



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

PICO Formula

PICO

The acronym used to help formulate a well-defined searchable question.

P

- Patient, population or problem: What are the most important characteristics of the patient and their health status?

I

- Intervention/Exposure: What main intervention are you considering (medical, surgical, preventative)?

C

- Comparison: What are the alternative benchmark or gold standards being considered, if any?

O

- Outcome: What is the estimated likelihood of a clinical outcome attributable to a specific disease, condition or injury?

❖ 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 Scenario

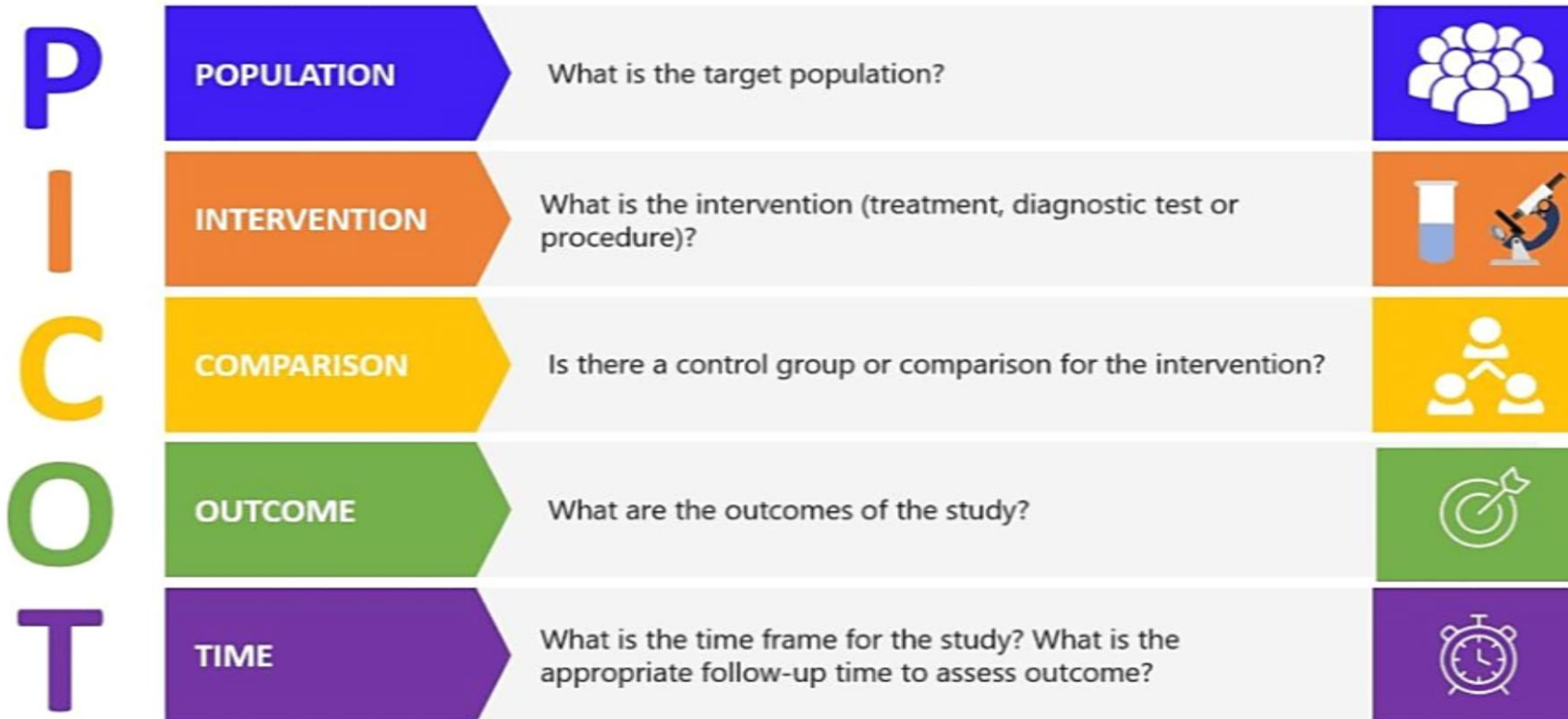
- A GP with a general practice to persuade her colleagues that brief intervention is an effective smoking cessation strategy

P opulation	Teenagers who smoke
I ntervention	Brief intervention
C omparison	None
O utcomes	Smoking cessation

age those in her practice to persuade her colleagues that brief intervention is an effective smoking cessation strategy particularly on the GP's own practice. This can be used as an

PICOT framework

PICOT Framework



❖ Case Scenario:

