Finding the Evidence

in PubMed (MEDLINE)

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Overview

This tutorial is designed to help you find evidence-based answers to clinical questions using PubMed.

It covers:

- basic searching concepts; and
- focuses on retrieving data from quantitative studies following a structured search process.

This structured search process can also be applied to non-clinical searches and serve as a framework for searching other databases.

PubMed & other biomedical databases are available to Duke users at the **Duke University Medical Center Library (DUMCL) website**.

Video tutorials & printable tipsheets are available on the Library's **Tutorials & Tipsheets** page.

PubMed

- Developed by the National Library of Medicine (NLM), PubMed is the search system for the MEDLINE database.
- PubMed covers medicine, nursing, dentistry, health services research, the basic sciences, and more.
- It has 21+ million citations from 5000+ journals.
- PubMed includes all the content indexed for MEDLINE, plus newer references that haven't yet been assigned Medical Subject Headings (MeSH).

While you are affiliated with Duke, you should use the version of PubMed on the **DUMCL website**. It contains links to full-text journal articles accessible to Duke.

Want More Information about PubMed? **Click here for a list of resources.**

Indexing & MeSH

- Human indexers read articles in MEDLINE and assign standardized terms called **Medical Subject Headings** (**MeSH**) to describe them.
  - Article citations that have been indexed with MeSH terms display with the tag: **[PubMed - indexed for MEDLINE]**.
  - New citations that haven't yet been assigned MeSH terms display with the tag: **[PubMed - in process]**.
  - Citations received electronically from publishers display with the tag: **[PubMed - as supplied by publisher]**.

Topical MeSH Terms

- Topics can often be expressed in multiple ways.
- Example: **Cancer** might be called tumors, malignancy, etc.
  - PubMed uses the MeSH, **Neoplasms**, for the broad concept of cancer.
  - PubMed will automatically include narrower terms when searching for a broad heading like cancer. This is called **exploding**.
- **Subheadings** can be used with MeSH to get at specific aspects of a topic.
  - Example: An article about drugs used to treat cancer would be indexed to the MeSH heading/subheading: **Neoplasms/drug therapy**.

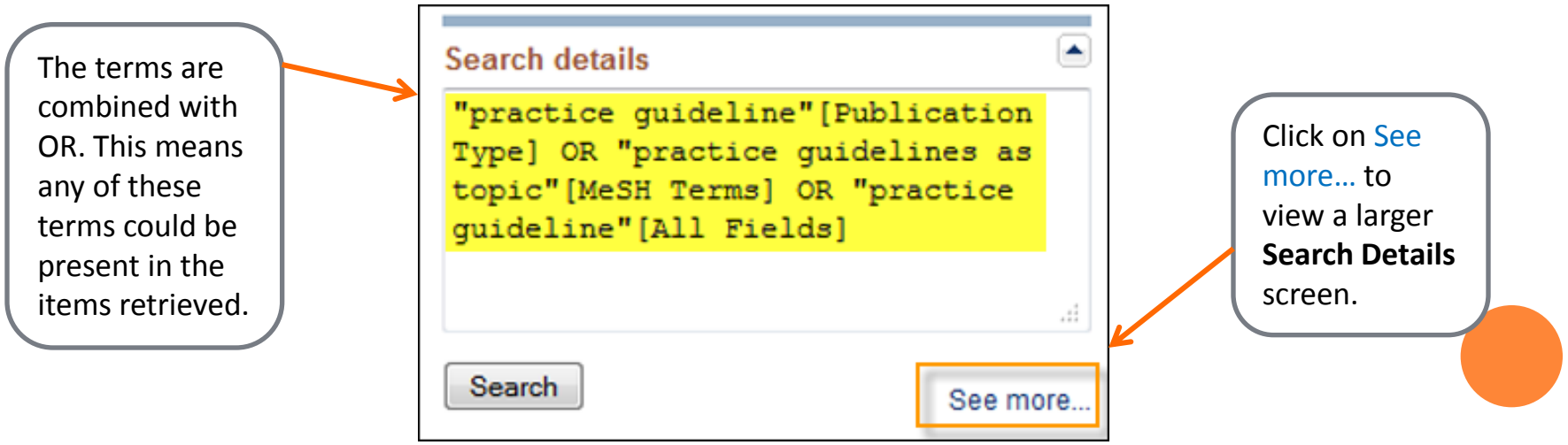
Publication Types

- These are standardized terms that describe the **type** of item being indexed.
- These publication types are helpful for retrieving the evidence:
  - Clinical Trial, Meta-Analysis, Multicenter Study, Practice Guideline, & Randomized Controlled Trial.
- Sometimes there is a **topical MeSH term** & a **publication type**. For Example:
  - An article about how to conduct randomized controlled trials would be indexed with **"randomized controlled trials as topic"[MeSH Terms]**.
  - An article that is the report of an actual RCT would be indexed to **"randomized controlled trial"[Publication Type]**.
  - An article that describes a RCT and also talks about recruitment strategies for RCTs might be indexed with both MeSH terms.
- If there's no publication type for a study design, a topical MeSH will be used. For Example:
  - Indexers use **"Cohort Studies"[Mesh]** to describe an article that reports the results of an actual cohort study (since there is no publication type), or an article that talks about cohort studies in general.

Automatic Term Mapping (ATM)

- PubMed uses ATM to maximize your search retrieval.
- When you search PubMed, the system looks for your term(s) in “All Fields”. It also tries to translate (or map) your search into MeSH terms.
- To see how PubMed translated your search, ALWAYS look at the **Search Details** box on the lower right side of the **Search Results** screen (Fig. 1).
- Example: A search for **practice guideline** will map to:
  - the Publication Type, the MeSH term, or the phrase in All Fields (Fig. 1).

Fig. 1 Automatic Term Mapping in PubMed.



Caution!

- The following will **turn off ATM** (& official MeSH terms will **not** be included in your search):

1. Using an asterisk (*) as a wildcard or truncation symbol.

- Example: A search for **diagnos*** picks up the words *diagnosis, diagnostic, diagnose,* etc., in All Fields.
- However, it won't map to or explode the broad MeSH term, **Diagnosis**.

2. Putting a phase in quotes.

- Example: Searching on **"diagnostic imaging"** will find that exact phrase in all fields (Fig. 2). But it won't map to or explode the MeSH term, **Diagnostic Imaging**.

Without ATM, you will not be mapped to the MeSH term, **Diagnostic Imaging**.

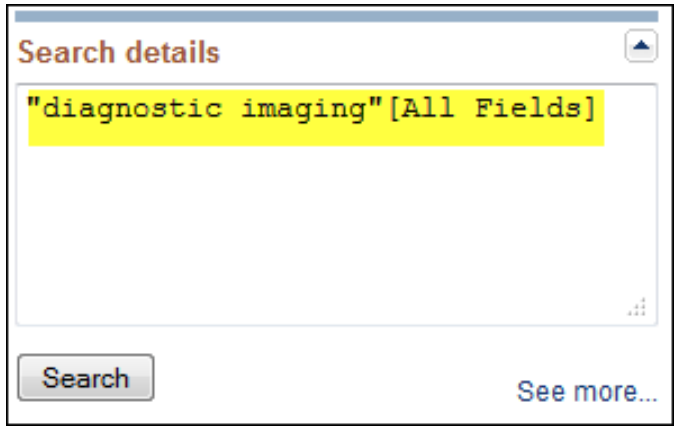


Fig. 2 Search details for "diagnostic imaging".

Search Tips:

1. To maximize retrieval, try searching with the MeSH term & truncated word root.

2. Searching on a quoted phrase can help find concepts for which there isn't a good MeSH term.

MeSH Database

Use the MeSH database to:

- Identify MeSH terms to use in a search.
- View broader and narrower headings (hierarchy of terms) for a MeSH term (Fig. 3).
- See what narrower terms will be included by exploding a broad MeSH (Fig. 3).

Fig. 3 Hierarchy of terms (tree view) for the MeSH term, **Neoplasms**.

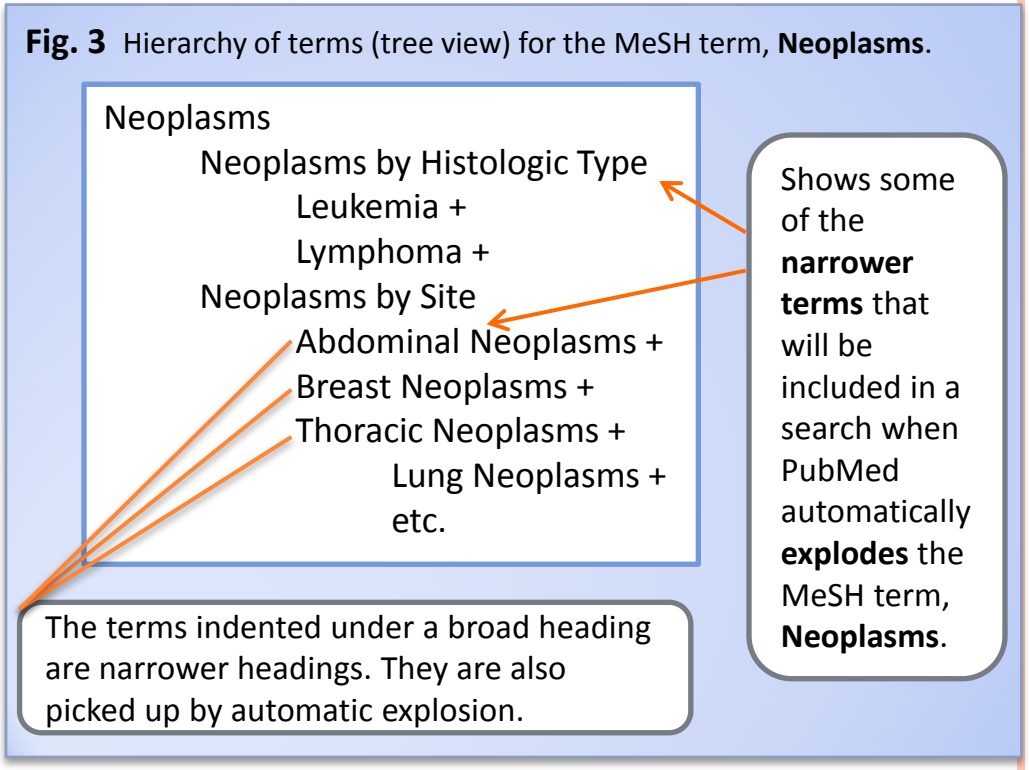
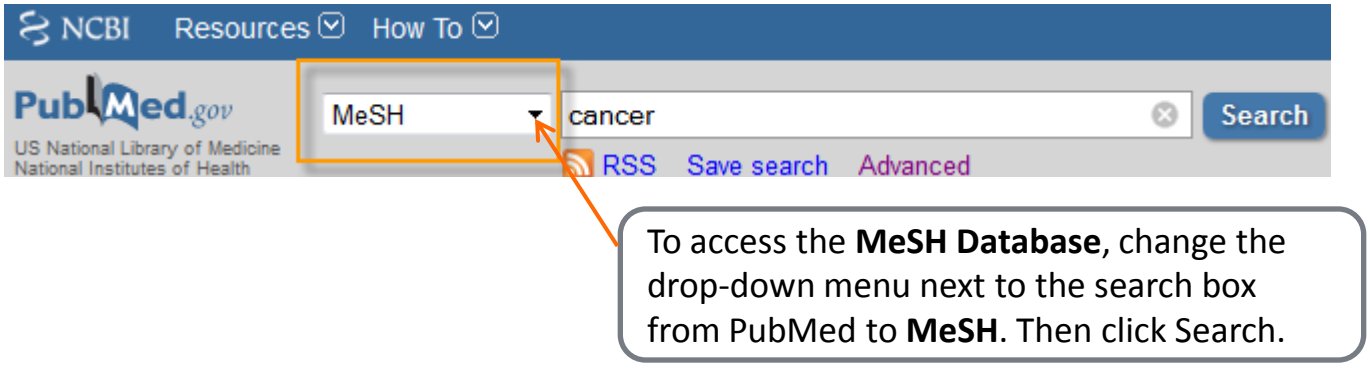
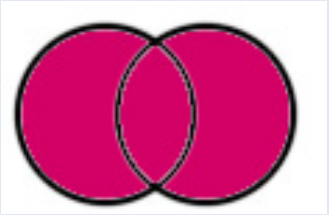
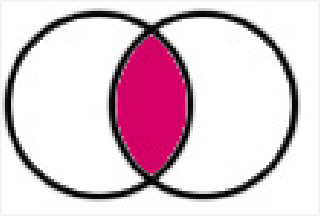
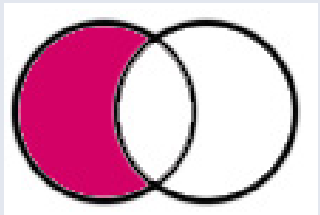


Fig. 4 Accessing the MeSH Database.



Use Boolean Operators (OR & AND) to Combine Search Terms/Sets

Operator	Example Search	Search will find…	Venn Diagram (results shown in pink)
OR Use OR to combine similar terms, or when you don't care which terms appear in the results.	dizziness OR vertigo	Items containing either "dizziness" or "vertigo", or both. OR broadens a search, resulting in more hits.	
AND Use AND when you want ALL the terms to appear in the results.	hypertension AND beta blockers	Items containing both "hypertension" AND "beta blockers". AND narrows a search, resulting in fewer hits.	
NOT Can be helpful in excluding items, but is risky!	Mexico NOT New Mexico	Items containing "Mexico" but not "New Mexico". USE WITH CAUTION! It's easy to exclude relevant items.	

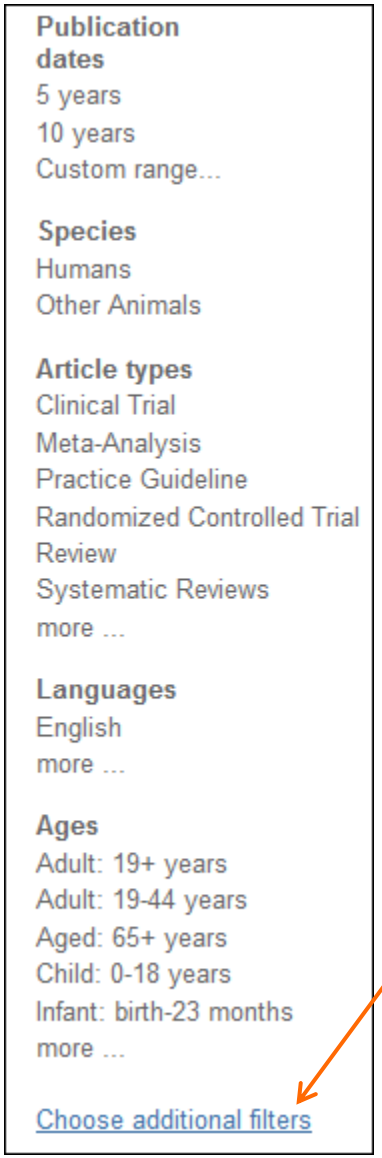
Use Filters to Limit Search Results

- Use the Filters in PubMed to limit/focus your search results.
- Filters are located on the **left** side of the **Search Results** page.

Frequently used Filters include:

- **Publication Dates**
- **Article Types** (= publication type)
- **Languages**
- **Ages:** This is the preferred way to find articles about a specific age group, such as a pediatric or elderly population.
- ***Note:*** Selected filters remain active until you change/remove them.

- **Additional Filters** have been added to Duke's version of PubMed so you can quickly get at higher levels of evidence, such as **Systematic Reviews** & **Randomized Controlled Trials** (Therapy/Treatment filter). You will also find a **Nursing Journals** filter.
- These filters are located on the **right** side of the **Search Results** page.



Click on **Choose Additional Filters** to view & add other Filters, such as **Journal Categories**.

Fig. 5 PubMed Filters

Clinical Queries: Find Answers to Clinical Questions

- **Clinical Queries** are specialized searches related to types of clinical questions, such as:
  - etiology, diagnosis, therapy, prognosis, & clinical prediction guides.
- Clinical Queries also include systematic reviews and medical genetics.
- For each study category, the search can be either broad and sensitive, or narrow and specific.
- You can search directly from the Clinical Queries page, but it may be best to take the results of a well-constructed PubMed search and use the Clinical Queries as a way to "filter" your search results.

