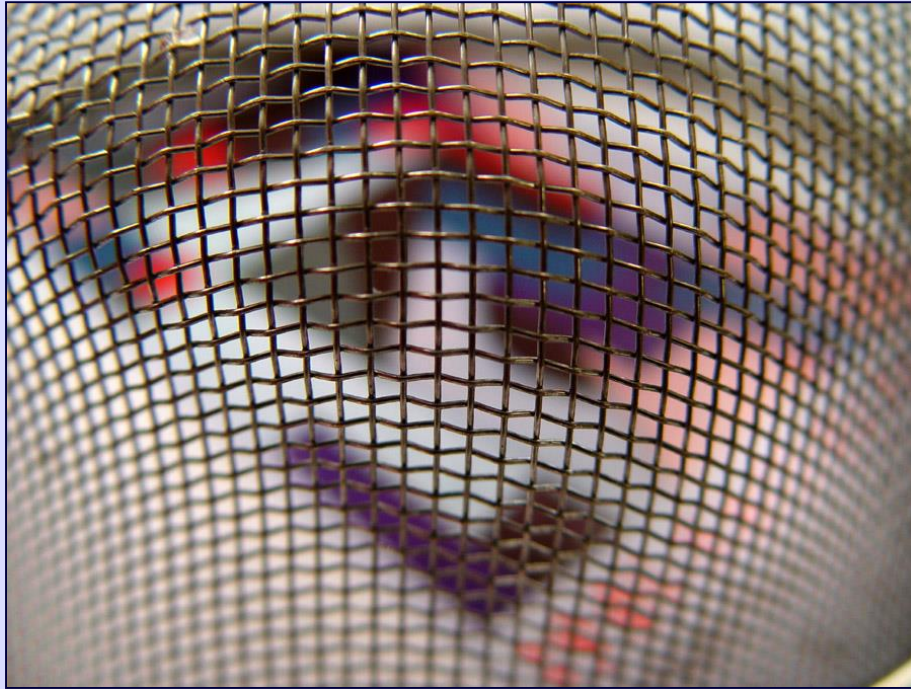


# MeSH ing around in PubMed



OR

With permission from <http://www.perkowitz.net/photo/themes/songtitles/mesh-03.html>

## Why Bother with Subject Headings?

# Two sections in this tutorial:

- Why use subject headings?
- How do you search on subject headings in PubMed?

# Two types of searching

- Keyword
- Subject heading\*

\*Subject headings = standardized phrases describing main ideas



# Keyword searching

Simplest search to do

1. Type in word(s)
2. Click **GO** or hit **Enter** on keyboard.

Computer searches for character strings (letters, numbers, punctuation) that match what you have entered.

# Keyword search results



1512275  
results ?!?

- Too many to read through!
- Lots of "false hits"!
- Results that barely mention your terms!
- Headaches and time drains!

Where searching is involved,

simple  $\neq$  best

# Keyword searches can give “bad” results because they...

1. Ignore negating expressions (but, except, never...)
2. Treat all words as equally important
3. Don't include synonyms and varieties of a search term (infant, infants, infantile, infancy, neonate, newborn, baby...)
4. Ignore ambiguities (*right* to life, *right* vs. left)

Examples

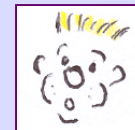


# 1. Ignored negatives example

You search on “cardiac rehabilitation.”

Resulting articles could read:

“We recommend this exercise for all patients *except* those undergoing cardiac rehabilitation.”



NOT what you wanted!



A pediatric neurosurgeon keyword-searches  
on YOUNG and BRAIN.

His results:



- Author H.S. **Young** on hospital billing for **brain** monitors during chest surgery for patients of all ages.



- One sentence in a 30-page article on Alzheimer's that compares a typical **young brain** to a typical old **brain**.



- An article focusing specifically and only on surgical techniques for a **young person's brain**.

YAY! Just what  
you wanted!

3. No synonyms/variations  
example

You want to search on Type 2 diabetes mellitus in a 7<sup>th</sup> grader.

