Search Strategy

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TEXAS TECH UNIVERSITY
HEALTH SCIENCES CENTER
Libraries *of the* Health Sciences

Goals & Objectives

- Improve students' ability to construct strong search strategies in PubMed:
  - Basic terminology is explained
  - Appropriate usage examples are presented
  - Questions are supplied for practice

Introduction

- The old saying "Garbage in, garbage out" holds true for developing strong searching skills.

- If you "Ask" the right question, you will "Acquire" the information you are seeking.

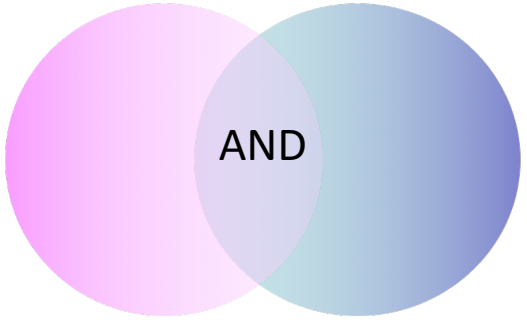
Database Used — PubMed

- Examples are based on the PubMed database
  - PubMed is:
    - is Free
    - is available to anyone 24/7 on the Internet
    - has 26+ million records from over 5,500 publications
    - is updated daily
    - covers fields of:
      - medicine, nursing, dentistry, veterinary medicine, pharmacology, health care system, and allied health
    - is international in scope

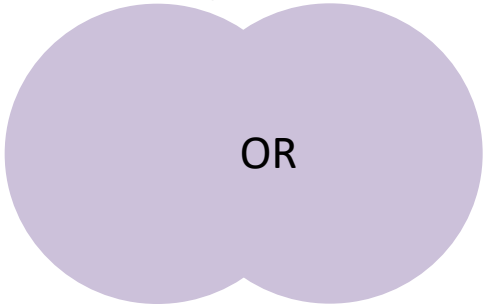
Boolean Operators—Glossary

- Boolean Operators — logic system used to combine search terms
  - AND
  - OR
  - NOT

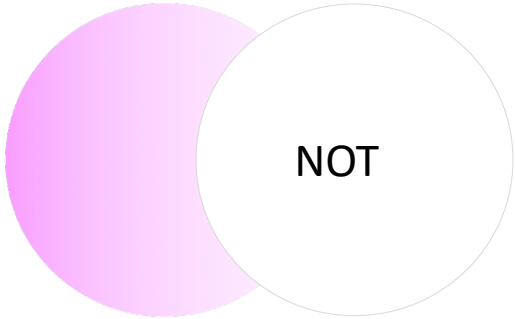
AND: retrieves only the middle section (intersection)



OR: retrieves all (left and right side)



NOT: excludes, only pink section is retrieved. Should use sparingly.



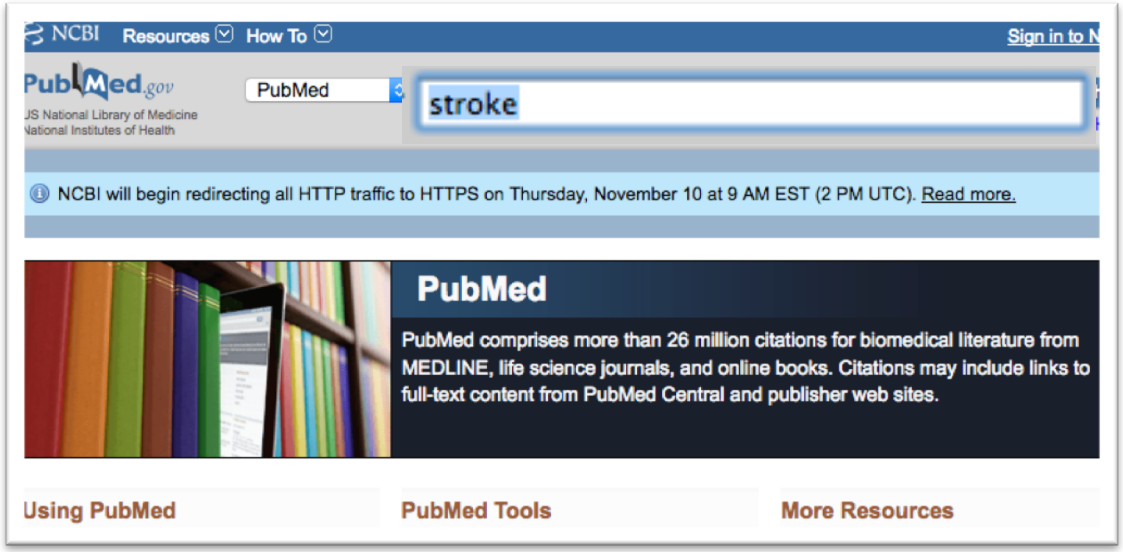
Less is More!

If you focus on your topic,

even though you have fewer numbers,

your results will be more relevant!

Keywords



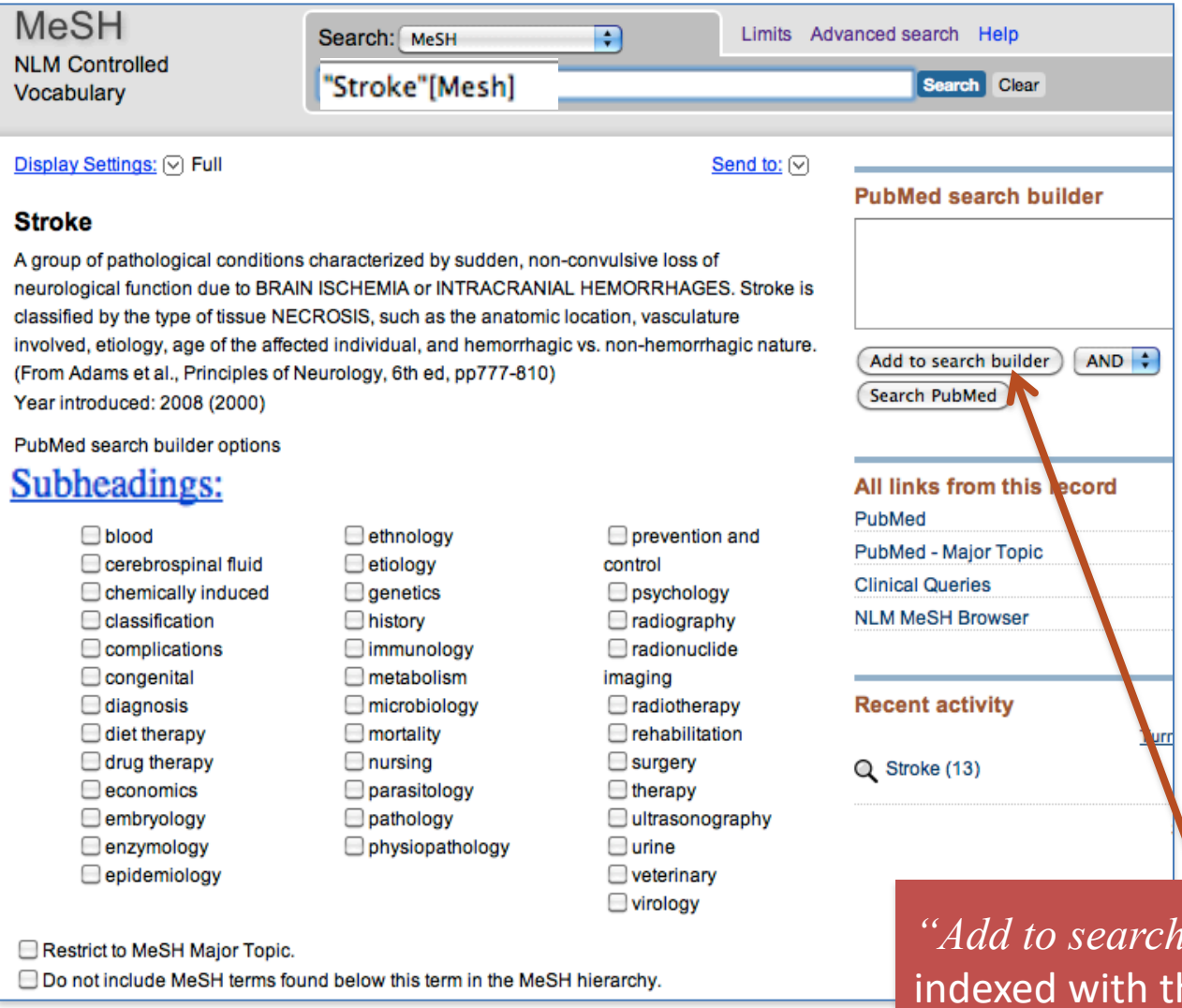
- Stroke (Keyword)
  - retrieves 224,000+ records

- Keyword searching locates the term anywhere in the electronic record, *even when the article's focus is on another topic.*
- "Swimming strokes" will also appear in the results of this search on "stroke."

Keyword searching *also* locates very recent articles that have not yet been indexed or tagged with *Subject Headings*.

NOTE: Results numbers were valid on the day the PPT was created. The database is updated daily so the numbers may change.

