Developing an effective search strategy in academic databases

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Conducting a literature search

- Introduction
- Developing a search strategy
- Literature sources
- Electronic searches
- PICO method for searching articles

What is a Literature Review?

- One of the first and most essential steps in any scientific research

- It’s not just a summary of other people's work — it’s a **critical and analytical evaluation**. Think of it as a detective, looking for clues in the literature to define the best direction for your research.

Why Is a Search Strategy Essential for a Literature Review?

- A Literature Review is not just about reading a few papers. It’s a systematic and purposeful process to find, evaluate, and analyze existing knowledge on a specific topic.
- To perform this step effectively, we need a well-designed search strategy because:

✓ Scientific databases contain a vast amount of information ;without a clear plan, we can easily get lost.

✓ Choosing the right keywords, using logical operators (like AND, OR, NOT), and applying filters (such as date or study type) help us find exactly the articles that are most relevant to our research.

✓ A structured strategy ensures we collect comprehensive, reliable, and high-quality data, making our literature review more scientific, coherent, and credible.

The Importance of Scientific Literature Search

- After choosing a research topic, the next crucial step is to gather reliable and valid sources.
- A well-planned literature search helps define the research direction, avoids duplication, and leads to new and creative ideas.
- It’s an essential investment for high-quality research.

Key Objectives of a Literature Search

A proper literature search helps to:

- ✓ Find up-to-date and credible information
- ✓ Understand key concepts and terminology
- ✓ Identify similar studies
- ✓ Compare conflicting results
- ✓ Discover research gaps
- ✓ Design better hypotheses and methods
- ✓ Gather references for papers or theses

Definition of literature search

- A literature search is a methodical search for all of the literature published on a topic.
- Before carrying out your search you will need to identify your research question and plan your search strategy.

Developing a search strategy

1. Define your **topic** –write down your research question.
2. Identify what **type** of literature you are looking for e.g. primary research in journal articles, systematic reviews, research reports, books, etc.
3. Identify **sources** to search databases, Google Scholar, individual organisations'websites, library catalogues etc.

4. Develop **keywords/search** terms that are logical and relevant to your search

5. Think about the **scope** of the topic/search restrictions –anything related to your topic that you wish to exclude

6. Design a means of **recording** what you find (keep records)

Literature sources

- Scientific databases (references to journal articles)
- Peer-reviewed journals
- Theses and dissertations
- Books

Electronic searching

- Your search strategy can be used in all databases and Internet search engines, **with tweaks** as required.
- Each database operates **slightly differently,** and it takes time to learn how to use them effectively. However, the following general principles apply (Next slide):

General principles for electronic searching

- Synonyms (e.g. “young people” / adolescents)
- Differences in European and American terminology (e.g. Accident and Emergency / Emergency Room)
- Differences in spelling (e.g. anaemia / anemia)
- Old and new terminology (e.g. mongolism / down syndrome)
- Lay and medical terminology (e.g. stroke / cerebrovascular accident)
- Acronyms (e.g. AIDS)
- Consulting with an expert to identify more keywords

Thesaurus / subject headings

- Some databases are **indexed** using a **thesaurus / subject headings**. A thesaurus reconciles different spellings, terminology, plurals, etc., allowing all articles on the same topic to be indexed under the same subject headings, regardless of how subject is described in the text. Cochrane Library, PubMed and Medline all use **MeSH (Medical Subject Headings).**
- Correct use of a thesaurus or subject headings improves the **accuracy** of your results and is essential to an effective search.
- Ideally, you should use a combination of free text searching and subject heading searches.

Search techniques

- **Boolean operators:** AND/NOT/OR
  - **AND** –allows you to narrow your search by combining words using AND, e.g. “hospital managers” AND upskilling
  - **OR** –lets you broaden your search to include similar or other information connected by OR, e.g. retina OR eye;
  - **NOT** –allows you to exclude specific information from the search, e.g. anxiety NOT depression

