

Introduction:

Early in 2010, the Practitioner Committee of the EBVMA conducted a survey of practicing veterinarians in the United States concerning their familiarity with the terms and concepts of evidence-based medicine and their attitudes towards it. The survey instrument was based on those used in published studies involving medical doctors and nurses. There were significant challenges in obtaining an adequately large, representative sample of U.S. practitioners. Ultimately, 5000 veterinarians were invited to participate via a printed letter, and 119 completed web-based questionnaires were completed, a response rate of about 2.5%. While this does not permit meaningful generalizations to be made about the population of interest, the project was, at the least, an instructive pilot study, and further studies are planned.

Methods:

A written invitation letter explaining the project and inviting participation was sent to 5000 veterinarians selected from a commercial direct-mail database. Details about the source of the names were limited, but it appears the database was built from telephone and business directories. The potential participants were sent a url for a web-based survey instrument. Follow-up emails were sent to those invitees for whom an email address could be located (a very small proportion). Fewer than 10 invitations were returned as undeliverable. 119 separate individuals participated in the survey, though most did complete all questions, so the number of responses for any given question was typically less than 119.

Results:

A. Participant Demographics:

Participants identified themselves as graduates of 19 different U.S. veterinary schools and several schools outside of the U.S. Table 1 lists the number of respondents associated with each school.

Table 1. Veterinary schools from which respondents graduated.

School	Number of Respondents
Alabama-Auburn	11
Alabama-Tuskegee	1
Florida	3
Georgia	5
Illinois	5
Indiana	10
Iowa	11
Kansas	5
Michigan	5
Mississippi	1
Missouri	8
North Carolina	3
Ohio	9
Oklahoma	1
Pennsylvania	4
Tennessee	1
Texas	15
Virginia-Maryland	1
Wisconsin	3
Foreign Schools	3

Respondents identified their year of graduation, age range and gender.. The average number of years in practice was 23.8 (median=22, range: <1to 48), and the sample was 64% male, 36% female. Details are presented in Table 2 and Figures 1 and 2.

Figure 1. Year of graduation of respondents

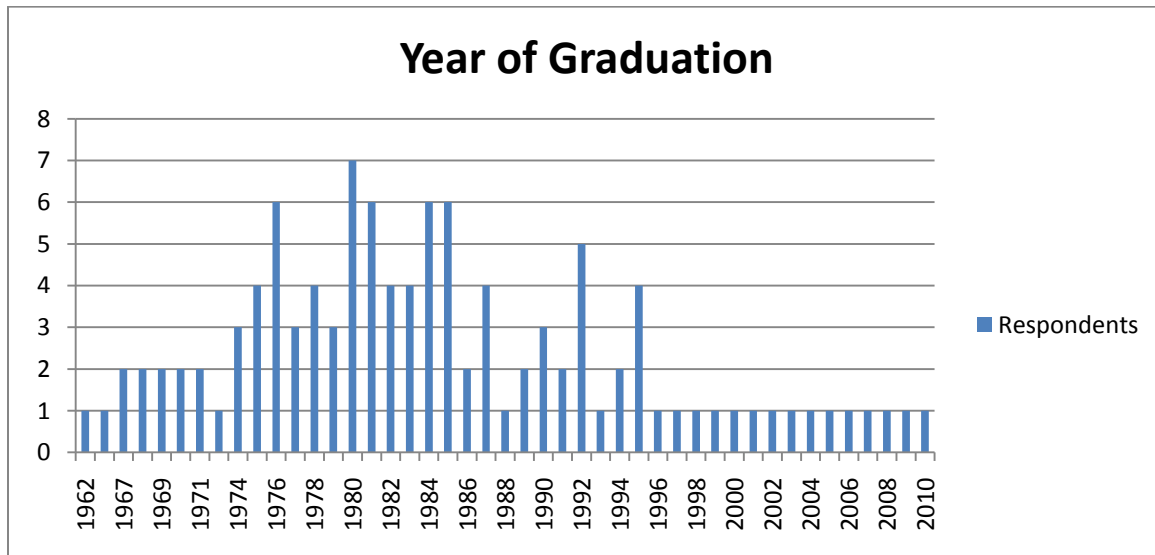
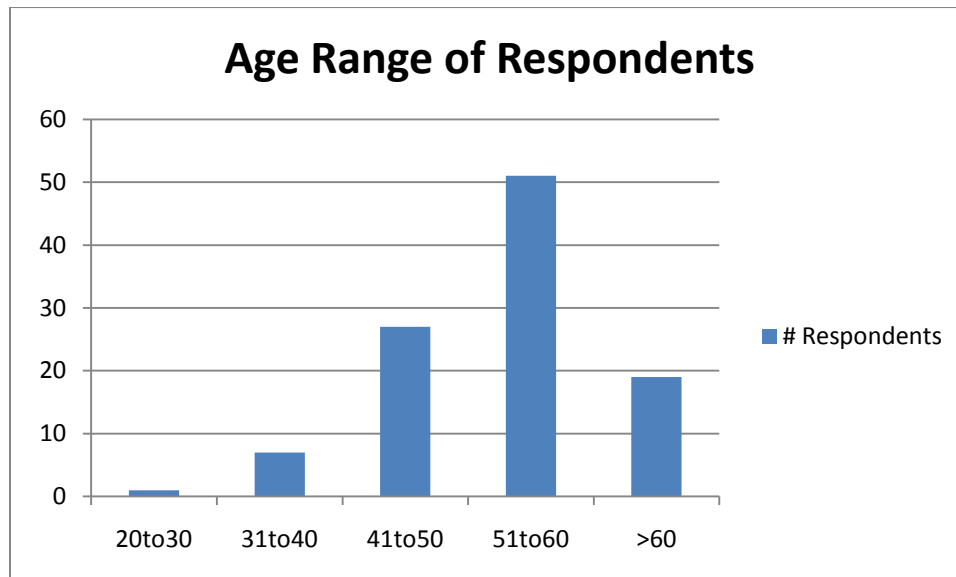


