



PRIMARY HEALTHCARE TEAMWORK

Evidence-based Health Care I & II

Objectives:

- ★ Formulate different types of clinical questions
- ★ Define and explain EBM.
- ★ Recognize history of EBM
- ★ Explain hierarchy of evidence
- ★ Construct a clinical question using PICO(T)
- ★ Identify sources of Evidence
- ★ Participants who successfully complete this workshop will be able to:
- ★ Formulate different types of clinical questions
- ★ Define and explain EBM.
- ★ Recognize history of EBM
- ★ Explain hierarchy of evidence
- ★ Construct a clinical question using PICO(T)
- ★ Identify sources of Evidence

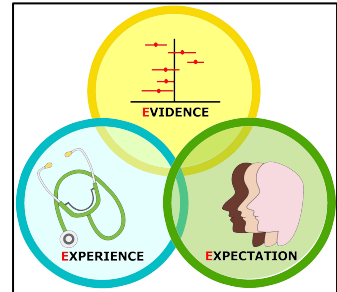
Color index:

Original text **Important** Doctor's notes **Golden notes** Extra

Evidence-Based Health Care I

The Definition Of Evidence-Based Healthcare (EBHC)

- The conscientious (المتقن), explicit (الواضح), and judicious (الحكيم) use of current best evidence in making decisions about the care of individual patients.
- It's a skill you must learn.
- It requires the integration of:
 1. Individual clinical expertise.
 2. Patient preferences.
 3. The best available clinical evidence from systematic research.
 4. **Consideration of available resources.** ex. Cost or Technology



EBM Is The Integration Of:

What do we mean by **Best Research Evidence**?

- Clinically relevant research.
- Sometimes from the basic sciences of medicine.
- Most of the times from patient-centred clinical research:
 1. Therapy.
 2. Harm.
 3. Differential diagnosis¹.
 4. Diagnosis (diagnostic tests).
 5. Prognosis.
- These above are the 5 types of question you can ask in a clinical setting.

1

What do we mean by **Clinical Expertise** ?

- Ability to use: our clinical skills and past experience to:
 - Rapidly identify each patient's unique health state and diagnosis.
 - His/her individual risks and benefits of potential interventions/exposures/diagnostic tests.²
 - His/her personal values and expectations.³
- Moreover, clinical expertise is required to integrate evidence with patient values and circumstances.

2

What do we mean by **Patient Values**?

- The unique preferences, concerns, and expectations that each patient brings to a clinical encounter.
- That must be integrated into shared clinical decisions if they are to serve the patient.
- "Evidence say that cruciate ligament surgery have better outcome in young adult" When 45 years old athletic patient you do the surgery but non-athletic similar patient you do not.

3

4

What do we mean by "**Patient Circumstances**"?

- Patient's individual clinical state and the clinical setting.⁴

1. DDx of palpation in primary care unit: arrhythmia, anemia, hyperthyroid etc..
2. Example of individual risks: an 80 year old patient on insulin has a higher risk of hyperglycemia
3. Example of expectations: a patient came expecting steroid injections for her knee pain but after learning that the pain relief is temporary she changes her mind
4. Example of patient circumstances: in patients with prediabetes we have to consider the age. If they are less than 60 years old we can start the treatment, if they are older than 60, we do not start treatment"

Evidence-Based Health Care I

Evidence-Based Medicine (EBM)

A. What is Evidence-Based Medicine?

- A subcategory of Evidence-Based Health Care (EBHC).
- EBHC also includes other branches of health care practice, such as evidence-based nursing or evidence-based physiotherapy.
- Subcategories of EBM include evidence-based surgery and evidence-based cardiology.

C. Why do I need to learn Evidence-Based Medicine?

- So you make efficient use of the published literature in guiding your patient care.

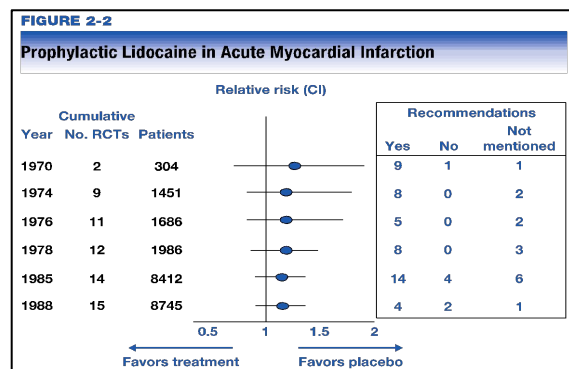
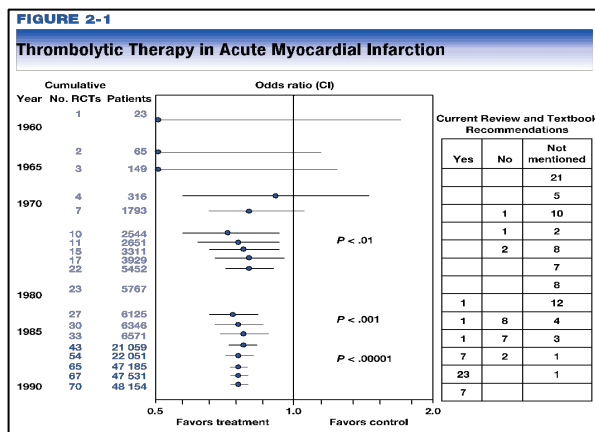
D. What if I don't learn and apply EBM?

- Your patients will suffer as you will have messy clinical reasoning and neglect or misunderstand research findings.

E. What are the 3 fundamental principles of EBM?

- Awareness of the best available evidence.
- Decision whether evidence is trustworthy=how confident can we be of the of the estimates provided by the studies=quality of the evidence.
- Evidence alone is never sufficient to make a clinical decision.

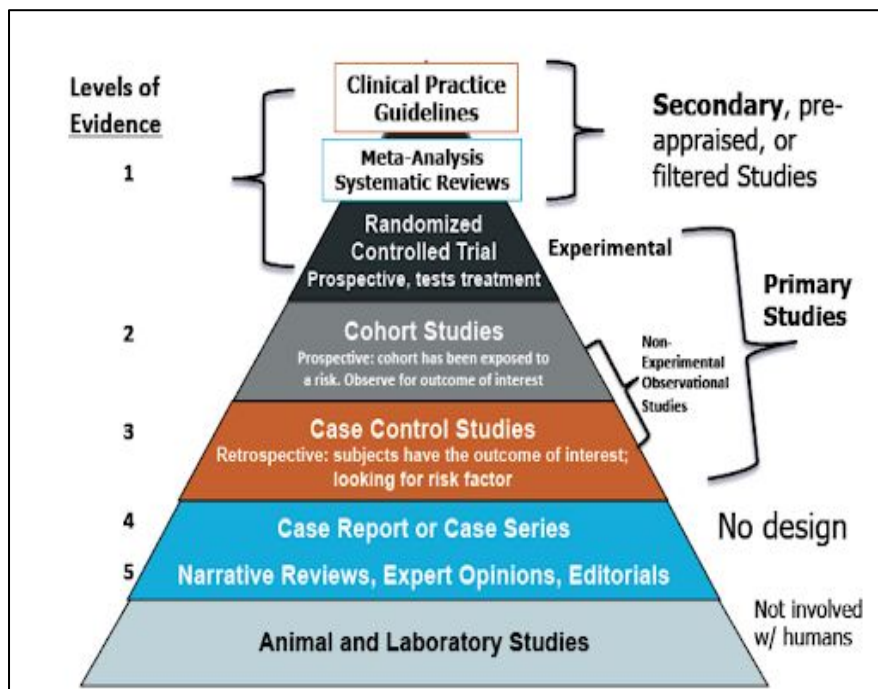
F. What was going on in medical literature before EBM?



