S3 : PubMed, a bibliographic database: 22 mn

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S3.1 Characteristics of PubMed : 2 mn

PubMed is a bibliographic database on life sciences and biomedical information, developed and maintained, in the United States, by the National Library of Medicine, the largest biomedical library in the world.

A bibliographic database contains journal citations, like this one from PubMed. Journal citations are information which describe a scientific article : who are the authors ? what is the title of the article ? the date of publication ? in which journal can I find it ? the citation is generally followed by the abstract of the article, and sometimes by the free full text.

PubMed has been a free resource since 1997, thanks to a decision of U.S. government.

It covers all biomedical fields: medicine, biology, pharmacy,public health,...

It contains more than 20 million journal citations to articles from more than 5,500 biomedical journals in 40 languages.

More than 2 million Web searches are performed every day on PubMed.

S3.2 MeSH thesaurus : 4 mn

A thesaurus is a collection of selected terms, named keywords or concepts, organized through a hierarchy, with correspondences between synonyms or similar terms. It is a tool which has two objectives : describing the content of a database document and consequently helping users to find relevant information more easily.

The MeSH®, a term which stands for Medical Subject Headings, is the thesaurus used at the National Library of Medicine, in the U.S., to describe the content of articles included in PubMed.

Members of PubMed's team, specialists with a specific training, are in charge of the indexation of the database, in other words, read the full text of the articles included in PubMed and describe them with MeSH terms.

The MeSH® is composed with 16 main categories, including Anatomy, Diseases, Chemicals and Drugs,...

Each category is also organized through a hierarchy, for example the Disease category including 23 branches.

The MeSH® contains more than 26,000 main terms, named descriptors. Each one is presented with a detailed description, named Scope note, and its position in the hierarchy. A term may belong to different hierarchies as in this example for Amyotrophic lateral sclerosis.

Each main term is associated to Entry terms, considered as synonyms. Using them to run a search in the database will match to the main term and display the related documents.

Subheadings are terms which may be used in combination to a main term in order to precise one of its specific aspects. For example, this article, indexed with the descriptor Amyotrophic lateral sclerosis, followed by the subheading Diagnosis. The asterisk added to Diagnosis indicates that it is the major topic of this article on Amyotrophic lateral sclerosis .

S3.3 Search without the MeSH : 10 mn

Search by author

Type its name followed by initials in the search box. Click the Search button.

More than 100 citations of articles from this author are displayed.

You can narrow your search to Review articles, which are scientific summaries by one or more experts to sum up the current state of the research on a particular topic.
You also can filter the results to the articles with a free full text.

Search by subject

*Here is **an example** to help you understanding PubMed search strategy. We are going to search for citations on Williams syndrome.*
As you type your query, terms are suggested. When you select a suggested term, you need not click the Search button.
On the results page, a Search details box is always displayed to help you understanding how PubMed translated your query. The most important is the first item. PubMed identified Williams syndrome as a MeSH term and displayed the related citations. PubMed also automatically added terms to your query to optimize it.
*A **second example** to explore this strategy; search for citations on nanism.*
PubMed identified nanism as an entry term, a synonym for the Mesh term dwarfism. That's why it displayed the citations corresponding to dwarfism, as you can see on the Search details box.
***Third example**, search for citations on sarcosinemia. PubMed did not find any correspondance between sarcosinemia and Mesh terms or Entry terms. So it extended its search to all fields and found the term sarcosinemia in the titles or abstracts.*

PubMed search strategy

What is PubMed strategy called automatic term mapping ? Here is a visual representation including the three previous examples.
PubMed searches an exact match, the same string of letters, between the terms you enter in the Search box and the terms of its thesaurus, the MeSH, or their synonyms, the Entry terms.
This process stops if an exact match is found like for Williams syndrome, identified as a MeSH term, or for nanism identified as an entry term, and then switched to Dwarfism.
If no correspondance is found, PubMed searches the terms of your query in the article titles and abstracts, like for sarcosinemia.

