



**Evidence based
medicine**

The March 1,
1981

- article titled “How to read clinical journals: I. Why to read them and how to start reading them critically.”
Written by David Sackett, MD (1934–2015) of McMaster University.
- it introduced a series of articles that highlighted the importance of critical appraisal of the literature.

Starting in 1993

- a set of articles in the *Journal of the American Medical Association* titled “Users’ guides to the medical literature” reprised and expanded on the earlier series.
- These works, and other efforts by their authors, made critical appraisal of the literature accessible to the masses and laid the groundwork for evidence-based medicine (EBM).

the early 1990s

- **Gordon Guyatt, MD, coined the term “evidence-based medicine”, while he served as the internal medicine residency program director at McMaster University.**
- **Dr. Guyatt and colleagues had incorporated critical appraisal of the literature into the residency program curriculum, and Dr. Guyatt wanted a term to describe and advertise their efforts.**

What Is Evidence -Based Medicine?

In simple terms, it means using the current best evidence in decision-making in medicine in conjunction (together) with expertise of the decision-makers and expectations and values of the patients/people



EBM

The diagram features a central red arrow pointing right, labeled 'EBM'. To its right are four rounded rectangular boxes arranged in a 2x2 grid. The top-left box is olive green and contains the text 'Has one goal'. The top-right box is a darker green and contains 'two fundamental principles'. The bottom-left box is a medium green and contains 'three components'. The bottom-right box is a teal color and contains 'four steps.'. A light blue arrow shape is behind the grid, pointing from the 'EBM' arrow towards the right.

Has one goal

two
fundamental
principles

three
components

four steps.

Goal of EBM

EBM has one goal: to improve the health of people through decisions that will maximize their health-related quality of life and life span.

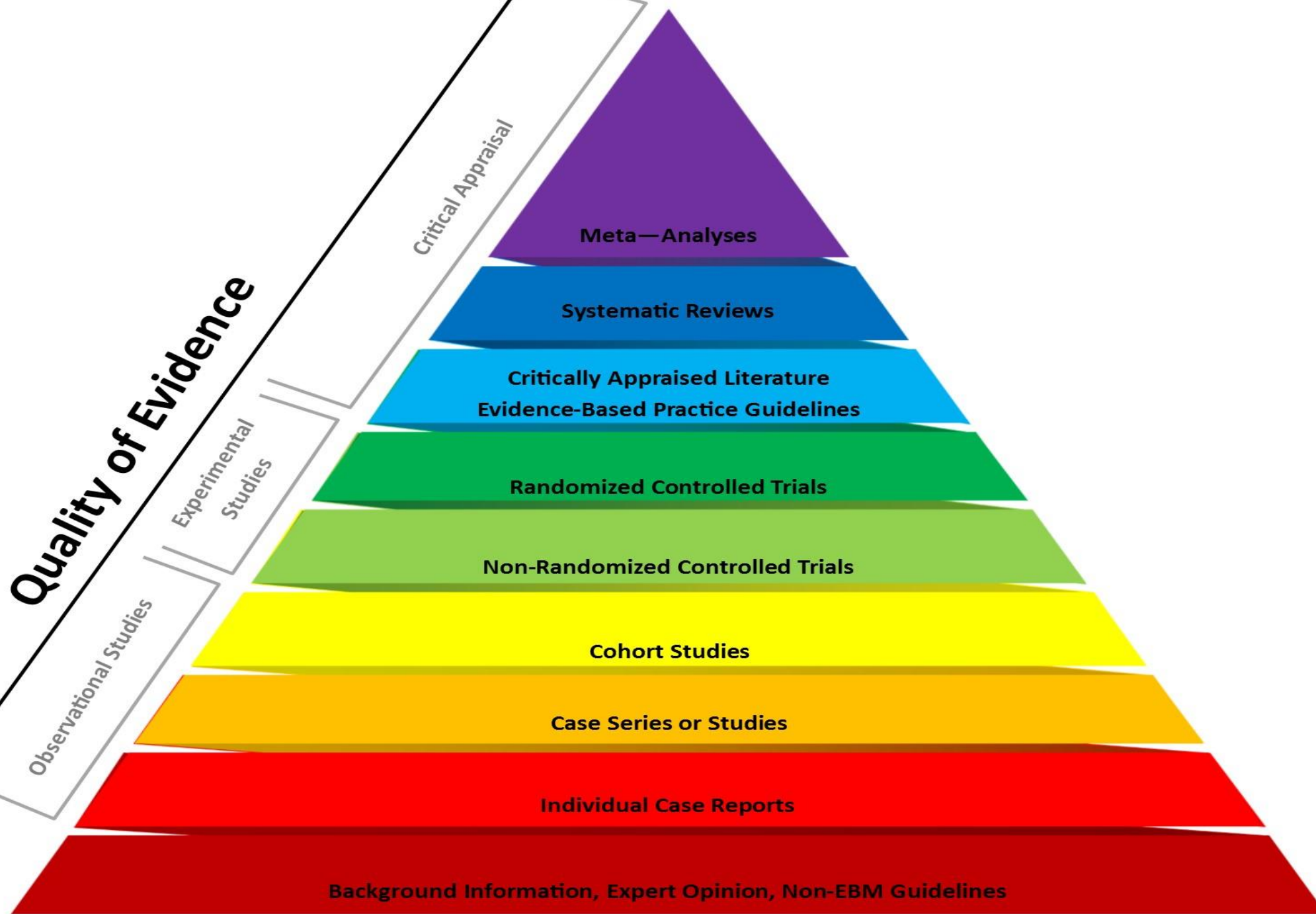
The decisions may be in relation to public health, health care, clinical care, nursing care or health policy