Some of the search terms you might need to get all relevant articles:

*non-insulin-dependent diabetes OR non insulin-dependent diabetes OR non-insulin responsive diabetes OR non-insulin-responsive diabetes OR adult onset diabetes OR adult-onset diabetes OR type II diabetes OR type 2 diabetes OR NIDDM*

AND

*juvenile OR juveniles OR teen OR teens OR teenage OR youth OR youths OR child OR children OR childhood OR paediatric OR pediatric OR adolescent OR adolescence...*

## Keyword searches don't recognize homonyms (one combination of letters that can represent several different meanings.)

- **dressing**  retrieves articles on both
  - bandages on wounds AND
  - putting clothing on
- **hearing**  retrieves articles on both
  - auditory function AND
  - the judicial function of Congress or a committee
- **aids**  retrieves articles on both
  - Acquired Immunodeficiency Syndrome (AIDS) AND
  - visual aids (posters/graphics) about any disease

**The solution?**

# MeSH to the Rescue!



Or

How Subject  
Headings Help

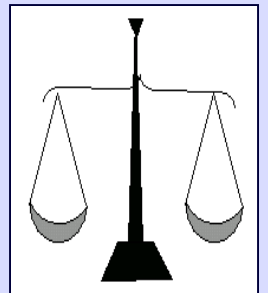
# What's MeSH?

- Medical
- Subject
- Headings

= Subject headings (standardized phrases describing topics) specific to the health sciences

# Why take the time to use subject headings?

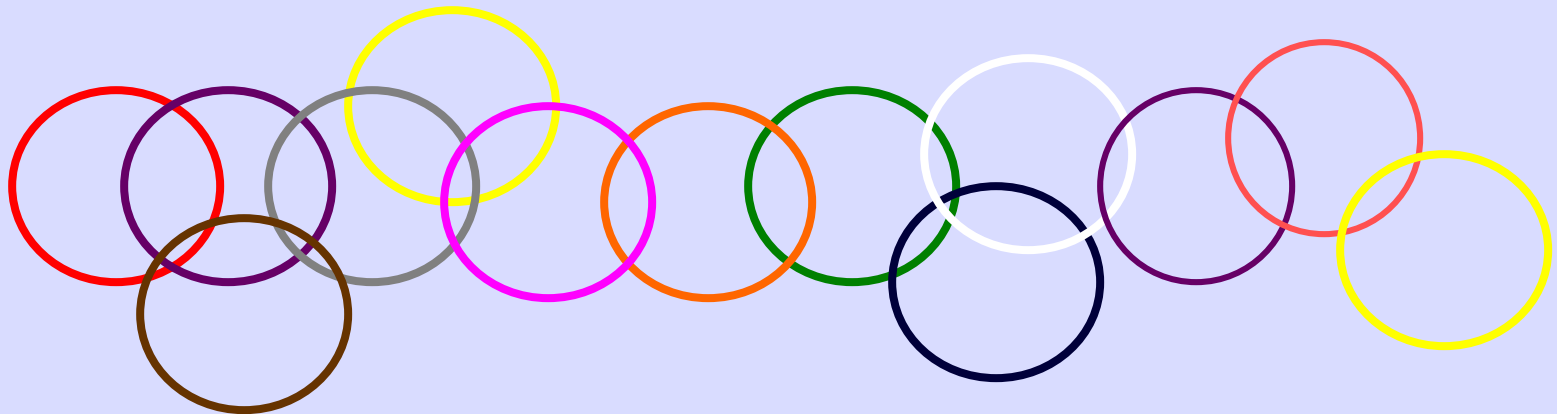
1. Humans apply subject headings. In doing so, they
  - consider negating words like *but*, *not*, *except* so your results won't include citations in which your search terms are specifically **excluded**
  - weigh the relative importance of the search term to the whole article



# String of terms

2. Subject headings link all synonyms/grammatical forms/spelling variations together.

So... pick the right subject heading and all the possible words/forms come along!



1 meaning: 1 term

3. Subject headings represent unique meanings for **homonyms**.

- Example: Instead of the multi-meaning keyword **delivery**, you would use :
  - *Drug Delivery Systems* or
  - *Home Childbirth* or
  - *Delivery of Health Care*



# How PubMed's MeSH Database helps

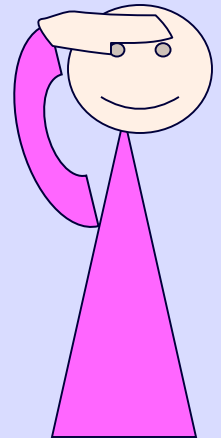
- Enables you to search precisely yet comprehensively on a subject.
- Suggests terms if you've typed in a non-MeSH term or mistyped/misspelled a MeSH term.
- Retrieves citations published between 1966 and last week\*

\*Citations published before 1966 or in the previous week or two don't have Medical Subject Headings, so you'll need to keyword search to retrieve them.

