

Evidence-Based Veterinary Medicine

What is it?

Why do we need it?

How does it work?



What is EBVM?

Evidence-based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.

Sackett, DL. et al. Evidence based medicine: what it is and what it isn't



What is EBVM?

The integration of the best research evidence with our clinical expertise and our patient's unique values and circumstances.

Strauss, SE. et al. Evidence-based medicine: how to practice and teach EBM.



What is EBVM?

At its heart is the confidence in the scientific methodology that has developed over the centuries to enable us to distinguish what is likely to be true from what is likely to be false (or unproven).

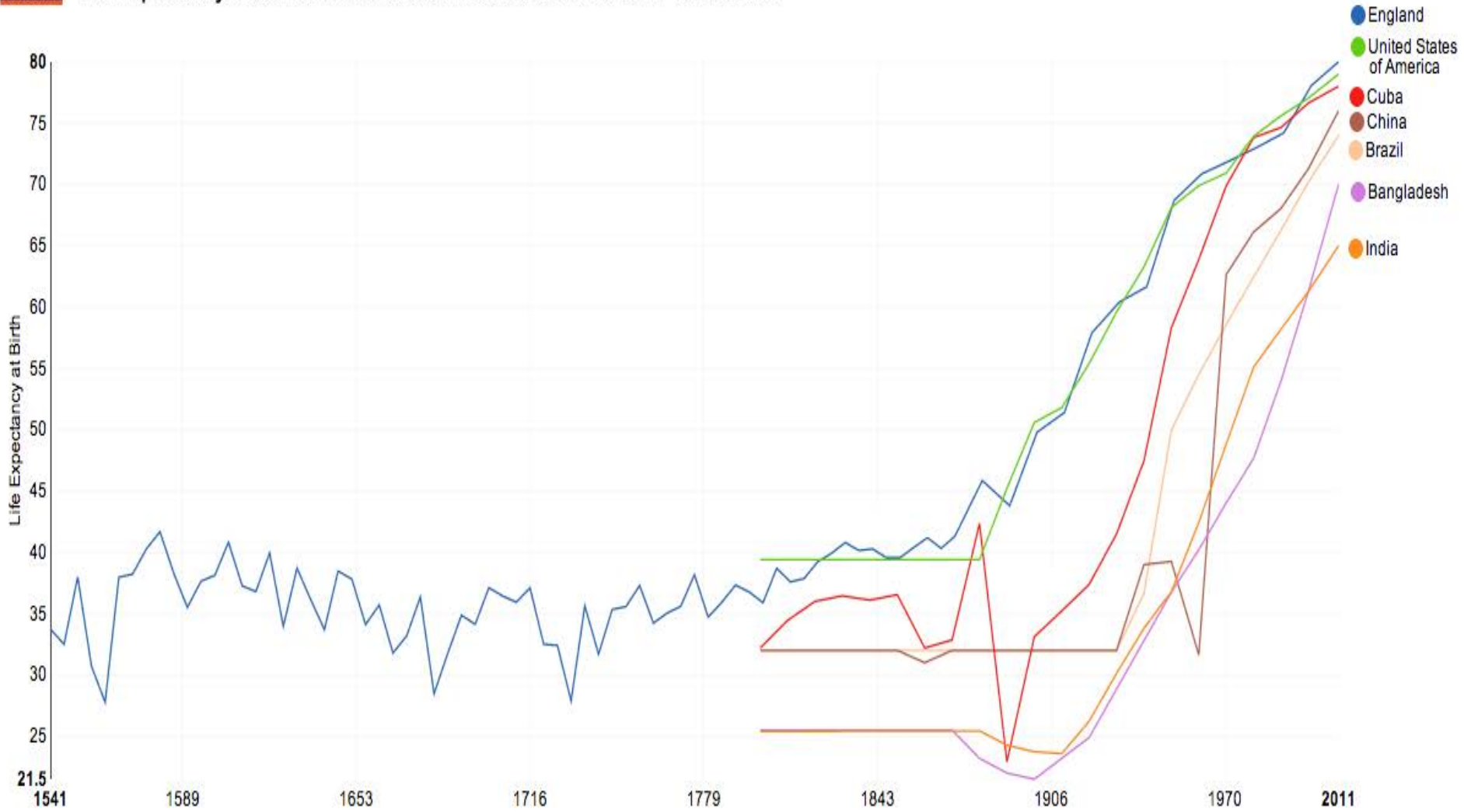
Cockroft, P. Holmes, M. Handbook of Evidence-Based Veterinary Medicine



The logo features the word "Science" in white, bold, sans-serif font, arched over the word "WORKS" in a yellow, 3D, sans-serif font. The text is set against a blue background with a subtle, swirling pattern.

