

PubMed[®]/MEDLINE[®] Basics: Finding What You Need

(Focused on Radiology)



National Library of Medicine
<http://www.nlm.nih.gov/>

NLM brochures

Advanced PubMed Searching Resource Packet: <http://nlm.gov/training/resources/pubmedpacket.pdf>
Full Text and PubMed: <http://nlm.gov/training/resources/fulltexttri.pdf>
LoanSome Doc[®]: <http://nlm.gov/training/resources/ldtrifold.pdf>
MedlinePlus[®] for Health Professionals: <http://nlm.gov/training/resources/mp4hptri.pdf>
PubMed Basics: <http://nlm.gov/training/resources/pmtri.pdf>
PubMed My NCBI: <http://nlm.gov/training/resources/myncbtri.pdf>
Searching PubMed with MeSH: <http://nlm.gov/training/resources/meshtri.pdf>

Other resources

NLM PubMed Online Training: <http://www.nlm.nih.gov/bsd/disted/pubmed.html>
NN/LM Non-English Guides to PubMed: <http://nlm.gov/training/resources/intlpubmedlinks.html>
PubMed[®]/MEDLINE[®] Basics: <http://nlm.gov/training/resources/pubmedbasic8.pdf>
NLM PubMed[®]/MEDLINE[®] Advanced: <http://nlm.gov/training/resources/pubmedadv8.pdf>

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National Library of Medicine <http://www.nlm.nih.gov/>

The United States National Library of Medicine (NLM), part of the National Institutes of Health (NIH), is the world's largest medical library. The collections of the National Library of Medicine include more than seven million books, journals, technical reports, manuscripts, microfilms, photographs, and images on medicine and related sciences, including some of the world's oldest and rarest works. Additionally, there are a wide variety of databases available through NLM including genetics, consumer health, environmental health and toxicology, and the literature citation database: PubMed.



PubMed®

The PubMed database was developed by the National Center for Biotechnology Information (NCBI) at NLM and is one of the many databases under NCBI's Entrez retrieval system available on the Web. Since 1996, free access to MEDLINE has been available to the public online via PubMed. PubMed contains over 22 million bibliographic citations back to 1809, although the indexing of citations began in 1948 with Index Medicus.

PubMed is updated Tuesday through Saturday. Coverage is worldwide, but most records (86%) are from English-language sources and/or have English abstracts. PubMed provides links to the full-text of articles at participating publishers' Web sites and from PubMed Central. PubMed also includes links to images in PubMed Central, to biological data, sequence data and other molecular biology databases maintained by NCBI, and to chemical information in PubChem Substance, PubChem Compound and PubChem Bioassay databases.

Citations in PubMed

Most records are initially supplied electronically by publishers and are immediately made available via PubMed. They will have the status tag: **[PubMed - as supplied by publisher]**. Articles that are not yet available in print will include in the citation: **[Epub ahead of print]**.

All citations go through a quality control process. At the **[PubMed - in process]** step, 12 to 16 Medical Subject Headings (MeSH) terms (NLM's controlled vocabulary or keyword terms) are added to a citation, as well as links to other databases and information sources. The records are also checked for bibliographic accuracy. After this step is completed, the citations graduate to become MEDLINE records with the status tag: **[PubMed - indexed for MEDLINE]**. About 50% of citations move from submission to fully indexed MEDLINE citations within two months, although the length of time depends on the journal and the article. A relatively small number of records are included in PubMed – but are not selected for MEDLINE – and contain the status tag: **[PubMed]**.

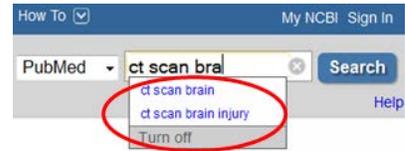
MEDLINE®

MEDLINE is the indexed subset of PubMed. MEDLINE contains over 20 million bibliographic citations and over 5,600 biomedical journals are currently indexed by NLM for MEDLINE. The scope of MEDLINE includes such diverse topics as microbiology, delivery of health care, nutrition, pharmacology and environmental health. The categories covered in MEDLINE include everything from anatomy, organisms, diseases, psychiatry, and psychology to the physical sciences. MEDLINE makes up 90% of PubMed.