- Your friend
factor.
doesn't
second
breast
second

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

I-

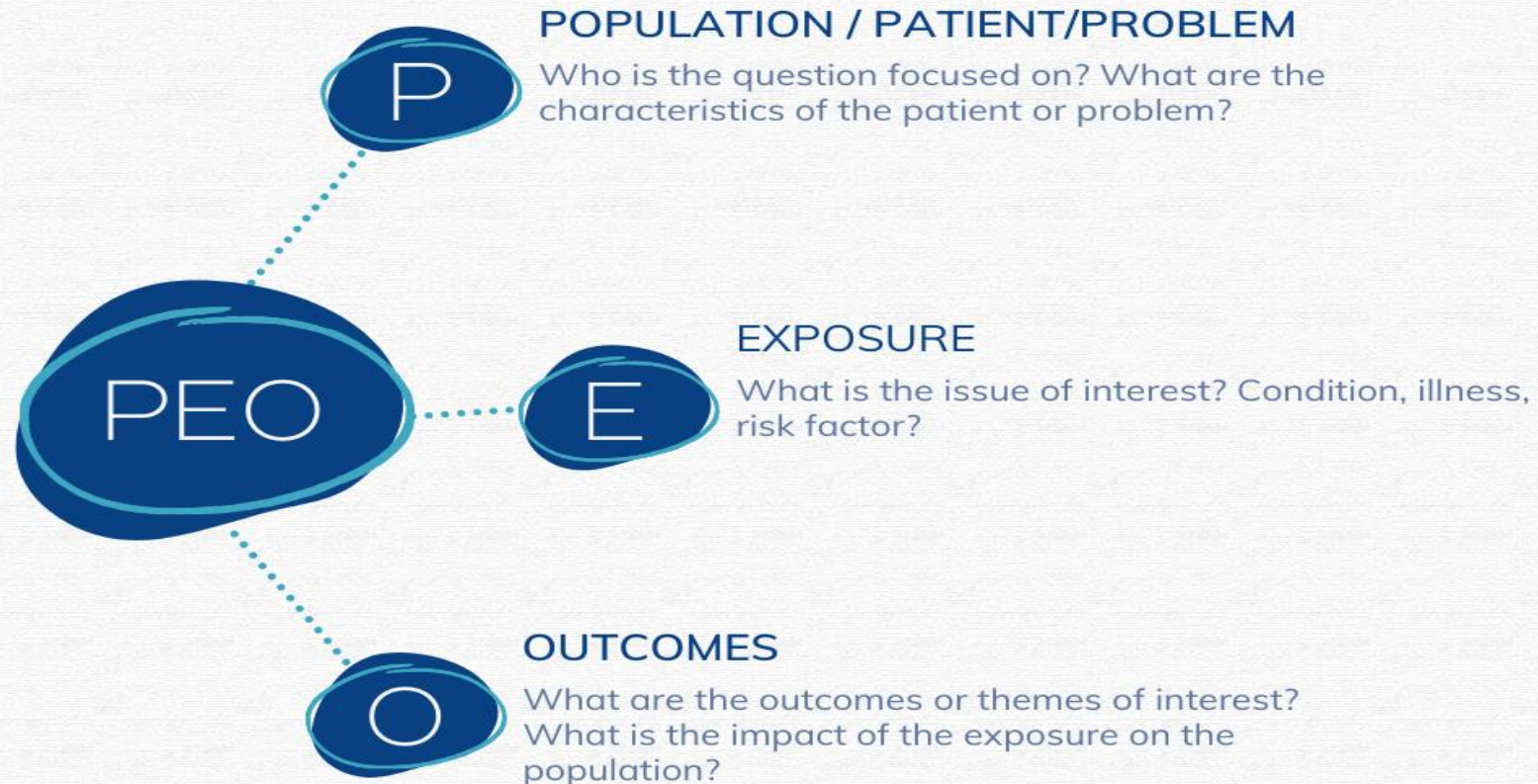
C- female non smokers w/o daily smoke exposure

O- develop breast cancer

T- over ten years

cancer. Her
ve been a
while she
posure to
o develop
posure to

PEO framework



The University of Melbourne Library

❖ 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 (Patient or Population)	Patients undergoing abdominal surgery	Abdominal Surgery	Abdominal surgery OR Surgery OR Postoperative OR Recovery
I (Intervention)	Chewing gum	Chewing Gum	Chewing Gum OR Gum
C (Comparison)	Not chewing gum		
O (Outcome)	Affects post-operative ileus	Postoperative Ileus	Postoperative Ileus OR Paralytic Ileus OR Ileus

Fig. 2

Medical Subject Heading (MeSH)

Google MeSH

Images Videos Shopping Meaning MeSH browser Fabric Terms Database WiFi All filters Tools SafeSearch

About 1,130,000,000 results (0.23 seconds)

 National Institutes of Health (.gov)
https://www.ncbi.nlm.nih.gov > mesh

Home - MeSH - NCBI

MeSH. MeSH (Medical Subject Headings) is the NLM controlled vocabulary thesaurus used for indexing articles for PubMed.

