Evidence-Based Medicine: A Challenge to The Teachers & Learners

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Objectives

At the end of this session, audience will be able to:

1. Describe why EBM is important in medical education
2. Analyze barriers to practice EBM
Why is EBM important?

- **Knowledge translation** –

- Scurvy: use of citrus was proven to prevent and cure scurvy in 1754, but it was almost 50 years after the data was published before lemon juice was added to British ships

<table>
<thead>
<tr>
<th>Additive to diet (n=2 in each group)</th>
<th>Observed effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quart of cider</td>
<td>Minor improvement</td>
</tr>
<tr>
<td>Unspecified elixir t.d.s</td>
<td>No change</td>
</tr>
<tr>
<td>Seawater</td>
<td>No change</td>
</tr>
<tr>
<td>Garlic, mustard and horseradish</td>
<td>No change</td>
</tr>
<tr>
<td>Spoonfuls of vinegar</td>
<td>No change</td>
</tr>
<tr>
<td><strong>Two oranges and a lemon</strong></td>
<td>Dramatic recovery</td>
</tr>
</tbody>
</table>

Table 1. Lind’s study on scurvy: 1747

What is Evidence-Based Medicine?

- EBM is the integration of
  - Sound research evidence in medical care
  - Competency of clinical skills
  - Patient’s best interest
Essential Components of EBM

Evidence-Based Medicine

- Research Evidence
- Clinical Expertise
- Patient Values
Three Essential Components of EBM

Clinical state and circumstances

Clinical expertise

Patients' preferences and actions

Research evidence
Characteristics of EBM Research

Best Research Evidence

- Clinically Relevant
- Patient-Centered
- Outcome-Oriented
Areas of EBM Research

EBM
Basic & Clinical Research

- Diagnosis
- Prognosis
- Prevention Rehabilitation
- Treatment
Essential Elements of Clinical Skills

Clinical Expertise

- Clinical Skills
- Literature Appraisal Skills
- Information Technology Skills
- Clinical Decision Making
Essential Elements of Patient Values

- Concerns
- Expectations
- Preferences
- Sensitivity
- Specificity
Differences Between Traditional and EBM Approaches

- **Traditional approach**
  - Knowledge-based
  - Expert opinion-based
  - Non standardized
  - Global
  - Outdated

- **EBM approach**
  - Evidence-based
  - Research-based
  - Standardized
  - Patient-specific
  - Up-to-date
Please identify the MOST essential component of EBM

1. Up-to-date
2. Research-based
3. Good clinical skills
4. Patient-specific
5. Cost-conscious
Why do we need Evidenced-Based Medicine?
My students are dismayed when I say to them “Half of what you are taught as medical students will in 10 years have been shown to be wrong. And the trouble is none of your teachers knows which half.”

Dr. Sydney Burwell
Dean of Harvard Medical School, 1956
EBM in Medical Education

- EBM is an essential component of undergraduate medical education
- EBM is one in 6 core competencies of Graduate Medical Education (GME)
- EBM is a mandate in CME
Barriers to the Practice of EBM
Barriers at the Practitioner Level

- Time
- Skills
- Resources
Environmental Barriers to the Practice of EBM

Patients

Colleagues

Commercial Industry
System-Related Factors/Barriers to the Practice of EBM

- Healthcare Policy
- Media
- Characteristics of Evidence

![Graph showing healthcare policy, media, and characteristics of evidence.](Image)
How well our faculty perform EBM?
Survey of Faculty for Competency in EBM

1. Definition of EBM
2. List 3 essential components of EBM
3. List 3 websites for each area: EBM, Guidelines
4. Eponyms: POEM, PICO, KAP, KT
5. Calculate RRR, NNT, Sensitivity, Specificity
6. Explain p-value, CI
7. List EBM tools
8. List EBM tertiary references
Example for Testing Knowledge and Practice: The Three main EBM Sources

- Clinical Evidence:  
  http://www.clinicalevidence.com

- National Guidelines Clearinghouse  
  http://www.guidelines.gov

- U.S Preventive Services Task Force (USPSTF)  
  http://www.ahrq.gov/clinic/uspstfix.htm
Systematic Review: The Relationship between Clinical Experience and Quality of Health Care

Niteesh K. Choudhry, MD; Robert H. Fletcher, MD, MSc; and Stephen B. Soumerai, ScD

Figure 2. Distribution of study results relating physician age to clinical performance in various domains.

- Studies in which length of time in practice or age was associated with lower performance for all outcomes.
- Studies in which length of time in practice or age was associated with lower performance for some outcomes; no effect was found for other outcomes.
- Studies in which there was a concave relationship between length of time in practice or age and performance.
- Studies in which no association was found between length of time in practice or age and performance.
- Studies in which length of time in practice or age was associated with higher performance for some outcomes; no effect was found for other outcomes.
- Studies in which length of time in practice or age was associated with higher performance for all outcomes.
Review the World Literature Fortnightly*

Medical Articles Per Year

- Biomedical: 5,000? per day
- MEDLINE: 1,500 per day
- Trials: 95 per day
- Diagnostic?:
What are your clinical questions?

- A 35 year old man says his brother recently died of a ruptured cerebral aneurysm. He is worried about whether he might have one and what the chances are that it would rupture.
The greatest enemy of knowledge is not ignorance; it is the illusion of knowledge.

– Stephen Hawking
New Paradigm

The study and understanding of basic mechanisms of disease are necessary but insufficient guides for clinical practice. The rationales for diagnosis and treatment which follow from basic pathophysiologic principles may in fact be incorrect, leading to inaccurate predictions about the performance of diagnostic tests and the efficacy of treatments.
Why is EBM important?

Up-to-date knowledge and clinical performance can deteriorate with time

There is a statistically and clinically significant negative correlation between a physician’s knowledge of up to date care and the years that have elapsed since graduation from medical school.

Why is EBM important?

Traditional continuing medical education programs have not been shown to improve clinical performance.

Systematic reviews of the relevant randomized trials have shown that traditional, instructional CME fails to modify clinical performance and is ineffective in improving the health outcomes of patients.

Developing the clinical question

- **Step 1:** Formulate the clinical issue into a searchable, answerable question.
- **Step 2:** Distinguish what type of question you may have.
Background questions ask for general information about a condition or thing.

- A question root (who, what, when, etc) combined with a verb.

What microbial organisms can cause community-acquired pneumonia?

Background questions are typically answered by textbooks.
Patient-Specific (Foreground) questions

- Foreground questions ask for specific knowledge about a specific patient with a specific condition.

Is St. John’s Wort effective in relieving the symptoms of Hispanic patients with post-partum depression?
Developing the question

- Patient-specific (Foreground) questions usually have four components.

\[ P = \text{Patient population} \]

\[ I = \text{Intervention} \]

\[ C = \text{Comparison} \]

\[ O = \text{Outcome} \]
### PICO: Components of an answerable, searchable question

| Patient population/disease | The patient population or disease of interest  
- age  
- gender  
- ethnicity  
- with certain disorder (e.g., hepatitis) |
|----------------------------|--------------------------------------------------------------------------------------------------|
| Intervention               | The intervention or range of interventions of interest  
- Exposure to disease  
- Prognostic factor A  
- Risk behavior (e.g., smoking) |
| Comparison                 | What you want to compare the intervention against  
- No disease  
- Placebo or no intervention/therapy  
- Prognostic factor B  
- Absence of risk factor (e.g., non-smoking) |
| Outcome                    | Outcome of interest  
- Risk of disease  
- Accuracy of diagnosis  
- Rate of occurrence of adverse outcome (e.g., death) |

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In patients with chronic pain, does the use of progressive muscle relaxation lead to a lessening of pain?

In patients with significant anterior or posterior vaginal wall prolapse, do vaginal cones help?

In patients with moderate depression, is St. John’s Wort vs. traditional SSRI’s effective in relieving symptoms with fewer adverse effects?
Question Templates for Asking PICO Questions

**Therapy**
In __________________, what is the effect of __________________ on __________________ compared with ____________________?

**Etiology**
Are ________________ who have ________________ at ________________ risk for/of __________________ compared with ________________ with/without ____________________?

**Diagnosis or Diagnostic Test**
Are (Is) ____________________ more accurate in diagnosing ________________ compared with ________________?

**Prevention**
For __________________ does the use of ________________ reduce the future risk of ________________ compared with ________________?

**Prognosis**
Does ________________ influence ________________ in patients who have ________________?
## Question:
In adult with acute maxillary sinusitis, does a 3-day course of trimethoprim-sulfamethoxazole yield the same cure rates as a 10-day course, with fewer adverse effects and costs?

### Type of question:
Therapy

### Type of study:
RCT > cohort > case control > case series
Conclusions

- Knowledge, Attitude, Practice and Performance are essential for EBM

- Role model is a MUST for effective implementing EBM
Thank You