

# **PubMed for Experts**

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# Table of Contents

How Searching Works - Mapping	4
MeSH Translation Table	5
Journals Translation Table	6
Full Author Translation Table	6
Author Index	7
Phrase Searching	8
Truncation	10
Limits	11
Boolean Operators	17
MeSH	18
MeSH Browsers & Databases	
Searching With Field Tags	25
Affiliation [AD]	26
Journal Name [TA]	26
Personal Name as Subject [PS]	26
Subset [SB]	27
Text Words [TW]	28
Title Word Searching [TI][TI/AB]	29
Searching for Comments, Corrections or Retractions	30
Discipline Searching	31
Veterinary Medicine Subset	32
Nursing Discipline Searching	32
Allied Health Discipline Searching	34
Clinical Queries	37
Special Queries	41
Link Out	44
My NCBI	
Saving Your Search and Automatic E-mail Updates	
Filters	50

# **Expert Searching Discussion: Review of Basic skills**

# **How Searching Works - Mapping**

## **Subject Searching**

**Search:** Find citations to articles about having a rash and a fever.



# **Entering Search Terms**

- Enter significant terms in the query box (e.g., *rash fever*).
- Click on the Go button.

A spell checking feature suggests alternative spellings for PubMed search terms that may include misspellings.

## Example:



Click on the hyperlinked alternative spelling to generate that search.

# PubMed Automatic Term Mapping

Unqualified terms that are entered in the query box are matched against (in this order):

- 1. MeSH (Medical Subject Headings) Translation Table
- 2. Journals Translation Table
- 3. Full Author Translation table
- 4. Author Index
- 5. Full Investigator (Collaborator) Translation Table
- 6. Investigator (Collaborator) Index

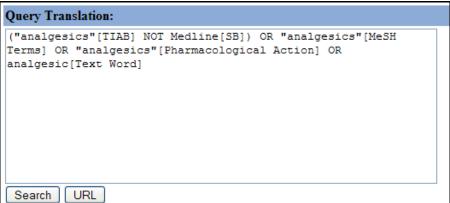
## **MeSH Translation Table contains:**

- MeSH Terms
- The See-Reference mappings (also known as entry terms) for MeSH terms
- MeSH Subheadings
- Publication Types
- Pharmacologic action terms
- Terms derived from the Unified Medical Language System (UMLS)
- Supplementary concept (substance) names and their synonyms

If a match is found in this translation table:

- The term will be searched as a MeSH term (which includes any terms under that term in the MeSH hierarchy), and as a Text Word.
- If you enter a MeSH Term that is also a Pharmacologic Action, PubMed will search the term as [MeSH Terms], [Pharmacologic Action], OR [Text Word].

## Example:



 If you enter an "Entry Term" for a MeSH term, PubMed will also include a Title/Abstract search for that MeSH term limited to citations outside the MEDLINE subset of citations.



#### PubMed's translation:

("exanthema"[TIAB] NOT Medline[SB]) OR "exanthema"[MeSH Terms] OR rash[Text Word])

Rash is an Entry Term for the MeSH term, Exanthema.

#### **Journals Translation Table contains:**

- Full journal title
- Title abbreviation
- International Standard Serial Number (ISSN)

### Example:



PubMed Translation: "J Cell Biol"[Journal]



Watch out for Journal names that are also MeSH terms. For example, typing in "Cell" retrieves citations for the MeSH term cell. Search results will not include the journal Cell.

## Full Author Translation Table includes:

- Full author names for articles published from 2002 forward.
- Full author searching can be entered in natural or inverted order:

julia s wong wong julia s

- When searching a full name using the inverted order, a comma following the last name is generally optional.
- Omit periods after initials, and put all suffixes at the end, e.g. jr.
- If you include an initial or suffix, you will only retrieve citations that were published under that initial or suffix (e.g. herron, bruce j will not retrieve citations for herron, bruce).
- To distinguish author initials that may match a full author name use the [fau] search tag, e.g., peterson do[fau].
- For some names, however, it is necessary to distinguish which name is the last name by using the comma following the last name:

ryan, james james, ryan

# **Author Index:**

- If the phrase is not found in the MeSH or Journal Translation Tables, PubMed checks the Author Index for a match.
- When combining multiple authors to avoid a match with full author names, include initials or use the [au] search tag (e.g., ryan[au] james[au]).
- If only the first initial is used, PubMed automatically truncates the author's name to account for varying initials.

# **Example:**



This search retrieves citations to articles written by o'brien j, o'brien ja, o'brien jz, etc.

# **Phrase Searching**

If a phrase is entered that does not match to a MeSH term or entry term, PubMed breaks apart the phrase and repeats the automatic term mapping process until a match is found.

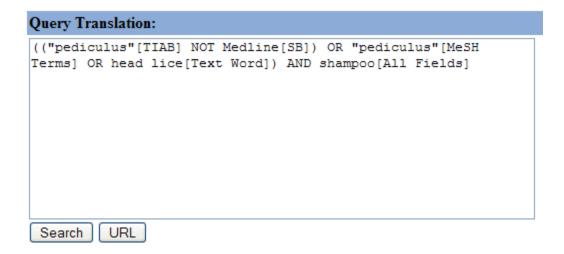
## **Example:**



PubMed conducts the above search in the following order:

	Searches for:	Results:	Action:
1.	head lice shampoo	No match found	Removes term on right to rerun Automatic Term Mapping process.
2.	head lice	Match found in MeSH Translation Table	head lice will be searched as ("pediculus"[TIAB] NOT Medline[SB]) OR "pediculus"[MeSH Terms] OR head lice[Text Word])
3.	Shampoo	No match found in Translation Tables	shampoo will be searched as shampoo[All Fields]

• The individual terms will be combined (ANDed) together and searched in all fields:



You can force PubMed to search for a phrase under these conditions:

- 1. The phrase is entered with a search tag: kidney allograft [tw]
- 2. The phrase is enclosed in quotes: (The absence of a search tag indicates the search should be conducted in All Fields.) "kidney allograft"
- 3. The term is hyphenated: first-line
- 4. The phrase is truncated: kidney allograft\*

#### **Example:**



PubMed Translation: "pressure point"[All Fields]

 The above formats for phrase searching instruct PubMed to bypass automatic term mapping. Instead PubMed looks for the phrase in its index of searchable terms. If the phrase is in the index, PubMed will retrieve citations that contain the phrase.



When you enclose a phrase in quotes, PubMed will **not** perform automatic term mapping which includes explosions of MeSH terms. As a result, you could miss relevant citations.

**Truncation** (find all terms that begin with a given text string):

 Place an asterisk (\*) at the end of a string of characters to search for all terms that begin with that string. The asterisk may only be used at the end of a string of characters.

**Example:** mimic\* will find all terms that begin with the letters m-i-m-i-c-; e.g., mimic, mimics, mimicing.

 PubMed searches the first 600 variations of a truncated term. If a truncated term, e.g., tox\*, produces more than 600 variations, PubMed displays the following warning message on the Results screen in pink near the top of the screen:

Wildcard search for 'tox\*' used only the first 600 variations. Lengthen the root word to search for all endings.



