Accessing the “Evidence Base”

EBCP Module #6; CAPSI - 2016
Outline of Module

- Review: EBCP process & the four A’s
- Review: Background vs. foreground questions
- Review: Clinical question “Domains”
- The PICO method for searching MEDLINE
- Types of clinical questions
  - Intervention (treatment or prevention)
  - Diagnosis
  - Prognosis
  - Etiology
- Goal: Finding the “best available evidence”
Objectives of Module

- Students who complete this lecture should be able to:
  - Differentiate between foreground and background questions
  - Identify the EBCP “domain” of a foreground clinical question
  - Match question domain to most desirable study type
  - Develop well-constructed clinical questions in all four domains using the PICO format
  - Perform a basic Keyword search in MEDLINE using PICO terms
  - Identify common MEDLINE filters that are helpful in EBCP searches
  - Understand the concept of the MeSH database
Brief Review
The EBCP Cycle

- Ask
- Acquire
- Appraise
- Apply

Essential Steps of EBCP

Patient Dilemma
Let’s review: Background vs. Foreground questions

- Definition: EBCP involves integrating information from clinical experience with the goals and values of individual patients and the best available evidence* from scientific research.

- A helpful way to classify clinical questions is into “background” and “foreground” questions.
  - **Background questions** are broad. The answers to these questions are well-established and commonplace.
    - e.g. “What is tuberculosis?” or “What is amniocentesis?”
    - Best answered by secondary literature (synthesized or summarized sources)
  - **Foreground questions** pertain to a specific patient or problem.
    - Common in clinical practice → this type of question is the usual focus for applying EBCP techniques
    - Often best answered by primary literature (e.g. original research), but systematic reviews & meta-analyses or EBM summaries (e.g. Dyna-Med) may be available

- And how do we know if it is “best” (or even relevant)? This question will be the focus of the majority of future modules.
Types of clinical questions

- Among foreground questions, it is useful to further categorize your type of question into a *clinical domain*.

- In EBCP, the four primary domains for foreground questions include:
  - **Intervention** (treatment /therapy or prevention)
    - e.g. “Does use of a daily baby aspirin prevent heart attacks in middle aged men?”
  - **Diagnosis**
    - e.g. “What is the likelihood that a positive immunoassay result for HIV is false?”
  - **Prognosis**
    - e.g. “What is the long-term risk of recurrence after remission of invasive ductal carcinoma after partial mastectomy?”
  - **Etiology/Harm/Risk**
    - e.g. “Does consumption of diet soda during pregnancy increase the risk of birth defects?”

- These categories will assist you in determining the type of research study that is likely to provide the best available evidence, which in turn helps you to narrow and focus your search. For example:
  - Intervention questions generally are best answered by experimental studies
  - Questions that involve potential harms or other ethical considerations can only be studied with observational research designs
The PICO Method
Before we consider the various resources that can be used to search for answers to a clinical question, it is useful to learn the PICO method.

What is PICO?

PICO is just a silly acronym that is used to help remember the general parts of a searchable clinical question. It stands for:

- **P** – Patient and Problem (e.g. age, gender, disease)
- **I** – Intervention/Issue (e.g. a surgery or medication)
- **C** – Comparison (e.g. placebo or other treatment)
- **O** – Outcome (e.g. death or years of remission)
Variations on PICO

- The acronym “PICO” is generally used for clinical queries related to interventions (treatment or prevention).
- However, other types of questions may use variations of the PICO acronym.

For diagnosis questions:
- P – Patient
- T – Test
- S – Standard (e.g., you might compare a “new” test to a proven one)
- D – Disease

For prognosis questions:
- P – Patient
- F – Factors (e.g. additional qualifiers of patient’s condition, like “post-radiation therapy”)
- O – Outcome (e.g. years in remission)
Example of PICO

A 44 year old woman comes into your office. She has previously been diagnosed with clinical depression. The woman calmly explains to you that she will not be taking any “drugs” as this conflicts with her beliefs. She wants to know if St. John’s Wort is as effective as traditional antidepressants for treating her symptoms.