- After doing your PubMed search:
  - Go to the **Advanced Search Builder** page. (A link to Advanced can be found under the PubMed search box).
  - Under **History** locate the set number of the search you wish to filter. (Example: Search **#5**)
  - At the top of the **Advanced Search Builder** page, locate **More Resources** (Fig. 7). Choose **Clinical Queries** from the drop-down menu.
  - From the Clinical Queries page, type **#5** into the search box & click Search.

To view the search strategies used to develop Clinical Queries, click here.

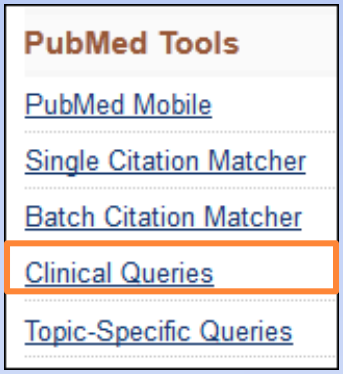


Fig. 6 You can link to **Clinical Queries** from the main page of PubMed (under **PubMed Tools**).

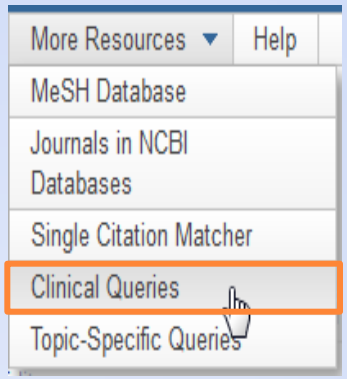


Fig. 7 A link to **Clinical Queries** can be also be found on the **Advanced Search Builder** page under **More Resources**.

Type of Question and Type of Study

The study design most likely to provide the best evidence for answering a clinical question varies according to the type of question. Categories of questions and the original study designs most appropriate for answering them are shown below:

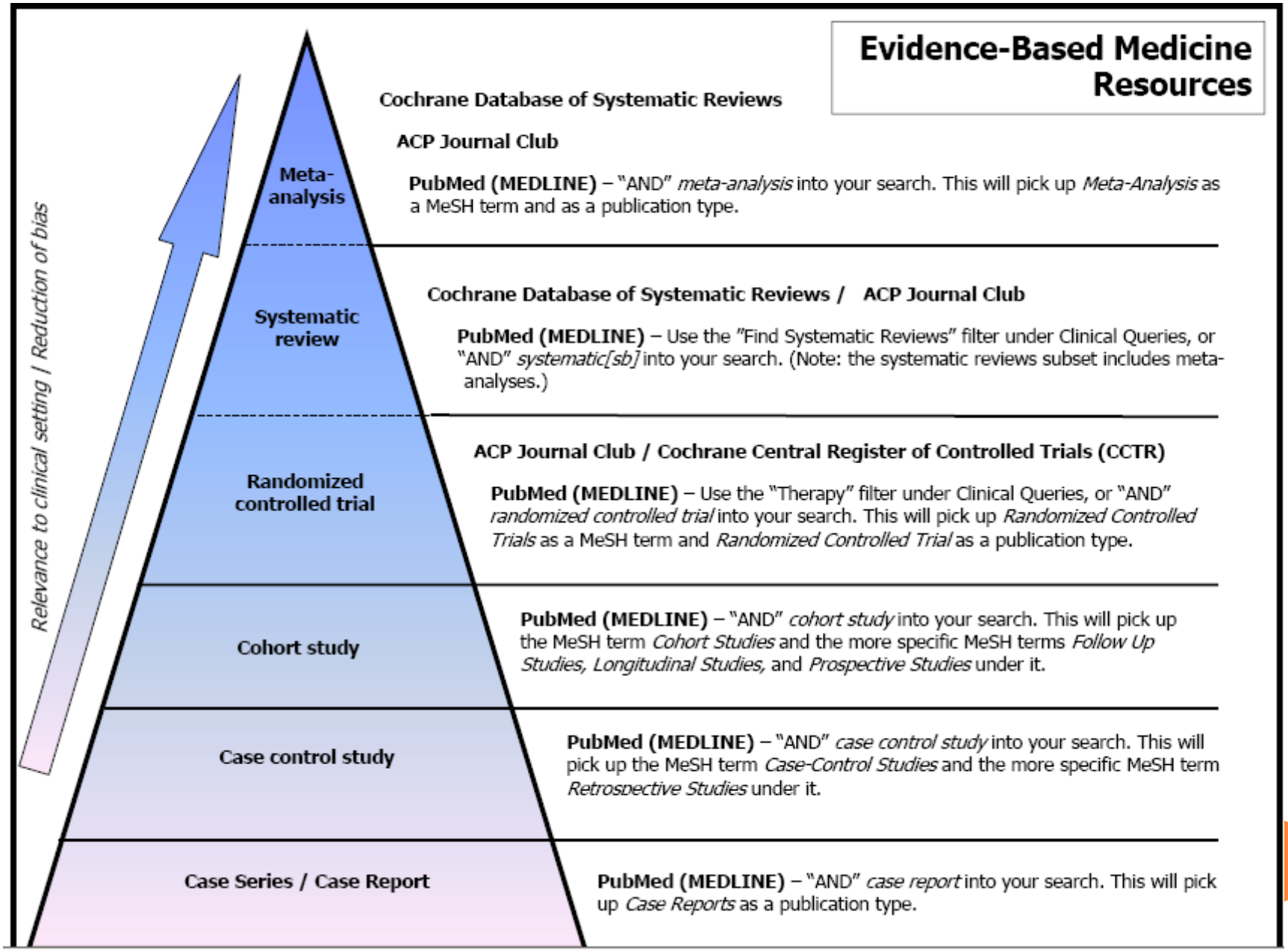
Type of question	**Suggested best type of study**
Therapy	Randomized Controlled Trial (RCT)
Diagnosis	Prospective, blind comparison to a gold standard
Prognosis	Cohort Study > Case Control > Case Series
Etiology/Harm	RCT > Cohort Study > Case Control > Case Series
Prevention	RCT > Cohort Study > Case Control > Case Series
Cost-analysis	Economic Analysis

In addition, syntheses of the evidence may be available in the form of systematic reviews, meta-analyses, and evidence-based practice guidelines.

A search in PubMed should take into account the type of study that will provide the best data to answer your question.

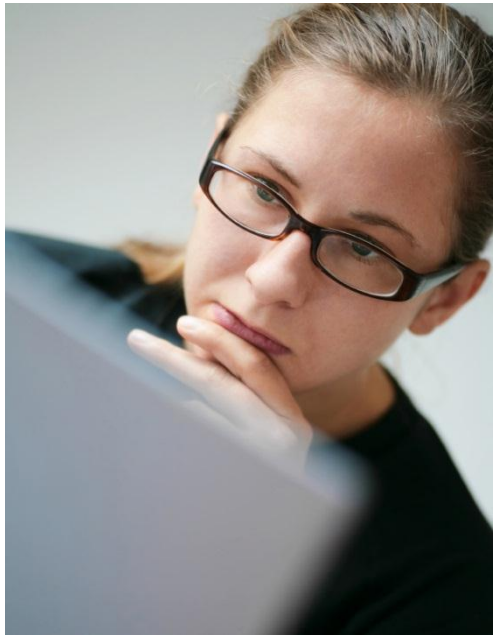
Want More Information about Study Designs & Levels of Evidence? Click here.

The Evidence Pyramid (or Hierarchy of Evidence)



EBM Pyramid & EBM Page Generator (2006) .Trustees of Dartmouth College & Yale University. Produced by Jan Glover, David Izzo, Karen Odato and Lei Wang.

Approaching the Search



1. Begin with a focused, searchable question or topic.

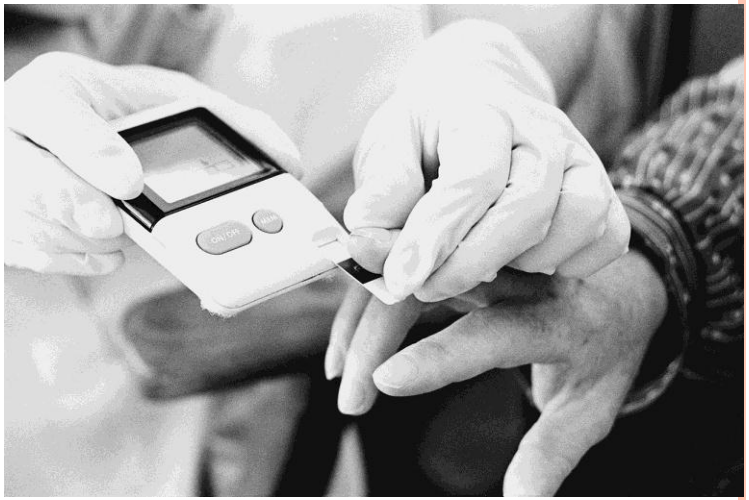
2. Identify key concepts of your question/topic.
   - It may be helpful to use PICO as a guide. We will discuss PICO in more detail on the next slide.

3. Choose relevant keywords & subject headings (MeSH).
   - Think of other ways to describe your concepts.
     Example: critical care OR intensive care units.
   - Look at MeSH terms from relevant articles for ideas about other search terms.

4. Search each concept separately. Then combine concepts using Boolean operators OR & AND.
   - **Tip:** First combine similar concepts with OR. Then combine different concepts with AND to get your final results.

5. Use Filters, such as English language, dates, age groups, etc., at the end to narrow your search results.

PICO Framework for Developing Your Search Strategy



Patient or Problem

How would you describe a group of patients similar to yours? What are the most important characteristics of this patient population? What is the main problem or condition of interest?

Intervention, Exposure, Prognostic Factor

What main intervention (diagnostic test, prevention strategy, treatment, etc.) are you considering? Is there an exposure, risk, or prognostic factor of interest?

Comparison (if applicable)

What is the main alternative being considered, if any?

Outcome

What are you trying to accomplish, measure, improve, or affect?

To determine the type of evidence you need, you may also want to think about the:

Type of question

How would you categorize this question?

Type of study

What would be the best study design to answer this question?

Search Scenario

You're concerned about the number of critically ill patients in your hospital who've recently developed pressure ulcers, significantly adding to the morbidity, mortality, and cost associated with their hospitalization. You'd like more information about factors or characteristics that increase the risk of developing pressure sores in this population, and evidence about the effectiveness of interventions to prevent pressure sores in critically ill patients.

Before you search:

- Develop a focused question. Use PICO to help identify your key concepts.
- Determine the two main questions that we want to answer, and what types of questions (etiology/harm, prevention, diagnosis, prognosis, therapy, etc.) they are.

Question 1: In critically ill patients, what factors or characteristics increase the risk of developing pressure sores?

- This is an **etiology/harm** question, in that it deals with causes of or factors associated with an adverse outcome.

Question 2: In critically ill patients, what are effective interventions for preventing pressure sores?

- This is both a **prevention and therapy** question, related to the effectiveness of preventive interventions.

This is what the PICO might look like for the first question we want to address:

In critically ill patients, what factors or characteristics increase the risk of developing pressure sores?

P = critically ill patients (or something similar)
I = no *specific* factors or characteristics to search for
C = none specified
O = pressure sores (esp., what increases the risk of development)

It's a good idea to determine the type of question we're asking. This will help us determine the study type we need.

Type of question = etiology/harm*
Type of study = RCT> cohort > case control > case series

Note: The type of question doesn't necessarily have to be included in the search strategy. Its main purpose is to help you think about the study design that is best suited for answering the type of question you're asking.

PubMed Search

Using our PICO as a guide, the first concept (P) in our search relates to the patient population or main problem, which is **critically ill patients**.

- Search for **critically ill patients** in the main PubMed search box (Fig. 8).

Note: Terms that appear below the search box as you type are NOT necessarily MeSH terms or even good search terms! They are just terms other people have typed into the box. If this feature is distracting, you can turn it off.

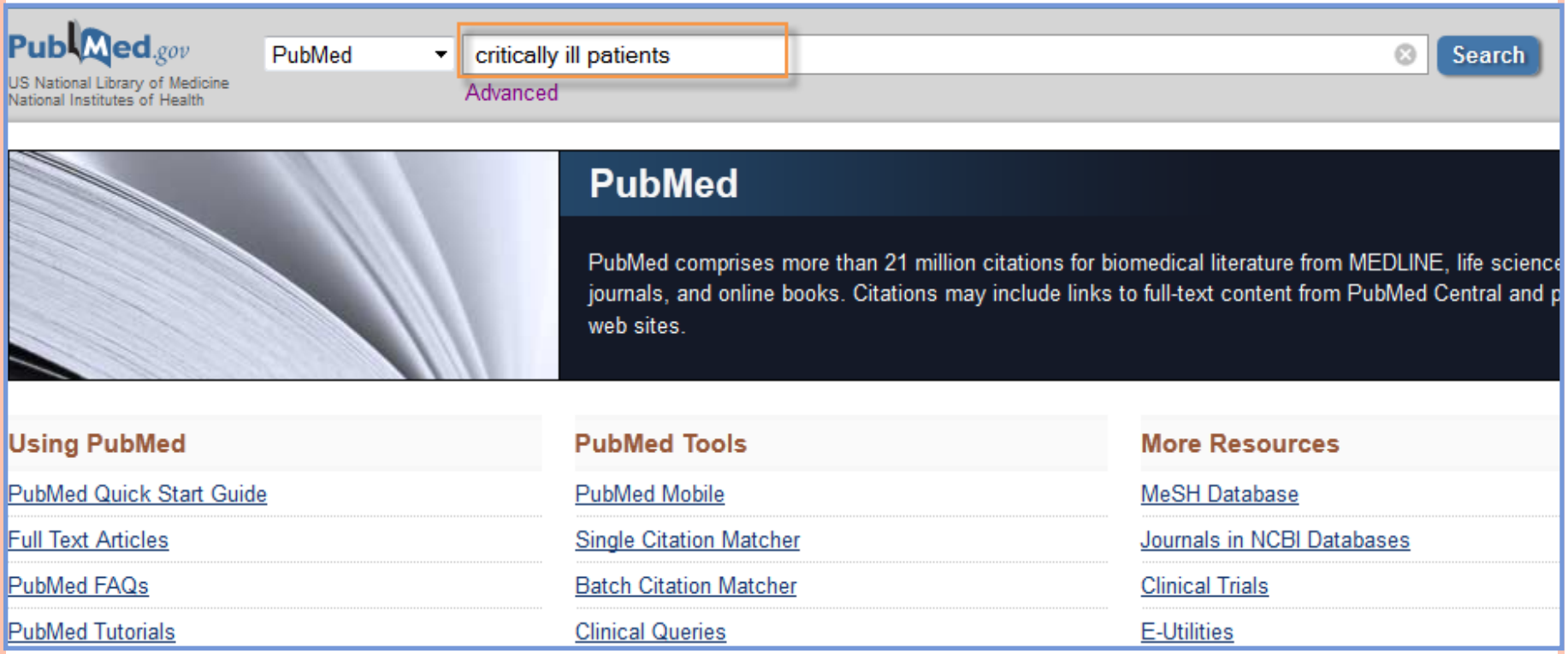
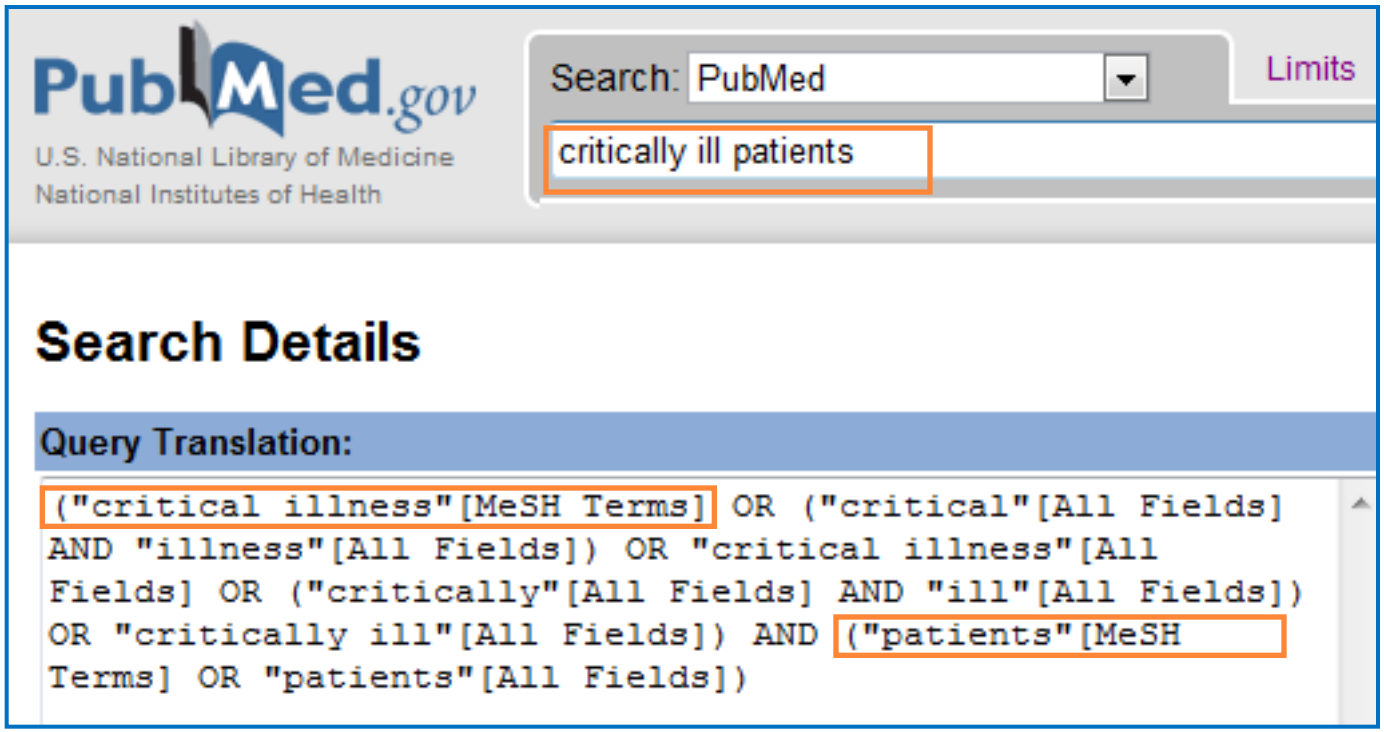


