

In the first infographic of this series we identified important questions; questions that all animal health professionals are inherently well trained to answer when presented with a truth claim. In this second infographic we discuss the important topic of comparison groups.

When you hear or read that a treatment, drug, health program, or surgical procedure works, or that it works better, the first question needs to be “compared to what?” However, not all veterinary studies and published abstracts clearly describe the study methodology and sometimes this makes it difficult to recognize what kind of a comparison has been made.

It is also common for case reports and case series to be published in veterinary journals. These types of articles are useful to introduce novel observations and to stimulate follow-up research but, because there is no comparison group, they cannot be used to make truth claims or inferences about the effect of a treatment (Dohoo et al., 2009).

For example, let's say you've read a case study that describes an animal recovering well when an adjunct local anesthetic was used and you want to know if you should include this procedure in your practice. The problem is that without a comparison animal or group of animals you cannot answer the question, “Would the animal have recovered just as well without the added local anesthetic?”

Alternatively, you may have found a published experimental study where the authors reported that the animals recovered favorably with the adjunct local anesthetic as compared to animals that received just sterile saline. In experimental studies the comparison group is often referred to as a control group. There are broadly two kinds of controls in experimental studies; negative and positive. A negative control group has animals that receive no treatment, a sham treatment, or a placebo. In the above study the researchers used a negative control to answer the question “Does use of an added local anesthetic change how the animal recovers?”

If the researchers had instead used a positive control they would have been trying to answer a different question such as “Is the outcome of this adjunct anesthetic treatment protocol different from the outcome of some other adjunct anesthetic treatment protocol?”. Positive controls are treated with something active instead of a placebo or sham. In this example a positive control may have received the current standard of care for adjunct local anesthetics, an alternate experimental local anesthetic, or the same local anesthetic but used at a different timing, dosage, or duration.

Observational studies are not experiments because the researchers don't have control over the placement of animals into treatment groups. Observational studies typically involve use of hospital records of actual patients rather than experimental animals that have been randomly assigned to comparison groups. The researcher interprets observed group differences within the context of known and unknown factors beyond just the treatment of interest (i.e. in this example the use of an adjunct local anesthetic). Researchers must clearly describe in the study report the inclusion/exclusion criteria for groups such as the make-up and important environmental differences between the groups for both the animals receiving the local anesthetic and the animals not receiving the adjunct treatment in order for the reader to assess the appropriateness of the comparison. Without accounting for these extra details the researchers won't know if it was the treatment or some other factor such as age, sex, breed type, co-morbid conditions, etc., that contributed to the observed group differences in outcomes.

By identifying first if a comparison has been made, and then determining if the comparison is an experimental positive or a negative control, or a comparison from an observational study, the animal health professional can quickly ascertain if it is even reasonable to make a truth claim, and if it is, then what kind of question that truth claim has answered.

Technically, the claimant's choice of a comparison group is a function of their choice of study design which, in and of itself, may be the biggest determinant of the strength of such a claim. Study design, however, is a much bigger topic and will be covered in another infographic.

Dohoo, I., Martin, W., Stryhn, S., 2009. Introduction to observational studies, in: *Veterinary Epidemiologic Research*. VER Inc., Charlottetown, Canada, pp. 151–166.

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