

**An Introduction to
PubMed Searching:
A Reference Guide**



Created by the Ontario Public Health Libraries Association (OPHLA)

ACCESSING PubMed

PubMed, the National Library of Medicine's free version of MEDLINE, is accessible at the following URL:

<http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed>

PubMed contains over 15 million citations. It is primarily a biomedical database, but incorporates allied health and nursing topics as well.

THE PubMed INTERFACE

PubMed's main interface screen has a number of features and functions that will help you to navigate the database during your search:

- The **black toolbar** lists molecular biology databases provided by the National Library of Medicine.
- The **grey query bar** allows you to enter search terms and execute the search strategy.
- The **grey tabs** located below the query box offer additional search options.
- The **blue side bar** on the left provides a list of all PubMed services.

The screenshot displays the PubMed website interface. At the top, there is the NCBI logo and the PubMed logo, along with the text "A service of the National Library of Medicine and the National Institutes of Health". Below this is a search bar with the text "Search PubMed" and a "Go" button. To the right of the search bar are tabs for "Limits", "Preview/Index", "History", "Clipboard", and "Details". On the left side, there is a blue sidebar with various links, including "PubMed Services" which is circled in red. A red arrow points to the "Go" button, and another red arrow points to the "Limits" tab. A yellow box highlights a "My NCBI" advertisement that says "Set up an automated PubMed update in fewer than 5 minutes." and lists three steps: (1) Get a My NCBI account, (2) Save your search, and (3) Your PubMed updates can be e-mailed directly to you.

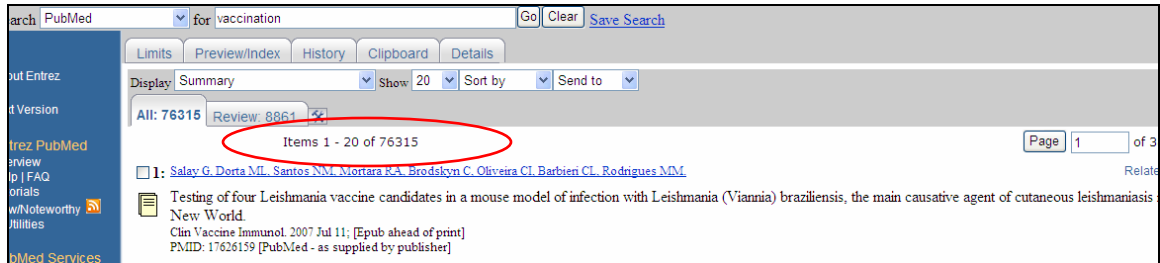
There are 2 principal ways to search PubMed:

1. Basic PubMed searching
2. Using the MeSH database

PubMed SEARCHING: THE BASICS

1. Enter your term(s) in the query box and click the “Go” button.

When a term is entered in the query box, PubMed will search for that term in all primary fields (author, title, abstract, and MeSH headings) and look for an **exact** subject heading match. This is commonly referred to as “keyword searching”.



The screenshot shows the PubMed search interface. The search box contains the term "vaccination". The search results are displayed in a list format. The first result is highlighted, showing the title "Testing of four Leishmania vaccine candidates in a mouse model of infection with Leishmania (Viannia) braziliensis, the main causative agent of cutaneous leishmaniasis in New World." The search results are sorted by relevance, and the first result is displayed. The search results are displayed in a list format. The first result is highlighted, showing the title "Testing of four Leishmania vaccine candidates in a mouse model of infection with Leishmania (Viannia) braziliensis, the main causative agent of cutaneous leishmaniasis in New World." The search results are sorted by relevance, and the first result is displayed.

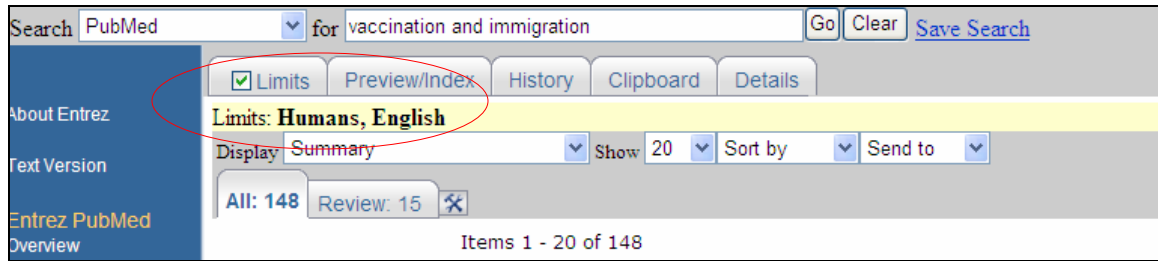
Note: Broad search terms will retrieve a large number of articles, as demonstrated by the above example, so it is important to identify major concepts and related synonyms to help further refine your search.

