# Sources of Evidence

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# Evidence-based Practice Centers

- **Created in 1997; now 13 centers**
- **Produce**
  - **"evidence reports"**
  - **systematic reviews**
  - **technology assessments**
  - **"rapid reviews"**
  - **meta-analyses and cost analyses**
  - **analysis of large databases**
- **Work with public and private sector partners**

# Oregon Evidence-based Practice Center

- **USPSTF**
- **Drug class reviews for states**
- **Food claims for FDA**
- **Various other topics**
  - ***HBOT for cerebral palsy***
  - ***Rehabilitation for traumatic brain injury***
  - ***Treating actinic keratoses***
  - ***Telemedicine***
  - ***VBAC***
  - ***Osteoporosis diagnosis and treatment***
  - ***Preventing youth violence***

# Oregon Evidence-based Practice Center

http://www.ohsu.edu/drugeffectiveness/reports/final.cfm

http://www.ahrq.gov/clinic/uspstfix.htm

**What is the kind and strength of the evidence you are relying on to make a recommendation?**

# What is Evidence-based Medicine?

"Evidence-based medicine is the integration of best research evidence with clinical expertise and patient values."

David Sackett

- A comprehensive, systematic, open minded review of all the evidence
- The evidence determines the conclusion, not vice versa
- Not, the citation of  papers supporting a preformed conclusion (and trashing of those that don't)
- Not, the use of evidence when it is 'positive' but judgement when it isn't

# An Evidence-based Decision *Process*

- Makes use of an independent, systematic review of the evidence
- Employs rules for linking evidence to recommendations
- Produces explicit, defensible recommendations

# Systematic Literature Reviews

- Define the strengths and limits of the evidence.
- Clarify what is based on evidence and what is based on other grounds.
- Do not necessarily tell you what to do when the evidence is limited. Other factors, such as equity, clinical judgment, values, and preferences play a role in using the evidence.

+ Rules for linking evidence to recommendations

+ local judgments and values

=

***Evidence-based decision-making***

# Strength of Recommendations

| Quality of Overall Evidence | Estimate of Net Benefit (Benefit Minus Harms) | | | |
|---|---|---|---|---|
| | Substantial | Moderate | Small | Zero/ Negative |
| **Good** | A | B | C | D |
| **Fair** | B | B | C | D |
| **Poor** | I – Insufficient Evidence | | | |

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# Systematic Literature Reviews

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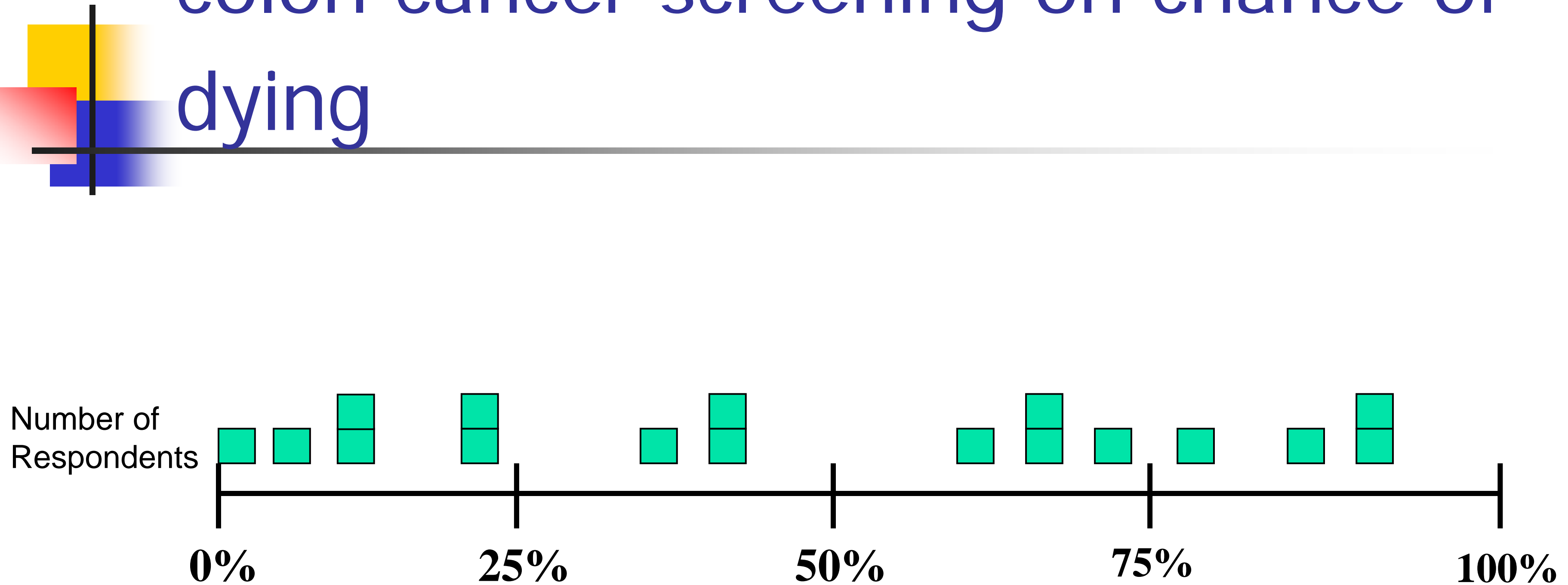
  - *Experts may underplay controversy or select only supportive evidence*