Phrase searching

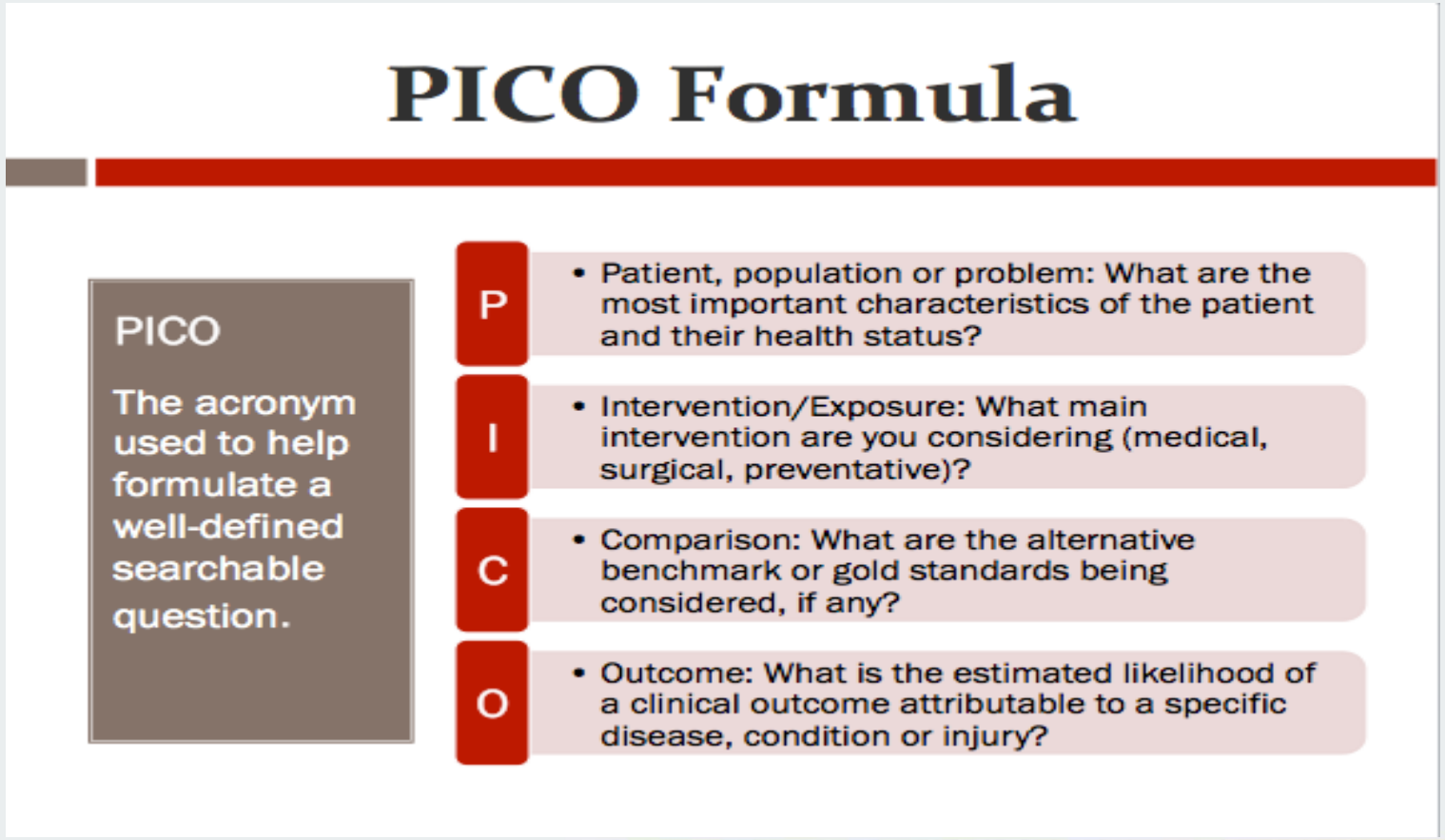
- **Phrase searching** will help when you are looking for a particular phrase or title. Use quotation marks.
- Cardiovascular AND Disease
- “ cardiovascular disease “
- Cardiovascular OR disease

Limiters

- You can also use **limiters** to refine your search –limit by date, gender, language, articles that include an abstract, etc.

- e.g.: The effect of air pollution on stomach cancer in female children in the last 5 years

PICO framework



❖ Case Scenario:

A 55-year-old female has just come into the hospital. She has been diagnosed with high blood pressure. She exercises and eats right. You need to decide with your team whether she needs to be on a beta-blocker or an ACE inhibitor.

- ✓ **P**: 55-year-old female with high blood pressure
- ✓ **I**: beta-blocker
- ✓ **C**: ace-inhibitor
- ✓ O: blood pressure control

❖ Case Scenario:

School-based healthy eating programs and physical exercise to reduce BMI in children:

a systematic review

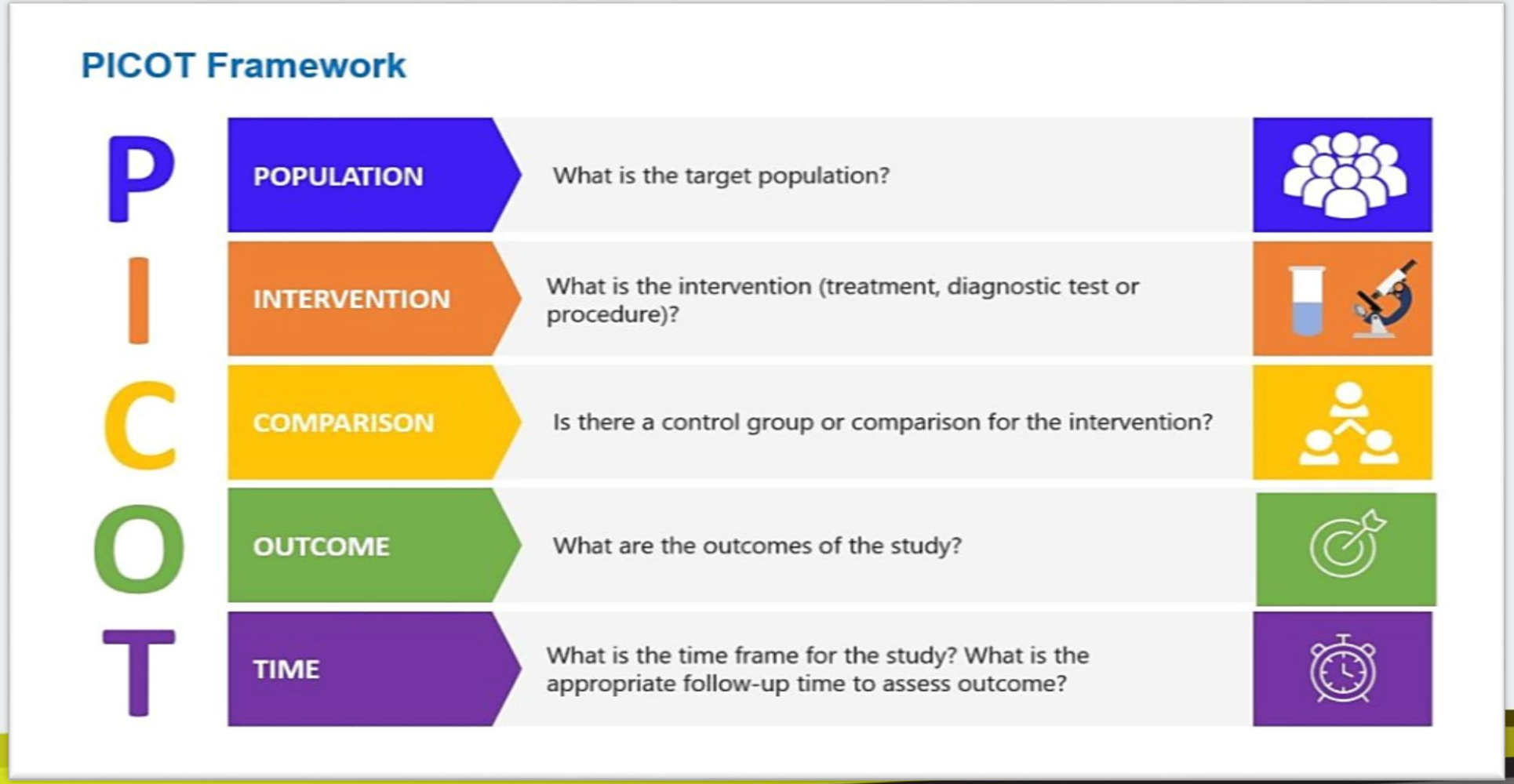
- ✓ **P**: children
- ✓ **I**: healthy eating programs
- ✓ **C**: physical exercise
- ✓ O: reduce BMI

❖ Case Sce

- A GP with age those in her practice to to persuade her colleagues icularly on the effectivenes on be used as an effective sn

Population	Teenagers who smoke
Intervention	Brief intervention
Comparison	None
Outcomes	Smoking cessation

PICOT framework



❖ Case Scenario:

- Your fe ancer. Her friend ve been a factor. while she doesn't posure to second- o develop breast posure to second hand smoke?