2. To develop a more detailed search strategy, include additional key terms or subject headings. Search terms can be combined with Boolean connectors **AND**, **OR**, or **NOT**. By adding additional terms, more precise search results can be attained.



The screenshot shows the PubMed search interface. The search box contains the terms "vaccination AND immigrants". The search results are displayed in a list format. The first result is highlighted, showing the title "Rubella immune status of indigenous and immigrant pregnant women in Catalonia, Spain." The search results are sorted by relevance, and the first result is displayed.

3. By clicking the grey “Limits” tab below the search box, you can further refine your search by applying common limits (eg. English language, publication type or date). Once you have selected your limits, a yellow bar highlighting the applied limits is displayed. The checkbox indicating the limits function has been activated in the screen shot below.



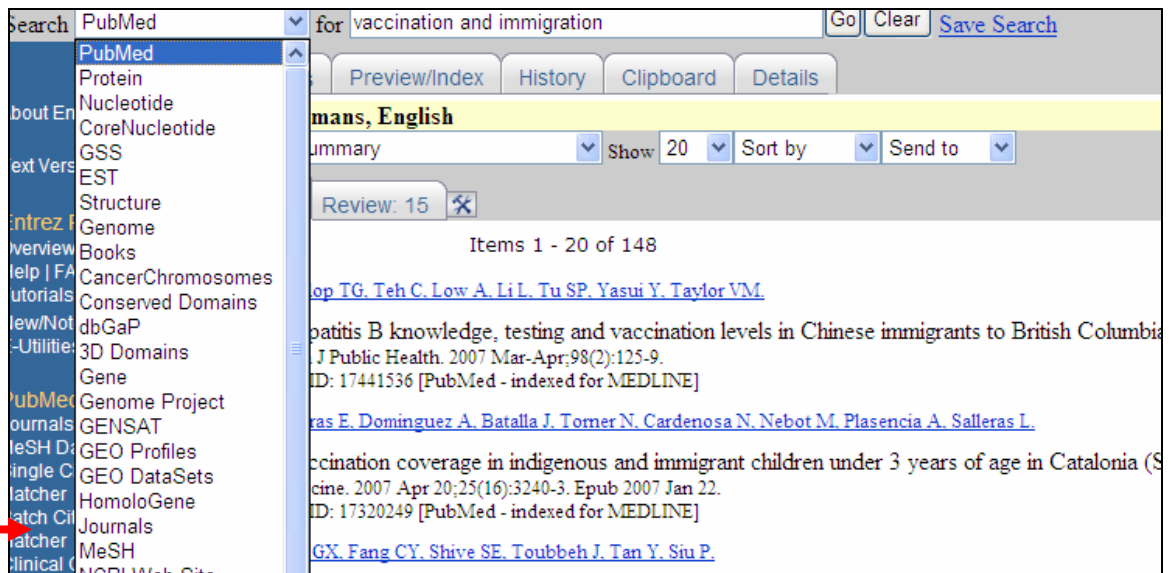
MeSH Searching

Medical Subject Headings (MeSH) are assigned to all records indexed in MEDLINE. In PubMed, selecting the MeSH database allows for a more focused search strategy because it eliminates broad base keyword searching and uses a controlled vocabulary to locate MEDLINE articles.

Accessing the MeSH database

There are two ways to access the MeSH database:

1. Under “**PubMed Services**”, click on the MeSH database hyperlink. Click on the drop down menu from the Search box, select MeSH and click the “**Go**” button.




OR

2. On the blue left menu bar, click on the “**MeSH Database**” hyperlink. You will be forwarded automatically to the MeSH database.

PubMed Services
 Journals Database
 MeSH Database
 Single Citation
 Matcher
 Batch Citation
 Matcher
 Clinical Queries
 Special Queries
 LinkOut
 My NCBI

Related Resources

databases. Users may need to upgrade or change to another [Web browser](#).



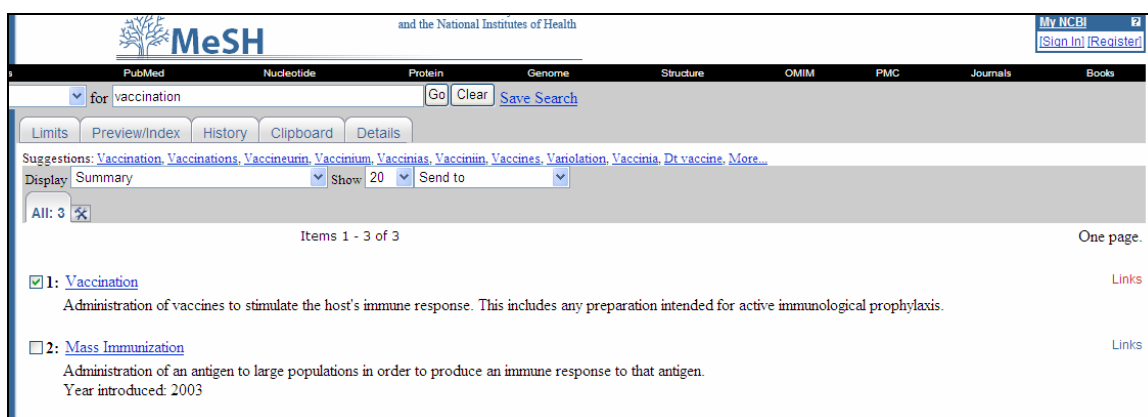
Set up an automated PubMed update in fewer than 5 minutes.