(a) Hierarchy of evidence :

It says that evidence available in any clinical decision making can be arranged in order of strength based on likelihood of freedom from error.

For example, for treatment decisions, meta-analyses of well conducted large randomized trials may be the strongest evidence, followed in sequence by large multi-centric randomized trials, meta-analyses of well conducted small randomized trials, single-centre randomized trials, observational studies, clinical experience or basic science research.

Quality of Evidence





Why do we do clinical
research ?

1- to prove or disprove whether an association between a potential cause and an outcome is casual or coincidental .

1- to prove whether an intervention works , and if it does , whether its benefit outweighs its harm

Two giants in medical research have proposed for causation.

The first Robert Koch , the discoverer of the cause of tuberculosis .

the second was Austin Bradford Hill, the man who performed and published the first two randomized clinical trials and who proposed criteria for establishing a casual relationship.

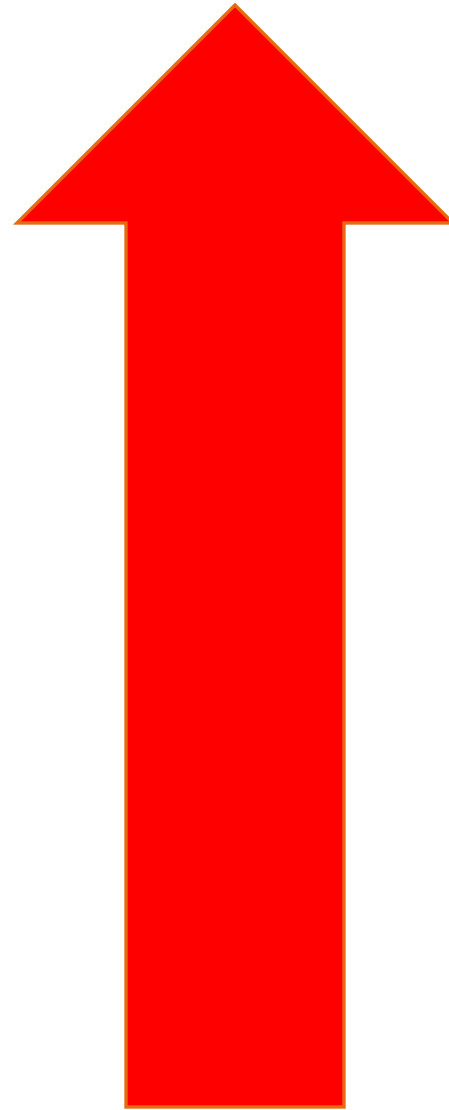
B) Insufficiency of evidence alone : The second fundamental principle of EBM is that evidence alone is never sufficient for decision-making. It has to be integrated with clinical expertise and patients' expectations and values.