P- female non smokers w/ daily second hand smoke exposure

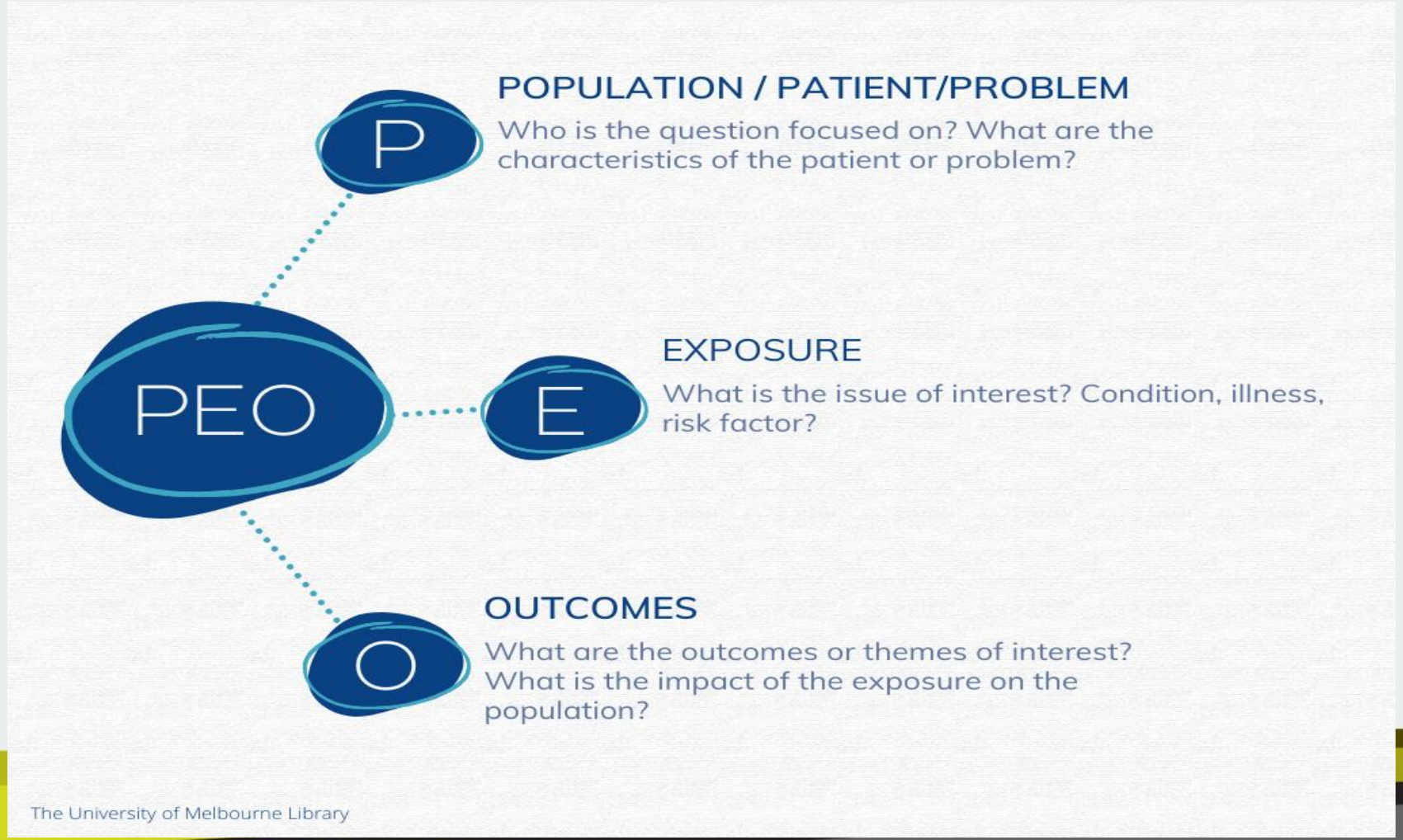
I-

C- female non smokers w/o daily smoke exposure

O- develop breast cancer

T- over ten years

PEO framework



❖ Case Scenario:

In infants, is there a relationship between exposure to soy milk and the development of peanut allergy?

- ✓ **P**: infants
- ✓ **E**: soy milk
- ✓ **O**: peanut allergy

PLAN YOUR SEARCH STRATEGY

- **Plan a search strategy by:**

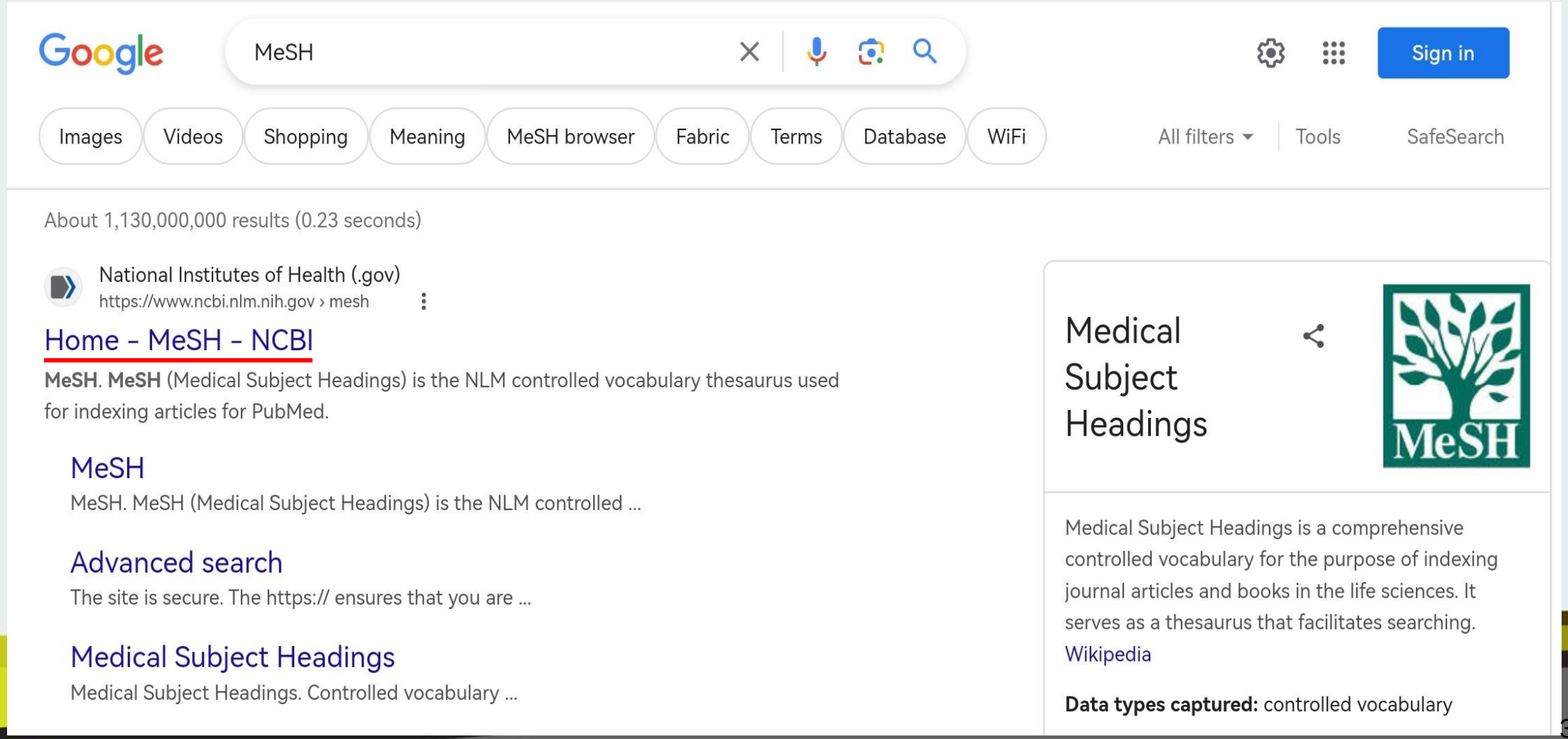
  1. Determining which database(s) to search
  2. Identifying the major elements of your question
  3. Translating natural language terms to subject descriptors, MeSH Headings, or synonyms