Truncation turns off automatic term mapping. For example, heart attack\* will not map to the MeSH term, Myocardial Infarction or include any of its more specific terms, e.g., Myocardial Stunning.

• Truncating a word in a multi-word query may result in an unexpected phrase search. For example the search, fetus infection\* maternal will treat fetus infection\* as a phrase.

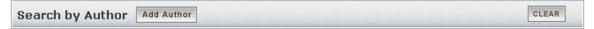
## Limits

Click on the Limits tab.



#### **Search by Author Limit**

 You may limit your search terms to a specific author by selecting Add Author.



- Enter the last name of the author. A drop-down box will provide you with a list of possible authors with that last name. Select the author's name. Once you click on the "go" button on the search bar, the author's name will be automatically added to your search.
- You can add multiple authors by clicking on the <u>Add Another Author</u> link.



### **Search by Journal Limit**

 You may limit your search terms to a specific author by selecting Add Journal.



Enter the name or abbreviation of the journal. A drop-down box will
provide you with a list of possible journal titles. Select the journal title.
Once you click on the "go" button on the search bar, the journal will be
automatically added to your search.



## Full Text, Free Full Text, and Abstracts Limit

• To limit your search results to only citations that include a link to full text, a link to free full text, or an abstract, click the appropriate check boxes:



- The **Links to full text** limit will only include citations that have a publisher supplied link. It may not include links to a specific library's holdings.
- The Links to free full text limit will include citations with free full text access to articles. Note: Citations are not restricted to journals in PubMed Central.
- The Abstracts limit will retrieve only citations with an abstract. Most citations in PubMed to articles published before 1975 do not include abstracts.

#### **Dates Limit**

- PubMed contains citations published back to the 1950s (there are a limited number of citations that go back to 1865).
- New citations are added Tuesday-Saturday.
- You may restrict to two date fields from the Limits screen:
  - Published in the Last: the date the article was published; Click on the drop-down box and select a set time interval (e.g. 30 days, 60 day, etc) or enter a date range
  - Added to PubMed in the Last: the date the citation was initially added to PubMed; Click on the drop-down box and select a set time interval (e.g. 30 days, 60 day, etc) or enter a date range



## **Human or Animal Limit**

- To limit to human or animal, click the appropriate check box.
- Note: Do not rely on this limit when searching for veterinary articles.



#### **Gender Limit**

- To limit to male or female, click the appropriate check box.
- Note: Exercise caution when limiting by gender; the majority of the literature focuses on male subjects.



## **Languages Limit**

- Journals published in approximately forty languages are indexed.
- The selections at the top are frequently searched languages.
- Scroll down to find a complete listing of languages.
- Multiple selections are allowed (ORed together).



### **Subsets Limit**

Allows you to limit your retrieval to one of the following:

- 1. Journal Groups:
  - Core clinical journals
  - Dental
  - Nursing
- 2. Topics
  - AIDS
  - Bioethics
  - Cancer
  - Complementary Medicine
  - History of Medicine
  - Space Life Sciences
  - Toxicology



Each topic subset limit uses its own specialized search strategy. More information on the Journal Groups and Topics subset can be found later in the workbook.

#### 3. More subsets

- MEDLINE: citations with MeSH headings and other indexing terms that have also been checked for accuracy
- PubMed Central: citations that have a full-text article available for free in PubMed Central

# **Type of Article Limit**

- You may limit your search results based on the type of material the citation represents (e.g. clinical trail, editorial, letter, review, etc.).
- With this limit, PubMed retrieval will be limited to MEDLINE citations. The "in process" and "supplied by publisher" citations will be excluded because they have not yet completed the indexing process and will not include a Publication Type.
- Multiple selections are permitted (ORed together).



## **Ages Limit**

- To search for a specific age group for human studies, click on the Ages pulldown menu and make a selection.
- Multiple selections are permitted (ORed together).



#### **Limits Indicator**



- Once you have selected limits, a check box appears next to the limits on the Feature tabs.
- When you run a search, the limits in effect will appear in the yellow bar above the display button:

Limits: English, Review



To turn off all of the limits before you run your next search, click on the check box next to the Limits tab.

# **Search Rules and Syntax**

# **Boolean Operators**

Boolean logic is a system of logic that symbolically represents relationships between entities.

- The Boolean operators AND, OR, NOT must be entered in uppercase letters.
- Boolean connectors are processed left to right.

### Logical Operator AND:

Used to retrieve a set in which each citation contains all search terms.

### **Example:** salmonella AND hamburger

#### Logical Operator **OR**:

- Used to retrieve a set in which each citation contains at least one of the search terms.
- Use OR when you want to pull together articles on similar topics.

#### **Example:** football OR hockey OR soccer

#### Logical Operator **NOT**:

- Retrieves a set from which citations to articles containing specified search terms following the NOT operator are eliminated.
- Use the NOT operator with caution; you might eliminate relevant articles.

#### **Example:** sports NOT hockey

#### Nesting

 To change the order in which terms are processed, enclose the terms(s) in parentheses. The terms inside the set of parentheses will be processed as a unit and then incorporated into the overall strategy. This is called nesting.

#### Example:

shoulder joint AND (baseball OR hockey) AND arthroscopy

## MeSH

## Basic Information about MeSH:

- MeSH is an acronym for <u>Me</u>dical <u>Subject Headings</u>. It is the controlled vocabulary used to index MEDLINE articles and to catalog books, documents, and audiovisuals acquired by NLM.
- The home page for the MeSH section of NLM is located at http://www.nlm.nih.gov/mesh/meshhome.html
- MeSH is revised annually. The NLM Technical Bulletin will identify when the revision has been completed each year and the significant changes that were made. Access the Technical Bulletin at <a href="http://www.nlm.nih.gov/pubs/techbull/tb.html">http://www.nlm.nih.gov/pubs/techbull/tb.html</a>
- Indexers typically assign 10-12 MeSH terms to a journal article with major topics indicated with an asterisk (\*). Indexers use the most specific MeSH term available.
  - Note: In *indexing*, the \* denotes the MeSH Major Heading. In the Citation display format in PubMed, the MeSH terms assigned to that citation will be displayed and the \* denotes the MeSH Major Heading(s).
  - In searching, PubMed interprets an asterisk (\*) as a truncation symbol. The asterisk (\*) should be used very carefully in searching PubMed as it turns off the Automatic Term Mapping function.

## What is a controlled vocabulary?

 A controlled vocabulary is a list of words approved for indexing. Only these words are allowed as indexing terms.

## Why use a controlled vocabulary?

- A controlled vocabulary provides uniformity and consistency to indexing.
- Indexing with a controlled vocabulary allows for retrieval of all relevant information with the use of a single, key term.
- In key word searching, searchers have to know all possible spelling variations (color and colour, for example) and all possible terms related to the subject matter (dog, canine, doggy, pooch, puppie, pup, Fido, etc.) in order to find the needed information. A controlled vocabulary eliminates this and makes searching more efficient.