Journals are selected for indexing by the Literature Selection Technical Review Committee (LSTRC) which meets three times a year and considers approximately 140 titles for MEDLINE at each meeting. Final approval is made by the Director of the National Library of Medicine. Titles are considered for scope and coverage, quality of content, quality of editorial work, production quality, audience, and type of content. For more details, see the NLM Fact Sheet, MEDLINE Journal Selection, at <http://www.nlm.nih.gov/pubs/factsheets/jsel.html>.

Searching PubMed

Enter significant search terms in the search box (e.g., *ct scan brain aneurysm*) and click on the **Search** button. Note that as you type, PubMed offers suggestions (e.g., *ct scan brain injury*). However, these suggestions are based on searches made by other researchers and may not accurately reflect an effective PubMed search on your topic. Turn off the autosuggest by clicking “Turn off” or permanently turn it off when signed into My NCBI (see My NCBI Site Preferences).



PubMed uses Automatic Term Mapping to translate the search and map the terms to the indexed or keyword database. The terms are mapped against:

- 1) The MeSH Translation Table (with headings, subheadings, publication types, entry terms (synonyms), etc.);
- 2) The Journals Translation Table (title, abbreviation, International Standard Serial Number ISSN, etc.); and
- 3) Authors and investigators translation tables and indexes.

If no match is found, PubMed breaks apart the long phrase from right to left and repeats the automatic term mapping process until a match is found. Terms that don't make a match will be searched in **All Fields**. Individual terms of a phrase will also be searched as **All Fields** and will be combined (ANDed) together.

- **ALWAYS check Search Details after a search to see how PubMed tried to improve the search.**

Search Details

Query Translation:

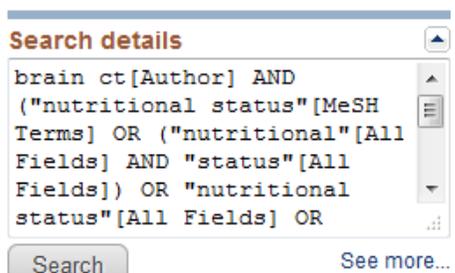
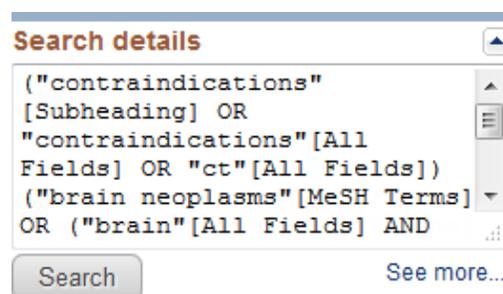
```
( "tomography, x-ray computed"[MeSH Terms] OR
("tomography"[All Fields] AND "x-ray"[All Fields] AND
"computed"[All Fields]) OR "x-ray computed tomography"[All
Fields] OR ("ct"[All Fields] AND "scan"[All Fields]) OR "ct
scan"[All Fields]) AND ("intracranial aneurysm"[MeSH Terms]
OR ("intracranial"[All Fields] AND "aneurysm"[All Fields]) OR
"intracranial aneurysm"[All Fields] OR ("brain"[All Fields]
AND "aneurysm"[All Fields]) OR "brain aneurysm"[All Fields])
```

Search URL

In the case of *ct scan brain aneurysm*, the long phrase was broken into two separate segments: **ct scan AND brain aneurysm**

After every search, scroll down the right hand column and review **Search Details** to verify PubMed performed the search you expected. Click **See more** to access the Query Translation box. Make any needed changes in the Search Details screen and rerun the search.

Example: How does PubMed perform these two searches?

A. Search for: <i>brain ct nutrition</i>	B. Search for: <i>ct brain cancer</i>
<p>View Search details in the right hand column. Instead of nutrition issues related to brain cat scans:</p>  <ul style="list-style-type: none"> • <i>brain ct</i> was mapped to the author: Dr. CT Brain (PubMed broke apart the search, found a match for the next phrase <i>brain ct</i>.) • <i>Nutrition</i> was mapped to <i>Nutritional Status</i> 	 <ul style="list-style-type: none"> • <i>ct</i> was mapped to the subheading, contraindications. (Subheadings may be used to focus searches.) • <i>brain cancer</i> is a MeSH synonym and was mapped to brain neoplasms.

