CUMULATIVE ENDPOINTS FOR DAIRY CATTLE

1. PURPOSE

To describe guidelines for the development and assessment of cumulative endpoints for dairy herd maintained for teaching, research, and production.

2. RESPONSIBILITY

2.1 Animal science technicians

2.2 Herd manager

2.3 Principal Investigator (PI) and research staff

2.4 Veterinarian

3. MATERIALS

3.1 Herd Management Software (Dossier Sante Animal (DSA) -Laitier Producteur)

3.2 Animal Use Protocols (AUP) and/or

3.3 Procedure Summary Sheets

4. GENERAL CONSIDERATIONS

4.1 Endpoint Definitions

- Scientific Endpoint: End of the need for an animal(s) in a scientific study, animal(s) is/are euthanized.
- Experimental Endpoints: End of the need for an animal(s) in an experiment, animal(s) may be euthanized, repurposed, removed from the study, retired from research or adopted.
- Humane Endpoints: “The earliest indicator in an animal experiment of pain/distress that within the context of moral justification and scientific endpoints, can be used to avoid or limit pain/distress by taking actions such as humane killing or terminating/alleviating pain and distress”
- Cumulative Endpoints: The point at which an animal(s) is/are no longer eligible to be used in subsequent research/teaching based on overall lifetime use.

4.2 Dairy cattle are large animals with relatively long lifespans. At baseline, they are used for production, housed and maintained under industry standards (NFACC, 2023). In addition to this, the herd is used for both teaching and research purposes.

4.3 Meeting experimental endpoints infrequently results in euthanasia or slaughter. Individuals used for teaching or research are often ‘returned to the herd’ (production use only) once these activities are completed or animals are removed from the study.

4.4 Cumulative endpoints must be considered for dairy cattle used in multiple AUPs or individual AUPs conducted over an extended period.

4.5 Cumulative endpoint decisions must be made on a case-by-case basis considering the animals health, welfare, and research/teaching history.

- Health: Age, disease, milk production, conformation, injury, fertility, and associated procedures
- Welfare: Temperament/stress, housing, and husbandry practices

- Research/teaching: Invasiveness, frequency, duration, multiplicity, and intensity of procedures, and training/skill-level of personnel performing procedure

4.6 As such, accurate and extensive record keeping throughout the animal's life is paramount to making endpoint decisions. Information from log sheets, recruitment and procedures in AUPs, Lactanet reports, veterinary records, should be easily accessible, and wherever possible, transcribed into the herd management software (DSA- Laitier Producteur) file for each individual animal.

5. PROCEDURE

1.1. Prior requirements:

1.1.1. Specific evaluation of the number, duration, frequency, and severity of procedures, scientific and humane intervention points, and associated interventions by the Facility Animal Care Committee (FACC) prior to protocol approval.

1.1.2. Development of an animal monitoring regime according to the procedures performed on an animal.

1.1.3. Evaluate the eligibility of each prospective cow to be enrolled in a scientific/teaching activity for if cumulative endpoints have been reached based on their health, welfare, and prior research/teaching history from the herd management software (DSA- Laitier Producteur) and relevant reports/records. These should be discussed by a committee composed of animal science technician(s), veterinarian(s), and member(s) of the research staff.

1.1.3.1. Animals should be subjected to only one severe or high welfare impact experience in their lifetime (a category of welfare impact level D or E; see the CACC guidelines on categories of welfare impact).

1.2. During the scientific activity:

1.2.1. Monitor animals as they progress through the scientific activity.

1.2.2. Ensure consistency in the application of any scoring sheets or checklists used, keeping records of all monitoring and intervention activities in the office.

1.2.3. Apply interventions as required and previously approved on the AUP.

1.2.4. In the event of unexpected adverse outcomes, adapt scientific endpoints and humane intervention endpoints as required. The PI is required to submit an amendment to their AUP reflecting these adaptations to the FACC.

1.3. After completion of the scientific activity (Retrospective Analysis):

1.3.1. Evaluate the effectiveness of the scientific endpoints and humane intervention points.

1.3.2. Incorporate the accumulated experience and evaluations to further improve the animal monitoring procedure, endpoints, and welfare assessment.

6. REFERENCES

Canadian Council on Animal Care (CCAC). Identification Of Scientific Endpoints, Humane Intervention Points, And Cumulative Endpoints. March 2022; Available online: https://ccac.ca/Documents/Standards/Guidelines/CCAC_guidelines_scientific_endpoints.pdf

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Hendriksen, C.F.M.; Morton, D.B. (Eds.) Humane Endpoints in Animal Experiments for Biomedical Research. In Proceedings of the International Conference, Zeist, The Netherlands, 22–25 November 1998; Royal Society of Medicine Press Limited: London, UK, 1999.

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