# How sure are we?
## Expert estimates of breast implant rupture rates

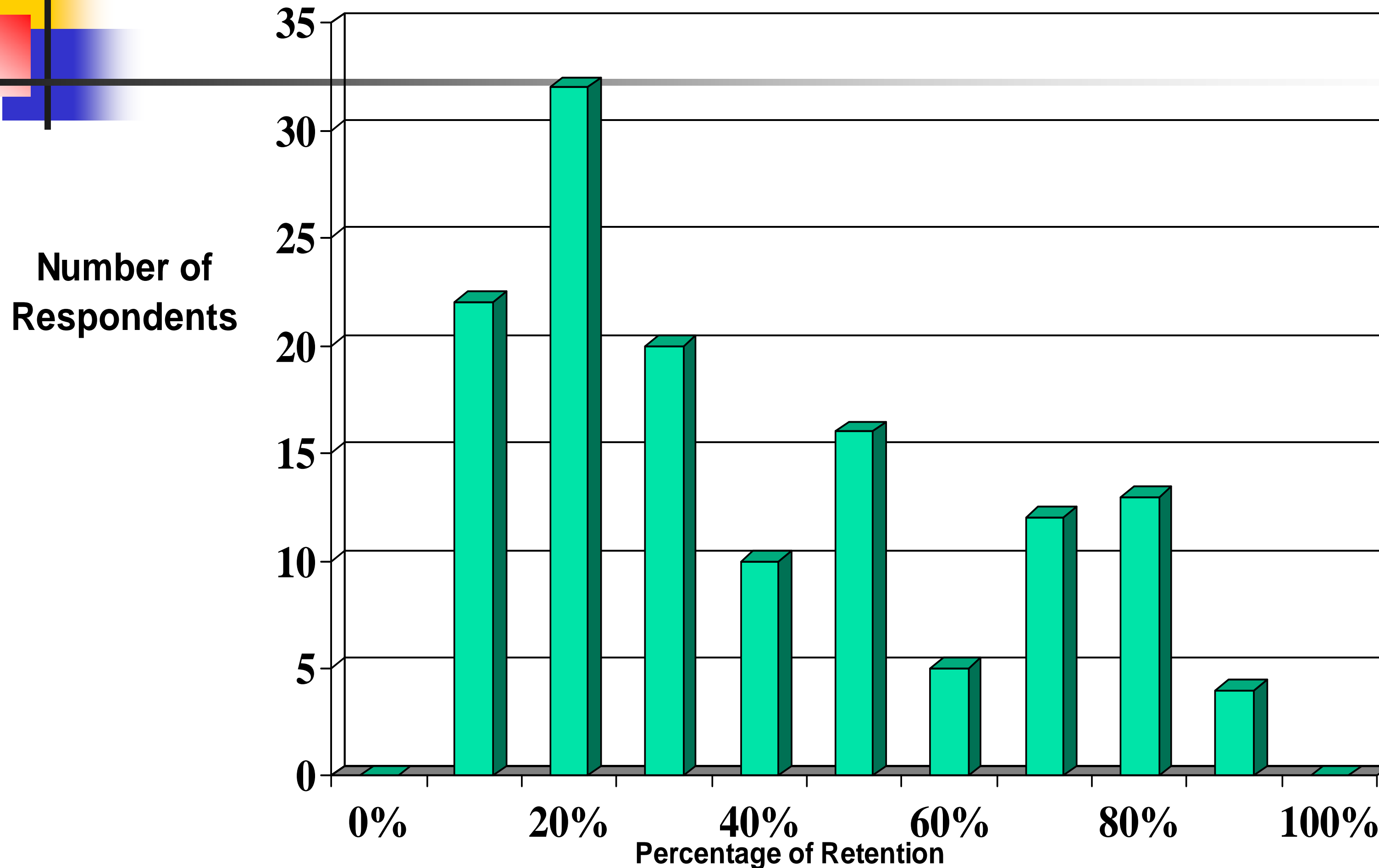
Source: Dr. David Eddy

# Experts estimates of the effect of colon cancer screening on chance of dying




Source: Dr. David Eddy

# Experts' estimates of probability of acute retention in men with BPH*




*BPH = Benign Prostatic Hyperplasia

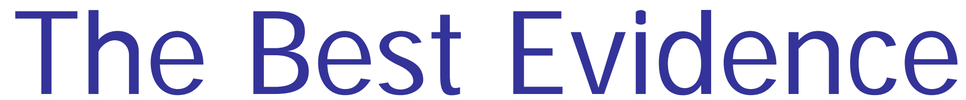
Source: Dr. David Eddy

# Systematic Literature Reviews

- Are *systematic* to remove bias in finding and reviewing the literature.
  - *Experts may underplay controversy or select only supportive evidence*
- Emphasize the best evidence

# Types of Evidence

- Case reports, case series
- Animal studies
- Studies of etiology
- Prospective cohort studies
- “Open-label” controlled or uncontrolled studies
- Randomized trials



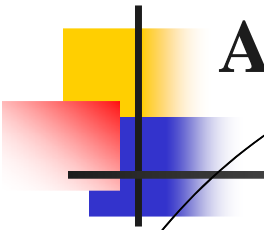
# The Best Evidence

- Addresses health outcomes rather than intermediate outcomes.

*(such evidence is called "direct")*

# Direct and Indirect Evidence

- Direct evidence
  - Evidence from controlled studies linking an action to health outcomes
  - *One* body of evidence
- Indirect
  - More than one body of evidence is needed to link actions to health outcomes