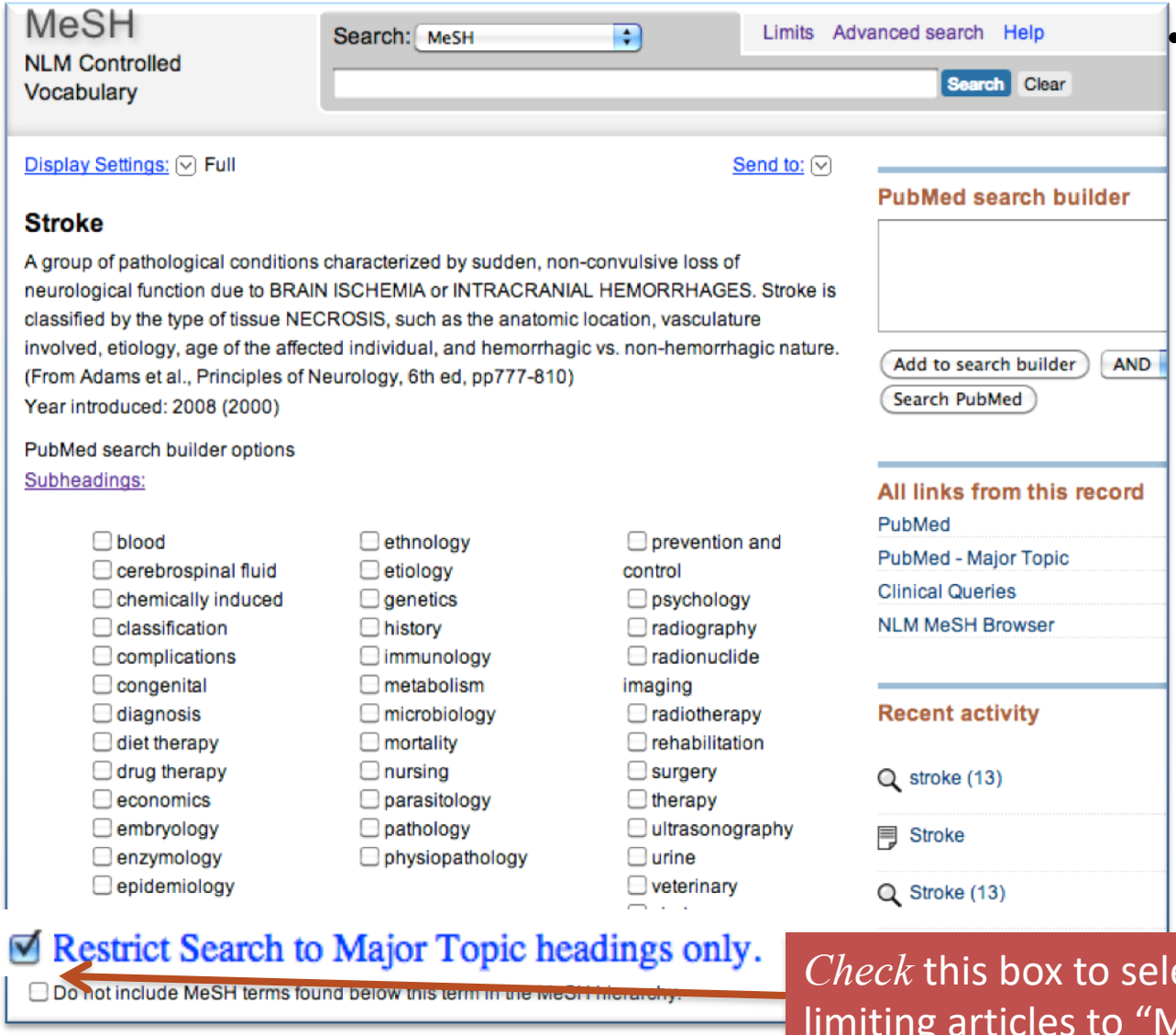
Medical Subject Headings (MeSH)



- Stroke (MeSH)
  - retrieves 103,000 + records
- MeSH is the controlled vocabulary or thesaurus used in PubMed to organize articles.
- Use MeSH headings to locate articles that are indexed or tagged for a specific concept.
- Related words or synonyms are included.
- Subject headings are easily modified using subheadings.

"Add to search builder" to retrieve *all* articles indexed with this subject heading or concept.

Major Headings



- Stroke (Majr)
  - Retrieves 79,000+ records

- Limiting the subject heading to "Major Topic" locates only those articles where the focus of the article is on this main concept.

- NOTE: Fewer articles are located than when searching with MeSH; however, these articles are focused and more relevant to your search.

Check this box to select "Major Topic" when limiting articles to "Major Topic" ONLY.

Example of MeSH Relationship

A Anatomy

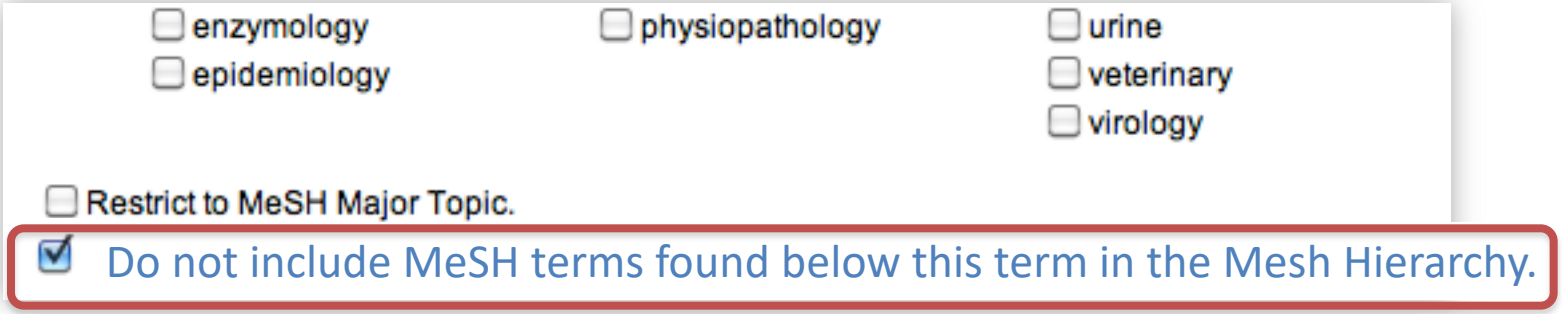
A1 Body Regions
A2 Musculoskeletal System
A3 Digestive System
A4 Respiratory System
A5 Urogenital System
A6 Endocrine System
A7 Cardiovascular System
A8 Nervous System
A9 Sense Organs
A10 Tissues
A11 Cells
A12 Fluids and Secretions
A13 Animal Structures
A14 Stomatognathic System
A15 Hemic and Immune Systems
A16 Embryonic Structures
A17 Integumentary System

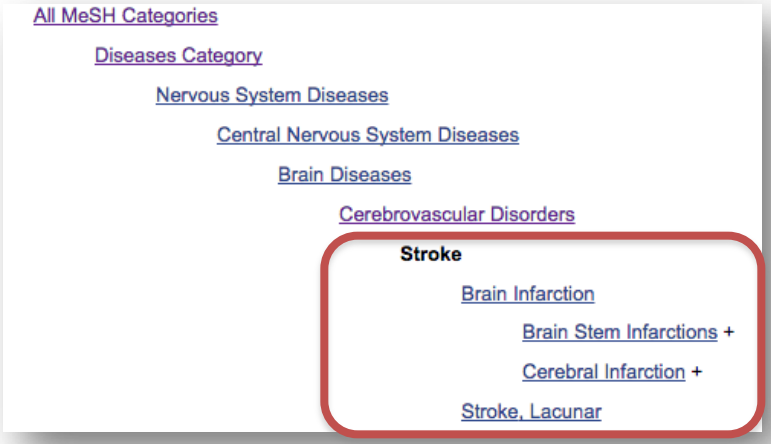
All MeSH Categories
Anatomy Category
Body Regions
Abdomen
Abdominal Cavity +
Abdominal Wall
Groin
Inguinal Canal
Umbilicus
Back
Lumbosacral Region
Sacrococcygeal Region
Breast
Mammary Glands, Human
Nipples
Extremities
Amputation Stumps
Lower Extremity +
Upper Extremity +
Head
Ear
Face +
Scalp
Skull Base +

Face
Cheek
Chin
Eye
Eyebrows
Eyelids +
Forehead
Mouth
Lip
Nose
Parotid Region

- MeSH is organized into thematic hierarchical categories.
- Themes are broken down into more specific concepts…
  i.e. subject headings.
- Articles are indexed (tagged) for the most specific concept.
- "**+**" signifies that there are more specific terms available
  e.g. Face + .
- MeSH vocabulary is updated annually.
- Most articles are tagged with 10–15 subject headings.

“Do not include indented MeSH terms”



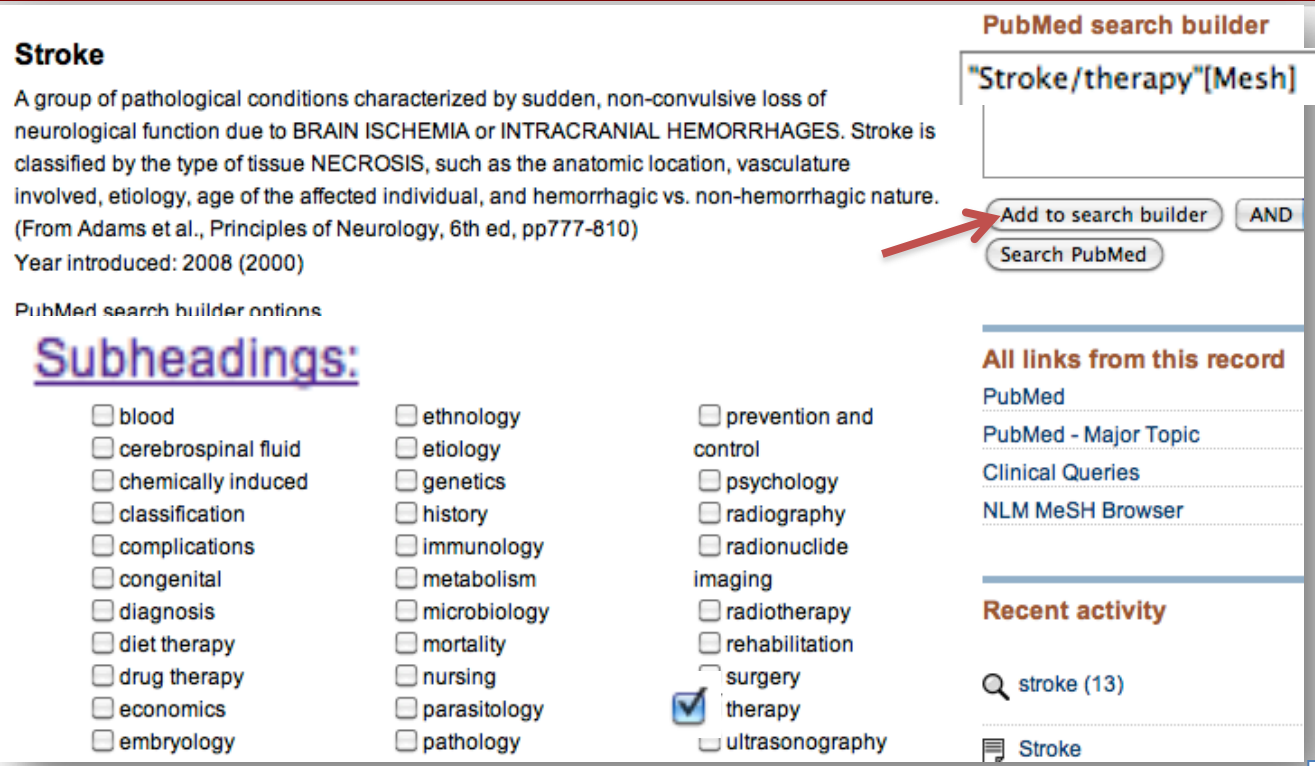


i.e., Brain Infarction etc. is not included in this search because of our selection above.

- All subject headings indented and below the chosen subject heading “Stroke” will automatically be included in the search strategy *unless* the “Do not include…” option is selected.

