SMARTER SEARCHES: ADVANCED PUBMED TIPS FOR RESEARCHERS

Diana Louden, Translational Research Librarian, UW Health Sciences Library
2.2 Billion PubMed Searches in FY2012

- 22% increase in worldwide use of PubMed from FY 2011 to FY 2012.

- How many of those searches were yours?

- How many yielded the perfect article at the top of the page?

Savvier Searches:
Making PubMed Work for You

- Common Questions & Points of Confusion
- Tips, Explanations, & Work-Arounds
- Goal: Equip You With Tools to be a More Effective Searcher. Find What You Need Faster.
- 15-Minute Rule (If you can’t find what you need after 15 minutes of searching, contact your librarian!)
Your Librarian Can Provide One-On-One Research Assistance

http://libguides.hsl.washington.edu/liaisons
Why did I only find two articles by Paul O. Sheppard in PubMed? I know he wrote more than that.

Pitfall #1
Author Searching: Greatest accurate retrieval by using last name and initials

Tip #1

PubMed search for "sheppard po"

Results: 17

1. The role of genomic data in the discovery, annotation and evolutionary interpretation of the interferon-lambda family.
   Fox BA, Sheppard PO, O'Hara PJ.
   Related citations

2. A glycoprotein hormone expressed in corticotrophs exhibits unique binding properties on thyroid-stimulating hormone receptor.
   Related citations

3. Cloning and characterization of a human orphan family G-protein coupled receptor GPRC5D.
   Bräuner-Osborne H, Jensen AA, Sheppard PO, Brodin B, Krogsgaard-Larsen P, O'Hara P.
   Related citations

4. Platelet-derived growth factor C (PDGF-C), a novel growth factor that binds to PDGF alpha and beta receptor.
   Related citations
Searching for an Author’s Full Name
Only Works for Recent Articles

- Looks are deceiving.
- Ability to search with an author’s full name was enabled starting in 2002, but was not retroactive.
- For the most thorough results, search for the author’s last name plus initials (no punctuation)
- Using the field tag [au] is optional
- Example: Sheppard PO
I wanted to find a specific article, not every article on a topic.

Pitfall #2

I read a news article reporting on a new analysis of the correlation between hormone replacement therapy and breast cancer. The news article only gave the journal name and the lead investigator’s name.

How can I find this specific article and not every article about HRT and breast cancer?

A PubMed search for “breast cancer hormone replacement therapy” turns up over 4,000 references.
Use Single Citation Matcher to Find a Specific Known Article

Tip #2
Fill in Just the Fields You’re Sure Of

PubMed Single Citation Matcher

Use this tool to find PubMed citations. You may omit any field.

- **Journal** • Help: Journal of the National Cancer Institute
- **Date**: 2013 (month and day are optional)

Details:
- **Volume**
- **Issue**
- **First page**

- **Author name** • Help: Chlebowski R

Limit authors:
- [ ] Only as first author
- [ ] Only as last author

Title words

[Search] [Clear form]
Easily spot the article you’re looking for and follow the link to the full text.

Estrogen Plus Progestin and Breast Cancer Incidence and Mortality in the Women’s Health Initiative Observational Study.

Chlebowski RT, Manson JE, Anderson GL, Cauley JA, Aragaki AK, Stefanick ML, Lane DS, Johnson KC, Wactawski-Wende J, Chen C, Qi L, Yasmeen S, Newcomb PA, Prentice RL.

Estrogen Plus Progestin and Breast Cancer Incidence and Mortality in the Women’s Health Initiative Observational Study

Rowan T. Chlebowski, JoAnn E. Manson, Garnet L. Anderson, Jane A. Cauley, Aaron K. Aragaki, Marcia L. Stefanick, Dorothy S. Lane, Karen C. Johnson, Jean Wactawski-Wende, Chu Chen, Lihong Qi, Shagufta Yasmeen, Polly A. Newcomb, Ross L. Prentice

Manuscript received August 27, 2012; revised January 20, 2013; accepted February 13, 2013.

Correspondence to: Rowan T. Chlebowski, MD, PhD, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, 1124 W Carson St, Torrance, CA, 90502 (e-mail: rowanchlebowski@gmail.com).

Background In the Women’s Health Initiative (WHI) randomized trial, estrogen plus progestin increased both breast cancer incidence and mortality. In contrast, most observational studies associate estrogen plus progestin with favorable prognosis breast cancers. To address differences, a cohort of WHI observational study participants with characteristics similar to the WHI clinical trial was studied.
There are So Many Links on the PubMed Screen. I Just Ignore All of Them.

