

Getting the Most Out of PubMed

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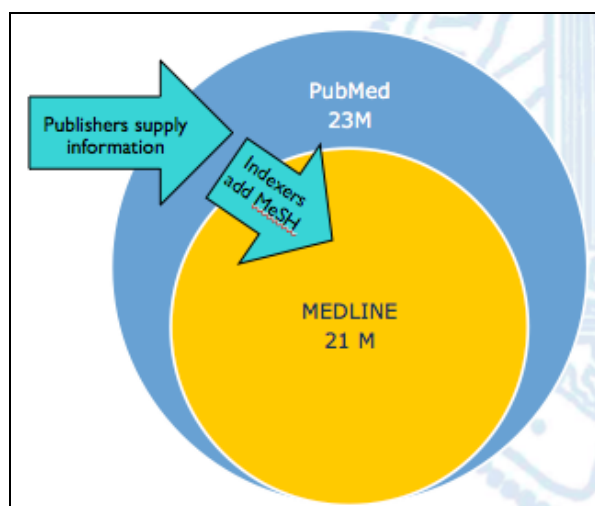


Biotechnology Information (NLM and NCBI respectively) PM is the granddaddy of biomedical databases. It is still the world's standard. It is freely available to all worldwide, unlike its competitors. Commercial databases purchase access to

PubMed files and add them to theirs. It contains about 36M; growing by about 1 million articles a year. It is organized for intelligent retrieval of information.

Structure of PubMed and MeSH

MEDLINE is a highly organized subset of PubMed. MEDLINE contains about 90% of the articles in PubMed. The part of PubMed NOT in MEDLINE is where the newest material lives until it is "indexed" by "subject experts" at the NLM.



"Indexed" means each article is read and additional information ("metadata") is added to the database of articles making it easier for searchers to find what they want. 10-15 subject "tags" (AKA MeSH or Medical Subject Headings) are applied to each article. Of those 10-15 "tags", 2 or 3 are identified as the most important (and labeled MAJR).

The tags are selected from a standardized set of ~25,000 MeSH. Think of MeSH as the index or glossary to the "book" that is PubMed. Other

metadata added at the same time includes publication type, sex, species and age group of study subjects, and more.

There is a lot to learn about PubMed, and there are classes and consultations available at JABSOM Library for those who are interested in more depth. Contact the Library at hslinfo@hawaii.edu for more information.

Starting off a search in PubMed:

- Clarify your question and identify concepts within your question. Two or three concepts per search usually work best
- Your first PubMed search will be a list of your concepts **without** punctuation. (Punctuation means " ", [], *, AND, OR. See page 2 and 4)
- Good enough results? STOP! If not, open Advanced and view Details. See page 2.
- Edit your search in Advanced. Remove, add, change until satisfied.
- Save your work. See page 7 for more info.



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Start with a list of the concepts from your question **without punctuation** and work from there. The words in the search should be nouns. **PubMed does not understand time sequence or cause and effect.** Full sentences do not work as well. PubMed attempts to translate the words of your search into MeSH and common word variations.

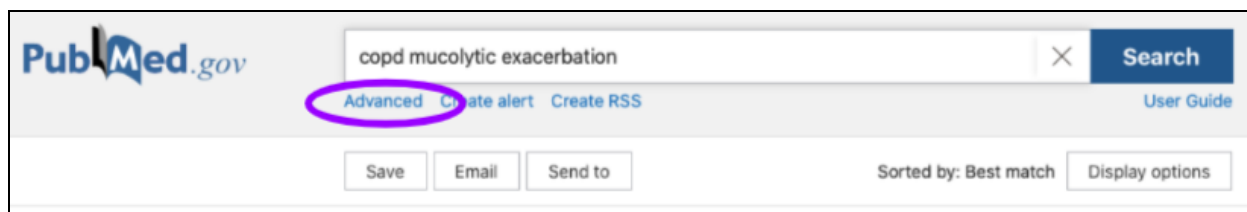
PubMed “punctuation” to avoid when you run your first search

“**mucolytics for COPD**” – searches for exactly what is between quotes anywhere in a PubMed entry

child* = “truncation symbol”. PM will search for child, children, childhood, childish, etc.

Example: What is the effect of mucolytic agents on patients with COPD who are stable?

Try searching for these in the PubMed search box:



Advanced is found right below the search box. You can use this for two things.

1. Your search history. You can return to previous searches by clicking on results numbers
2. Combining and editing searches. One clever way to use advanced search is to build a search for each concept. Then combine with Advanced. To do this, search each concept separately and combine in Advanced using **Add query**. See image below.

