The State of the Information Infrastructure Supporting Evidence Based Veterinary Medicine: A Comparison with Human Medicine

EAHIL 2010 Discovering New Seas of Knowledge

June 16, 2010

Lorraine Toews MLIS
Veterinary Medicine Librarian
Health Sciences Library
University of Calgary
Calgary, Alberta, Canada
ltoews@ucalgary.ca

Study Question

What are the key characteristics of the current information infrastructure that supports the practice of evidence based veterinary medicine, and how does this infrastructure compare with that of human medicine?

Information Infrastructure Elements

1. Clinical trial registries
2. **Clinical research reporting standards**
3. **State of review articles**
4. Organizational support for production of systematic reviews
5. Structured abstracts
6. Indexing of clinical intervention studies
7. Search filters
8. Evidence based point of care resources

Methods

- Literature searches
  - PubMed and CAB Abstracts
  - 1995 to present, English language

- Bibliographies
  - Evidence Based Clinical Practice Bibliography

    How To Teach Evidence Based Clinical Practice Workshop
    McMaster University, 2004

  - An Evidence-Based Medicine Bibliography, Susanne Whitaker
    http://www.ebvma.org/?q=node/590

- Grey literature search – Google

2.1 Why do clinical research reporting standards matter?

- *Quality* of study
  - Not reported, likely not done
- Poor reporting > *exaggerated/biased estimate of treatment effect*
  - Resources spent on ineffective treatments
  - Harm to patients
- *Reader* can *not assess validity*
- *Indexing* affected
  - Not reported > not indexed > not retrieved in search

2.2 Research Reporting Standards

Human Medicine

Reporting Standards

- 1996 – CONSORT Statement – clinical trials
  - Checklist 22 items – how trial designed, analyzed, interpreted
- 2001, 2010 revised
- Endorsed by:
  - ICMJE
  - Council of Science Editors
  - World Association of Medical Editors
  - Hundreds medical journals
- PRISMA – systematic reviews
- Equator Network – other study designs

2.3 Research Reporting Standards

Veterinary Medicine

Quality of Reporting Improved?

Sargeant JM, Thompson A, Valcour J, Elgie R, Saint-Onge J, Marcynuk P, Snedeker K. Quality of Reporting of Clinical Trials of Dogs and Cats and Associations with Treatment Effects. J Vet Intern Med. 2010 24:44-50

- Evaluated 100 clinical trials of *dogs and cats* published 2006-2008
- Found: *"substantive deficiencies in reporting of key trial features"*
  - Randomization method
  - Double blinding
  - Inclusion criteria for study subjects
  - Differences between treatment groups
- Concluded:
  - Potential *biases associated with not reporting* - increased proportion of positive *treatment effects*
- Recommend use of CONSORT to improve quality of reporting

Quality of Reporting Improved?

Sargeant JM, Elgie R, Valcour J, Saint-Onge J, Thompson A, Marcynuk P, Snedeker K. Methodological quality and completeness of reporting in clinical trials conducted in livestock species. Prev Vet Med. 2009 Oct 1 91(2-4):107-15.

- Evaluated 100 clinical trials in *livestock* populations published 2006 to 2008
- Found: "...*substantive deficiencies in reporting* of many…trial features…related to methodological quality":
  - Randomization
  - Double blinding
  - Number of subjects lost to follow-up
- Concluded:
  - "Many livestock trials do *not* currently *meet* the *standard of … CONSORT …*"
  - "our results support the hypothesis that *biased treatment effects may* be present in trials where key trial components are not reported"

Reporting Standards - Veterinary

- Modify CONSORT to reflect *distinctive* aspects reporting livestock trials
  - Consensus meeting November 2008 Chicago
  - Goal - "substantially improve…reporting of trials on production, health and food-safety outcomes."
  - Result: REFLECT Statement www.reflect-statement.org

- Evidence-based minimum data set for trials reporting production, health, and food-safety outcomes
  - 14 items from CONSORT modified
  - Added sub-item to address challenge trials
  - Terminology - common usage in livestock production

Reporting Standards - Veterinary

REFLECT endorsed by:

- Journal of Food Protection
- Journal of Swine Health & Production
- Journal of Veterinary Internal Medicine
- Preventive Veterinary Medicine
- Zoonoses & Public Health

Reporting Standards - Veterinary

Hinchcliff KW, DiBartola SP. Quality matters: publishing in the era of CONSORT, REFLECT, and EBM. J Vet Intern Med. 2010 Jan-Feb; 24(1):8-9.