Brain-injured patients

A

# Cognitive Rehabilitation

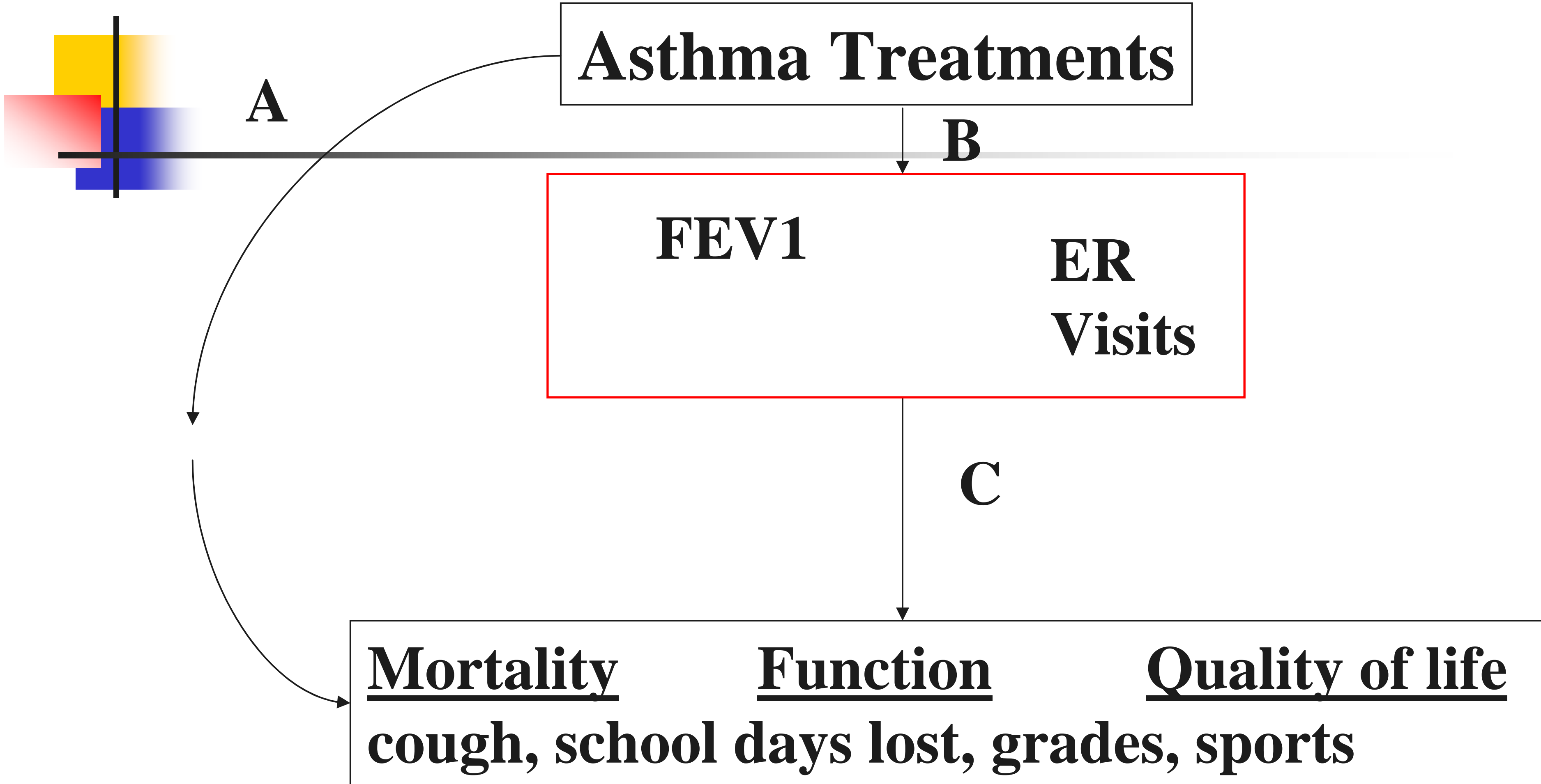
B

**PASAT, neuropsych battery**

