Introduction to Evidence-Based Research

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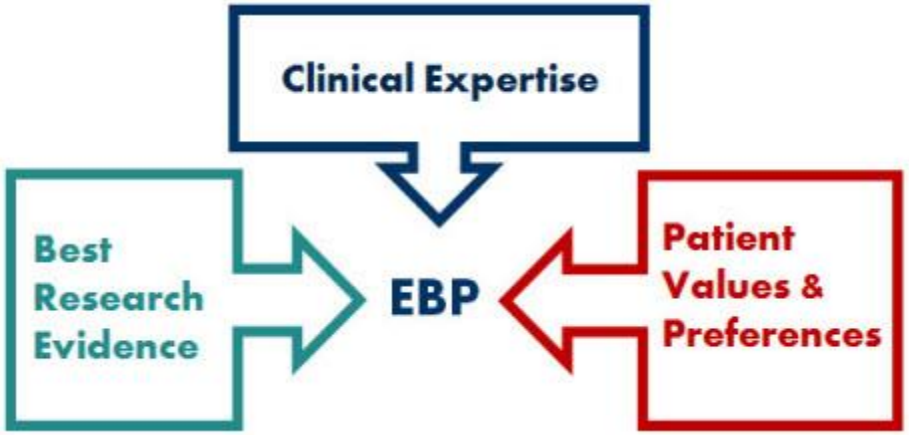
Objectives

- Define evidence based research, identify process steps and know where the library services fit
- Recognize types of studies and understand how they related to levels of evidence
- Formulate literature searches to find such evidence
- Know where to go for additional information



The definition of EBM comes from Sackett et al,[1] who defined it as the “integration of the best research evidence with clinical expertise and patient values to make clinical decisions.”

1. Sackett DL, Rosenburg WM, Gray JA, Haynes RB, Richardson WS. Evidence-based medicine: what it is and it isn't. BMJ. 1996;312:71–72.

Steps in Evidence Based Research

1. Asking answerable questions
2. Finding the best evidence
3. Critically appraising the evidence
4. Applying a decision
5. Evaluation

Heneghan C, Badenoch D. *Evidence-based medicine toolkit.* 2d ed. Malden, MA: Blackwell, 2007

Step 1 - Question

Asking answerable questions – focused, searchable, clinical

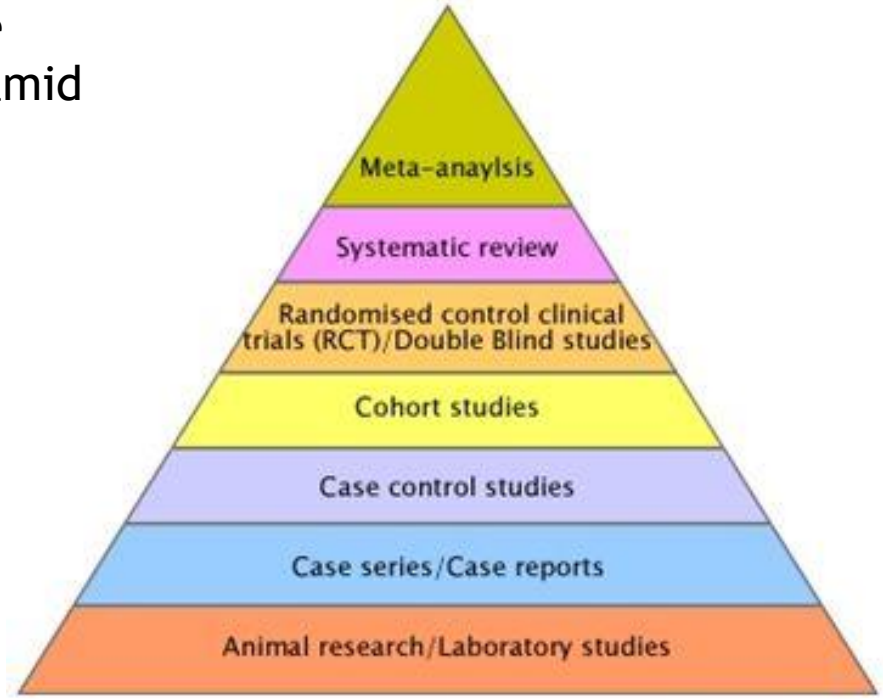
- PICO
  - Patient, Problem, Population
  - Intervention or therapy
  - Comparison, Control, Context
  - Outcome

