

Evidence-based Medicine (EBM) Rotation Overview

*Where is the knowledge we have lost in information?
Where is the wisdom we have lost in knowledge?*
- T.S. Eliot

*Where is the information we have lost in data?
Where is the data we have lost?*
- Anonymous

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Web tutorial: <http://www.hsl.unc.edu/Services/Tutorials/EBM/index.htm>

Resident Information Resources: <http://sfguide.ucsf.edu/barnett/fcm>

InfoPoems: Username: fmres
Password: sfg

Photocopy codes: Ward 83: 2007

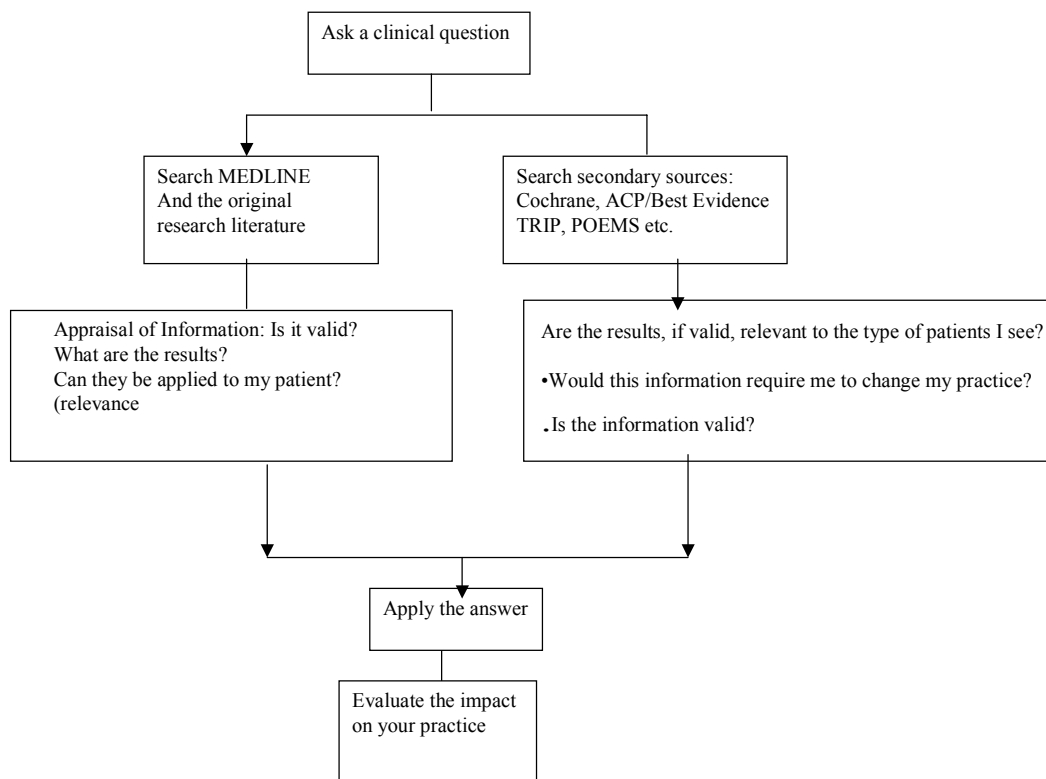
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A. What is evidence-based medicine (EBM)?

Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decision about the care of individual patients

B. Steps in applying EBM

1. Recognize important gap in knowledge
2. Formulate and meaningful, potentially answerable question
3. Locate the best evidence for answering question (systematic review of primary search)
4. Critically appraise the evidence (relevance to patient or patients you want to apply results to, strength of study, translation of results into meaningful form)
5. Integrate the evidence with expert clinical opinion, your experience, and your knowledge about the patient and the patient's preferences
6. Evaluate the impact on your practice



C. A Brief History of EBM:

EBM (or, more recently, Evidence-Based Practice or EBP) is term applied to an approach to generating, evaluating, and incorporating information to enhance our clinically useful knowledge (the wisdom part is up to you). It brings together and builds on several developments over the past several decades.