- It took a decade for the experts to catch up with the evidence!
- If the evidence summaries presented in the forest plots had been available to the experts, they would have grasped the benefits of thrombolytic therapy far earlier than they did and abandoned prophylactic lidocaine far earlier.

Evidence-Based Health Care I

The Hierarchy Of Evidence:



Notes On The Hierarchy Of Evidence:

- The hierarchy works better for studies related to **therapeutic interventions** (therapy). (RCT for therapy is the best)
- For studies of the accuracy of **diagnostic tests** (diagnosis), the top of the hierarchy includes studies that:
 - Enrolled patients about whom clinicians had diagnostic uncertainty. (Patients with typical and atypical presentations)
 - Undertook a blind comparison between the candidate test and a criterion standard. (Saliva viral culture for COVID Dx and the PCR as the golden test)
- For **prognosis**, prospective observational studies are the best:
 - Accurately documenting exposures and outcomes.
 - Following up all patients during relevant periods would sit atop the hierarchy.
- The risk of biases decrease as we go up.
- RCT isn't ALWAYS the best evidence.

Evidence-Based Health Care I

What is the “Grade Working Group”?

- The Grading of Recommendations Assessment, Development and Evaluation (short GRADE) working group began in the year 2000 as an informal collaboration of people with an interest in addressing the shortcomings of grading systems in health care.
- The working group has developed a common, sensible and transparent approach to grading quality (or certainty) of evidence and strength of recommendations.
- Grading the strength of evidence

How Can We Judge If The Evidence Is Trustworthy?

- We can judge if the evidence is trustworthy by Confidence Assessment Criteria.
- Trustworthy = Be Confident About The Estimates = Quality Of Evidence.
- RCTs begin as high confidence.
- Observational studies begin as low confidence.
- Notes on confidence assessment criteria:
 - Risk of bias: if the study has major problems in design and execution then it has high risk of bias.
 - Imprecision: Wide 95% confidence intervals (CI).
 - Publication bias: when the publication of research depends on the direction of the study results and whether they are statistically significant. (Any research should be published)
 - When an RCT or multiple RCTs suffers from a number of these limitations, the confidence in estimates may be low or even very low.
- When an observational study has treatment effects sufficiently large and consistent, confidence ratings can be moderate or even high.
 - For example, observational studies have allowed extremely strong inferences about:
 - The efficacy of insulin in diabetic ketoacidosis.
 - Hip replacement in patients with debilitating hip osteoarthritis.
- RCT is not always best evidence.

TABLE 2-1

Confidence Assessment Criteria^a

Study Design	Confidence in Estimates	Lower If ^a	Higher If ^a
Randomized trial	High	Risk of bias -1 Serious -2 Very serious	
	Moderate	Inconsistency -1 Serious -2 Very serious	Large effect +1 Large +2 Very large
Observational study	Low	Indirectness -1 Serious -2 Very serious	Dose response +1 Evidence of a gradient
	Very low	Imprecision -1 Serious -2 Very serious	
		Publication bias -1 Likely -2 Very likely	

^aMinus and plus signs refer, respectively, to rating down and rating up confidence in estimates. The 1 refers to rating down or up by 1 level (eg, from high to moderate or moderate to high), and the 2 refers to rating down or up by 2 levels (eg, high to low or low to high).

Evidence-Based Health Care I

A STORY:

An intensive care specialist, developed a lesion on his lip shortly before an important presentation. He was concerned and, wondering whether he should take acyclovir, proceeded to spend the next 30 minutes searching for and evaluating the highest-quality evidence. When he began to discuss his remaining uncertainty with his partner, an experienced dentist, she cut short the discussion by exclaiming, “But, my dear, that isn’t herpes!”

- You should have clinical expertise to be able to apply EBM

What Are The Knowledge And Skills Necessary For Optimal Evidence-based Practice?

- Diagnostic expertise.
- In-depth background knowledge.
- Effective searching skills.
- Effective critical appraisal skills.
- Ability to define and understand benefits and risks of alternatives.
- In-depth physiologic understanding that allows application of evidence to the individual.
- Sensitivity and communication skills required for full understanding of patient context.
- Ability to elicit and understand patient values and preferences and work with patients in shared decision making.

How To Formulate A Structured Clinical Question?

BOX 3-1

Framing Clinical Questions: PICO

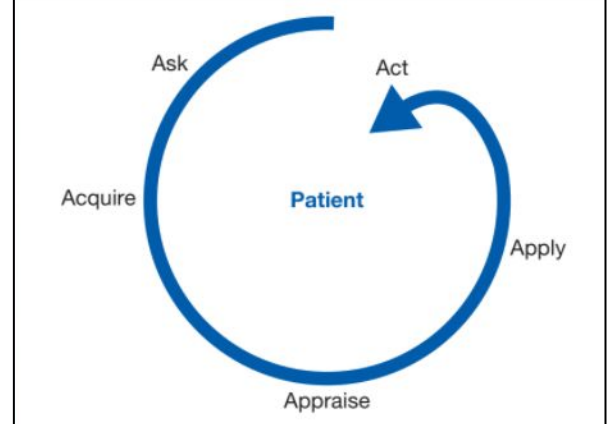
Patients or Population: Who are the relevant patients?

Intervention(s) or Exposure(s): For example, diagnostic tests, foods, drugs, surgical procedures, time, or risk factors. What are the management strategies we are interested in comparing or the potentially harmful exposures about which we are concerned?

Comparator: For issues of therapy, prevention, or harm, there will always be both an experimental intervention or putative harmful exposure and a control, alternative, or comparison intervention.

Outcome: What are the patient-relevant consequences of the exposures in which we are interested? We may also be interested in the consequences to society, including cost or resource use. It may also be important to specify the period of interest.

Using the Medical Literature to Provide Optimal Patient Care



These are called the 5 As, some add a 6th A, which stands for “Assess” for yourself for your success in applying this process.

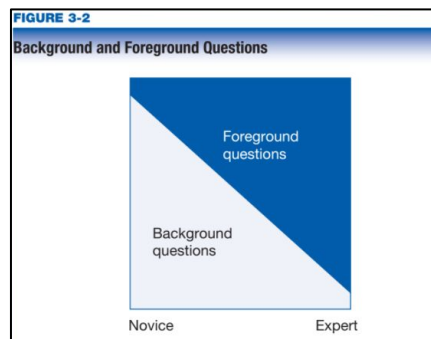
Evidence-Based Health Care I

A STORY:

Consider a medical student, early in his training, seeing a patient with newly diagnosed type 2 diabetes mellitus. he will ask questions such as the following: “What is type 2 diabetes mellitus?” “Why does this patient have polyuria?” “Why does this patient have numbness and pain in his legs?” “What treatment options are available?” These questions address normal human physiology and the pathophysiology associated with a medical condition.

