Outline

- Introduction
- Resources / Databases
- How to search
  - PubMed
  - TRIP Database
- Management of search results
Learning through play

- Try all “buttons”
- Make lots of “mistakes”
- Have fun
Introduction

Foundations of informed healthcare are:

- assessment of knowledge gaps,
- question formulation,
- gathering and synthesis of evidence and
- application of that evidence into clinical practice
Task

Questions:
- What is hypertension?
- What is Chagas disease?
- What is the role of a single dose versus short course of Primaquin in management of Plasmodium falciparum transmission?

Task:
Search and get the answer.
Where to search: you decide........
What is hypertension?
Which type of question is this?

A. Background
B. Foreground
C. Neither
D. I have no idea
Whether a single dose or short course of Primaquin added to treatments for malaria caused by Plasmodium falciparum infection reduces malaria transmission

What is an ideal study design to answer this question?

A. Cohort study
B. Case control study
C. Cross sectional study
D. Randomized controlled trial (RCT)
E. Systematic review of RCTs
Resources

- A resource’s usefulness is contingent on many factors such as:
  - Type of question
  - Availability of resources
  - Stage of your training
  - Your specialty
  - Your familiarity with the specific topic of a search
## Categories of Clinical Information Resources

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Degree of Evidence Processing</th>
<th>How Many Exist</th>
<th>Ease of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systems</strong></td>
<td>Textbook-like resources that summarize and integrate clinical evidence with other types of information directed at clinical practice decisions/directions</td>
<td>Substantial processing with the integration of evidence and practice—can direct care (give answers) or provide evidence on a clinical action</td>
<td>Few</td>
<td>Very easy</td>
</tr>
<tr>
<td><strong>Synopses</strong></td>
<td>Summaries of studies and systematic reviews that include guides or advice for application by expert clinicians</td>
<td>Evidence is externally assessed, with strengths and weaknesses provided for each article/topic</td>
<td>Several thousand</td>
<td>Easy</td>
</tr>
<tr>
<td><strong>Summaries</strong></td>
<td>Systematic review of articles and clinical practice guidelines—you assess the information and make decisions</td>
<td>Systematic reviews and high-quality guidelines summarize and present evidence from primary studies; some exemplary guidelines can also be considered synopses</td>
<td>Fewer than 50,000</td>
<td>Use may be time consuming and access to full text may require some searching</td>
</tr>
<tr>
<td><strong>Studies</strong></td>
<td>Individual studies (e.g., MEDLINE articles)</td>
<td>No processing of evidence at all—individuals must assess and apply</td>
<td>In the millions</td>
<td>Requires critical appraisal; hard to find and may require searching databases</td>
</tr>
</tbody>
</table>
Where to search?

Published studies

Shimberg Library
Main library e-journals
Inter library loan service

- General clinical questions
  - MEDLINE (PubMed)
    - Pubmed “Apps” and other resources
  - EMBASE
  - CENTRAL (Cochrane library)
  - Web of Science
Where to search?

Published studies

- Subject-specific databases
  - CINHAL, British Nursing Index, AMED
    - Nursing and allied health
  - PsychINFO, ASSIA
    - Social science, education, psychology and psychiatry
  - AgeLine, Childdata, Social Services Abstracts
    - Social and community health and welfare
Where to search? Published studies

- **Regional databases**
  - LILACS
    - Latin America and the Caribbean
  - PASCAL
    - Europe (fee based)
  - IndMED
    - India
  - CBM
    - China (in Chinese)
  - IMSEAR
    - South-East Asia
Where to search?

Ongoing/unpublished trials

- **National and International trial registries**
  - [Clinicaltrials.gov](https://clinicaltrials.gov)
  - [WHO International Clinical Trials Registry](https://www.who.int/ictrp)
  - [CenterWatch](https://www.centerwatch.com)

- **Industry trial registries**
  - GlaxoSmithKline (all attempted trials)
  - AstraZeneca, Bristol-Myers Squibb, Eli Lilly, Novartis, Roche, Wyeth (selected trials are reported)
Where to search?

**Hand-searching**

- Conference abstracts
  - ASH, ASCO, APHA,
- Snowball search
  - References from related systematic reviews and literature reviews
  - References in included studies
- Consult with content experts
Using the question to guide the search

- Scenario - You are interested in checking the hearing of elderly patients, and have heard that the ‘whispered voice test’ is good.