Return to [Help/Tutorials](#) page

# Where can I find MeSH terms?

1. Use the links on them in a relevant result from a keyword search
2. Look them up in the MeSH Database



# Stealing MeSH

3

The screenshot shows a web interface for displaying search results. At the top, there is a 'Display' pull-down menu currently set to 'Abstract'. A gray box highlights this menu, and a red arrow points to the 'Citation' option, which is highlighted in blue. Other options in the menu include MEDLINE, XML, UI List, LinkOut, ASN.1, Related Articles, Cited Articles, Cited in Books, and CancerChrom Links. To the right of the menu, there are controls for 'Show' (set to 20), 'Sort by', and 'Send to'. Below the menu, the first search result is visible, titled 'metal detector for localisation of ingested metallic foreign bodies - a critical investigation.' by 'Joedhofer H, Gossler A, Schleef J.' The authors' names are underlined and blue, indicating they are links. Below the title, there is a brief description of the study and a 'MeSH Terms' section.

Ingested metallic foreign bodies (MFBs) are usually diagnosed by taking X-ray films of the neck, chest and/or abdomen. This study evaluates the use of a hand-held metal detector (HHMD) for the diagnosis and localisation of MFBs. In a prospective study, 53 consecutive paediatric patients with history of a swallowed MFB were examined with X-rays and HHMD. In 47 children, the MFB could be verified radiologically. Coins were most frequently swallowed. The HHMD could detect and locate all coins but only 47% of other MFBs. There were no false-positive results. A HHMD is an effective tool for screening the location of suspected ingested coins. This method is easy, inexpensive and free of radiation. Very small MFBs cannot be reliably detected. CONCLUSION: If an innocuous metallic foreign body is clearly identified with a hand-held metal detector in the stomach or lower gastrointestinal tract of an asymptomatic child, additional radiological confirmation is not required.

## MeSH Terms:

- [Adolescent](#)
- [Child](#)
- [Child, Preschool](#)
- [Diagnostic Techniques, Digestive System](#)
- [Female](#)
- [Foreign Bodies/diagnosis\\*](#)
- [Foreign Bodies/radiography](#)
- [Gastrointestinal Tract/radiography\\*](#)
- [Humans](#)
- [Male](#)
- [Numismatics](#)
- [Prospective Studies](#)

4

1. Perform a keyword search on your topic (example: swallowed coin).
2. Find a relevant result
3. Change the **Display** pull-down in the gray area above the item to **Citation**.
4. Click on a relevant term from **MeSH Terms** list to search on it.

# Where's the MeSH Database?

The image is a screenshot of the PubMed website. At the top, there is a header with the NCBI logo on the left, the PubMed logo in the center, and the text "National Library of Medicine" on the right. Below the header is a navigation bar with tabs for "All Databases", "PubMed", "Nucleotide", "Protein", and "Genome". Under the "PubMed" tab, there is a search bar with the text "Search PubMed" and a dropdown arrow, followed by the word "for" and a search input field, and a "Go" button. On the left side of the page is a blue sidebar with white text. The sidebar contains the following links: "About Entrez", "Text Version", "Entrez PubMed" (in yellow), "Overview", "Help | FAQ", "Tutorial", "New/Noteworthy", "E-Utilities", "PubMed Services" (in yellow), "Journals Database", and "MeSH Database" (circled in red). To the right of the sidebar, there is a large text overlay that reads: "In PubMed's left sidebar, 2<sup>nd</sup> item under 'PubMed Services'".