Types Of Clinical Questions:

Background questions: ¹	Foreground questions:
<ul style="list-style-type: none"> Ask for general knowledge about a condition, test, or treatment. 	<ul style="list-style-type: none"> Ask for specific knowledge to inform clinical decisions or actions.²
<ul style="list-style-type: none"> Components of background clinical questions: <ul style="list-style-type: none"> A question root (who, what, where, when, how, why) and a verb. A disorder, test, treatment, or other aspect of healthcare. 	<ul style="list-style-type: none"> Components of foreground clinical question (PICOT): <ul style="list-style-type: none"> the Patient (Problem) the Intervention or exposure the Comparison the clinical Outcomes Time
<ul style="list-style-type: none"> Examples: <ul style="list-style-type: none"> How does heart failure cause pleural effusions? “What causes COVID-19?” 	<ul style="list-style-type: none"> Example: “Ali is a 30 years old teacher, he is known to have perennial allergic rhinitis. He presented to you for a follow up appointment, and he wants to get cetirizine pills to control his rhinitis. You wonder should you prescribe intranasal budesonide or just prescribe cetirizine?”



- Basic information that usually doesn't change with time (ex. basic years 1&2)
- Would hydroxychloroquine be effective for the treatment of COVID19?"

Evidence-Based Health Care I

When Confronted With A Clinical Question, Whom Would You Consult?

Experts

Colleagues

Textbooks

Others

COLLEAGUES- EXPERTS	Textbooks
<ul style="list-style-type: none"> ● A great source of information. ● Quick, affordable and accessible. ● But potentially very biased: <ul style="list-style-type: none"> ○ Not updated ○ Variability 	<ul style="list-style-type: none"> ● Rapidly out-of-date (2-4y). ● A good source of basic information (for eg.pathophysiology). ● But a poor source of information for most foreground questions (clinical eg. treatment).

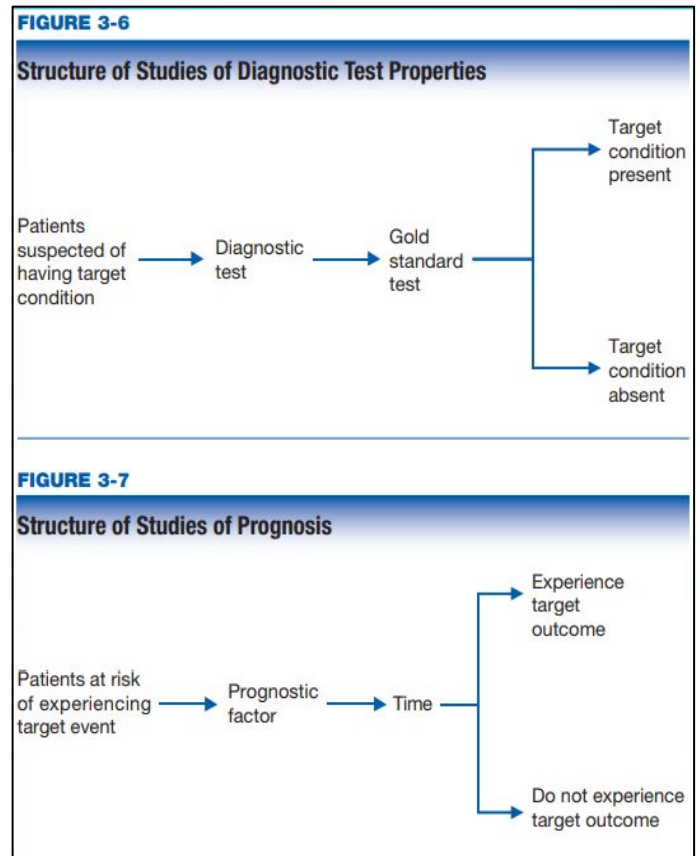
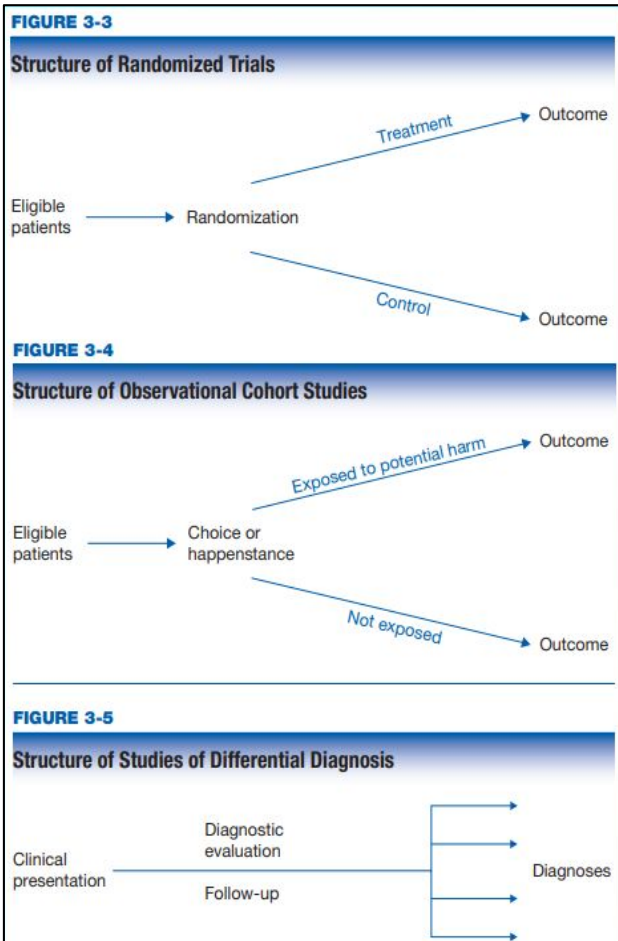
How To Ask Clinical Questions Correctly?

- Experienced clinicians managing a patient with type 2 diabetes mellitus will ask questions such as:
 - In patients with new-onset type 2 diabetes mellitus, which clinical features or test results predict the development of diabetic complications?
 - In patients with type 2 diabetes mellitus requiring drug therapy, does starting with metformin treatment yield improved diabetes control and reduce long-term complications better than other initial treatments?
- To ask clinical questions correctly. First, turn your scenario into a 'well-built' foreground clinical Question.
 - For **Therapy** or harm questions:
 - We use PICO framework
 - For questions of **Prognosis**, you can use 1 of 2 alternative structures:
 - 3 elements (PIO): patients, intervention/exposure (time), and outcome.
 - An alternative (PICO) focuses on patient-related factors, such as age and sex, that can modify prognosis: patients, exposure (eg, older age or male), comparison (eg, younger age or female), and outcome.
 - For questions about **Diagnostic tests** (diagnosis):
 - (PIO)S:
 - Patients, intervention/exposure (test), and outcome (criterion standard).

Evidence-Based Health Care I

What Are The Types Of Foreground Clinical Questions?