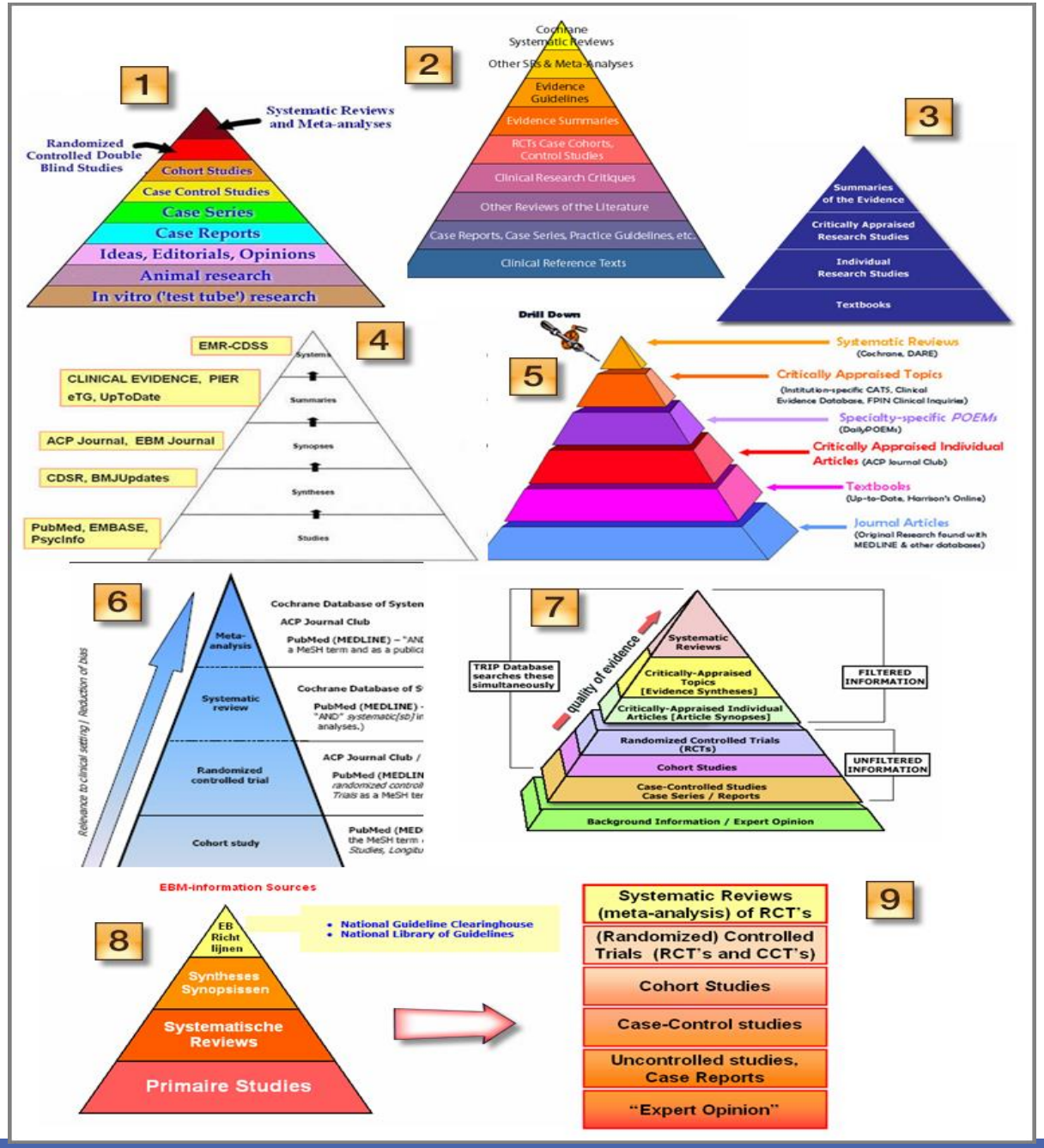
Step 2 - Studies

Finding the best evidence with which to answer the question through structured searches and understanding the literature

- Primary Studies
  - Clinical trials
  - Randomized Controlled Trials
  - Multicenter studies
- Secondary (synthesized, summarized) Studies
  - Reviews
  - Meta-analyses

The **EVIDENCE PYRAMID** is often used to illustrate the development of evidence. At the base of the pyramid is animal research and laboratory studies - this is where ideas are first developed. As you progress up the pyramid the amount of information available decreases in volume, but increases in relevance to the clinical setting.



