Component 2: Evidence-Based Medicine

Unit 5: Evidence-Based Practice
Lecture 2

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
  - http://www.cebm.net
  - http://www.cche.net/
  - http://ktclearinghouse.ca/cebm/
  - http://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)

- Studies – original articles published in journals
- Syntheses – systematic reviews and evidence reports
- Synopses – evidence-based abstractions
- Systems – actionable knowledge
- 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

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