



Evidence-Based Medicine

By:

Awwab Hammad - Asiel Habashneh - Osama Al Khatib



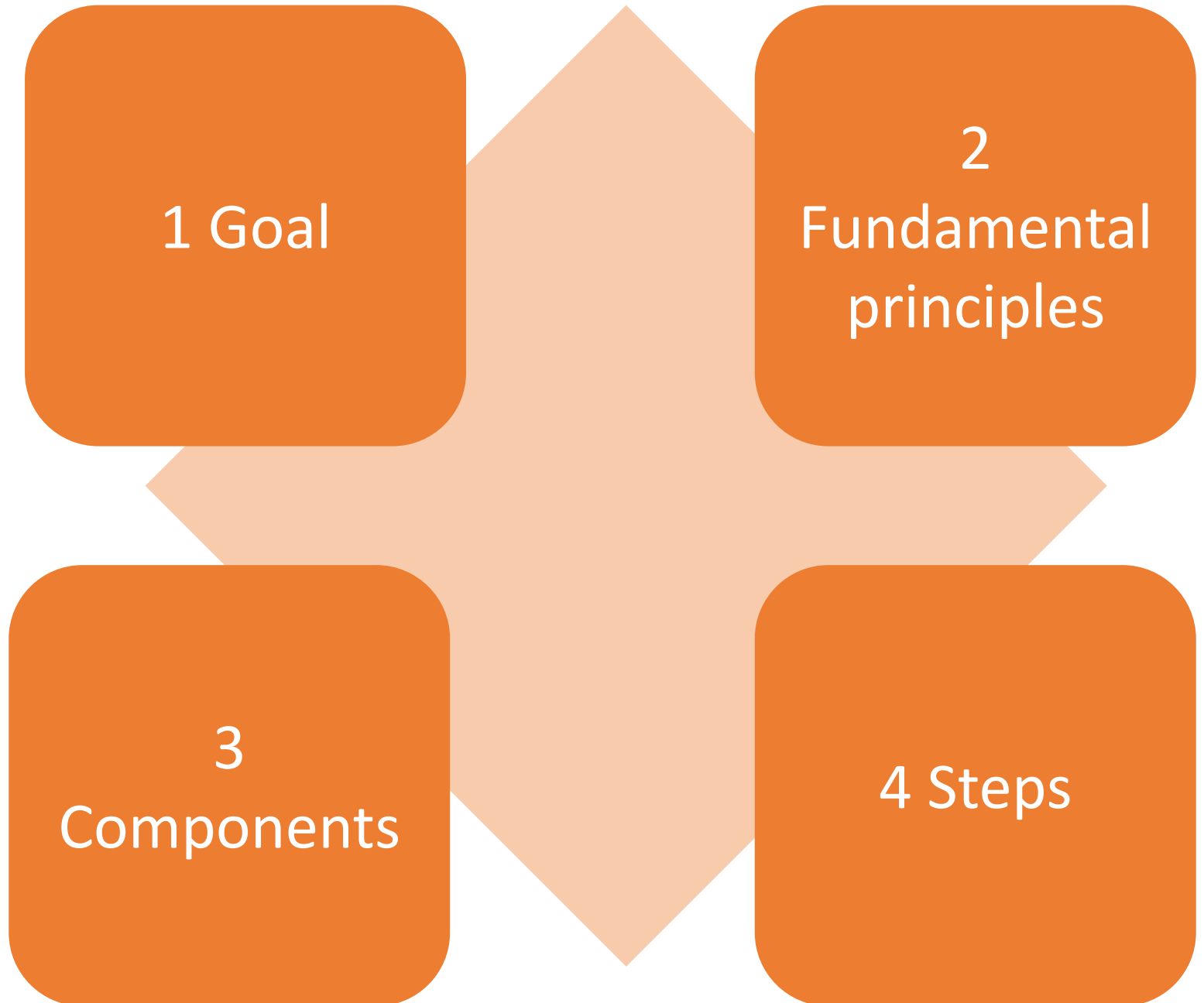
Definition

“Evidence- based medicine is the integration of best research evidence with clinical expertise and patient values”

- David Sackett

- Explicit, judicious, and conscientious use of current best evidence from medical care research to make decisions about the medical care of individuals.