How might you break down her question into PICO format?
Example of PICO

- **P**: middle-aged, female, clinical depression
- **I**: St. John’s Wort
- **C**: Antidepressant treatment
- **O**: reduction of depressive symptoms

**Note**: You should always be able to restate your PICO as a plain language question.

- e.g. “For a middle-aged female with clinical depression, is St. John’s Wort as effective as antidepressants to reduce depressive symptoms?”
Databases of medical literature

- There are many existing databases in which you can find medical literature.
  - So many, really, that seeing them laid out in a list, it is often hard to know where to start.
    - Are they all the same? If not, how do you know which is best?
  - The type of resource you want to use will depend on whether you have a background or foreground question.
A few resources you should know about*

- **PubMed** – Run by the National Institutes of Health. Pubmed provides access to the bibliographic information of articles from most peer-reviewed medical journals in the world (and since before 1950!). If accessed on campus or using the off-campus proxy address provided here, you may use the library’s subscriptions to access individual articles. (Primary and secondary literature)

- **DynaMed** – An excellent point-of-care resource for common questions that includes summaries of synthesized information. (Secondary literature)

- **UpToDate** – Another excellent point-of-care resource for common questions. Summaries include evidence-based recommendations along with “expert” opinions. (Secondary literature)

- **Micromedex** – A resource for accessing, searching and navigating drug, toxicology and patient education information. Provides info on: dosing, adverse effects, indications and interactions. (Secondary literature)

- **AccessMedicine** – A database containing numerous well-regarded medical textbooks. A useful resource for “background” questions.

*You may find it worthwhile to bookmark some of these links as you may use them often.

All health sciences resources can be accessed from the A-Z list on the Hardin Library homepage: [http://www.lib.uiowa.edu/hardin/eresources/](http://www.lib.uiowa.edu/hardin/eresources/)
PubMed: A Primer

- While there are many databases that you will utilize to answer clinical questions, MEDLINE via PubMed is unique in both its breadth and complexity.
  - Therefore, it deserves some additional attention.

- PubMed is a digital interface that provides access to bibliographic information of articles from most peer-reviewed medical journals in the world.
  - PubMed (a product of National Institute of Health and the National Library of Medicine) contains the MEDLINE database in addition to other citations. Unlike many resources, PubMed is free! However, you should access it through the Hardin website to get access to full text while affiliated with the University of Iowa.
    - Of note, MEDLINE existed for decades in print form; PubMed debuted in 1997.
    - PubMed is an interface we use to search MEDLINE. It’s similar to using Google for searching the Internet. PubMed is a search engine. MEDLINE is a database.
If you prefer to watch a video rather than read, most of the remaining material in this module is presented in the Hardin Library YouTube video below.

You may watch it now or after you have completed the module, depending on your preferred learning style.

https://www.youtube.com/watch?v=5f7Hs4YfFi4&feature=youtu.be
Accessing articles using PubMed

- PubMed does not provide the full text of any articles but only provides links to these texts.
  - *Open access* articles are openly available to anyone through PubMed links. (These articles are often denoted as “free” in the accompanying button).
  - Other articles require use of the library’s subscription service and can be accessed digitally using the Infolink button.*

*Occasionally, you will encounter articles available only in print or from another library. The library’s Infolink button will provide the option to request digital copies of these articles. These requests are generally filled within a few business days.
Strategies for Using PubMed

- PubMed contains millions of citations and may become easily overwhelming.
  - Finding an article “needle” in the PubMed “haystack” requires specific strategies.

- Here, we present three strategies to improve your PubMed search:*
  1. Filters (study types, sex, age, etc.)
  2. Clinical Queries
  3. MeSH terms

* Note: For those unfamiliar with more basic aspects of PubMed, you may find a variety of useful tutorials at the library website: [http://www.lib.uiowa.edu/hardin/pubmed/](http://www.lib.uiowa.edu/hardin/pubmed/). You may also arrange to meet with a librarian to discuss your questions: [http://www.lib.uiowa.edu/hardin/contact](http://www.lib.uiowa.edu/hardin/contact)
Filters provide a very important way to focus your PubMed search results.

Filters are available from the PubMed page showing your search results.

They allow you to limit your search by article type, language, sex, age, date of publication and more.

Do NOT filter by “free full text” or “full text” availability. Use the InfoLink button instead to obtain full text available through the University’s subscription. Your student fees help pay for this access!
Study Types and Question Types

- Article type relates directly to the quality/validity of the information. We want to find the best available evidence, not “any” available evidence.

- Different study types are suited to different questions. For example:

  **Most Clinical Questions:** Meta-analyses, systematic reviews
  **Therapy:** Randomized Controlled Trial
  **Diagnosis:** Prospective, blind controlled trial compared to gold standard
  **Prognosis and Etiology/Risk/Harm:** Cohort study (best), case control, case series/case report
Filtering by Study Types*

- Some study types are available as filters in the left hand column of your search results screen. Other study types have to be included as search terms.