Fig. 8 Type your query into the search box, and click Search.

After searching for **critically ill patients**, check **Search Details** (Fig. 9) to see how PubMed translated ("mapped") your phrase and whether it found a relevant MeSH (Medical Subject Heading).

Fig. 9 Search Details for **critically ill patients**.

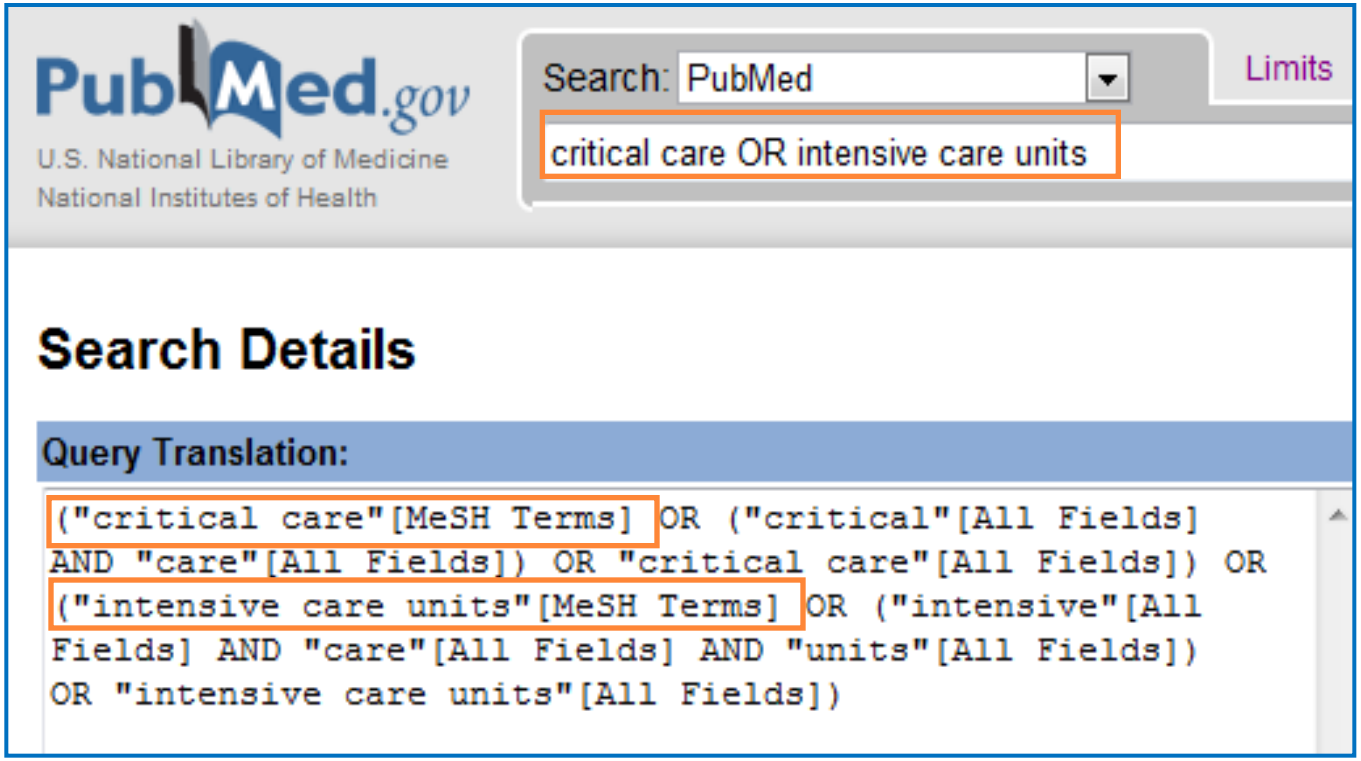


Notice that PubMed did **not** find an exact MeSH term for *critically ill patients*. But it did find the MeSH term, ***critical illness***, which it combined with the MeSH term, **patients**. This seems appropriate.

- There is often more than one way to get at a concept. Other ways to retrieve items related to **critically ill patients** might be to search for **critical care** (the type of care received) or **intensive care units** (the setting in which care is received).

- To increase the chances of retrieving relevant articles, search for **critical care OR intensive care units**. Check **Search Details** (Fig. 10) to see whether your search included relevant MeSH terms.
  - **Note**: The Boolean operators OR & AND should be capitalized.

Fig. 10 Search Details for **critical care OR intensive care units**.



In this case, the terms we used correspond to official MeSH terms. These MeSH were incorporated into the search by PubMed's automatic term mapping.

- **Remember:** When PubMed includes a MeSH term in a search, it automatically **explodes** the term to pick up narrower, more specific terms in the hierarchy of headings.
  - Example: the explosion of the MeSH, **Critical Care**, also picks up the MeSH, **Intensive Care**.
- From the **MeSH Database**, you can learn more about headings, see broader and narrower terms, and use advanced search features.
- To see whether specific types of intensive care units were picked up by the automatic explosion of the broader heading, we need to go to the **MeSH Database**.
  - From the main search screen in PubMed, change the drop-down menu next to the search box from PubMed to MeSH. Then click Search.
  - Search for MeSH terms that correspond to the concept, **intensive care units**.
  - Click on the broadest heading you find, which is **Intensive Care Units** (Fig. 11).

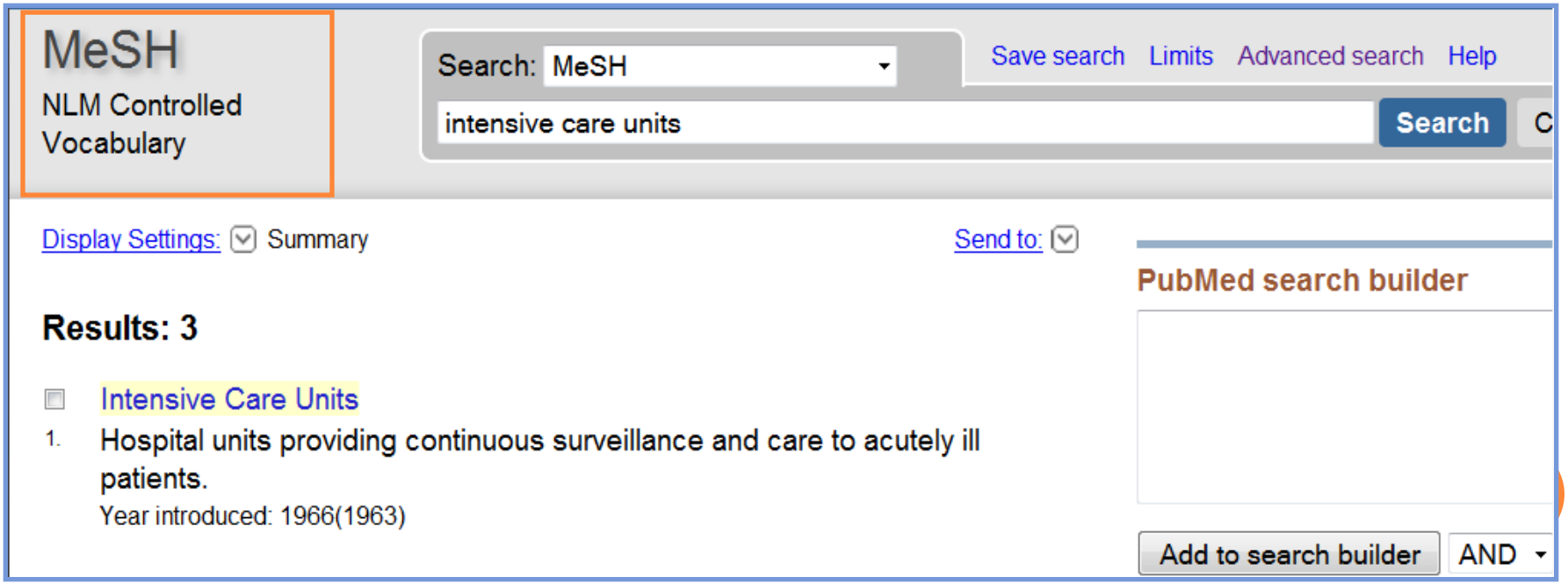
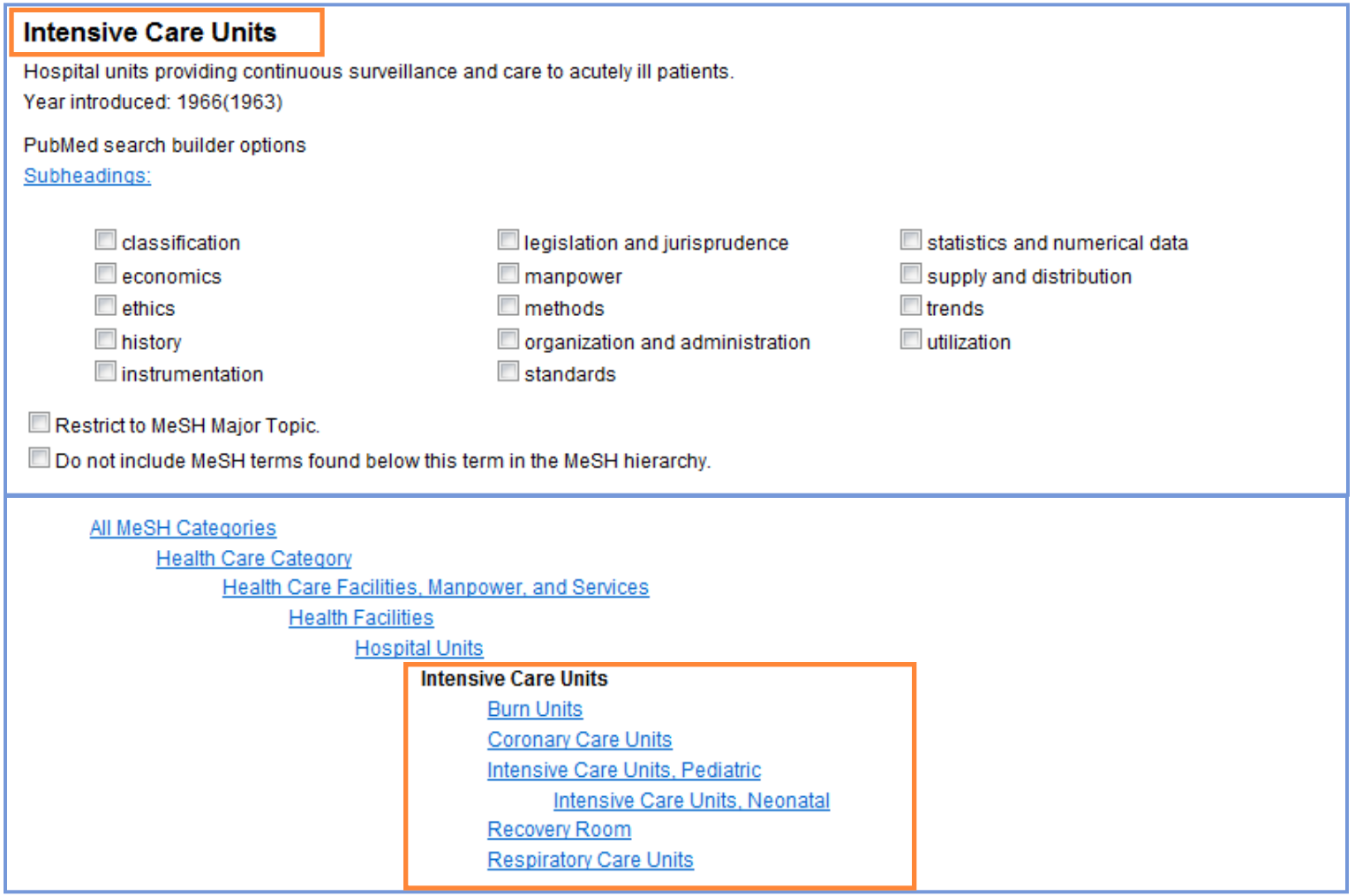


Fig. 11 Search results for **intensive care units** in the MeSH Database.

- After clicking on **Intensive Care Units** in the MeSH Database, you'll see more information about the term, including narrower terms picked up by automatic explosion (Fig. 12).
- So … when PubMed searches for this broad heading, it's also searching for articles about **Burn Units** OR **Coronary Care Units** OR **Intensive Care Units**, etc. Any of these headings could be present in retrieved citations (Fig. 12).

Fig. 12 MeSH term, **Intensive Care Units**.



Getting Out of MeSH & Returning to PubMed

When you're done exploring the MeSH Database and want to go back to PubMed, you can:

- Change the drop-down menu (next to the search box) from **MeSH** to **PubMed**. Make sure the search box is empty, and click Search.

OR

- Click on **PubMed** at the bottom of the page, under POPULAR (Fig. 13).

Fig. 13 To leave the MeSH database and return to PubMed, click on the **PubMed** link under POPULAR.

Let's get back to our PubMed search and merge the searches related to **critically ill patients**.

- Leave the MeSH Database and go to the **PubMed Advanced Search Builder** page. (The **Advanced** link is below the search box on the main page in PubMed.)
- Look under **History** for the searches we've already done.
- To combine these two search sets, type **#1 OR #2** into the **Builder**, and click **Search**. (The order doesn't matter.) We use **OR**, not AND, because we don't care which of these concepts appears in the final results. Combining similar concepts with **OR** ensures that overlapping references only appear once in the merged results.