EBM



What is
it?



Goal of Evidence-Based Medicine

To improve quality of clinical care by integrating new evidence that is being generated which can create changes in the way patients are treated.

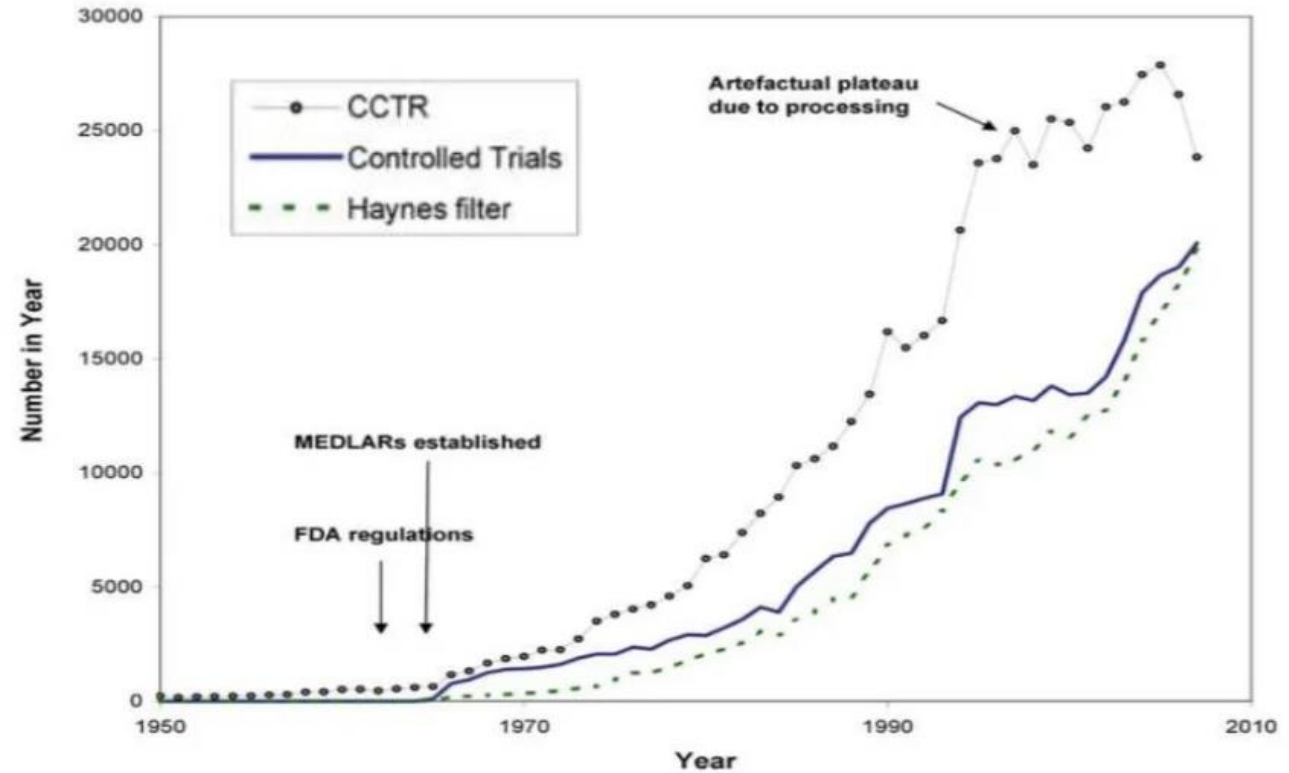
But how much is actually being applied to patient care?

Although new evidence is generated on a daily basis physicians don't get it.

- Lack of time
- Out of date textbooks
- The disorganization of the up-to-date journals.



Rapid increase
in evidence calls
for better skills
to keep up-to-
date more
efficiently than
previous
generations of
clinicians.