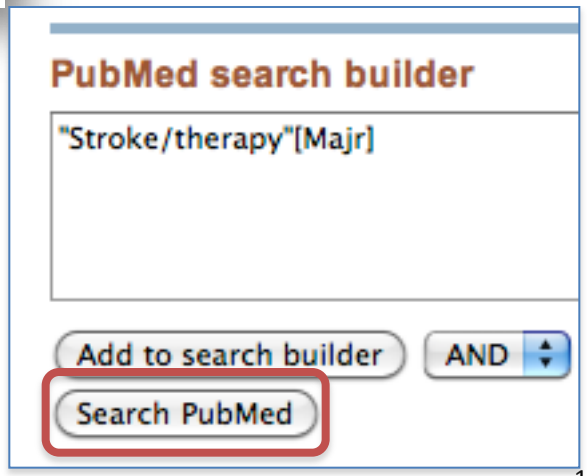
- Automatic inclusion of these terms broadens the search as related subject headings are added automatically.

MeSH Subheadings



- Stroke (MeSH) with subheading: "*therapy*"
  - Retrieves 43,830+ records

- Stroke (Majr) with subheading: "*therapy*"
  - Retrieves 25,600+ records



Subheadings NARROW the subject heading.

e.g., diagnosis of stroke or genetics of stroke or therapy of stroke

☑ *Select* as many descriptors as you need.

MeSH Subheadings

Abnormalities
Administration & dosage
Adverse effects
Agonists
Analogs & derivatives
Analysis
Anatomy & histology
Antagonists & inhibitors

Biosynthesis
Blood
Blood supply

Cerebrospinal fluid
Chemical synthesis
Chemically induced
Chemistry
Classification
Complications
Congenital
Contraindications
Cytology

Deficiency
Diagnosis
Diagnostic use
Diet therapy
Drug effects
Drug therapy

Economics
Education
Embryology
Epidemiology
Ethics
Ethnology
Etiology

Genetics
Growth & development

History
Immunology
Injuries
Innervation
Instrumentation
Isolation

Legislation

Manpower
Metabolism
Methods
Microbiology
Mortality

Nursing

Organization

Parasitology
Pathegenicity
Pathology
Pharmacokinetics
Pharmacology
Physiology
Physiopathology
Poisoning
Prevention & control
Psychology

Radiation effects
Radiography
Radionuclide imaging
Radiotherapy
Rehabilitation

Secondary
Secretion
Standards
Statistics & numerical data
Supply & distribution
Surgery

Therapeutic use
Therapy
Toxicity
Transmission
Transplantation

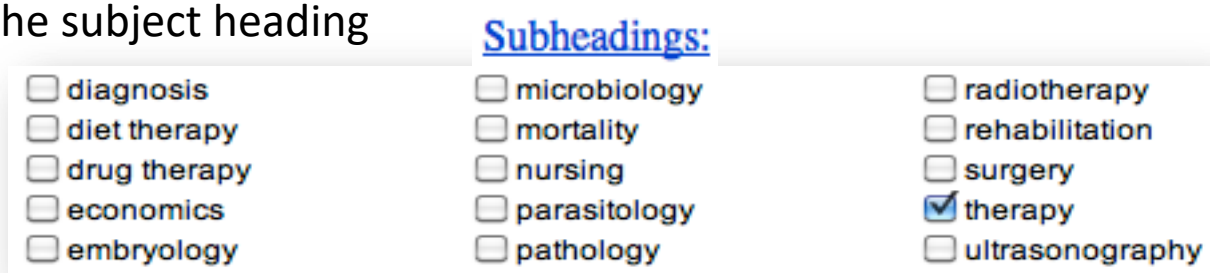
Ultrasonography
Ultrastructure
Urine
Utilization

Veterinary
Virology

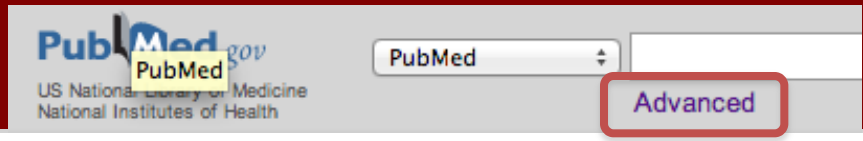
NOTE: Some subject/subheading combinations are not available
e.g., STROKE/therapeutic use

- Subheadings NARROW the subject heading.
- Usually they are combined with the subject heading
  - e.g., Stroke/therapy

("stroke" is the subject heading & "therapy" the subheading.)



Advanced Search



Builder

	All Fields	"Stroke/therapy"[Majr]
AND	All Fields	"Patient Care Team"[Mesh]
AND	All Fields	

Search or Add to history

History Download history Cle

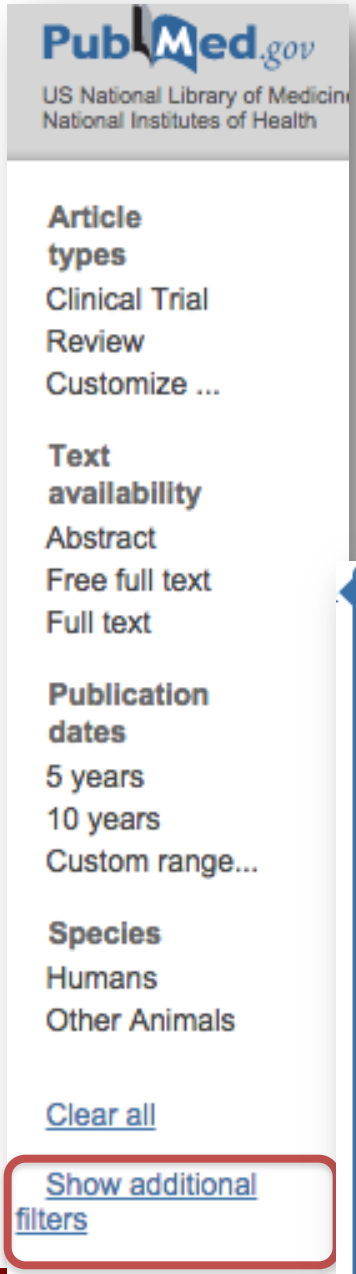
Search	Add to builder	Query	Items found
#10	Add	Search **("Patient Care Team"[Mesh]) AND "Stroke/therapy"[Majr]**	476
#9	Add	Search **"Patient Care Team"[Mesh]**	59509
#7	Add	Search **"Stroke/therapy"[Majr]**	30634
#6	Add	Search **"Stroke/therapy"[Mesh]**	43839
#5	Add	Search **"Stroke"[Majr]**	79065
#4	Add	Search **"Stroke"[Mesh]**	103388

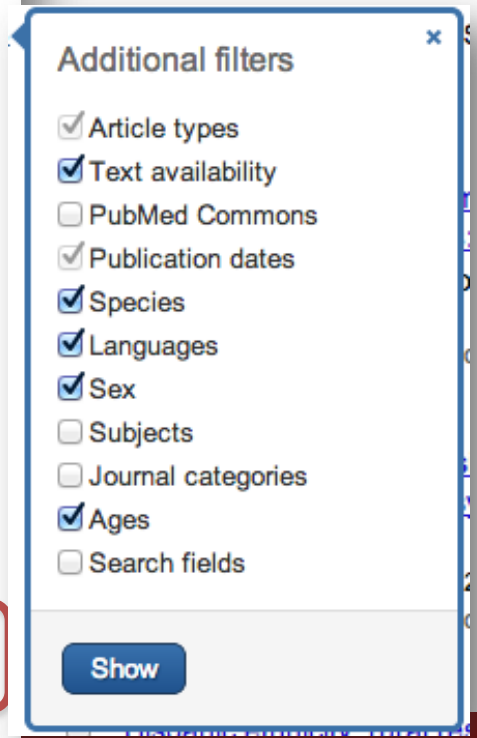
The Advanced Search page shows your search strategies and search results. These search statement numbers (e.g. #4 or #6) can be combined with each other, [AND], or with new search terms [#X] using Boolean logic operators “AND”, “OR”, “NOT”.

NOTE: The result numbers in your search sets may be different since the database is updated DAILY!

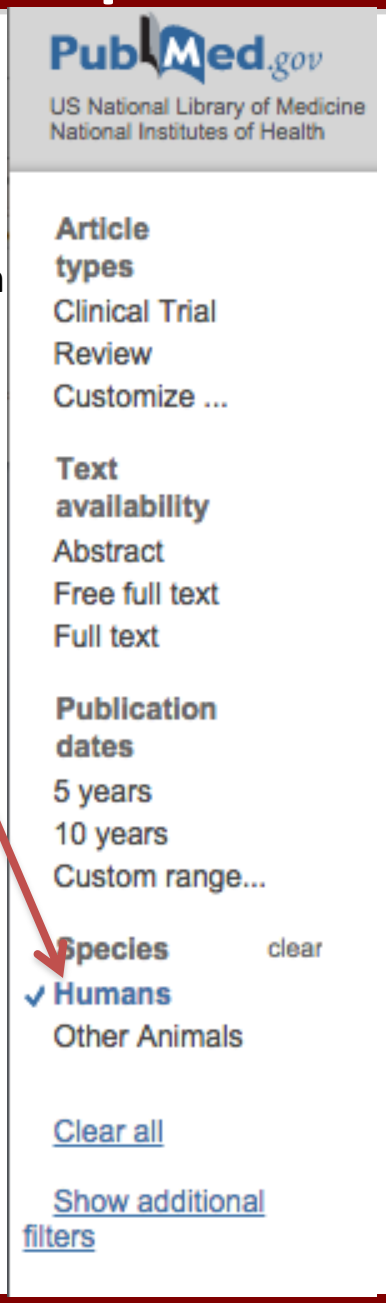
Filters – used to narrow down topic

Filters are located on the left-side of the results page.

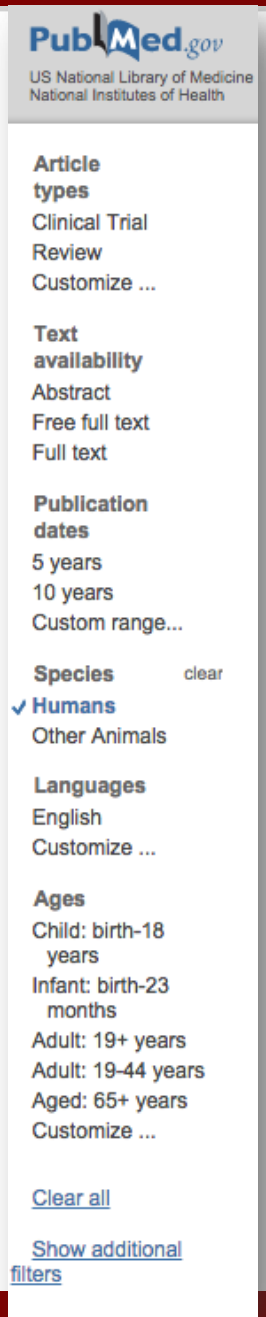




To activate filters; select and click on on needed ones. Once blue, they are active.



Filters – used to narrow down topic



Commonly used modifiers are located within the "Filters" options.

The Boolean operator "OR" is the default operator within groups.

e.g., meta-analysis or practice guideline from the "Articles Types" grouping retrieves articles of either publication type.

