

Evidence-based veterinary medicine



By Elizabeth Lund,
DVM, MPH, PhD

I am delighted to introduce Stanley Robertson, DVM, acting chief of staff at Banfield's Spanish Fort, Ala., hospital, as a new contributor to the Banfield Journal. Dr. Robertson has been a faculty member at Mississippi State University since 2001, teaching evidence-based veterinary medicine (EBVM), informatics and professional development in the veterinary curriculum. Dr. Robertson's contributions will begin a new series of articles from DataSavant. In this issue, he introduces the concepts of evidence-based medicine and its history. With this new format, we embark on a journey to provide more value to our doctors around the practice of EBVM. We want to partner with veterinarians to provide the information they need to enhance clinical decision-making. Please let us know what evidence you need to practice high-quality medicine and support client communications (elizabeth.lund@banfield.net).



By Stanley Robertson, DVM

What do the terms “evidence-based veterinary medicine” (EBVM) and “outcome assessment” mean to you? Do they conjure visions of researching every aspect of a problem and looking at all possible outcomes before making clinical decisions? Do you think of “cookbook” or “cookie-cutter” medicine? EBVM and outcome assessment have become buzz words and areas in which the veterinary profession is beginning to focus, both academically and clinically. The idea of evidence-based medicine (EBM) is really not new. Its philosophical roots date back to mid-19th century Paris, where Pierre Louis rejected the dogma that venesection (surgically cutting a vein and releasing blood) was a beneficial therapy for cholera, during the cholera outbreaks in Europe. Louis sought the truth by systematic observation of patients with cholera. Human medicine began to recognize the need to use scientific evidence to substantiate medical decisions and integrate this knowledge into medical practice back in the 1970s. A.L. Cochrane, CBE, FRCP, FFCM, published a book, *Effectiveness and Efficiency: Random Reflections on Health Services*, in which he illustrated the importance of randomized clinical trials to measure the efficacy of medical treatments.¹ Others in the medical profession began collecting and cataloging clinical trials. From these efforts, the Cochrane Collaboration, an international nonprofit organization that produces and disseminates up-to-date accurate information about healthcare treatments and interventions, evolved.²

The term evidence-based medicine was derived in the 1980s by the McMaster University School of Medicine in Canada to define a process of integrating new information and emerging technology into practice. Since then, more than 23,000 articles have been published on this topic in the medical journals. EBVM can be considered a subspecialty of EBM. Articles on EBVM were published as early as 2000, and the *Handbook of Evidence-Based Veterinary Medicine* was published in 2003.³ Since then, several articles and book chapters have been written on this topic.

What is evidence-based medicine?

There are many definitions of EBM, including the most widely quoted definition by Sackett and colleagues, EBM is the “conscientious, explicit and judicious use of current best evidence in making

decisions about individual patients”; the more current definition by Straus and colleagues, “the integration of the best research evidence with our clinical expertise and our patients’ unique values and circumstances”; or the definition of EBVM by Cockcroft and Holmes, “a process of lifelong, self-directed problem-based learning” that uses “current best evidence in making clinical decisions.”³⁻⁵ Whatever the definition, the best clinical decisions ideally incorporate the best available evidence, clinical expertise, client preferences or patient needs and available resources.

Although many veterinarians believe they already routinely use the process of evidence-based practice, the observed variation in practice might suggest this is not always true. Evidence-based practice can be viewed as an attempt to standardize clinical practice. Because it requires a bottom-up approach that integrates the best external evidence with individual clinical expertise and unique patient circumstances and owner’s choice, it cannot result in “cookbook” approaches to individual patient care.⁶ External clinical evidence can inform, but cannot replace individual clinical expertise; it is this expertise that decides whether the external evidence applies to the individual patient at all and, if it does, how it should be integrated into the clinical decision for the patient. Similarly, any external guideline must be integrated with individual clinical expertise in deciding how it matches the patient’s clinical state, clinical circumstances and owner’s preferences, and then whether it should be applied.⁷ The application of EBVM may suggest the best approach to a specific clinical problem. However, it is still up to the veterinarian to determine whether the individual patient will benefit from this approach. If the patient is much different from those for whom there is evidence, the veterinarian may be justified in taking another approach to solve the problem. This decision should be based upon sound background and patho-physiological information.

EBVM: The steps

EBVM involves five steps, sometimes called the educational prescription⁵:

Step 1: Ask an answerable clinical question.

Converting the need for information (about diagnosis, prognosis, prevention, therapy, causation, etc.) into an answerable question is the first and most important step in the EBVM process and sets the stage for a successful answer to the clinical problem. Identifying exact knowledge deficiencies and transforming this need for information into answerable clinical questions can be as challenging as the case itself. Several acronyms have been devised to help create effective questions that aid in efficient searches for answers.

The most common acronym used is PICO, which represents a process for clearly identifying informational needs and serves as a basis for designing effective clinical questions. Using PICO, an answerable clinical question can be divided into four parts:

P: Patient population. From what type of patient or population do you need information (e.g., age, species, breed, gender)?

I: Intervention. What is the desired treatment or procedure (e.g., therapeutics, surgeries, medical procedures, diagnostic tests)?

