MeSHing around in PubMed

Why Bother with Subject Headings?

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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.

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

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

1512275 results ?!?
Where searching is involved,

simple ≠ 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
You search on “cardiac rehabilitation.”

Resulting articles could read:

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

1. Ignored negatives example

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!

2. Treating every term equally example
You want to search on Type 2 diabetes mellitus in a 7th 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!
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
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?

In PubMed's left sidebar, 2nd item under "PubMed Services"
To search the MeSH Database for (all articles on) a single subject:

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.

Example:
- **Exercise**: Physical activity which is usually regular and done with the intention of improving PHYSICAL FITNESS or HEALTH. Contrast with EXERTION which is confined to the physiologic and metabolic response to energy expenditure. Year introduced: 1989

- **Asthma, Exercise-Induced**: 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

• 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
Attach subheadings to your MeSH term

I: 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, D5, D6, D12, D13, D23, D4-11, G14) PH, physiol
Used with organs, tissues, and cells of uncellular 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 (D5, D1-5, D9-10, D13, D20, D22, 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 \textit{Exercise/physiology} should be more relevant than if you had combined the separate terms \textit{Exercise AND Physiology}.
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:

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.

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**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
- [x] physiology
- [ ] psychology
- [ ] statistics and numerical data

[ ] Restrict Search to Major Topic headings only
Exploding means searching for both a term and all more specific terms under it in the MeSH “tree” of terms.

PubMed automatically explodes MeSH terms.

To “unexplode” ¹, click in the checkbox immediately beneath the checkbox for Major MeSH.

¹ 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

**Links**

- The testing of the acuity of the sense of hearing to determine the thresholds of the lowest intensity levels at which an individual can hear a set of tones. The frequencies between 125 and 8000 Hz are used to test air conduction thresholds and the frequencies between 250 and 4000 Hz are used to test bone conduction thresholds.

**Subheadings:** This list includes those paired at least once with this heading in MEDLINE and may not reflect current rules for allowable combinations.
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)
To send the multiple MeSH term search

Click Search PubMed button to run search

Proof that PubMed searched the two terms combined!
Watch MeSH in action!

MeSH—Your tool for catching the best results

Now available in PubMed's MeSH Database

Drawings by and with permission of Gary Heimbigner, Bothell, WA.