#### **MeSH Particulars**

There are several major components of the MeSH vocabulary:

- Headings (also known as MeSH Headings or Descriptors)
  - Headings describe concepts found in the literature.
  - o These are generally nouns.
  - o These are generally NOT brand names or personal names.
  - o Examples of headings:

Seasonal Affective Disorder

Brain

**Liver Diseases** 

**New South Wales** 

Hair Follicle

- When an article is indexed for MEDLINE, MeSH terms are often (not always) accompanied by a subheading because indexers index to the most specific term available.
- Subheadings (also known as Qualifiers)
  - These are generally adjectives that describe the nouns (headings) and add specificity to the search.
  - o Examples of subheadings:

Adverse effects

Prevention and control

 Think of using a subheading whenever there is an "of" in a research question:

What is the mortality rate of asthma?

Asthma = heading

Mortality = subheading

 Subheadings are attached to MeSH headings in the following manner: MeSH/Subheading (or MH/sh). The subheadings may be spelled out in full or the official two letter abbreviation may be used:

What is the mortality rate of asthma?

Use: Asthma/mortality

Asthma/mo

- Only one subheading may be attached to a MeSH heading at a time. It is not proper to use MH/sh/sh.
- o There are two ways to include several subheadings in a search:
  - 1. Use the PubMed MeSH Database and select the desired subheadings from the full display screen;
  - 2. "OR" together the MH/sh combinations in the PubMed search box. For example: asthma/mortality OR asthma/etiology OR asthma/therapy.
- For a comprehensive list of subheadings, see Advanced PubMed Searching Resource Packet
- (http://nnlm.gov/training/resources/pubmedpacket.doc)

## Floating a Subheading:

- You can "float" a subheading by using a subheading term in a search without attaching it to a particular MeSH heading.
- Using floating subheadings may result in a lot of noise (false drops or false hits) in the search results.

Note: These searches are NOT identical:

urticaria/im

urticaria[mh] AND immunology[sh]

urticaria AND immunology
urticaria/im[mh:noexp]

- The search "urticaria[mh] AND immunology[sh]" will result in citations indexed as urticaria/immunology, but it will also pull up urticaria/chemically induced or pneumonia/immunology or any other citation in which a MeSH heading is combined with /immunology.
- The search "urticaria/im" will result in a smaller result set, but a more specific one. Remember, however, that both MeSH and the subheadings automatically explode to include narrower terms from the hierarchy.
- The most specific search is utricaria/im[mh:noexp] as it will retrieve only citations that have "urticaria/immunology" in the indexing.

When using MeSH for searching, remember that the most specific MH or MH/sh combination is used to index articles. Searchers need to do the same in order to get the most relevant results.

Additional Components of the MeSH Vocabulary:

## • Supplementary Concept Records

- o These are generally chemical and substance names.
- There are over 100,000 Supplementary Concepts included in MeSH.
- o These are updated quarterly.
- o Examples:

Tonicaine

Benorilate

Atavorstatin

**Chromium Sulfate** 

## CAS Registry Number/EC Number

- This is a unique 5 9 digit number in hyphenated format representing either the Chemical Abstracts number or the E. C. number from the Enzyme Nomenclature. It is sometimes referred to as the RN number.
- Examples:

439-14-5 is the CAS registry number for diazepam (Valium) 54910-89-3 is the registry number for fluoxetine (Prozac)

- o The RN number can be used to search PubMed.
- The registry numbers for substances may be seen in the "MEDLINE" type display for a citation in PubMed (the RN field) or in the MeSH section's browser in appropriate records.

## **MeSH Browsers & Databases**

- There are <u>two</u> MeSH browsers available: the PubMed MeSH Database and the MeSH section's online browser.
  - The MeSH Database may be accessed via a link on the left hand side (blue frame) of the PubMed page.
  - The MeSH section's browser is located at <u>http://www.nlm.nih.gov/mesh/MBrowser.html</u>
- Both of these will identify MeSH terms and show the section of the MeSH tree pertinent to that concept. Beyond that, they display much of the same information in different ways and they provide different functionality.

#### MeSH Database:

- In the PubMed MeSH Database, a definition of the heading is provided.
- The allowed subheadings are presented here with check boxes. Users may select none, one, or more subheadings to add to their search.

□ 1: Common Cold
A catarrhal disorder of the upper respiratory tract, which may be viral, a mixed infection, or an
allergic reaction. It is marked by acute coryza, slight rise in temperature, chilly sensations, and general indisposition. (Dorland, 27th ed)
Subheadings: ☐ blood ☐ cerebrospinal fluid ☐ chemically induced ☐ classification ☐ complications
🗆 diagnosis 🗆 diet therapy 🗀 drug therapy 🗀 economics 🗀 enzymology 🗀 epidemiology
☐ ethnology ☐ etiology ☐ genetics ☐ growth and development ☐ history ☐ immunology ☐ metabolism ☐ microbiology ☐ mortality ☐ nursing ☐ pathology ☐ physiopathology
🗆 prevention and control 🗆 psychology 🗆 radiography 🗀 radiotherapy 🗀 rehabilitation
☐ surgery ☐ therapy ☐ transmission ☐ urine ☐ veterinary ☐ virology
□ Restrict Search to Major Topic headings only
$\square$ Do Not Explode this term (i.e., do not include MeSH terms found below this term in the
MeSH tree).
Entry Terms:
Cold, Common
Colds, Common
Common Colds
Coryza, Acute
Acute Coruza

- Two other search related options are available from the MeSH Database page:
  - Restrict Search to Major Topic headings only
  - Do Not Explode this term
- A PubMed search may be built directly from this Database using the "Send to" options at the top of the page.

#### MeSH Browser:

MeSH Heading	Common Cold
Tree Number	<u>C02.782.687.207</u>
Tree Number	C08.730.162
Annotation	often caused by a picornavirus
Scope Note	A catarrhal disorder of the upper respiratory tract, which may be viral, a mixed infection, or an allergic reaction. It is marked by acute coryza, slight rise in temperature, chilly sensations, and general indisposition. (Dorland, 27th ed)
<b>Entry Term</b>	Cold, Common
<b>Entry Term</b>	Coryza, Acute
Allowable Qualifiers	BL CF CI CL CN CO DH DI DT EC EH EM EN EP ET GE HI IM ME MI MO NU PA PC PP PS PX RA RH RI RT SU TH TM UR US VE VI
Unique ID	D003139

- The Entry terms are synonyms or concepts included by this MeSH heading. If an entry term is typed into the search box in PubMed, it will map to the designated descriptor. In this example, "Coryza, Acute" will map directly to the MeSH heading COMMON COLD.
- The annotation presents additional information on the concept that may be of use to indexers and/or searchers.
- The allowable qualifiers are the subheadings (qualifiers) that may be used with this term. In the MeSH section browser, these two letter abbreviations for each subheading are hyperlinks that, if followed, will link directly to the record for the subheading.