C: Comparison. With what is the selected intervention compared to assess its efficacy (e.g., past or current standard treatments, medical versus surgical procedures or no treatment at all)?

O: Outcome. What is the effect/outcome of the selected intervention (e.g., return to normal function, increased expected life span, reduction in severity of clinical signs)?

Step 2: Find the best available evidence.

The search for finding the best available evidence to answer the clinical question is made easier by properly constructing an answerable clinical question. The words representing the different parts of the clinical question, PICO, become initial keywords for the search. However, this is just the beginning. Good literature searching skills and knowledge of the best information sources are important in a search of veterinary medical literature for studies that are more likely to yield the best evidence.

Many databases are available in which current literature can be found. One of the most powerful and available databases is MEDLINE, which is typically accessed through PubMed. It contains journals for human and veterinary medicine, as well as for many of the allied health professions. Standardized keyword searching is done using MeSH (Medical Subject Heading) terms. There is also a “clinical query” function that helps to narrow searches based on the clinical decision (e.g., etiology, prognosis, diagnosis and treatment). There are limitations, however, for many veterinary medical-related queries. Despite this limitation, PubMed is a valuable search tool for the practicing veterinarian. Other databases include CAB Direct, AGRICOLA, IVIS and CONSULTANT. Each of these databases has strengths and weaknesses to be aware of when searching for the necessary evidence.

Step 3: Critically appraise the evidence.

After the evidence has been found, each article needs to be appraised and evaluated for its validity (closeness to the truth), relevance (appropriateness), impact (size of the effect) and application (usefulness in clinical practice). All evidence is not created equally, so each piece of evidence should be individually evaluated to determine its potential significance in the decision-making process.

One way to look at evidence is by ranking it in a hierarchical “evidence pyramid” which ranks the evidence from strongest to weakest. Within each level of evidence, individual resources should be evaluated after a thorough appraisal as being stronger or weaker. Clinical epidemiology, including study design, bias, and statistical inference, helps to provide the framework necessary to critically appraise the evidence (See Figure 1, page 18).

Step 4: Apply the evidence.

Once the evidence has been found and critically appraised, it should be applied by integrating it with clinical expertise and the patient’s specific, unique biology and circumstances. But several questions must be asked: Is the client amenable to the plan? Can the client afford the recommended procedures?

Do you have the knowledge and skills required to perform the best-evidence procedures? Is the technology available to perform these best-evidence procedures? This step involves integrating the best available evidence, along with clinical expertise, patient's needs, client preferences, and available resources to determine the best-evidence plan of action.

Step 5: Implement and evaluate the outcomes.

Once the best-evidence has been integrated into a clinical plan, that plan should be implemented and the outcomes in the patient or population evaluated. The veterinarian should look at the outcomes that are important to him or her, the patient and the client. Were the expected results seen? If not, how did the results differ? Record the success or failure of the attempted diagnostics, treatments or prognosis and use this information in the "clinical expertise" portion of EBVM. These recorded experiences may also be published as case reports or case series and used to contribute to the evidentiary portion of EBVM.

For outcomes to be valuable evidence, standard medical terminology and standard classifications for medical diagnoses should be in place, so one is comparing apples to apples instead of apples to oranges.

Conclusion

Typically, there are more questions than time to answer them. In most veterinary practices, clients often expect a diagnosis, treatment and prognosis for their Pets within the first 15 to 30 minutes of the exam. This can present a problem for veterinarians if all the steps of evidence-based practices are to be used for clinical cases.

In human medicine, many of the common medical questions are addressed in brief summary form as critically appraised topics (CATs). Currently, collections of CATs do not exist in veterinary medicine for practitioners to use. However, within a practice or group, the work of looking for answers to common clinical questions could be shared among individuals in the group, and the information collated for practice use.

EBVM is part of a lifelong learning process and should be incorporated into the everyday practice of veterinarians. It can be a pathway to establishing the best practices that will lead to continuous quality improvements in veterinary medicine.

References

1. Cochrane AL. Effectiveness and Efficiency: Random Reflections of Health Services. London: RSM Press; 1999.
2. The Cochrane Collaboration: Available at: www.cochrane.org. Accessed March 20, 2009.
3. Cockcroft P, Holmes M. Handbook of Evidence-Based Veterinary Medicine. Oxford: Blackwell Publishing; 2003; 1-33.

4. Sackett DL, Straus SE, Richardson WS, Rosenberg W, Haynes RB. Evidence-based Medicine: How to Practice and Teach EBM. 2nd ed. Edinburg: Churchill Livingstone; 2000; 1-27.
5. Straus SE, Richardson WS, Glasziou P, Haynes B. Evidence-based Medicine: How to Practice and Teach EBM, 3rd edition. Edinburg: Churchill Livingstone; 2005; 13-30.
6. Sackett DL, Rosenberg WM, Gray JAM, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. BMJ.1996; 312 (7023):71-2.
7. Mayer D. What is evidence-based medicine? In: Essential Evidence-Based Medicine. Cambridge: Cambridge University Press; 2004; 9-16.