Search by author and subject

To search for citations to articles from Alfred Mahr on systemic vasculitis, type in any order his name plus initial and the subject.
59 citations from this author are displayed including 13 review articles, which he is an expert on the topic.

Search for terms in quotes

Typing terms in quotes helps narrowing a search to the exact match.
Compare, in this example, the number of citations for "health inequalities" in quotes, with the number without quotes.
Using quotes turns off the automatic term mapping. So PubMed searches in all fields of citations, including the title of articles and the abstracts.

Search using Truncation

Truncation consists in adding a special character, generally an asterisk, to a word or to its first letters in order to search for its variations. This query will search for health inequalities, health inequities, health inequality, health inequity, as you can see on the Search details box. Using truncation in PubMed turns off the automatic term mapping. So PubMed searches in all fields of citations, including the title of articles and the abstracts.

Search using operators

Using operators allows combining search terms.
Using a space or AND between terms will search for results including all of them.
For example, ehlers danlos pregnancy separated with a space. Look at the Search details box for the way PubMed translated the query.

Using the OR operator between two or more terms searches for results including at least one of them. The OR operator has to be typed in upper case letters.
In this example, as there are two different operators, OR and a space, you also need to precise the order in which your query will be performed, by enclosing terms in parentheses. Here, PubMed will search for articles concerning alkaptonuria associated to one or both of the terms diagnosis and treatment.

S3.4 Search with the MeSH : 6 mn

A PubMed search using the MeSH database is helpful for five main reasons :
Identifying the exact MeSH term and getting detailed information on it
Accessing to PubMed specific citations
Limiting a search to main citations
Combining MeSH terms
Building precise queries

Identifing the exact MeSH term and getting detailed information on it

Clicking the link from PubMed homepage is an easy way to access the MeSH database.
Enter the term of your query in the search box, for example Horton disease. As you select Horton disease in the suggested terms, you nrrd not click the search button. PubMed displays Giant cell arteritis, the term mostly used in the medical literature for Horton disease.
A short but precise description, the Scope note, is associated to help you being sure that it is the desired option.
A list of Entry terms, considered as synonyms, is displayed, including Horton disease. Using Entry terms to run a search will match to the main term and find the related documents.
The MeSH term, Giant cell arteritis, is also visualized in the different hierarchies to which it belongs. It is a useful information as it helps you identifying the categories of diseases related to it.

Accessing to PubMed specific citations

The MeSH page for Giant cell arteritis includes a PubMed link to all the citations described with this term. So clicking on it displays more than four thousand specific citations.

Limiting a search to main citations

From the same MeSH page, a link is proposed to PubMed - Major Topic, that is to say to the articles one of the main topics is Giant cell arteritis. Clicking PubMed - Major Topic narrows your search to more specific citations.

Combining MeSH terms

MeSH terms can be combined with operators to refine a search.
We are going to run a search about gene therapy for patients with Huntington disease.
Search for Huntington disease in the MeSH database. An option is proposed, through a check box, to restrict the search to the Major topics, if needed.
Add this first search to PubMed search builder by clicking the button Add to search builder.
Search now for the term gene therapy and add it to the search builder using the AND operator.
Clicking the button Search PubMed displays 54 citations.

Building precise queries

We are going to run a search on epidemiology of thalassemias.
Step 1 : Search for the term thalassemias in the MeSH database. Clicking the needed term thalassemia displays its full record including its position in its different hierarchies.
If you check the box "Do not include MeSH terms found below this term in the MeSH hierarchy", PubMed will run a general search on thalassemias and not on its different types.
If you need information on all types of thalassemias, it is not necessary to check this box.
Step 2 : Subheadings are terms associated to a MeSH term to describe some of its specific aspects. Among the list of subheadings, check the box related to epidemiology.
Step 3 : If you want specific citations,check "Restrict to MeSH Major Topic"
Step 4 : Add your selections to the search builder by clicking the button "Add to search builder".
Step 5 : Click the button "Search PubMed".