**Available as Filters:** Meta-analyses, systematic reviews, randomized controlled trial, case control, case series/case report are all filter options.

**Search Terms:** “Cohort study” is a good term to include for studies related to prognosis, etiology, risk, etc. For “prospective, blind controlled trial compared to gold standard” there is not a perfect term, so you might consider using “sensitivity and specificity” for diagnosis questions.

* Note: You will learn much more about these terms and study types later.
Levels of Evidence

This pyramid shows the levels of evidence with the highest levels at the top. In addition, it provides some guidance on selecting the appropriate resource based on the level of evidence/study type needed. A good general approach is to work top-down while also keeping in mind that different questions types are best answered by different types of studies.

Adapted from Supporting Clinical Care: An Institute in Evidence-Based Practice for Medical Librarians (2010). Evidence Pyramid. http://www.dartmouth.edu/~blmed/institute2010/
The Clinical Queries interface provides an additional strategy to narrow your search results.

- It is similar to the filters feature, but organized differently to provide additional functionality.
- It can be accessed via the PubMed homepage.
One great feature of the “Clinical Queries” interface is that it allows you to filter by type of clinical question.

*Note: You must enter search terms before you are allowed to change clinical study categories.
Another way to focus your search is to use MeSH terms. This is a more advanced searching technique.*

MeSH stands for “Medical Subject Heading.” MeSH terms are pre-specified “tags” used to categorize medical literature. They indicate the most relevant concepts covered in a paper. They often correspond to the terms in your PICO. Using MeSH terms focuses your search by reducing the number of irrelevant citations that are pulled. Very recent articles may not have MeSH terms. In addition, very new or specific terms may not have been added to the MeSH database. Use keywords in these cases.

MeSH terms can be found using the MeSH search interface as shown below. As these terms are pre-specified by PubMed, it is important that you search for MeSH terms to learn how they should be added to your search.

*Of note: Only articles indexed in MEDLINE have MeSH terms. This is another reason that it is relevant that PubMed indexes more citations than those in MEDLINE.
For some PubMed citations, you can expand the section indicated by the arrow to learn which MeSH terms have been assigned to an article (as shown on the following slide).
Below are the MeSH terms for this article on breast cancer.

MeSH Terms
- Aged
- Breast Neoplasms/chemically induced
- Breast Neoplasms/epidemiology*
- Causality
- Drug Combinations
- Estrogen Replacement Therapy/adverse effects*
- Estrogens, Conjugated (USP)/adverse effects*
- Female
- Follow-Up Studies
- Humans
- Incidence
- Mammography/utilization*
- Medroxyprogesterone Acetate/adverse effects*
- Middle Aged
- Postmenopause
- Risk Factors
- United States/epidemiology

You can add MeSH terms to future searches.

MeSH terms with an “*” are the major topics covered in the article.

This section serves only to introduce MeSH.
Demonstration & Practice
PubMed: Video Tutorial / Demonstration

- If you haven’t already done so, please watch the following tutorial demonstrating key word and MeSH searching in PubMed
  - Includes tips to make searching faster & easier
  - Created by a Hardin librarian (Amy Blevins) specifically for use by students in CAPS-I!

https://www.youtube.com/watch?v=5f7Hs4YfFi4&feature=youtu.be
A Practical Exercise

- Try using both Dynamed and PubMed to find answers to the PICO question considered on slide 17.
  - Do you notice a difference in the number of results you obtain?
  - How might you use MeSH, filters, or Clinical Queries to direct your PubMed search?
Key Points for Module 6

- During the “ask” and “acquire” steps of EBCP, it is useful to categorize clinical questions as “background” versus “foreground” and by type (intervention, diagnosis, prognosis, and etiology).

- PICO provides a valuable way for you to organize a clinical question and choose keywords for your search.

- Various databases exist to help find answers to clinical questions. These vary in focus and breadth.

- Knowing which study types are best suited to the different types of questions will help you find the best available evidence on a topic (Slides 26-28).

- PubMed is a particularly powerful and complex resource. Understanding how to use features such as filters, Clinical Queries, and MeSH terms may improve your likelihood of finding literature relevant to your question.
Please Complete the ICON Quiz

Thank you!

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