NCBI

PubMed

National Library of Medicine

All Databases PubMed Nucleotide Protein Genome

Search PubMed for

Go

About Entrez

Text Version

Entrez PubMed

Overview

Help | FAQ

Tutorial

New/Noteworthy

E-Utilities

PubMed Services

Journals Database

MeSH Database

In PubMed's left sidebar,  
2<sup>nd</sup> item under "PubMed  
Services"

# To search the MeSH Database for (all articles on) a single subject

MeSH National Library of Medicine

PubMed Nucleotide Protein Genome Structure OMIM

for **exercise** **Go**

Limits Preview/Index History Clipboard Details

Suggestions: [Exercise](#); [Exercises](#); [Exertion](#); [Exertions](#); [Exolise](#); [Exepanol](#); [Exenatide](#)

Display Summary Show 20 Send to

All: 7

Items 1 - 7 of 7

☐ 1: [Exercise](#)

Physical activity which is usually regular and done with the intention of improving PHYSICAL FITNESS or HEALTH. Contrast with EXERTION which is the physiologic and metabolic response to energy expenditure.


Year introduced: 1989

1. Type in term
2. Click **[Go]** or hit **ENTER** on keyboard
3. Scan list for best term. Click on **Links** at its right.
4. Click on **PubMed** in resulting box.

- ☐ 1: [Exercise](#) **Links**
- Physical activity which is usually regular and done with the intention of improving PHYSICAL FITNESS or HEALTH. Contrast with EXERTION which is the physiologic and metabolic response to energy expenditure.
- Year introduced: 1989
- ☐ 2: [Asthma, Exercise-Induced](#) **Links**
- Asthma attacks following a period of exercise. Usually the induced attack is short-lived and

# To search for specific aspect(s) of a topic

- Go to the **MeSH Database**
- Type a term in the search box
- Click **[Go]** or hit **ENTER** on your keyboard



MeSH

Nucleotide Protein Genome

for exercise Go

LimitsPreview/IndexHistoryClipboardDetails

- Click on the hyperlinked term.

## 1. Exercise

Physical activity which is usually regular and done with the intention of improving or maintaining PHYSICAL FITNESS or HEALTH. Contrast with EXERTION which is concerned largely with the physiologic and metabolic response to energy expenditure.

Year introduced: 1989

Then...



# Attach subheadings to your MeSH term

## 1: Exercise

Physical activity which is usually regular and done with the intention of improving or maintaining PHYSICAL FITNESS or HEALTH. Contrast with EXERTION which is concerned largely with the physiologic and metabolic response to energy expenditure.

Year introduced: 1989

### Subheadings:

☐ drug effects ☒ physiology ☐ psychology ☐ statistics and numerical data

Click in the checkboxes in front of subheadings for aspects of the topic you're interested in. Add many--or none!

The hyperlink [Subheadings](#) shows definitions of these terms

[physiology](#) (A1-17, B1-7, D6, D8, D12, D13, D23, G4-11, G14) PH, physiol  
Used with organs, tissues, and cells of unicellular and multicellular organisms for normal function. It is used also with biochemical substances, endogenously produced, for their physiologic role.

[physiopathology](#) (A1-5, A7-10, A13, A14, A17, C1-23, F3) PP, physiopathol  
Used with organs and diseases for disordered function in disease states.

[poisoning](#) (B6, D1-6, D8-10, D13, D20, D23, D25-27, J2) PO, pois  
Used with drugs, chemicals, and industrial materials for human or animal poisoning, acute or chronic, whether the poisoning is accidental, occupational, suicidal, by medication error, or by environmental exposure.

MeSH term

+ Subheading

Specific!

Each subheading attaches directly to its subject term.

It's as if you were searching the phrase "the physiology of exercise."

Results from searching the term/subheading ***Exercise/physiology*** should be more relevant than if you had combined the separate terms ***Exercise AND Physiology*** .



# Major MeSH

A record in **Citation Display** format will have asterisks to show which topics are of *major* importance in the article.

MeSH terms without asterisks represent topics covered in the article but not its main focus.

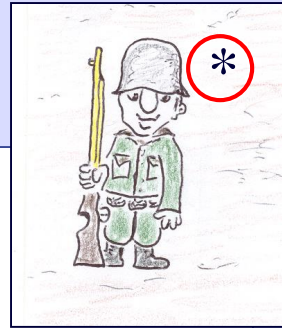
**Endurance in young athletes: it can be trained.**

[Baxter-Jones AD](#), [Maffulli N](#).