1. Incorporation of patient-relevant outcomes in research. For example, about 25 years ago research on rheumatoid arthritis began to move from using sedimentation rates and other biological markers as the outcome of clinical trials to using measures of patient functional status (e.g. Activities of Daily Living or MOS-SF-36) as the principal outcomes. In EBM terminology this is a shift from Disease Oriented Evidence (DOEs) to Patient Oriented Evidence that Matters (POEMs).
2. Inclusion of patient-oriented outcomes and EBM terminology (e.g., number needed to treat or NNT) in publications.
3. Use of EBM principals in formulating guidelines (USPSTF pioneered use of EBM, in contrast to traditional ‘consensus of experts’ approach).
4. Use of information technology to make information widely available. Essentially a separate line of development, but one generally enthusiastically embraced by EBM. Examples are net resources, including searchable systemic reviews and EBM tutorials, and extension of these resources to handhelds.
5. Adaptation of traditional epidemiologic tools to serve needs of clinicians
6. Incorporation of EBM into clinical practice to improve the quality of patient care. The ultimate goal of EBM and the focus of the next two weeks.

D. Some EBM Concepts and Terms

General EBM areas:

Core:

- Diagnosis
- Treatment
- Screening & Prevention
- Avoiding harm
- Meta-analysis
- Systematic Reviews (SRs)

Secondary

- Economic analysis
- Clinical guidelines

Specific EBM Concepts

Study designs

- RCT
- Prospective Cohort
- Retrospective Cohort
- Case-Control
- Cross-sectional

Quantitative concepts

- OR (odds ratio)
- RRR (relative risk reduction)
- ARR (absolute risk reduction)
- NNT (number needed to treat or screen to attain desired outcome in 1 patient)
- LR (likelihood ratio)
- NNH (number needed to treat to harm 1 patient)
- Specificity
- Sensitivity
- Positive predictive value
- Negative predictive value
- SnNout (for a test with high **S**ensitivity, a **N**egative result effectively rules **out** the dx)
- SpPin (for a test with high **S**pecificity, a **P**ositive result effectively rules **in** the dx)

Other terms

- SR (Systematic Review)
- CAT (Critically Appraised Topic)

E. List of Tasks for the Rotation

The EBM rotation includes completion of the following tasks:

1. Complete tutorial at <http://www.hsl.unc.edu/Services/Tutorials/EBM/index.htm> (about 4 hours)
2. Complete Pub Med tutorial (about 45 minutes)
3. Session searching for information on the web with Joy Graham or Terry Mason (about 1 hour)
4. Attend FMIS am rounds once each week (usually Tuesday 11 AM) to get one or two EBM questions.
5. Research and answer FMIS question(s) each week.
6. Present answer to FMIS question each week (usually Friday at 11 am)
7. Choose an article and present at journal club on Wednesday noon of 2nd week
8. Read additional materials as needed
9. Email me electronic copy of any FMIS CATs and power point journal club presentation

F. Instructions for FMIS Question(s) (Weeks 1 and 2 of rotation)

1. Show up at “Attending Rounds” for FPIS (on Ward 3B) as per schedule to receive 1 to 3 clinical questions. Use the format provided by the EBM form (end of this handout) to clarify question: (1) what are the key characteristics of the patient to whom the question is applied (e.g. post MI, second GI bleed, diabetic); (2) what is the exposure, intervention, diagnostic test or prognostic factor of interest, (3) what is the comparison (e.g., lack of exposure, a different intervention, an alternative diagnostic test), (4) what is/are the main outcome/s of interests (focus on most clinically relevant – e.g. functional status or morbidity rather than a change in lab value).

2. Search for information (meet with librarian first)

3. Evaluate and assimilate information into a response. You can use the forms provided to formulate question and summarize your findings in the CAT format (see below).

4. Discuss with me.

5. Present answer to FMIS per schedule. Presentations are usually brief (5-10 minutes plus discussion). Bring about 10 copies of CAT.

5. Email me an electronic copy of your CAT.

G. Instructions for Journal Article (Second Wednesday of Rotation)

1. Pick an article (preferably by end of first week). I have a list of potentially interesting articles as well as Journal Watch and Evidence-Based Medicine – two summaries of recent articles relevant to primary care. Criteria for article is that it could potentially change clinical care for here.
2. Discuss article with me. (Give me a copy first!).
3. Prepare your talk
 - a. Power point presentation preferable, but have back-up overheads. Give me an electronic copy of the presentation to archive.
 - b. Plan to present about 30 minutes of material to leave plenty of time for questions/discussion
 - c. Recommended format of presentation is
 - Introduction (<5 minutes) – why you chose it, why you think it is important
 - Description of article by section (Background, Methods, Results, Discussion, Conclusions)
 - Critical appraisal of article using EBM approach to that type of article (see Sackett, the MSU tutorial or JAMA and Lancet articles in the binder)
 - Summary and Conclusions (Clinical Bottom Line: what you will or won't do clinically as a result of reading this article)
 - Discussion
4. See our medical information website (<http://sfghdean.ucsf.edu/barnett/fcm>) under “Topics” heading for examples of past presentations. One example is under Cardiology, Heart Failure, JC by Karen Odom at <http://sfghdean.ucsf.edu/barnett/EBM/JClub/0412OdomComboCHF.ppt>
5. E-mail me an electronic copy of your power-point presentation.