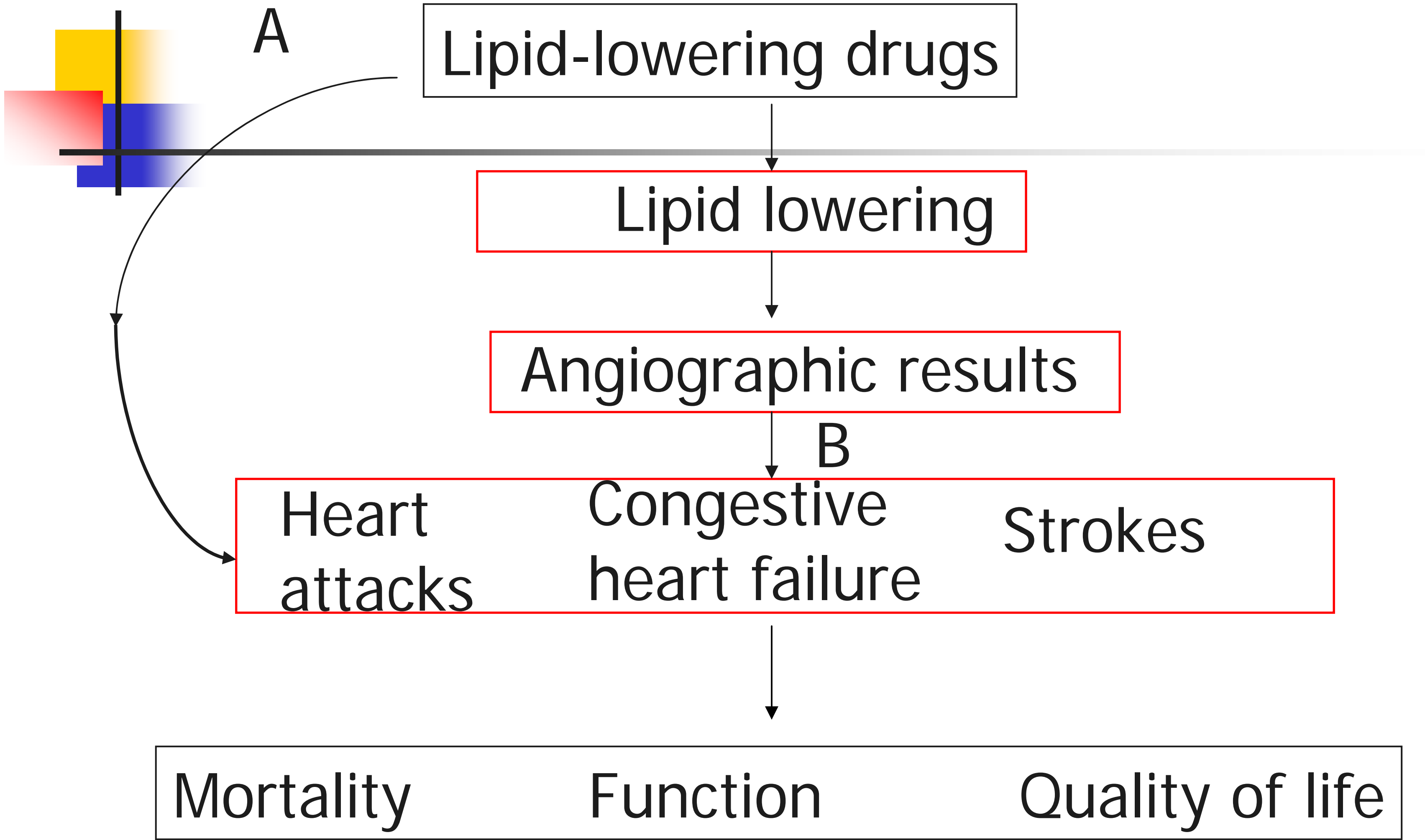
C

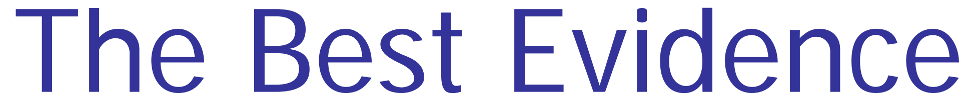
**<u>Function</u> Return to Work, work maintenance social function**