College of Kinesiology, University of Saskatchewan, Saskatoon, SK, Canada.

MeSH Terms:

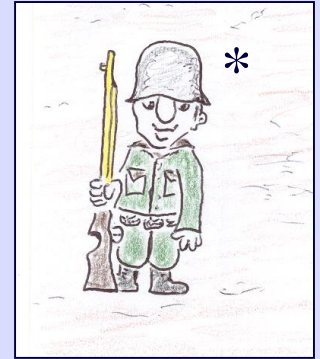
- [Adolescent](#)
- [Anaerobic Threshold/physiology](#)
- [Child](#)
- [Exercise/physiology](#)\*
- [Humans](#)
- [Oxygen Consumption/physiology](#)
- [Physical Endurance/physiology](#)\*
- [Puberty/physiology](#)



Use this to capture the essence (topics) of any article that lacks an abstract.

To limit your results to articles in which your concept is a central idea or major focus:

## Major MeSH



1. Go to **MeSH Database**
2. Type in your term. Click **GO**/hit **ENTER**.
3. Click on the *most appropriate* MeSH term.
4. Click in the "**Restrict to Major Topic headings**" checkbox directly beneath the subheadings list, as shown below.

### Exercise

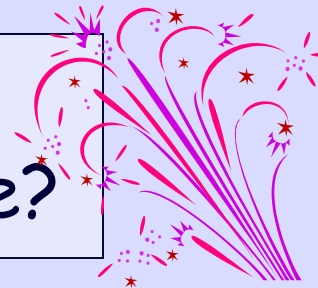
Physical activity which is usually regular and done with the intention of improving or maintaining PHYSICAL FITNESS or HEALTH. Contrast with EXERTION which is concerned largely with the physiologic and metabolic response to energy expenditure.

Year introduced: 1989

Subheadings: This list includes those paired at least once with this heading in MEDLINE and may not reflect current rules for allowable combinations.

☐ drug effects ☒ physiology ☐ psychology ☐ statistics and numerical data

☒ Restrict Search to Major Topic headings only

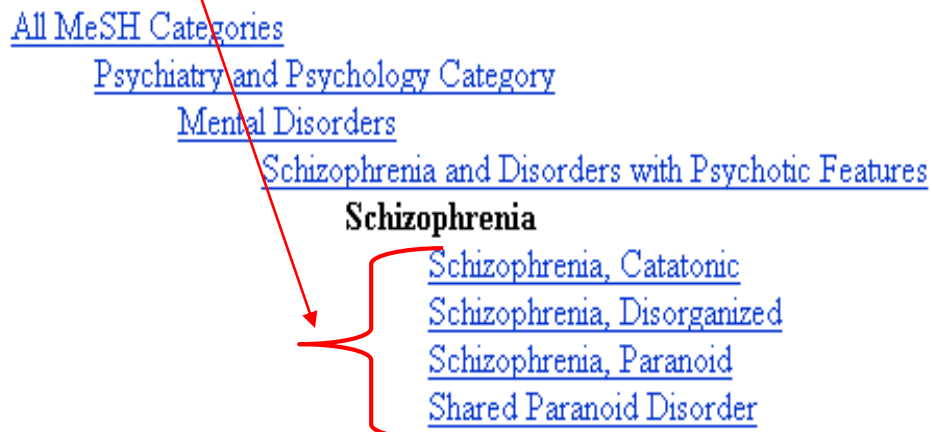


# To Explode or Not to Explode?

**Exploding** means searching for both a term and all more specific terms under it in the MeSH "tree" of terms.

- ☐ 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:
- Schizophrenias
  - Schizophrenic Disorders
  - Disorder, Schizophrenic
  - Disorders, Schizophrenic
  - Schizophrenic Disorder
  - Dementia Praecox



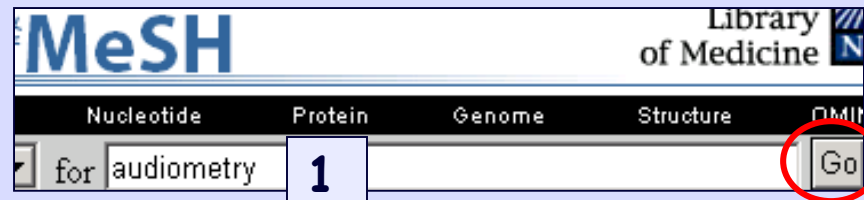
PubMed  
**automatically**  
explodes MeSH  
terms.