Table 2. Age range of respondents

Age Range	Number Respondents	Percentage Respondents
20-30 yrs	1	0.95
31-40 yrs	7	6.67
41-50 yrs	27	25.71
51-60 yrs	51	48.57
>60 yrs	19	18.10

Figure 2. Age range of respondents



A large majority of respondents worked in small, private practices and worked predominantly with small animals. Details are presented in Tables 3-5.

Table 3. Practice categories of respondents

Practice Category	Number of Respondents	% of Respondents
General Private Practice	97	91.51
University Practice	0	0.00
Specialty/Referral Practice	4	3.77
Mobile Private Practice	3	2.83
Corporate Practice	2	1.89
Government/Military	0	0.00

Table 4. Size of respondents' practices.

Number of Veterinarians	Number Respondents	Percentage of Respondents
1	55	51.89
2-4	47	44.34
5-10	4	3.77
>10	0	0

Table 5. Predominant species in respondents' practices

Predominant Species	Number of Respondents	Percentage of Respondents
Small animal	79	75.24
Mixed animal	14	13.33
Food animal	5	4.76
Equine	5	4.76
Other	2	1.90

B. Attitudes Towards Evidence-Based Veterinary Medicine:

Evidence-based medicine was defined at the start of the survey as "clinical decision making that relies on the explicit use and integration of the best available research evidence with clinical expertise as well as the unique needs or wishes of each client." Respondents were then asked about their attitudes towards EBVM as so defined, and they were asked to respond to a series of statements intended to investigate these attitudes.

1. How would you describe your attitude towards evidence-based medicine? 118 responses

Response	Percentage of Respondents
Positive	91
Neutral	19
Negative	1
No Opinion	7

2. How would you describe the attitude of most of your colleagues towards evidence-based medicine? 119 responses

Response	Percentage of Respondents
Positive	41.18
Neutral	29.41
Negative	0.84
No Opinion	28.57

3. Do you feel research findings are useful in your day-to-day management of patients? 119 responses

Response	Percentage of Respondents
Very useful	50.42
Somewhat useful	47.06
Not useful	2.52
No Opinion	0.00

4. How do you feel about this statement? "Practicing evidence-based medicine improves patient care." 119 responses

Response	Percentage of Respondents
Strongly agree	40.34
Agree	47.06
Disagree	4.20
Strongly disagree	0.00
No opinion	8.40

5. How do you feel about this statement? "Evidence-based medicine is of limited value in clinical practice because of the lack of sufficient relevant research evidence." 117 responses

