Answering a Clinical Question

While this phase of clinical research seems to be the least glamorous and often most overlooked, it is imperative to phrase an answerable, concise and focused question to help focus all following research steps.

Question Types:

- Background question
    - Based on theoretical knowledge from the past training of the professional
    - Usually not terribly useful to treatment and diagnosis type clinical questions
    - Usually used to fill a void in core knowledge in order to ask a more meaningful clinically relevant question
    - Example: What age of individual is most likely to develop osteoarthritis of the knee?
- Foreground question
    - Typically more clinically relevant
    - Takes a thorough background knowledge to proceed to this step
    - Example: For a 20-30 year old female with a diagnosis of lateral epicondylitis, is ASTYM more effective than therapeutic exercise at improving DASH functional scores?
    - This type of question can be directly related to a specific patient issue
- Thoughts on application
    - If posing a background question, look to textbooks, expert opinion, and basic science literature
    - If posing a foreground question, look to primary research of the appropriate type (Intervention, diagnostic, prognostic, etiologic, etc)
- PICO format
    - Whenever possible clinical questions should be presented in the PICO format
    - This allows for direct clinical application and assures a focused literature search
    - This will save you a tremendous amount of time reviewing irrelevant literature
    - If your question if too narrow you will not find enough citations
    - If your question is too broad you will aquire too many potentially non-useful citations
    - P – Population examined (gender, age, ethnicity, clinical diagnosis, etc)
    - I – Invervention (or diagnostic test) you are planning to investigate
    - C – Comparison intervention (or diagnostic test) – Can be no treatment or another intervention
    - O – Outcomes you will use to determine success (or diagnostic accuracy) – Can be function, ROM, strength, pain, work status, etc.

Types of Studies

- Intervention
    - Used to determine the effectiveness of a particular intervention
    - Usually linked to a desired outcome (Function, pain, work status, ROM, strength, etc)
    - Not useful at answering questions about diagnostic accuracy of a particular test or etiological questions
    - Common statistics used include t-test, ANOVA, and Chi Squared, number needed to treat (NNT)or harm (NNH)
- Diagnostic
    - Used to determine the accuracy of diagnostic tests
    - Usually compared to a reference or "gold" standard test
    - Can also use expert consensus in the absence of a reference standard
    - Not helpful in answering foreground questions related to a particular treatment intervention
    - Common statistics used include measured of validity (Sensitivity and specificity), minimal clinically important change (MCIC), reliability, + and - likelihood ratios, and well as positive and negative predictive values
- Prognostic
    - Used to follow patients with a known disorder over time
    - Helps determine level of illness progression
    - Not tied directly to treatment intervention but rather a particular diagnosis
- Etiology
    - Investigates the adverse effects of a particular stimulus
    - Can be a negative stimulus or even a treatment intervention
    - Usually compares the outcomes of a group exposed to a particular stimulus with a group not exposed
- Systems Reviews and Metanalyses
    - Narrative
        - An authors response to a body of literature but not subject to statistical comparisons
        - Any recommendations have an inherent risk of reviewer bias
        - However, potentially less bias than a primary article since the conclusions of multiple articles are compared
- Meta-analysis
    - Conclusions drawn from the statistical assessment of a body of literature
    - Less inherent bias if study methodology sound
        - Authors should predetermine inclusion and exclusion criteria for articles
        - Should outline their search strategies and methods for article critique
        - Should involve more than one reviewer
        - Should outline procedure for handling differing opinions of article outcomes

    - The conclusions drawn from these studies are limited by the quality and amount or research present on the given topic
- Practice guidelines
    - Statements to help guide the practitioners clinical decision making
    - Usually based on meta-analyses
    - Occasionally based on expert opinion (Although this type is more at risk of potential bias)
    - Usually the most clinically relevant of all the study types
- Thoughts on study selection
    - You must ensure that the studies you choose to review have the capacity to answer your clinical question
    - You will likely choose not to review a great deal of quality literature because it does not pertain to your particular question
        - This is a huge time saver if you can become proficient at this skill
    - You must review the methodology of the study to determine the value of the conclusions
        - The authors often make a conclusion that is not supported by their data
        - Do not get in the habit of only looking at the results and conclusion
        - Perform at least a cursory methods analysis to ensure the study is sound