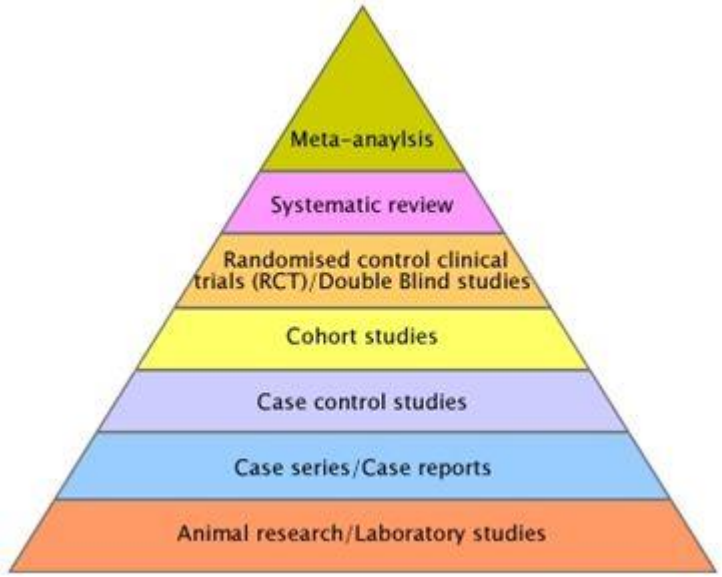


Too Many Pyramids!

Case Series - report on a series of patients with an outcome of interest. No control group is involved.

Case Control Study - study which involves identifying patients who have the outcome of interest (cases) and patients without the same outcome (controls), and looking back to see if they had the exposure of interest.

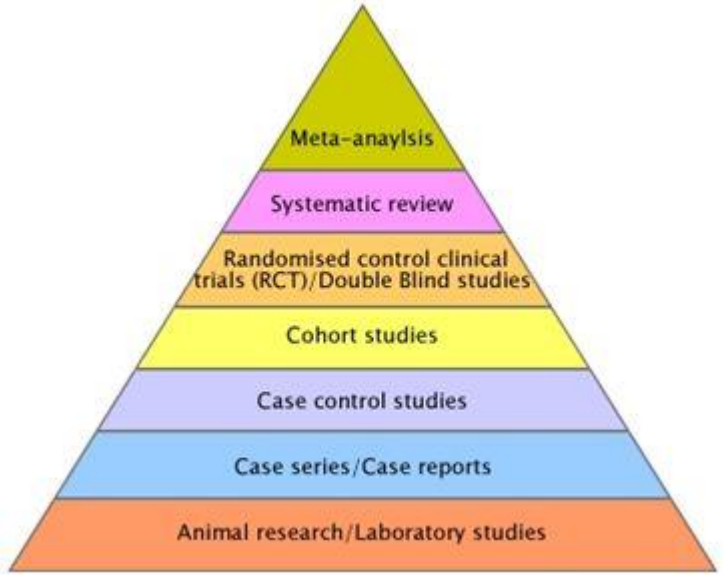
Cohort Study - Involves identification of two groups (cohorts) of patients, one which received the exposure of interest, and one which did not, and following these cohorts forward for the outcome of interest. (Can be prospective or retrospective)



Randomized Controlled Trial - Participants are randomly allocated into an experimental group or a control group and followed over time for the variables/outcomes of interest.

Systematic Review - summary of the medical literature that uses explicit methods to perform a comprehensive literature search and critical appraisal of individual studies and that uses appropriate statistical techniques to combine these valid studies.

Meta Analysis - systematic review that uses quantitative methods to synthesize and summarize the results.



Definitions from Centre for Evidence-Based Medicine Toronto

Step 3 – Critical Appraisal

Critically appraising the evidence for its validity (closeness to the truth), impact (size of the effect) and applicability (usefulness in clinical practice)

- Is it valid? (Well designed study?)
- Is it important? (Impact on my patient)
- Can it help? (Is it applicable to my patient?)

Step 4 – Application

Applying a decision - Combining findings to make a recommendation, placing the evidence into context, incorporating recommendation into a specific patient situation, clinical setting or organization

- How much will it help a patient or population?
- Does it meet their values and goals?
- Is it cost-effective?

Step 5 - Evaluation

Evaluation - Determining and measuring the effectiveness of the practice change over time

- How could it be done better next time?
- What is the outcome of using (or not using) particular information and its impact on clinical practice?

So how do we find the evidence?

Primary Research - Bibliographic Databases

- PubMed
- Alternative Health Databases

Filtered Information/Secondary Sources

- Cochrane Database of Systematic Reviews
- Practice Guidelines
- Computerized Decision Support (UpToDate, etc.)

Tertiary Sources

- Textbooks

Demos!

iSearch

PubMed

UpToDate

Scholarly Journals

- NEJM
- J Compl Alt Med

- Peer-reviewed
- Scientifically valid

VS

Trade Publications

- NDNR Newsletter
- Homeopathy Links
- Townsend Letter

- Current trends
- Interest articles
- News / opinions

Be Critical: Who, What, Where, When and Why

Commercial intent? Authoritative? Accuracy?
Relevance? Personal bias?

Keyword

- Word you choose
- Non-specific
- Generally searches abstract, title, and subject headings

VS.

Subject heading

- Standardized terms
- Single or “controlled” vocabulary
- Consistent
- Helps to eliminate non-relevant results

Searching using
keywords and subject headings
yield **DIFFERENT** results