# A Comparison of the two Browsers:

PubMed's Database	MeSH Home's Browser
Definition	Definition (scope note)
No annotation	Annotation
Entry terms	Entry terms
History: year concept added to	History: year concept added to MeSH
MeSH	
Previous indexing available	Previous indexing available
"See also" concepts available &	"See also" concepts available &
hyperlinked	hyperlinked
RN numbers not searchable	RN numbers searchable
Subheading records available	Subheading records available
No pharmacological action data	Pharmacological action data available
Can build a PubMed search here	Can NOT build a PubMed search here
Provides some help for misspelled	Words must be spelled correctly in order
words	to be searched here
Suggests other terms of possible	Provides the option of searching for the
interest	exact term, all fragments, or any
	fragment

# **Searching With Field Tags**

- Search fields can be specified using PubMed's search field tags. A list of the available field names, abbreviation, and brief field descriptions may be found in the PubMed Help under Search Field Descriptions and Tags. Abbreviations are listed below with a brief description.
- Each search term should be followed with the appropriate search field tag, indicating which field will be searched
   The search field tag must follow the term. You cannot prequalify a term.
   The term must be post qualified.

Correct entry: aromatherapy [mh] Incorrect entry: [mh] aromatherapy

- Search field tags must be enclosed in square brackets []
- Case and spacing do not matter: ice[mh] = Ice [mh] = ICE [MH]

A complete list of Search Field Descriptions and Tags can be found in the Advanced PubMed Searching Resource Packet (http://nnlm.gov/training/resources/pubmedpacket.doc)

# **Affiliation [AD]**

- May include the institutional affiliation and address (including email address) of the first author of the article as it appears in the journal.
- This field can be used to search for work done at specific institutions, though it will only retrieve citations that actually have the institutional name appearing in the address.

**Example:** cleveland [ad] AND clinic [ad]

# Journal Name [TA]

Search for journals using the full journal name, or the MEDLINE abbreviation, or the ISSN.

Examples: journal of biological chemistry [ta]

j biol chem [ta] 0021-9258 [ta]



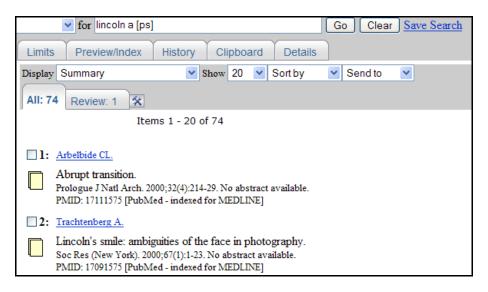
All single-word journal titles should be tagged with [ta].

**Example:** cell [ta]

# Personal Name as Subject [PS]

Use the [ps] tag to search for citations to articles about a named individual. The name is searched in the same format as for authors.

Example: lincoln a [ps]



# MeSH headings [MH]

MeSH headings can be qualified using two search field tags:

[mh] to search a MeSH heading[majr] to search a MeSH heading that is a major topic of an article

- PubMed automatically searches the MeSH headings as well as the more specific terms beneath that heading in the MeSH hierarchy; i.e., the term is exploded.
- To turn off automatic explosion of MeSH headings:

Use one of the following tags: [mh:noexp] or [majr:noexp]

Example: thromboembolism [mh:noexp] thromboembolism [majr:noexp]



Searching with MeSH headings will **exclude** in process and publisher-supplied citations, as they are not indexed with MeSH.

# Subset [SB]

- Allows you to limit your search to various PubMed subsets.
- Note: Not all subsets use [sb] tag (see list below)
- Available values include:

Level of processing (Status) Subsets	Subject Subsets	Journal Subsets
<ul><li>medline [sb]</li><li>in process [sb]</li><li>publisher [sb]</li></ul>	<ul><li>aids [sb]</li><li>bioethics [sb]</li><li>cam [sb]</li><li>(Complementary Medicine)</li></ul>	<ul><li>medline pmc [sb]</li><li>free full text [sb]</li><li>loprovmedlib [sb]</li></ul>
<ul><li>pubstatusaheadofprint</li><li>pubmednotmedline [sb]</li><li>pubstatusnihms</li></ul>	<ul><li>history [sb]</li><li>space [sb]</li><li>systematic [sb] (Systematic Reviews)</li></ul>	<ul> <li>jsubsetname (see list below)</li> </ul>
<ul><li>oldmedline [sb]</li></ul>	<ul><li>tox [sb] (Toxicology)</li><li>veterinary [sb]</li></ul>	

**Example:** hospice care AND aids [sb]

## **Journal Subsets**

# Limiting to published journal indexes

• The following values are available:

Core clinical journals	jsubsetaim
Dental journals	jsubsetd
Bioethics journals	jsubsete
Health administration journals, non-Index Medicus	jsubseth
Index Medicus journals	jsubsetim
Consumer health journals, non-Index Medicus	jsubsetk
Nursing journals	jsubsetn
History of medicine journals and selected citations from other	Jsubsetq
journals	
Citations from non-Index Medicus journals in the field of	jsubsetqis
history of medicine	
Citations from space life sciences journals and selected space	jsubsets
life sciences citations from other journals	
Health technology assessment journals, non-Index Medicus	jsubsett
AIDS/HIV journals (selected citations from other journals 1980 – 2000)	jsubsetx



Do **not** use a field tag; just use the search value.

**Example:** baseball AND jsubsetaim

Do not confuse JOURNAL subsets with SUBJECT subsets, e.g.

aids [sb] vs jsubsetname

# **Substance Name [NM]**

 Searching the substance name allows for more specific searching of drug names.

**Example:** albuterol [NM]

# **Text Words [TW]**

Terms or numbers that are searched with the Text Words [tw] field tag will be searched in the following fields:

- Title
- Abstract

- MeSH headings and Subheading (includes single words and phrases)
- Publication types
- Substance name
- Personal name as subject
- Secondary Source Identifier (The SI field identifies other data sources, databanks and accession numbers of molecular sequences discussed in MEDLINE articles.)

# Title Word Searching [TI][TI/AB]

- Enter significant terms (numbers, too) from the title of an article.
- Each word must be followed by the [TI] search field tag.
- Words should be combined with the AND operator.

**Example:** I'm looking for an article. The title is "Memory improvement following cardiac transplantation".

**Query box:** memory [ti] AND improvement [ti] AND cardiac [ti] AND transplantation [ti]

#### Result:

1: Roman DD, Kubo SH, Ormaza S, Francis GS, Bank AJ, Shumway SJ.

Related Articles, Links

Memory improvement following cardiac transplantation.