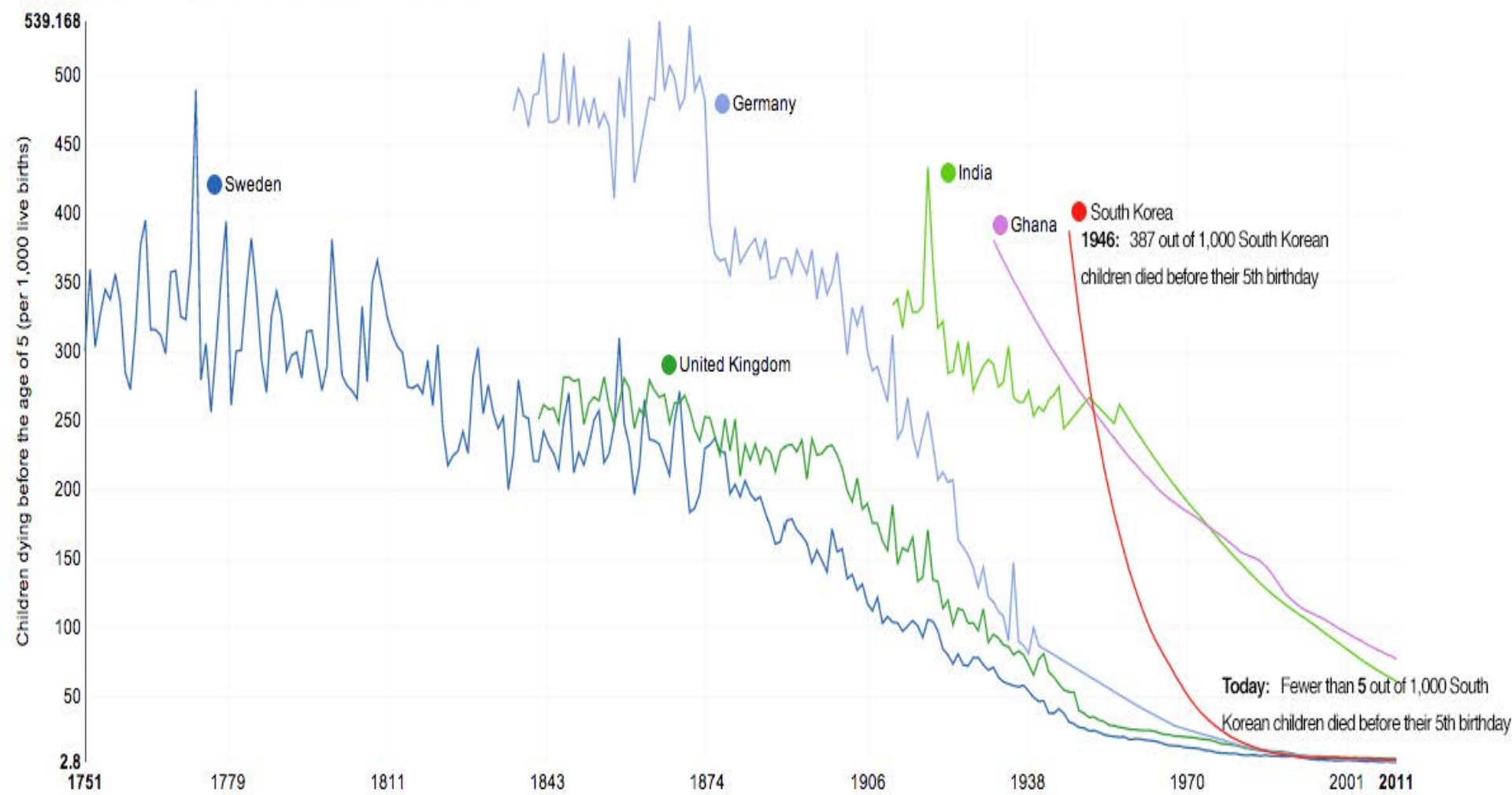
Science
WORKS

Life expectancy at birth in countries around the world 1540-2011 – Max Roser



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Child Mortality from 1751 to 2011 – Max Roser



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Data source: UNICEF's www.childmortality.org

Why do We Need EBVM?

- To prevent and correct our errors
- To improve patient care outcomes
- To meet our ethical obligation to our clients

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- To prevent and correct our errors
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In

My

Experience



50c



GC • 40

DR. BENJAMIN SPOCK

BABY AND CHILD CARE

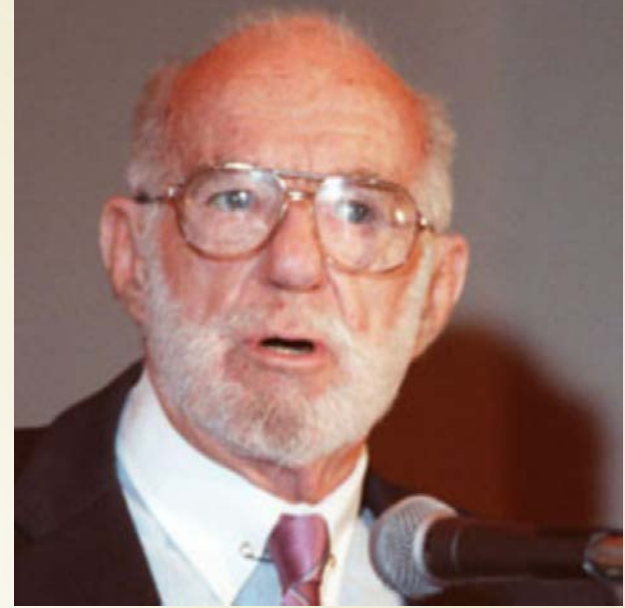


The most widely recommended hand-
book for parents ever published—
Authoritative, illustrated, indexed

Over 19,000,000 copies sold

The
Complete
Book
POCKET
BOOKS

*As near as my husband and I can figure, your book, **Baby and Child Care**, has become the Modern Bible of American Parenthood*