- Question
  - Population
  - Indicator (intervention, test, etc)
  - Comparator
  - Outcome
**PICO(TS)**

- **Question in a structured format**
  - Population – in elderly patients does
  - Indicator – a ‘poor’ whispered voice test
  - Comparator – a ‘normal’ whispered voice test
  - Outcome – predict abnormal audiogram
  - Type - diagnostic accuracy
  - Study design- cross sectional

- **Pubmed**
Case

- Lumbar supports (also called braces or corsets) are commonly used in the prevention and treatment of low-back pain.
- Is lumbar support useful in the management of lower back pain?
- How would you search for evidence to support your judgment / decision regarding buying a lumbar support brace?
  - Amazon?
  - Google?
  - Pinterest?
  - Facebook?
Truncation

- Most databases allow use of a symbol to assist in retrieving different endings for words

- Pathology in a search retrieves just that
- pathol* retrieves the root with any ending, i.e., pathology, pathological, pathologist, etc.

- * is the most common truncat* symbol
Boolean

Mathematical operators represented by words

- OR = addition; using “OR” results
- AND = intersect/union; using “AND” results
- NOT = subtraction; using “NOT” also results

- Math symbols (+,-) do not work;
- use OR AND NOT; and capitalized
“AIDS” AND “Tuberculosis”

“Penicillin” OR “Cipro”

“AIDS” NOT “Sarcoma”
PubMed

- Where we search for research from medical journals
- 13 million citations/abstracts
- 4,500 journals
  - From 1966

Covers
- Medicine
- Nursing
- Dentistry
- Veterinary medicine
- Healthcare systems
- Preclinical sciences
More About PubMed

- Links to other databases
  - OLDMEDLINE (1950-1965)
  - International biomedical journals
    - 1,760,000 citations
- Not all journals are strictly scientific or medical
  - We recently found a Newsweek article in PubMed
- Links (LinkOut) to the full-text of articles at participating publishers' web sites
What Can You Do in PubMed?

- Search for articles (usually abstracts)
  - By keyword
  - By author
  - By Journal, etc
- Combine searches
- Link to related articles
- Link to outside sources
  - To purchase the full article
  - Look at related books (including pages in the books)
- Clinical queries
Searching PubMed

Can sign in using personal login for limited access to full text articles or using your institutional login (USF) for access to articles available to your institution.
Searching PubMed

Comprehensive PubMed search

Advanced search builder:
Allows you to combine previous searches

Clinical Queries:
- Limits search to specific clinical research areas
- Use to search for systematic reviews

MeSH Database:
- Use to search for MeSH terms to include in search strategy
Using PubMed Clinical Queries

Results of searches on this page are limited to specific clinical research areas. For comprehensive searches, use PubMed directly.

Bisphosphonates for Multiple Myeloma

Clinical Study Categories
Category: Therapy
Scope: Broad

Results: 5 of 803
Bisphosphonates in multiple myeloma: a network meta-analysis.

Effects of induction and maintenance plus long-term bisphosphonates on bone disease in patients with multiple myeloma: the Medical Research Council Myeloma IX Trial.

Systematic Reviews
Results: 5 of 32
Bisphosphonates in multiple myeloma: a network meta-analysis.

Bisphosphonates in lung cancer: can they provide benefits beyond prevention of skeletal morbidity?
Hirsh V.

Bisphosphonate antitumor activity in prostate cancer and other genitourinary cancers.
Saad F, Mulders P.

Medical Genetics
Topic: All

Results: 5 of 30
A gene expression-based predictor for myeloma patients at high risk of developing bone disease on bisphosphonate treatment.

Immune modulation by zoledronic acid in human myeloma: an advantageous cross-talk between Vy9V62 T cells, qβ CD8+ T cells, regulatory T cells, and dendritic cells.
General search in PubMed

Result: 1 to 20 of 991

1. Targeted therapy of multiple myeloma: the changing paradigm at the beginning of the new millennium.
   Morabito F, Recchia AG, Mazzone C, Gentile M.
   PMID: 22671929 [PubMed - as supplied by publisher]
   Related citations

   Chang ST, Tenforde AS, Grimsrud CD, O'Ryan F, Gonzalez JR, Baer DM, Chandra M, Lo JC.
   Bone. 2012 May 23. [Epub ahead of print]
   PMID: 22634175 [PubMed - as supplied by publisher]
   Related citations

   PMID: 22592688 [PubMed - in process]
   Related citations

4. Bisphosphonates: focus on inflammation and bone loss.
   Iannitti T, Rosini S, Lodì D, Frediani B, Rottigni V, Palmieri B.
   PMID: 22540638 [PubMed - in process]
   Related citations
Setting search filters in PubMed

Choose additional filters

Text availability
Publication dates
Species
Article types
Clinical Trial
Clinical Trial, Phase I
Clinical Trial, Phase II
Clinical Trial, Phase III
Clinical Trial, Phase IV
Randomized Controlled Trial
Review
Systematic Reviews
Search fields