This principle gives rise to considerations of components of EBM which follows below.

In one sense, EBM is a misnomer, because besides evidence, two other Es are required for decision-making, namely:

(a) Expertise of the decision-makers

(b) Expectations and values of the patients/people



**To illustrate
the
importance
of the two Es,
other than
evidence, two
examples
follow.**

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 rabies. It becomes clear that the patient had a dog bite 3 months ago and received only partial immunization



This example illustrates the role of expertise in practicing EBM.

If the diagnosis is wrong, all the EBM discussion is not needed

Further investigation confirmed the suspicion of rabies, and the patient was shifted to Infectious Diseases Hospital for further treatment. The whole discussion on GBS was irrelevant.

Example 2

Expectations, values and circumstances of the patients/people

(A) 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. In view of the high cost and risk of hepatotoxicity (and the need to pay out of pocket in India), many neurologists and their patients do not use this.

Example B

B-There is a consistent evidence to show that alcohol in moderation is protective against heart attacks and stroke. However, in Islam, alcohol is forbidden. It would be unacceptable to discuss alcohol intake in moderation with a Muslim even if he has many risk factors for heart attack and stroke.

steps of EBM

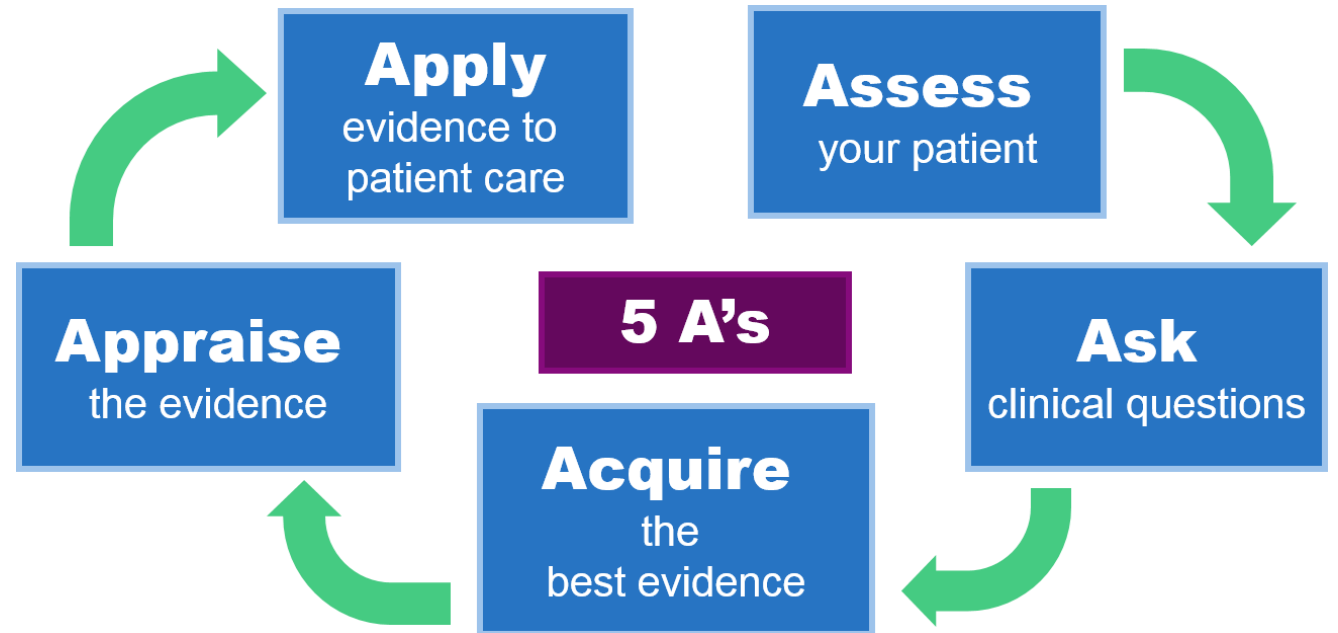
four key steps (4 As) are necessary

Ask for the required information by formulating your question.

Acquire (find) the information by searching resources.

Assess or appraise the relevance, quality and importance of the information.

Apply the information in your practice or patient.



Step 1: Asking for the Required Information in the Form of a Question

specify the following in your clinical questions:

(a) Patient population: type of patients

(b) Intervention (new): the new approach or strategy of treatment

(c) Comparison: the control intervention

(d) Outcomes: clinically meaningful outcomes that are important for the patients

The acronym 'PICO'

Step 2

: Acquiring
(Searching for) the
Evidence

Step 3: Assessment or Critical Appraisal of the Papers

(a) Relevance

(b) Validity

(c) Consistency

(d) Importance or
significance of
results

There are four issues in the critical appraisal:

(a) Relevance



refers to the extent to which the research paper matches your information need.