(1) Get a [My NCBI account](#). (2) Save your search.
 (3) Your PubMed updates can be e-mailed directly to you.

Read the [My NCBI Help](#) material to explore other options, such as automated updates of other databases, setting search filters, and highlighting search terms.

Searching the MeSH Database

1. Enter **one** keyword or subject heading at a time in the query box. PubMed will automatically “map” or try to match the term entered in the search query box to the list of subject headings indexed within the database.



2. Select a subject heading that most accurately describes your concept. Descriptions for individual subject headings are displayed below the main term to help you select the best possible term.
3. Click inside the check box beside the main subject heading to select the term and to view any related subheadings and synonyms.

MeSH Subheadings

Subheadings are designed to help the you refine your search strategy by restricting the search to a pre-determined subtopic of interest which has been assigned specifically to that Subject Heading. For example, if you were looking for the **nursing** aspect of vaccination, a pre-existing subtopic already exists for that subject heading, eliminating the need to search for the term “nursing” separately in PubMed.

1. Click on as many subheadings checkboxes that you require.
2. The “**Send To**” drop down menu presents you with options for executing the search in PubMed.

The screenshot shows the MeSH database interface with a search for 'Vaccination'. The 'Send to' menu is open, showing options like Text, File, Printer, Clipboard, and Search Box with AND/OR/NOT. The main content area displays the following information:

- Display:** Full, **Show:** 20, **All:** 1
- Instructions:**
 - If making selections (e.g., Subheadings, etc.), use the **Set** button.
 - Select **PubMed** under the Links menu to retrieve all records.
 - Select **NLM MeSH Browser** under the Links menu for a more detailed view to see PubMed records with those specifications.
- 1: Vaccination**
 - Administration of vaccines to stimulate the host's immune response. This includes any preparation intended for active immunological prophylaxis.
 - Subheadings:** This list includes those paired at least once with this heading in MEDLINE and may not reflect current rules for allowable combinations.
 - administration and dosage
 - adverse effects
 - classification
 - complications
 - contraindications
 - economics
 - ethics
 - history
 - immunology
 - instrumentation
 - legislation and jurisprudence
 - manpower
 - methods
 - mortality
 - nursing
 - psychology
 - standards
 - statistics and numerical data
 - supply and distribution
 - therapeutic use
 - trends
 - utilization
 - veterinary
 - Restrict Search to Major Topic headings only.
 - Do Not Explode this term (i.e., do not include MeSH terms found below this term in the MeSH tree).
- Entry Terms:**
 - Vaccinations
 - Immunization, Active
 - Active Immunization
 - Active Immunizations
 - Immunizations, Active

MeSH Search Options

There are several functions to consider in the MeSH database when a search term is presented.

The MeSH database will prompt you with the following options:

- 1. Restrict search to major topic headings only**
Select this option if you want the term entered in the search box to be the main subject of the article retrieval.
- 2. Do not explode this term**
Select this option if you want the term entered in the search box to be the principal term searched and not all of the other terms indexed under this main subject heading. For example, under the MeSH term "**Natural Disasters**", the indented term "**Volcanic Eruption**" will be excluded if you select this option.

Note: PubMed automatically explodes all terms entered in the search box unless otherwise specified.

Entry terms are synonyms or concepts that are included for each MeSH term. For example, if you enter terms like *earthquakes*, *floods*, or *hurricanes* in the query box, they will be mapped to the main subject heading "**Natural Disasters**".

Entry Terms:

- Natural Disaster
- Disaster, Natural
- Disasters, Natural
- Drought
- Droughts
- Earthquakes
- Earthquake
- Floods
- Flood
- Hurricanes
- Hurricane
- Tornado
- Tornadoes

Previous Indexing:

- [Disasters \(1966-1971\)](#)

See Also:

- [Relief Work](#)

[All MeSH Categories](#)

[Biological Sciences Category](#)

[Environment and Public Health](#)

[Environment](#)

[Disasters](#)

[Natural Disasters](#)

[Volcanic Eruption](#)



Refining Your Search: PubMed and MeSH

Combining Search Strategies using Boolean Logic: AND/OR/NOT

Boolean logic using **AND/OR/NOT** refers to the logical relationship between concepts. In PubMed, these operators must be entered in the **UPPERCASE** letters.