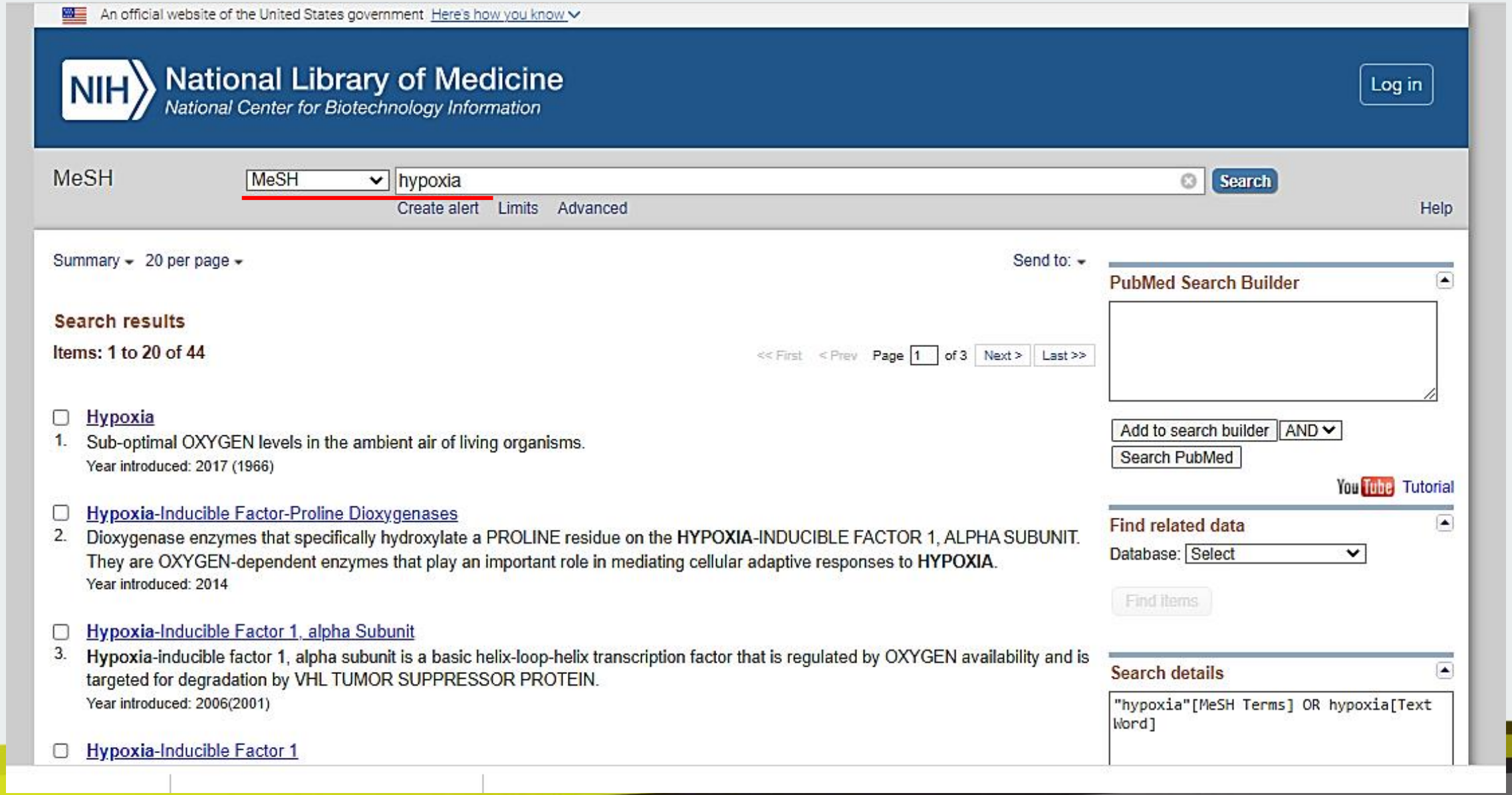
PICO elements with synonyms

PICO ELEMENTS	KEYWORDS	SEARCH TERMS	SEARCH STRATEGIES
P (**P**atient or **P**opulation)	Patients undergoing abdominal surgery	Abdominal Surgery	Abdominal surgery **OR** Surgery **OR** Postoperative **OR** Recovery
I (**I**ntervention)	Chewing gum	Chewing Gum	Chewing Gum **OR** Gum
C (**C**omparison)	Not chewing gum		
O (**O**utcome)	Affects post-operative ileus	Postoperative Ileus	Postoperative Ileus **OR** Paralytic Ileus **OR** Ileus

Fig. 2

Medical Subject Heading (MeSH)