Pitfall #3
Train Yourself to Focus on Key Sections

Tip #3

Filters: useful, common ways to narrow your search
Search details lets you see how PubMed interpreted your search. Helps you select MeSH terms or see what to change.
Find related data connects you to pertinent records in NCBI scientific databases.

Nucleotide polymorphism records from dbSNP that have current articles as submitter-provided references.

Find items
Libraries can customize PubMed to link to their electronic journal subscriptions. You can make best use of your full-text journal access by specifying your library in your My NCBI account.

Individuals can also customize PubMed within My NCBI to make it more useful. This includes modifying your search interface and filters.
Set Up a My NCBI Account
and Customize Your Filters

Tip #4
Set up a My NCBI Account.
Customize your filters and site preferences.
Specify your library.
Sign in when you search.

http://libguides.hsl.washington.edu/myncbi
Key Benefit of Customizing Filters:  
Easier Access to Full-Text Journal Articles

- Consider limiting your search to articles available immediately through your library’s electronic subscriptions.

- When viewing a PubMed abstract, look for your library’s full-text icon (if there’s no free full text icon).

- Note to UW users: If the publisher’s full-text link prompts you to log in or pay, and if there is no purple “UW Article Online” icon, always click on the purple & gold “Check for Full Text” icon. Many UW subscriptions can only be accessed this way.
I Must Have Done Something Wrong. A Completely Irrelevant Article is at the Top of my Search Results.

Pitfall #5

Google would have known what I meant!
GOOGLE AND PUBMED: DIFFERENT MINDSETS

Google: Essential Facts

- **Content**: The endless internet, its metadata, & other “mineable” elements as read by search algorithms.
- **Creator**: Commercial institution
- **Search Tips**: Get good results with natural language queries.
- **Transparency**: Intentional black box
- **Search Results**: Ranked by relevance based on keywords, what’s popular, how many reputable sites link to it, and what you’ve looked at before.

PubMed: Essential Facts

- **Content**: Traditional journal article database (over 5,000 journals back to 1940s) indexed by humans
- **Creator**: US Government institution
- **Search Tips**: Improve results by using defined search fields, recommended search terminology, & help screens
- **Transparency**: “Search Details” box explains how your search was interpreted.
- **Search Results**: **ALL** results match your search criteria. Most recent references listed first.
Tip #5: Adopt Different Mindsets for Different Search Interfaces

Google

- Results organized with most relevant items listed first
- Optimized to connect you to the “top” references.
- Nobody looks at “all” references. Everything is shades of gray – ever-decreasing grades of relevance.

PubMed

- PubMed results: organized with most recent items listed first.
- Designed to retrieve ALL references that meet search criteria.
- PubMed offers some auxiliary search approaches that involve relevance ranking.
A Multi-Step Strategy Works Best in PubMed, But There Are Google-Like Approaches

Tip #5b

Google-like approaches in PubMed include looking at “Titles with your search terms” to find a few relevant references.
Tip #5c – another “Google like” approach:

1. Identify a useful reference.

2. “Related Citations in PubMed” will connect you to a list of about 100 references on the same topic. (Click on “See all.”)
I Just Wanted a Few Good References, Not Thousands

Pitfall #6

PubMed search results for "patient cells tumor xenograft model" with Display Settings: Summary, 50 per page, Sorted by Recently Added. Results: 1 to 50 of 3075.

1. Pharmacokinetic characterization of CK2 inhibitor CX-4945.
   Son YH, Song JS, Kim SH, Kim J.
   Arch Pharm Res. 2013 Mar 31. [Epub ahead of print]
   PMID: 23543629 [PubMed - as supplied by publisher]
   Related citations

2. β-catenin/POU5F1/SOX2 transcription factor complex mediates IGF-1 receptor signaling and predicts poor prognosis in lung adenocarcinoma.
   Cancer Res. 2013 Mar 28. [Epub ahead of print]
   PMID: 23539445 [PubMed - as supplied by publisher]
   Related citations
Steps for Building a Search Strategy Using MeSH Terms (Medical Subject Headings)

1. Try to identify 1-3 relevant references.
   a. Dream up a perfect title, and search for significant words from your dream title.
   b. Search for specific phrases using quotation marks.
2. Select MeSH terms that have been applied to the best references.
3. Build a strategy using a combination of MeSH terms, individual words, or phrases.
4. Apply filters such as a publication type, a patient population, a date range, or a language.

Tip #6
Get in the PubMed Mindset.

Use a multi-step strategy to conduct a thorough search and retrieve highly relevant references.
Find a couple of relevant references. These are your pearls.

Step #1:
Narrow your search until you can identify a couple of relevant references.

- We’re looking for the use of patient-derived cells in a tumor xenograft animal model.

- Our original search yielded 3,075 references. References weren’t on target.

- Now we try a more specific search strategy requiring that the phrase “patient derived” appear in the title or abstract.