Note: Boolean logic can be applied to both Keyword and MeSH database searching.

The operators:

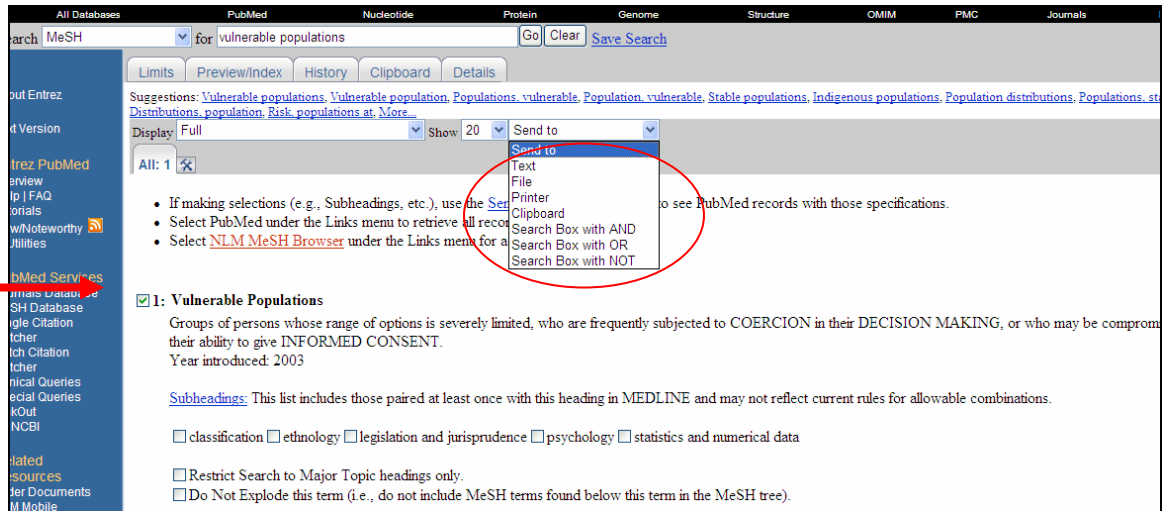
AND combines separate concepts where both terms are retrieved from all of the records. For example, “Natural Disasters **AND** Public Health” should retrieve articles containing both these terms.

OR retrieves records where at least one of the terms in which at least one of the search terms appears. The Boolean operator **OR** is often used to add like terms, for example “Cancer **OR** neoplasms”.

NOT eliminates the search term following the **NOT** operator. For example, “blue jays **NOT** Toronto” will retrieve those articles related to the bird blue jay (i.e. those records that contain the words “blue” and “jay” but not the word “Toronto”).

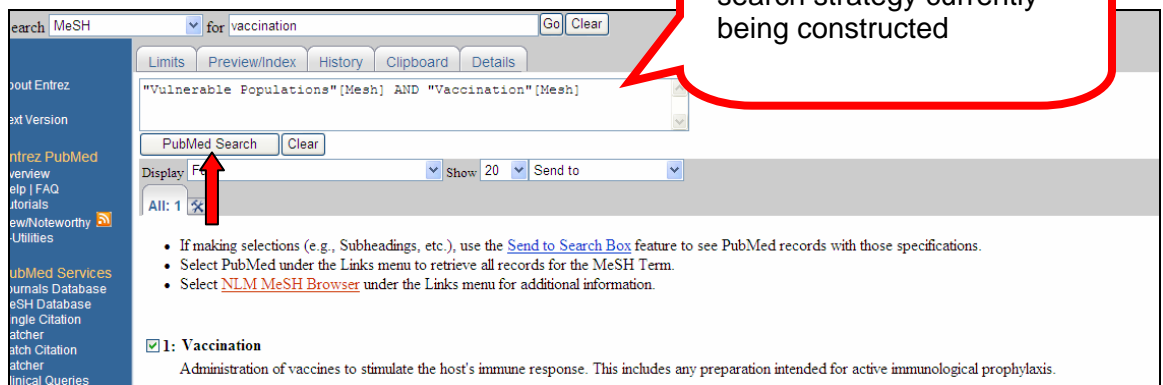
Combine MeSH Search Terms: Step-by-Step

1. Enter one concept in the search box at a time.
2. From the “**Send To**” drop down menu select the relationship structure using **AND**, **OR** and **NOT** to send the search to the PubMed database.
3. Click on the “**Clear**” button before entering each additional concept in the query box.



The screenshot shows the MeSH search interface. The search box contains the text "vulnerable populations". The "Send to" dropdown menu is open, showing options: Text, File, Printer, Clipboard, Search Box with AND, Search Box with OR, and Search Box with NOT. The "Search Box with AND" option is highlighted. A red circle highlights the dropdown menu. Below the search box, there are tabs for Limits, Preview/Index, History, Clipboard, and Details. The main content area displays suggestions for "Vulnerable Populations" and a list of subheadings.

