EBM e Medicina Veterinaria: un modo di affrontare i problemi clinici e prendere decisioni da un'altra prospettiva.

EBM and Veterinary Medicine: a different way to deal with clinical problems and decision making.

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Veterinary "Art" vs. "Science"

- Is veterinary medicine an art or a science?
- A good clinician applies art on a foundation of science

What do I mean by "Art"

- Instincts based upon experience
- Powers of observation
- Empathy with our patients
- Empathy with our clients
- Manual dexterity
- Other skills

What do I mean by "Science"

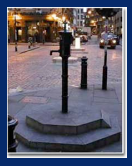
- Search for truth
- Methodical and systematic process
- Hypothetico-deductive reasoning
- Scepticism
- Recognition of uncertainty
- Quantification of that uncertainty
- Objectivity - avoiding bias

John Snow (1813-1858)

- Prevailing theory of disease spread by vapours
- Proposed that "Cholera Poison" reproduced in body spread through the contamination of food or water
- Water taken from Thames upstream & downstream of city (& sewage outflow)
- Began mapping cases of cholera in '54 outbreak

Preventing the spread

- Cluster of 500 cases in 10 days
- Intersection of Cambridge & Broad St
- Ordered disabling of water pump
- Contained the epidemic!



SIDS (Cot Death)

- "Invalid health information is potentially lethal"
- Iain Chalmers
  - One of the founders of the Cochrane Collaboration

There are two disadvantages to a baby's sleeping on his back. If he vomits, he's more likely to choke on the vomitus. Also, he tends to keep his head turned toward the same side—usually toward the center of the room. This may flatten that side of his head.

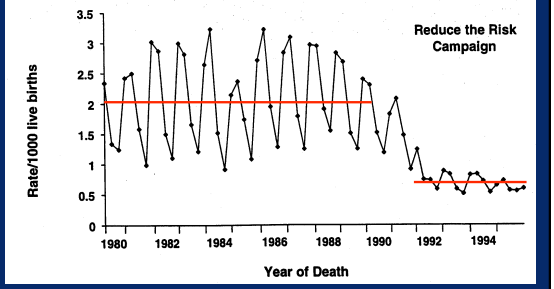
I think it is preferable to accustom a baby to sleeping on his stomach from the start if he is willing. He may change later when he learns to turn over.

Results of a meta-analysis

- Collation of the results of many studies contradict this advice
- Extract from publicity prepared for the UK 'Reduce the Risk' Campaign (early 1990s)

  "The risk of cot death is reduced if babies are not put on the tummy to sleep. Place your baby on the back to sleep. ….Healthy babies placed on their backs are not more likely to choke."

Figure 3: Sudden Infant Death (SID) incidence (live birth to one year) by quarter. England and Wales 1980-1995



Iain Chalmers

- "No doubt like millions of his other readers, I passed on and acted on this apparently rational and authoritative advice."
- "We now know that the advice promulgated so successfully in Spock's book led to thousands, if not tens of thousands, of avoidable cot deaths."

(Letter to BMJ)

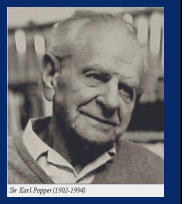
Belief and Knowledge

- A belief may be true
- A belief implies an undefined uncertainty
- Scientific knowledge is defined by our ability to test its truth
  - Knowledge implies a degree of certainty (or low level of uncertainty)
  - Knowledge is never absolute, it is a stronger belief supported with evidence

Karl Popper

1. Propound empirically testable theories;
2. Aim to refute them;
3. Given any theory T, aim to replace it by another theory T' which is more general and precise

Popper later placed much more emphasis on the importance of non-empirical theories, while retaining empirical content as the ultimate goal of theory development.