The Boolean Operator "AND" is the default operator between groupings.

e.g., English from the "Languages" grouping combined with "Adult: 19+ years" retrieve articles that are in English and deal with adults over 19 years of age. All concepts must be present for retrieval.

See Boolean Slide

WHEN DO I USE…

- **Use MeSH** when unfamiliar with the topic and don't know how much has been written on the subject. It will give you the broadest search for your term as a **concept**.

- **Use Major: If** you find too much on the subject then go back to the MeSH database and start filtering (narrowing down) by choosing to only get those articles that are focused on your topic (Majr).

- **Attach subheadings** to either MeSH or Major: when you are interested in a particular facet of your concept.

Most importantly, you will use pieces of the database to construct what you hope will give you the answer to your question.

IT DEPENDS ON THE QUESTION!!!

- Sometimes your topic may be so small and already narrow that you only need to use MeSH.
  - Today 11/8/16 a search for Zika Virus Infections results in 372 articles
    - So will only need minimal work to narrow down.
  - Today 11/8/16 there are 952,781 articles on Heart Disease
    - You will definitely want to narrow this down.
- **How?** Maybe you are interested in population, then locate a 2nd MeSH term
  - e.g. African Americans and combine.
    - ("Heart Diseases"[Mesh]) AND "African Americans"[Mesh]

IT DEPENDS ON THE QUESTION!

- The indexers index/tag to the most specific level of subject heading.
  - Heart diseases is very broad so narrow the strategy to a more specific term: myocardial infarction [MeSH]
  - You are interested in prevention:
    - there is a subheading for prevention and control that can be used with myocardial infarction
    - ("Myocardial Infarction/prevention and control"[Mesh]) = 9,310 articles (2/8/16) **Still too many!**
  - So you may relook at your question and realize that what you really want are articles on the prevention of Myocardial Infarction in the African American population.
    - (2 MeSH headings and one of the MeSh headings has a subheading attached)
    - ("Myocardial Infarction/prevention and control"[Mesh]) AND "African Americans"[Mesh] = 13

REMEMBER: Combining two concepts (2 MeSH terms) also narrows your topic.

This article was one of the results of strategy…

(”Myocardial Infarction"[Mesh]) AND "African Americans"[Mesh]

Evid Based Med. 2016 Feb;21(1):33-4. doi: 10.1136/ebmed-2015-110258. Epub 2015 Nov 25.

ACE inhibitors in African Americans with hypertension associated with worse outcomes as compared to other antihypertensives.

Lund LH[1].

⊕ Author information

Comment on

Outcomes with Angiotensin-converting Enzyme Inhibitors vs Other Antihypertensive Agents in Hypertensive Blacks. [Am J Med. 2015]

PMID: 26608476 DOI: 10.1136/ebmed-2015-110258

[PubMed - indexed for MEDLINE]

Publication Types, MeSH Terms, Substances

Publication Types

Comment

MeSH Terms

African Americans*
Angiotensin-Converting Enzyme Inhibitors/therapeutic use*
Antihypertensive Agents/therapeutic use*
Female
Humans
Hypertension/drug therapy*
Male
Myocardial Infarction/prevention & control*
Stroke/prevention & control*

Substances

Angiotensin-Converting Enzyme Inhibitors
Antihypertensive Agents

THE FOLLOWING SLIDES AND EXAMPLES WILL HELP YOU TO PRACTICE USING THESE CONCEPTS

Search Question:

This form can help organize your thought process.

Databases:

1 ⟷	AND 2 ⟷	AND 3 ⟷	AND 4
OR ↕			

Do you need… ?

subheadings

dates

limiters such as:

language

human or animal

age groups

publication types

journal subsets

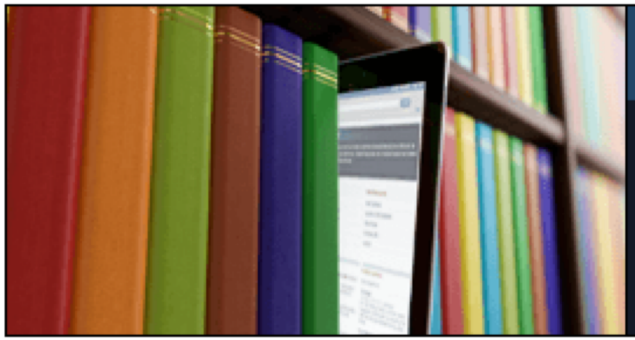
PubMed: How to Search Step–by–Step

PubMed.gov
US National Library of Medicine
National Institutes of Health

PubMed | Search

Advanced | Help

NCBI will begin redirecting all HTTP traffic to HTTPS on Thursday, November 10 at 9 AM EST (2 PM UTC). Read more.



PubMed

PubMed comprises more than 26 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites.

Using PubMed

- PubMed Quick Start Guide
- Full Text Articles
- PubMed FAQs
- PubMed Tutorials

PubMed Tools

- PubMed Mobile
- Single Citation Matcher
- Batch Citation Matcher
- Clinical Queries

More Resources

- MeSH Database
- Journal in NCBI Databases
- E-Utilities (API)

Select

From the PubMed homepage *Click* on MeSH Database…to search by concept.

Review Point

- Using the major Boolean operators “And,” “Or,” and “Not,” a search strategy can be refined to effectively locate articles on specific topics.

  - True or false: The Boolean operator “And” means that an article MUST be indexed for “Both” terms
  - (e.g., HELLP Syndrome “And” Pregnancy…both concepts will be in all the articles)

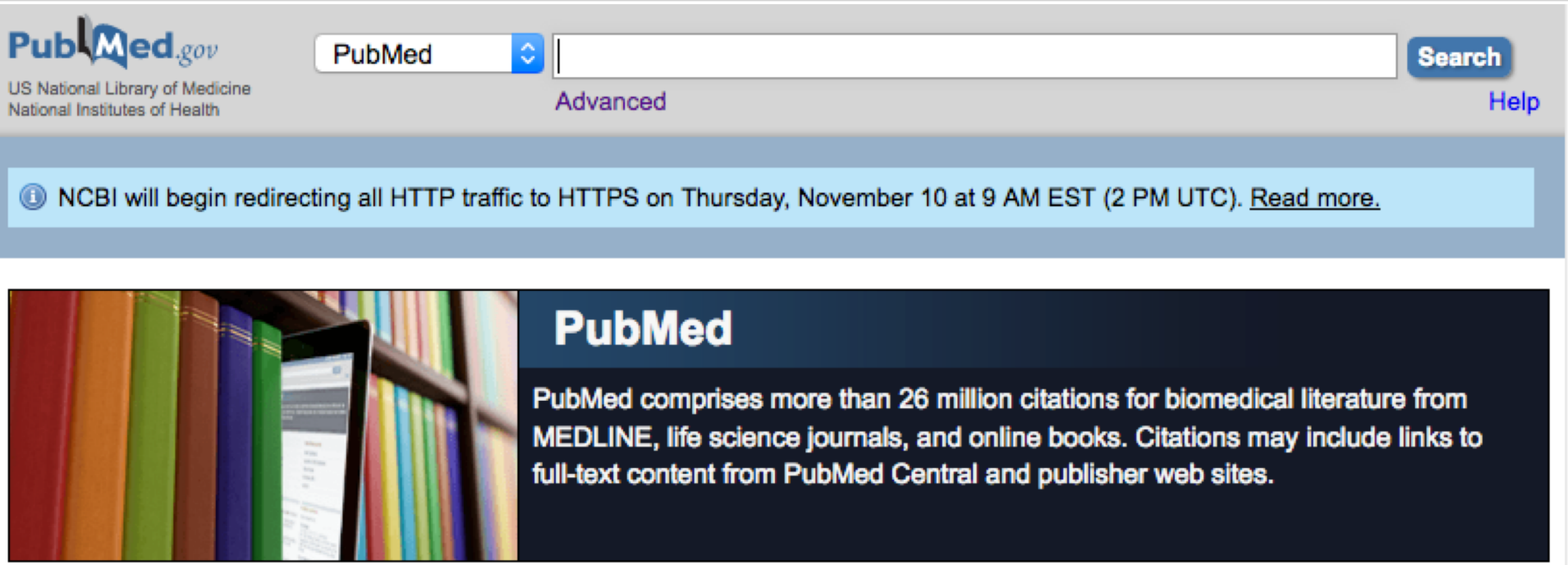
Review Point

- *True*

- When using the Boolean operator “And,” articles are indexed for both terms. Only the articles in the intersection will be retrieved.

See Boolean operators slide

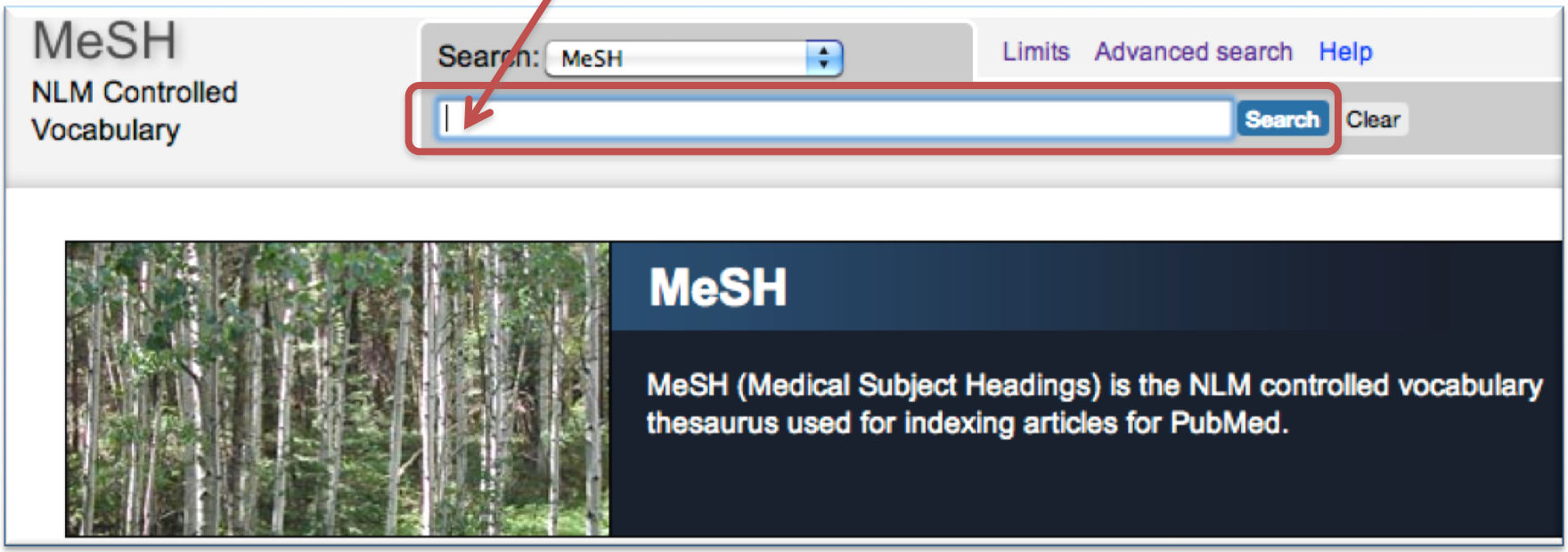
PubMed: How to Search Step–by–Step



To search by subject heading from the PubMed homepage *Click* on MeSH Database…

Using MeSH

Step 1) On the MeSH page: *Type* needed term. Then *Click* "Search"



If your term does not show up…

Consider using synonyms and if they are MeSH headings they will display. Next, consider a broader term that may be helpful. If still having difficulties locating an appropriate MeSH term, consult your librarian.