Response	Percentage of Respondents
Strongly agree	0.85
Agree	14.53
Disagree	59.83
Strongly disagree	13.68
No opinion	11.11

6. How do you feel about this statement? "The adoption of evidence-based veterinary medicine is a worthy goal but impractical due to constraints on time and resources." 118 responses

Response	Percentage of Respondents
Strongly agree	1.69
Agree	22.88
Disagree	55.08
Strongly disagree	9.32
No opinion	11.02

C. Use of Evidentiary Resources:

Respondents were then asked a series of questions about their use of the scientific literature and research results, as well as other sources of evidence, to inform their clinical practice.

1. Do you currently use any of the following approaches for incorporating research evidence in patient care? 227 total selections

Approach	Number of Selections
Locating/appraising primary research myself	42
Using research summaries from journals/professional organization	92
Using evidence-based guidelines/protocols from expert panels/professional organizations	85
None of the above	8

2. If you use any of these approaches, which is most helpful? 13 total selections

Approach	Number of Selections
Locating/appraising primary research myself	16
Using research summaries from journals/professional organization	41
Using evidence-based guidelines/protocols from expert panels/professional organizations	52
All equally useful	21
Not applicable	6

3. How often in the last year have you (or someone on your behalf) used MEDLINE, PUBMED, CAB Direct or another bibliographic database for literature searching? 78 respondents

Frequency	Number of Respondents	Percentage of Respondents
Never	57	73.08
< 10 times	0	0.00
11-20 times	9	11.54
>20 times	12	15.38

4. When did you last do a literature search which influenced your clinical practices? 113 respondents

Time Period	Number of Respondents	Percentage of Respondents
Within last month	46	40.71
Within last 6 months	32	28.32
Within last 12 months	14	12.39
> 12 months	14	12.39
Never	7	6.19

5. Have you ever received formal training in electronic literature search strategies or appraisal of scientific literature? 115 respondents

Yes- 17 (14.78%)

No- 98 (85.22%)

6. In the last year, how often have you used the following resources?

	Never	<10 times	11to20 times	>20 times	Total
VIN	39	17	12	44	112
Lonesome Doc	98	3	0	1	102
Vet school library	81	21	6	1	109
Commercial service	76	28	5	6	115

7. When asked about other resources used besides those listed in 6, many respondents mentioned Google or other general internet search engines, and some mentioned professional or regional listserv mailing lists or discussion fora.

8. I then asked about specific print journals, and also provided an open question for respondents to list others they read regularly. The table below indicates how many respondents reported regularly reading specific journals. Those in italics are those I listed in the survey, and the others were listed by respondents.

Journal	Number of Respondents Selecting/Listing
<i>Journal of the American Veterinary Medical Assoc.</i>	99
<i>American Journal of Veterinary Research</i>	11
<i>Journal of Veterinary Internal Medicine</i>	11
<i>Journal of Feline Medicine and Surgery</i>	11
<i>Veterinary Clinics of No. America-Sm Anim Practice</i>	21
<i>Equine Veterinary Journal</i>	10
<i>Veterinary Clinics of No. America-Equine Practice</i>	4

<i>Journal of the American Animal Hospital Assoc.</i>	16
<i>Veterinary Surgery</i>	2
<i>Compendium</i>	92
Veterinary Medicine	19
Clinicians Brief	14
Veterinary Economics	16
DVM360 Magazine	8
The Capsule Report	3
Journal of Clinical Microbiology	1
Vaccine	1
Journal of Infectious Disease	1
Veterinary Dentistry	1
Veterinary Clinics of No. Amer. - Exotics	3
Veterinary Clinics of No. Amer. - Small Ruminants	1
The Bovine Practitioner	2
Journal of Swine Health and Production	3
Theriogenology	2
Veterinary Clinics of No. Amer. - Food Animal	1
Veterinary Forum	3
Journal of Exotic Pet Medicine	1
Journal of Avian Medicine and Surgery	1
Endocrinology	1
Firstline	1
Equine Veterinary Education	1

D. Familiarity with Evidence-Based Medicine:

I asked two questions assessing how familiar respondents were with the general concept of evidence-based medicine, as defined for the initially, and how comfortable they were some specific relevant concepts and terms.