Type of Question	Best Design
Therapy: Determining the effect of interventions on patient-important outcomes (symptoms, function, morbidity, mortality, and costs).	RCT
Harm: Ascertaining the effects of potentially harmful agents (including therapies from the first type of question) on patient-important outcomes.	Observational studies (Cohort or Case control)
Differential diagnosis: In patients with a particular clinical presentation, establishing the frequency of the underlying disorders.	Observational studies (Cohort or Case series)
Diagnosis (performance of a diagnostic test): Establishing the power of a test to differentiate between those with and without a target condition or disease.	Observational studies (Cohort)
Prognosis: Estimating a patient's future course.	Observational studies (Cohort)



Example 1:

A 55-year-old woman presents with type 2 diabetes mellitus and hypertension. Her glycemic control is excellent with metformin, and she has no history of complications. To manage her hypertension, she takes a small daily dose of a thiazide diuretic. During a 6-month period, her blood pressure is near 155/88 mm Hg.

- Initial Question:
 - When treating hypertension, at what target blood pressure should we aim?
- What are the limitation of the above question?
 - It fails to specify the population in adequate detail. The benefits of tight control of blood pressure may differ:
 - Among patients with diabetes vs those without diabetes.
 - In type 1 vs type 2 diabetes.
 - Among patients with and without diabetic complications.
- What if we specify the population as “(middle-aged women with uncomplicated type 2 diabetes”
 - It will ensure that the answer we get is applicable to our patient.
 - However, the problem will be that we might fail to find any studies that restrict themselves to this population.
- Ok, what should we do?
 - Start with a specific patient population.
 - Be ready to remove specifications to find a relevant article.
- In this case, we may be ready to remove the “female,” “middle-aged,” uncomplicated,” and “type 2,” in that order.
- **The order in which we remove the patient specifications depends on how likely it is that those characteristics will influence response to treatment.**
 - We suggest removing “female” first because we think it likely that optimal target blood pressure will be similar in men and women.
- Improved (searchable) question: (A question about therapy)
 - **Patients:** Patients with hypertension and type 2 diabetes without diabetic complications.
 - **Intervention/Exposure:** Any antihypertensive agent that aims at a target systolic blood pressure below 140 mm Hg.
 - **Comparator:** placebo.
 - **Outcomes:** Stroke, myocardial infarction, cardiovascular death, and total mortality.

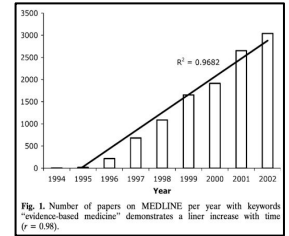
Example 2:

A previously well, although a heavy drinker, 55-year-old man presents to the emergency department with an episode of transient loss of consciousness. On the evening of presentation, he had his usual 5 beers and started to climb the stairs at bedtime. The next thing he remembers is being woken by his son, who found him lying near the bottom of the stairs. The patient took about a minute to regain consciousness and remained confused for another 2 minutes. His son did not witness any shaking, and there had not been any incontinence. Physical examination findings were unremarkable; the electrocardiogram revealed a sinus rhythm with a rate of 80/min and no abnormalities. Glucose, sodium, and other laboratory results were normal, and a blood alcohol test result was negative.

- Initial Question:
 - How extensively should I investigate this patient?
- The initial question gives us little idea of where to look in the literature for an answer.
- We could, for instance, pose a question of **differential diagnosis**.
- If we knew the differential diagnosis in such patients, we could **choose to investigate the more common and omit investigations** targeted at remote possibilities.
- Alternatively, we could ask a question of **prognosis**.
- If patients had benign prognoses, we might be much less eager to investigate extensively than if patients tended to have poor outcomes.
- **Improved (searchable) question: (A question about differential diagnosis)**
 - **Patients:** Middle-aged patients presenting with transient loss of consciousness.
 - **Intervention/Exposure:** Thorough investigation and follow-up for common and less common diagnoses.
 - **Comparator:** Minimal investigation and follow-up.
 - **Outcomes:** Frequency of underlying disorders, such as vasovagal syncope, seizure, arrhythmia, and transient ischemic attack.
- **Improved (searchable) question: (A question about prognosis)**
 - **Patients:** Middle-aged patients presenting with transient loss of consciousness.
 - **Exposure/Comparison:** Time.
 - **Outcomes:** Morbidity (complicated arrhythmias or seizures, strokes, or serious accidents) and mortality in the year after presentation.

History of EBM

History of EBM: [Read it at home :\)](#)



- Old term of EBM is clinical epidemiology.
- Investigators from McMaster University began using the term (EBM) during the early 1990s.
- The term EBM may be new (in the 90s) and is being actively taught in medical schools, but the concept has been around for a long time.
- With the advent of the computer, large databases, and the Internet; the methods and efficacy of the practice of EBM has increased.
- Archie Cochrane published his classic book in 1972: "Effectiveness and efficiency: random reflections on health services."
- This text has had a profound influence on the practice of medicine and on the evaluation of medical interventions.
- He was the first to set out clearly the vital importance of RCTs for assessing the effectiveness of treatments.
- His work led directly to the setting-up of the Cochrane Center, which later became the Cochrane Collaboration
- Cochrane Collaboration; an international nonprofit, independent organization dedicated to making up-to-date, accurate information about the effects of health care readily available worldwide.
- It produces and disseminates systematic reviews of health care interventions and promotes the search for evidence in the form of clinical trials and other studies of interventions.
- During the late 1970s a group of clinical epidemiologists at McMaster University including Dr. David Sackett prepared a series of articles to assist clinicians interpreting clinical research.
- These articles, introducing the term "critical appraisal", appeared in the Canadian Medical Association Journal beginning in 1981.
- In 1990 Dr. Gordon Guyatt introduced the term "evidence-based medicine" to stress the role of rigorous, systematic evidence from clinical research in conjunction with patients' values and preferences in clinical decision-making.
- A group of academic physicians subsequently formed the international Evidence-based Medicine Working Group and published a 1992 article announcing the "new paradigm" of evidence-based medicine.
- The Evidence-based Medicine Working Group decided to build on the popular series in the Canadian Medical Association Journal by creating a more practical approach to applying the medical literature to clinical practice.
- Championed by Dr. Drummond Rennie, an editor of the Journal of the American Medical Association (JAMA), the result was the Users' Guides.
- The guides originally consisted of 25 topics, covered in a series of 32 articles published in JAMA between 1993 and 2000, describing approaches to different types of medical questions and the study designs that may answer them.

Clinical Scenario

Case Study 1:

Ali is a 30 years old teacher, he is known to have perennial allergic rhinitis. He presented to you for a follow up appointment, and he wants to get cetirizine pills to control his rhinitis. You wonder should you prescribe intranasal budesonide or just prescribe cetirizine?

Clinical question:

- In Patients with perennial allergic rhinitis, does the use of intranasal budesonide over 1 year lead to lower nasal symptom scores than cetirizine?

Answer:

- Early treatment of perennial rhinitis with budesonide or cetirizine and its effect on long-term outcome.

