Overview: When should I use this database?

PubMed comprises more than 29 million citations for biomedical literature from MEDLINE, life science journals, and online books. The public database is maintained by the U.S. National Library of Medicine (NLM) and the National Center for Biotechnology Information, and this tip sheets applies to this public-facing version, not the version of Medline supported by Ovid. It offers a fairly broad overview of existing literature on a particular topic, but it should not be seen as a complete overview.

Before you start searching, keep in mind . . .

Save your search in a document, citation management software (Endnote, Refworks, etc.), and/or the database

- By saving your search, your strategy will be reproducible for another time and properly documented.
- Explore options and instruction for citation management here, and find tips on how to export results.
- To save searches in PubMed, create an NCBI account by clicking on the sign in to NCBI link in the upper-right corner of the screen (sign up for a My NCBI account by clicking here). Once you complete a search, click on "Create an alert" underneath the search box. From here you can create a search alert or save your search strategy.

Keywords

Automatic Term Mapping

- PubMed uses Automatic Term Mapping (ATM) when you search with keywords. This means that the search terms you type into the search box are automatically mapped to controlled vocabulary (MeSH) terms. To see ATM in action, scroll to the "Search details" box on the left hand side of the results page. Warning: ATM is not always correct. For example, if you search for "cold AND zinc," PubMed will include the controlled vocabulary for "cold temperatures" in the search.
- Using quotes around a phrase or truncation turns off Automatic Term Mapping. The terms are instead searched as keywords.

Keywords — How to Find & Use

- Keyword terms can be single words or phrases.
- Use quotes around all phrases to ensure that the phrase is searched instead of each word individually. (e.g. "public health")
Keywords — How to Find & Use (continued)

- For more possible search terms, visit the MeSH (Medical Subject Headings) database and look at the "entry terms" listed for each MeSH record. MeSH is NLM’s controlled vocabulary of biomedical terms used to describe the subject of each journal article in MEDLINE. The entry terms are synonyms, alternate forms, and other closely related terms generally used interchangeably with the preferred term.

- Consult controlled vocabularies in other subject databases for additional help. For example, the Embase has a controlled vocabulary called Emtree. Emtree records contain synonym lists similar to the "entry terms" in a MeSH record. The Emtree synonym list often contains European spellings/variations.

Controlled Vocabularies — How to Find & Use

Locate Controlled Vocabulary (MeSH)

- MeSH (Medical Subject Headings) is NLM’s controlled vocabulary of biomedical terms used to describe the subject of each journal article in MEDLINE. These are a standardized set of terms that are used to bring consistency to the searching process. In total, there are approximately 26,000 terms, and they are updated annually to reflect changes in medicine and medical terminology. Using MeSH terms helps account for variations in language, acronyms, and British vs. American English.

- MeSH can be searched from a NCBI interface: https://www.ncbi.nlm.nih.gov/mesh

- Terms are arranged hierarchically by subject categories with more specific terms arranged beneath broader terms. MeSH terms in PubMed automatically include the more specific MeSH terms in a search.

- To turn off this automatic explode feature, click on the button next to, "Do not include MeSH terms found below this term in the MeSH hierarchy" in the MeSH record or type [mh:noexp] next to the search term, e.g. neoplasms [mh:noexp]. See next page for additional information on no explode.

- Once MeSH terms have been searched, terms will appear in a box labelled “Search details,” located beside the list of the results on the right side of the screen. This box will display how each term has been searched, and can be useful for editing your search. Corrections can be made directly within this box, and once corrections have been made, the search button beneath the box will re-run your search.

Difference between “Explode,” “No Explode,” and “Major Heading”

- “Explode” will search with all subheadings beneath the main heading included and bring up all results listing any of these terms subject heading subheadings combinations. PubMed will default to explode any MeSH you search.

- Choosing to focus (also referred to as “not exploding”) will only search for your chosen MeSH term. Terms are chosen by MeSH indexers to be the primary focus of an individual article. Command to search: [Mesh:noexp] will only find the term specified, not the terms beneath it (for example: “diarrhea”[Mesh:noexp] only finds records indexed with diarrhea, not acute diarrhea or bloody diarrhea, etc.)
Controlled Vocabularies — How to Find & Use (continued)

Difference between “Explode,” “No Explode,” and “Major Heading” (continued)

- Searching for “major headings” will narrow your search to only find MeSH terms listed as a major topic of an article. Command to search: [majr] (e.g. “diarrhea”[majr] will find articles with diarrhea as a major topic. Major topic MeSH terms will have an asterisks (e.g. Diarrhea*), while non-major topics will not have one.

