What is Evidence-Based Medicine (EBM)?

The conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients.\*

\*Sackett, DL. Evidence Based Medicine: What it is and what it isn’t. *BMJ.* 1996. Jan 13, 312, (7023): 71-2.

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The EBM process can be divided into a framework called the **5A Process**.\*

**5A Process**

1. Assess: Start with the patient—a clinical problem or question arises from the care of the patient.

2. Ask: Construct a well-built clinical question.

3. Acquire: Select the appropriate resource(s) and conduct a search.

4. Appraise: Appraise that evidence for its validity and applicability.

5. Apply: Return to the patient - integrate the evidence with clinical expertise, patient preference, and apply it to practice.

\*[EBP's 5-Step Process](http://hsl.mcmaster.libguides.com/physician-assistant/ebp). McMaster University. Accessed December 2018. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This tutorial will focus on steps 2 and 3: **Ask** and **Acquire**.

2. **Ask**: Construct a well-built clinical question.

3. **Acquire**: Select the appropriate resource(s) and conduct a search.

**Ask**

Let’s take a look at how to construct a focused clinical question from a patient encounter and develop a search strategy using the acronym, **PICO-TT\***.

**PICO-TT** stands for:
P = patient/problem/population

I = intervention

C = comparison intervention

O = outcome

T = type of question

T = type of study/publication

Let’s go through each letter of **PICO-TT**.

**P = Patient/Problem/Population**

* Include a description of the patient or the target disease/disorder of interest.
* Age, sex, symptoms, etc.
* What are the most important characteristics of the patient? How would you describe a group of patients similar to yours?

**I = Intervention**

* Could be a type of therapy, specific drug, or diagnostic/screening test.
* What main intervention, prognostic factor, or exposure are you considering? What do you want to do for the patient (prescribe a drug, order a test, etc.)?

**C = Comparison Intervention**

* This category is most relevant when looking at therapy questions. For many questions, you may not have a comparison.
* What is the main alternative to compare with the intervention?
* The comparison intervention may be a placebo, standard therapy, etc.

\*[Evidence-Based Medicine: PICO](http://libguides.gwumc.edu/ebm/picot). Himmelfarb Health Sciences Library.

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**O = Outcome**

* This category is used for the clinical outcome of interest to you and your patient.\*
* What do you hope to accomplish, measure, improve, or affect?
* Reduced mortality or morbidity, accurate and timely diagnosis

\*[The Well Built, Patient-Oriented Clinical Question](http://www.dartmouth.edu/~biomed/services.htmld/EBP_docs/clin_question_worksheet.pdf). Dartmouth Biomedical Libraries. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**T = Type of Question**

Most clinical questions fall into one of the following categories:

* Therapy
* Prevention
* Prognosis
* Diagnosis
* Etiology/Harm
* Cost analysis

**T = Type of Study/Publication**

The next slide is the traditional hierarchy of evidence. It depicts the variety of studies present in the literature. As you work your way up the pyramid, the evidence is of higher quality to make patient care decisions. Systematic reviews and meta-analyses are at the top while animal and test tube research are at the bottom.

**Hierarchy of Evidence**

Systematic reviews and Meta-analyses

Randomized controlled double blind studies

Cohort studies
Case control studies

Case series/Case reports

Editorials, opinions

Animal research

In vitro (”test tube”) research

Keep this chart in mind when you are searching the literature. All evidence is not of equal value. Systematic reviews are considered the best source of evidence because they analyze the results of many different trials focused on the same topic.

They provide a scientific rather than subjective summarization of the literature and can help decision makers to cope with the sheer volume of literature by summarizing it.

**Characteristics of a Systematic Review**

* Comprehensive identification and synthesis of all relevant studies on a given topic
* Based on clearly defined in-depth search of the literature
* Explicit criteria are used to appraise the quality of the papers reviewed
* Comprehensive list of all studies included, as well as excluded (with a justification for exclusion)
* Findings are analyzed using validated methods, such as a meta-analysis

**Meta-analysis**

A statistical technique to combine the results of several suitably similar studies into a single numerical estimate.

Unfortunately, you will not always find a systematic review or meta-analysis on your topic. They usually focus on therapy topics.

The next slide lists the types of studies to look for based on a particular type of clinical question.

|  |  |
| --- | --- |
| **Type of Question** | **Type of Study** |
| Therapy | Systematic Review, Meta-analysis, RCT |
| Prevention | RCT > Cohort Study > Case Control |
| Diagnosis  | Prospective, blind controlled trial comparison togold standard |
| Prognosis | Cohort Study > Case Control > Case Series/ Case Report |
| Etiology/harm  | Cohort Study > Case Control |
| Cost analysis | Economic analysis |

Note: Meta-analyses and systematic reviews, when available, often provide the best answers to clinical questions.

Let’s work through a sample case using the **PICO-TT** format.

**Sample Patient**

In your outpatient clinic, you see a 35-year-old, international businessman for a routine physical. He travels frequently for work, and he asks if there is anything he can take to relieve jet lag symptoms. He mentions that he read on Facebook that melatonin can help with jet lag.

The clinical question from this patient scenario could be:

Is melatonin effective for treating jet lag in adults?

Breaking the clinical question into PICO-TT could look like this:

**Patient** = 35-year-old-male

**Intervention** = melatonin

**Comparison** = placebo

**Outcome** = reduce jet lag symptoms

**Type of Question** = therapy

**Type of Study** = systematic review, meta-analysis, RCT

**Acquire**

For the rest of the tutorial modules, we will focus on the Acquire phase of the 5A EBM process.

**Developing a Search Strategy**

PICO-TT can not only help you focus your question, but it can also help you identify search terms. Identifying the possible types of studies that may answer your question will guide you to what resources to search.

For many clinical questions, you may only be using search terms for the problem and intervention, such as melatonin and jet lag. More complex questions will have a comparison and outcomes used as search terms.

**Narrowing your results**

If you need to narrow your search results, you can add more patient characteristics, such as age and gender, to your search.

Limiting to particular study types, such as randomized controlled trials, will also narrow your results.

**Expanding your results**

If you don’t find any articles on your topic, try to think about synonyms and related terms you can use as search terms.

Some related terms for jet lag are transcontinental travel, shift work, circadian rhythm sleep disorders, time zone, and sleep-wake cycle disorders.

Searching Library resources that contain systematic reviews and other secondary studies is a good place to begin your search for evidence.

**Secondary Studies**

Secondary studies summarize or draw conclusions from original research. They may also be referred to as filtered or synthesized resources.

Some examples of secondary studies are systematic reviews, meta-analyses, and practice guidelines.

They can save you time because someone has searched and summarized the information for you. However, you still need to evaluate the content for bias, quality, and relevancy.

**Secondary Studies**

Some library resources that contain secondary studies are the Cochrane Library and Essential Evidence Plus.

You can also filter your PubMed results to secondary studies.

**Primary Studies**

Some examples of primary studies, studies that report original research, are randomized controlled trials, cohort studies, and case reports. Primary studies may also be referred to as unfiltered or unsynthesized resources.

Searching PubMed is the best method to identify primary studies.

To find information for the therapy question about melatonin, we will start by searching library resources that contain secondary studies, such as the Cochrane Library.

The Cochrane Library includes full text systematic reviews, which address therapy topics and are high on the hierarchy of evidence.

Next, we’ll look at the Library’s Evidence-Based Medicine Resources page.