**PASAT=Paced Auditory Serial Addition Test**



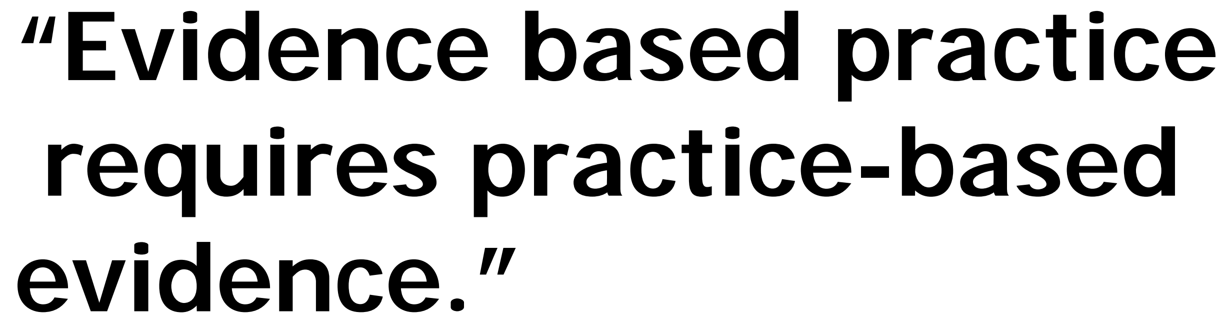

*FEV=Forced Expiratory Volume*

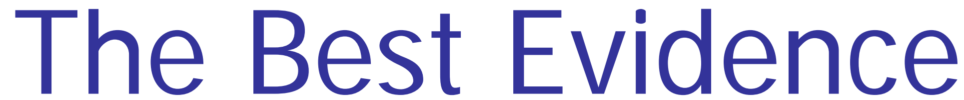

A
Lipid-lowering drugs
Lipid lowering
Angiographic results
B
Heart attacks
Congestive heart failure
Strokes
Mortality
Function
Quality of life



# The Best Evidence

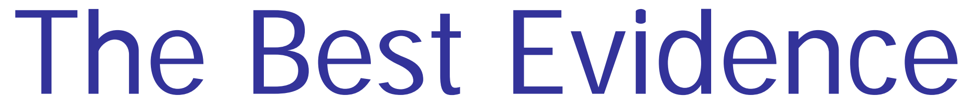
- Addresses health outcomes and not just intermediate outcomes
- **Includes the spectrum of patients to whom a test or treatment will be applied, not just highly selected patients in research studies.**


“Evidence based practice
requires practice-based
evidence.”



# The Best Evidence

- Addresses health outcomes and not just intermediate outcomes
- Includes the spectrum of patients to whom a drug will be prescribed
- Considers the potential harms as well as the benefits of the intervention being considered.




- Addresses health outcomes and not just intermediate outcomes
- Is from “real” patients like ours, not just highly selected patients in studies.
- Considers the potential harms as well as the benefits of the intervention being considered.
- Is from well-designed, well-conducted studies

# Steps in Conducting a SR

- ➔Selecting questions
- Finding evidence
- Selecting evidence
- Rating the quality of studies
- Synthesizing evidence
- Presenting evidence
- Peer review and revision
- Maintaining and updating reviews