An official website of the United States government Here's how you know
National Library of Medicine
National Center for Biotechnology Information
Log in
MeSH
MeSH
hypoxia
Search
Create alert
Limits
Advanced
Help
Summary
20 per page
Send to:
Search results
Items: 1 to 20 of 44
<< First
< Prev
Page 1 of 3
Next >
Last >>
Hypoxia
1. Sub-optimal OXYGEN levels in the ambient air of living organisms.
Year introduced: 2017 (1966)
Hypoxia-Inducible Factor-Proline Dioxygenases
2. Dioxygenase enzymes that specifically hydroxylate a PROLINE residue on the HYPOXIA-INDUCIBLE FACTOR 1, ALPHA SUBUNIT. They are OXYGEN-dependent enzymes that play an important role in mediating cellular adaptive responses to HYPOXIA.
Year introduced: 2014
Hypoxia-Inducible Factor 1, alpha Subunit
3. Hypoxia-inducible factor 1, alpha subunit is a basic helix-loop-helix transcription factor that is regulated by OXYGEN availability and is targeted for degradation by VHL TUMOR SUPPRESSOR PROTEIN.
Year introduced: 2006(2001)
Hypoxia-Inducible Factor 1
PubMed Search Builder
Add to search builder
AND
Search PubMed
YouTube Tutorial
Find related data
Database: Select
Find items
Search details
"hypoxia"[MeSH Terms] OR hypoxia[Text Word]

Hypoxia

Sub-optimal OXYGEN levels in the ambient air of living organisms.
Year introduced: 2017 (1966)

PubMed search builder options
Subheadings:

- blood
- cerebrospinal fluid
- chemically induced
- classification
- complications
- congenital
- diagnosis
- diagnostic imaging
- diet therapy
- drug therapy
- economics
- embryology
- enzymology
- epidemiology
- ethnology
- etiology
- genetics
- history
- immunology
- metabolism
- microbiology
- mortality
- nursing
- parasitology
- pathology
- physiopathology
- prevention and control
- psychology
- radiotherapy
- rehabilitation
- surgery
- therapy
- urine
- veterinary
- virology

Restrict to MeSH Major Topic.
Do not include MeSH terms found below this term in the MeSH hierarchy.

Tree Number(s): C23.888.852.079
MeSH Unique ID: D000860
Entry Terms:

- Oxygen Deficiency
- Deficiency, Oxygen
- Deficiencies, Oxygen
- Oxygen Deficiencies
- Hypoxemia
- Anoxia

Add to search builder | AND
Search PubMed

YouTube Tutorial

Related information

PubMed
PubMed - Major Topic
Clinical Queries
NLM MeSH Browser
MedGen

Recent Activity

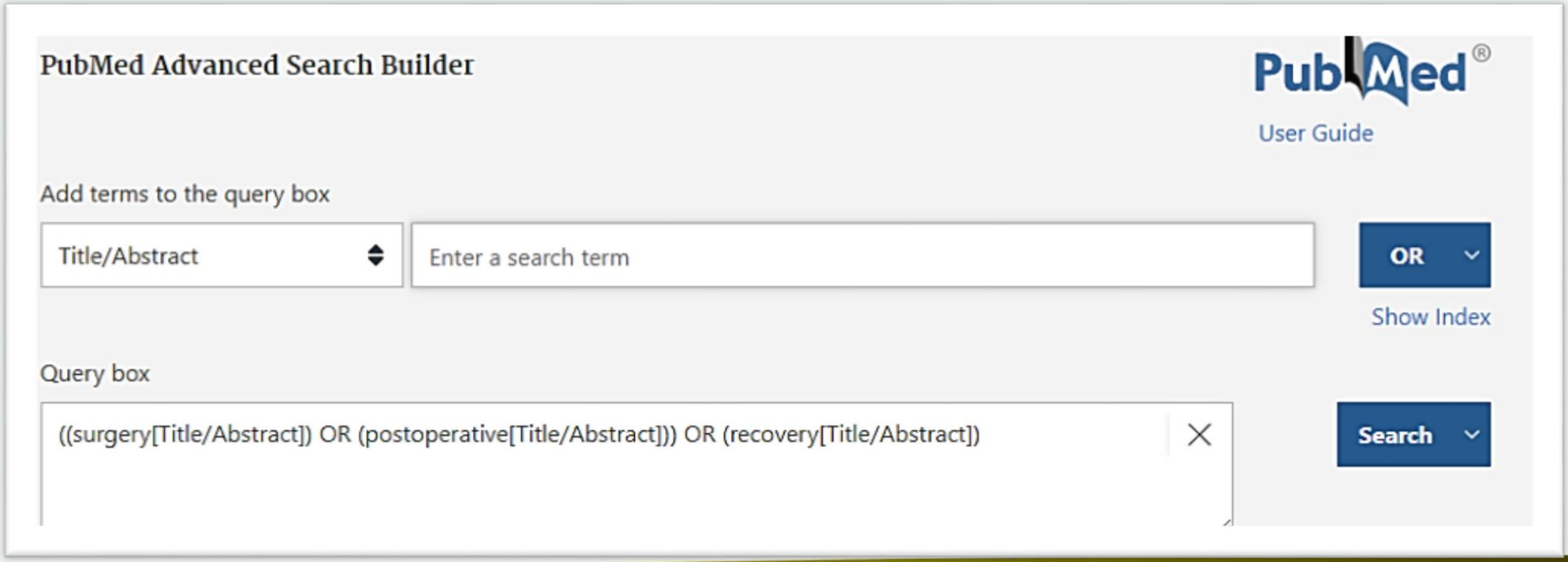
Turn Off Clear

Hypoxia MeSH
hypoxia (44) MeSH
hypoxi a (1) MeSH
Hypoxis MeSH
hypoxi (1) MeSH

- It is better to put the word OR between the synonyms.
- After that, put AND between the different concepts.