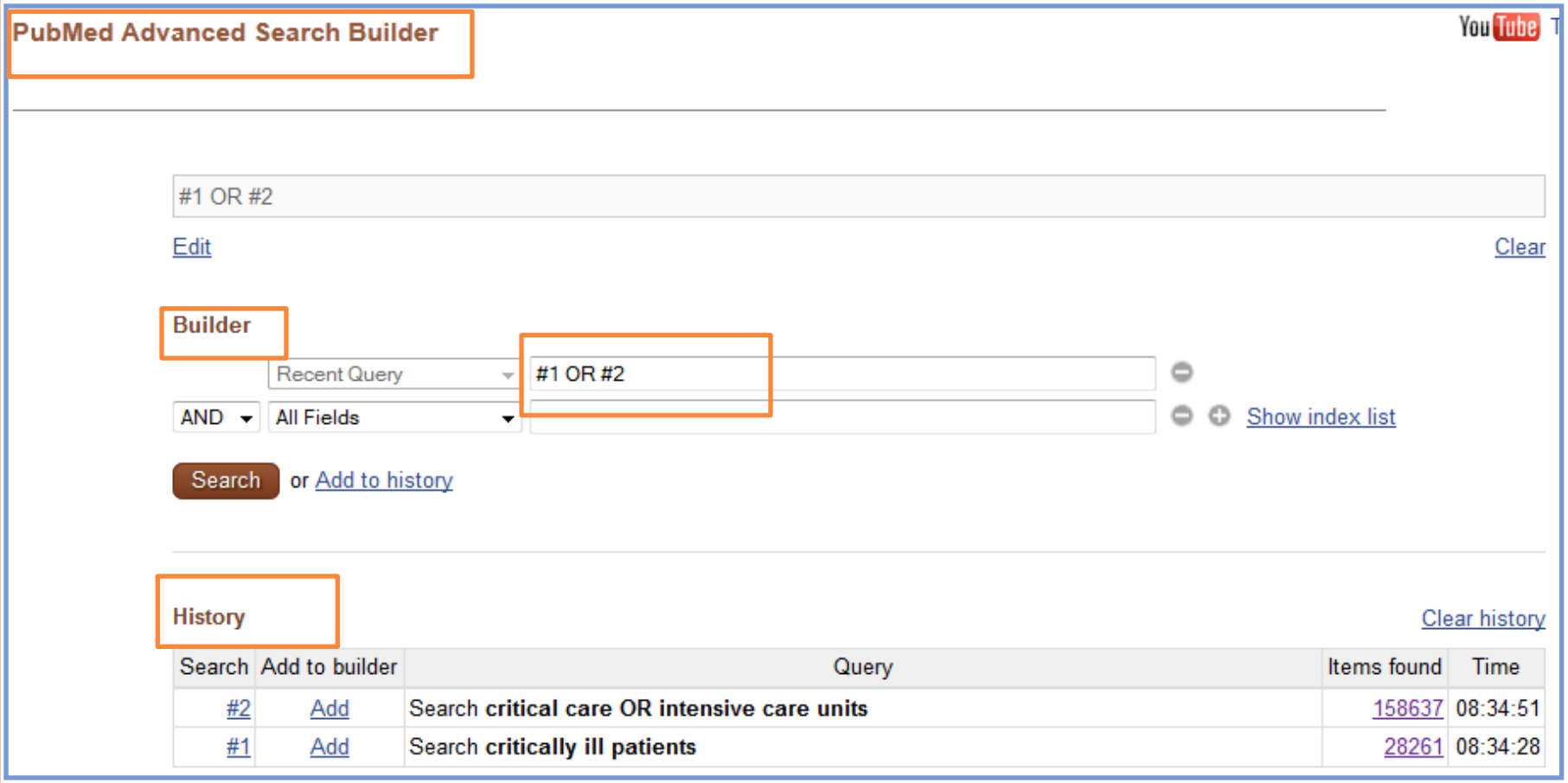
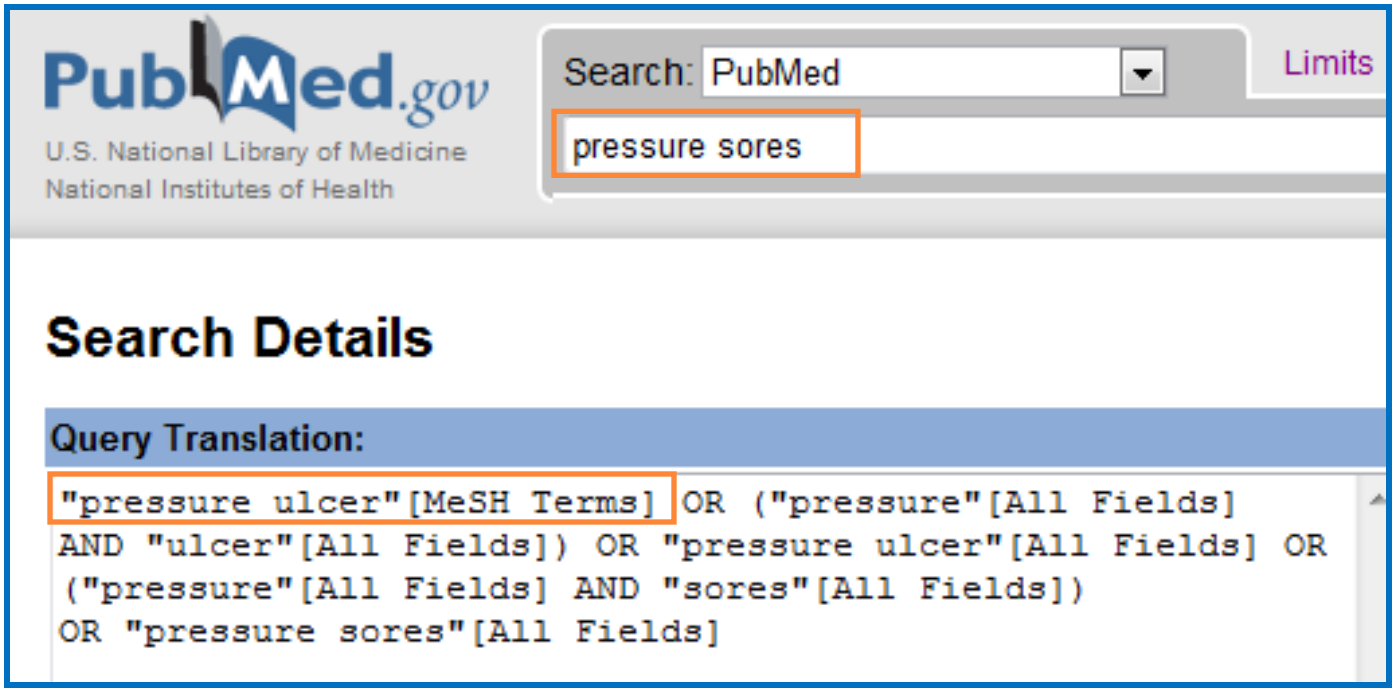


Fig. 14 PubMed **Advanced Search Builder** page: Combine search sets (under **History**) in the **Builder** using OR.

Our search questions have to do with **pressure sores** in **critically ill patients**.

- Following our PICO framework, there aren't any specific terms related to the **I** (Intervention) or **C** (Comparison) to include in our search.
- **Pressure sores** are the Outcome (**O**) of interest.
  - Search for **pressure sores**. Then check **Search Details** to see how PubMed interpreted your query (Fig. 15).

Fig. 15 Search Details for **pressure sores**.



PubMed translated our term into the official MeSH, **pressure ulcer.** It also searched in all fields (which includes title and abstract) for **pressure ulcer** OR **pressure sores**. This increases our chances of finding relevant articles.

- Let's combine our different concepts, **critically ill patients** (or similar) and **pressure sores** (pressure ulcers), to see what we get.
- Go to **Advanced Search Builder** and combine the relevant search sets using the Boolean operator **AND**. (We use **AND** because we want to make sure that **both** concepts are included in the articles we retrieve.)

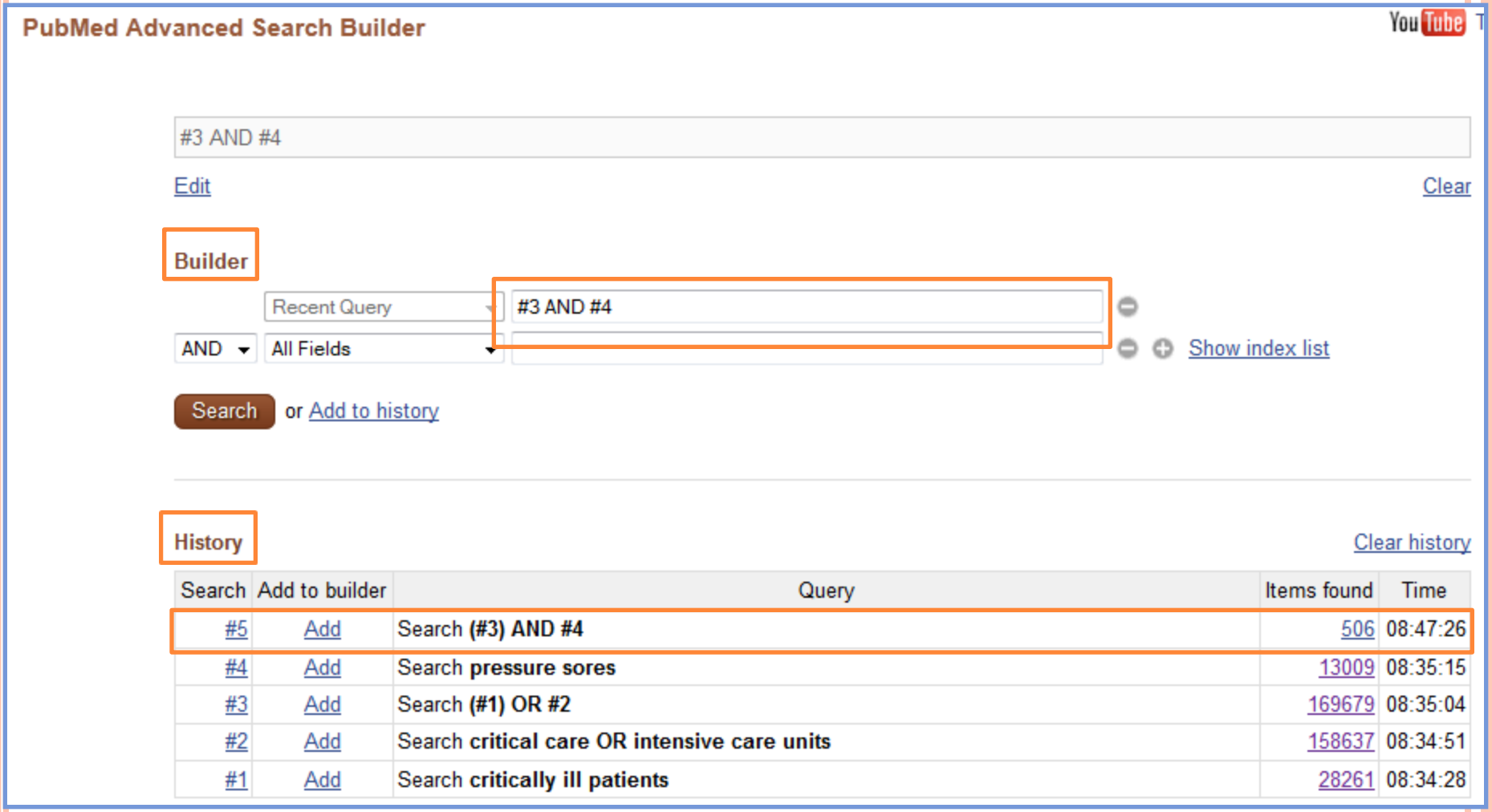
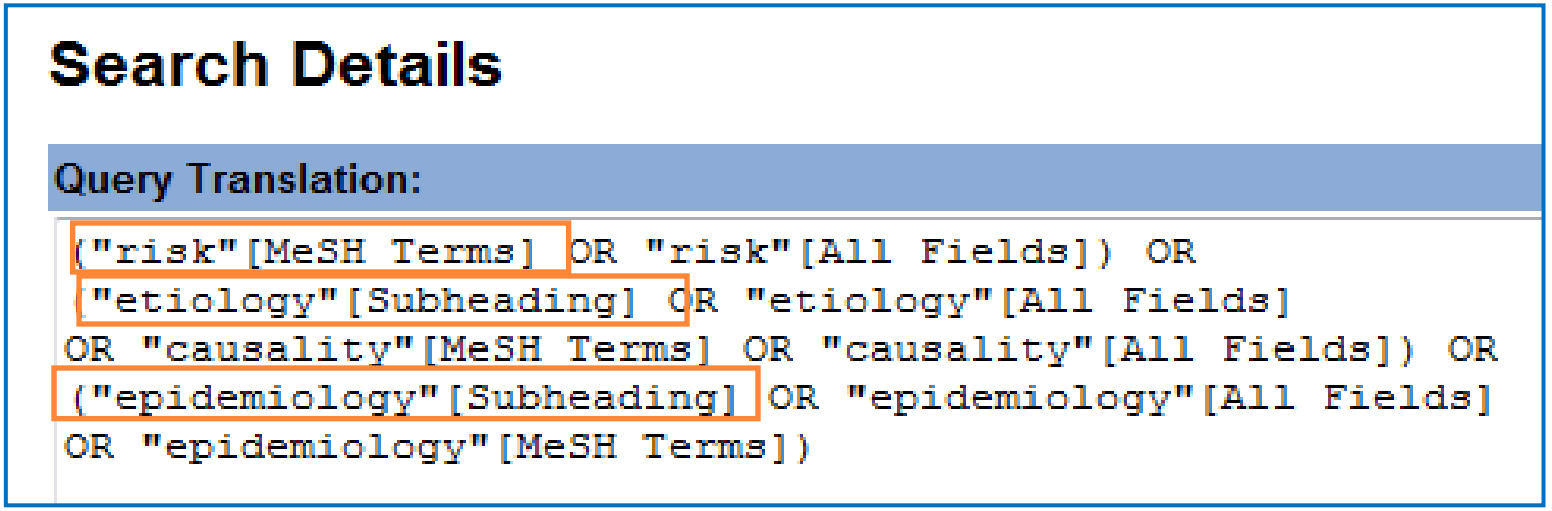


Fig. 16 Combine relevant search sets with AND. Search #5 (under **History**) displays the results of this search.

- An area of interest to us is factors that increase the risk of developing pressure sores.
- We could browse the 500+ articles we've retrieved, or we can do a more targeted search by adding in **risk**.
  - Other terms to consider are **etiology** (for causative factors) or **epidemiology** (for factors related to distribution and incidence of a condition).
- Search for the terms **risk OR etiology OR epidemiology**. Then check **Search Details** to see how PubMed interpreted your query.

Fig. 17 Search details for **risk OR etiology OR epidemiology**.



Our search finds the MeSH term, **risk**. (The automatic explosion of **risk** also picks up these narrower MeSH: **risk assessment**, **risk factors**, or **logistic models**.) Note that **etiology** and **epidemiology** have also been searched as **Subheadings**, which are special qualifying terms used with MeSH to focus on specific aspects of a topic.

- Let's go back to the **Advanced Search Builder** page and combine the **risk OR etiology OR epidemiology** search set with our previous results. Use the Boolean operator, **AND**.