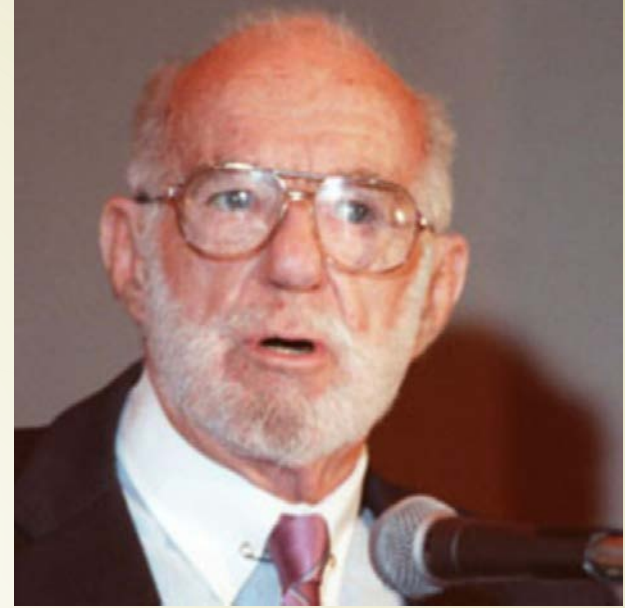


By 1973 *Baby and Child Care* had gone through 201 printings and sold over 23 million copies; been translated into 29 languages; For two decades it sold about a million copies a year.

Every time the supply [of the book] runs out I get verbal and written pleas not only from parents, and relatives and friends of prospective parents, but from schools of social work, medical schools, teacher training schools, etc., who are using the book as a text, from obstetricians and pediatricians who give the book to each new patient, and even from a state health department which is recommending it routinely.

Advice to Prevent SIDS

Babies Should Sleep on Their Stomachs

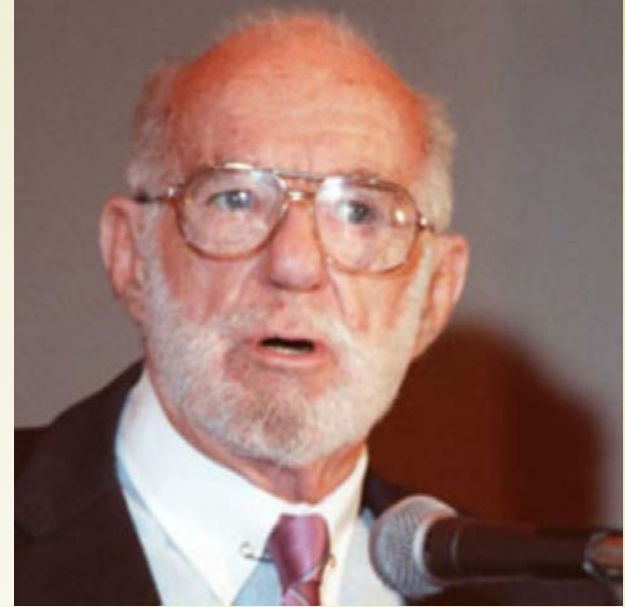


If he vomits, he's more likely to choke on the vomitus....I think it is preferable to accustom a baby to sleeping on his stomach from the start if he is willing.