J Clin Exp Neuropsychol. 1997 Oct; 19(5):692-7. PMID: 9408799 [PubMed - indexed for MEDLINE]



Consider using the Single Citation Matcher available from the sidebar. When using Single Citation Matcher, you do not have to tag each title word.Or, choose Title Word from Limits, which also eliminates the need to qualify each word

# Volume [VI] Issue [IP] Pagination [PG]

**Example:** 27 [vi]: 5 [ip] : 234 [pg]

# **Searching for Comments, Corrections or Retractions**

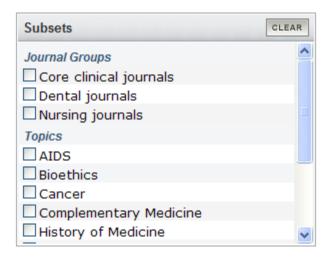
- You can search for citations to other associated journal publications (e.g. comments or errata). Often these link to the respective citation.
- Comments/Corrections data can be retrieved by the search term that follows each type:
  - Comment in: hascommentin
  - Comment on: hascommenton
  - Erratum in: haserratumin
  - Erratum for:: haserratumfor
  - o Corrected and republished in: hascorrectedrepublishedin
  - o Corrected and republished from: hascorrected republished from
  - o Partial Retraction in: haspartialretractionin
  - Partial Retraction of: haspartialretraction of
  - o Republished in: hasrepublishedin
  - Republished from: hasrepublishedfrom
  - Retraction in: hasretractionin
  - Retraction of: hasretraction of
  - Update in: hasupdatein
  - Update of: hasupdateof
  - Summary for patients in: hassummaryforpatientsin
  - o Original Report in: hasoriginalreportin

**Example:** To search for a retracted publication by JL Wallace:



# **Discipline Searching**

PubMed has a number of options that make searching in specific disciplines simple. An obvious tool for this kind of searching is the Subsets limit:



Discipline/Topic Subset choices are

- AIDS Subset This subset strategy was created to facilitate searching for subjects in the area of AIDS. It is based on search strategies used for creating NLM's AIDSLINE® database. This subset can also be used in a search as aids [sb].
- **Bioethics Subset** This subset strategy was created by NLM and the Kennedy Institute of Ethics, Georgetown University to facilitate searching for citations to articles in the area of bioethics. This subset can also be used in a search as **bioethics [sb]**.
- Cancer Subset This subset strategy was created by NLM and the National Cancer Institute to aid in searching for citations to cancer-related articles. This subset can also be used in a search as cancer [sb].
- Complimentary Medicine This subset strategy was created by NLM and that National Center for Complementary and Alternative Medicine (NCCAM) and is designed to limit a search to citations in the area of complimentary and alternative medicine. This subset can also be used in a search as cam [sb].
- Dental Journals Subset This subset can also be used in a search as jsubsetd.
- **History of Medicine Subset** This subset strategy was created by NLM's History of Medicine Division to facilitate searching for subjects in the history of medicine. This subset can also be used in a search as **history [sb]**.

- Nursing Journals Subset This subset strategy was created using the titles found in the *International Nursing Index* (discontinued in 2000). This subset can also be used in a search as jsubsetn.
- Space Life Sciences Subset This subset strategy was developed by NLM and the NASA SPACELINE Office and is intended to retrieve citations of interest to those working in the field of space life sciences research. This subset can also be used in a search as space [sb].
- Systematic Reviews Subset Systematic Reviews cover a broad set of articles that build consensus on biomedical topics. This feature is provided to help clinicians locate systematic reviews and similar articles. This subset can also be used in a search as systematic [sb].
- **Toxicology Subset** This subset strategy was created by NLM's Specialized Information Services to facilitate searching for subjects in the area of toxicology. This subset can also be used in a search as **tox [sb].**

PubMed also offers other powerful tools for use by the researcher working in a specific discipline: natural language searching, specific MeSH headings and MeSH subheadings. Following are instructions from some sample disciplines.

# **Veterinary Medicine Subset**

The veterinary medicine subset (**veterinary [sb]**) retrieves citations to journal literature, combining subject search terms, title words, and veterinary and animal health journal titles. Information on the veterinary medicine search strategy is located at: <a href="http://www.nlm.nih.gov/services/veterinarymed\_details.html">http://www.nlm.nih.gov/services/veterinarymed\_details.html</a>

# Nursing Discipline Searching

PubMed has a special benefit for nurses in that the Nursing Journal Subset is built into the Limits feature.

## **MeSH Searching**

For a search that extends beyond the nursing journals subset, but is specific to the nursing profession, a search strategy can be constructed from MeSH terms (e.g. nurse, nursing, etc.) instead of using the subset limiter. Other combinations may be found using MeSH headings such as "Philosophy, Nursing."

## **MeSH Subheadings**

Of course not all searches about nursing information are about nursing. Some are about nursing aspects of some topic--a disease, or practice, for example. MeSH is useful in this situation by giving one the ability to modify a term with a subheading. For instance, to get information on care giving in the context of cancer, search on the term "neoplasms" with "nursing" used as a subheading or modifier:

Neoplasms/nursing[mh]
Or
Neoplasms/nu[mh]

As with the veterinary search, the subheading "nursing" or "nu" may be added to a strategy as a free-floating subheading:

Neoplasms[mh] AND nu[sh]

# Allied Health Discipline Searching

Searching MEDLINE for information relevant to allied health professions is not as straightforward as finding literature relevant to nursing or veterinary medicine. The large variety of occupations involved makes the creation of a simple filter unwieldy and undesirable. This section will show how MeSH maps allied health professions and will aid searchers building queries that effectively retrieve information written (1) about and (2) for these occupations.

As a result of a division between professional and paraprofessional occupations, MeSH has two major categories that are further subdivided into allied health practice: Allied Health Occupations, and Allied Health Personnel. "Allied Health Occupations" belongs under the Biological Sciences/Health Occupations rubric while "Allied Health Personnel" belongs under the "Persons Category." The distinction is academic: audiology is an occupation; an emergency medical technician is a person. Consequently, there are no MeSH terms for audiologist or for emergency medical technology. Following are the two categories and their subordinate headings.

## **Allied Health Occupations**

Audiology
Occupational Therapy
Physical Therapy (Specialty)
Speech-Language Pathology
Technology, Dental
Technology, Medical
Technology, Radiologic
Teleradiology

## **Allied Health Personnel**

**Animal Technicians** Community Health Aides **Dental Auxiliaries Dental Assistants Dental Hygienists** Dental Technicians + **Emergency Medical Technicians** Home Health Aides Medical Record Administrators **Medical Secretaries** Medical Receptionists Nurses' Aides **Psychiatric Aides Operating Room Technicians** Pharmacists' Aides Physician Assistants Ophthalmic Assistants Pediatric Assistants

A MEDLINE search for information about a specific allied health field would use the appropriate subcategory. For instance, to find information regarding physician assistants, start with:

Physician Assistants [mh]

The strategy indicated above can be fleshed out to create real searches about the work of physician assistants by adding more terms, either natural language terms or MeSH. To find out the role of physician assistants in nephrology, start with a search strategy that looks like this:

Physician Assistants [mh] AND nephrology Or Physician Assistants [mh] AND nephrology [mh]

The two searches do not, of course, exhaust the possibilities for this simple strategy since one or both of the search terms can be made into major terms.

There are a number of allied health occupations (see the AMA's list at http://www.ama-assn.org/ama/pub/category/2322.html), that are missing from MeSH, for instance, recreation therapist, cytotechnologist, perfusionist (aka perfusion therapist). To search MEDLINE for information on these topics start with this question: Can this occupation be found in another branch of the MeSH tree? Medical Illustration is a subcategory all by itself under "Health Occupations." While MeSH doesn't recognize Medical Illustration as an Allied Health Occupation, it does recognize it as an occupation.