Results: 1 to 20 of 60
Filters activated: published in the last 10 years, Humans, Clinical Trial, Phase III, Randomized Controlled Trial, Clinical Trial, Clinical Trial, Phase II, Clinical Trial, Phase IV

1. [The affection of bisphosphonates combined with chemotherapy on bone metabolism index in multiple myeloma].
   PMID: 22339822 [PubMed - indexed for MEDLINE] Related citations

2. Economic evaluation of denosumab compared with zoledronic acid in hormone-refractory prostate cancer patients with bone metastases.
   Xie J, Namjoshi M, Wu EQ, Parikh K, Diener M, Yu AP, Guo A, Culver KW.
   PMID: 21942303 [PubMed - indexed for MEDLINE] Free Article Related citations

3. Bisphosphonate-related osteonecrosis: laser-assisted surgical treatment or conventional surgery?
   PMID: 21809068 [PubMed - indexed for MEDLINE] Related citations

4. Effects of zoledronic acid versus clodronic acid on skeletal morbidity in patients with newly diagnosed multiple myeloma.
Advanced search in PubMed

Manually edit search
Choose appropriate Boolean operator (AND, OR, NOT)
Record of previous searches
Add in terms from search history or type in new search terms
Using Medical Subject Headings (MeSH)

- **Subheadings**: >80 possible groupings used
- **MeSH categories**: Broader categories
  - Bone Density Conservation Agents
  - Organic Chemicals
    - Organophosphorus Compounds
      - Diphosphonates
        - Alendronate
        - Clodronic Acid
        - Etidronic Acid
  - Pharmacologic Action
  - Related information
  - PubMed search builder options
- **Select subheadings and terms to add to the search builder**
Building a search with MeSH terms

Pros
- Allows you to search for multiple related terms using single search

Cons
- MeSH terms are assigned to studies by humans
  - Assignment may be subjective and may not include all studies in the category
- MeSH terms are assigned after the study is indexed
  - May not identify recently published studies

Using a broad MeSH category will allow you to search all the terms below it

Use a combination of text and MeSH terms
PICO search

Medline allows you to search using the

- Patients
- Intervention
- Control
- Outcomes
- Publication type (trial/systematic review etc.)

PICO search

Image search

Google images
Trip database

- a clinical search engine designed to allow users to quickly and easily find and use high-quality research evidence; has been online since 1997.
- motto is ‘Find evidence fast’.
- can search across other content types including images, videos, patient information leaflets, educational courses and news.

- The content from PubMed is typically added every two weeks
- while content added manually (secondary evidence) is added once per month (middle of the month).
Tips for building a good search strategy

- Use MeSH terms
  - Form ‘backbone’
- Add free text
  - Identify recently added/un-indexed studies
- Use appropriate filters
  - To obtain manageable number of studies manual selection
- Pilot test strategy
Managing search results

You may choose to display abstracts and perform the study selection in PubMed...

... or export studies to a reference management software for selection.

Exporting studies will:
- Make it easier to keep track of the study selection
- Remove duplicate publications
Managing search results:

Working with EndNote

- Create new EndNote library
  (File: New => [enter library name] => Save)
- Import results
  - (File: Import: File)

Select the file exported from searched database
Select database used to search for studies (PubMed, Cochrane…)
If compiling results from multiple searches, this option will automatically remove all duplicate references
PRISMA diagram
FDA Webpage – Tons of Info.

- Contains MedWatch
  - product safety alerts
    - Alerts be sent to your email address as they happen
- Find
  - Warning Letters
    - [http://www.fda.gov/foi/warning.htm](http://www.fda.gov/foi/warning.htm)
  - Approved drugs and patent information
    - Using the Electronic Orange Book database
      - [http://www.fda.gov/cder/ob/default.htm](http://www.fda.gov/cder/ob/default.htm)
  - Devices
    - [http://www.fda.gov/cdrh/index.html](http://www.fda.gov/cdrh/index.html)
  - Guidance documents
# Categorization of Information Resources Readily Available