Benjamin Spock, MD

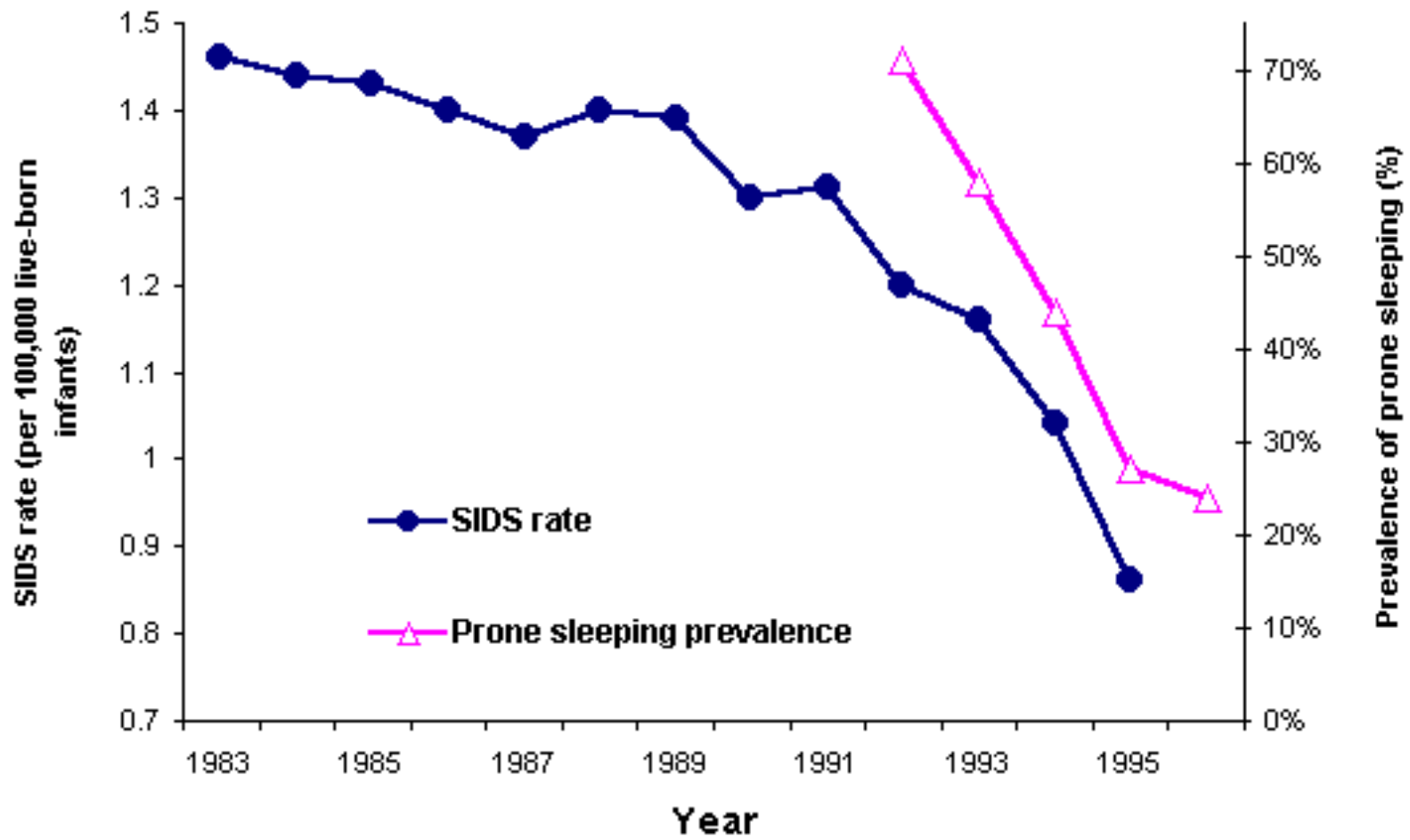
SIDS Research

Babies Should Sleep on Their Backs



Advice to put infants to sleep on the front for nearly a half century was contrary to evidence available from 1970 that this was likely to be harmful. Systematic review of preventable risk factors for SIDS from 1970 would have led to earlier recognition of the risks of sleeping on the front and might have prevented over 10,000 infant deaths in the UK and at least 50,000 in Europe, the USA, and Australasia.

Gilbert R, Salanti G, Harden M, See S. Infant sleeping position and the sudden infant death syndrome: systematic review of observational studies and historical review of recommendations from 1940 to 2002. *Int J Epidemiol.* 2005;34(4):874-887. doi:10.1093/ije/dyi088



We Are Easily Fooled



Healthy Self-Doubt

...Often getting the right diagnosis and therapy is less about what you know and more about being rigorous about understanding how you know. Only when you are conscious of your ability to think poorly, can you compensate.

Mark Crislip, MD

The real purpose of the scientific method is to make sure Nature hasn't misled you into thinking you know something you actually don't know.

Robert Pirsig

Zen and the Art of Motorcycle Maintenance

We Are Easily Fooled

Search Satisfying

Availability Bias

Premature Closure

Cognitive Biases

Anchoring

Confirmation Bias

Overconfidence

Representative Heuristic

Aggregate Bias

Gambler's Fallacy

Human Error

Patient/Doctor Surveys-

- Mistakes made in 35-42% of cases

Mistakes Often Serious-

- 33% of deaths due to diagnostic error

Most Mistakes are Human Error-

- 50-96% of medical mistakes due to decision errors

Why do We Need EBVM?

- To prevent and correct our errors
- To improve patient care outcomes
- To meet our ethical obligation to our clients

Evidence for EBM

Checklists-

WHO Surgical Checklist-

- Decreased mortality from 1.5% to 0.8%
- Decreased inpatient complications from 11% to 7%

SURPASS Surgical Safety Checklist Study-

- Would have prevented 40% of deaths
- 29% of liability incidents

Evidence for EBM

Evidence-based Clinical Practice Guidelines-

Formal certified BLS and ACLS training of healthcare professionals leads to definitive improvement in the outcome of CPR.

Evidence for EBM

Evidence-based Clinical Practice Guidelines-

Adherence to a protocol based on the BTF guidelines can result in a significant decrease in hospital days and charges.... In addition, mortality and outcome may be significantly affected.

Fakhry SM, Trask AL, Waller MA, Watts DD, IRTC Neurotrauma Task Force *Management of brain-injured patients by an evidence-based medicine protocol improves outcomes and decreases hospital charges.* J Trauma. 2004 Mar;56(3):492-9; discussion 499-500.

There is a tendency toward support for the idea that outcomes improve for patients, personnel, or organizations if clinical practice in health care is evidence-based, that is, if evidence-based clinical practice guidelines are used.

Outcomes of evidence-based clinical practice guidelines: a systematic review. Bahtsevani C, Udén G, Willman A. Int J Technol Assess Health Care. 2004 Fall;20(4):427-33.

Evidence for EBM

EBM Methods

EBP patients had a clinically and statistically significantly lower risk of death than contemporaneous standard practice patients...and a shorter length of stay...

Hmmmm.....