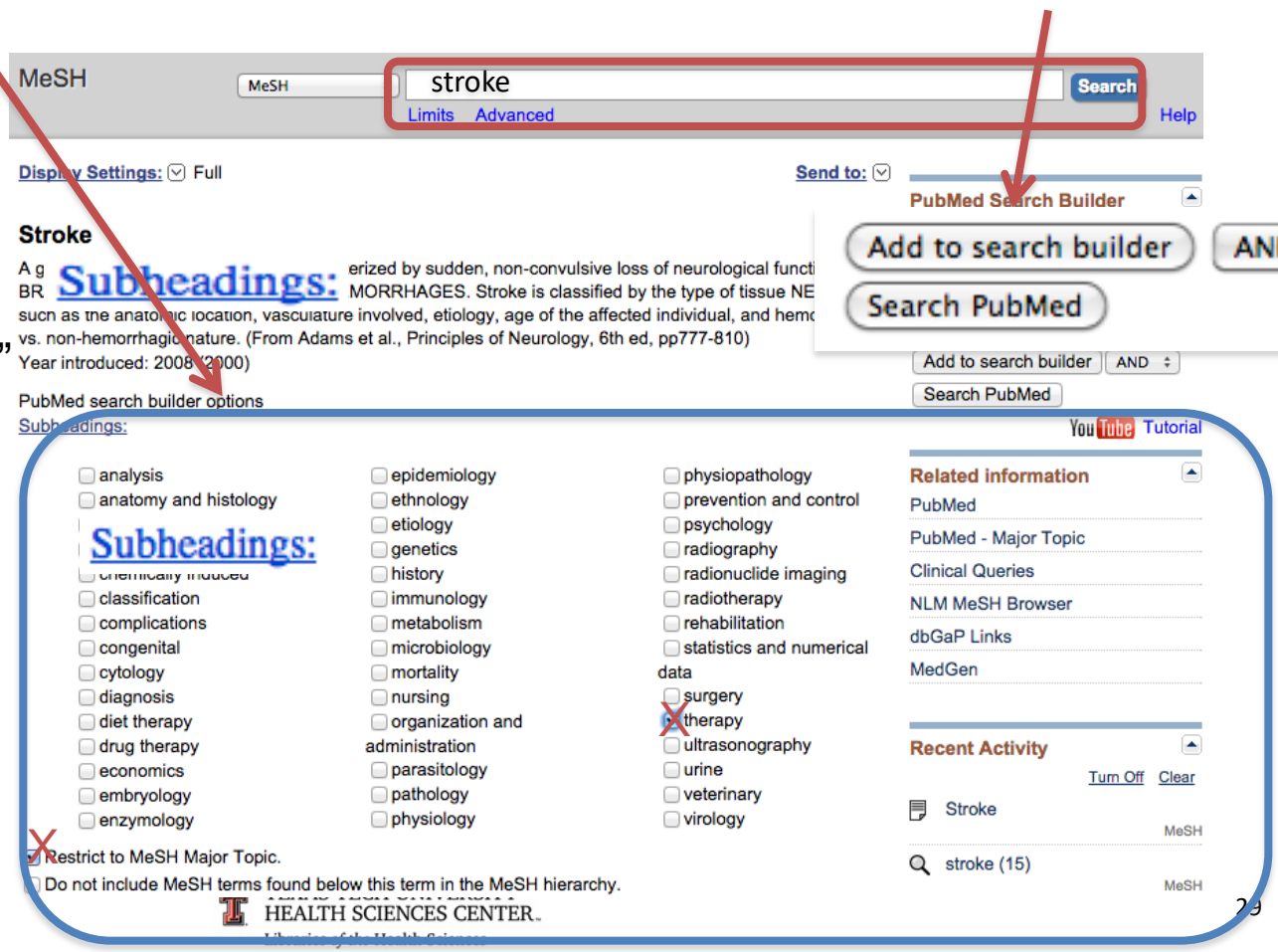
PubMed: How to Search Step–by–step

Step 1) From the MeSH page: *Type* needed term. *Click* "Search"

Step 2)
Select subheading(s) (optional) based on your search needs.

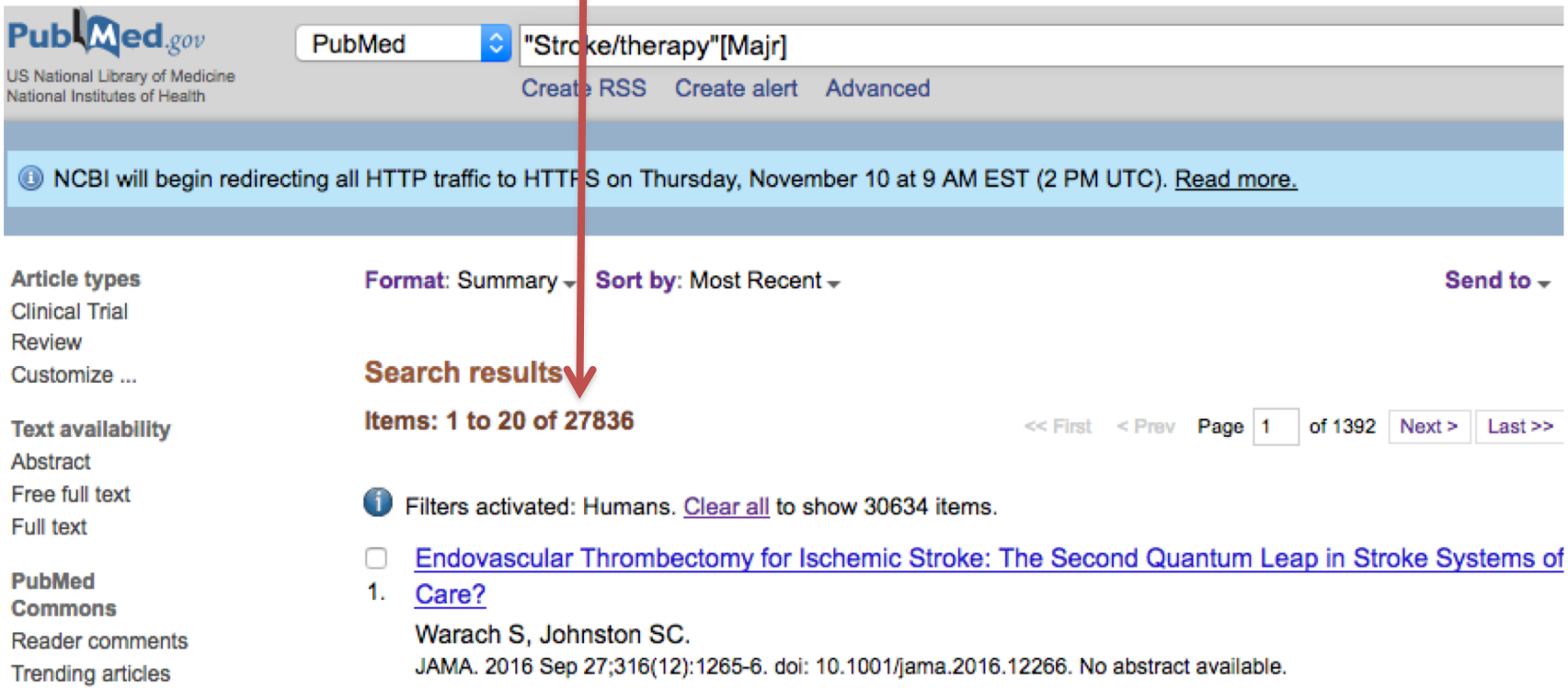
Step 3)
"Add to search builder"

Step 4)
Then: "Search PubMed"