4. PubMed displays a search history box below the field tags as you construct your search strategy to help you keep track of your search terms and search term combinations.



The screenshot shows the MeSH search interface. The search box contains the text "vaccination". The search history box is visible below the search box, showing the search strategy: "Vulnerable Populations" [Mesh] AND "Vaccination" [Mesh]. A red arrow points to the "PubMed Search" button. A red speech bubble contains the text: "PubMed search history box allows you to view the search strategy currently being constructed". Below the search box, there are tabs for Limits, Preview/Index, History, Clipboard, and Details. The main content area displays suggestions for "Vaccination" and a list of subheadings.

5. Once you have entered all of the main concepts and established your relationship structures, click the “**PubMed Search**” icon to execute the search strategy in the PubMed database.

- Main concepts are initially searched separately in PubMed and presented as individual search sets.
- In the PubMed database, select the “**History**” tab to view your search strategy from the MeSH database. Individual numbered search sets are displayed. Execute your search strategy by combining your search sets. Make sure the proper logical operators are applied between the search sets.

The screenshot shows the PubMed interface with the 'History' tab selected. A search query is entered: '#15 AND #19 AND #33'. Below the search bar, there are tabs for 'Limits', 'Preview/Index', 'History', 'Clipboard', and 'Details'. A callout box with a red border contains the following text:

- The **AND** operator combines different search concepts
- The **OR** operator adds “like” or similar terms

Below the callout box, there is a table titled 'Most Recent Queries' with columns for 'Search', 'Time', and 'Result'.

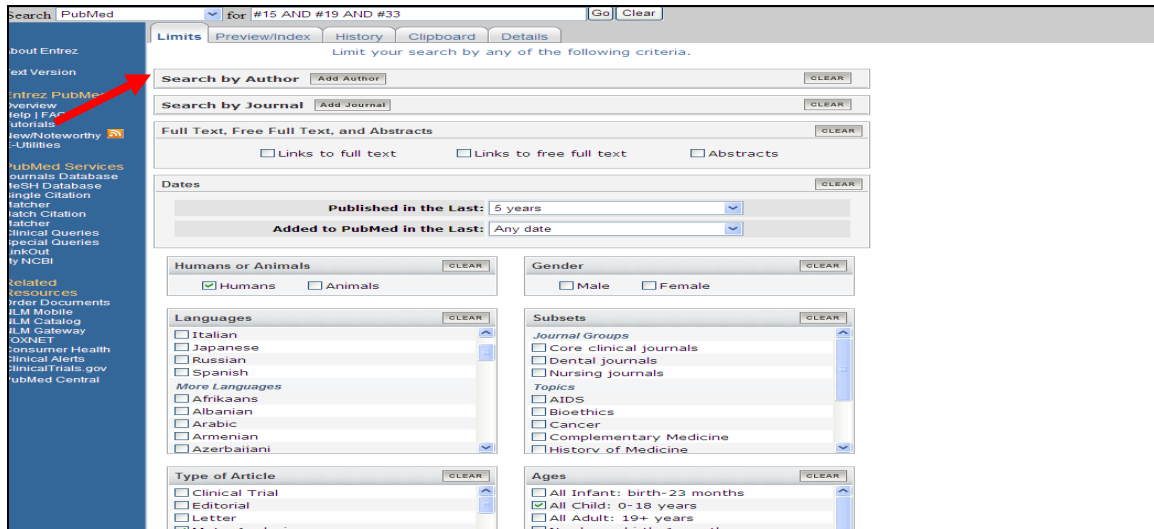
Search	Time	Result
#33 Search "Program Evaluation"[Majr] OR "Immunization Programs"[Majr] OR "Public Health Practice"[Majr]	14:32:20	175874
#32 Search "Immunization Programs"[Majr]	14:30:29	3228
#30 Search "Public Health Practice"[Mesh:Major] OR "Immunization Programs"[Mesh:noexp] OR "Program Evaluation"[Mesh]	14:28:45	354703
#27 Search "Public Health Practice"[Mesh] OR "Immunization Programs"[Mesh:NoExp] OR "Program Evaluation"[Mesh]	14:23:20	354703
#29 Search #15 AND #19	14:22:26	2702
#28 Search #15 AND #19 AND #27	14:21:18	2702
#19 Search "Mass Immunization"[Mesh] OR "Vaccination"[Mesh]	14:14:05	41105
#15 Search "Vulnerable Populations"[Majr] OR "Transients and Migrants"[Mesh] OR "Prostitution"[Mesh] OR "Emigration and Immigration"[Mesh] OR "Aged"[Mesh] OR "Homeless Persons"[Mesh] OR "Ethnic Groups"[Mesh] OR "Rural Population"[Mesh]	14:12:36	1708578
#6 Search "Vulnerable Populations"[Majr] OR "Transients and Migrants"[Mesh] OR "Prostitution"[Mesh]	14:09:26	10451