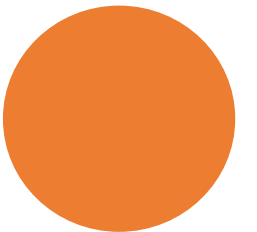
Example on EBM

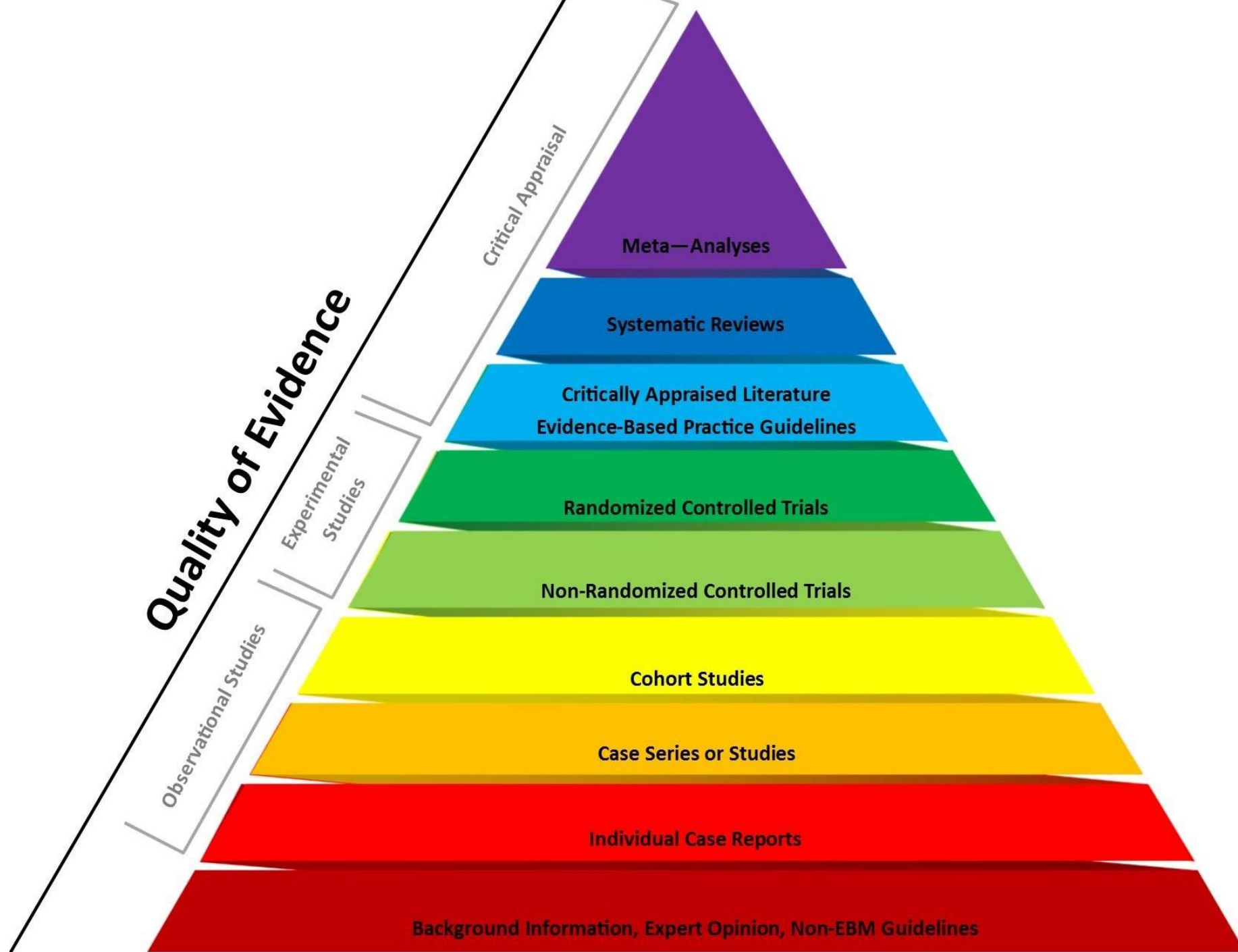
- Mr.Q is a 60yr old man presenting with retrosternal chest pain of 1 hour duration.
- ECG shows lateral ST-elevation consistent with acute MI.
- In this patient does treatment with aspirin reduce mortality?
- In 1988 new evidence appeared supporting the reduction of mortality in acute MI with streptokinase and aspirin therapy.
- Application of this new evidence was poor in 1997 where aspirin was not given to 55% of patients following acute MI, and 78% of patients who did receive aspirin received it more than 30mins after arrival to the ER

Principles of Evidence-Based Medicine

A) Hierarchy of evidence:

Evidence available in any clinical decision making can be arranged in order of strength based on likelihood of freedom from error.