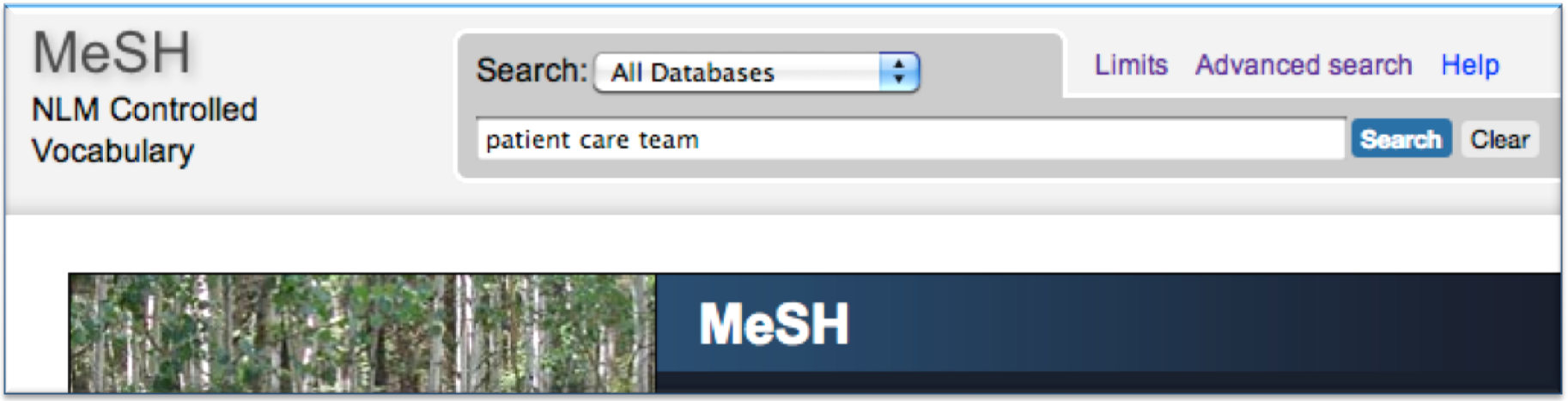
PubMed: Results 1st Concept

1) 1st subject heading results



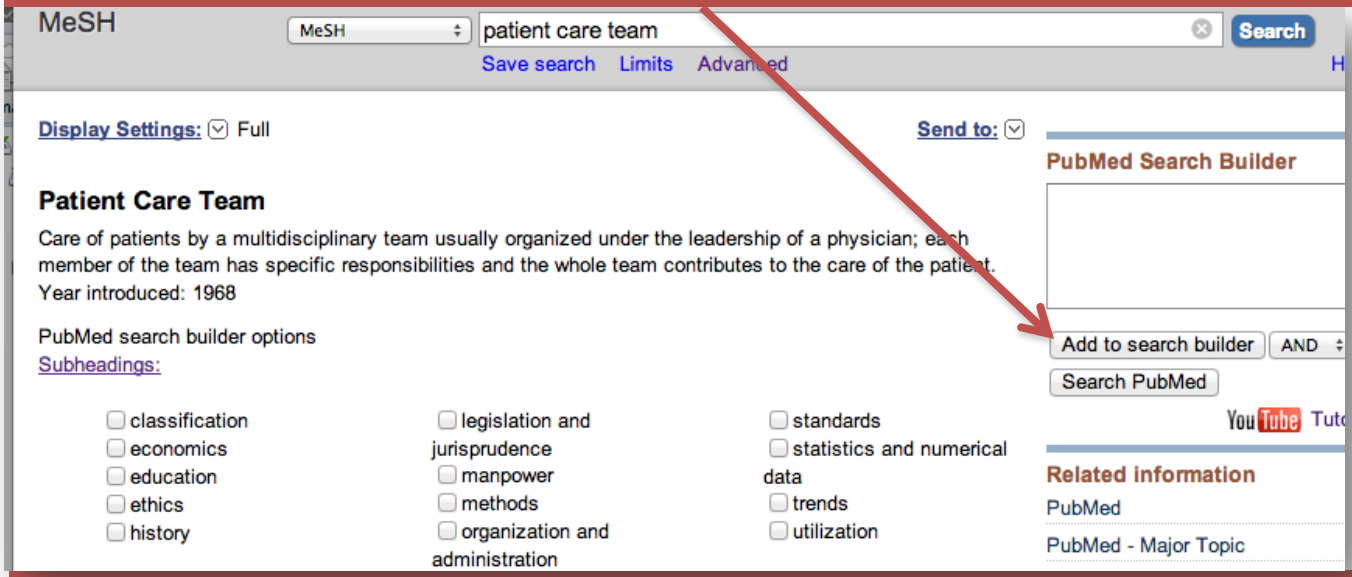
Using MeSH – 2nd Concept

1) Repeat steps/selections with 2nd concept

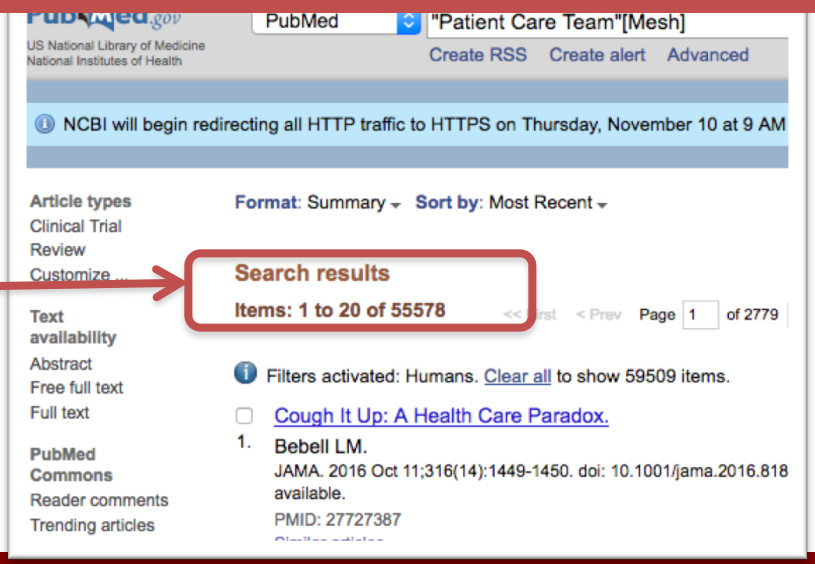


Using MeSH – 2nd concept

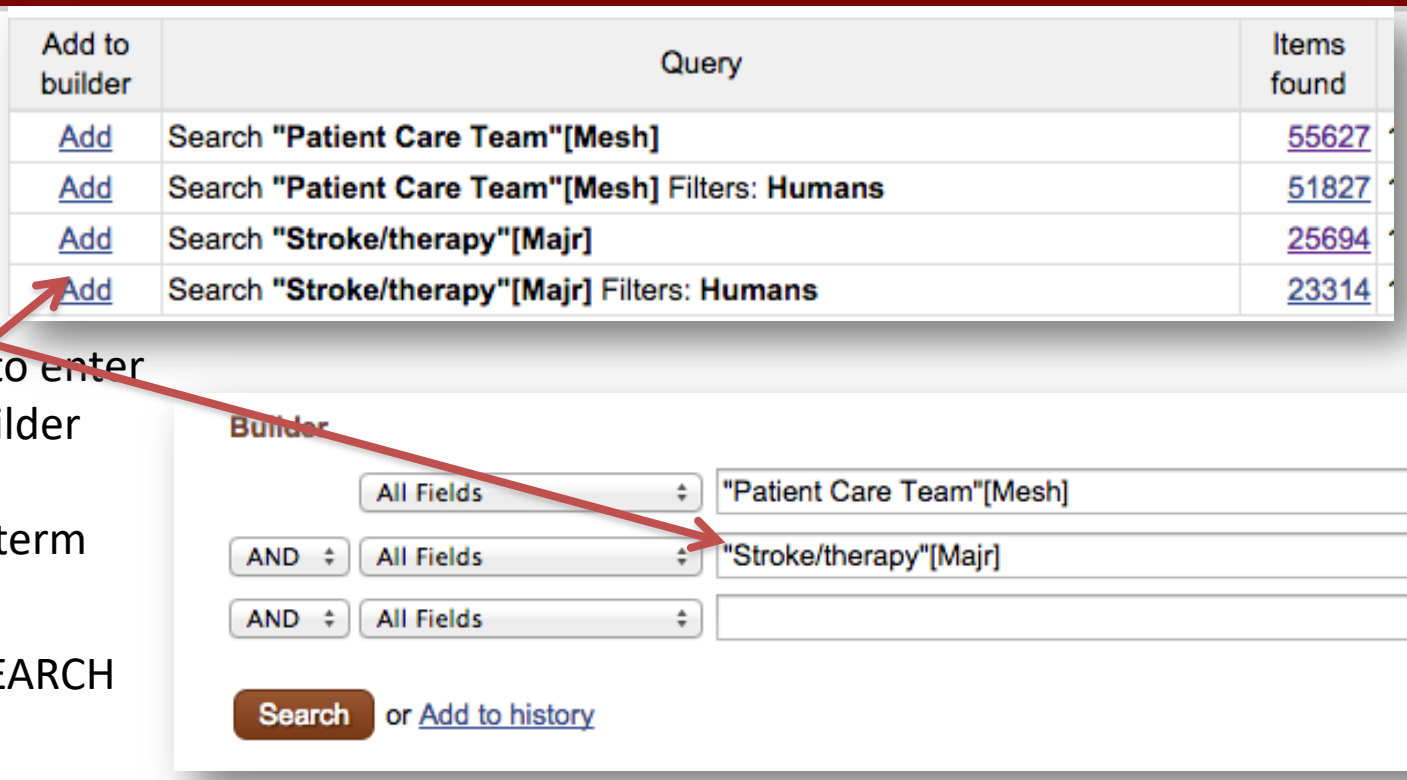
2) 2nd concept selections, "Add to search builder"



3) 2nd concept results



Using Advanced Search with "And"



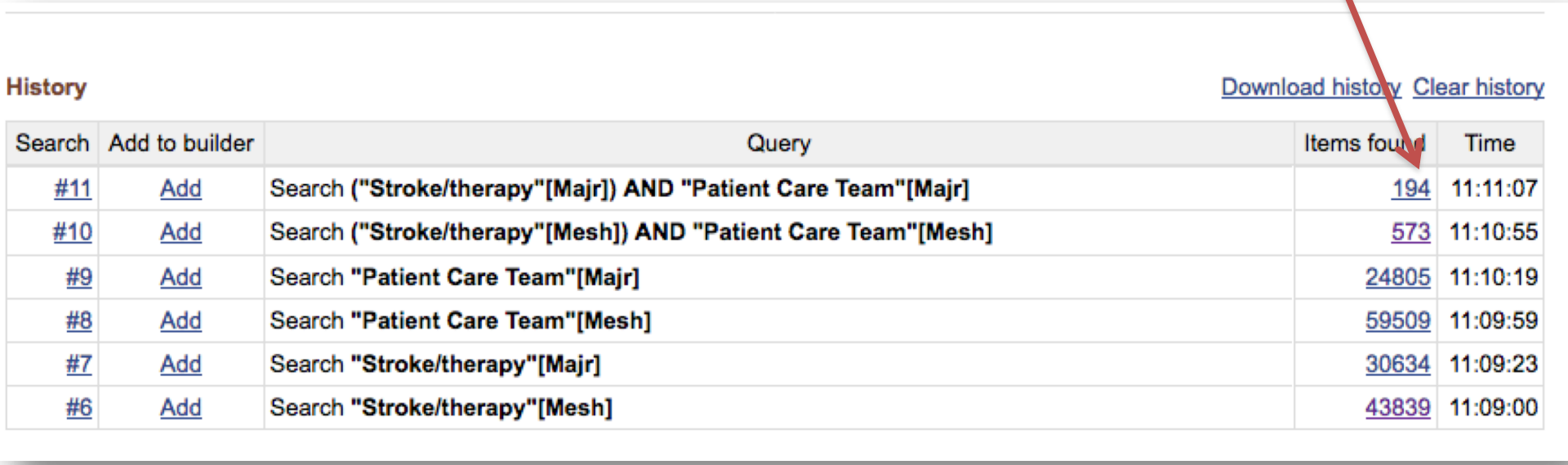
1) Click on "Add" to enter into 'Search Builder

2) Repeat with 2nd term

3) Then *Click* on SEARCH

Results after using Boolean "And"

Notice the search has been done with
MeSH Headings (573)
and then refine more using
Major Headings (194)



