

How to assess animal welfare

Animal welfare is assessed by observing or measuring physical or behavioural features of the animal or qualities of the animal's environment. These signs of animal welfare are known as 'welfare indicators'. Welfare is complex, so it is usually important to assess more than one indicator to reveal the extent to which welfare is good or bad, rather than assessing just one aspect of the animal's biology or environment.

There are three main sources of welfare indicators:

1. **The animal in its current situation**, e.g. frequencies or durations of abnormal behaviour¹, concentrations of hormones², or body condition;
2. **The animal in a decision-making test**, e.g. preference tests (reviewed in³) and cognitive bias tests^{4,5}; and
3. **The animal's environment or situation**, e.g. quality and quantity of the diet, presence of a hiding place, exposure to weather, or details of husbandry routines⁶.

Furthermore, welfare indicators can be measured via a continuum between two main approaches:

1. **Objectively**, e.g. quantifying rates, durations, frequencies, concentrations or intensities e.g. for behaviour:^{7,8} or
2. **Subjectively**, e.g. owner/keeper questionnaires⁹, qualitative behaviour assessment¹⁰, or subjective lameness or pain scoring systems¹¹.

Which welfare indicators you should assess depends partly on whether your concept of welfare includes the animal's feelings, physical functioning, and/or naturalness. Feelings can be crucial to some concepts of welfare, e.g. even healthy animals living in a naturalistic habitat could have poor welfare if they are anxious, bored, or socially stressed. Despite feelings being private to each individual, it is possible to measure the behavioural and physical signs of those underlying experiences¹²⁻¹⁵.

The specific welfare indicators for any given scenario should be selected on the basis of:

- the welfare concern or aim, e.g. preventing pain, or encouraging playfulness;
- the timescale of interest, e.g. using vocalisations to assess fleeting experiences, or stomach ulceration to assess long term stress;
- ethical considerations, e.g. assessing hormone concentrations non-invasively in faeces, rather than invasively in blood samples, where possible; and
- feasibility, e.g. the amount of money, time, and skill required.

A hypothesis should be created with a specific prediction about whether each welfare indicator should increase or decrease under better (or poorer) welfare conditions. Other features of good scientific practice include 'blinding' the observer to sources of bias, random allocation of animals across treatments, ethical approval, repeatability, and appropriate sample sizes e.g. ⁷.

Good reviews of commonly used welfare indicators exist for different species or sectors of animal use, such as for zoo animals ^{16,17}. Well-chosen welfare indicators can provide evidence that allow reasoned conclusions to be drawn about animal welfare.

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Assessing Animal Welfare, September 2020 © Animal Welfare Foundation (AWF)*