1. Are you already familiar with the concept of evidence-based veterinary medicine as described above? 117 responses

Response	Number of Respondents	Percentage of Respondents
Unfamiliar	7	5.98
Slightly Familiar	27	23.08
Somewhat Familiar	48	41.03
Very Familiar	35	29.91

2. The following are terms relevant to evidence-based veterinary medicine. Please indicate your familiarity with them by marking the applicable response.

	Unfamiliar (%)	Some Understanding (%)	Could Explain (%)	Total Responses (%)
Relative/Absolute Risk	28(25.2)	69(62.2)	14(12.6)	111
Systematic Review	30(27.3)	67(60.9)	13(11.8)	110
Meta-Analysis	85(76.5)	21(18.9)	5(11.8)	111
Confidence Interval	53(47.8)	44(39.6)	14(12.6)	111
Publication Bias	30(27.0)	56(50.4)	25(22.5)	111
Positive/Negative Predictive Value	32(28.6)	57(50.9)	23(20.5)	112
Confirmation Bias	65(58.6)	40(36.0)	6(5.4)	111
Number Needed to Treat	39(35.4)	64(58.2)	7(6.4)	110

E. Barriers to Implementing Evidence-Based Practices:

Finally, I asked respondents to rate the importance of a number of possible barriers to practicing evidence-based veterinary medicine.

	Not a Barrier (%)	Slight Barrier (%)	Moderate Barrier (%)	Severe Barrier (%)	Total Responses
Articles not available	15(13.9)	41(38.0)	38(35.2)	14(13.0)	108
Implications of research for practice not clear	11(10.2)	42(38.9)	46(42.6)	9(8.3)	108
Statistics not understandable	13(12.0)	32(29.6)	48(44.4)	15(13.9)	108
Research not relevant	9(8.5)	25(23.6)	57(53.8)	15(14.2)	106
Resources inadequate to implement research findings	6(5.6)	41(38.3)	49(45.8)	11(10.3)	107
Research methodologically inadequate	12(11.3)	45(42.5)	36(34.0)	13(12.3)	106
Result not generalizable to practice	2(1.9)	33(30.8)	55(51.4)	17(15.9)	107
Conclusions of research not justified	23(21.9)	49(46.7)	17(16.2)	16(15.2)	105
Literature is conflicting	8(7.6)	46(43.8)	39(37.1)	12(11.4)	105
Research not clearly reported/readable	9(8.5)	46(43.4)	37(34.9)	14(13.2)	106
Amount of research overwhelming	12(11.2)	29(27.1)	39(36.4)	27(25.2)	107
Cost of articles prohibitive	20(18.5)	39(36.8)	30(28.3)	17(16.0)	106

F. Open Comments:

I also gave respondents an opportunity to offer any comments they wished on evidence-based veterinary medicine or the use of research results in daily practice. Only a few respondents provided comments, and these are copied below:

1. This will remain a lofty goal until communication is greatly improved between academia, private practice, and specialties. Terminology is not standardized sufficiently nor resources presented concisely enough that the forest gets lost for the trees.

2. I'm concerned about the increasing popularity of homeopathy. A veterinary magazine recently featured a homeopathic vet as a primary story. What organizations do you recommend joining to help fight this trend?

3. Finding that you defined this term at the end of the survey and the related terms would have been a very fulfilling end for me. There is a lot of confusion about this.

4. It would be refreshing if the majority of veterinarians really strived to do the very best they can. I have seen too many 2nd opinions to believe that many vets have the patients best interest in mind. They look at the bottom line, or just wing it. If they would look at a few research abstracts or papers, or just read a few journals their knowledge would grow, and their patients would benefit. And I sincerely wish that companion animal practitioners would not treat cats as small dogs. Had to get that one in. I feel that most vets do not have time or will not take the time to treat patients properly. That means with current medicine, and maybe, with on the edge medicine. Fortunately, here in ny, beginning 2011 vets are required to have 45 credit hours of CE every triannual licensure renewal. That may help. I do not mean to give the "holier than thou" sermon. I do not feel that i am superior. I do know I go the "extra mile" for my patients. Maybe I have more passion. After 15 yrs in practice I still come to work with enthusiasm, wondering what will walk in the door today. I love what I do.