# Selecting questions

- Our premise is that *important questions arise from practice. "Experts in practice"--and patients*--select the populations, interventions, and outcome measures of interest.

# The Public Makes Decisions About

1. Patients and settings
2. Which drugs to include
3. Outcomes (beneficial and harmful)
   measures of outcomes

# Selecting Questions

- By using citizen panels, our process for selecting and refining questions puts providers' and patients' concerns at center stage
- The process illustrates how the evidence people need to make decisions and the evidence researchers provide is often a mismatch

# NSAID Key Questions

In adults with arthritis, soft-tissue pain, or back pain:

- 1. Are there differences in efficacy[1] or safety or adverse effects[2] between different COX 2 inhibitors?
- 2. Are there differences in efficacy[1] between coxibs[3], Cox-II selective NSAIDs[3], and nonselective NSAIDs[3]?
- 3. Are there clinically important differences in safety or adverse effects?
- 4. Are there subgroups[4] for which one medication is more effective or associated with fewer adverse effects?

# Quality of the Evidence at 3 Levels

1. Type of study.
2. Quality of each study based on study design.
3. Overall quality of the evidence for a key question.

# 1. Types of Studies

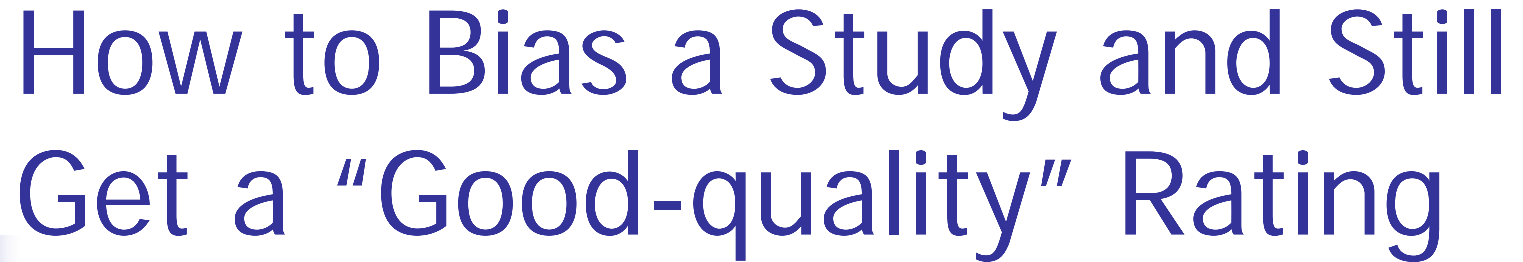
- Case reports, case series
- Animal studies
- Studies of etiology
- Prospective cohort studies
- “Open-label” controlled or uncontrolled studies
- Randomized trials