<table>
<thead>
<tr>
<th>Category/Examples of category</th>
<th>Soundness of Evidence-Based Approach</th>
<th>Comprehensiveness</th>
<th>Ease of Use and Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Textbook-like Resources (Systems)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to Date</td>
<td>Moderate</td>
<td>Most clinical areas, especially internal medicine and primary care</td>
<td>Easy to use, although searching somewhat lacking; $450 for individuals for their first year, then $350 per year; $10,000 plus for libraries</td>
</tr>
<tr>
<td>DynaMed</td>
<td>Strong</td>
<td>More than 2,000 summaries presented in standard formats for primary-care physicians</td>
<td>Easy to use; $200 but free if you help in the development</td>
</tr>
<tr>
<td><strong>Pre-appraised (Synopses)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>InfoPOEMs</td>
<td>Strong</td>
<td>Recently published family medicine studies; covers all categories of studies</td>
<td>Easy to use; $250</td>
</tr>
<tr>
<td>DARE (Database of Abstracts of Reviews of Effects) York, UK</td>
<td>Strong</td>
<td>Covers all disciplines; concentrates on therapy and prevention; summaries of systematic reviews of studies of diagnostic test performance may also be found</td>
<td>Easy to use; free</td>
</tr>
</tbody>
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<th>Category</th>
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<tbody>
<tr>
<td><strong>Systematic Reviews and Guidelines (Syntheses)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US National Guidelines Clearinghouse</td>
<td>Comprehensive coverage of US and many other nations' guidelines; often several guidelines on the same topic</td>
<td>Easy to search; one of the strengths of the site is being able to &quot;compare&quot; guidelines on the same topic; free</td>
</tr>
<tr>
<td>Cochrane Database of Systematic Reviews</td>
<td>Covers broad range of disciplines; limited to therapy and prevention</td>
<td>Easy to find a Cochrane review but sometimes difficult to apply because of the depth of coverage; abstracts free; included in many composite resources such as Ovid</td>
</tr>
<tr>
<td><strong>Primary Studies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEDLINE</td>
<td>Lots of primary studies across all disciplines and areas of research</td>
<td>Hard to find a specific study and often difficult to use; free</td>
</tr>
<tr>
<td>Cochrane Controlled Trials Registry (CCTR)</td>
<td>All specialties and all topics for which a controlled trial is relevant (therapy and prevention mainly)</td>
<td>The Cochrane Library includes DARE, Cochrane systematic reviews, and CCTR; the fastest way to determine whether a controlled trial has been published on the topic</td>
</tr>
<tr>
<td>PubMed Clinical Queries</td>
<td>Limits searches to those articles with some possibility of having direct clinical application</td>
<td>Easier to use than MEDLINE because the queries turn MEDLINE into a clinical tool; free</td>
</tr>
</tbody>
</table>
## Categorization of Information Resources Readily Available

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<tr>
<th>Category</th>
<th>Comprehensiveness</th>
<th>Ease of Use/Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Others</strong></td>
<td>One of the major search engines to the Web—almost everything</td>
<td>Easy to find something, hard to find just what you want and to know the worth and evidence behind the content; fastest way to find high-impact articles that have recently made press and media headlines</td>
</tr>
<tr>
<td>Google</td>
<td>A single search system for 150 health databases; one-stop searching; comprehensive; also has 27 specialist subsections (allergy to urology)</td>
<td>Easy to use; free access</td>
</tr>
</tbody>
</table>
# Selection Criteria for choosing or Evaluating Resources

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Description of Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Soundness of evidence-based approach</strong></td>
<td>- How strong is the commitment to evidence to support inference?</td>
</tr>
<tr>
<td></td>
<td>- How well does the resource indicate the strength of the evidence behind the recommendations or other content?</td>
</tr>
<tr>
<td></td>
<td>- Does the resource provide links for those who wish to view the evidence?</td>
</tr>
<tr>
<td><strong>Comprehensiveness and specificity</strong></td>
<td>- Does the resource cover my discipline or content area adequately?</td>
</tr>
<tr>
<td></td>
<td>- Does it cover questions of the type I am asking (e.g., therapy, diagnosis, prognosis, harm)?</td>
</tr>
<tr>
<td></td>
<td>- Does it target my specific area of practice?</td>
</tr>
<tr>
<td><strong>Ease of use</strong></td>
<td>- Does it give me the kind of information I need quickly and consistently?</td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>- Is it readily available in all locations in which I would use it?</td>
</tr>
<tr>
<td></td>
<td>- Can I easily afford it?</td>
</tr>
</tbody>
</table>
Case 1

- A 65 year old female comes to your clinic and is suffering from chemotherapy induced anemia and is being treated with erythropoietin stimulating agent (ESA). She is wondering if an iron supplement in addition to the current ESA will help her anemia get any better?

- Search for evidence to assist you in decision-making!!
Case 2

- A 60 year old man with multiple myeloma is referred to a cancer center for the management of his bone disease.
- Bisphosphonates are used to manage osteoporosis. The attending physician wants to decide whether the patient should be treated with bisphosphonates?
- Search for evidence to assist you in decision-making!!