Introduction to Evidence-Based Medicine

“It is astonishing with how little reading a doctor may practice medicine, but it is not astonishing how badly he may do it.”
Case 1

- 2 m/o, rural clinic $^o= 103.4$, exam otherwise WNL
  - transportation: $5,000$ (not covered)
- Risk bacterial meningitis or other serious bacterial disease $\sim0.5\%$ and $1.5\%$ respectively; clinical guidelines provide solid evidence for close ambulatory f/u of low-risk infant ($\text{WBC 5-15K, no shift, nl U/A, <5 WBC per field if diarrhea}$)
Case 2

- 50 y/o construction worker with mallet finger
- Dueling specialists
Case 3

- 2 patients same afternoon ask for HCV screen
  - Married, monogamous male received 2 units whole blood in 1969 for ruptured spleen
  - Single, female college student volunteers in day care impoverished area

- Requirement for a screening test
  - Condition c early recognizable phase
  - Effective treatment available (improves prognosis)
  - Relatively simple, not harmful and acceptable test
  - Balance between false + and false -
The “Birth” of Evidence

- Has always been a search for evidence
  - Hippocrates, Galen, Fracastore, Paracelsus, Graunt, Farr, Louis, Snow, Cochrane
- 1980s, Pauker, Kessiere – JAMA Series
  - Clinical Decision Analysis, Sensitivity and Specificity, Pre-Odds x Likelihood Ratio
- 1992, David Sackett gives birth to EBM
  - Same concepts, accessible to clinicians
  - Emphasized absolute vs ratio measures, e.g. NNT
  - Hierarchical Evidentiary Pyramid
    - Role of Observational Studies?
The Problem: Keeping up With Medicine

- The slippery slope of knowledge
  - Best predictor of correct HTN Rx is # yrs from graduation

- Too many journals
  - 25,000 in print
  - Biomedical knowledge doubles q 19 yrs
Global Judgment by Experts

- Experts see different patients
  - 2nd seizure after primary febrile seizure
    - 1.5 – 6% in population-based studies
    - 77% in seizure clinic studies
- Geographic Variations (Wennberg)
  - Tonsillectomy rates 8% in one Vermont county vs 70% in another
  - Hysterectomy rates range from 20% to 70% in Maine
What about textbooks?

- 2 years from manuscript preparation to publication
- Several year lag between editions
- In 1986 Harrison’s did not have an entry for AIDS
What about CME?

- Didactic CME does not change MD behavior (Davis, JAMA 1999)
- RCT of CME had no effect on clinical behavior (Sackett)
Implications

- Outdated or incorrect treatments
- Incorrect or missed diagnoses
- Incorrect information
- Costly, wasteful, and ineffective practice
Endarterectomy

Should a newly symptomatic pt. c severe carotid stenosis have endarterectomy?

- 8 out of 10 primary care docs said no
- 19/100 untreated will suffer major stroke or death
- 10/100 treated will have same complications
- Only have to treat 11 pts to prevent one stroke or death (clear and substantial benefit)
Lidocaine for PVCs

- Once routine post-MI
  - To prevent “R on T” V-tach
- RCT showed *increased* risk of death in group randomized to prophylactic lidocaine
- Other discredited treatments
  - Routine tonsillectomy, phenobarbital for febrile sz’ s, portal bypass procedure for esophageal varices, HRT
A Proposed Solution: Evidence-Based Medicine

- Ask, Answer, Appraise, Apply
- Ask: The PICO Approach
- Answer and Appraise:
  - PubMed
  - Ovid, SliverPlatter, ACP, Cochrane Collection
- Diagnosis, Treatment, Prognosis, Harm
Clarifying the Problem Using PICO

Before starting an EBM search, you must have a clear idea on the type of information you are looking for. What type of treatment options, if any, do you want to explore?

One good way of doing all this is to apply a set of questions to the clinical problem. This is called PICO, which stands for:

<table>
<thead>
<tr>
<th><strong>Patient or population</strong></th>
<th>Describes patient (age, sex, race, past medical history, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention (or exposure)</strong></td>
<td>What happens or is to be done; treatment, diagnostic test, exposure (e.g. passive smoking)</td>
</tr>
<tr>
<td><strong>Comparison</strong></td>
<td>Compared to what? Nothing, placebo, another intervention</td>
</tr>
<tr>
<td><strong>Outcomes (preferably clinical)</strong></td>
<td>What is the effect of the intervention? (Be specific; mortality, hospitalizations)</td>
</tr>
</tbody>
</table>

Before starting a search, write down the answers to these PICO questions. The key elements in the answers will become search terms in your online search.
Answer: PubMed
Clinical Queries

Search by Clinical Study Category

This search finds citations that correspond to a specific clinical study category. The search may be either broad and sensitive or narrow and specific. The search filters are based on the work of Haynes RB et al. See the filter table for details.

Search [ ] Go

<table>
<thead>
<tr>
<th>Category</th>
<th>Scope</th>
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<tbody>
<tr>
<td>etiology</td>
<td>narrow, specific search</td>
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<tr>
<td>diagnosis</td>
<td>broad, sensitive search</td>
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<tr>
<td>therapy</td>
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<tr>
<td>prognosis</td>
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<tr>
<td>clinical prediction guides</td>
<td></td>
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</tbody>
</table>

Find Systematic Reviews

For your topic(s) of interest, this search finds citations for systematic reviews, meta-analyses, reviews of clinical trials, evidence-based medicine, consensus development conferences, and guidelines.

For more information, see Help. See also related sources for systematic review searching.

Search [ ] Go
Other Sources

- Google ‘Evidence Based Medicine’
- Ovid
- Silver Platter
- American College of Physicians
- Cochrane Collaboration
How to use PubMed Clinical Queries

<table>
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<tr>
<th>Diagnosis</th>
<th>These are questions about the degree to which a particular test is reliable and clinically useful. Would your patient get enough benefit from the test (on average) to justify it’s being done. Most good studies of diagnosis compare the test under study to some “gold standard” or definitive test.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>What therapy is best for a particular patient, and what are the possible outcomes of different treatment options</td>
</tr>
<tr>
<td>Prognosis</td>
<td>Closely allied to treatment questions, prognostic questions are about a patient’s future health, and quality of life given a particular treatment option</td>
</tr>
<tr>
<td>Harm</td>
<td>Essentially questions of etiology; is a particular risk factor associated with a disease? How strongly? Can modifying risk factors have a benefit for your patient?</td>
</tr>
</tbody>
</table>
Help

- When in doubt consult a medical librarian.
- Trained in use of Filters, MESH Terms
  - Note: Filters and MESH terms built into PubMed clinical query page
- Aware of alternative sources