But what about perfusionists? MeSH recognizes "perfusion" but not the therapists who do the work. Here, it is time to partially abandon MeSH; to initiate a search for articles about perfusionists by entering "Perfisionist" into the PubMed search box without any qualifiers:

#### Perfusionist

The term is entered without qualifiers. PubMed searches for the word in all fields, including titles and abstracts. All allied health queries may be entered in this way, without the MeSH apparatus, but MeSH allows considerable control in a search strategy. So, MeSH need not be abandoned altogether in this kind of search. Someone interested in the intersection of perfusion therapy and aortic aneurysm in the abdominal region might use a combination of the natural language search above and MeSH terminology:

Perfusionist AND Aortic Aneurysm, Abdominal [MH]

The AMA recognizes sixty-seven allied health occupations, not all of which are recognized by MeSH. But neither does the AMA recognize all occupations that other associations or schools include in their roster of occupations. What is important to remember is not particularly that MeSH does not measure up, but that MEDLINE remains a great source of bibliographic information for the allied health fields. And not a tremendous amount of skill is required to search with PubMed: know when to use MeSH and when to use natural language and when to use them in tandem.

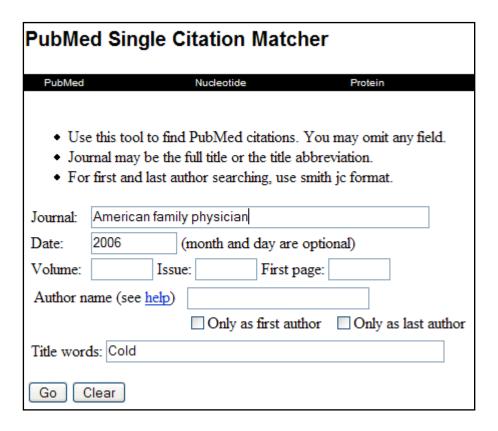
# **Single Citation Matcher**

The Single Citation Matcher makes it easy to search for a specific citation when you have some bibliographic information, e.g., journal name, volume, or page number.



The Single Citation Matcher is available from the PubMed sidebar

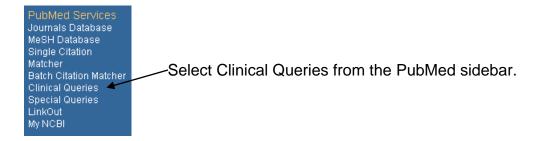
- The journal box includes an auto complete feature that suggests titles as you enter a title abbreviation or full title.
- The author box also includes an auto complete feature that suggests author names. Full author names may be searched for citations published from 2002 forward if the full author name is available in the article
- Click either the 'Only as first author' or 'Only as last author' checkbox to limit an author name to the first or last author.



## **Clinical Queries**

The PubMed Clinical Queries page provides specialized PubMed searches for clinicians:

- Search by Clinical Study Category
- Finding Systematic Reviews
- Medical Genetics Searches



## Clinical Study Category

The Clinical Study Category is PubMed's Evidence-Based Medicine (EBM) filterset based upon research done by R. Brian Haynes, MD, PhD at McMaster University.

The MeSH definition for Evidence-Based Medicine is:

The process of systematically finding, appraising, and using contemporaneous research findings as the basis for clinical decisions. Evidence-based medicine asks questions, finds and appraises the relevant data, and harnesses that information for everyday clinical practice. Evidence-based medicine follows four steps: [1]formulate a clear clinical question from a patient's problem; [2]search the literature for relevant clinical articles; [3]evaluate (critically appraise) the evidence for its validity and usefulness; [4]implement useful findings in clinical practice. The term "evidence based medicine" (no hyphen) was coined at McMaster Medical School in Canada in the 1980's to label this clinical learning strategy, which people at the school had been developing for over a decade. (From BMJ 1995;310:1122) Year introduced: 1997.

Following this definition, the purpose of these filters is to aid clinicians (and librarians!) to perform step 2, "search the literature for relevant clinical articles." To this end, hedges were established, using the McMaster work to search for contemporaneous research-based literature.

To find citations using the Clinical Study category:

- 1. Click Search by Clinical Study category
- 2. Enter your search term in the search box
- 3. Select a Category: therapy, diagnosis, etiology, or prognosis
- 4. Select a Scope: "narrow, specific search or broad, sensitive search
- 5. Click Go

The Clinical Study category provides these hedges for clinical problems:

- Therapy: Treatment of a disease or condition.
- Diagnosis: Determination of the nature of a disease or condition or the distinguishing of one disease or condition from another.
- Etiology: (Also known as Harm.) Causation of a disease or condition.
- Prognosis: Prediction of the probable outcome of a disease based on a individual's condition and the usual course of the disease as seen in similar situations.
- Clinical Prediction Guides

Additionally, there are two emphasis filters:

- **Sensitivity**: also known as "recall," retrieves relevant citations, but also includes citations that are less relevant.
- **Specificity**: also known as "precision," retrieves fewer, more relevant citations.

The result of a filter search is, especially when an emphasis of Specificity is applied, a substantial decrease in retrieval set. However, the set is restricted to research-based citations.

### **Example:**

A PubMed search on treating patients with heart disease and diabetes mellitus:

"heart diseases AND diabetes mellitus AND therapy"

#### PubMed

6844 hits. Included in those hits are 141 editorials and 206 letters; additionally, there are hundreds of non-research-based articles.

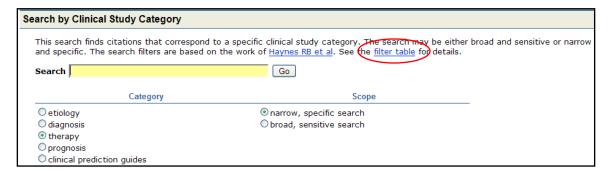
#### Clinical Study

507 hits. Two are editorials and only 7 are letters. Most articles are research-based. [The search term "Therapy" is dropped from the strategy since the Clinical Queries search filter covers the concept.]

Tips for using the Clinical Study Category:

- Clinical Study search defaults to Therapy and Specificity.
- If a Specificity search retrieves too few citations, use the Sensitivity emphasis instead.
- While natural language searches often work best in the Clinical Study interface, MeSH terminology can be used to reduce the large retrieval sets, for example: "Heart Diseases [MH] AND Diabetes Mellitus[MH]."
- Copy and paste a search from the MeSH database into the Clinical Queries search box for more control.

For an excellent overview of what is covered by the clinical study category, including specificity, sensitivity and PubMed search terms, click on the link to filter table.



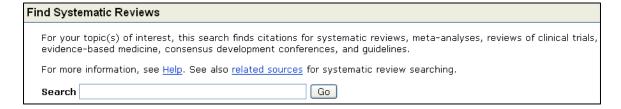
## Systematic Reviews

The Systematic Reviews strategy is intended to retrieve citations identified as systematic reviews, meta-analyses, reviews of clinical trials, evidence-based medicine, consensus development conferences, guidelines, and citations to articles from journals specializing in review studies of value to clinicians.