Algorithms

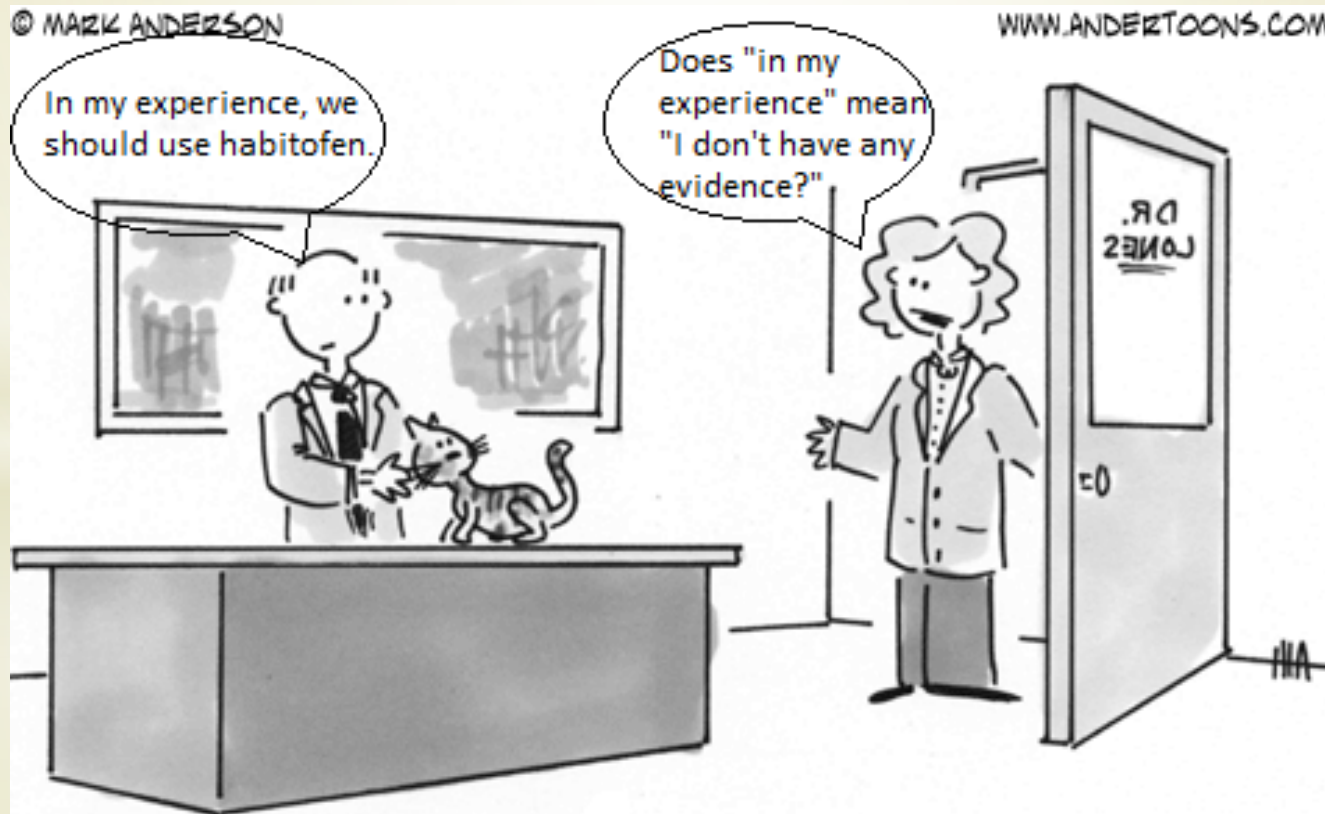
- 136 clinical studies evaluated
- 128 studies found mechanical prediction as good as or better than clinical judgment (about 50:50)
- 8 studies found clinical judgment to be superior

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Informed Consent

Information about the nature of the evidentiary record, or lack thereof, undergirding the physician's recommendation could be viewed as an essential part of the informed-consent process because such information might significantly influence the patient's decision to accept, reject, or negotiate around the physician's advice.



Informed Consent

Veterinarians significantly underestimated the desire of clients to be told about uncertainties in treatment [and] significantly overestimated the loss of client confidence resulting from saying “I am not sure about this.”

This study suggests that most clients want to be told about their veterinarian’s clinical uncertainties.

Informed Consent

For the clients, the central qualification was that the information given had to be the truth.

How Does EBVM Work?



Steps of EBVM

1. Ask useful questions
2. Find relevant evidence
3. Assess the value and reliability of the evidence
4. Draw a conclusion/Make a decision
5. Assign a level of confidence to your conclusion



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Ask Useful Questions

P- patient, problem

I- intervention, exposure

C- comparator

O- Outcome

Ask Useful Questions

Question Type	Patient Problem or Population	Intervention or Exposure	Comparison or Control	Example Outcome Measures
Therapy (Treatment)	Patient's disease or condition.	A therapeutic measure, eg., medication, surgical intervention, or life style change.	Standard care, another intervention, or a placebo.	Mortality rate, number of days off work, pain, disability.
Prevention	Patient's risk factors and general health condition.	A preventive measure, e.g., A lifestyle change or medication.	Another preventative measure OR maybe not applicable.	Mortality rate, number of days off work, disease incidence.
Diagnosis	Specific disease or condition.	A diagnostic test or procedure.	Current "reference standard" or "gold standard" test for that disease or condition.	Measures of the test utility, i.e. sensitivity, specificity, odds ratio.
Prognosis (Forecast)	Duration and severity of main prognostic factor or clinical problem.	Usually time or "watchful waiting".	Usually not applicable.	Survival rates, mortality rates, rates of disease progression.
Etiology (Causation)	Patient's risk factors, current health disorders, or general health condition.	The intervention or exposure of interest. Includes an indication of the strength/dose of the risk factor and the duration of the exposure.	Usually not applicable.	Survival rates, mortality rates, rates of disease progression.