Patient Population:	Patients with with perennial allergic rhinitis
Intervention:	intranasal budesonide
Comparison:	intervention. cetirizine
Outcomes:	Nasal symptom scores
Time:	1 year

Objective: The main objective was to determine whether early introduction of long-term daily intranasal steroid treatment would have a positive effect on the clinical course and outcome of perennial rhinitis compared with the effect of an antihistamine. A secondary objective was to compare the clinical efficacy of intranasal budesonide and oral cetirizine.

Methods: One hundred forty-three **adult patients with newly detected perennial allergic** or nonallergic eosinophilic **rhinitis** of 1 to 3 years' duration were randomized to receive **budesonide** dry powder, 400 µg (delivered dose of 280 µg) **intranasally, or cetirizine, 10 mg orally, once daily for 1 year.**

At the end of the double-blind treatment period, medication was stopped, and the patients were followed for another year, during which time they could use 14-day courses of intranasal budesonide as needed to control rhinitis relapses. The main outcome measures were the time to first relapse and the number of relapses during the second year. **Nasal symptom scores,** nasal smear eosinophilia, and nasal peak expiratory flow were used to compare the clinical efficacy of the 2 treatments.

Results: **During the randomized phase of the study, budesonide was significantly more effective than cetirizine in relieving nasal symptoms.** Nasal peak expiratory flow improved significantly in budesonide-treated patients compared with in patients

Clinical Scenario

Case Study 2:

Khalid is a 60 years old teacher, he is known to have hypertension. He presented to the ED with severe chest pain for the last two hours. In addition to history / exam and ECG, you wonder what should you request for a timely diagnosis: troponin or creatine kinase- MB or both?

Clinical question:

- In Patients attending the ED with chest pain, is troponin as compared to creatine kinase-MB more valid for the diagnosis of ischemic heart disease?

Answer:

- The diagnostic value and cost-effectiveness of creatine kinase-MB, myoglobin and cardiac troponin-T for patients with chest pain in emergency department observation ward.

Patient Population:	Hypertensive patients with acute severe chest pain
Intervention:	Measurement of Troponin
Comparison:	Measurement of creatine kinase-MB
Outcomes:	Accuracy of diagnosis of IHD

Health technology

The authors studied three cardiac markers in patients presenting with chest pain of suspected cardiac origin. The markers were creatine **kinase MB isomer (CKMB)**, myoglobin and **cardiac troponin-T**.

Type of intervention

Diagnosis.

Economic study type

Cost-effectiveness analysis.

Study population

The study population comprised **patients aged above 30 years with chest pain, or chest discomfort, of suspected cardiac origin and of recent onset (within one week)**. Patients whose electrocardiogram suggested AMI, or those who had a clinical diagnosis of acute coronary syndrome or unstable angina, were excluded. Further exclusion criteria were AMI or cardiac catheterisation within the past month, discharge against medical advice, and chest pain suspected to be of non-ischaemic origin.

Analysis of effectiveness

The primary health outcomes were:

the prevalence of AMI,

survival at 7 and 30 days after discharge from the observation ward, and

the diagnostic accuracy of the technologies (sensitivity, specificity, positive predictive value, negative predictive value, and likelihood ratios for a positive test and a negative test).

The authors did not report any summary statistics for the study participants.

Effectiveness results

According to the final diagnoses, 7 cases (1.5%) were of proven AMI.

No one died within 7 days, although one person died of terminal malignancy within 30 days.

Sensitivity was 0.57 for CKMB, 0.29 for myoglobin and 1 for troponin-T.

Specificity was 0.94 for CKMB, 0.89 for myoglobin and 0.99 for troponin-T.

The positive predictive value was 0.13 for CKMB, 0.04 for myoglobin and 0.70 for troponin-T.

The negative predictive value was 0.99 for CKMB, 0.99 for myoglobin and 1 for troponin-T.

The likelihood ratio for a positive test was 9.5 for CKMB, 2.6 for myoglobin and 100 for troponin-T.

The likelihood ratio for a negative test was 0.46 for CKMB, 0.8 for myoglobin and 0 for troponin-T.

Clinical conclusions

The authors concluded that the diagnostic performance of troponin-T was much better than CKMB, and that myoglobin is of no value on account of its lack of specificity.

Clinical Scenario

More Examples:

Patient Population:	In patients with acute MI
Intervention:	Does early treatment with a statin
Comparison:	Compared to Placebo
Outcomes:	Decrease cardioVascular mortality?

Patient Population:	In women with Suspected coronary disease
Intervention:	What is the accuracy of exercise echocardiogram
Comparison:	Compared to exercise ECG
Outcomes:	For diagnosing significant CAD?

Patient Population:	In post-Menopausal women
Intervention:	Does hormone replacement therapy
Comparison:	Compared to No HRT
Outcomes:	Increase the risk of breast cancer?

Acquire The Best Evidence:

Filtered sources:	Unfiltered sources:	Other prefiltered sources:
<ul style="list-style-type: none"> • UpToDate • BMJ Best practice • Dynamed • Physicians Information and Education Resource (PIER) • Clinical Practice Guidelines • Cochrane Library • Medscape • MD Consult 	<ul style="list-style-type: none"> • MEDLINE (www.pubmed.gov) • Google Scholar (www.google.com) 	<ul style="list-style-type: none"> • ACP Journal Club (www.acpjc.org) • The database of abstracts of reviews of effects (DARE) (www.crd.york.ac.uk) • Evidence Based Medicine (ebm.bmj.com) • Evidence Based mental health (ebmh.bmj.com)

Rx

Educational Prescription

3-part Clinical Question

Target Disorder:

Intervention (+/- comparison):

Outcome:

Date and place to be filled:

Presentation will cover:

1. search strategy;
2. search results;
3. the validity of this evidence;
4. the importance of this valid evidence;
5. can this valid, important evidence be applied to your patient;
6. your evaluation of this process.

Used to help applying EBM in clinical practice.

Figure 3. Point-of-care information summary rankings with providers listed in alphabetical order. Quartiles according to 2014 rankings for volume, editorial quality, and evidence-based methodology: black, bottom quartile; dark gray, low intermediate quartile; light gray, high intermediate quartile; white, top quartile (for evidence-based methodology and volume, white represents only the maximum scores of 15 and 100, respectively, as the top quartiles fell on the maximum scores).

Name of Product	Editorial Quality Score	Evidence-Based Methodology Score	Volume (%)
5 Minute Consult			
ACP Smart Medicine			
BestBets			
BMJ Best Practice			
Clinical Access			
Clinical Key			
Cochrane Clinical Answers			
Decision Support in Medicine			
Dynamed			
EBM Guidelines			
Essential Evidence Topics			
eTG Complete			
GP Notebook Free			
Map of Medicine			
Medscape Drugs & Diseases			
Micromedex			
NICE Pathways			
Nursing Reference Center			
PEMSoft			
PEPID Primary Care Plus Ambulatory Care			
Prodigy			
Rehabilitation Reference Center			
UpToDate			

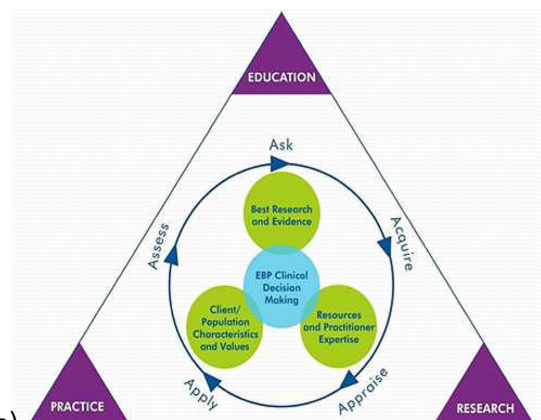
Providing Doctors With High-Quality Information: An Updated Evaluation of Web-Based Point-of-Care Information Summaries

The lighter the color the better the score.