Limiting Searches

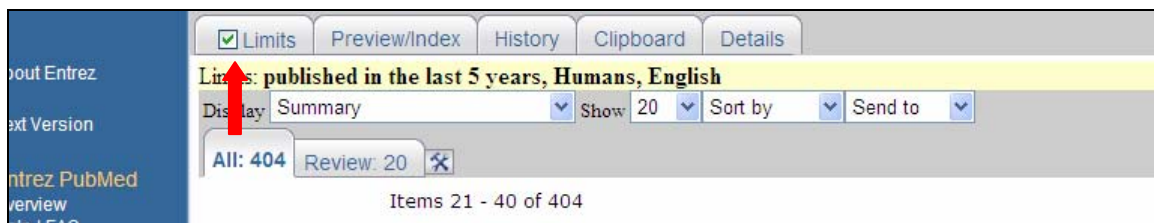
The “**Limits**” function will invariably reduce your search results and enable you to refine your search. The more commonly used limits include language, age, date of publication and publication type.

To activate the Limits function:

- Click on the “**Limits**” tab located on the grey toolbar above the search query box. In addition to commonly used limits, more comprehensive limits can be found here.
- Click the appropriate checkbox for the limits that you want to apply to your search strategy.
- Click the “**Go**” button to apply those set limits to your search.



- Once you have selected your limits, a check box will appear beside the “Limits” tab.
- Your limits parameters will then be highlighted in a yellow bar above the display button.



Note: Unless you deactivate the limits prior to a new search, these limits will be applied to your next search. Remember to remove your set limits by clicking on the check box next to the Limits field tag.

Selecting Citations for Printing, Emailing, Saving

- Click on the check box beside the citations that are relevant to your search.
- When you have reviewed the citations and selected your articles, click on the “Send To” drop down menu, and select the “Clipboard” tab to ready your citations for printing, emailing, etc.

The “Clipboard” acts as a temporary saving place for the articles selected for printing, emailing or saving. When a citation has been selected, the selected article numbers are highlighted in green in the Clipboard space.

3. The “**Display**” drop down menu lets you choose the format in which articles will be displayed, save, printed, or emailed.
 - Select the “**Summary**” option to present the article references in the brief citation format (ie. The Unique Identifier, Title, Author & Source), or
 - Select the “**Abstract**” option to present the citations in the abstract form, or
 - Select the “**Citation**” option to present the article references in the citation format, including the abstract and the associated MeSH headings for each individual citation. This option may be useful in identifying more relevant or additional subject headings.

4. Citations are generally presented 20 at a time. By clicking on the “**Show**” drop down menu, you can change the number of citations displayed on the main search screen.

5. The “**Send to**” drop down menu allows you to select the method of article delivery.
 - The “**Text**” function reads the citations in a text format. Click on File→ Print from the main interface browser to send the citations to the printer.
 - The “**File**” function will automatically prompt you to open or save the list of citations from PubMed.
 - The “**Printer**” function sends the selected articles to the printer in the citation format. It will prompt you to print your results.

- The “E-mail” function reads the citations for emailing and will prompt you to enter an email address, the format of citation delivery (abstract, brief citation) and the number of citations to be sent.

Additional PubMed Search Features

Field Tags

When a field tag is assigned to a term in the search query box, it instructs PubMed to search only in the field specified.

With a field tag search, search terms should be accompanied with the appropriate search field tag and **must** be enclosed in **square brackets**.


For example, if you were looking for articles on prostate cancer that have been published in the journal *JAMA*, the search strategy would look something like this:

1. Select the MeSH database
2. Type in the term prostate cancer in the search box.
3. Select “prostatic neoplasms” and run the search in PubMed with the logical operator **AND**.
4. Type in the journal name *JAMA* and assign the tag that denotes journal name field [TA] at the end of that term.
5. Click the “Go” button. A list of citations from the journal *JAMA* on the subject of prostate cancer should appear.

The screenshot shows a PubMed search interface. The search bar contains the query: "Prostatic Neoplasms"[Major] AND JAMA [TA]. Below the search bar, there are tabs for "Limits", "Preview/Index", "History", "Clipboard*", and "Details". The "Display" dropdown is set to "Summary", "Show" is set to "20", and "Sort by" is set to "Relevance". The search results show "All: 292" and "Review: 9". A red callout box highlights the "[TA]" field tag in the search query, with the text: "The field tag [TA] is assigned to journal name." The search results list three articles from JAMA, 2007, Apr 18;297(15):1652; author reply 1652-3. No abstract available. PMID: 17440142 [PubMed - indexed for MEDLINE].