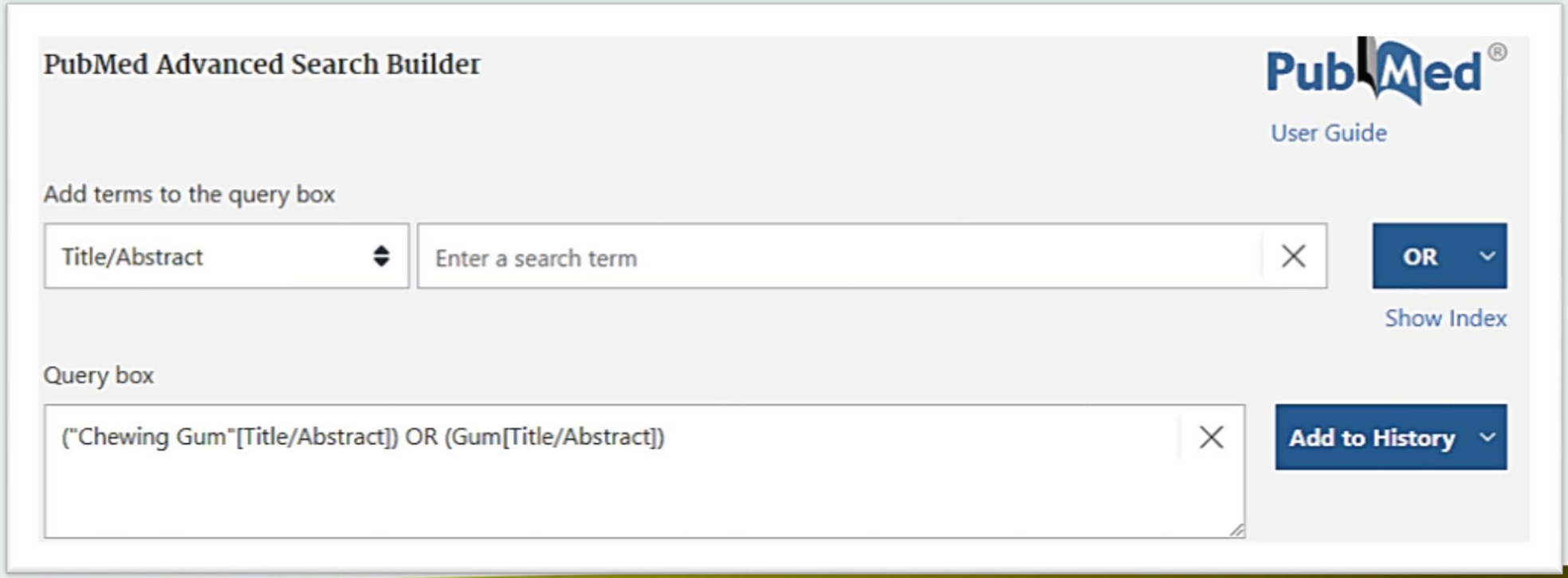
Exclude the search

- **P** (Patient or Population):



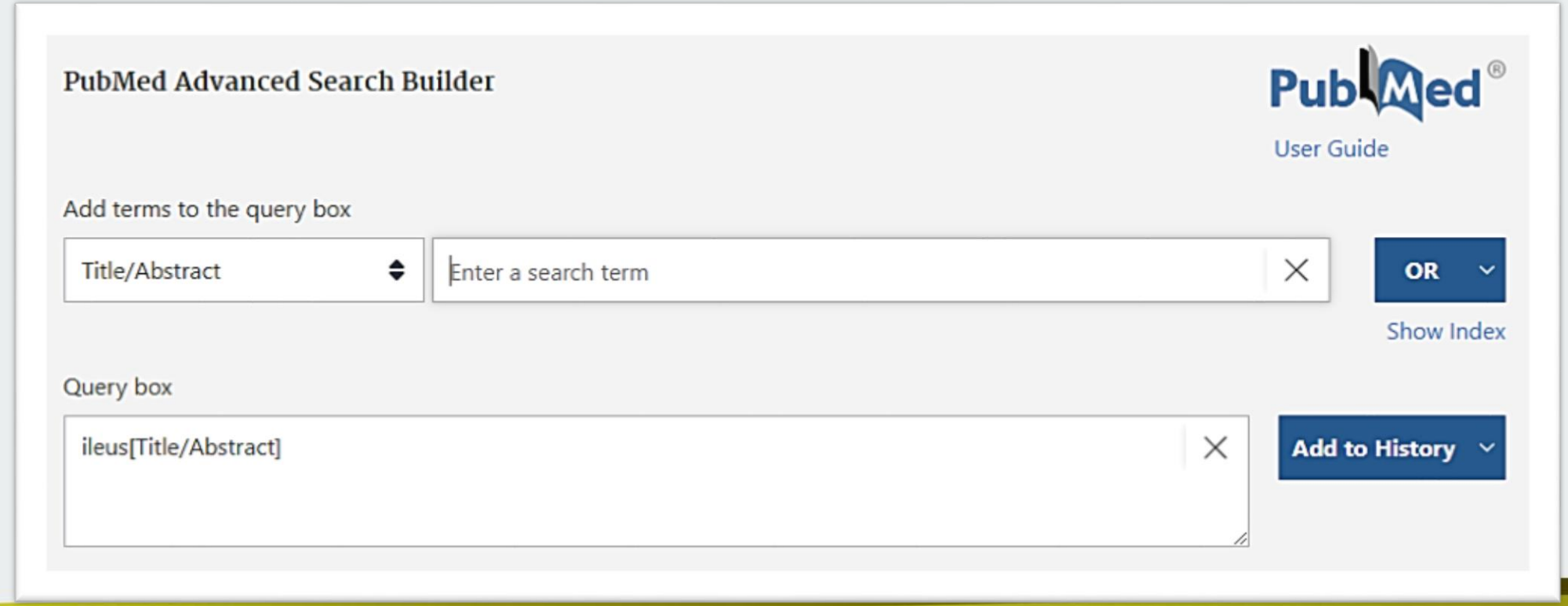
Exclude the search

- **I**(Intervention):Start a new search for the Intervention .



Exclude the search

- **O** (Outcome): You can now conduct a search for the Outcome.



Results

History and Search Details

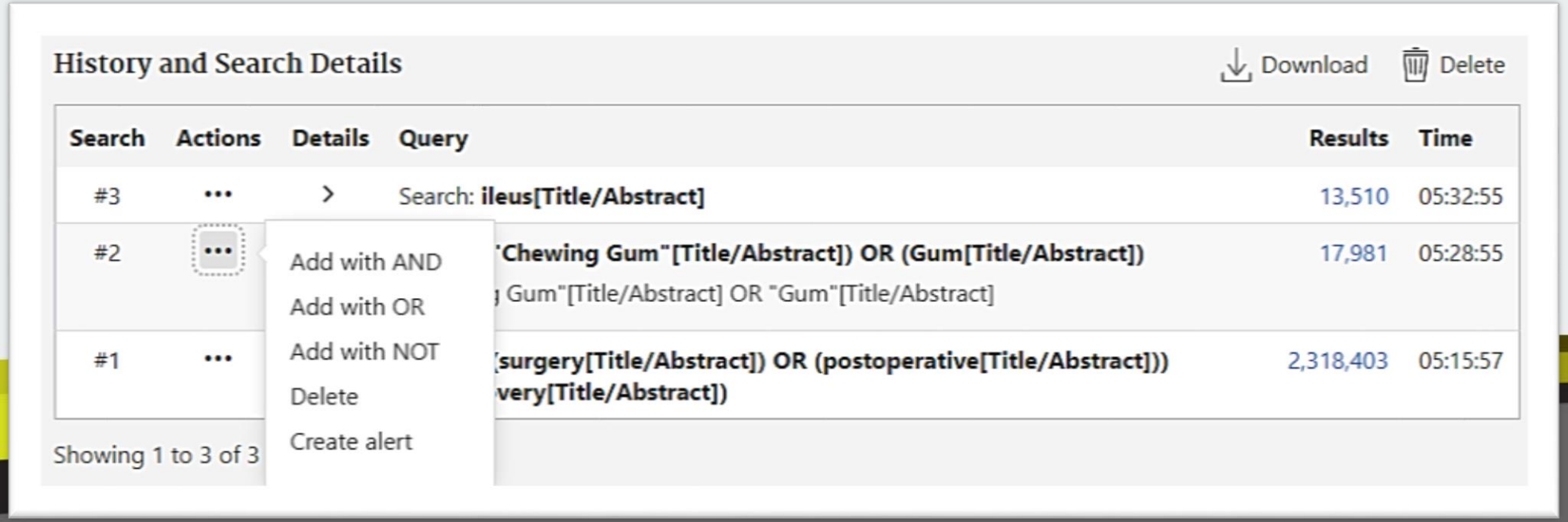
Download Delete

Search	Actions	Details	Query	Results	Time
#3	•••	›	Search: **ileus[Title/Abstract]**	13,510	05:32:55
#2	•••	›	Search: **("Chewing Gum"[Title/Abstract]) OR (Gum[Title/Abstract])**	17,981	05:28:55
#1	•••	›	Search: **((surgery[Title/Abstract]) OR (postoperative[Title/Abstract])) OR (recovery[Title/Abstract])**	2,318,403	05:15:57

Showing 1 to 3 of 3 entries

Combine searches

- **Combine searches:** To complete your search, you will combine the Population; the Intervention and the Outcome. By using your database's Search History, you should be able to combine these searches into one search showing results from all three of your previous searches.



Add terms to the query box

Title/Abstract | Enter a search term | OR

Show Index

Query box

((((surgery[Title/Abstract]) OR (postoperative[Title/Abstract])) OR (recovery[Title/Abstract])) AND ((" Chewing Gum "[Title/Abstract]) OR (gum[Title/Abstract]))) AND (ileus[Title/Abstract])

Add to History

History and Search Details

Download Delete

Search	Actions	Details	Query	Results	Time
#3	•••	›	Search: **ileus[Title/Abstract]**	13,512	02:03:19
#2	•••	›	Search: **(" Chewing Gum "[Title/Abstract]) OR (gum[Title/Abstract])**	17,984	02:02:36
#1	•••	›	Search: **((surgery[Title/Abstract]) OR (postoperative[Title/Abstract])) OR (recovery[Title/Abstract])**	2,318,563	02:01:49