Basic Search Engine Techniques (Pub Med used as an example)

- Choosing a search database
    - It is recommended to start with Medline (PubMed is free) as this will usually retrieve the largest number of citations
    - Unfortunately many journals commonly used in PT are not referenced on Medline
    - Second, choose another database (CINAHL is a good option for PT)
    - This helps you round out your search to journals Medline may have excluded
    - You will receive many duplicates between the databases so do not re-review previously reviewed articles
    - See **Literature Search Assistance** document for help finding appropriate search databases
- PubMed free database (**www.ncbi.nlm.nih.gov/sites/entrez**)
    - You can limit your search characteristics by using the pulldown bar above the search line
    - Keep in mind this will limit the number of results you receive

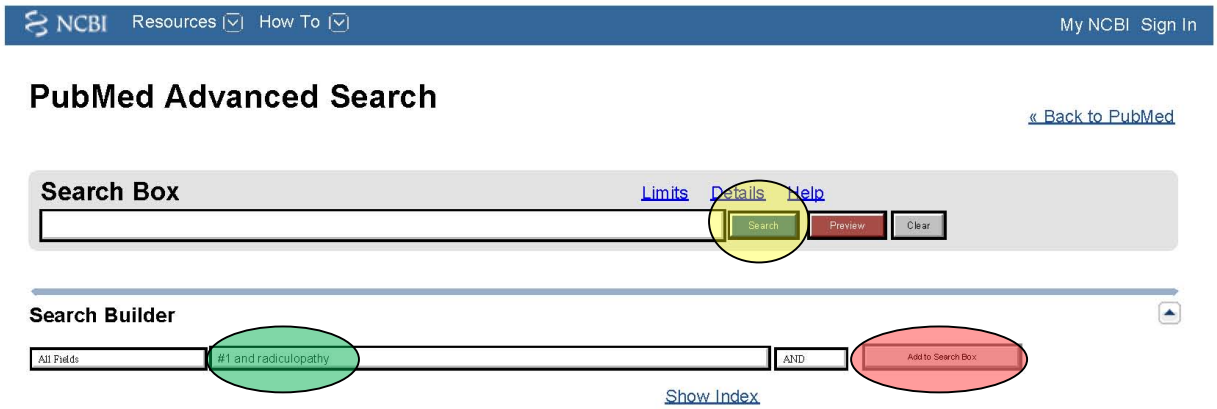
PubMed home

- A basic search can be performed by simply typing one component of your clinical question (Do not enter all the components)
- You can limit your results by adding more terms later

- You will then receive a list of applicable articles

- If the number of articles is too large proceed to the next step

- Refining a search
  - Click on the Advanced Search link at the top of the page
  - You will be directed to another page to add terms
  - In the search box add terms one at a time to limit your results (Starting with your initial component from the simple search) –
  - To add terms simply enter the number of the phrase you want to combine AND the new search component into the search builder box - **Green circle**
  - Click the add to search box link- **Red Circle** and then the blue search button above – **Yellow Circle**



- You will receive an updated search with fewer results

  - Continue this process, adding terms until you obtain a realistic number of articles to review
  - Pubmed will hold up to 100 search terms and will keep these search terms for at least 24 hours even if you close your web browser
  - Next look through the abstracts for applicability
  - For all selected articles refer to the **Literature Search Assistance** document to obtain the articles (preferably in full text)
- Expanding a search
  - If you obtain no results or very few results you may want to expand your search.
  - You can either choose a less specific term or you may choose to use the protocol for refining a search but select the OR box in the search builder

Other Databases

- The majority of other search databases are similar in form to the PubMed system
- Practice refining and expanding searches in the databases you use most often
- Make sure you keep record of the parameters of your search
  - The date of the search
  - Search terms used along with number of citations per search term
  - Results of selected articles
  - This will keep you from the laborious task of recreating a search if you either want to publish a study later or simply want to refine your search further

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