Evidence-Based Health Care II

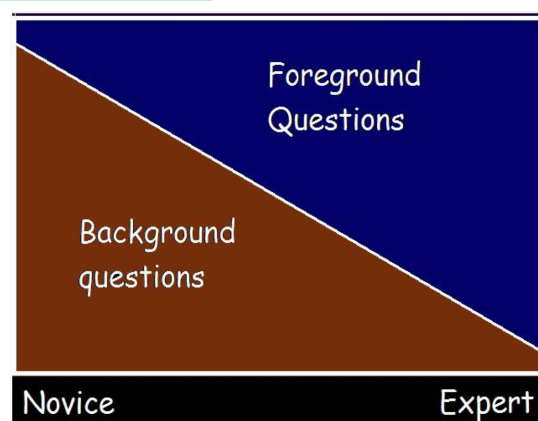
5 Step EBM Process:

1. **A**sk a clinical question.
2. **A**cquire the Evidence(s).
3. **A**ppraise the evidence.
4. **A**pply The best evidence to your patient.
5. **A**ssess Yourself & **A**ssess your patient (Patients needs)
 - (History, Physical examination, Investigations)
 - (Formulate DDx & pretest probability of disease).



Foreground Vs. Background EBM questions

- The type of the question determine where to look for an answer.
 - Background > Books
 - Foreground > BMJ
- Background questions: who, what, where, when, how, why.
- Foreground questions: PICOT (Patient, Intervention, Comparison, Outcomes, Time)



1st Step Ask:

- To start with first you get a problem (ex. not sure what the best for your patient). You synchronize your patient data (age, gender, complaint) with the literature then you get the answer and then manage your patient.
1. **Classify the type of question:**
 - **What is the treatment?** Question of INTERVENTION/PREVENTION
 - **What causes the problem?** Question of ETIOLOGY, RISK
 - **Does this person have the problem?** Question of DIAGNOSIS
 - **Who(and how likely) will get the problem?** Question of PROGNOSIS
 2. **Identify background questions, create a PICO and focused clinical question for this case:**
 - 54 year old male patient was diagnosed with prostate cancer and wants to know whether to get a radical prostatectomy or radiation treatment. He is concerned about death from prostate cancer and also risks of impotence and incontinence.
 3. **Formulate the Clinical Question(PICO)**
 - **P:** 54 year old male with intermediate grade prostate cancer
 - **I:** Radical prostatectomy
 - **C:** Radiation treatment
 - **O:** Reduce risk of mortality, impotence, and incontinence
 5. **Focused clinical question:**
 - In 54 year old male patients with intermediate grade prostate cancer, is radical prostatectomy more effective compared to radiation treatment in reducing the risk of mortality, impotence, and incontinence?

Evidence-Based Health Care II

2nd Step Acquire:

- Acquisition of data is different as a researcher or as physician

3rd Step Appraise:

- Data are Primary or Secondary as a physician you go to secondary study as they do the appraisal for you (systematic review/guidelines).

4th Step Apply:

- Before applying any in information you have to make sure its
 - Validated
 - And Applicable for your patient in other word POET
 - P: Patient
 - O: Oriented
 - E: Evidence
 - T: That matter
- Then apply it

5th Step Assess:

- Assess the impact of evidence that was applied on my patient (Follow up)
- Two types of outcome:
 1. Patient oriented
 2. Bioproxy AKA Bio-Physiological
- Patient oriented is patient quality of life improvement (Ex. Decrease in asthmatic attacks)
- Bio-Physiological is what the medication have done to the body (Ex. Metformin decrease the HbA1C)

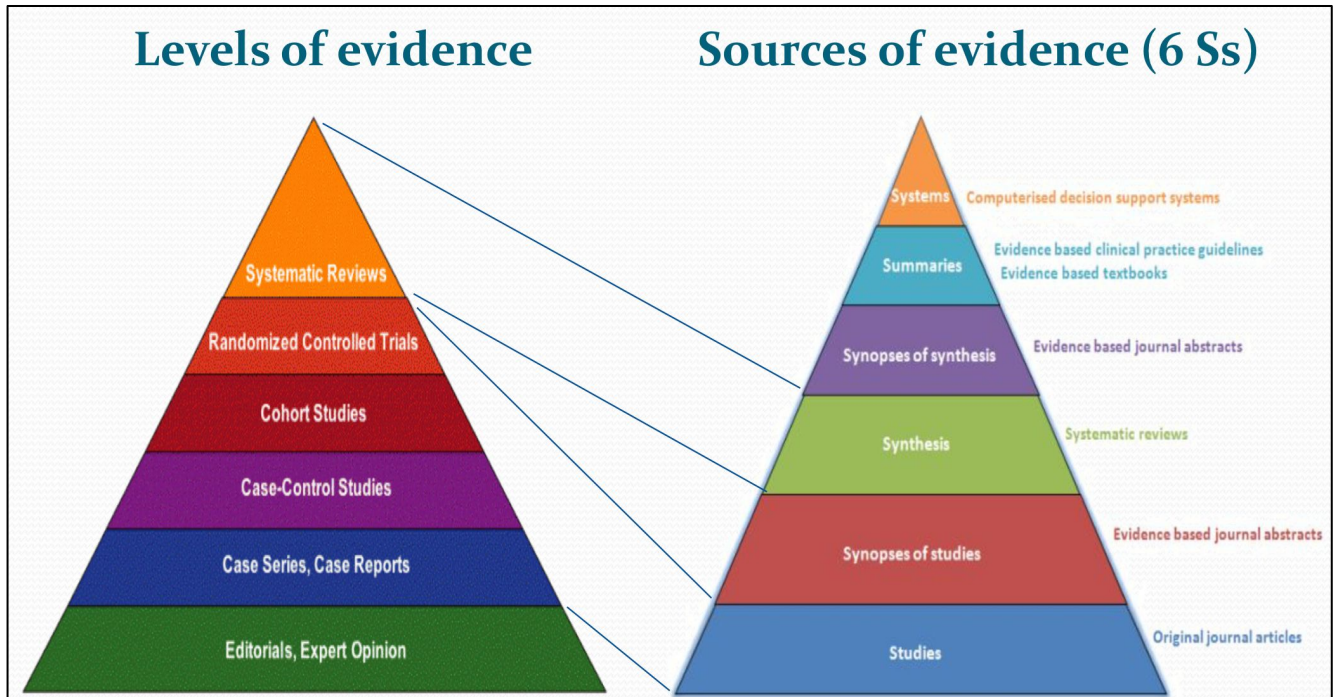
Where Do You Search For Evidence?