History and Search Details				Add lines 2,3,4,5 to the query box with AND		Download
Search	Actions	Details	Query			Results
#5	...	Add query	motrin or ibuprofen			15,922
#4	...	Delete	tylenol OR acetaminophen OR paracetamol			30,391
#2	...	Create alert	fever			233,837
#3	...	>	Search: child OR children OR toddler OR preschool OR pre-school			2,950,489

Also notice **Details** in the same image. This tool makes PubMed “transparent”. It is easy to see what PubMed did and identify/correct search engine misinterpretations. See the image below. To view **Details** click on the chevron (purple rectangle).



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#6 ... [dropdown arrow]

Shows how PubMed interpreted the whole search

Search: (((motrin or ibuprofen) AND (tylenol OR acetaminophen OR paracetamol)) AND (fever)) AND (child OR children OR toddler OR preschool OR pre-school)

("ibuprofen"[MeSH Terms] OR "ibuprofen"[All Fields] OR "motrin"[All Fields] OR "ibuprofen s"[All Fields] OR "ibuprofens"[All Fields] OR ("ibuprofen"[MeSH Terms] OR "ibuprofen"[All Fields]

Shows details about one term at a time

child"[All Fields] OR ("pre"[All Fields] AND "school"[All Fields]) OR "pre school"[All Fields]))

Translations

Evaluate your search and revise (it is unusual to get it right the first time!)

Look at the first 20-40 results to see if you are getting what you want. If not, revise... Use **Advanced** and **Search details** to help.

Display options: PubMed sorts results by Best Match (relevance ranked) by default. You can change most aspects of the display with **Display options**. See image below.

(((motrin or ibuprofen) AND (tylenol OR acetaminophen OR paracetamo) X Search

Advanced Create alert Create RSS User Guide

Save Email Send to Sorted by: Best match Display options

265 results

1 ☐ Comparison of Acetaminophen (Paracetamol) Treatment of Fever or Pain in Children Young People: A Review and Meta-analysis.

Cite Tan E, Braithwaite I, McKinlay CJD, Dalziel SR.

Share JAMA Netw Open. 2020 Oct 1;3(10):e2022398. doi: 10.1001/jama.2020.19888. PMID: 33125495 Free PMC article.

IMPORTANCE: **Acetaminophen (paracetamol)** and **ibuprofen** are the most widely prescribed and available over-the-counter medications for management of **fever** and pain in **children**. Despite the common use of these medications, treatment recommendations ...

DISPLAY OPTIONS

Format Summary

Sort by Best match

Per page 10

Show snippets ☒



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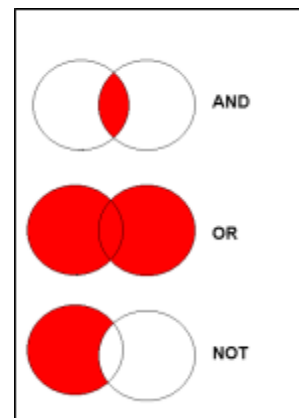
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Boolean Operators (AND, OR, NOT)

Combine concepts with AND

Combine synonyms with OR

Use NOT rarely.



Complex search construction: Once you have broken your question into concepts, we suggest looking up each concept in MeSH to see if there is a matching term, then adding any synonyms you know or find for the term. The final search will look like this:

(Concept 1_{MeSH} OR Concept 1_{synonym 1} OR Concept 1_{synonym 2} OR ...)

AND

(Concept 2_{MeSH} OR Concept 2_{synonym 1} OR Concept 2_{synonym 2} OR ...)

AND

(Concept 3_{MeSH} OR Concept 3_{synonym 1} OR Concept 3_{synonym 2} OR ...)

Troubleshooting: Too many results? Too few? Results not on topic?

Too many?	Too few	Not on topic?
For a keyword search: Add “ ” (phrase), [ti], [tiab] to the search. Add another concept with AND. Use filters (you will lose articles that are not yet indexed).	For a keyword search: Remove terms. Remove “ ” (phrase), [ti], [tiab]. Add synonyms with OR.	Go back to background sources (textbooks, Google searches, Wikipedia). Learn more and try again...
For a MeSH search: Move down one level in the MeSH “tree” to more specific term. Add filters, subheadings, MeSH terms. Change MeSH to MAJR in disease or condition.	For a MeSH search: Move up one level in MeSH “tree” to a more general term. Remove filters, subheadings, remove a concept, substitute MeSH for MAJR.	“Pearl grow” find one good article about the topic from a text, Google search, quick PubMed search, etc. In PM, look at MeSH terms, author keywords, and look at related articles. In Google Scholar look for cited articles, related articles.
		Consider moving outside of PubMed □ Web of Science Education related? □ ERIC Sociology? □ Sociological Abstracts Psychology? □ PsycINFO Nursing/Allied Health? □ CINAHL

PLAN YOUR SEARCH!