G. Discussion:

The limitations in the size and makeup of the sample preclude generalizations about U.S. veterinarians as a whole. The sample population was dominated by experienced veterinarians in small, private, small-animal predominant practice. The high proportion of male veterinarians likely reflects the skewing of the sample towards veterinarians in their third and fourth decades in practice. Though direct questions about practice ownership were not asked, the fact that many respondents had been in practice more than twenty years, and over half worked in single-doctor practice, suggests that a high proportion were likely practice owners.

Respondents appeared to view the concept of evidence-based veterinary medicine (EBVM), and the term itself, quite favorably. Interestingly, while 91% described their view of EBVM as positive, only 41% described their colleagues' view as positive. This is consistent with abundant social science research indicating we see ourselves as more objective, rational, and intelligent than average (e.g. <http://skeptvet.com/Blog/2010/04/the-dunning-kruger-effect-why-incompetence-is-blind-to-itself/>).

Most respondents also described themselves as familiar with EBVM generally, but many did

not express confidence in their understanding of common EBVM-related terms. Only between 5.4% and 22.5% of respondents felt able to explain the terms asked about in the survey, and between 25.2% and 76.5% responded that they were not familiar with these terms at all. This suggests there is a need for greater education of veterinarians about the basic concepts and methods of EBVM, at least in this population.

This is also indicated by the responses to questions concerning the use of the scientific literature. Respondents clearly relied on research summaries, consensus statements, and protocols promulgated by professional organizations far more than on independent use of the literature. 73% reported never having conducted a literature search using Medline, PubMed, or CAB Direct. This is not surprising since 85% reported never having received any formal training in literature search or appraisal. Hopefully this reflects the veterinary curriculum of 20-30 years ago more than that of today, but if not it suggests a great need for more explicit training in literature search and interpretation in the veterinary curriculum.

The journals most used by respondents, by a large margin, were JAVMA and Compendium. Many of the journals mentioned by participants in the survey were those that focus on summary or review of primary research rather than reporting research studies; e.g. Veterinary Clinics of North America and Veterinary Medicine, Clinician's Brief. This, along with the respondents preference for guidelines and protocols rather than independent review of the primary literature suggests a need for convenient, evidence-based review resources that facilitate translating basic and clinical research into applied clinical practices.

Of those electronic resources which the survey inquired about, by far the most frequently used was the Veterinary Information Network. Google and other internet search engines were frequently mentioned as resources used by respondents as well. This suggests that even for this population, the barrier to literature search is not a lack of comfort or familiarity with electronic media in general (especially since all respondents had to actively log on to the survey and complete it via the Internet, which ought to select for a technologically fluent population). The greater impediment appears to be a lack of confidence in evaluating the primary literature and a sense (revealed in subsequent questions) that it is often not directly applicable to practice. This is consistent with the preferences already expressed for a distillation of the primary literature into practical, usable form. Unfortunately, while VIN is a highly successful and user-friendly tool, in its current form it very much supports the model of opinion-based medicine rather than evidence-based medicine. Similar resources that encourage a more evidence-based approach would be valuable.

The distribution of responses for the question concerning barriers to implementing EBVM was very consistent, with most respondents selecting Slight Barrier and Moderate Barrier for most questions. This may represent a weakness in the question design, or simply a lack of strong opinions on the part of participants. The strongest responses seemed to be to the idea that research results are not necessarily relevant to clinical practice (about 68% of respondents felt this was a Moderate to Severe barrier). A large number of respondents also seemed to feel the amount of research information was overwhelming (25% Severe Barrier and 36.4% Moderate Barrier). This again seems to support the notion that while practitioners generally believe research evidence is important and should be the foundation for veterinary medicine, they do

not feel equipped or qualified to examine the primary research directly and would be more inclined to find it useful if summarized or distilled into practical and digestible form, such as protocols, guidelines, or other secondary resources.

Based on this pilot study, a larger-scale survey of a more representative sample population would be informative and useful in guiding efforts to promote EBVM. If consistent with the results obtained for this population, such a survey would suggest a need for greater education concerning EBVM, particularly in the area of searching and evaluating primary research literature. It would also suggest that practitioners understandably feel that summaries, reviews, and protocols based on the primary literature are more directly useful to them in practice, and that providing such resources would be a worthwhile activity.