“it depends on the question and whether it’s a background or a foreground question”

- | | | |
|---|---------------------------|--------------------|
| ● ACP Clinical Guidelines and Recommendations | ● Essential Evidence Plus | ● StatRef |
| ● BMJ Best Practice /Clinical Evidence | ● Google | ● TRIP Database |
| ● ClinicalKey / MDConsult | ● Google Scholar | ● UpToDate |
| ● Cochrane Library | ● Medscape | ● Web of Knowledge |
| ● DynaMed | ● PubMed | ● WebMD (Med-U) |
| | ● Saudi Digital Library | ● Other |
| | ● Skyscape | |

Evidence-Based Health Care II

Hierarchy Of Evidence



- Level is different than the Source
- What (Level of evidence).
- Where (source of evidence).
- The evidence is stronger as we go up.
- Level of evidence is not on the level of Guidelines b/c some of the recommendation depends on the patient's preference or culture etc..

An area for your notes

Evidence-Based Health Care II

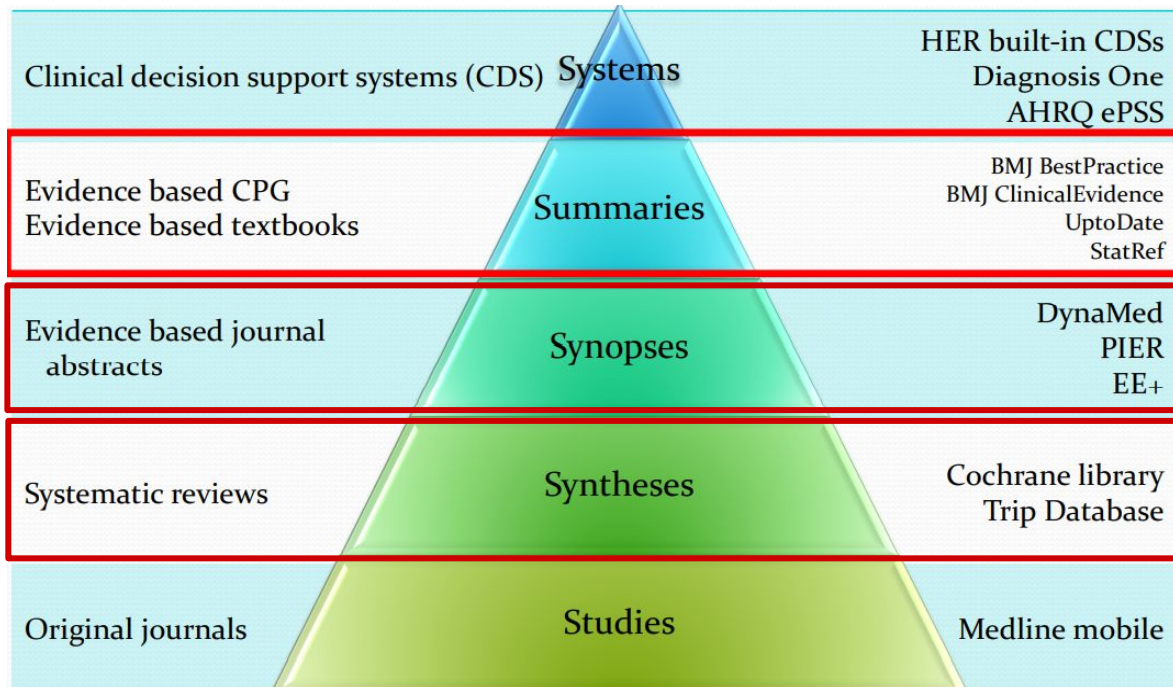
Oxford Centre for Evidence-based Medicine Levels of Evidence (May 2001)

Level	Therapy/Prevention, Aetiology/Harm	Prognosis	Diagnosis	Differential diagnosis/symptom prevalence study	Economic and decision analyses
1a	SR (with <u>homogeneity</u>) of RCTs	SR (with <u>homogeneity</u>) of inception cohort studies; <u>CDR+</u> validated in different populations	SR (with <u>homogeneity</u>) of Level 1 diagnostic studies; <u>CDR+</u> with 1b studies from different clinical centres	SR (with <u>homogeneity</u>) of prospective cohort studies	SR (with <u>homogeneity</u>) of Level 1 economic studies
1b	Individual RCT (with narrow <u>Confidence Interval</u>)	Individual inception cohort study with $\geq 80\%$ follow-up; <u>CDR+</u> validated in a single population	Validating** cohort study with <u>good+++</u> reference standards; or <u>CDR+</u> tested within one clinical centre	Prospective cohort study with good follow-up****	Analysis based on clinically sensible costs or alternatives; systematic review(s) of the evidence; and including multi-way sensitivity analyses
1c	<u>All or none</u>	All or none case-series	<u>Absolute SpPins and SnNouts+</u>	All or none case-series	Absolute better-value or worse-value analyses +++++
2a	SR (with <u>homogeneity</u>) of cohort studies	SR (with <u>homogeneity</u>) of either retrospective cohort studies or untreated control groups in RCTs	SR (with <u>homogeneity</u>) of Level >2 diagnostic studies	SR (with <u>homogeneity</u>) of 2b and better studies	SR (with <u>homogeneity</u>) of Level >2 economic studies
2b	Individual cohort study (including low quality RCT; e.g., <80% follow-up)	Retrospective cohort study or follow-up of untreated control patients in an RCT; Derivation of <u>CDR+</u> or validated on split-sample\$\$\$ only	Exploratory** cohort study with <u>good+++</u> reference standards; <u>CDR+</u> after derivation, or validated only on split-sample\$\$\$ or databases	Retrospective cohort study, or poor follow-up	Analysis based on clinically sensible costs or alternatives; limited review(s) of the evidence, or single studies; and including multi-way sensitivity analyses
2c	"Outcomes" Research; Ecological studies	"Outcomes" Research		Ecological studies	Audit or outcomes research
3a	SR (with <u>homogeneity</u>) of case-control studies		SR (with <u>homogeneity</u>) of 3b and better studies	SR (with <u>homogeneity</u>) of 3b and better studies	SR (with <u>homogeneity</u>) of 3b and better studies
3b	Individual Case-Control Study		Non-consecutive study; or without consistently applied reference standards	Non-consecutive cohort study, or very limited population	Analysis based on limited alternatives or costs, poor quality estimates of data, but including sensitivity analyses incorporating clinically sensible variations.
4	Case-series (and <u>poor quality cohort and case-control studies</u>)	Case-series (and <u>poor quality prognostic cohort studies</u>)	Case-control study, poor or non-independent reference standard	Case-series or superseded reference standards	Analysis with no sensitivity analysis
5	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"	Expert opinion without explicit critical appraisal, or based on economic theory or "first principles"