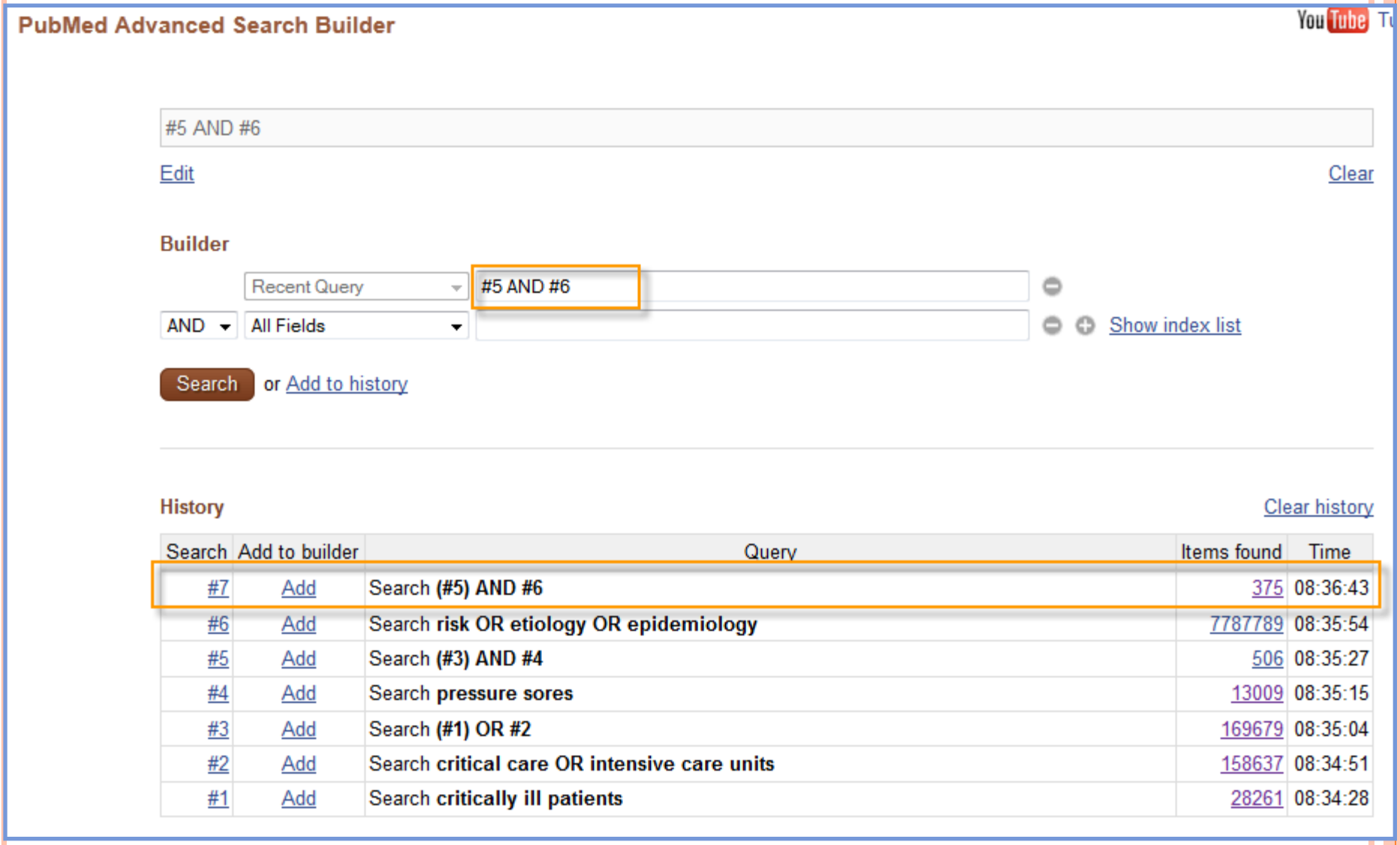


Fig. 18 Combine relevant search sets with AND. Search #7 (under **History**) displays the results of this search.

- Many articles may talk about risk factors associated with development of pressure ulcers. However, if we want evidence (quantitative data) to substantiate this, we need to look for clinical studies.
- A **Randomized Controlled Trial (RCT)** could supply this data. However, the most likely study design to provide evidence for a harm question is an observational study, preferably a **cohort study**.
- To find evidence from a cohort study, search for **cohort study**. **Search Details** reveals that *cohort study* maps to **cohort studies [MeSH Terms]**.

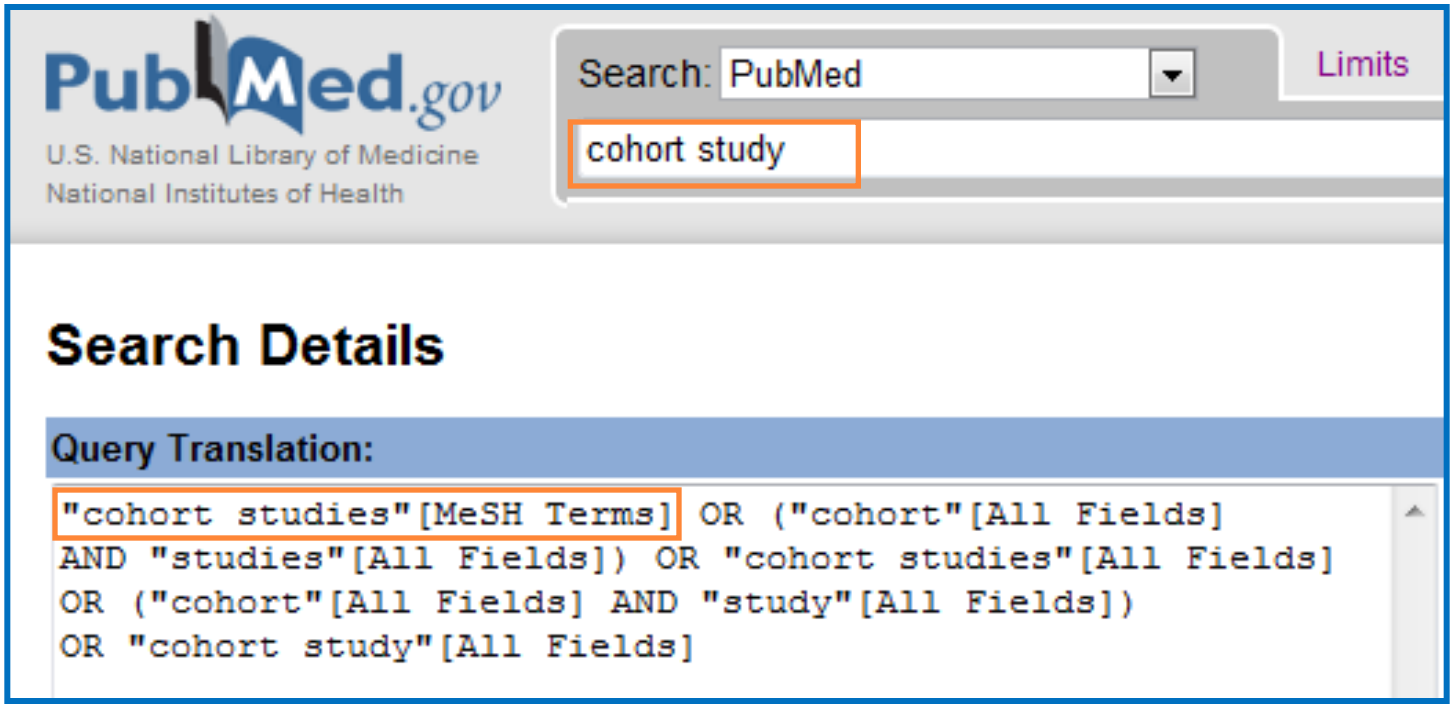


Fig. 19 Search Details for **cohort study**.

- It's important to know if there are narrower subject headings being picked up by the automatic explosion of the MeSH term, **Cohort Studies**.
- Let's go into the MeSH Database and find out. There we find the following headings indented under **Cohort Studies:**
  - **Follow-Up Studies**, **Longitudinal Studies**, **Prospective Studies**, & **Retrospective Studies**.
  - Because of automatic explosion, any of these headings will be retrieved by our search for **Cohort Studies**.

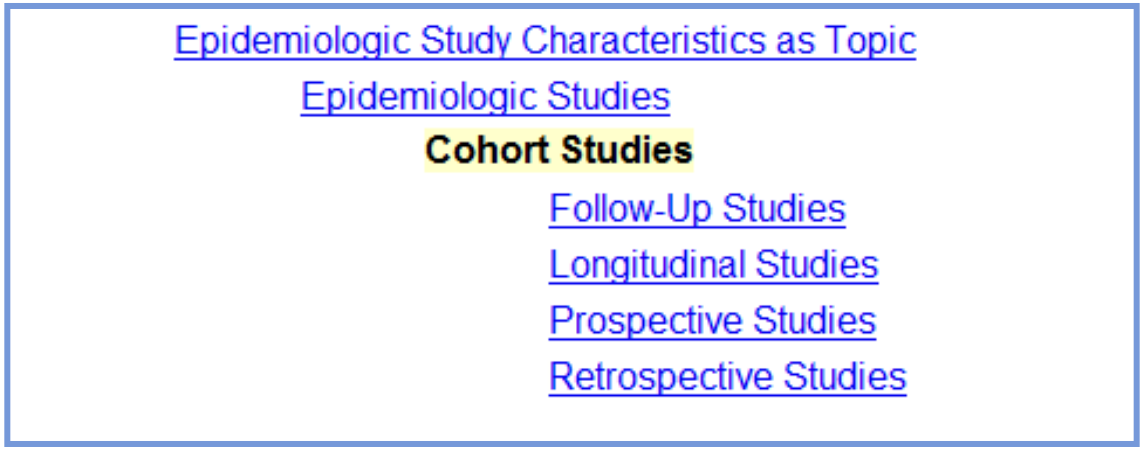


Fig. 20 From the MeSH Database: hierarchy of terms for **Cohort Studies**.

Note: Many cohort studies are prospective studies. However, there are also retrospective (aka "historical") cohort studies. Be sure to read the description of a study's methods and look at all the headings used to describe it to determine whether it's a prospective or retrospective study.

For the next step in our search, we'll combine the **cohort study** set with previous results by going to the **Advanced Search Builder** page and using **AND**.

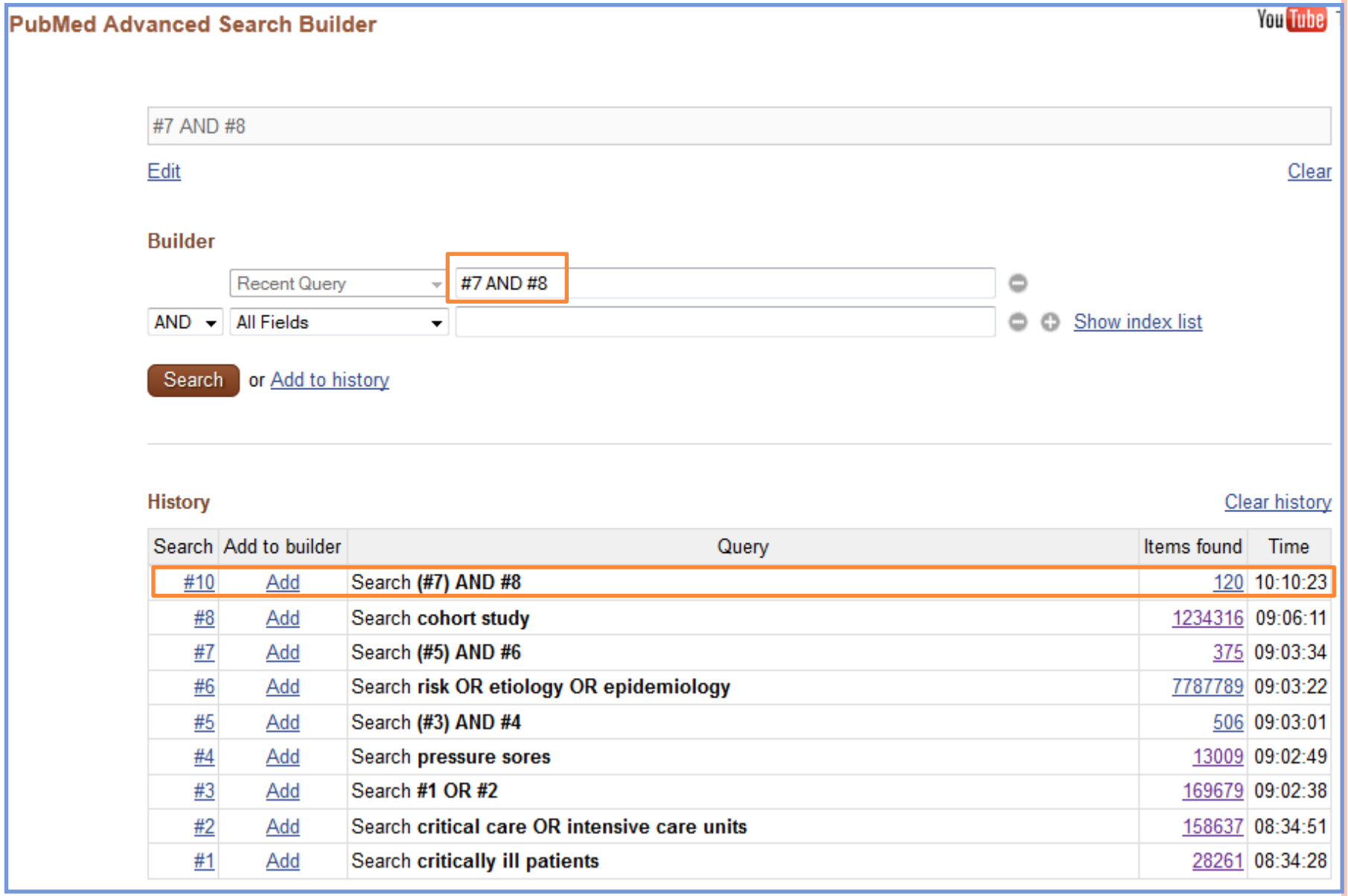


Fig. 21 Combine **cohort study** with previous search results using AND. Under **History**, #10 displays the results of this search.

- Example of a study retrieved by our search (Figs. 22 and 23).
- Note the presence of many of our search terms in the abstract and MeSH.

J Clin Nurs. 2010 Feb;19(3-4):414-21.

Risk factors related to the development of pressure ulcers in the critical care setting.

Kaitani T, Tokunaga K, Matsui N, Sanada H.

Department of Gerontological Nursing/Wound Care Management, Graduate School of Medicine, University of Tokyo, Tokyo, Japan. kaitanit-tky@umin.ac.jp

Abstract

AIM: This study identified risk factors for pressure ulcer development early in the admission stage to determine what appropriate interventions might be conducted early in the admission stage to decrease the risk of pressure ulcer development.

BACKGROUND: Among patients who develop pressure ulcers, 8-40% of them occur in a critical care setting. Therefore, the development of pressure ulcers is a common problem.

DESIGN: Prospective cohort study.

Fig. 22 Note the presence of **risk**, **critical care** and **cohort study** in the article abstract. (Abstract abbreviated.)

To see MeSH and other indexing terms, click on the **+** next to **Publication Types, MeSH Terms.** After opening, the **+** changes to a **–** (as shown here).

– Publication Types, MeSH Terms

Publication Types

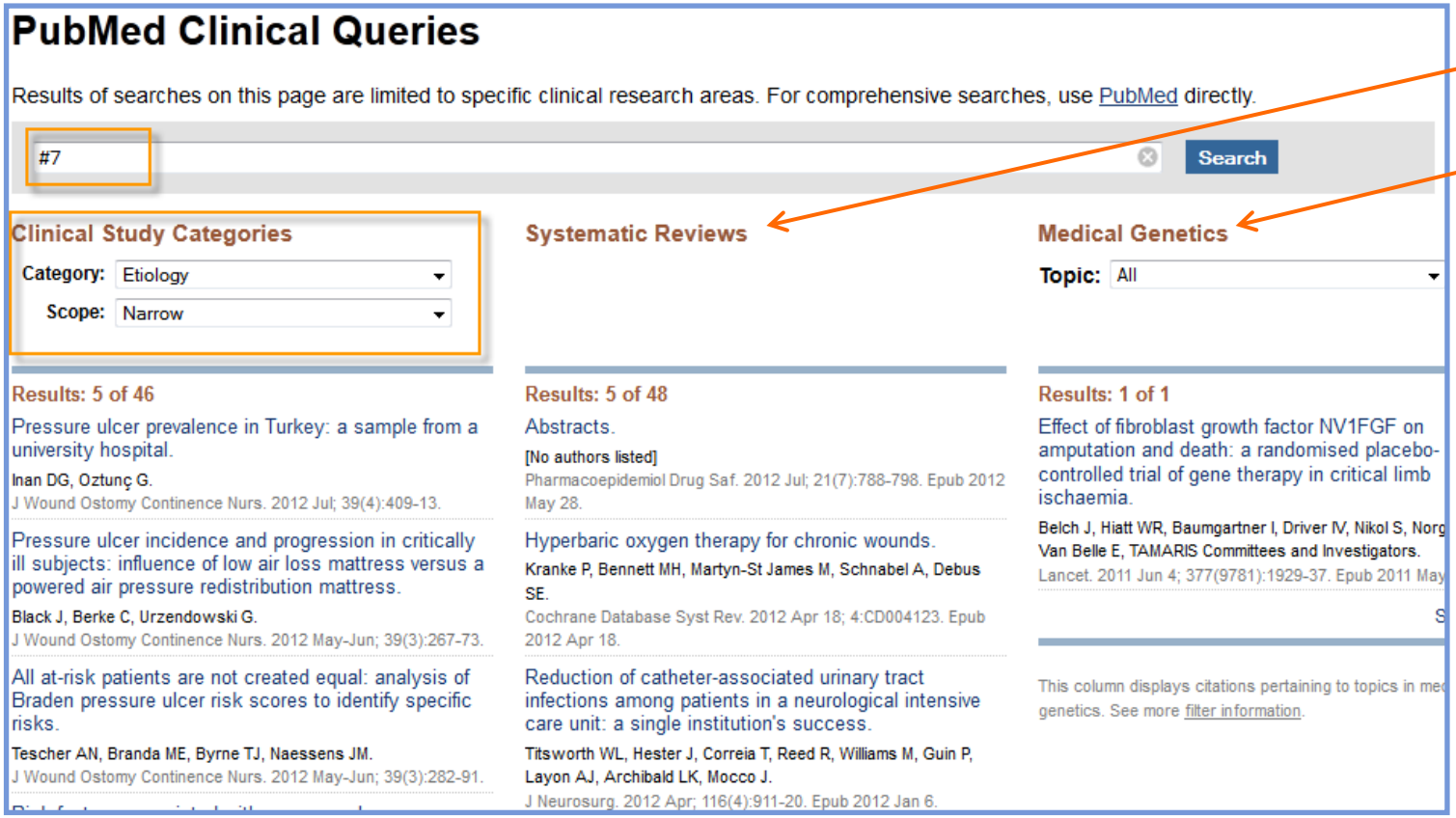
Research Support, Non-U.S. Gov't

MeSH Terms

Aged
Cohort Studies
Critical Care*
Humans
Incidence
Japan/epidemiology
Middle Aged
Pressure Ulcer/epidemiology*
Pressure Ulcer/nursing
Pressure Ulcer/prevention & control
Risk Factors

Fig. 23 MeSH Terms/ subheadings used to describe the content of the above article.

- You can also find evidence related to etiology/harm questions by using **Clinical Queries** (rather than including **cohort study** as part of your search).
- To access these, click on **More Resources** at the top of the **Advanced Search Builder** page. Choose **Clinical Queries** from the drop-down menu.
- On the **Clinical Queries** page, type in the **Search #** that you want to "filter", and click search. (Refer to your **History** on the **Advanced Search Builder** page to find the Search #.)
- Choose **Etiology** as the **Category** and **Narrow** as the **Scope**.



In addition to the Clinical Study Categories, PubMed automat-ically searches for Systematic Reviews and items related to Medical Genetics.

Fig. 24 PubMed **Clinical Queries** page using the **Etiology Narrow** filter.

To view the search strategies used to develop Clinical Queries, click here.

- Another study design related to harm is a **case-control study**. (***Note:*** This study type is a lower level of evidence than a cohort study.)
- In our example, we could search for **case control study** and combine those results with our earlier results from Search #7. Search Details would show that **case control study** mapped us to the MeSH, **case-control studies**. A MeSH Database search would reveal that the automatic explosion of **Case-Control Studies** also picks up the narrower MeSH term, **Retrospective Studies**.

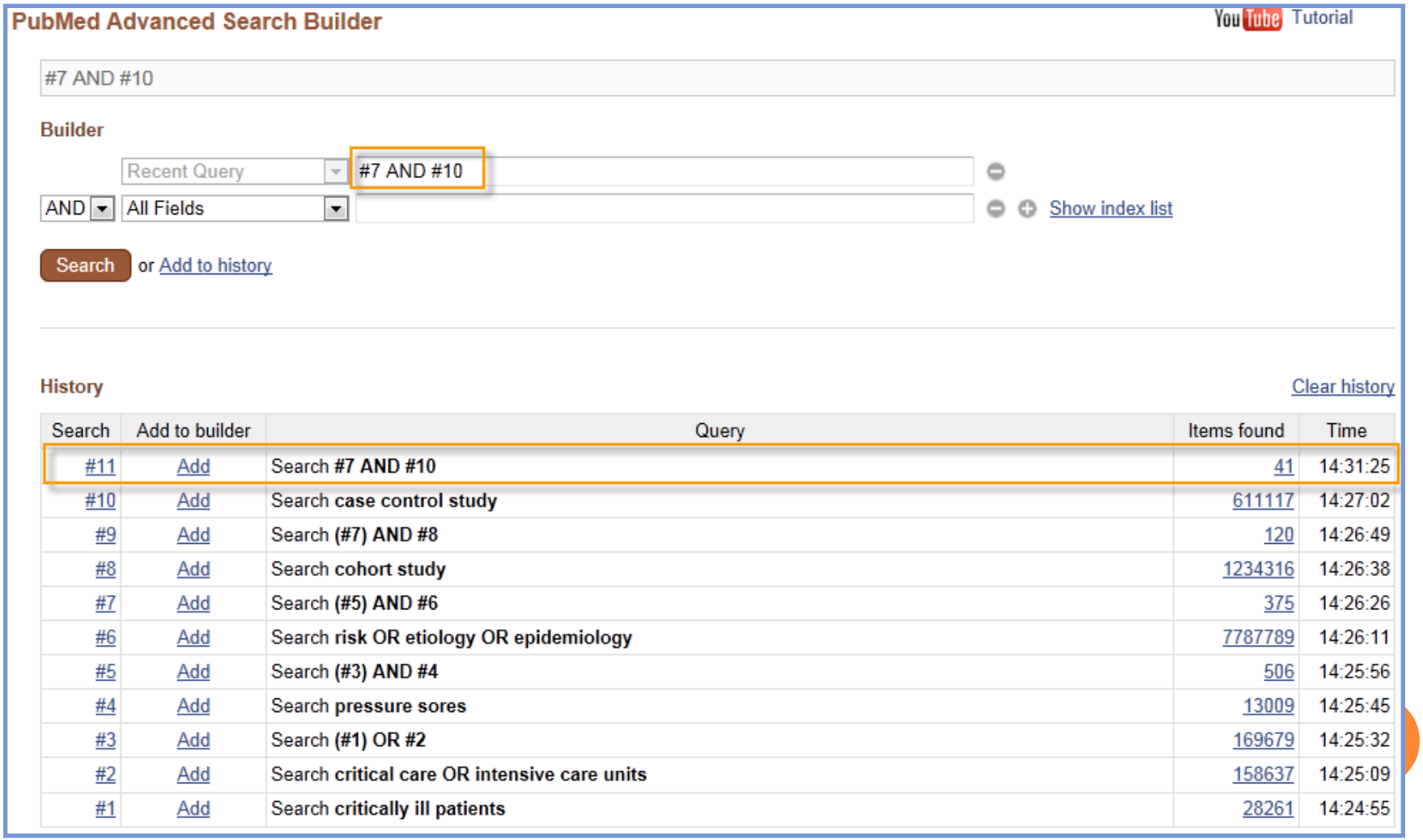
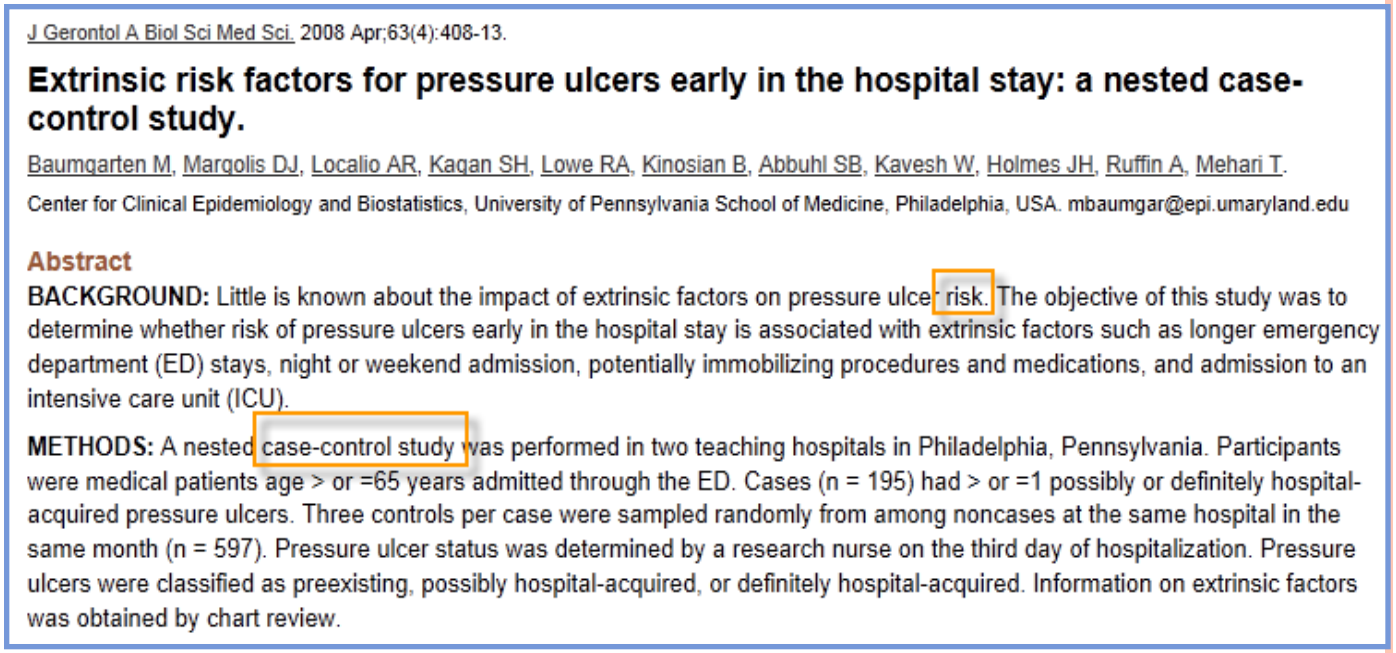


Fig. 25 Search for **case control study**. Combine those results with Search #7. Search #11 displays the final results.

Fig. 26
Example of a study retrieved by this search. Note the presence of several of our search terms in the abstract and MeSH. (Abstract abbreviated.)



J Gerontol A Biol Sci Med Sci. 2008 Apr;63(4):408-13.

Extrinsic risk factors for pressure ulcers early in the hospital stay: a nested case-control study.

Baumgarten M, Margolis DJ, Localio AR, Kagan SH, Lowe RA, Kinosian B, Abbuhl SB, Kavesh W, Holmes JH, Ruffin A, Mehari T.

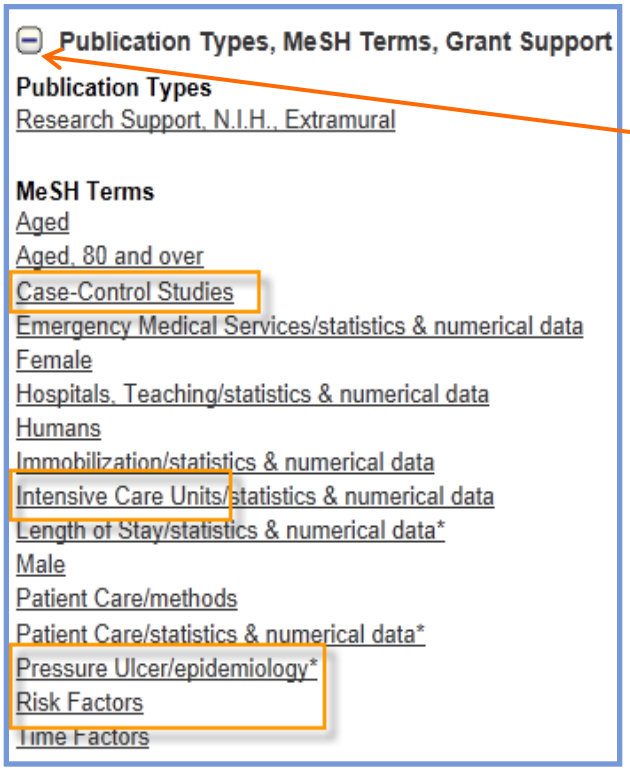
Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania School of Medicine, Philadelphia, USA. mbaumgar@epi.umaryland.edu

Abstract

BACKGROUND: Little is known about the impact of extrinsic factors on pressure ulcer risk. The objective of this study was to determine whether risk of pressure ulcers early in the hospital stay is associated with extrinsic factors such as longer emergency department (ED) stays, night or weekend admission, potentially immobilizing procedures and medications, and admission to an intensive care unit (ICU).

METHODS: A nested case-control study was performed in two teaching hospitals in Philadelphia, Pennsylvania. Participants were medical patients age > or =65 years admitted through the ED. Cases (n = 195) had > or =1 possibly or definitely hospital-acquired pressure ulcers. Three controls per case were sampled randomly from among noncases at the same hospital in the same month (n = 597). Pressure ulcer status was determined by a research nurse on the third day of hospitalization. Pressure ulcers were classified as preexisting, possibly hospital-acquired, or definitely hospital-acquired. Information on extrinsic factors was obtained by chart review.

Fig. 27 MeSH Terms/subheadings used to describe the content of the above article.



Publication Types, MeSH Terms, Grant Support

Publication Types

Research Support, N.I.H., Extramural

MeSH Terms

Aged
Aged, 80 and over
Case-Control Studies
Emergency Medical Services/statistics & numerical data
Female
Hospitals, Teaching/statistics & numerical data
Humans
Immobilization/statistics & numerical data
Intensive Care Units/statistics & numerical data
Length of Stay/statistics & numerical data*
Male
Patient Care/methods
Patient Care/statistics & numerical data*
Pressure Ulcer/epidemiology*
Risk Factors
Time Factors

To see MeSH and other indexing terms, click on the **+** next to **Publication Types, MeSH Terms.** After opening, the **+** changes to a **–** (as shown here).

Let's move on to the second question we wanted to address in our original scenario:

In critically ill patients, what are effective interventions for preventing pressure sores?

- This is both a prevention and therapy question, focusing on effectiveness of preventive therapies or interventions.

P = critically ill patients (or related ideas)
I = no *specific* intervention to search for
C = none specified
O = prevention of pressure sores

It's a good idea to determine the type of question we're asking. This will help us determine the study type we need.

Type of question = prevention/therapy
Type of study = randomized controlled trial (RCT)*

Note: While RCTs are usually considered the optimal study design for evaluating the efficacy of therapies, they aren't the only study design relevant to a question like ours. Observational studies may also contribute to the evidence base for this question.

- This search will be identical to our earlier search up through **Search #5**. But now we're interested in interventions that will **prevent** pressure ulcers.
- Search for **prevention**. (***Note:*** Looking at **Search Details** would reveal that **prevention** automatically maps to the subheading, **prevention and control**.)
- Now combine those results (**Search #6** below) with our results from **#5**, using AND.