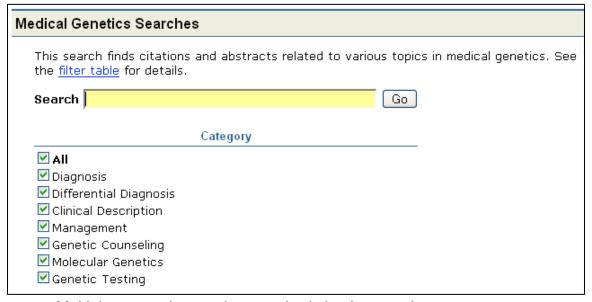
A **systematic review** is "a summary of the medical literature that uses explicit methods to perform a thorough literature search and critical appraisal of individual studies and that uses appropriate statistical techniques to combine these valid studies." (Sackett, et al, 2000.) **Meta-analyses** are also systematic reviews but they use quantitative methods (statistics) to summarize results.

Systematic Reviews are a subset of the MEDLINE database (as opposed to a hedge). Systematic reviews may also be searched by adding systematic[sb] to any PubMed search strategy.



### Medical Genetics Searches

Developed in conjunction with the staff of GeneReviews: Genetic Disease Online Reviews at GeneTests (University of Washington, Seattle), these filters search citations and abstracts related to various topics in medical genetics.

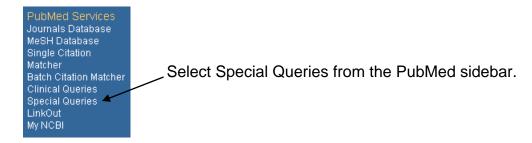


Multiple categories can be searched simultaneously.

## **Special Queries**

The Special Queries page provides a directory of topic-specific PubMed queries including:

- Queries targeted to clinicians and health services researchers
- Subject queries
- Additional search interfaces



You will be taken to the Special Queries page, located on the National Library of Medicine's website. After you select a special query, you will be taken be able to conduct a PubMed search targeted to that specific area.

Directory of Topic-Specific PubMed Qu	eries Return to Pubmed	
Queries Targeted for Clinicians and Health Services Researchers		
<u>Clinical Queries</u>	A search interface to find citations in the areas of:     Clinical Study Categories: Find citations corresponding to a specific clinical study category.     Systematic Reviews: Find citations for systematic reviews, meta-analyses, reviews of clinical trials, evidence-based medicine, consensus development conferences, and guidelines.     Medical Genetics: Find citations related to various topics in medical genetics.	
Health Services Research (HSR) Queries	A search interface to find PubMed citations relating to health care quality or to health care costs	
Cancer Topic Searches	A search interface to retrieve PubMed citations on more than 100 major cancer topics	
Healthy People 2010	A search interface providing searches for published literature related to the Healthy People 2010 focus areas of the HP2010 Information Access Project.	

**Example:** Let's conduct a search targeted to health information literacy:

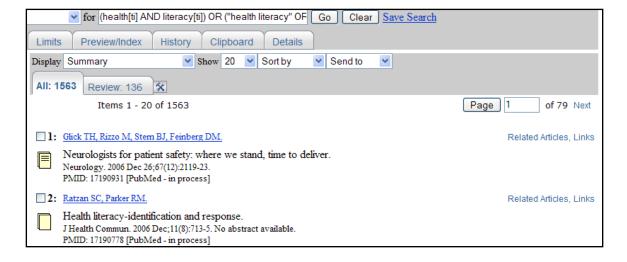
<u>Cancer Topic Searches</u>	A search interface to retrieve PubMed citations on more than 100 major cancer topics	
Healthy People 2010	A search interface providing searches for published literature related to the Healthy People 2010 focus areas of the HP2010 Information Access Project.	
Subjects		
AIDS	Limits search to the PubMed <u>AIDS subset</u>	
<u>Bioethics</u>	Bioethics Information Resource page providing a PubMed search function using the PubMed <u>Bioethics subset</u> , and links to additional bioethics-related resources.	
Cancer	Limits search to the PubMed <u>Cancer subset</u>	
Complementary Medicine	Limits search to the PubMed Complementary Medicine subset	
Health Literacy	PubMed search and links to other health literacy information resources	

Scroll down the list of specialized queries to select **Health Literacy**:

You will be taken to an intermediary page that will describe the health information literacy search. Select the link to: **MEDLINE/PubMed health literacy search** 



Clicking on the link will take you into the PubMed database. Notice that a PubMed search has been run that focuses on health literacy:

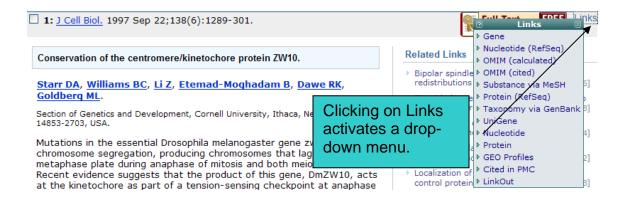


To further limit your search, you can enter any additional terms into the search box (e.g. diabetes)

## **Link Out**

LinkOut is a service that provides external links from PubMed citations to other NLM databases, publisher Web sites for full-text journal articles, biological data, sequence centers, etc. from third parties.

To see the full list of web-accessible online resources for a citation, select **Links** from the Links pull-down menu. The available links will vary from citation to citation, depending on the topic or focus of the article. Selecting the LinkOut option will allow you to connect to publisher websites and other resources.



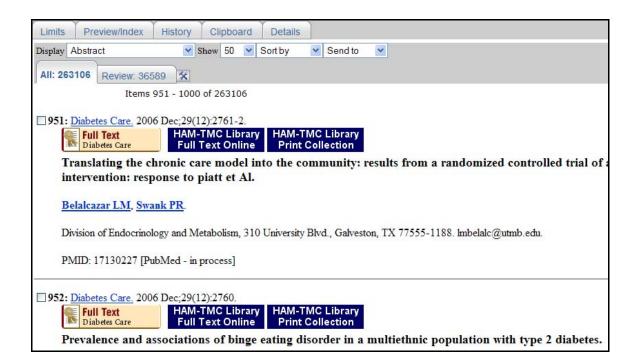
#### Additional uses for LinkOut:

- Every library that participates in LinkOut receives a unique user identification, or LinkOut username. To find a list of libraries participating in LinkOut and their usernames, go to <a href="http://www.ncbi.nlm.nih.gov/entrez/journals/active\_libraries.html">http://www.ncbi.nlm.nih.gov/entrez/journals/active\_libraries.html</a>. This list is also available from the LinkOut sidebar in PubMed
- Once the LinkOut files for a library are processed, they can be activated in PubMed using the following URL:
   <a href="http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?holding=medlib">http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?holding=medlib</a>
   where "medlib" is the LinkOut username assigned to your library. LinkOut Libraries should place this link in their web pages.

## Example:

The Houston Academy of Medicine – Texas Medical Center Library's website has the following link to PubMed:

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?holding=hamtmc. When their users access PubMed via this link, instead of the traditional pubmed.gov URL, they will see the Library's icons in their search results:





Other options are available for libraries via the **LinkOut** link on the PubMed side bar.

# **My NCBI**



My NCBI saves searches and features an option to automatically update and email search results from your saved searches. My NCBI includes additional features for storing an e-mail address, filtering search results and setting LinkOut, document delivery service and outside tool preferences.