Evidence Based Topic Of the Week

- Questions should ask for foreground information (specifics about diagnosing or managing patients), not background information.
- Consider generating questions from patients' ideas, concerns and expectations about their illness and treatment
- If there are too many questions, choose those that, 1. are most relevant to patients' well being, 2. best address your knowledge gaps, or 3. are likely to recur on our service.

The 4 parts of a Question:

1. Patient & problem	
2. Intervention, exposure or prognostic factor	
3. Comparison	
4. Outcome	

The Question: (e.g. In middle-aged patients with chronic atrial fibrillation, does the administration of aspirin when compared to warfarin reduce the risk of stroke?)



Evidence Based Topic Of the Week

Key Citations: (author, title, journal title, year, volume/issue, page nos)

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Brief Description of the Study(ies):

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The Evidence (summary):

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Comments:

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Clinical Bottom Line

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Your name: _____

Date: _____

CAT Format

Name: The resident who compiled the CAT and the faculty mentor who reviewed it.

Date: When generated and (if applicable) reviewed or updated.

Title: Preferably a declarative answer to the clinical question

Bottom line: A one to two sentence summary conclusion

Clinical scenario: A brief summary of the patient and problem in the form of a clinical question using the PICO format (patient/problems, intervention, comparison and outcome).

The evidence: The source of evidence, including study type, size, effect size.

Comments: Critical appraisal of the study, including internal and external validity.

Citation: Including web-link to article if available

Cerebrospinal Fluid May Become Sterile Within A Few Hours After Pretreatment With Parenteral Antibiotic In Pediatric Patients With Bacterial Meningitis

Bottom Lines:

- In pediatric cases of bacterial meningitis, cerebrospinal fluid was found to be sterile within hours after pretreatment with parenteral antibiotic.
- Depending of the pathogen, CSF cultures were negative within 2 hours for N meningitis, 4-10 hours for S. pneumoniae, and 33.5 hours for group B streptococcus. This demonstrates that CSF sterilization may occur sooner than previously suggested.
- The authors emphasize the importance of obtaining antibiotic-pretreated CSF for antibiotic susceptibility testing to avoid unwarranted prolonged antibiotic therapy.

Clinical Question:

- How long after parenteral antibiotic administration is it possible to successfully culture CSF fluid in an adult patient with bacterial meningitis?

The Evidence:

- In their retrospective review, Kanegaye et al looked at 128 pediatric cases of bacterial meningitis during a 5-year period to determine the rate at which pretreatment with parenteral antibiotics sterilizes CSF culture.
- The bacterial pathogens involved included N meningitis, S pneumoniae, H influenzae, group B streptococcus, and other organisms.
- The patients underwent lumbar punctures after initiation of parenteral antibiotics or had serial LP's before and after initiation of parenteral antibiotics.
- After ≥ 50 mg/kg of a third generation cephalosporin, 3 of 9 cases of meningococcal meningitis had negative cultures within 1 hour of parenteral antibiotic and all cases of meningococcal meningitis were negative after 2 hours.
- CSF cultures were negative 4-10 hours for S pneumoniae, and 33.5 hours for group B streptococcus.

Comments:

- This study looked at cases of bacterial meningitis in pediatric patients with a median age of 8 months so the results may not be generalizable to adult patients. The fact that the blood-brain barrier in children is more permeable than that of adults may shorten the time of antibiotic entry into CSF and for CSF to become sterile.
- As the authors pointed out, this retrospective review used data collected from medical record for chronologic data and culture results, which may not be accurate or complete. The authors were uncertain if the time recorded represented the beginning or end of antibiotic infusion and the rate of the infusion.
- It is unlikely that this question will be addressed by a randomized controlled trial, as it would not be ethical to delay LP's in cases of suspected bacterial meningitis and there are risk involved in performing frequent LP's for CSF sampling.

Citation:

Kanegaye JT, Soliemanzadeh P, Bradley JS. Lumbar puncture in pediatric bacterial meningitis: defining the time interval for recovery of cerebrospinal fluid pathogens after parenteral antibiotic pretreatment. *Pediatrics*. 2001 Nov;108(5):1169-74. Erratum in: *Pediatrics* 2002 Sep;110(3):651.