To "unexplode" <sup>1</sup>,  
click in the  
checkbox  
immediately  
beneath the  
checkbox for  
Major MeSH.

<sup>1</sup> search only for articles on the **general** topic or those that discuss **multiple specific** topics

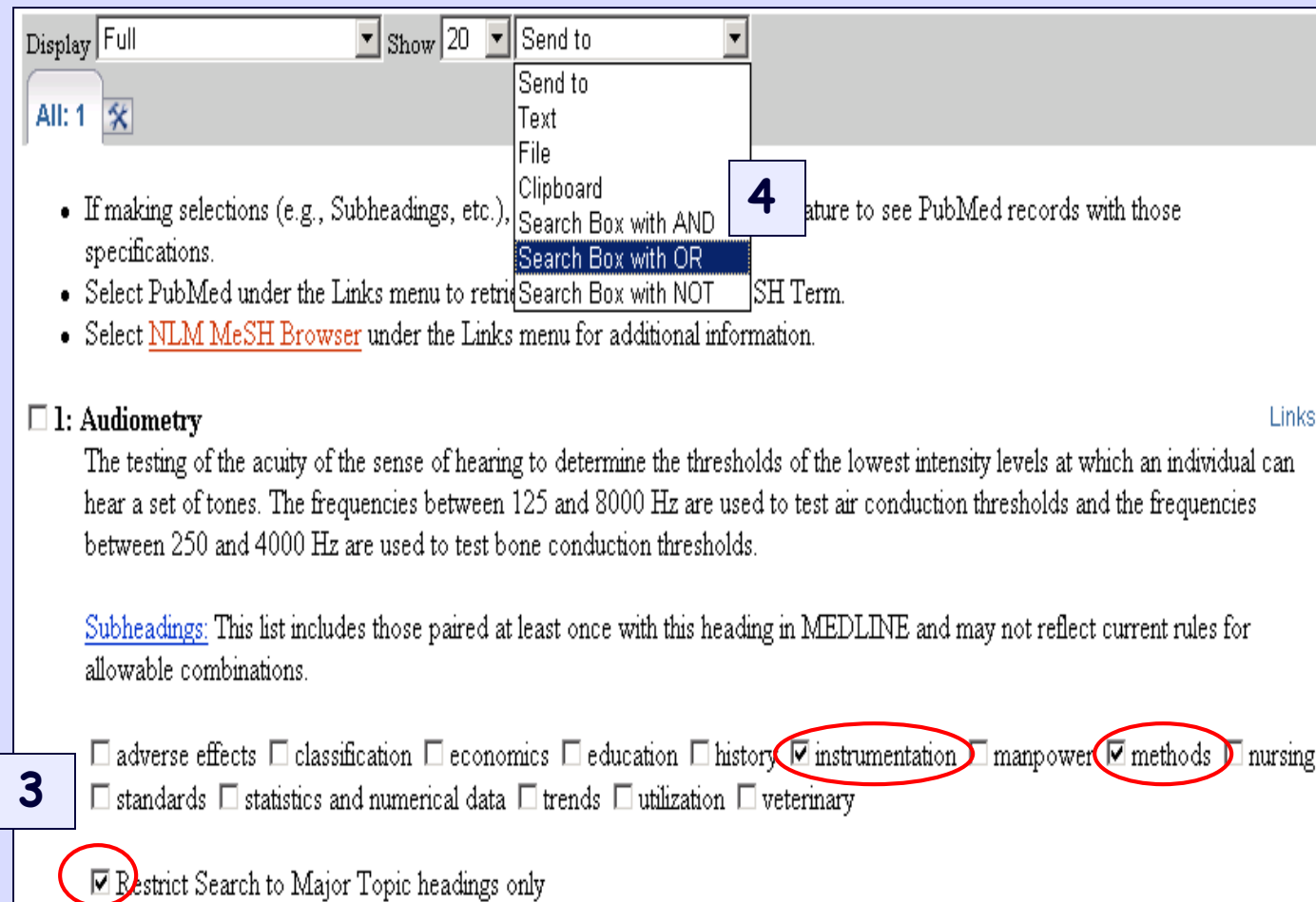
# To search several MeSH terms simultaneously