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Formulate the Search: To use a database effectively, **think before you type!**

1. After some background reading your original question may need to be reformulated; it may begin to look like several questions or you may answer it with background information.

2. Create a simple, searchable question. This is the single most important (and difficult) step!

What does “**simple, searchable**” mean? Avoid unnecessary detail. Carefully choose your words. Be willing to change words if they do not seem to work when you do your search. Here are four construction methods to try. You don’t have to do them all!

- Make a simple **sentence** of your question. Use the subject and object as search terms, avoid the verb as search engines are usually no good with those.
- Write down a **list** of all the concepts within your topic. Select two or three as your search terms.
- Use the **PICO model**. This approach is derived from Evidence-Based Medicine (EBM), or more properly EBP (EB Practice)
- Most time consuming, organized and effective method: Create a **table of concepts**. Select two or three. Think of **synonyms** for each. String all that together and use that as your search.

A. One searchable sentence:

B. Concept List: circle the most important two or three concepts:

-
-
-
-

C. PICO:

P	Population or Problem or Patient	
I (or E)	Intervention (or Exposure)	
C	Comparison Group (if any)	
O	Outcome	

D. Concept/synonym table:

	Synonym A	Synonym B	Synonym C	Synonym D
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Concept 1				
Concept 2				
Concept 3				
Concept 4				

Examples of search formulation:

You are asked by a parent which medicine is best to give their 3-year-old boy for a temperature of 102° F, Tylenol or Advil?

What is the **one sentence clinical question** you might ask based on this vignette?

Probably something like **"Which is better for treating fever in children, acetaminophen or ibuprofen?"**

Concept list:

* = most important concepts for search

parental anxiety
medication side-effect
medication effectiveness
***3 year old (age group)**
boy (sex)
***temperature (fever)**
102° F
***Tylenol**
***Advil**

Concept/synonym table:

Concept 1 synonyms = Tylenol, acetaminophen, panadol

Concept 2 synonyms = Motrin, ibuprofen, Advil

Concept 3 synonyms = fever, hyperpyrexia, pyrexia

Concept 4 synonyms = children, toddlers, pediatrics (**you could also consider using filters**)

Final search: (Tylenol OR acetaminophen OR Panadol) AND (Motrin OR ibuprofen OR Advil) AND (fever OR hyperpyrexia OR pyrexia) AND (children OR infants OR toddlers OR pediatrics) into the search box.

Tip: Use **AND** for required concepts and use **OR** between synonyms and use filters to limit by study design



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Saving your work

You have given your all to create a good search; **Create alert** saves a search to your MyNCBI account. By default, you will receive email alerts when new things appear in PM that match your search. You can set the timing and amount of information received or turn off the alert in MyNCBI.

From the **Send to** menu you can temporarily (8 hrs) save articles to **Clipboard** as you work and permanently save articles to MyNCBI **Collections**, or create a file to export to a **Citation manager** (Zotero, EndNote). See the image below.

The screenshot shows a PubMed search results page. At the top, there is a search bar with the query: (((motrin or ibuprofen) AND (tylenol OR acetaminophen OR paracetamo). To the right of the search bar is a 'Search' button. Below the search bar, there are links for 'Advanced', 'Create alert', 'Create RSS', and 'User Guide'. Below these links, there are buttons for 'Save', 'Email', and 'Send to'. A red arrow points to the 'Send to' button, which has a dropdown menu open. The dropdown menu contains the following options: 'Clipboard', 'My Bibliography', 'Collections', and 'Citation manager'. Below the dropdown menu, there is a list of search results. The first result is titled 'Acetaminophen (Paracetamol) With Ibuprofen for Pain in Children Younger Than 2 Years: A Systematic Analysis.' and includes the PMID: 33125495 and a link to the 'Free PMC article.' The text 'IMPORTANCE: Acetaminophen (paracetamol) and ibuprofen are the most widely prescribed and available over-the-counter medications for management of fever and pain in children. Despite the common use of these medications, treatment recommendations ...' is also visible.