Goals JVIM's revised Guidelines for Authors, which now support the *REFLECT statement*

- Improve the *quality of reporting*
- Improve the *quality of articles*
- Easier for *readers* to "*use evidence-based principles* in their practices"

3.0 Systematic Reviews

"Systematic reviews differ from traditional narrative reviews in that systematic reviews follow a *structured research protocol* to *reduce sources of bias at all stages* of the review. This includes the objective, the literature search, the identification of relevant literature, quality assessment of relevant studies, summarization or statistical analysis of data, and conclusions."

Sargeant JM, Rajic A, Read S, Ohlsson A. The process of systematic review and its application in agri-food public-health. Prev Vet Med. 2006 Aug 17;75(3-4):141-51

3.1 Why do systematic reviews matter?

- *Transparency,* methodological soundness
  - Provide reader info needed to evaluate validity of review
- Create *more precise, powerful conclusions*
  - Synthesis of *all* studies on clinical topic – clearer picture of state of knowledge
- Identify *gaps* in knowledge
- *Translate research evidence* into healthcare *practice*
  - Increased volume medical literature
  - Time – clinicians lack time to read primary literature

3.2 Systematic Reviews

Human Medicine

Systematic Reviews

Systematic reviews are available to address a wide range of questions in human healthcare

PubMed Search (April 28, 2010)

Total records in PubMed	19,783,015
Systematic Review Subset	131,906*
Publication Type: meta-analysis	23,369*

** With Veterinary Subset records removed*

Quality of Reviews

Mulrow CD. The medical review article: state of the science. Ann Intern Med.1987 Mar 106(3):485-489

- Examined methods in 50 review articles
- Published 1985 to 1986 in NEJM, Ann Int Med, JAMA, Arch Int Med

- Concluded - "current medical reviews do *not routinely use scientific methods* to identify, assess, and synthesize information"

Quality of Reviews

Antman EM, Lau J, Kupelnick B, Mosteller F, Chalmers TC. A comparison of results of meta-analyses of randomized control trials and recommendations of clinical experts. Treatments for myocardial infarction. JAMA. 1992 Jul 8 268 (2):240-8

- Compared meta-analysis of RCTs to recommendations of experts – treatments for myocardial infarction
  - Newer, but effective treatments excluded
  - Some therapies that had proven harmful still being recommended
- *Weakness of narrative reviews* – not using *all* evidence

Quality of Reviews

"Authors [of the Antman study] concluded that identifying & *assessing therapeutic trials* had become *too difficult for narrative reviews to be useful in transferring new information to clinicians*, and that….techniques such as meta-analysis were required for summarizing research evidence"

Sargeant JM, Rajic A, Read S, Ohlsson A. The process of systematic review and its application in agri-food public-health. Prev Vet Med. 2006 Aug 17 75 (3-4):141-51

3.3 Systematic Reviews

Veterinary Medicine

Systematic Reviews

PubMed Search – April 28, 2010

	Veterinary Medicine # records		**Human Medicine # records**
Systematic Review Subset and Veterinary Special Query	**2,833**	Systematic Review Subset *	131,906
Publication Type: Meta-analysis and Veterinary Special Query	**426**	Publication Type: Meta-analysis*	23,369

** With Veterinary Subset records removed*

Quality of Reviews

Sargeant JM, Torrence ME, Rajić A, O'Connor AM, Williams J. Methodological quality assessment of review articles evaluating interventions to improve microbial food safety. Foodborne Pathog Dis. 2006 Winter;3(4):447-56

- Evaluated 65 review articles published 2000 to 2005 - *microbial food safety*
- Methodological quality poor
- *Lack systematic approach* to conducting review

Quality of Reviews

Waddell L, Rajić A, Sargeant J, Parker S, Deckert A, McEwen S. The methodological soundness of literature reviews addressing three potential zoonotic public health issues. Zoonoses Public Health. 2009 Nov 56(9-10):477-89.

- Evaluated 132 studies in 111 journals published 2000 to 2006
- Routine *scientific methods rarely or never utilized* in...reviews ... *zoonotic public health*

Reviews – Size of Primary Literature

Keene BW. Towards evidence-based veterinary medicine. J Vet Intern Med. 2000 Mar-Apr 14(2):118-9.

"The most reliable evidence…is obtained from the results of systematic reviews (eg. meta-analyses) of multiple, randomized, blinded, placebo-controlled trials … Such virtually unassailable evidence is currently unavailable in veterinary medicine because there have been *too few trials* performed *on any single topic*."