1. Type your **first** term in the search box



2. Click **[Go]** or hit **[ENTER]** on your keyboard

3. Click checkboxes for subheadings/  
Major MeSH/Don't explode



4. Set **Send to** pull-down to **[Search box with OR]** if you have two or more subheadings

## To add the second term

1. Type your **second** term into the search box at the top of the page
2. Click **[Go]** or hit **[ENTER]** on keyboard
3. On results list, click checkbox to left of term for general search (shown here) *OR* click hyperlinked term, then click subheading/major/  
no explode checkboxes (not shown here but shown on previous slides.)
4. Set **Send to** pull-down menu to appropriate combining term (AND,OR,NOT)

MeSH

PubMed Nucleotide Protein Genome

for newborn 1 2

Limits Preview/Index History Clipboard Details

("Audiometry/instrumentation"[MeSH] OR "Audiometry/methods"[MeSH]) 1<sup>st</sup> term

Search PubMed Clear

Suggestions: [Newborn](#); [Newborns](#); [Newbertyte](#); [Neamine](#); [Nerosin](#); [Neoline](#)

Display Summary Show 20 Send to 4

All: 14 X

Items 1 - 14 of 14

3

☒ 1: [Infant, Newborn](#)

An infant during the first month after birth.

# To send the multiple MeSH term search

Click  
Search  
PubMed  
button to  
run  
search

```
("Audiometry/instrumentation"[MeSH]  
OR "Audiometry/methods"[MeSH]) AND "Infant, Newborn"[MeSH]
```

Search PubMed

Clear

Proof that  
PubMed  
searched the  
two terms  
combined !

Preview/Index

History

Clipboard

Details

History will be lost after eight hours of inactivity.

Combine searches use # before search number, e.g., #2 AND #6.

Numbers may not be continuous; all searches are represented.

On query # to add to strategy

## Most Recent Queries

Time

Result

Search ("Audiometry/instrumentation"[MeSH] OR "Audiometry/methods"[MeSH]) AND "Infant, Newborn"[MeSH]