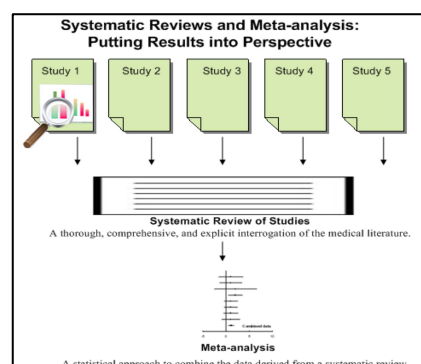
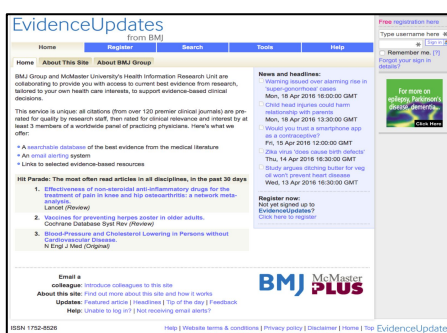
An area for your notes

Evidence-Based Health Care II

Haynes' 5s Pyramid Of EBM Resources:



- Studies: are original studies ex. cohort, cross sectional etc...
- Syntheses: are systematic review (multiple studies merged with meta analysis)
 - Condition were systematic review cannot be meta analyse
 - Zero studies, Heterogeneous data or Qualitative studies
 - Systematic review are done only when there is specific intervention and specific outcome
- Synopsis: are usually made by association they are appraised abstract (IOW abstracts with comments) it can be synopses of systematic review or synopses of studies
- Summaries: are guidelines which are everything related to a disease
- Studies and syntheses: primary sources and you need to appraise them.
- Synopses, Summaries and Systems are already appraised.
- A systematic review attempts to gather all available empirical research by using clearly defined, systematic methods to obtain answers to a specific question. A meta-analysis is the statistical process of analyzing and combining results from several similar studies.



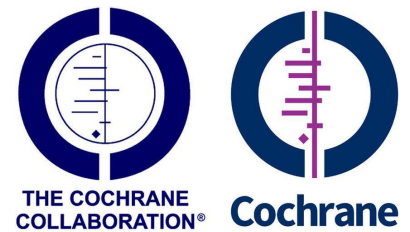
Evidence-Based Health Care II

Where Do You Search For Guidelines?

- BMJ Best Practice
- CMA Infobase
- Cochrane
- DynaMed
- EMBASE
- Essential Evidence Plus
- Medline
- National guideline Clearinghouse
- **TRIP database**

What is Cochrane?

- Archie Cochrane (1909-88)
 - British epidemiologist.
 - Advocated RCTs to inform healthcare.
- Cochrane collaboration
 - Cochrane Reviews (>4,000) registered.
 - Identify, appraise and synthesise research-based evidence and present it in accessible format; regularly updated.
 - Focus on interventions.
 - Outstanding general resource.
- **It's filtered and critically appraised ebm resources:**
 - The Cochrane Library by The Cochrane Collaboration via Wiley
 - Independent non-for-profit international collaboration.
 - Reviews are among the studies of highest scientific evidence.
 - Minimum Bias: Evidence is included/excluded on the basis of explicit quality criteria.
 - Reviews involve exhaustive searches for all RCT, both published and unpublished, on a particular topic.
 - Abstracts searchable for free on the Internet; complete database is available via OVID in SDL for all universities. from 1995-



Evidence-Based Health Care II

Studies Are Primary Resources:

- **Global databases:**
 - (Cochrane, PubMed, Health PubMed, Ovid, Science Citations, grey literature, etc.)
- **WHO databases:**
 - (global / regional): observatories; scientific journals (WHO Bulletin / EMHJ); surveillance; surveys; ICTRP; CPG, etc.
- **National databases:**
 - ENSTINET, SaudiMedLit; NCHS, CAPMAS; healthcare delivery institutions (websites, reports); clinical trials; grey literature, etc.

PubMed:

- <https://www.ncbi.nlm.nih.gov/pubmed>
- Hands on training

PubMed Health:

- <http://www.ncbi.nlm.nih.gov/pubmedhealth>
- About Pubmed Health
 - PubMed Health provides information for consumers and clinicians on prevention and treatment of diseases and conditions.
 - PubMed Health specializes in reviews of clinical effectiveness research, with easy-to-read summaries for consumers as well as full technical reports. Clinical effectiveness research finds answers to the question “What works?” in medical and health care.
 - PubMed Health is a service provided by the National Center for Biotechnology Information (NCBI) at the U.S.National Library of Medicine (NLM).

Medline via OVID:

- Hands on training

Central Issues In Clinical Work, Where Clinical Questions Often Arise:

Clinical findings:	- how to properly gather and interpret findings from the history and physical examination. “Example: what are the most common symptoms of covid?”
Etiology/risk:	- how to identify causes or risk factors for disease (including iatrogenic harms). “Usually cohort study. Example: risk factors for IHD like obesity and smoking”
Clinical manifestations of disease:	- knowing how often and when a disease causes its clinical manifestations and how to use this knowledge in classifying our patients' illnesses. “Example: Percentage of patients with fatty liver develop liver fibrosis”
Differential diagnosis:	- when considering the possible causes of our patient's clinical problems, how to select those that are likely, serious, and responsive to treatment. “Example: The percentage of each Ddx in a patient with chest pain”
Diagnostic tests:	- how to select and interpret diagnostic tests, to confirm or exclude a diagnosis, based on considering their precision, accuracy, acceptability, safety, expense, and so on. “Example: Why did we decide that HbA1c should be maintained under 7%? Because studies concluded it meant less complications”
Prognosis:	- how to estimate our patient's likely clinical course over time and anticipate likely complications of the Disorder.
Therapy:	- how to select treatments to offer our patients that do more good than harm and that are worth the efforts and costs of using them.
Prevention:	- how to reduce the chance of disease by identifying and modifying risk factors and how to diagnose disease early by screening. “Example: COVID vaccine for prevention ”
Experience and meaning:	- how to empathize with our patients' situations, appreciate the meaning they find in the experience, and understand how this meaning influences their healing.
Improvement:	- how to keep up to date, improve our clinical and other skills, and run a better, more efficient clinical care system. “Example: Is it better to book appointments online or in person?”

YOU HAVE DONE IT

Lecture Quiz

Q1: Test your knowledge: What is the first step in the evidence based practice process?

- A- Applying research to practice
- B- Acquiring available research and evidence
- C- Assessing the impact of change
- D- Asking a clinical question
- E- Appraising the research quality

Q2: which one of the following Classifies the type of question What is the treatment?

- A- Question of etiology, risk
- B- Question of intervention/prevention
- C- Question of prognosis
- D- Question of diagnosis

Q3: which one of the following Classifies the type of question Does this person have the problem?

- A- Question of etiology, risk
- B- Question of intervention/prevention
- C- Question of prognosis
- D- Question of diagnosis

Q4: which one of the following Classifies the type of question Who(and how likely) will get the problem?

- A- Question of etiology, risk
- B- Question of intervention/prevention
- C- Question of prognosis
- D- Question of diagnosis

Q5: which one of the following Classifies the type of question What causes the problem?

- A- Question of etiology, risk
- B- Question of intervention/prevention
- C- Question of prognosis
- D- Question of diagnosis

THANKS!!

Obtained and edited from Team 437, by:

- Mohammed Ajarem

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*Special thanks to..
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*Send us your feedback:
We are all ears!*