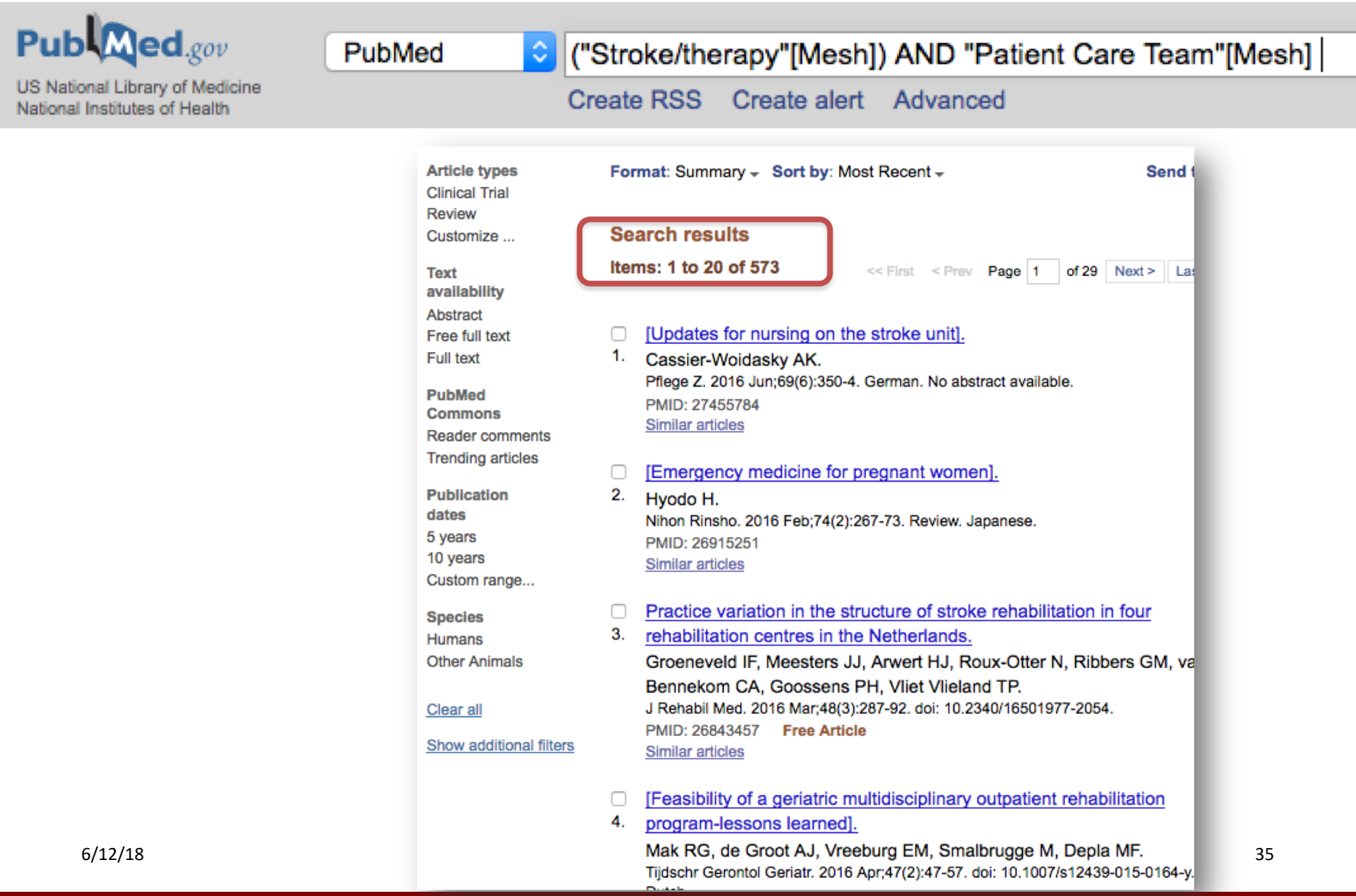
History

Download history Clear history

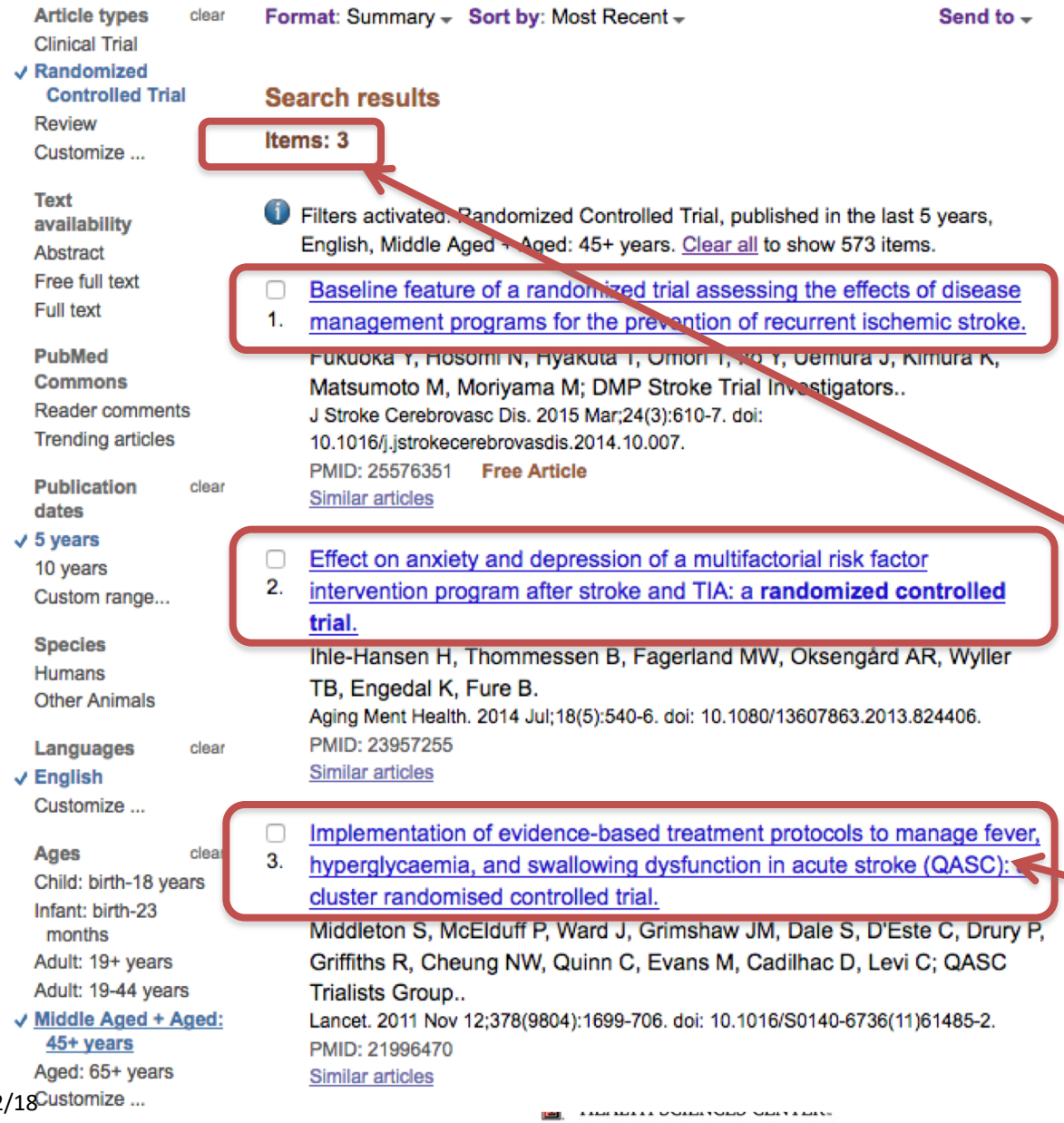
Search	Add to builder	Query	Items found	Time
#11	Add	Search **("Stroke/therapy"[Majr]) AND "Patient Care Team"[Majr]**	194	11:11:07
#10	Add	Search **("Stroke/therapy"[Mesh]) AND "Patient Care Team"[Mesh]**	573	11:10:55
#9	Add	Search **"Patient Care Team"[Majr]**	24805	11:10:19
#8	Add	Search **"Patient Care Team"[Mesh]**	59509	11:09:59
#7	Add	Search **"Stroke/therapy"[Majr]**	30634	11:09:23
#6	Add	Search **"Stroke/therapy"[Mesh]**	43839	11:09:00

In order to narrow the topic further, the filters on the next screen can be applied. So *Click* on the "Items found" that you want to manipulate and then select filters from the filters list (next screen).

Results – Before filters



Results after using "Filters"



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Abstract Format

Lancet. 2011 Nov 12;378(9804):1699-706. doi: 10.1016/S0140-6736(11)61485-2. Epub 2011 Oct 11.

Implementation of evidence-based treatment protocols to manage fever, hyperglycaemia, and swallowing dysfunction in acute stroke (QASC): a cluster randomised controlled trial.

Middleton S[1], McElduff P, Ward J, Grimshaw JM, Dale S, D'Este C, Drury P, Griffiths R, Cheung NW, Quinn C, Evans M, Cadilhac D, Levi C; QASC Trialists Group.

⊕ Author information

Abstract

BACKGROUND: We assessed patient outcomes 90 days after hospital admission for stroke following a multidisciplinary intervention targeting evidence-based management of fever, hyperglycaemia, and swallowing dysfunction in acute stroke units (ASUs).

METHODS: In the Quality in Acute Stroke Care (QASC) study, a single-blind cluster randomised controlled trial, we randomised ASUs (clusters) in New South Wales, Australia, with immediate access to CT and on-site high dependency units, to intervention or control group. Patients were eligible if they spoke English, were aged 18 years or older, had had an ischaemic stroke or intracerebral haemorrhage, and presented within 48 h of onset of symptoms. Intervention ASUs received treatment protocols to manage fever, hyperglycaemia, and swallowing dysfunction with multidisciplinary team building workshops to address implementation barriers. Control ASUs received only an abridged version of existing guidelines. We recruited pre-intervention and post-intervention patient cohorts to compare 90-day death or dependency (modified Rankin scale [mRS] ≥2), functional dependency (Barthel index), and SF-36 physical and mental component summary scores. Research assistants, the statistician, and patients were masked to trial groups. All analyses were done by intention to treat. This trial is registered at the Australia New Zealand Clinical Trial Registry (ANZCTR), number ACTRN12608000563369.

FINDINGS: 19 ASUs were randomly assigned to intervention (n=10) or control (n=9). Of 6564 assessed for eligibility, 1696 patients' data were obtained (687 pre-intervention; 1009 post-intervention). Results showed that, irrespective of stroke severity, intervention ASU patients were significantly less likely to be dead or dependent (mRS ≥2) at 90 days than control ASU patients (236 [42%] of 558 patients in the intervention group vs 259 [58%] of 449 in the control group, p=0·002; number needed to treat 6·4; adjusted absolute difference 15·7% [95% CI 5·8-25·4]). They also had a better SF-36 mean physical component summary score (45·6 [SD 10·2] in the intervention group vs 42·5 [10·5] in the control group, p=0·002; adjusted absolute difference 3·4 [95% CI 1·2-5·5]) but no improvement was recorded in mortality (21 [4%] of 558 in intervention group and 24 [5%] of 451 in the control group, p=0·36), SF-36 mean mental component summary score (49·5 [10·9] in the intervention group vs 49·4 [10·6] in the control group, p=0·69) or functional dependency (Barthel Index ≥60: 487 [92%] of 532 patients vs 380 [90%] of 423 patients; p=0·44).

INTERPRETATION: Implementation of multidisciplinary supported evidence-based protocols initiated by nurses for the management of fever, hyperglycaemia, and swallowing dysfunction delivers better patient outcomes after discharge from stroke units. Our findings show the possibility to augment stroke unit care.