Steps of EBVM

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Finding Research Evidence

- Literature Databases
 - Pubmed
 - CAB Abstracts/Vetmed Resource
 - AGRICOLA
 - SCOPUS
 - Web of Science
- Organizations
 - Veterinary Schools and Libraries
 - Academic Organizations
 - CEVM
 - Professional Organizations
 - AAHA
 - ACVIM

Finding Research Evidence

- Organizations
 - Private Organizations
 - RCVS Knowledge
 - IVIS
 - VIN
 - Deep Dyve
- Miscellaneous
 - Google
 - Researchgate
 - BioRxiv
 - Local Libraries
 - Journals
 - Individuals
 - Dark Web- Sci-Hub

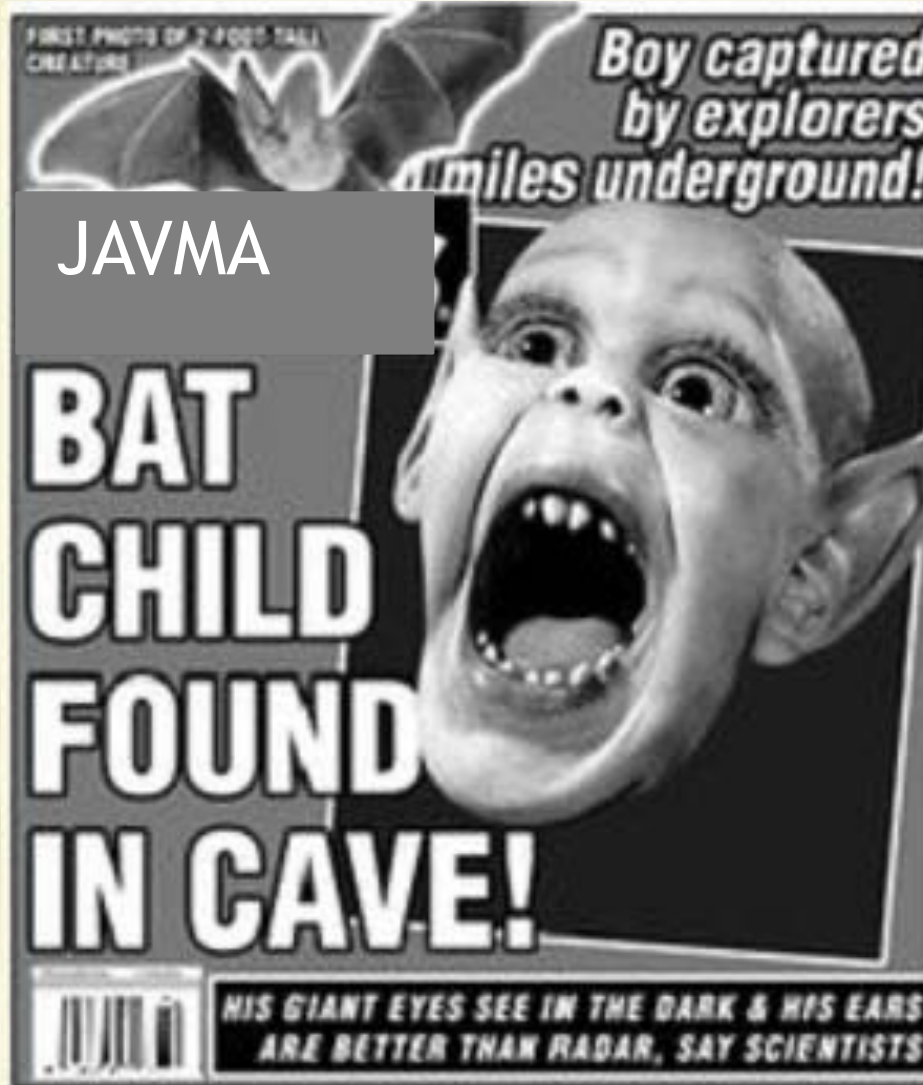
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Critical Appraisal