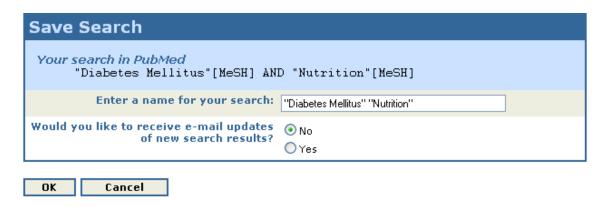
To use My NCBI, your Web browser must be set to accept cookies.

## Saving Your Search and Automatic E-mail Updates

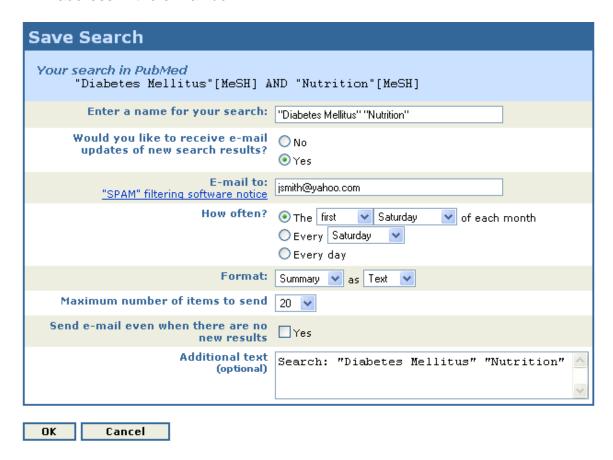
- 1. After signing in to My NCBI, run a PubMed search
- 2. Click the Save Search link next to the Clear button.



- 3. A separate window will open to prompt you for additional information about the search you are saving.
- 4. Click the Yes radio button to receive automatic e-mail updates of search results or OK to simply save the search



5. If you select Yes to receive e-mail updates of search results, enter an address in the e-mail box.



- 6. You can change the frequency of your updates by changing the defaults under **How Often?** E-mailed updates will be sent on the scheduled days starting from the day after the schedule is set.
- 7. Select the **Format** and either HTML or Text.
- 8. You may also change the maximum number of items to be sent and add additional text, up to 200 characters, to the automatic updates.
- 9. Click OK to save your search in My NCBI.



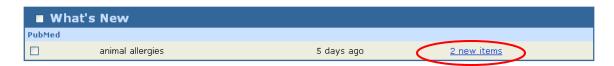
Links to Related Articles cannot be saved in My NCBI

## **Checking for New Citations**

- 1. After logging in to My NCBI the screen will show saved search strategies and when the last update was generated either automatically or manually.
- 2. Click the check box next to a search and click What's New for Selected.



3. To display the new items, click the # new items link. This also updates the saved search with the current date and time.



Note: If you do not click # new items, the search date and time are not updated.

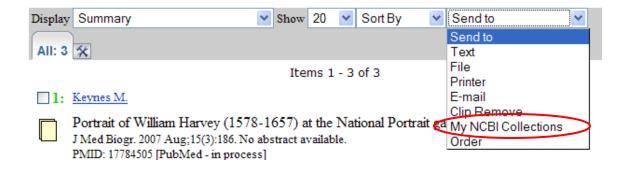
## **Deleting a Saved Search**

To delete a saved search, click the check box for a search and click **Delete Selected**.

### Collections

You can save citations for future use in PubMed using My NCBI Collections. My NCBI serves as a permanent clipboard. You must be logged into My NCBI to use this feature.

- 1. Send the citations of interest from your PubMed results to the Clipboard.
- From the Clipboard, click on the **Send to** drop down box and select **My** NCBI Collections.



- 3. A new window pops up, providing you with several options for your collection.
  - a. You can create a new collection or append to an existing collection.
  - b. Enter a name for your collection
  - c. Remove the items from the clipboard



### 4. Click OK

You can now access the saved citations through the Searches/Collections link on the My NCBI sidebar



## **Setting Your Filter Preferences**

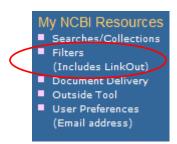
My NCBI includes a filters feature that groups search results by areas of interest. Filter results are displayed as separate tabs next to the "All" tab for total search results. You can have up to five active filters for each Entrez database using My NCBI.

#### **Filters**

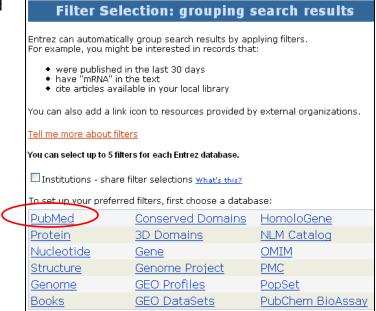
- My NCBI includes a Filters feature which groups search results into areas such as:
  - Review articles
  - Articles in English
  - Journals in your local library
- You can have up to five active filters using My NCBI

## To change your PubMed filter selections:

1. After logging in to My NCBI, select **Filters** from the left bar.



2. Select PubMed



3. Choose filters from Commonly-Requested Filters or click on **Browse** to access a list of all filters.



As long as you are logged into My NCBI, your selected filters will appear with every search.

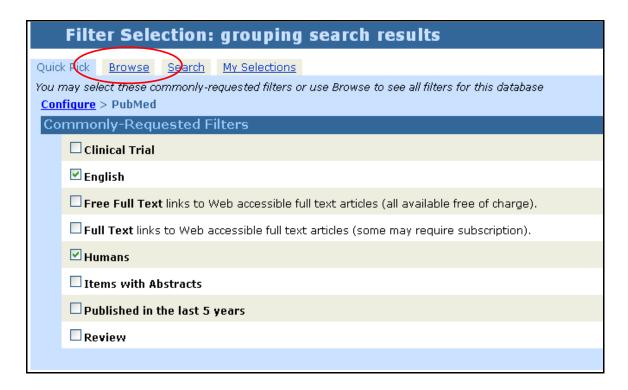
**Example:** In the search below, 211 citations were retrieved on the Major MeSH Terms "Nurse Midwives" AND "Home Childbirth." Of those, 205 articles were in English, 211 of the citations referenced human subjects and 14 of the citations were published in the last 5 years:



## Adding your library's holdings as a filter

You can add a Filter tab to display search results for journals that may be in your local library:

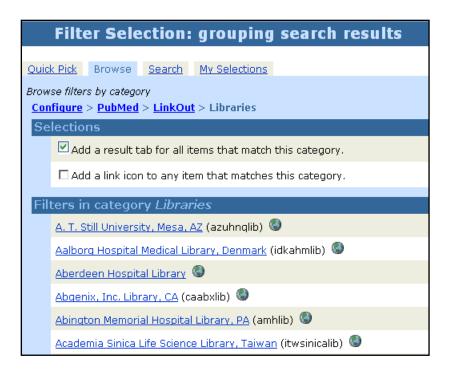
#### 1. Click on Browse:



### 2. Select the Libraries link:



3. Scroll down and locate your library. Click in the checkbox next to **Add a** result tab for all items that match this category to select the filter:



After you select the library you will receive a message telling you that the filter selection has been applied:



As long as you are logged into My NCBI, the tab for your library will be displayed on the filters bar:

