Evidence Based Medicine in Clinical Practice

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Learning Objectives

- What is EBM? – Definition
- Why is EBM becoming important?
- Introduction to EBM – 5 steps of EBM
- Advantages and Limitations of EBM
- EBM Resources
Clinician Goal in Medicine

- Provide the best care...
- Provide patients the best information to guide health care decisions...
- Improve health outcomes...
- ...based on the “truth” – separating medical knowledge from folklore
EBM: Original “Official” Definition

The explicit, conscientious, and judicious use of the current best evidence in making decisions about the care of individual patients (and populations)

Evidence-Based Medicine Working Group
Sackett et al circa 1996
“Evidence Based Medicine”?

“EBM aims to provide clinicians and patients with choices about the most effective care based upon best available research evidence”
Evidence-based medicine

The practice of EBM is the integration of

- individual clinical expertise

  with the

- best available external clinical evidence

  from systematic research.

  and

- patient’s values and expectations
Best research evidence

Clinical expertise

Evidence-based practice

Patient values
Individual Clinical Expertise

- Clinical skills and clinical judgement
- Vital for determining whether the evidence (or guideline) applies to the individual patient at all and, if so, how
Best Research Evidence

- Comprehensive – evidence only known to be best if all the available evidence is known
- Valid – critical appraisal determines potential for bias
- Systematic – selection and evaluation of evidence by protocol reduces author bias, investigator bias
- Current – every day new evidence could be best
- Synthesized – one study vs. the whole picture
Patients’ Values & Expectations

- Have always played a central role in determining whether and which interventions take place
- We’re getting better at quantifying and integrating them
What EBM is not:

- EBM is not cook-book medicine
  - evidence needs extrapolation to my patient’s unique biology and values
- EBM is not cost-cutting medicine
  - when efficacy for my patient is paramount, costs may rise, not fall
The Problems:

- We need evidence (about the accuracy of diagnostic tests, the power of prognostic markers, the comparative efficacy and safety of interventions, etc.) about 5 times for every in-patient (and twice for every 3 out-patients).
- We get less than a third of it.
Performance deteriorates, too

Determinants of the clinical decision to treat some, but not other, hypertensives

1. Level of blood pressure.
2. Patient’s age.
3. The physician’s year of graduation from medical school.
4. The amount of target-organ damage.
Knowledge of best hypertension care

Shiri et al, CMAJ, 1993

$r = -0.54$
$p < 0.001$

The slippery slope...
Three solutions

Clinical performance can keep up to date:

1. by learning how to practice evidence-based medicine ourselves.
2. by seeking and applying evidence-based medical summaries generated by others.
3. by applying evidence-based strategies for changing our clinical behaviour.
Why Is EBM So Important?

- EBM is an essential skill needed for a physician’s life-long learning (example of “self-directed learning”) so that patient care can be delivered in the most appropriate manner.

- EBM skills can be learned, practiced, and improved upon to enhance a physician’s LLL habits.
Ethical Framework for Decision-Making in Clinical Medicine

- First do no harm (Safety)
- Try and do good (Realistic)
- Justice/Equity (Benefit:cost for individual/popln)
- Patient autonomy

Result may be moral distress---
Why Is EBM Important?

Inadequate traditional sources:
- Outdated (Textbooks)
- Frequently wrong (Expert opinions)
- Ineffective (Didactics/CME)
- Too overwhelming in volume and variable in validity (Medical Journals)
Why do we need EBM?

Save LIVES!

- Encainide and flecainide for ventricular arrhythmia
  - Well proven to decrease the number of premature ventricular beats – became widely used 1980’s
  - BUT
  - Further studies showed significant INCREASE in MORTALITY – died from other cardiac complications and dysrhythmias (a dangerous “DOE”)

- Thrombolytics for acute MI
  - CLEAR evidence of benefit in the 1970’s
  - Not widely recommended until 1988 – almost 13 yrs later
  - How many thousands of people died unnecessarily in the years in between?
What is Driving EBM to the Forefront?

- More informed patients/families
- The internet – Not always accurate information
- Insurance companies
- Hospitals
- Accrediting bodies
- Medico-legal factors
- Research
- Medical education
Introducing EBM – 5 Steps

- **“Frame”** the patient care answerable question
- **Search** and find the best evidence
- **Appraise** critically the evidence
- **Integrate** the critical appraisal with expertise and patient’s unique values
- **Evaluate** the effectiveness and efficiency of steps 1-4
Framing the question - Tips

- **P = Patient/Problem/Population:** Ask “how would I describe a group of patients similar to mine?” Balance precision with brevity.

- **I = Intervention:** Ask “which main intervention am I considering?” (cause, prognostic factor, treatment, etc..)

- **C = Comparison/Control:** Ask “which is the main alternative to compare with the intervention?” again, be specific.