- Searching for a specific phrase narrowed our search to 103 references, and they’re more relevant.
Determine the Best MeSH Terms to Add to Your Search. Combine MeSH Terms With Other Words or Phrases.

Steps #2-3:
Select MeSH terms.
Add them to your search.
Include additional non-MeSH terms as needed.

Xenograft Model Antitumor Assays[MeSH Terms] AND Pancreatic Neoplasms[MeSH Terms] AND "patient derived"
Step #4: Apply Filters If Appropriate

Xenograft Model Antitumor Assays[MeSH Terms] AND Pancreatic Neoplasms[MeSH Terms] AND "patient derived"
My Search Strategies Build on Each Other, So I Wade Through the Same References Over and Over.

Here’s my previous search strategy:

Xenograft Model Antitumor Assays[MeSH Terms]) AND Pancreatic Neoplasms[MeSH Terms] AND “patient derived”

Now I want to conduct this search:

Pancreatic Neoplasms[MeSH Terms] AND “patient derived”

But I don’t want to see the references I’ve already looked at. (The first set of references would be a subset of my new search.)
Use Advanced Search Builder to Combine Searches or Exclude Previous Searches

Tip #7
Click on “Advanced” to see your recent searches.

Repeat, modify, build on, or exclude previous search results.
I Checked PubMed, and Nobody Has Ever Done What I’m Planning To Do
Try Multiple Search Strategies Before Drawing Your Conclusion

Tip #8a
Try multiple search strategies before drawing your conclusion.

We’re looking for clinical trials studying inhibitors of the quorum sensing mechanism (bacterial cell-to-cell communication) in *Pseudomonas*. Limiting our search to clinical trial reports yielded zero references.

Is it really true that nobody has undertaken a clinical trial to specifically study drugs interfering with “quorum sensing” in *Pseudomonas*?
Try Another Search Strategy Using MeSH Terms and Subheadings

Tip #8a, continued:

Look up terms in the MeSH database.

Use subheadings to focus on a particular aspect of a topic.

- By choosing the “Quorum Sensing” MeSH term and the “drug effects” subheading, we’ll limit our search to articles that discuss the effects of any drugs on quorum sensing.
Slightly modifying the search yielded three references we didn’t find the first time.

Explanation:

We didn’t require the specific word “inhibitors.” Instead, we used a subheading that encompassed the concept of inhibition, as well as other related topics.
You May Need to Search Multiple Databases

Tip #8b:

Try other reputable databases appropriate for your topic.

ClinicalTrials.gov

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<td>Conditions: Quorum Sensing; Prebiotics; Probiotics; Sepsis</td>
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<td>Interventions: Dietary Supplement: Bifidobacterium longum BB536; Dietary Supplement: Active hexose</td>
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<td>Intervention:</td>
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Try Multiple Searches and Multiple Databases. Contact a Librarian for Assistance

Remember:

PubMed does not contain ALL biomedical literature.

PubMed does not contain conference publications.

What you are looking for may not be in a journal article.

US Patent & Trademark Office
Patent Application Full Text and Image Database
I Don’t Have Time to Go Through All of These References Right Now

Since you’ve done the work to build a good search strategy, you don’t want to lose it.

PubMed will save your work for 8 hours, but to be on the safe side, save your references in a “collection.”

If you’re working with a group, consider sharing your search results with your colleagues using EndNote, Mendeley, or another citation manager.
Use My NCBI to Track Your Searches and Save Your References in Collections

Tip #9a

Sign in to My NCBI when you search.

Save groups of references within a “collection” in My NCBI.

- Collections can be held indefinitely, modified, or discarded.
- Using collections lets you take advantage of links to full-text articles and to other NCBI databases.

![Collections window with various named collections and details]
Use a Citation Manager Such as EndNote or Mendeley to Save and Share Your Work

Tip #9b
Use a citation manager to:

1) Save useful references & associated PDF files.
2) Share references with colleagues.
3) Easily cite references when writing in Word.

EndNote
Mendeley
Zotero
RefWorks
I’d like to keep up with the literature in my field, but it’s too overwhelming.

http://www.flickr.com/photos/hikingartist/
Determine a Reasonable Scope; Set up a Current Awareness Alert

Tip #10
Automated alerts are an essential tool for keeping up with the literature.

Consider multiple current awareness alerts – each one focused on a different topic.
Automatically Receive New References Added to PubMed That Match Your Search Criteria

- Contact your librarian for assistance with:
  - Choosing a database
  - Creating & refining the search strategy
  - Retrieving a manageable number of references each week

Contact Diana Louden (UW) or your local librarian for assistance.

Receive updates by email or RSS Feeds.
Thank you for your interest.

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