Scientific Purposes: The Assessment and Alleviation of Pain and Distress in Research Animals* (NHMRC, 2008) where relevant.

**Failure to Thrive and Body Weight Loss**

In immature animals the assessment of a body weight deficit, as a manifestation of failure to thrive, may be based on a comparison with body weight in a comparable group of control animals or predicted body weight for age derived from a species-specific growth chart. In circumstances where immature animals are likely to lose weight, both the failure to thrive and body weight loss components of the total animal burden must be specifically identified and addressed in the research protocol.

**Assessment of Animal Wellbeing**

The use of a scoring system, including a body condition scoring system, to assess the wellbeing of animals used in research activities that induce a body weight deficit is strongly encouraged. Preference is given to a scoring system in which an increasingly positive score indicates deterioration in the animal’s wellbeing based on indicators such as normal active behaviour, physiological responses, food and water intake and physical body condition. Assessments of wellbeing may also take into account marked difference between individual animals where there is no obvious, simple explanation for variation to occur.
**Body Weight Deficit Limits**

The standards used to set maximum limits for a body weight deficit in research animals are not based on fixed limits that are applied invariably to all study protocols. Rather, the cost to the animals of the weight deficit and its associated morbidity is balanced against the scientific benefit of the research on a case by case basis placed within a general framework.

Preference is given to the use of two thresholds for intervention to prevent undue suffering. When the first threshold is reached, the animal enters a regime of more intensive monitoring and provision of additional care, based on appropriate indicators of animal wellbeing, with a prospect for euthanasia before reaching the second threshold, whenever those indicators show that undue suffering is taking place. The second threshold is a limit of body weight deficit that is applied as a sole criterion for euthanasia of the animal regardless of other observations.

Researchers should justify the selection of both threshold points through the use of published guidelines specific to the species, published research articles or empirical data from past work. This should include a description and justification of the body weight deficit taking account of whether the weight change is of a persistent nature; or temporary and likely to recover. Researchers should also address failure to thrive and body weight loss as two distinct components of weight deficit in immature animals. Additional considerations should also be addressed in animals used in tumour induction studies; those that commence body weight loss from initial obesity; and animals in situations that may be affected by season variation, pregnancy or by fleece or other fibre production.

In general, the AEC will accept somewhat higher body weight deficit thresholds in protocols that contain a comprehensive approach to dual threshold monitoring and the wider assessment of animal wellbeing.

**Monitoring of Body Weight Deficit**

Preference is given to the following guidelines:

1. All animals should have at least one body weight measurement recorded, prior to any intervention.

2. Body weight measurement, as the basis for assessment of a body weight deficit, must be undertaken using an apparatus that provides objective, quantitative and accurate data on the body weight of the animal. The subjective assessment of a percentage body weight loss by visual inspection alone is unacceptable. The method of measurement of failure to thrive, when applicable, must be clearly specified in the study protocol.

3. Inspection and weighing of the animals should be performed and documented on a regular basis from the time experimental manipulations commence. Wellness scores should also be recorded regularly from that time.
4. The frequency of weighing should be increased as soon as the first threshold is reached and may require measurements on weekends. Wellness scores should also be recorded more frequently when the first threshold is reached and thereafter.

5. When an animal reaches the approved first threshold of body weight deficit, the Animal Welfare Officer (AWO) or other approved reviewer should be notified. Depending on the wellness score and other signs present, the reviewer may then choose to monitor the situation for a period of time or require treatment, palliative care, euthanasia or temporary cessation of the experimental program pending further deliberation by the AEC.

6. If the body weight deficit in any animal reaches the approved second threshold euthanasia must be performed. Euthanasia should also be mandatory if an upper wellness score limit has been stipulated.

7. If the Chief Investigator (CI) believes that too many animals with otherwise acceptable wellness scores or good prospects for timely recovery are being wasted upon reaching the second threshold of body weight deficit, the CI should request a review by the AWO. On the basis of this review, the AWO may support the CI in seeking approval by the AEC of a major amendment to the protocol to modify the thresholds for future animals. This application must be supported by empirical observations from the actual experiment. Until such time as the application for major amendment is approved, the existing thresholds must be strictly applied.

References