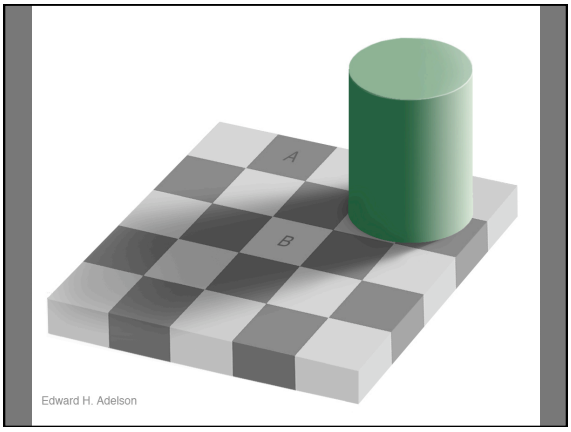
Sir Karl Popper (1902-1994)

Tests

- A test is just an observation
- An experiment is just an arrangement in order to make an observation
- An untested belief while possibly true remains a belief
- Tests provide the evidence that a clinical intervention may work

A belief that fails a test

- Discard the belief
- Modify the belief
- Question the test



Randomness and chance

- The natural world is riven with it
- Biological events especially so
- Statistics is a tool to help us deal with it

- Psychologically we are ill equipped to deal with it
- Unusual or interesting phenomena gain undue emphasis in our observations
- Hope, fear or desire clouds our judgment of risk or chance

The UK National Lottery

- 50 balls numbered 1 to 49
- 6 balls are randomly removed
- Possible combinations 49!/(6!*(49-6)!)
- Chance of winning 1:14 million

- To buy one ticket purchases hope
- To buy more than one demonstrates the triumph of hope over expectation

Reporting statistics

- What do we as clinicians need to know?

- How likely is it that the result is a 'lottery win'?
  - If we make an observation enough times we will 'win'!
  - We arbitrarily choose 1:20 (5%)
- How representative is the result?
  - What range of values might we expect to see if we repeated the observation
  - Confidence Interval
  - 95% probability that the true result falls in this range

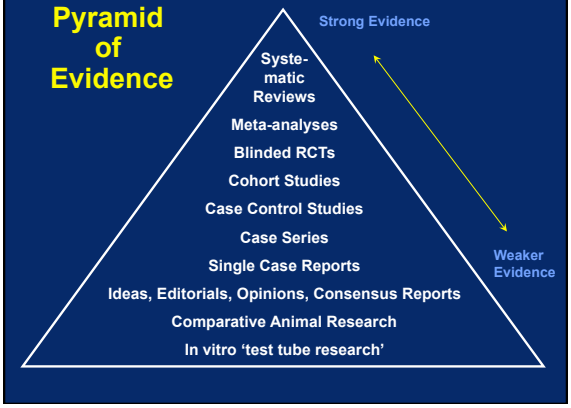
Scepticism

- With statistics we acknowledge our doubt
- Unless we are completely without imagination we can always think of an alternative reason for an observation
- "Our patients may get better in spite of our treatments rather than because of them"
- Our knowledge is very finite (limited)
- When we make observations or design experiments we introduce bias

Clinical decision making

- Very few clinicians are completely irrational when making a decision
- We have received a 'scientific' training
- Our knowledge consists of beliefs each of which is held for a reason
  - There is a provenance (evidence) behind our knowledge

Pyramid of Evidence



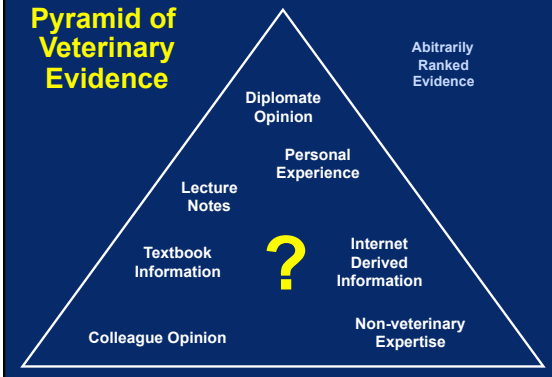
What is Evidence Based Medicine?