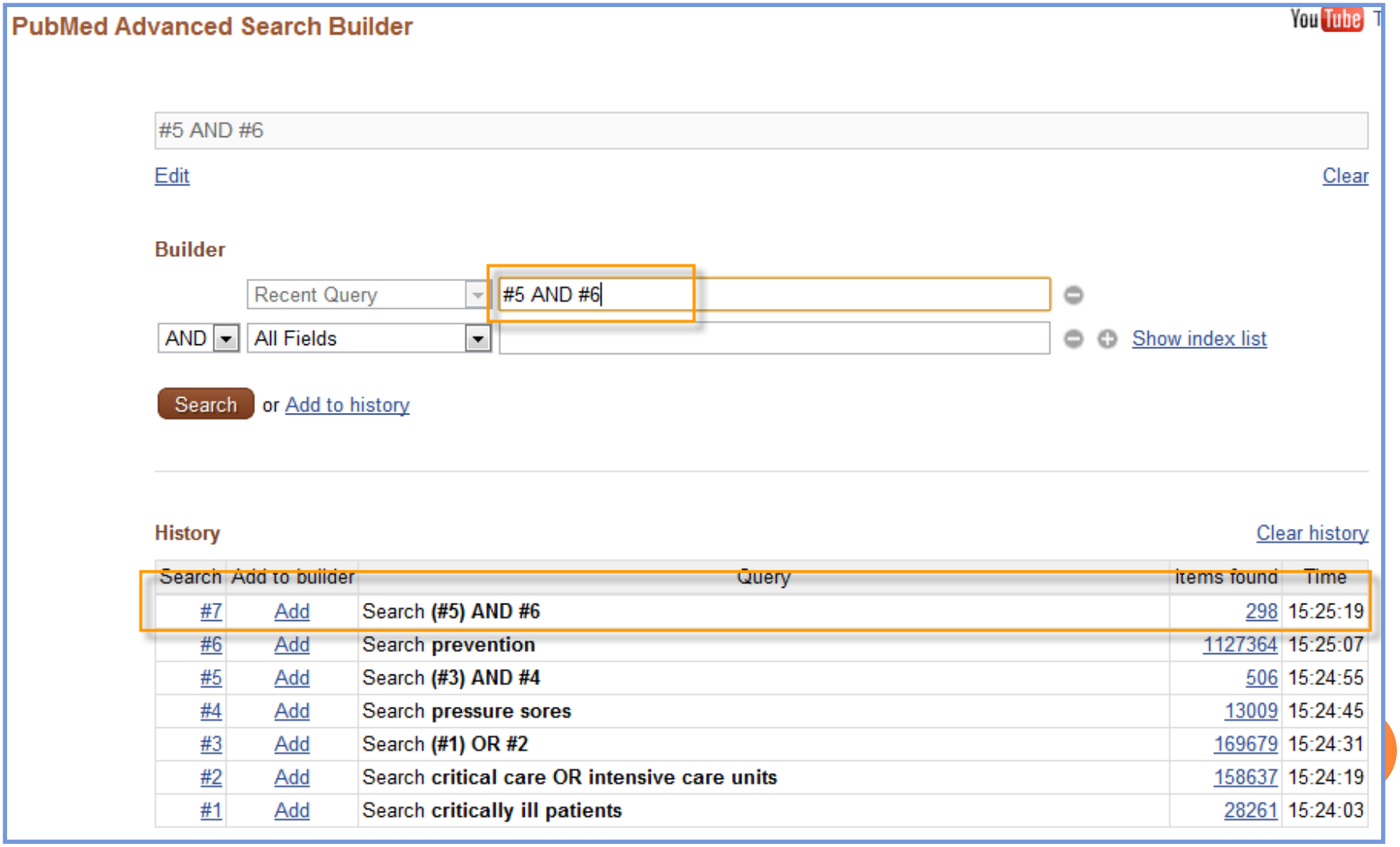


Fig. 28 Search for **prevention**. Combine those results with Search #5. Search #7 displays the final results of this search.

- Now let's find evidence from a **randomized controlled trial** that has studied interventions for preventing pressure ulcers.
- It isn't necessary to search for *interventions.* By looking for RCTs, our results will likely be studies about interventions or therapies.
- Search for **randomized controlled trial**. Check **Search Details** to see how PubMed translated this search. (Other ways to retrieve RCTs will be discussed later.)

Fig. 29 Search Details for **randomized controlled trial**.

When you search for **randomized controlled trial**, PubMed finds articles:

- with **randomized controlled trial** as the Publication Type;
- that have the MeSH term **randomized controlled trials as topic** (which means they are about RCTs but may not be reports of actual RCTs); and
- that have either the American (randomized) or British (randomised) spelling of the phrase in any field, including the title and abstract.

- One advantage of this method is that it will help you retrieve newer "in process" articles that haven't yet been assigned MeSH terms and publication types that have **randomized controlled trial** in the title or abstract.

- You should not search for the acronym RCT. It will not map you to the official MeSH terms!

Here is our strategy after combining the **randomized controlled trial** set (**#8**) with our previous results (**#7**), using AND.

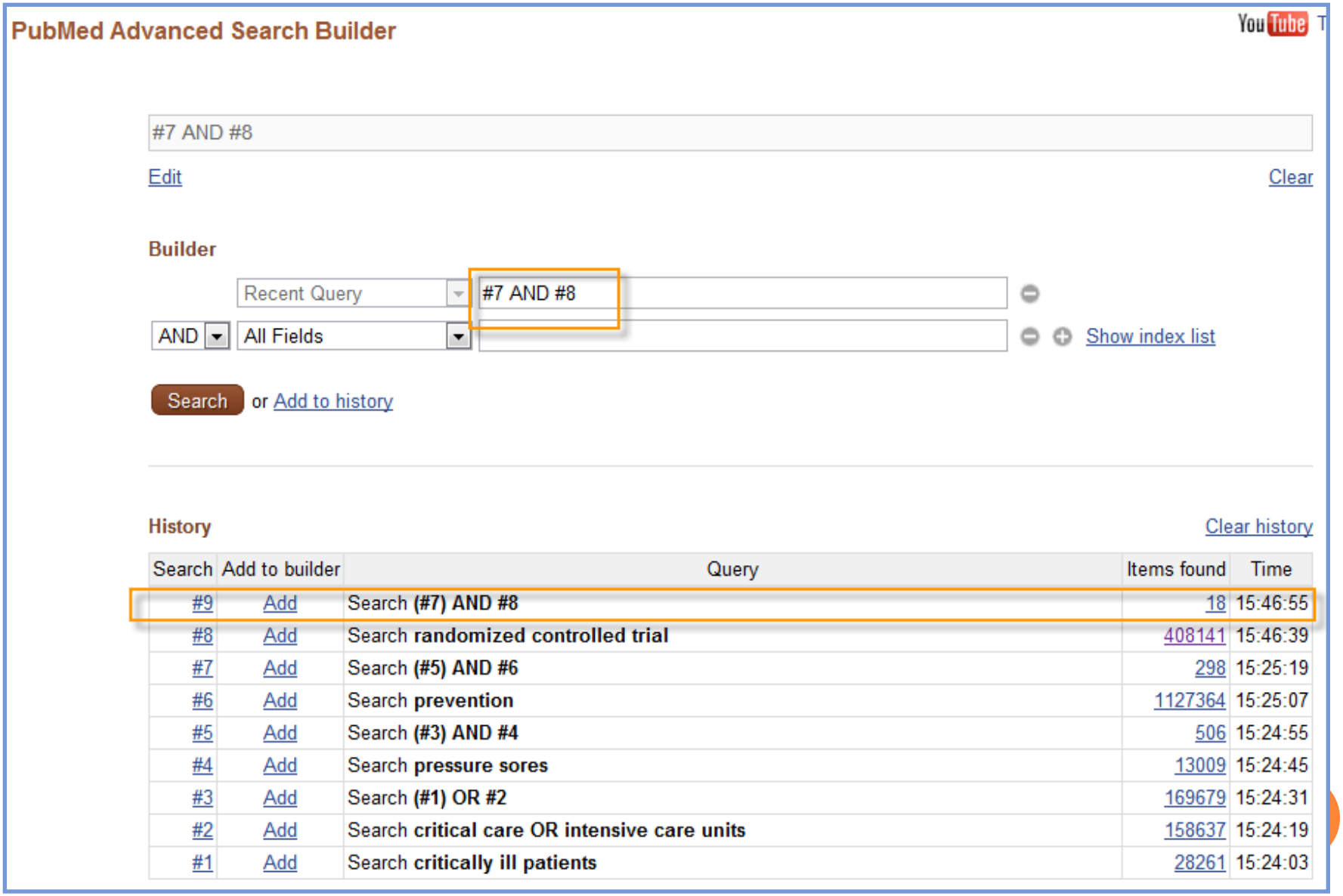


Fig. 30 Search for **randomized controlled trial**. Combine those results with Search #7. Search #9 displays the final results.

Fig. 31 Example of a study retrieved by this search.

Anaesthesia. 2005 Apr;60(4):395-9.

Pressure ulcer prevention in intensive care - a randomised control trial of two pressure-relieving devices.

Theaker C, Kuper M, Soni N.

Intensive Care Unit, Chelsea & Westminster Hospital, 369 Fulham Road, London, SW10 9NH, UK. cbtheaker@hotmail.com

Abstract

Pressure sores are a potential complication of intensive care. Modern methods of pressure sore prevention centre around the use of pressure-relieving devices. Few studies exist that confirm the effectiveness of these devices. This study evaluates the effectiveness of two devices, the Hill-Rom Duo mattress and the KCI TheraPulse. High-risk patients were randomly assigned to receive one of two devices. We excluded those patients who had pressure sores upon admission. Those patients that did develop a pressure sore had their wound digitally photographed and graded by two independent tissue viability nurses. Sixty-two patients were included (30 TheraPulse, 32 Duo. Nine developed a pressure sore (6 Duo, 3 TheraPulse). No statistical differences between the two devices could be found. The longer a patient was nursed on a device, the greater the risk of pressure sore development. Despite the use of these devices, pressure sores can still develop in the Intensive Care patient population.

Note the presence of **Randomized Controlled Trial** as a **Publication Type** and use of the subheading **prevention & control** with the MeSH Term **Pressure Ulcer.**

Publication Types, MeSH Terms

Publication Types

Clinical Trial

Randomized Controlled Trial

MeSH Terms

Adult
Aged
Aged, 80 and over
Analysis of Variance
Beds*
Equipment Design
Female
Humans
Intensive Care/methods*
Male
Middle Aged
Pressure Ulcer/prevention & control*
Prospective Studies
Time Factors
Treatment Outcome

Fig. 32 MeSH Terms and Publication Types for the above article.

Other Ways to Find Randomized Controlled Trials (RCTs)

In addition to ANDing **randomized controlled trial** into your search strategy, there are several other ways to locate RCTs.

1. **Use Filters.** On the left side of the Search Results screen, choose **Randomized Controlled Trial** under **Article Types**.
    - **Note:** This will restrict your retrieval to fully indexed articles, and you will not retrieve newer **in process** records!

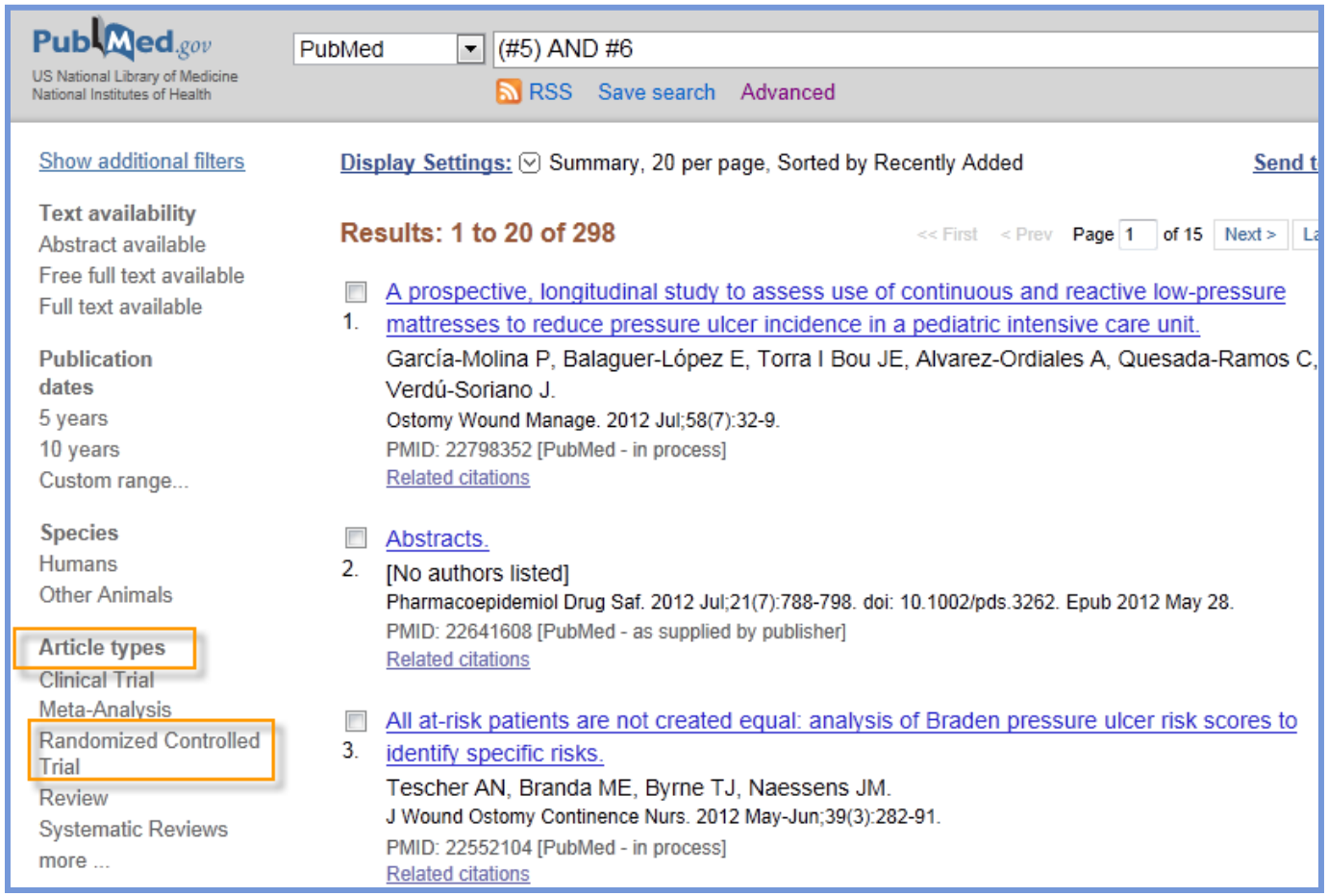
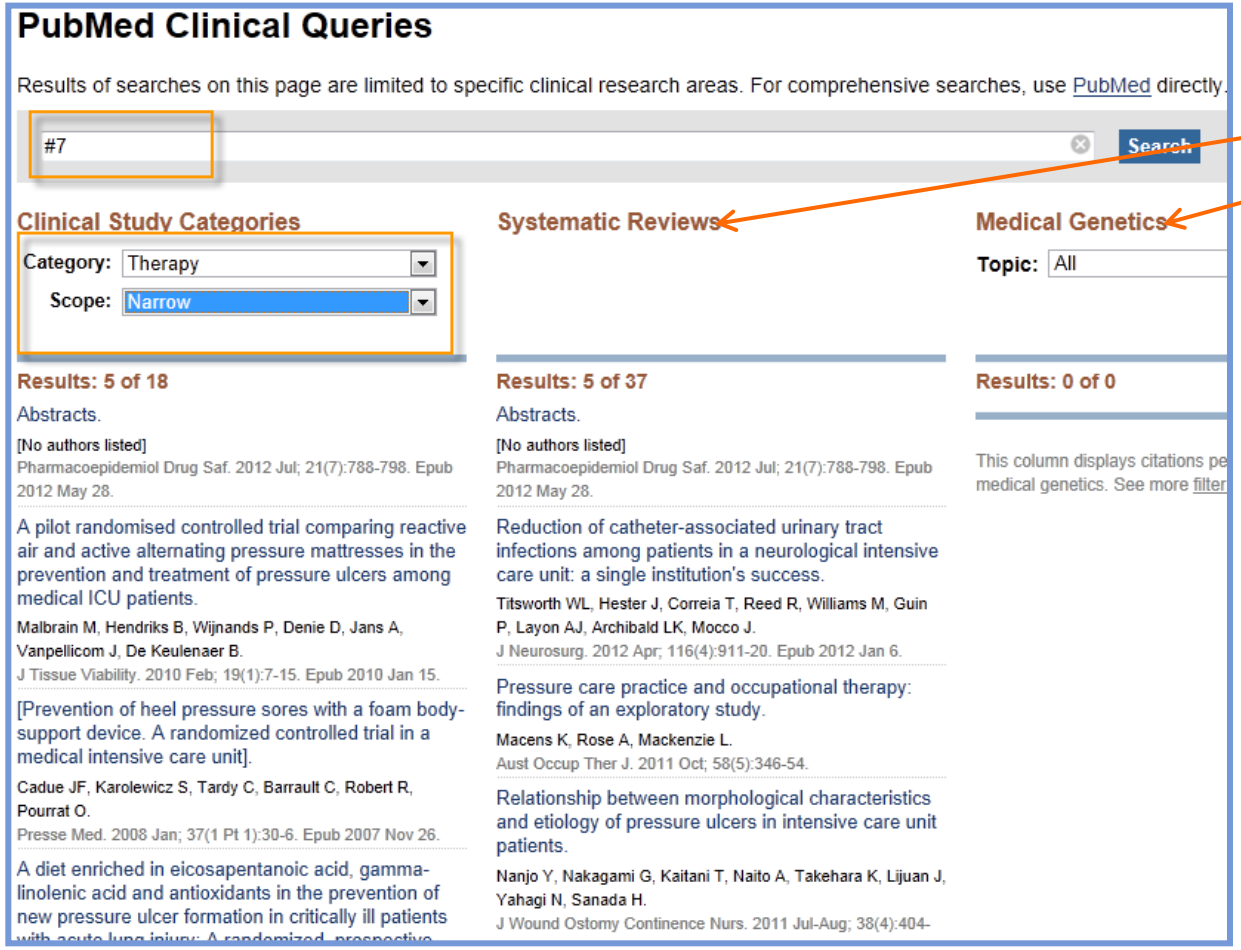


Fig. 33 Choose the **Randomized Controlled Trial** filter, which can be found under **Article types**.

