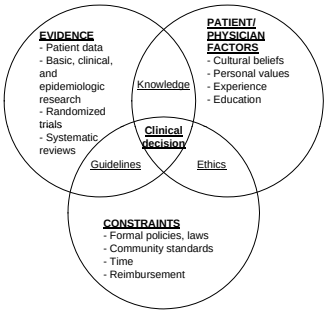
Evidence-Based Medicine – Definitions and Applications

Component 2 / Unit 5

Making evidence-based clinical decisions (Mulrow, 1997)



Best resources for EBM

- Three major books:
  - Straus et al., *Evidence-Based Medicine: How to Practice and Teach EBM, Third Edition*, 2005
    - Formerly known as "the Sackett book"
  - Guyatt et al., *Users' Guides to the Medical Literature*, 2008 (two books – one a handbook, the other more complete)
- Web sites
  - www.cebm.net
  - www.cche.net
  - http://ktclearinghouse.ca/cebm/
  - www.nettingtheevidence.org.uk

The changing nature of EBM (Hersh, 1999)

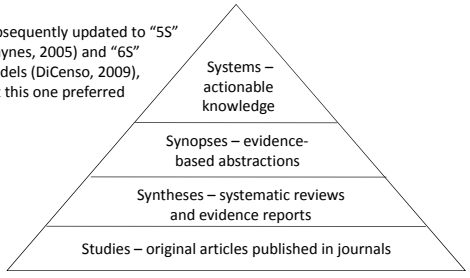
- Initial approach (aka, "first generation") was for clinician to find and critically appraise evidence
  - Takes too much time, clinicians lack expertise
- More recent approach (aka, "next generation") is synthesis and synopsis of evidence for clinician
  - Access to on-line, up-to-date information makes easier
- Slawson (2005) argues we should put more emphasis on teaching information management (seeking) than the techniques of EBM

Another viewpoint concerning evidence (Haynes, 1999)

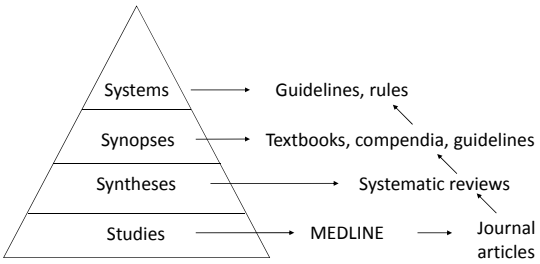
- Can it work?
  - Efficacy studies take place under "ideal" circumstances
  - This unit looks mainly at such studies
- Does it work?
  - Effectiveness studies ascertain whether something works in the "real world"
  - Sometimes called "outcomes research" (Clancy, 1998)
- Is it worth it?
  - Cost-benefit or cost-effectiveness studies determine whether benefits worthwhile in relation to cost or other resources

Hierarchy of evidence – the "4S" model (Haynes, 2001)

Subsequently updated to "5S" (Haynes, 2005) and "6S" models (DiCenso, 2009), but this one preferred



Where the evidence comes from



Studies

- Accessed (usually) in literature databases such as MEDLINE
- Retrieved from journals
  - Many available electronically now
- Application of critical appraisal and formulae
  - e.g., relative risk, number needed to treat, sensitivity, odds ratio, etc.

Syntheses

- Systematic reviews
  - Exhaustive review of data on a topic done in a systematic manner
    - Not a simple literature review or overview of papers one knows about
  - Application, where appropriate, of meta-analysis, the combination of results from multiple studies in a single analysis
    - Studies must be appropriately similar, and there are methodological means to assess that

Synopses and systems

- Synopses – highly summarized information appropriate for clinical setting, e.g.,
  - Critically appraised topics (CATs)
  - *Clinical Evidence*, InfoPOEMS, PIER
  - Clinical practice guidelines
- Systems – decision support within electronic health records
  - Best way to provide evidence to clinicians at point of decision-making

Overview of the application of EBM

- Steps include
  - Phrasing a clinical question that is pertinent and answerable
  - Identifying evidence to address the question
  - Critically appraising the evidence to determine if it applies to the patient

Phrasing the clinical question

- Background vs. foreground questions
  - Background questions ask for general knowledge about a disorder
    - Usually answered with textbooks and classical review articles
  - Foreground questions ask for knowledge about managing patients with a disorder
    - Usually answered using EBM techniques

Background questions

- General information not specific to a given patient
- Examples
  - What causes pneumonia?
  - When do complications of diabetes usually occur?
- Distinction from foreground questions can be blurry
  - New etiologies of disease
  - Level of training, e.g., specialist vs. student

Foreground questions

- Have three or four essential components (PICO)
  - Patient and/or problem
  - Intervention
  - Comparison intervention (if appropriate)
  - Outcomes
- Example
  - In an elderly patient with congestive heart failure, are beta blockers helpful in reducing morbidity and mortality without excess side effects?

Four categories of foreground questions

- Intervention (or Therapy) – benefit of treatment or prevention
- Diagnosis – test diagnosing disease
- Harm – etiology or cause of disease
- Prognosis – outcome of disease course

Questions to ask about the results from any study

- Are the results valid?
- Are the results important?
- Can the results be applied to patient care?

- Specific sub-questions depend on type of question and study

Hierarchy of study designs – increasing validity of designs

Level	*Design*	*Comment*
I	Randomized controlled trials	Equal probability of assignment of subjects
II	Cohort studies	Defined by exposure to factor
III	Case-control studies	Defined by outcome of interest
IV	Case series	Systematic observation without controls
V	Expert opinion, physiologic studies	Only as good as the expert