# 2. Quality of Individual Studies

- Use of random allocation
- Concealed allocation
- Double-blind method
- Exclusions after randomization

# 3. Rating overall evidence

- Quality and consistency of studies
  - large numbers of patients
  - consistent results across studies
- Applicability of studies
  - patient populations, interventions, outcomes like those of interest to the organization
  - “real life” evidence not just “efficacy”
  - attention to harms



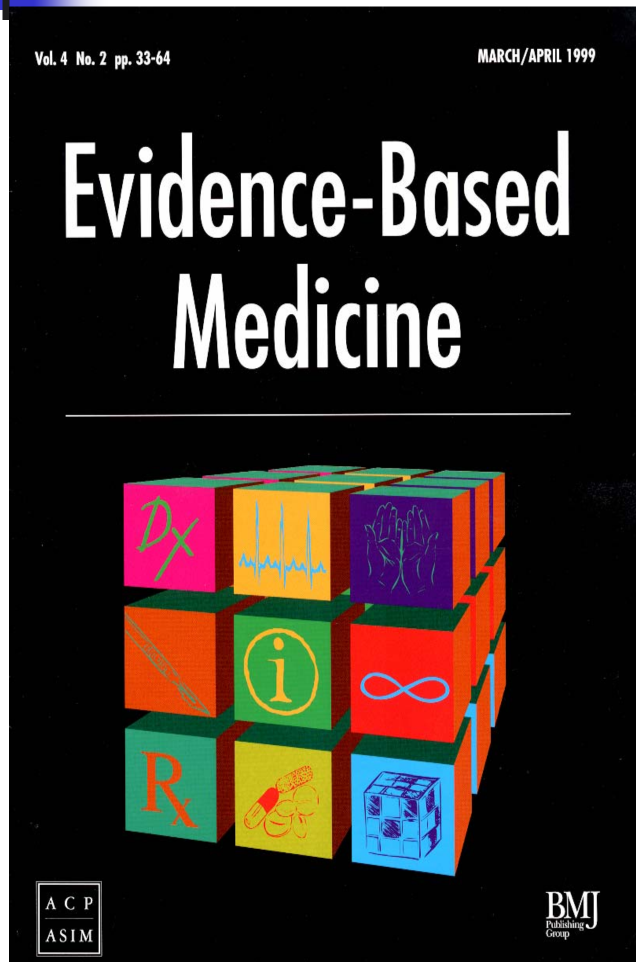
# How to Bias a Study and Still Get a "Good-quality" Rating

- Select compliant patients
- Dilute the control group interventions
- Measure only certain outcomes
- Cheat
  - report only certain outcomes
  - selective use of cut-off dates
  - what are the norms?

# Internal Validity Criteria for RCTs

- Initial assembly of comparable groups
- Maintenance of comparable groups
- Minimal loss to follow-up
- Measurements: equal, reliable, valid
- Clear definition of interventions
- All important outcomes considered
- Intention-to-treat analysis

# Gathering and Reviewing the Evidence




- It's expensive
- Systematic reviews and technology assessment require trained staff
- It can't be done overnight
- It can be controversial
- Using established sources can work