Refer to the PubMed website for a complete list of available field tags:
http://psgweb.ucsf.edu/computer_training/PubMedTags.html

Notes:

- 
1. To search for a **personal name** as a subject, select the field tag [PS], instead of the author field tag [AU]. This way, the name entered in the search box will be treated as a subject.
 2. The **text word** field tag [TW] will search for that word in all of the following fields
 - a. Title
 - b. Abstract
 - c. MeSH and Subheadings
 - d. Publication types
 - e. Personal name as subject
 3. For **title** searching, ensure that each word identified in the title should follow with the title field tag [TI]. The words with the [TI] tag assigned to them will only be searched in the title field.

For example, you would type words from the article title into the query box in the following manner:

Falling [TI] AND prevalence [TI] AND of [TI] AND smoking [TI]

Single Citation Matcher

Use the Single Citation Matcher feature if you are looking for a specific article reference and have very little bibliographic information.

The **Single Citation Matcher** function is located in the blue side bar to the left of the main PubMed screen.

1. Type in as much information in the appropriate fields as you have.
2. At least two or more fields should contain information in order to achieve an exact article match.

PubMed Single Citation Matcher

PubMed Nucleotide Protein Genome Struct

- Use this tool to find PubMed citations. You may omit any field.
- Journal may be the full title or the title abbreviation.
- For first and last author searching, use smith jc format.

Journal:

Date: (month and day are optional)

Volume: Issue: First page:

Author name (see [help](#))

Only as first author Only as last author

Title words:

3. Click on the “Go” button to run the search in PubMed.
4. If the article is indexed in PubMed, the article reference should appear in the citation format.

1: [N Engl J Med](#), 2007 Jul 12;357(2):154-62. NEJM.ORG
CLICK FOR FULL TEXT ONLINE

Clinical practice. Management of an inherited predisposition to breast cancer.

[Robson M, Offit K.](#)
Clinical Genetics Service, Department of Medicine, Memorial Sloan-Kettering Cancer Center, New York 10021, USA.
robsonm@mskcc.org
PMID: 17625127 [PubMed - indexed for MEDLINE]

Related Links

- ▶ [An integrated early detection concept in women with a genetic predisposition for breast cancer] [Radiology]
- ▶ Cost-effectiveness of screening BRCA1/2 mutation carriers with breast magnetic resonance imaging. [JAMA]
- ▶ [Medical management of women with inherited predisposition to breast cancer: indications and procedures for mammographic scre [Bull Canc

Related Links

If you find an article that is exactly what you are looking for while browsing records, you may want to use the **Related Articles** feature to view additional relevant references.

17: [Borras E, Dominguez A, Batalla J, Torner N, Cardenosa N, Nebot M, Plasencia A, Salleras L.](#) Related Articles, Links

Vaccination coverage in indigenous and immigrant children under 3 years of age in Catalonia (Spain).
Vaccine. 2007 Apr 20;25(16):3240-3. Epub 2007 Jan 22.
PMID: 17320249 [PubMed - indexed for MEDLINE]

1. Click on the blue “**Related Articles**” hyperlink on the right hand side of the citation that appears the most relevant to your research.
2. A list of related articles on the similar subject will be displayed.
3. Click the checkbox beside the citation to gather additional references appropriate to your research.

PMID: 15357937 [PubMed - indexed for MEDLINE]

13: [Ozcirpici B, Sahinoz S, Ozgur S, Bozkurt AI, Sahinoz T, Ceylan A, Ilcin E, Saka G, Acemoglu H, Palanci Y, Ak M, Akkafa F.](#) [Related Articles, Links](#)
 Vaccination coverage in the South-East Anatolian Project (SEAP) region and factors influencing low coverage. *BMC Public Health*. 2006 Feb;12(2):145-54. Epub 2005 Nov 2. PMID: 16260009 [PubMed - indexed for MEDLINE]

14: [Tonun SD, Bakirci N.](#) [Related Articles, Links](#)
 Vaccination coverage and reasons for non-vaccination in a district of Istanbul. *BMC Public Health*. 2006 May 5;6:123. PMID: 16677375 [PubMed - indexed for MEDLINE]

15: [No authors listed](#) [Related Articles, Links](#)
 From the Centers for Disease Control and Prevention. Vaccination coverage of 2-year-old children--United States, 1993. *JAMA*. 1994 Nov 2;272(17):1316-7. No abstract available. PMID: 7933381 [PubMed - indexed for MEDLINE]

16: [Kindelan Recarte M, Garcia Polanco D, Garcia Gonzalez JU, Abal Ferrer F.](#) [Related Articles, Links](#)
 [The vaccination coverage in a cohort of children at 2 years of age from a health area] *Aten Primaria*. 1993 May 15;11(8):389-92. Spanish. PMID: 8494958 [PubMed - indexed for MEDLINE]