Critical Appraisal



Critical Appraisal

Why Most Published Research Findings Are False

John P. A. Ioannidis

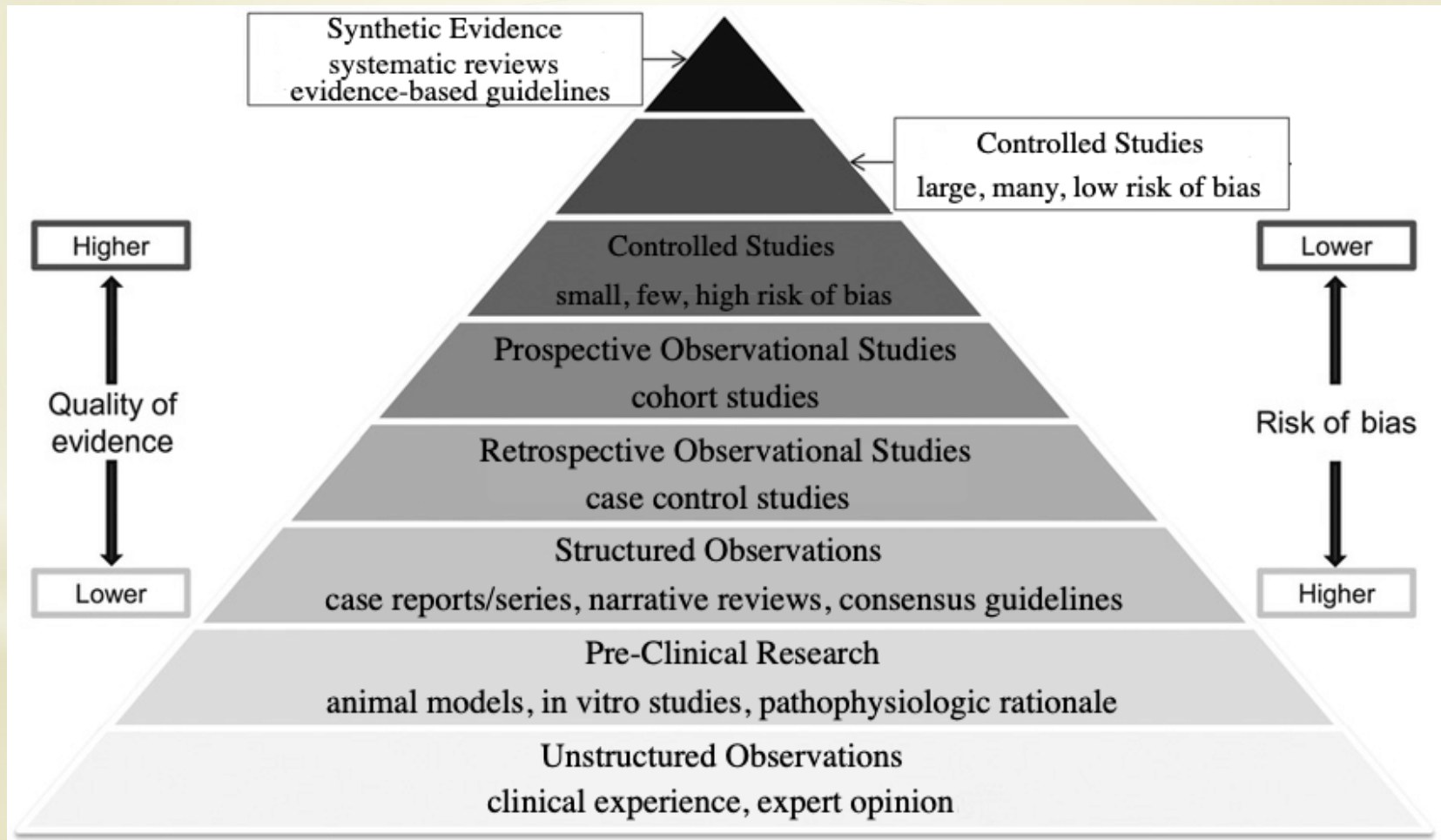


Simulations show that for most study designs and settings, it is more likely for a research claim to be false than true. Moreover, for many current scientific fields, claimed research findings may often be simply accurate measures of the prevailing bias.

Critical Appraisal

- Study Type and Design
- Study Features
- Data Collection
- Data Analysis
- Data Interpretation
- Other Sources of Bias
 - Funding
 - Publication

Hierarchy of Evidence



Hierarchy of Evidence

Systematic reviews, EBM guidelines, CATs

Synthetic
Literature

RCTs, other designs, case reports,
pre-clinical, human studies

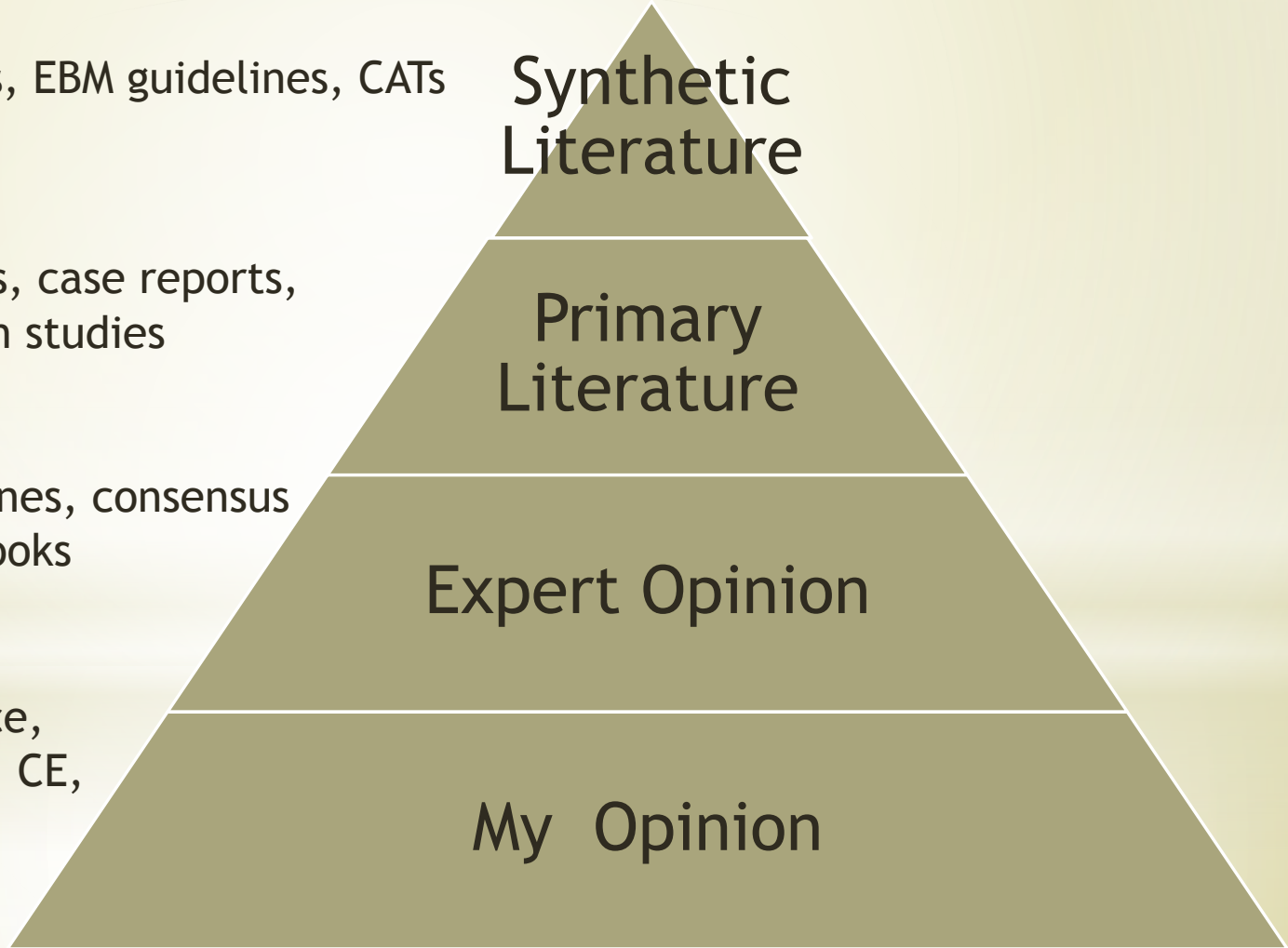
Primary
Literature

CE, clinical guidelines, consensus
statements, textbooks

Expert Opinion

personal experience,
colleagues, school, CE,
???????????