Subheadings

MeSH can be made more specific by the addition of subheadings such as "therapy" and "prevention and control"

- When in the MeSH record, add subheadings by clicking on the boxes next to the desired subheadings. Then click "Add to Search Builder." Warning: Adding too many subheadings may lead to missing important articles.

- MeSH/Subheading Combinations: You can manually add subheadings in the search box by using the format MeSH Term/Subheading, e.g. neoplasms/diet therapy. You can also use the two letter abbreviation for subheadings rather than typing out the full phrase, e.g. neoplasms/dh. [Click here for the abbreviations](https://www.ncbi.nlm.nih.gov/books/NBK3827/table/pubmedhelp.T.mesh_subheadings/) of other MeSH subheadings.

- For a MeSH/Subheading combination, only one Subheading at a time may be directly attached to a MeSH term. For example, a search of hypertension with the subheadings diagnosis or drug therapy will appear as hypertension/diagnosis or hypertension/drug therapy.

- As with MeSH terms, PubMed search results, by default, include the more specific terms arranged beneath broader terms for the MeSH term and also includes the more specific terms arranged beneath broader Subheadings.

Combining Searches Using Boolean Operators

- A comprehensive and systematic search of PubMed includes both controlled vocabulary and keyword terms (i.e. free text, natural language, and synonyms).

- **Boolean operators** are used to combine search terms. In PubMed, you can use the operators AND, OR, and NOT.

- Go to the “[Advanced Search” page](https://www.ncbi.nlm.nih.gov/books/NBK3827/table/pubmedhelp.T.mesh_subheadings/) to combine searches. This is where your search history is located during your search session.
Combining Searches Using Boolean Operators (continued)

- Boolean operators MUST be used as upper case (AND, OR, NOT).
  - OR—use OR between similar keywords, like synonyms, acronyms, and variations in spelling within the same idea or concept
  - AND—use AND to link ideas and concepts where you want to see both ideas or concepts in your search results
  - NOT—used to exclude specific keywords from the search, however, you will want to use NOT with caution because you may end up missing something important.

Field Tags

You can use field tags to specify where the database looks for the search term. In PubMed, first type the search term and then the field tag in brackets. e.g. Cardiology [TIAB] looks for cardiology in the title and abstract.

- [All Fields] or [ALL] – Untagged terms and terms tagged with [all fields] are processed using Automatic Term Mapping. Terms enclosed in double quotes or truncated will be searched in all fields and not processed using automatic term mapping.
- [Text Words] or [TW] – Includes all words and numbers in the title, abstract, other abstract, MeSH terms, MeSH Subheadings, Publication Types, Substance Names, Personal Name as Subject, Corporate Author, Secondary Source, Comment/Correction Notes, and Other Terms.
- [Title/Abstract] or [TIAB] – Words and numbers included in the title, collection title, abstract, and other abstract of a citation. English language abstracts are taken directly from the published article. If an article does not have a published abstract, NLM does not create one.

  NCBI explanation of Field Descriptions and Tags

Applying Filters

- On the left side of the results are options to filter your search by Article types, Publication dates, Language, Age, Gender, etc. To access the complete list of filters, click on the “Show additional filters” link.
- Use the PubMed built-in limits cautiously. Limits other than date or language will limit your search to indexed records only. In most cases it is best to develop another concept to use as a limiter.
Applying Filters (continued)

- For example, if you would like to limit your results to "human studies," use the following search to exclude animal studies instead of using the "humans" limit from the search results page. Simply add this to the rest of your search strategy using the NOT Boolean operator:

  (animals[MeSH Terms] NOT humans[MeSH Terms])

Truncation

- In PubMed you can use a * at the root of a word to find multiple endings. For example:
  - arthroplast* will return arthroplasty, arthroplasties, arthroplastic, arthroplastics, etc.
  - mobili* will return mobility, mobilization, mobilisation, mobilize, etc.

- Note: In PubMed you cannot combine phrase searching with truncation. Either use quotes, e.g. "early childhood mobility," or use truncation, e.g. early childhood mobili*

Accessing Full Text

In PubMed, the FIND IT and JHU FULL-TEXT icons (above) will often appear within an item record. To access the full text, first try the JHU FULL-TEXT icon, if available. This should take you directly to the text. If FULL-TEXT is not present, clicking the FIND IT icon will take you to an external page that will show a listing of full-text options. If the full-text is not available, you will see a heading that says, "Request a copy from Interlibrary Loan." Click on "Welch Medical Library Borrowers" link to request the article free of charge (only available for Hopkins students, faculty, and staff).

More Information

- General principles on searching in any database
- PubMedTutorials
- Additional tips on exploring journal table of contents, subject filters, and topic alerts