Focus Your Search with Filters

Limit your search by using the Filters in the left navigation menu. Click on a filter to activate it; PubMed applies the filter and recalculates the search results. A check mark indicates an active filter.

- **Article types:** Limit to specific articles such as clinical trials and/or reviews; Click **more ...** to see additional article type filters
- **Text availability:** Check with your librarian before using this filter; you may eliminate items available to you through your library
- **Publication dates:** Limit to a specific time period or click **Custom range**
- **Species:** Limit to human-focused or animal-focused research

Show additional filters: Click on this link to access additional filters; check the box for these filters to appear in the list of filters and click **Show**. Next click the now visible filter link to activate it.

- **Languages:** Limit to a specific language
- **Sex:** Limit to citations focusing on males or females
- **Subjects:** Subset options include journal groups, topics including systematic reviews, and citations available in PubMed Central
- **Journal categories:** Limit to, for example, nursing journals
- **Ages:** Limit to a specific age group
- **Search fields:** Click Choose and use the drop-down menu to limit to a specific search field such as Author, Journal or MeSH Term

Filters activated: Humans, Clinical Trial [Clear all](#)

The **Filters activated** information line will appear on the search Results page and update as additional filters are added. **Clear** individual filters by clicking **clear**. Use any **Clear all** link to remove all active filters.

NOTE: Most Filter terms (and MeSH terms) are available only for Indexed for MEDLINE citations.

PubMed Advanced (Search)

Use **Search History** to combine previous searches.

Example: previous searches on *cancer* (#3), *laser ablation* (#7) and *breast* (#8) may be combined to identify articles focusing on:

laser ablation in cases of breast or lymph cancer.

(Lymph cancer is not a MeSH term)

Search History

Clear the search box if necessary. Click on each number and then **AND** to add it to your search. PubMed will add parentheses.

`((#3) AND #7) OR #8`

Change the parentheses as needed in the search box and add any additional terms.

`#3 AND #7 AND (#8 OR lymph)`

Click **Search**.

More Resources

- **MeSH Database:** Use the Medical Subject Heading (MeSH) database to find appropriate terms for a search and to build search strategies
- **Journals in NCBI Databases:** Build journal and table of contents searches for PubMed
- **Single Citation Matcher:** Find individual citations easily
- **Clinical Queries:** Pre-formatted search filters including clinical studies and systematic reviews
- **Topic-Specific Queries:** Additional filter options

Search Results Options

On the *Results* screen you will find:

Search box: Which includes a drop-down menu to search other NCBI databases including MeSH

 **RSS:** Create an RSS Feed for the search

Save search: Save search strategies in My NCBI

Advanced: Additional options to focus a search

Help: Access the PubMed Help manual

Display Settings: Menu to change the results format

Send to: Menu to save or send selected citations

Filter your results: Use filters to sort or focus results

Find related data: Find records in other databases that cite the identified citations

Search details: View how PubMed does the search

Recent activity: Shows searches completed, citations and/or elements viewed, and the databases used

You may also see:

 **Filters activated:** Appears with when Filters have been applied

 **Clipboard:** Appears when items have been stored temporarily on the Clipboard; **Item in clipboard** identifies selected citations

Related searches: Suggestions based on searches performed by other researchers

***Titles with your search terms:** Appears when all search terms are in one or more citation titles

***Free full-text articles in PubMed Central:** Appears when one or more of the citations have a full-text article in PubMed Central, the free digital archive of biomedical and life sciences journal literature

***PMC Images search for:** Appears when images are found in PubMed Central for the term(s)

**Not available in Abstract display.*

Display Settings

Select the format, number of items and order in which you want the citations to be displaced, then click **Apply**.

- **Format:** Only two formats provide links to additional resources: *Summary* links to the individual citation; *Abstract* includes links to the Publication Types and MeSH Terms. The remainder of the formats appear as text in your browser.