Reviews – Quality of Primary Literature

Hinchcliff KW, DiBartola SP. Quality matters: publishing in the era of CONSORT, REFLECT, and EBM. J Vet Intern Med. 2010 Jan-Feb 24 (1):8-9.

It is “not feasible at this time to introduce rigorous and strict adherence to the CONSORT and REFLECT guidelines for all manuscripts accepted for publication in the journal. *To do so currently would result in very slender issues of the journal…”*

Reviews – Quality of Primary Literature

Sahora A, Khanna C. A survey of evidence in the Journal of Veterinary Internal Medicine Oncology Manuscripts (MSS) from 1999 to 2007 J Vet Intern Med. 2010: 24:51-56.

- Surveyed study designs in 172 oncology articles published in JVIM from 1999 to 2007
- Each of *JVIM* articles assigned one of 5 types of evidence – based on evidence hierarchies from CEBM Oxford 2001

Reviews – Quality of Primary Literature

Excerpt from Table 4

Characterization of manuscript quality using hierarchies of evidence for oncology manuscripts published in JVIM 1999 to 2007

Study Design	Level 1 RCTs	Level 2 Lesser quality RCTs Cohort Studies	Level 3 Case Control Studies	Level 4 Case Series	Level 5 Expert Opinion Case Reports Editorials
Percentage of Total	**0%**	**2%**	**9%**	**41%**	**20%**

Results

- Very few studies from higher levels of evidence
- Progressive increase in *prospective* studies
- *Decrease* in case reports
- No significant changes in classification of pub's in JVIM 1999 - 2007

Conclusions

Reporting Standards

- Poor reporting small / large animal literature
- Exaggerated/biased estimate of intervention effectiveness
- Not indexed > hinders retrieval by end user
+ REFLECT & CONSORT – improve quality

Review Literature

- Few SRs, poor quality
+ Studies on quality of reviews & primary veterinary literature – defining problem first step to address

Conclusions

- Veterinary Medicine information infrastructure in *embryonic stages* relative to human medicine
- Impact > serious *barriers*
  - *Research transfer* to practice
  - *Adoption of evidence-based practice modes*
- Critical *linkages* animal--human health
- Robust information infrastructure – evidence based practice in veterinary medicine critical
- Understanding | benchmarking 1st step to address

Point of Care Resources

An *evidence based* a point of care information resource *systematically* and *transparently*:

- Locates the evidence
- Critically appraises the evidence
- Synthesizes the evidence
- Objectively reports the evidence
- Derives conclusions & recommendations from the synthesis
- Updates the resource when new evidence is available

From DynaMed Content/Editorial Policies
http://www.ebscohost.com/dynamed/content.php

8.1 Why do Point of Care Resources Matter?

- Clinicians *lack time, search skills, critical appraisal skills* to use *primary & review literature* for clinical decision-making
- Primary | review literature
  - *Not in relevant, readable formats* for clinicians
  - Not enough *detail* to implement intervention
- *Knowledge translation* > clinicians use research-based evidence for clinical decision-making
  - Reduce error & improve patient outcomes

8.2 Point of Care Resources

Human Medicine

Point of Care Resources

A proposal for more informative abstracts of clinical articles. Ad Hoc Working Group for Critical Appraisal of the Medical Literature. Ann Intern Med. 1987 Apr 106(4):598-604

"difficulties in using *journals* to solve clinical problems...*takes too much time* to tack down the appropriate information"

Ghali WA, Sargious PM. The evolving paradigm of evidence-based medicine. J Eval Clin Pract. 2002 May 8 (2):109-12.

"…the fundamental need for ... *processing medical knowledge for prompt application in clinical* practice ... highlighted by a new international Charter on Medical Professionalism."