17: [Topuzoglu A, Ozaydin GA, Cali S, Cebeci D, Kalaca S, Hamanci H.](#) [Related Articles, Links](#)
 Assessment of sociodemographic factors and socio-economic status affecting the coverage of compulsory and private immunization services in Istanbul, Turkey. *Public Health*. 2005 Oct;119(10):862-9. PMID: 15949829 [PubMed - indexed for MEDLINE]

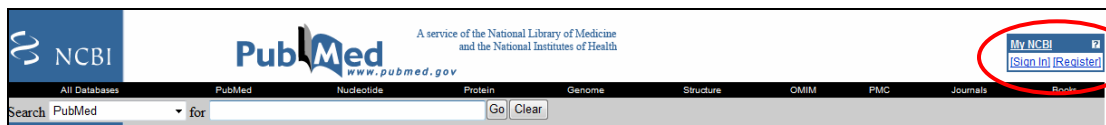
18: [Stampi S, Ricci R, Ruffilli I, Zanetti F.](#) [Related Articles, Links](#)
 Compulsory and recommended vaccination in Italy: evaluation of coverage and non-compliance between 1998-2002 in Northern Italy. *BMC Public Health*. 2005 Apr 21;5(1):42. PMID: 15845144 [PubMed - indexed for MEDLINE]

19: [Waldhoer T, Haidinger G, Vutuc C, Haschke F, Plank R.](#) [Related Articles, Links](#)
 The impact of sociodemographic variables on immunization coverage of children. *Eur J Epidemiol*. 1997 Feb;13(2):145-9. PMID: 9084996 [PubMed - indexed for MEDLINE]

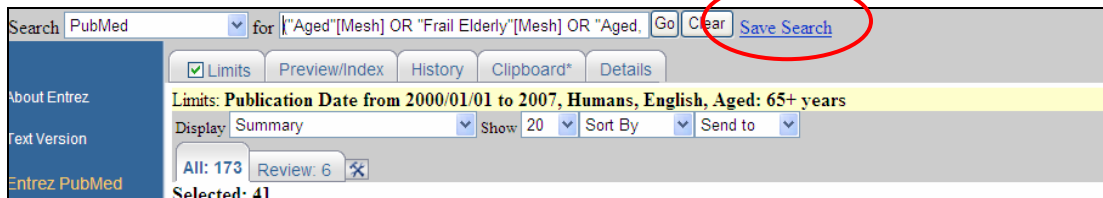
Saving Searches: My NCBI

PubMed allows you to save your search strategies, regularly updates your search with new articles related to your topic and allows you to retrieve and execute your search strategy at a later date.

1. From the top right hand corner from the main PubMed search screen click on the My NCBI link.
2. Set up an account, by creating a username and password. PubMed will prompt you to follow certain instructions.



3. Once you have created an account you will be allowed to save your search strategies.



4. Click on the “Save Search” blue hyperlink, located beside the query box. Name your search.

Save Search

Your search in PubMed

```
("Aged"[Mesh] OR "Frail Elderly"[Mesh] OR "Aged, 80 and over"[Mesh]) AND
"Accidents, Traffic"[Majr] AND "Risk Factors"[Mesh] AND
(("2000/01/01"[PDat]:"2007"[PDat]) AND (Humans[Mesh]) AND (English[lang]) AND
(aged[MeSH] )
```

Enter a name for your search: ("Aged" "Frail Elderly" "Aged, 80 and over") "Acci

Would you like to receive e-mail updates of new search results? No Yes

OK Cancel

- In addition to saving your search strategies and accessing them at a later date, PubMed offers you the option of emailing any new article entries related to your topic. Click in the check box "yes" if you want to see new articles added to your search results.
- To access your saved searches click on "My NCBI" link and enter your username and password to view a list of all of your saved search strategies.
- Lists of all of your saved searches are displayed.
- To access your search, click on the title assigned to your search. My NCBI will also indicate when the search was last updated with additional results.

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My NCBI Resources
 Searches/Collections
 Filters
 (Includes LinkOut)
 Document Delivery
 Outside Tool
 User Preferences
 (Email address)

My Saved Searches and Collections

Searches Collections

PubMed Searches ▼ ▲	Last Updated ▼ ▲	Details ▼ ▲
<input type="checkbox"/> ("Vulnerable Populations" "Transients and Migrants" "Prostitution" "Emigration and Immigration" "Age	2 days ago	No Schedule

What's New for Selected Delete Selected



Things to remember about PubMed...

- When a term is entered in the query box, in addition to treating the word as a keyword, PubMed will **automatically** look for the MeSH subject heading for that term.
- If you choose the PubMed database rather than the MeSH database to construct your search strategy, use **parentheses** for common synonyms in longer search strings. For example: (Exercise or physical fitness) **AND** aged
- Use keyword searching in PubMed when there is a very little information on your topic or if the topic is new and/or emerging.