Display Settings: Summary, 20 per page, Sorted by Recently Added

Format	Items per page	Sort by
<input checked="" type="radio"/> Summary	<input type="radio"/> 5	<input checked="" type="radio"/> Recently Added
<input type="radio"/> Summary (text)	<input type="radio"/> 10	<input type="radio"/> Pub Date
<input type="radio"/> Abstract	<input checked="" type="radio"/> 20	<input type="radio"/> First Author
<input type="radio"/> Abstract (text)	<input type="radio"/> 50	<input type="radio"/> Last Author
<input type="radio"/> MEDLINE	<input type="radio"/> 100	<input type="radio"/> Journal
<input type="radio"/> XML	<input type="radio"/> 200	<input type="radio"/> Title
<input type="radio"/> PMID List		

[Brain morphological signatures for chronic pain.](#)
Baliki MN, Schnitzer TJ, Bauer WR, Apkarian AV.
PLoS One. 2011;6(10):e26010. Epub 2011 Oct 13.
PMID: 22022493 [PubMed - in process] [Free PMC Article](#)
[Related citations](#) [Item in clipboard](#)

- **Summary Display** provides links to the citation, *Related citations* and the *Item in clipboard* when applicable. Some citations include *Free article* or *Free PMC article*, accessed by clicking on the title.
- **Abstract Display** also includes the full abstract, selected icons to full-text journals and library icons when signed into My NCBI.

- **Items per Page:** Default is 20; reveal up to 200 items on a page for review or printing
- **Sort by:** Reorder citations by date, author, journal title or article title

Send to: Selected citations may be sent to

Send to:

Choose Destination

<input type="radio"/> File	<input type="radio"/> Clipboard
<input type="radio"/> Collections	<input type="radio"/> E-mail
<input type="radio"/> Order	<input type="radio"/> My Bibliography
<input type="radio"/> Citation manager	

- **File:** Save a text version of the citation as a document
- **Collections:** Save citations permanently with My NCBI Collections
- **Order:** Order selected citations through PubMed's LoanSome Doc[®] system
- **Citation manager:** Format selected citations to save as a file
- **Clipboard:** Hold citations for up to eight hours
- **E-mail:** Email citations in any format to a specific address
- **My Bibliography:** Add selected citations to an individual My NCBI Bibliography (for Resumes and CVs)

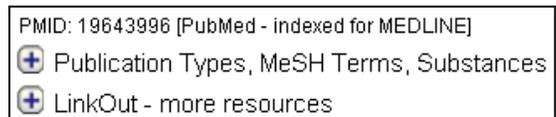
Examine Individual Citations

The Abstract format is the default for individual citations.

- **Abstract Supplemental Data** reveals how a citation is indexed and is accessed by clicking on the Plus sign before **Publication Types**. Click on a MeSH heading for additional information or to search PubMed or PubChem with the term.
- **Link Out** provides links to other resources related to the citation and to full-text articles.
- **Related citations in PubMed** are citations gathered from an algorithm based search for abstract, title and MeSH terms.

You may also see:

- **Images from this publication** appears when an article with images is included in PubMed Central. Click **See all images** to access the PubMed Central Image database.



PMID: 19643996 [PubMed - indexed for MEDLINE]

- + Publication Types, MeSH Terms, Substances
- + LinkOut - more resources

- Publication Types, MeSH Terms, Substances

MeSH Terms

Adolescent
Anesthesia, General
Appendicitis/radiography
Contrast Media/pharmacokinetics*
Female
Gastric Emptying*
Humans
Ileus/radiography
Iothalamic Acid/administration & dosage
Radiography, Abdominal*
Respiratory Aspiration/prevention & control

PubMed
MeSH
Add to Search
PubChem Compound
PubChem Substance

Images from this publication. See all images (7) Free text

- **Cited by xx PubMed Central article(s):** Links to articles in PubMed Central when available
- **Related information:** Links to other NCBI databases attached to the citation.