Evidence Report/Technology Assessment
Number 1

Systematic Review of the Literature Regarding the Diagnosis of Sleep Apnea

AHCPR
Agency for Health Care Policy and Research

Evidence Report/Technology Assessment
Number 5

Evaluation of Cervical Cytology

AHCPR
Agency for Health Care Policy and Research

Evidence Report/Technology Assessment
Number 2

Rehabilitation for Traumatic Brain Injury

AHCPR
Agency for Health Care Policy and Research

- **National Information Center on Health Services Research & Health Technology (NICHSR)**
  - Collection of information on health services research, clinical practice guidelines, and on health care technology, and technology assessments.
    - http://www.nlm.nih.gov/nichsr/
- **University of York Database of Abstracts of Reviews and Effects (DARE)**
  - Database of the National Health Service's technology assessments.
    - http://agatha.york.ac.uk/darehp.htm
- **The Cochrane Collaboration**
  - Systematic, updated reviews of all relevant RCT's in health care.
    - http://www.cochrane.org/

# Other Sources of Evidence, Cont.

- **National Institute of Clinical Effectiveness (NICE)**
  - Guidance on current "best practice". For both individual health technologies, and the clinical management of specific conditions.
    - http://www.nice.org.uk/
- **ECRI**
  - Focus on healthcare technology, healthcare risk and quality management, and healthcare environmental management.
    - http://www.ecri.org
- **Hayes Medical Technology Assessment**
  - Private firm specializing in medical technology assessment
    - http://www.hayesinc.com/medicaltechnologyassessment.htm

Aspirin or anticoagulant in nonvalvular AF [February 2003; 108-5] - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://www.jr2.ox.ac.uk/bandolier/band108/b108-5.html Go
Links



# Aspirin or anticoagulant in nonvalvular AF

Meta-analysis
Results
Comment

Nonvalvular atrial fibrillation increases the risk of stroke by about four times. The issue is not so much whether to do anything, but rather what to do. Should treatment be with oral anticoagulants like warfarin, or with aspirin? Use of warfarin implies intermittent measurement of INR, and perhaps an increased risk of bleeding.

A number of reviews have addressed this, and generally they conclude that warfarin is more effective. A new meta-analysis has gone a step further, and obtained information on each individual patient [1].

## Meta-analysis

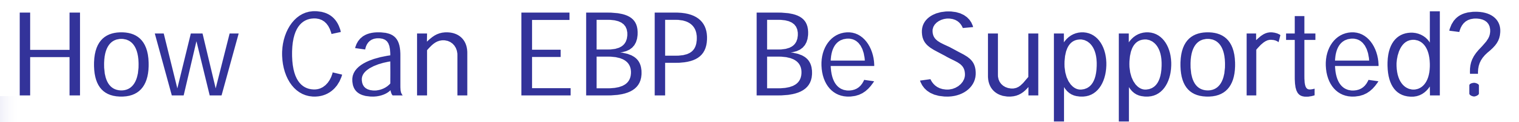
There were six randomised trials with 4,052 patients. Patients were assigned to full-dose oral anticoagulant (target INR 2.5-4.0), or aspirin (75-325 mg/day) and (in some patients) low dose warfarin (median 2.0 mg/day). Low dose warfarin patients were included because there was no difference between them and because including such patients would be likely to minimise differences between treatments.

Patients were stratified according to risk of stroke:

- High risk - hypertension, diabetes, or prior cerebral ischaemia
- Low risk - without these risk factors
- Moderate risk - all other patients

Internet

# How Can EBP Be Supported?



- Provide high level management commitment
- Train clinicians to do EBM
- Provide point of care evidence-based information
- Provide evidence-linked guidelines and support their implementation
- Educate patients to expect evidence-based interventions
- Provide access to system measures of evidence-based practice and outcomes

## Levels of Decision Making

*Level I. Would you have this done for yourself or for someone else in your immediate family?*
Influenced by one's personal experience with the disease and capacity to deal with risk. Affects few people.

*Level II. What would I recommend to my patient?* Physician making a recommendation for his/her patient. Influenced by prior experience, but the scientific evidence may play a greater role. Affects possibly hundreds of people.

*Level III. What would I recommend to the nation, the world?*
Across-the-board recommendations for a population must be based on rigorous assessment of the scientific evidence. Affects hundreds of thousands, even millions of people.