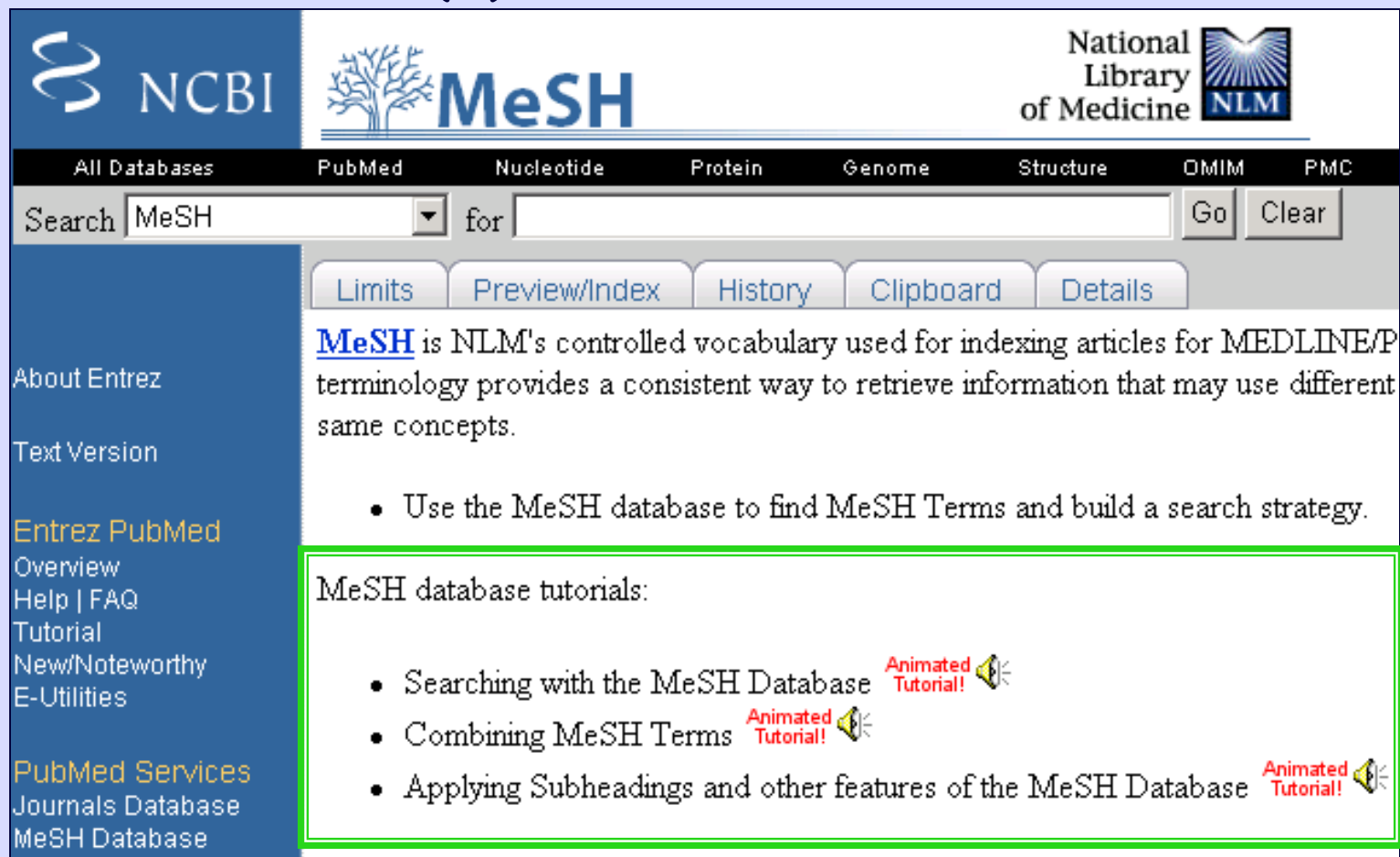
201

# Watch MeSH in action!

PubMed's MeSH Database main page ,

<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=mesh> ,

links to three (3) 2-3minute animated tutorials.



The screenshot shows the MeSH database main page. At the top, there are logos for NCBI, MeSH, and the National Library of Medicine (NLM). Below the logos is a navigation bar with links to All Databases, PubMed, Nucleotide, Protein, Genome, Structure, OMIM, and PMC. A search bar contains the text "MeSH" and a "Go" button. Below the search bar are buttons for Limits, Preview/Index, History, Clipboard, and Details. The main content area features a description of MeSH as NLM's controlled vocabulary and a list of links to MeSH database tutorials. A green box highlights the tutorials section, and a green arrow points to it from the right.

NCBI MeSH National Library of Medicine NLM

All Databases PubMed Nucleotide Protein Genome Structure OMIM PMC

Search MeSH for Go Clear

Limits Preview/Index History Clipboard Details

[MeSH](#) is NLM's controlled vocabulary used for indexing articles for MEDLINE/P terminology provides a consistent way to retrieve information that may use different same concepts.

- Use the MeSH database to find MeSH Terms and build a search strategy.

MeSH database tutorials:

- Searching with the MeSH Database **Animated Tutorial!**
- Combining MeSH Terms **Animated Tutorial!**
- Applying Subheadings and other features of the MeSH Database **Animated Tutorial!**

# MeSH— Your tool for catching the best results



- Items 1 - 18 of 18
- ☐ 1: [Mazer SE.](#)  
Hear, hear. Assessing and resolving hospital noise issues.  
Health Facil Manage. 2005 Apr;18(4):24-9. No abstract available.  
PMID: 15898453 [PubMed - indexed for MEDLINE]
  - ☐ 2: [Dijkers FG, Verheij JB, van Mechelen M.](#)  
Hereditary congenital unilateral deafness: a new disorder?  
Ann Otol Rhinol Laryngol. 2005 Apr;114(4):332-7.  
PMID: 15895791 [PubMed - indexed for MEDLINE]
  - ☐ 3: [Williams GB, Kun LE, Thompson JW, Gould HJ, Stocks RM.](#)  
Hearing loss as a late complication of radiotherapy in children.  
Ann Otol Rhinol Laryngol. 2005 Apr;114(4):328-31.  
PMID: 15895790 [PubMed - indexed for MEDLINE]

## Now available in PubMed's MeSH Database