Point of Care Resources

Straus S, Haynes RB. Managing evidence-based knowledge: the need for reliable, relevant and readable resources. CMAJ. 2009 Apr 28 180(9):942-5

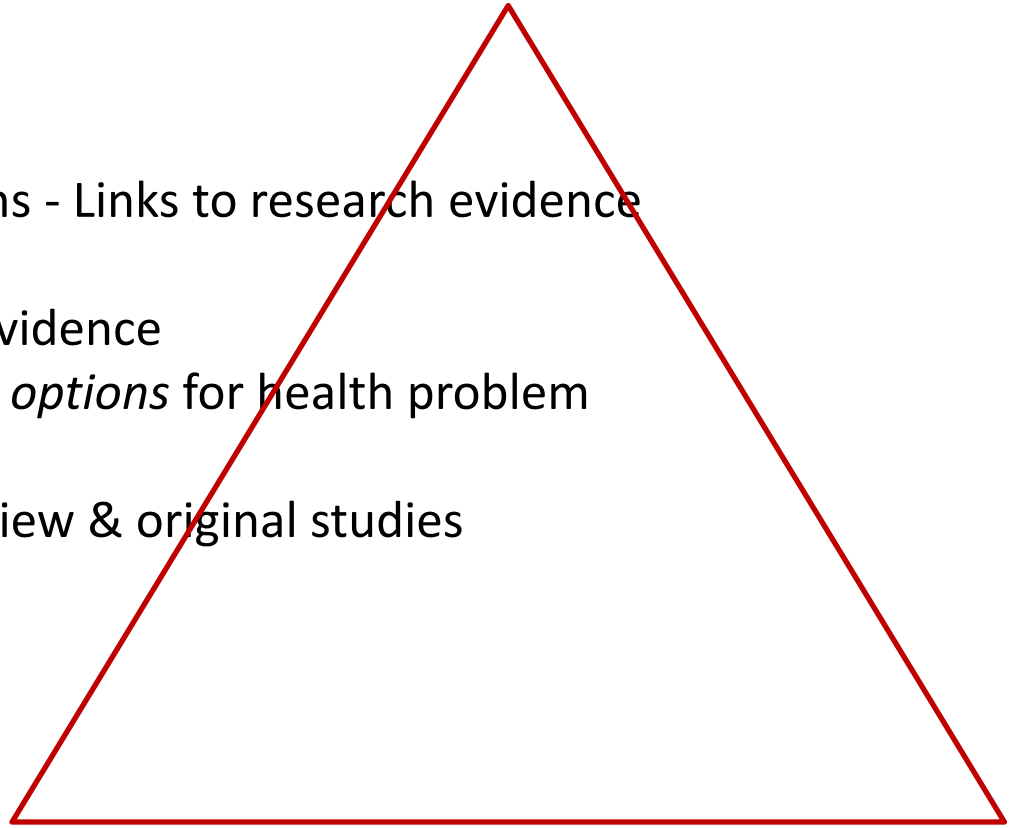
"those who publish … research-based evidence should focus on the 3Rs…

- **Reliability**
  - *Methods* used to generate POC resources must be *"explicit and rigorous"*
- **Relevance**
  - "to be clinically relevant … should consist of *content* that *is specific to the distinct needs* of well-defined groups of clinicians..."
- **Readability**
  - "format research in ways that make it more *readable for clinicians* … in *sufficient detail* to allow implementation at the clinic…"

Point of Care Resources

Haynes RB. Of studies, syntheses, synopses, summaries, and systems: the "5S" evolution of information services for evidence-based healthcare decisions. Evid Based Med. 2006 Dec; 11(6):162-4

- Systems
  - E-health record
  - Decision support systems - Links to research evidence
- **Summaries**
  - *Integrate full range* of evidence
  - *Full range management options* for health problem
- Synopses
  - Brief descriptions of review & original studies
- Syntheses
  - Systematic reviews
- Studies
  - Original primary study



Point of Care Resources

ACP Journal Club
BMJ Point of Care
Clinical Evidence
Cochrane Database of Systematic Reviews
Dynamed
Evidence Matters
First Consult
UpToDate

… and many more …

HLWIKI Canada - A wiki for health librarians
Point of Care Decision-Making Tools – An Overview
http://hlwiki.slais.ubc.ca/index.php/

8.3 Point of Care Resources

Veterinary Medicine

Point of Care Resources

CONSULTANT

http://www.vet.cornell.edu/consultant/Consult.asp

- Diagnostic decision support tool
- Produced by Dr. Maurice White, Cornell University
- No information on *criteria / process* used to *select, evaluate, rank* literature included in resource

Point of Care Resources

Veterinary Clinical Digest

http://www.veterinaryclinicaldigest.com/default.asp

- Synopsis of individual journal articles
- Produced by Wiley-Blackwell, edited by veterinarian Dr. Alex Gough
- Coverage limited to articles in Wiley-Blackwell journals
- Published infrequently – only 4 issues since 2007
- No information on *criteria / process* used to *select, evaluate, rank* literature included in resource