Assessing the validity of primary research in bovine practice: What approaches are there and what are the limits of the approaches

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Introduction

Every day in bovine practice, veterinarians need to make decisions ranging from a decision as to whether (or not) to use an intervention or to apply a diagnostic test, to decisions about the overall management of complex conditions. Increasingly, it is expected that decisions are evidence-based. Evidence-based medicine (EBM) is the conscientious, explicit and judicious use of current best evidence in making decisions about the care and management of patients.

Materials and methods

The aim of EBM is to integrate the experience of the clinician, the values of the patient/farm/production setting, and the best available scientific information to guide decision-making about clinical management. Because of the focus on the "best available evidence", the primary research should be evaluated for internal validity, i.e., whether the result is free from meaningful bias (reflects the true state of nature). However, assessing the "internal validity of the studies" appears more difficult than it should due to a confusing array of approaches available. Should clinics assess a research finding presented at a conference, by a company technical representative, or in a publication using levels of evidence, quality assessment and risk of bias assessment? We evaluated these approaches used by authors to assess internal validity that are commonly used in critical appraisal tools, systematic reviews and clinical practice guidelines and aimed to determine what differentiates these 3 broad approaches and what are the limitations and advantages of each approach.

Results

These approaches are differentiated by the assumptions made. Risk of bias assessment requires judgment about the context of the study. Therefore, a risk of bias assessment requires the least assumptions, but requires the most time and knowledge. For example, using risk of bias it is possible that a study that is not blinded will be considered low risk of bias, if the outcome measure is measured in an objective manner even in the absence of bias. It is also likely the more valid assessment. Quality assessment uses the presence or absence of particular design features to assess bias. For example, studies are evaluated if they reported randomization or blinding and a given a favorable assessment. Quality assessment does not assess the "need" for blinding. Therefore, failure to blind will be considered a negative even if it is not relevant to the outcomes. Finally, levels of evidence are based entirely on the study design and relate to multiple designs. The context of the study is not explicitly considered. One body of work may have 2 controlled trials, and the other 2 cohort studies, and regardless of the execution of the studies or the settings, the body of work with 2 trials will be considered to provide a higher level of evidence. Because no judgment is required about the context for quality assessment of levels of evidence, they are more likely to incorrectly report the potential for bias, compared to the context and judgment-based risk of bias.

Significance

We feel that bovine clinicians are constantly encouraged to be mindful and critical of the scientific information they are presented with. Therefore, clarifying the different tools for assessing internal validity is important to the continuing the education of practitioners as they seek to make evidence-based decisions.