Print Citations

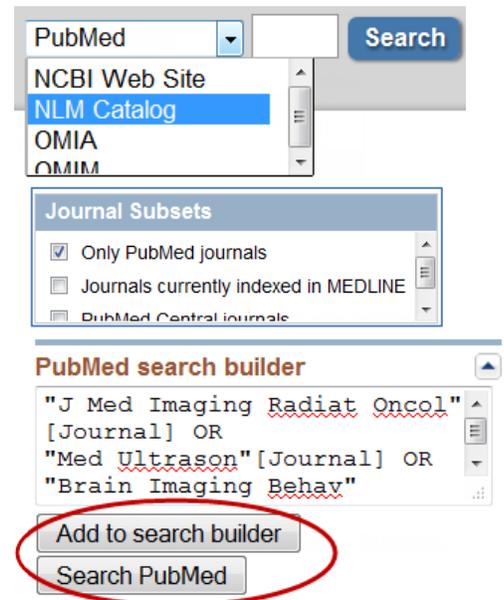


Print from the Internet browser: Select the citation(s) and the format desired, then use the **File** and **Print** commands from the browser.

Identify Specific Journals in the NLM Catalog

Find journal information in the **NLM Catalog**.

- To create and save large collections of journals to add to a search, select **NLM Catalog** from the drop-down menu and click **Search**. Alternatively, use the **Journals in NCBI Databases** link from the PubMed Homepage.
- **Limit to Only PubMed journals**
- Search by journal title or use the **Broad Subject Term** search on the NLM Catalog homepage to identify related journals (see <http://wwwcf.nlm.nih.gov/serials/journals/>). For example: Diagnostic Imaging[st] OR Nuclear Medicine[st] OR Radiology[st] OR Radiotherapy[st]
- Click on selected journals and then click **Add to search builder** and then **Search PubMed** for the journals.



PubMed [Search]

NCBI Web Site
NLM Catalog
OMIA
QMIM

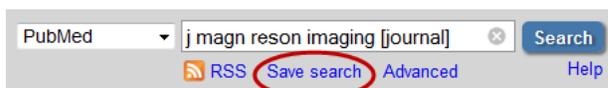
Journal Subsets

- Only PubMed journals
- Journals currently indexed in MEDLINE
- PubMed Central journals

PubMed search builder

"J Med Imaging Radiat Oncol"
[Journal] OR
"Med Ultrason"[Journal] OR
"Brain Imaging Behav"

Add to search builder
Search PubMed



PubMed [j magn reson imaging [journal]] [Search]

RSS Save search Advanced Help

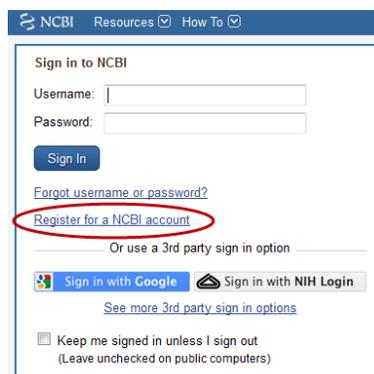
Finally, back in PubMed, save this search in My NCBI to focus future searches on these journals.



My NCBI

Use *My NCBI* to save citations, to save search strategies and to set personal preferences and filters

- Sign into My NCBI by clicking on the link in the upper right hand corner of PubMed
- Create a new account with **Register for an account**
- Optional options include **Keep me signed in unless I sign out** and **Use a 3rd party sign in option**



My NCBI Options



- **Saved Searches:** Click **Save Search** from the **Results** screen to hold searches and/or have PubMed run the search and send email updates of citations meeting the search criteria. Use the **Tool Icon** to edit the update options or to delete a search
- **Collections:** save citations permanently by using the **Collections** option in the **Send to** menu. Add citations to a new or existing collection; Collections may be shared
- **My Bibliography:** Collections of citations by a specific author
- **Recent Activity:** While signed into My NCBI, searches and individually viewed items are stored for six months; past search strategies may be saved and citations viewed added to a collection from Recent Activity
- **Filters:** Add filter links specific library or create a **Custom** filter based on a preset search

Customize this page | [NCBI Site Preferences](#) | [Video Overview](#) | [Help](#)

Common Preferences

- **Links Display:** For computers with pop-up limitations
- **Highlighting:** Of searched terms
- **Auto Suggest:** Turn on or off when signed into My NCBI
- **Shared Settings:** Used by institutions to allow others to easily access their resources

PubMed Preferences

- **Abstract Supplemental Data:** Set to *Open* to view MeSH headings in the Results
- **Document Delivery:** Service used by **Send to Order**
- **PubMed Filters & Icons:** Set under **Filters**
- **Outside Tool:** Used by some institutions for document delivery
- **Result Display Setting:** How search results appear

Order the Full Text of Articles

PubMed's offers *LoanSomeDoc*, an article ordering system connecting health science library systems around the world.

