

**REVIEW**

**Evidence-based Rapid Review to Approach Diagnostic Test Research. A Veterinary Practitioners Opinion**

**Julio A. Arenas    Jeff M. Perez\***

Advanced Veterinary Centre, Madinat Khalifa South, Doha, Qatar

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ABSTRACT

In animal research systematic reviews and meta-analysis have been playing an important role in improving the quality of evidence that professionals use worldwide. However, it is claimed that it is in its initial stage of development. In veterinary medicine the heterogeneity in the evaluation of variables of exposure and response makes it difficult to gather the data results for a meta-analysis and evidence-based rapid reviews and other types of reviews can accelerate the way how we obtain this information and a problem-solving approach can be developed in the veterinary medicine field.

**1. Introduction**

Systematic reviews and meta-analysis are the best types of studies to report evidence-based medicine with high quality standards and greater strength in their conclusions compared to other types of studies<sup>[4;14]</sup>. There are numerous possible interventions in human and veterinary medicine that meta-analysis can resolve regardless of whether the conclusions of the analysis are positive or negative<sup>[11]</sup>. A meta-analysis carried out by collecting the effect size from similar studies offers the possibility to be updated when new research is published. Besides, gathering effect size can impulse other researchers to report it, rather than relying on the traditional p-value.

In animal research systematic reviews and meta-analysis have been playing an important role improving the quality of evidence that professionals use around the

world and there is an updated database (VetSRev) to avoid repeated publications, the authors encourage readers and researchers to consult this database before beginning a new systematic review or meta-analysis (<http://webapps.nottingham.ac.uk/refbase/>). The objective of systematic reviews and meta-analysis in veterinary practice is to always provide the best possible evidence in any type of intervention for animal health and animal husbandry. However, unlike human medicine, in veterinary medicine these types of scientific advances are not well developed, indeed, it is claimed that it is in its initial stage of development<sup>[7]</sup>.

**2. Thinking Outside the Box**

Currently, the collection of information can be accomplished in a timely manner in human medicine. However, in veterinary medicine, it is often time consuming and

*\*Corresponding Author:*

*Jeff M. Perez,*

*Advanced Veterinary Centre, Madinat Khalifa South, Doha, Qatar;*

*Email: jeff.mp@outlook.com*

arduous to at least obtain a sample size large enough to guarantee quality results <sup>[7]</sup>. Furthermore, in veterinary medicine there is often not a sufficient number of homogeneous clinical trials, making it difficult to analyze the information to produce reliable results <sup>[3]</sup>.

The characterization of diagnostic tests and its ability to recognize the truly positives, the truly negatives and specifically define disease or health status in an animal, is carried out in studies with different experimental designs and statistical methods, such as reporting the area under curve, the sensitivity and specificity, effect size or setting up the reference intervals where there is a healthy control group and an affected group characterized with the diagnostic test and a gold standard test <sup>[12]</sup>. However, it is not correct to use a diagnostic test immediately after this kind of characterization despite offering excellent results.

Regardless of encouraging results of a diagnostic test, the studied population does not necessarily behave the same as another in different settings. Therefore, considering the variability of the population, it is advisable to evaluate the same test in different situations, such as *in vitro*, *in vivo*, in situations of natural disease and induced disease, but also to establish possible events that may alter the diagnostic method and its results.

To reach a rational conclusion regarding the quality of a diagnostic test, it is important to have results that can be evaluated and compared under different conditions and with a seemingly similar population to define the size of the effect, and which strength of recommendation will be defined in order to recommend it in practice. In veterinary medicine, this situation almost never occurs and there is a gap regarding the rigor that veterinarians have to recommend and to use a diagnostic test in veterinary practice <sup>[9]</sup>.

In some cases, only one cohort with small animal population is used, with different types of studies and sometimes, based on empiricism and weak results. In addition, it is quite frequent that in veterinary medicine, researchers do not take into consideration the effect size and overestimate the importance of the p-value to report statistical significance or difference between study populations.

Considering the above, it is clear that in veterinary medicine the heterogeneity in the evaluation of variables of exposure and response makes it ever more difficult to gather the data results. Indeed, there is an evident gap related to the scarcity of existing research in order to create new, purposeful and conclusive meta-analysis and systematic reviews that can be reproduced <sup>[8]</sup>. There is a critical need for developing clinical guidelines that outline specific and appropriate diagnostic tests and treatments in order to reach or approach a decisive conclusion. This goal is frustrated by the existence and common usage of

variable methodologies within different clinical trials with the same objective.

In recent years, we have chosen to classify the evidence provided by the publications where diagnostic tests are analyzed to recommend them at the practical level. This has increased the quality of veterinary medicine practice and has generated a tendency to find new alternatives, comparable to systematic reviews and meta-analysis and the direction that scientific research is currently looking forward is a path where medical knowledge can be provided with a more agile and faster way to obtain conclusions, but keeping the credibility and reliability of scientific evidence <sup>[14,5]</sup>.

### **3. Opportunity for Evidence-base Rapid Reviews**

The world is constantly changing and new emerging diseases such as SARS-CoV-2, African Swine Fever (ASF) or Leishmaniasis create an opportunity to modify the way we create novel investigations. This emerging and re-emerging diseases need regular updates to generate good quality knowledge in a short period of time. Therefore, evidence-base rapid reviews have grown in popularity since the last decades and they have many algorithms to facilitate the review process and make the research development shorter and more agile <sup>[13,6]</sup>. However, should be stated that this type of study gives relevant results in a shorter period of time, could have bias or limited accuracy in the results because it simplifies or omits the conventional systematic review process recommended in the PRISMA statement <sup>[14]</sup>.

In general, there are different sorts of evidence-base medicine review process with results characterized as umbrella reviews <sup>[1]</sup>, review summaries, a summary of systematic reviews and also a synthesis of reviews <sup>[13]</sup>. There are also scoping reviews that have been used for the last decade gaining strength to categorize different types of studies in terms of their impact and scope in different areas, especially diagnostic test. In addition, one of the features of this sort of evidence-base medicine reviews is that is possible to identify and maintain control over the flow of information in any field of knowledge, helping researchers to improve the typology of studies in veterinary medicine <sup>[10]</sup>.

Apparently in veterinary medicine greater control is required in terms of study methodologies and characterization of variables conducting impact and scope reviews such as those previously mentioned. The evidence-based rapid reviews as brief approach should be considered as a premature field in veterinary medicine. Thus, further strengthened and updates are expected because these stud-

ies do not yet have an essential uniformity due to the lack of guidelines as the PRISMA statement for systematic reviews and meta-analysis. The future is promising for this kind of research and the transmission of information for decision-making will become fast and uniform with the cutting-edge methods of obtaining knowledge<sup>[2]</sup>.

#### 4. Conclusions

Systematic reviews and meta-analysis cannot be replaced in terms of evidence-base medicine, at least for the upcoming years. It's likely that artificial intelligence and machine learning can and will generate new methods to obtain results without bias with greater strength of recommendation and better quality of evidence with minimal human intervention. However, in the meantime systematic reviews and meta-analysis will remain critical to achieve the objectives of medical practice worldwide in order to always have the most accurate and reliable possible evidence to obtain the best results on the target population and evidence-based rapid reviews and other types of reviews can accelerate the way how we obtain the information and a problem-solving approach can be developed in the veterinary medicine field.

#### Conflict of Interest

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#### Consent for Publication

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