My Opinion



Synthetic Literature

Clinical Practice Guidelines-

- Must be evidence-based
 - Transparent
 - Explicit review of evidence quality and quantity
- Not GOBSAT
- Must be interpreted in context of individual patient

Synthetic Literature

Systematic Reviews-

- Literature search and critical appraisal done for you
- May include meta-analyses
- Only as good as evidence on which they are based
- Not 100% bias free

Synthetic Literature

Narrative Reviews-

- Literature search and some appraisal done for you
- Methods not standardized or explicit
- Reflects the perspective and skills of the authors in
 - Evidence selection
 - Evidence appraisal
 - Conclusions

Synthetic Literature

Critically Appraised Topics (CATs)-

- Smaller, more narrowly focused than systematic reviews
- Less comprehensive
- Some critical appraisal done for you
- Some risk of bias

Primary Literature

Veterinary Clinical Trials-

- More effort
 - Locating
 - Appraising

Human Clinical Trials-

- Often numerous
- Questionable applicability

Primary Literature

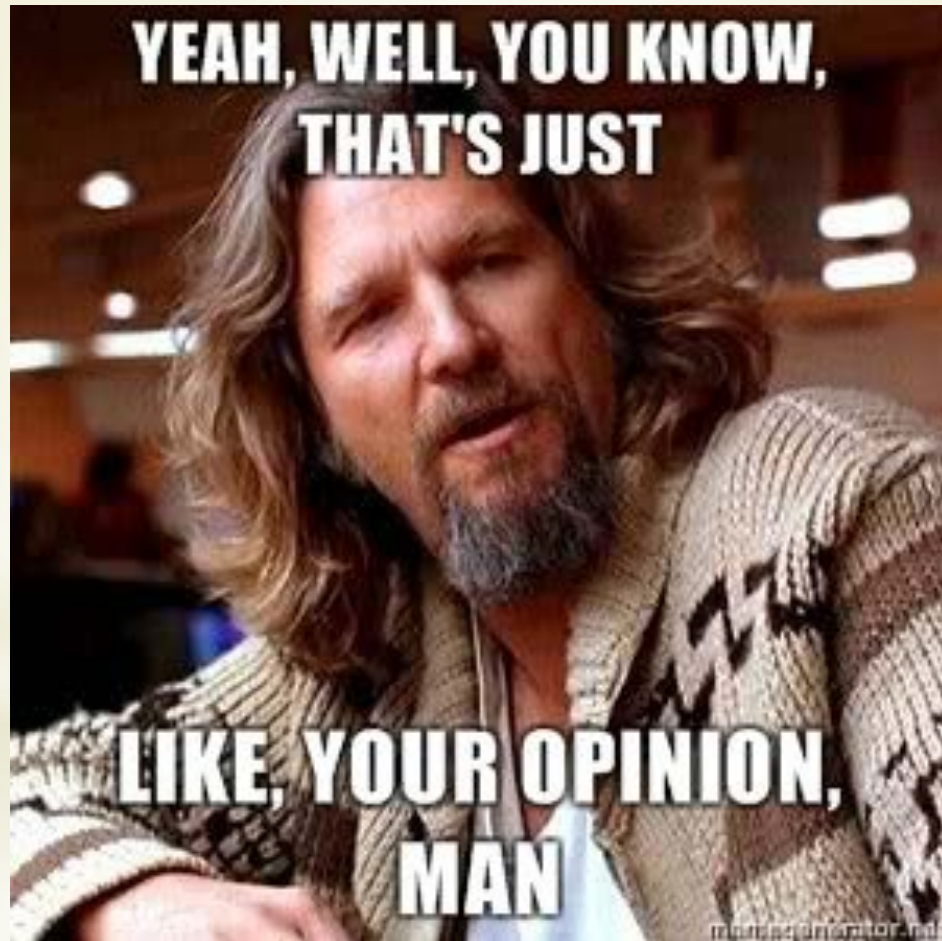
Other Study Designs-

- Observational
- Case-control
- Case studies/series

Pre-clinical Research-

- In vitro
- Animal models

Opinion



Steps of EBVM

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Evidence-based Decisions

The integration of the best research evidence with our clinical expertise and our patient's unique values and circumstances.

- Total body of evidence
 - Quality
 - Applicability
- Clinical experience, skills
- Available resources
- Unique circumstances of patient
- Client goals and values

Steps of EBVM

1. Ask useful questions
2. Find relevant evidence
3. Assess the value and reliability of the evidence
4. Draw a conclusion/Make a decision
5. **Assign a level of confidence to your conclusion**

Evidence-based Decisions

I	Benefit >>> Risk	Should be performed, is recommended
IIa	Benefit >> Risk	Is reasonable to perform
IIb	Benefit \geq Risk	May be considered
III	Risk > Benefit	Should not be performed

Evidence-based Decisions