FUNDING: National Health & Medical Research Council ID 353803, St Vincent's Clinic Foundation, the Curran Foundation, Australian Diabetes Society-Servier, the College of Nursing, and Australian Catholic University.

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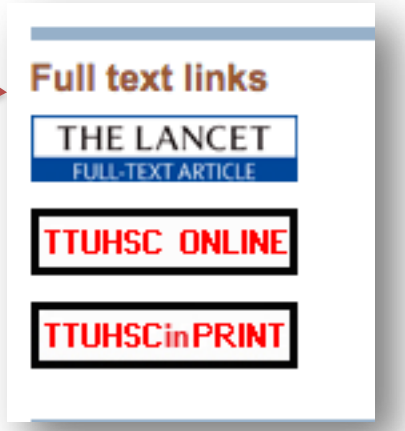

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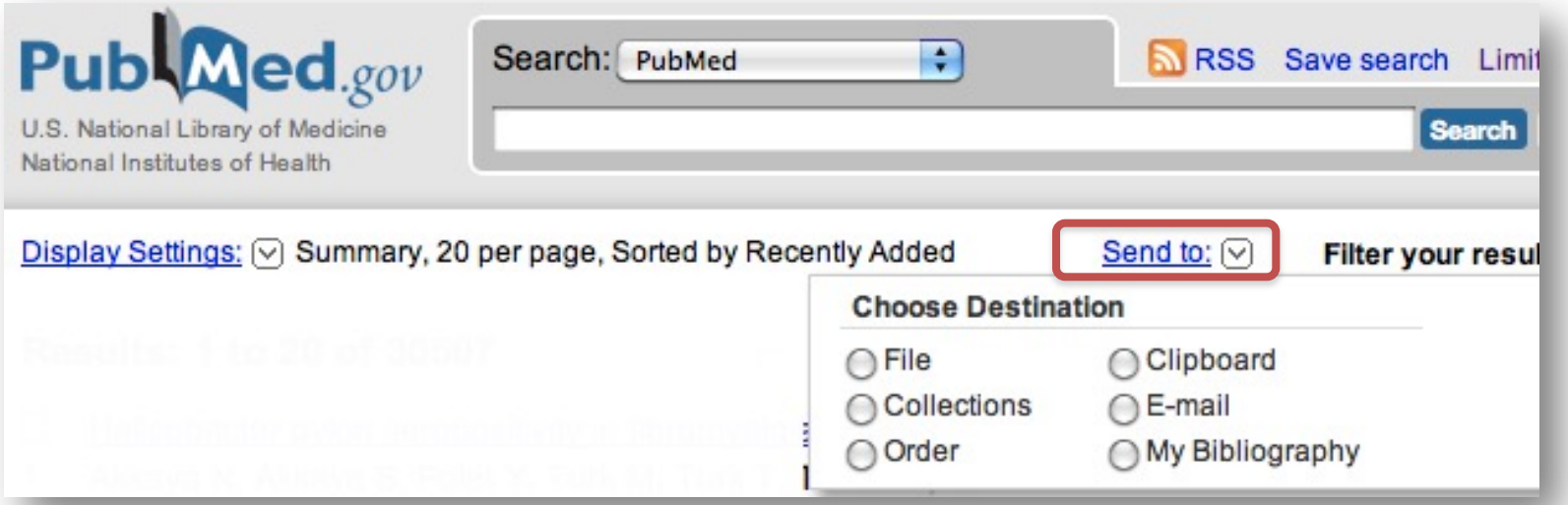

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Future Study

PubMed

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- PubMed Quick Start Guide
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More Resources

- MeSH Database
- Journals in NCBI Databases
- Clinical Trials
- E-Utilities (API)
- LinkOut

From Library Home Page> Databases> PubMed then select: Tutorials.

Practice Question #1

- Research current trends and utilization of health care services in rural Texas.

- POSSIBLE ANSWER is on the next page.
- You may want to try searching for this topic before moving on.

Answer: Practice Question #1

Add to builder	Query	Items found
Add	Search **("Texas"[Mesh]) AND (("Rural Health Services/trends"[Mesh] OR "Rural Health Services/utilization"[Mesh]))**	5
Add	Search **("Rural Health Services/trends"[Mesh] OR "Rural Health Services/utilization"[Mesh])**	1063
Add	Search **"Texas"[Mesh]**	23656

This is a possible strategy to answer Practice question #1.
(Read strategy from the bottom up.)
NOTE: As the database is updated daily the "Results" numbers may change.
Therefore the document retrieval numbers have been removed.

This strategy located 5 articles on November 9, 2016

Locating the correct subject heading or MeSH term and then using appropriate subheadings creates a good strategy for this question.

Practice question #2

- Does use of finasteride prevent the risk of developing prostate cancer in the male population over 65 years of age?

- Limit to Randomized Controlled Trial, English and Human

- POSSIBLE ANSWER is on the next page.
- You may want to try searching for this topic before moving on.

Practice Question 2: Strategy 1

Keeping it simple and to the point works!

Add	Search (("Finasteride"[Mesh]) AND "Prostatic Neoplasms"[Mesh]) AND "Risk" [Mesh]	97
Add	Search "Risk"[Mesh]	958097
Add	Search "Prostatic Neoplasms"[Mesh]	104975
Add	Search "Finasteride"[Mesh]	1941

However, if your results are too many…try the next strategy on the following slide.

This is a possible strategy to answer Practice question #2 .
(Read strategy from the bottom up.)
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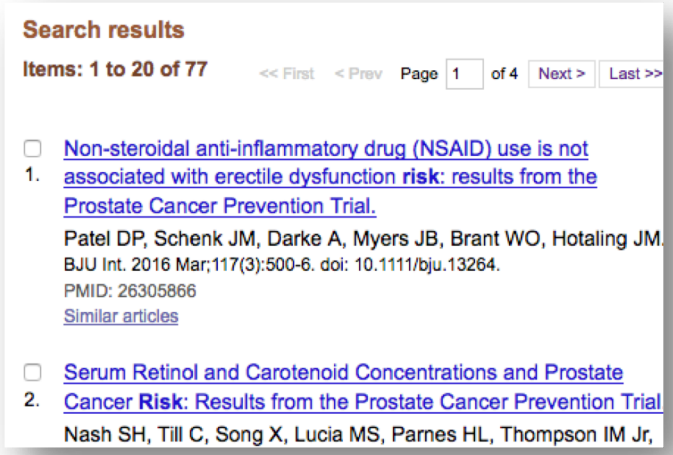

Search results

Items: 1 to 20 of 77 << First < Prev Page 1 of 4 Next > Last >>

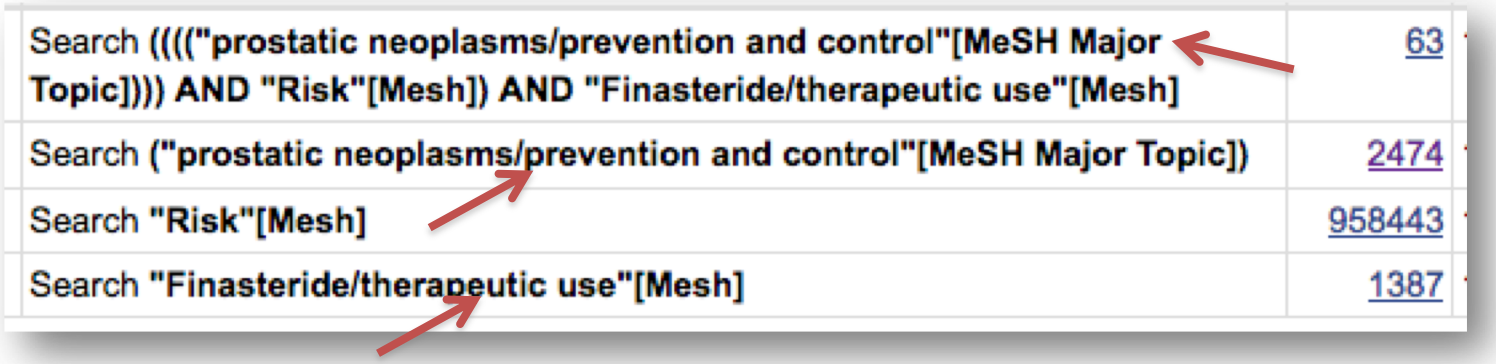
1. Non-steroidal anti-inflammatory drug (NSAID) use is not associated with erectile dysfunction **risk**: results from the Prostate Cancer Prevention Trial.
Patel DP, Schenk JM, Darke A, Myers JB, Brant WO, Hotaling JM.
BJU Int. 2016 Mar;117(3):500-6. doi: 10.1111/bju.13264.
PMID: 26305866
Similar articles

2. Serum Retinol and Carotenoid Concentrations and Prostate Cancer **Risk**: Results from the Prostate Cancer Prevention Trial
Nash SH, Till C, Song X, Lucia MS, Parnes HL, Thompson IM Jr,

This strategy located
97 articles on
November 9, 2016

Practice Question 2: Strategy 2

1. Subheadings and use of [Majr] concept narrows results.



Search ((((("prostatic neoplasms/prevention and control"[MeSH Major Topic])))) AND "Risk"[Mesh]) AND "Finasteride/therapeutic use"[Mesh]	63
Search ("prostatic neoplasms/prevention and control"[MeSH Major Topic])	2474
Search "Risk"[Mesh]	958443
Search "Finasteride/therapeutic use"[Mesh]	1387

This is a possible strategy to answer Practice question #2.
(Read strategy from the bottom up.)
NOTE: As the database is updated daily the “Results” numbers may change.

This strategy located 63 articles on November 10. 2016

Practice Question #3

- Can better communication among staff in the operating room prevent medical errors?

- POSSIBLE ANSWER is on the next page.
- You may want to try searching for this topic before moving on.

Answer: Practice Question #3

Search (("Interprofessional Relations"[Mesh]) AND "Surgical Procedures, Operative"[Mesh]) AND ("Medical Errors/prevention and control"[Mesh])	58
Search "Medical Errors/prevention and control"[Mesh]	16587
Search "Surgical Procedures, Operative"[Mesh]	2687400
Search "Interprofessional Relations"[Mesh]	60817

This is a possible strategy to answer Practice question #3.
(Read strategy from the bottom up.)
NOTE: As the database is updated daily the "Results" numbers may change.
Therefore the document retrieval numbers have been removed.

This strategy located 58 articles on November 10, 2016

Sometimes locating the obvious subject heading is not easy. Consider other synonyms that have similar meaning.

Summary…Final Points

- Using database tools appropriately increases relevancy and accuracy of results.
  - Boolean operators
  - Subject headings (MeSH)
  - Subheadings
  - Major headings
  - Filters

PubMed

- If you have some topics that you would like covered please send a note to “Ask a Librarian.”

- Links to “Ask a Librarian” are located on the library homepage