Identifying the **Best** Study

Type of Question	Suggested best type of Study
Therapy	RCT > cohort > case control > case series
Diagnosis	Prospective, blind comparison to a gold standard
Etiology/Harm	RCT > cohort > case control > case series
Prognosis	Cohort > case control > case series
Prevention	RCT > cohort > case control > case series
Clinical Exam	Prospective, blind comparison to gold standard
Cost	Economic analysis

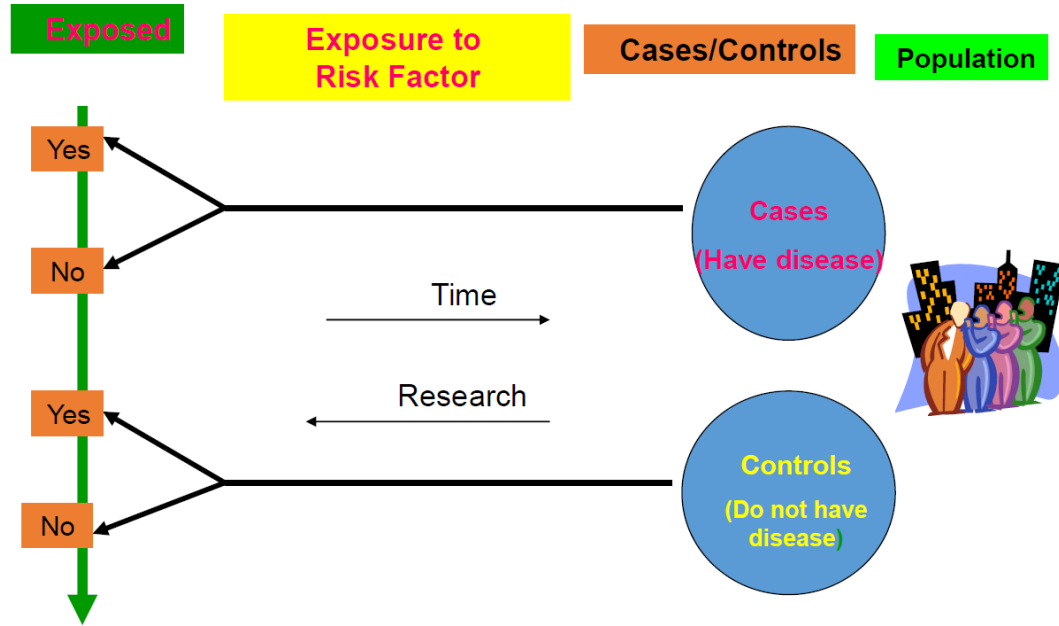


Observational Studies

1. **Case series** and **Case reports**

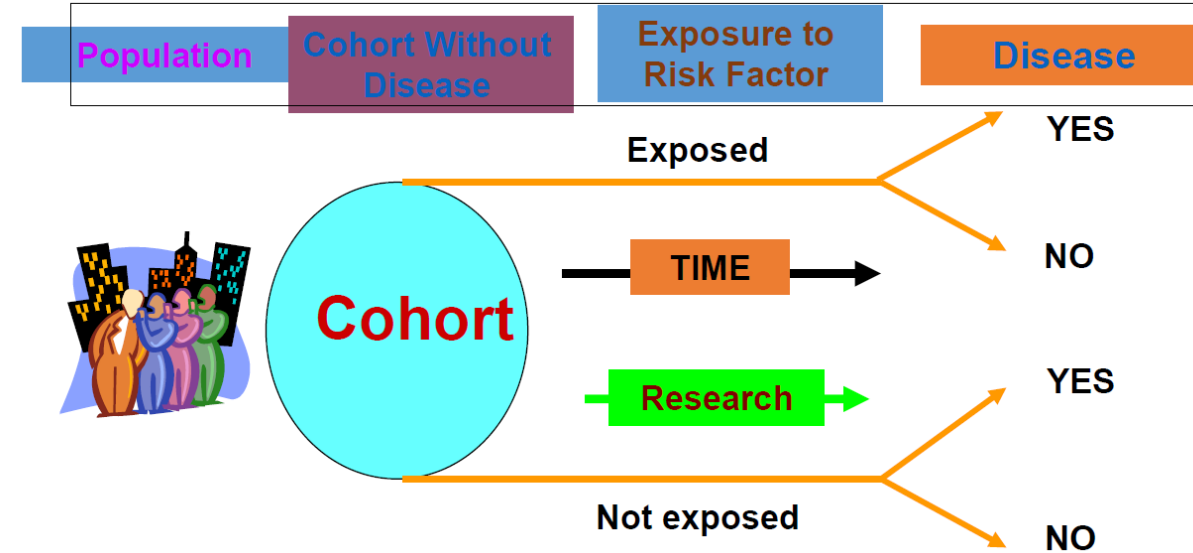
- Collections of reports on the treatment of **individual patients** or a report on a **single patient**.
 - **No control groups** with which to compare outcomes, so **limited** statistical validity.
- 

2. Case control studies



- Researcher looks back to identify **factors** or **exposures** possibly associated with the condition, often relying on **medical records** and **patient recall**.
- Starts with patients who already have the **outcome** and looks **backwards** to possible exposures or

3. Cohort studies

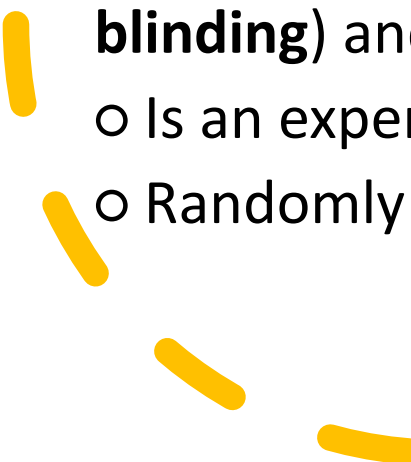


- Take a large population who are already taking a particular treatment or have an exposure, follow them **forward** over time, and then compare for outcomes with a similar group that has not been affected by the treatment or exposure.
- Starts with the **exposure** and follows



Experimental Studies

4. Randomized, controlled clinical trials

- Carefully **planned** projects that introduce a **treatment** or **exposure** to study its **effect** on patients.
 - Include **methodologies** that **reduce** the potential for **bias** (**randomization** and **blinding**) and allow for **comparison** between intervention and control groups.
 - Is an experiment and can provide sound evidence of **cause** and **effect**.
 - Randomly assigns exposures and then follows patients forward to an outcome.
- 



Clinical Appraisal Studies

5. Systematic Reviews

- o Usually focus on a clinical topic and answer a specific question.
- o An extensive literature search → identify studies with sound methodology.
- o The studies are reviewed, assessed, and the results are summarized according to the **predetermined criteria** of the review question.



6. Meta-analysis

- o Thoroughly examines several valid studies on a topic & combines the results using accepted statistical methodology to report results as if it were one large study.

Principles of Evidence- Based Medicine

B) Insufficiency of evidence alone:

The second fundamental principle of EBM is that **evidence alone is never sufficient for decision-making**. It has to be integrated with **clinical expertise** and **patient's expectations, values and circumstances**.