2. **Use Clinical Queries.** To access these, click on **More Resources** at the top of the **Advanced Search Builder** page. Choose **Clinical Queries** from the drop-down menu.
   - On the **Clinical Queries** page, type in the **Search #** that you want to "filter", and click search. (Refer to your **History** on the **Advanced Search Builder** page to find the Search #.)
   - Choose the **Therapy** Category and **Narrow** Scope.
   - The Therapy/Narrow filter looks for **randomized controlled trial** as a publication type or the words **randomized AND controlled AND trial** in the title or abstract of an article. This will help you find newer **in process** records.



In addition to the Clinical Study Categories, PubMed automatically searches for Systematic Reviews and items related to Medical Genetics.

Fig. 34 Choose the **Therapy/Narrow** filter to get at Randomized Controlled Trials.

3. Use the Therapy/Treatment Filter on Duke's version of PubMed.

- Under **Filter your results** on the right side of the Search Results page, click on the **Therapy/ Treatment** filter. (This is the same as using the Therapy/Narrow Clinical Query, but faster.)
- If you wish, you can set up this and other filters using your personal **MyNCBI** account. For more information about using MyNCBI, click here.

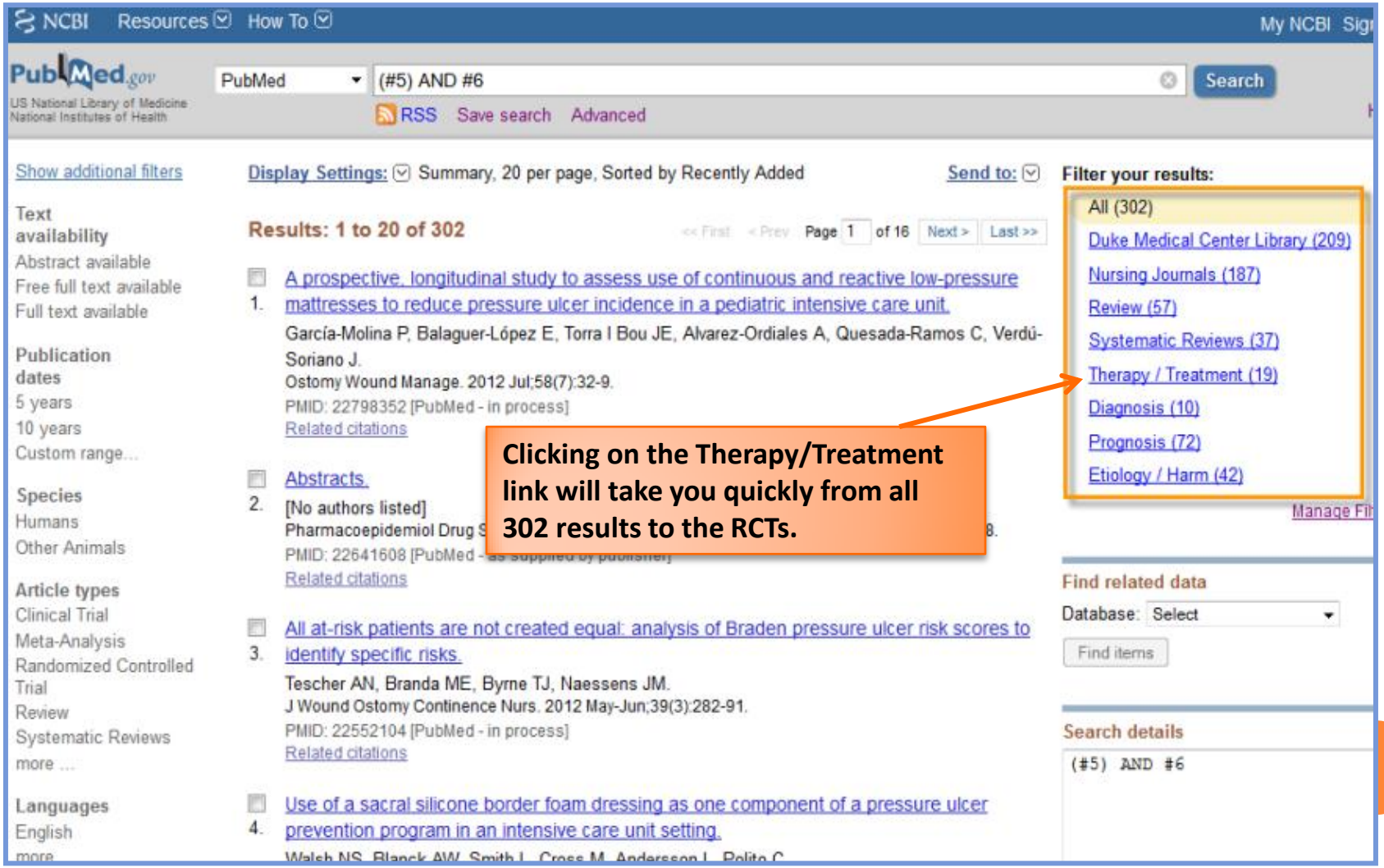


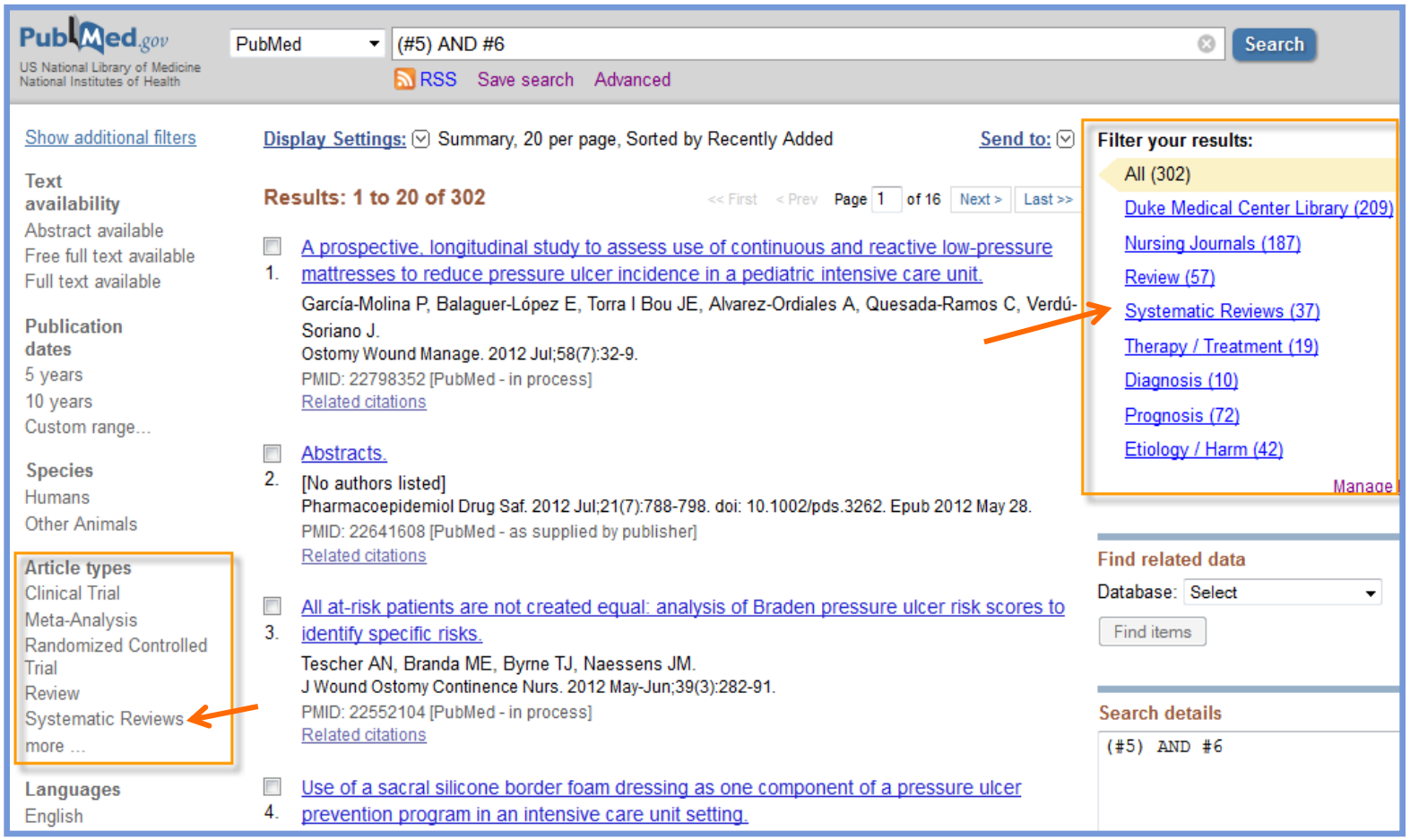
Fig. 35 Choose the **Therapy/Treatment** filter to get at Randomized Controlled Trials.

Finding Systematic Reviews

- In cases where there has been a fairly large body of research on a topic, you may want to look for a **systematic review** that provides a synthesis of the evidence.

To find systematic reviews in PubMed:

- Use the Filters on the left side of the Search Results screen. Under **Article types**, click on **Systematic Reviews**.
- On the right side of the Search Results screen, under **Filter your results**, click on **Systematic Reviews**.
- Systematic Reviews are also automatically displayed when you use **Clinical Queries**.



For information about the search strategy used to create the Systematic Reviews subset, click here.

Fig. 36 Use the **Systematic Reviews** filter under **Article Types** or **Filter Your Results** to get at this subset of articles.

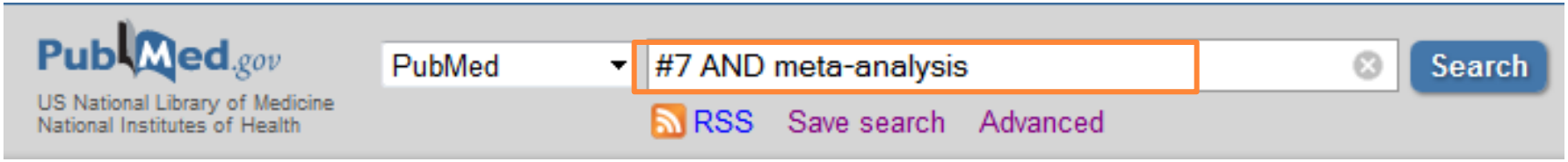
Finding Meta-Analyses and Practice Guidelines

Using the Systematic Reviews filter will also get you meta-analyses and evidence-based practice guidelines. However, you may want to look for these separately.

For **meta-analyses**:

- Combine the search term, **meta-analysis,** with previous search results using the Boolean operator, AND.
  - This will look for **“meta-analysis”[Publication Type]** OR **"meta-analysis as topic"[MeSH Terms]** OR **"meta-analysis"[All Fields]**. It will help you retrieve newer **in process** records.
- ***Note:*** This will retrieve some items that talk *about* meta-analyses without actually *being* meta-analyses.

Fig. 37 Combine previous search results (#7) with **meta-analysis** to retrieve articles of this type.



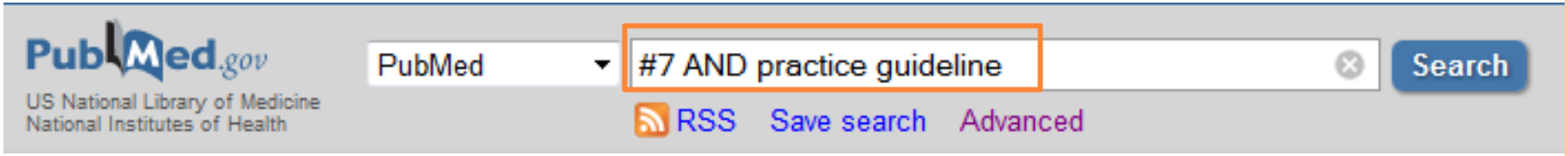
OR…

- On the **Search Results** screen, choose **Meta-Analysis** under **Article types**.
  - This will find fully indexed articles that are actual meta-analyses. However, it will not retrieve newer **in process** records.

For Practice Guidelines

- Add the term, **practice guideline**, to your previous search results using AND.
  - This will search for **"practice guideline"[Publication Type]** OR **"practice guidelines as topic"[MeSH Terms]** OR **"practice guideline"[All Fields]**.
  - It will help you find newer **in process** records. Be aware that this approach can retrieve articles that talk about how guidelines were used or the need for guidelines, in addition to actual practice guidelines.

Fig. 38 Combine previous search results (#7) with **practice guideline** to retrieve articles of this type.



OR…

- On the Search Results screen, choose **Practice Guideline** (found under **Article types**).
  - This will find fully indexed articles that are *actual* practice guidelines. However, you will not retrieve newer **in process** records.
  - ***Note:*** You may first need to add **Practice Guideline** as an option. You can do this by clicking on **more… ;** then select **Practice Guideline** from the list, and click on **Show**.

- **Keep in mind:** Guidelines issued by professional organizations often address broad topics. For instance, if you don't find guidelines for preventing pressure ulcers in critically ill patients, you might look for guidelines on pressure ulcer prevention in general.

Getting to Articles

- PubMed contains article citations, but not complete articles. Some full-text online articles are accessible for free, though most are available only to subscribing institutions.
- That's why it's so important to use **Duke's version of PubMed**, which includes the **DUMCL Online**, **DUMCL Stacks** & **Get it @ Duke** buttons (shown below).
- If Duke does not have access to a journal in electronic or paper format, Duke users may order the article (for a small fee) through Interlibrary Loan. For more information about requesting a book or journal article, click **here**.

Indicates online availability of the full article. Click the button to get to the article.

Indicates that DUMCL owns the journal in paper format, either in the Library or off-site.

Gives information about availability of the item in all formats for all Duke libraries. May sometimes provide online access to articles that don't have the DUMCL Online button. For journals not at Duke, the Interlibrary Loan option will be offered.

The End!

This concludes our tutorial on finding the evidence in PubMed. We've looked at how to locate the evidence from randomized controlled trials, cohort studies, and case-control studies, as well as syntheses of the evidence in the form of systematic reviews, meta-analyses, and practice guidelines.

A personal **MyNCBI account** can be a very useful tool for PubMed searchers. In addition to adding filters, you can save and rerun search strategies, set up email alerts for new references on your topic, and save and share references in collections. Click **here** for additional information about MyNCBI.

Librarians are also available to assist Duke users in a number of ways. For more information about getting help, visit the **Ask a Librarian** page.

For more information about PubMed, Clinical Queries, and Levels of Evidence, continue to the slides following this one.

Good luck, and we hope you'll enjoy searching for the best evidence to incorporate into your practice!