- Evidence-based medicine (EBM) is the integration of best research evidence with clinical expertise and patient values.
- In order to practice EBM you need:
  - Discipline
  - Appraisal skills
  - Clinical skills
  - Judgement

The process of EBM

- Turn your clinical question into an information need
- Search for the evidence
- Appraise the evidence
- Apply the evidence
  - Integrated with other relevant data:
    - » Your patient's needs
    - » Your client's needs
    - » Any other constraint
- We cannot remember everything
- We can use new skills & technology to find information when we need it

Pyramid of Veterinary Evidence



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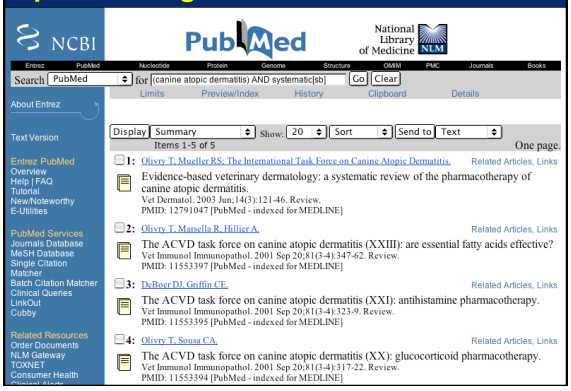

Appraising clinical research

- Looking at the methodology (materials and methods)
- Do not just believe what is concluded in the summary or abstract
- Look for bias
- Is it relevant for your patient (e.g. A similar population)
- Has there been an appropriate statistical analysis?
- Is the magnitude of the effect clinically significant?

Critical appraisal checklist and calculator for an article on therapy or prevention. This calculator works off-line.

First of all, for the results of a single trial to be valid
1. The assignment of patients to treatment options must be randomised and concealed.
2. all the patients entered must be accounted for at the conclusion, and analysed in the groups to which they were randomised.
Ideally the subjects and clinicians should be blind to the treatment group, and all other treatment should be identical. The groups must be shown to be similar at the start.

Number in control group with event outcome = 10 **Total num in control group =** 14
Num in experimental grp with event outcome = 10 **Total num in exp'tal group =** 13
Calculate results
Relative risk reduction (RRR) = -0.077 -7.7 **%**
Absolute risk reduction (ARR) = -0.055 -5.5 **%**
Number needed to treat (NNT) = NNT(harm) = 18
95% confidence From NNT(benefit) 4 to infinity to NNT(harm) 3

Programme written by DJR Hutchon (copyright)

This calculator is for educational use. It is believed accurate but no responsibility for accuracy of the results is accepted by the author. David J R Hutchon BSc, MB, ChB, FRCOG
Consultant Gynaecologist, Memorial Hospital, Darlington, England.
Comments and suggestions are welcome and will be included in the comments section. E-mail to me at DJRHutchon@Postmaster.co.uk
1/1/1999

Science isn't perfect

- Never be afraid to admit that you don't "know" (even if only to yourself)
- Never be shy of airing your "beliefs" but be prepared to discuss the "evidence"

The application of 'science' to patient care may not be the best way to cure our patients but I believe that it is the least worst.

Further Reading: books

- Handbook of Evidence-Based Veterinary Medicine
  - Peter Cockcroft & Mark Holmes, Blackwell Publishing
- Evidence-based Medicine, How to practice and teach EBM
  - Sackett et al, Churchill Livingstone (3rd Edition)
- How to Read a Paper
  - Trisha Greehalgh, BMJ Press


Further Reading: Papers

- Holmes MA & Cockcroft PD (2004) Evidence-based veterinary medicine 1. Why is it important and what skills are needed? In Practice 26:1 28-33
- Cockcroft PD & Holmes MA (2004) Evidence-based veterinary medicine 2. Identifying information needs and finding the evidence. In Practice 26:2 96-102
- Holmes MA & Cockcroft PD (2004) Evidence-based veterinary medicine 3. Appraising the evidence. In Practice 26:3 154-164
- Dahoo IR, Waltner-Toews D (1985) Interpreting clinical research: Part I. General considerations. Comp. Cont. Education 7:9 S474-7
- Dahoo IR, Waltner-Toews D (1985) Interpreting clinical research: Part II. Descriptive and experimental studies. Comp. Cont. Education 7:9 513-19
- Dahoo IR, Waltner-Toews D (1985) Interpreting clinical research: Part III. Observational studies and interpretation of results. Comp. Cont. Education 7:9 S474-7