- Go to: <https://docline.gov/loansome/login.cfm>
- **Sign up** by selecting and contacting a specific library

Once signed up, run a search in PubMed, check the box(es) next to the article(s) desired, then use **Send to Order** and click on **Order articles**. LoansomeDoc will contact the library with your request.



Exercises

Exercise 1: Find full-text articles about MRIs on seniors with pancreatic cancer.

- Clear search box if necessary and enter *MRI* and *pancreatic cancer* in any order; click **Search**
- Check for **Filters activated**; click **Clear all** or clear unwanted filters
 - Under **Text availability**, click **Free full text available** to find to citations free to everyone, everywhere
 - Click **Show additional filters**, check the **Ages** box, then click **Show**.
 - Click **Aged: 65+ years**
- Optional: Click **Save search** and follow the directions in **My NCBI**

The screenshot shows the PubMed search interface. The search box contains 'MRI pancreatic cancer'. The search button is circled in red. Below the search box, there are links for 'Show additional filters' and 'Clear all', both circled in red. The 'Text availability' section shows 'Free full text available' checked, also circled in red. A 'Filters activated' box indicates 'Free full text available, published in the last 5 years' and is circled in red. The search results show 'Results: 1 to 20 of 246'.

Exercise 2: Find articles of clinical trials of radiosurgery on female lung cancer patients. (Optional: Create a collection of citations).

- Enter *radiosurgery* and *lung cancer* in any order in the search box; click **Search**
- Clear all **Filters**; under **Article types**, click **Clinical Trial**
- Click **Show Additional filters**, check **Sex**, then click **Show**; now click **Female** to activate the filter
- Optional: Select several citations or to add all citations to a collection: Click the **Send to** menu, then **Collections**, then **Add to Collection** and follow the instructions to create a new collection or add to a previously created collection.

The screenshot shows the 'Choose Destination' dialog box. It has a 'Send to:' dropdown menu. The options are: File, Clipboard, Collections (selected), E-mail, Order, and My Bibliography. Below the options, it says 'Add 71 items.' and there is an 'Add to Collections' button.

Exercise 3. Select find articles about the effects of contrast media in children with abdominal injuries. View the MeSH headings for several citations.

- Clear all **Filters**; under **Ages**, click **Child: birth-18 years**
- Enter the search terms *contrast media* and *abdominal injuries*; click **Search**
- To view the MeSH terms, click **Display Settings** and **Abstract** under format, then click **Apply**
- Click on the **Plus** below a citation to review MeSH terms for that citation

The screenshot shows the 'Display Settings' menu. It has a 'Format' section with radio buttons for 'Summary', 'Summary (text)', 'Abstract' (selected), and 'Abstract (text)'. There is also an 'Items per page' section with radio buttons for '5', '10', '20', and '50' (selected).

[+ Publication Types, MeSH Terms](#)

NOTE: Click on a term to see the definition in the MeSH database or to add the term to a PubMed search.

The screenshot shows the 'Search details' box. It contains the search query: '(["contrast media"[MeSH Terms] OR ("contrast"[All Fields] AND "media"[All Fields]) OR "contrast media"[All Fields]) OR "contrast media"[All Fields] OR "contrast media"'. There is a 'Search' button circled in red and a 'See more...' link.

- To view how PubMed handled the search – and to find additional search terms, click **See more** under **Search Details**

The screenshot shows the 'Search Details' box. It contains the query translation: '(["contrast media"[MeSH Terms] OR ("contrast"[All Fields] AND "media"[All Fields]) OR "contrast media"[All Fields]) OR "contrast media"[Pharmacological Action] AND ("abdominal injuries"[MeSH Terms] OR ("abdominal"[All Fields] AND "injuries"[All Fields]) OR "abdominal injuries"[All Fields])) AND ("infant"[MeSH Terms] OR "child"[MeSH Terms] OR "adolescent"[MeSH Terms])'. There are 'Search' and 'URL' buttons.