Comparing the research question in the paper with your clinical question would help you to determine the **Relevance** of the paper. **Relevance** of the paper question would make it easy to take the decision. Many a times, you may find a match between the population and/or intervention, but the outcomes are different. Unless you find another paper with the

it may be advisable to proceed with the paper

Validity

refers to the extent to which the results are free from bias

Biases are mainly of three types

1. Selection bias

2.
Measurement
bias

3. Bias in analysis

In all types of studies, you must look for these biases

All kinds of studies need to be assessed for the above biases, while assessing validity

If a bias is present, you should ask the next question – so what? Does it affect the internal validity or external validity?

what these terms mean?

Internal validity

is the extent to which a study establishes a trustworthy cause-and-effect relationship between a treatment and an outcome.

2. External validity asks the question: To which population are the results of the study applicable or generalizable?

External validity is judged in terms of time, place and person.

Can the results be extrapolated to the current or future time

to different geographical region or settings and to patients outside the study?

(c) Consistency

refers to the extent to which the research results are similar across different analyses in the study and are in agreement with evidence outside the study.



Consistency may be internal or external.

(d) Significance of the information (results)

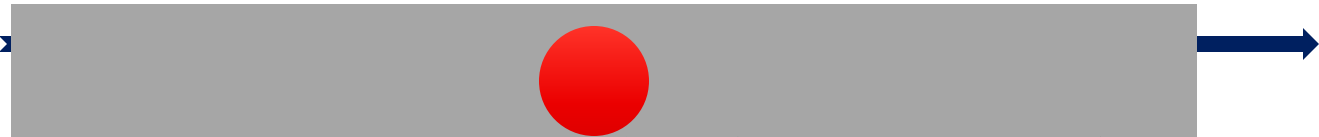
This needs to be evaluated in the light of the type of paper. For therapy (treatment) and diagnosis (test) paper, you need to ask:

1. How did the new treatment or test perform in the study?
Were the results statistically significant and clinically important?

2. What information can you take from the study to your practice/patient?

Step 4: Applying the Results to Your Patient

Having found that the information in the paper is relevant, valid, consistent and important, the question is whether the test or treatment will be useful for your patient/practice



You need to determine (or best guess) your patient's disease probability or risk of adverse outcome and then consider how these will change with the application of the new test or treatment. Whether this change is worth the risk and cost of the new interventions?

What does your patient think about the benefits and risks associated with the new test or treatment?

These considerations would help you to apply (or not to apply) the results of the paper and take a decision.

A practice which is based on these considerations is aptly called 'evidence-based clinical practice'



Thanks