- **O = Outcome:** Ask “what can I hope to accomplish?” or “what could this exposure really affect?” again, be specific.
Best Research Evidence

- Where to find it?
- How to know that it is the BEST available evidence?
- Is it clinically relevant? Is it patient-centered?
- Hierarchy of evidence – 4 S
  - Studies
  - Systematic Reviews
  - Synopses
  - Systems – Guideline and pathways
Study Pyramid

Randomized Controlled Double Blind Studies

Cohort Studies

Case Control Studies

Case Series

Case Reports

Ideas, Editorials, Opinions

Animal research

In vitro ('test tube') research

Systematic Reviews and Meta-analyses

Best

Worst
Quest for the **Current Best Evidence**

**CURRENT BEST Evidence**

Keep in mind that

Last year’s best might not be this year’s best
How to Learn About Best Information Resources?

- From librarians (hands-on training)
- From experts in medical informatics
- Courses/ Tutorials
Ideal, still theoretical, links EMR to best research evidence, always updated, drills down

Provide enough information to support a clinical action

More details, summaries based on exhaustive search for evidence, explicit scientific reviews, and systematic assembly of evidence

When all above fails, more recent or not reviewed topics
Systems

- **Clinical Evidence (BMJ)**
  - URL: [http://www.clinicalevidence.com](http://www.clinicalevidence.com)
  - Contains limited range of clinical questions

- **PIER (the Physician’s Information and Education Resource) by ACP**
  - URL: [http://pier.acponline.org](http://pier.acponline.org)
  - Only for members

- **UpToDate®**
  - URL: [http://www.uptodate.com](http://www.uptodate.com)
  - Updated quarterly
  - Extensively referenced

- **ACP Medicine (Formerly Scientific American Medicine)**
  - URL: [http://www.acpmedicine.com](http://www.acpmedicine.com)
Systems

Harrison’s Principles of Internal Medicine
- URL: http://www.harrisonsmed.com
- Only updated every 3 years

Evidence Based on Call
- URL: http://www.eboncall.org/content.jsp.htm

Evidence-Based Pediatrics and Child Health
- URL: http://www.evidbasedpediatrics.com

Evidence Based Cardiology
- URL: http://www.evidencebasedcardiology.com/

**OVID** includes and links EBMR (Cochrane, ACP Journal Club, the Database of Abstracts of Reviews of Evidence (DARE), and Medline
Synopses

- ACP Journal Club
  http://www.acpjc.org/
- Give the summary and links to the evidence
- Ex: “Low Molecular Weight Heparin is Effective and Safe in the Acute Coronary Syndromes”
Syntheses

- Cochrane Library
  - URL: http://www.cochranelibrary.com/

- OVID’s EBMR
  - (Includes ACP Journal Club, Cochrane Database of Systematic Reviews (CDSR), and DARE)
Studies

Specialized

ACP Journal Club:  
www.acpjc.org

Evidence Based Medicine:  
www.ebm.bmjournals.com

Evidence Based Nursing:  
www.ebn.bmjournals.com

Evidence Based Mental Health:  
www.ebmh.bmjournals.com

General

Cochrane Central Register of Controlled Trials (Therapy)

MEDLINE:  
  - Using the Clinical Queries Search

ASK MEDLINE  

Make use of your Library and Institutional subscriptions
When all fails
Evidence that Finds Us

- Cancel full-text journal subscriptions
  - We need to read 86-107 articles (top 5 full-text journals) to find one that meets the basic criteria for quality and relevance
  - This is 3 hours (at 2 minutes per article)
  - PubMed has also the feature of “related articles”, and “Links”
Evidence that Finds Us

Invest in evidence-based journals and online services (see synopses). Synopses are linked to full text articles

- With synopses we can set it up to:
  - Be alerted when new articles cite this review
  - Be connected to similar synopses on similar articles in the publisher’s other journals
  - E-mail the item to a friend or colleague
  - Download the synopsis
Evidence that Finds Us

Can have the current contents of certain journal in our specialty sent to us

Other specialty-based services:

- PedsCCM Evidence Based Journal Club
  http://pedsccm.wustl.edu/EBJournal_club.html
- Family Practice Journal Club (POEMS)
  http://www.infopoems.com/
- Critical Care http://ahsn.lhsc.on.ca
If You are on Your Own

- PubMed
- BioMed Central (Open access journals)
  http://www.biomedcentral.com
- Public Library of Science
  http://www.publiclibraryofscience.org/
- SCHARR
  http://www.shef.ac.uk/~scharr/ir/netting/
Top Five Used Resources

- In a Survey of commonly used resources, the top 5 resources used:
  1. Clinical Evidence
  2. UpToDate®
  3. DynaMed®
  4. ACP PIER
Evidence to Action

- Aware
- Agree
- Adopt
- Adhere

So What is “The Truth”? 

A probability statement... that what we do for patients does more good than harm
So.....

Why EBM??!!
Because Patients Do Not Come With Instructions!!!
EBM is here to stay. It has become an essential way of teaching and practicing in the uncertain world of medicine. The challenge is to engage the whole healthcare team in learning about it and making it part of the routine of clinical practice.

Editorial
BMJ 2004;329:989-990
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