Components of Evidence-Based Medicine

Expertise of the decision-makers

Example 1:



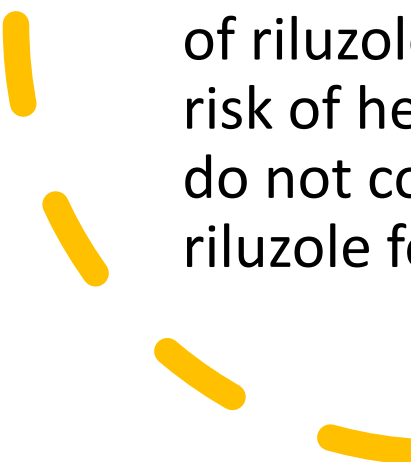
A 28-year-old man is admitted to the intensive care unit with ascending paralysis and respiratory distress. The resident makes a diagnosis of Guillain–Barré syndrome (GBS) and starts to discuss evidence-based approaches to treat him. The consultant comes, takes history and suspects dumb rabies. It becomes clear that the patient had a dog bite 3 months ago and received only partial immunization. Further investigation confirmed the suspicion of dumb rabies, and the patient was shifted to Infectious Diseases Hospital for further treatment. The whole discussion on GBS was irrelevant. This example illustrates the role of expertise in practicing EBM. If the diagnosis is wrong, all the EBM discussion is superfluous.



Components of Evidence-Based Medicine

Expectations, values and circumstances of the patients/people

Example 2



The diagnosis of motor neuron disease (amyotrophic lateral sclerosis) requires certain level of expertise and experience. Once the diagnosis is made, one can look for evidence in favor of certain treatments like riluzole. It turns out that there is definitive evidence from RCTs and meta analysis indicating that riluzole can prolong tracheostomy – free life for 3 months if taken regularly (usually for years). The cost of riluzole treatment is prohibitive “very high prices”. In view of the high cost and risk of hepatotoxicity, many neurologists and their patients do not use this. Patients do not consider it ‘worth it’; however, some patients who can easily afford to take riluzole for the treatment of this condition are prescribed with this drug.



The Four Step EBM Model

The practice of EBM involves 4 essential steps

Step 1

Formulating answerable clinical questions

- One of the difficult steps in practicing EBM may be the translation of a clinical problem into an answerable question
- When we come across a patient with a particular problem, various questions may arise for which we would like answers . These questions are frequently unstructured and complex and may not be clear in our minds
- PICO is a useful framework for making clinical questions more focused and relevant (patient or problem, intervention, comparison, outcome)

PICO

- To illustrate the concept of PICO, imagine that you have a four-month-old baby admitted to your ward with viral bronchiolitis. The child's symptoms get progressively worse, and you wonder whether giving corticosteroids might help the child improve and reduce the length of stay in hospital. You decide to use "clinical score" as a measure of improvement. The key components of your clinical question would be:
 - *Patient or problem*: 4-month-old baby with viral bronchiolitis.
 - *Intervention*: corticosteroids.
 - *Comparison*: no corticosteroids.
 - *Outcomes*: clinical score, length of hospital stay.

Step 2

Finding the evidence

- Once you have formulated your clinical question, the next step is to seek relevant evidence that will help you answer the question.
- There are several sources of information that may be of help such as asking your colleagues or experts, you can also use online electronic databases which allow thousands of articles to be searched in a relatively short period .
- Effective searches aim to maximize the potential of retrieving relevant articles within the shortest possible time.


Step 3 Critical appraisal of the papers

- After you have obtained relevant articles on a subject, the next step is to appraise the evidence for its validity and clinical usefulness.
- There are four issues in the critical appraisal such as relevance, validity, consistency and importance of the results





- **Relevance:-** Relevance refers to how much the information from the chosen literature applies to your clinical question. This is done by comparing the research question in the paper with your clinical question using PICO.
- **Validity:-** how well the results among the study participants represent true findings among similar individuals outside the study. There are two types of validity , Internal and external validity
- **Consistency:-** It refers to which the research results are similar across different analyses in the study and are in agreement with evidence outside the study
- **Results:-** Significance of the results depends on the type of question asked and whether the results were statistically significant and can be applied to patients.

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Step 4 Applying the evidence

- When we decide after critical appraisal that a piece of evidence is valid and important, we then have to decide whether that evidence can be applied to our individual patient or population. In deciding this we have to take into account the patient's own personal values and circumstances.
- The decision to apply evidence should also take account of costs and the availability of that particular treatment in your hospital or practice

References:

- 1) Dr. Farihan's slides
- 2) Clinical epidemiology; Fletcher and Fletcher
- 3) Source: Clinical epidemiology; Fletcher and Fletcher