MeSH
MeSH. MeSH (Medical Subject Headings) is the NLM controlled ...

Advanced search
The site is secure. The https:// ensures that you are ...

Medical Subject Headings
Medical Subject Headings. Controlled vocabulary ...

Medical Subject Headings



Medical Subject Headings is a comprehensive controlled vocabulary for the purpose of indexing journal articles and books in the life sciences. It serves as a thesaurus that facilitates searching.
[Wikipedia](#)

Data types captured: controlled vocabulary



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

☐ 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.

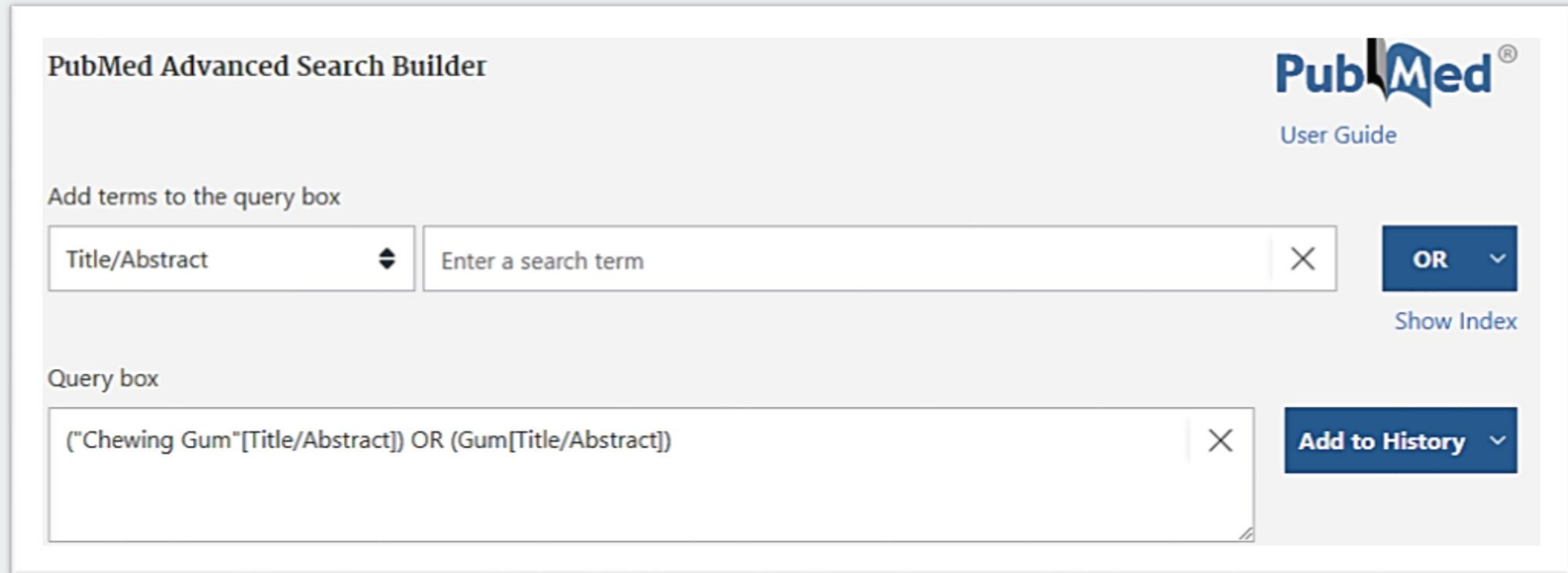
Exclude the search

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

The screenshot displays the PubMed Advanced Search Builder interface. At the top left, it says "PubMed Advanced Search Builder". At the top right is the PubMed logo and a "User Guide" link. Below the title, there is a section "Add terms to the query box" containing a dropdown menu with "Title/Abstract" selected, a text input field with the placeholder "Enter a search term", and a blue button labeled "OR" with a downward arrow. Below this is a "Query box" containing the search query: "((surgery[Title/Abstract]) OR (postoperative[Title/Abstract])) OR (recovery[Title/Abstract])". To the right of the query box is a blue button labeled "Search" with a downward arrow. Below the "OR" button is a link labeled "Show Index".

Exclude the search

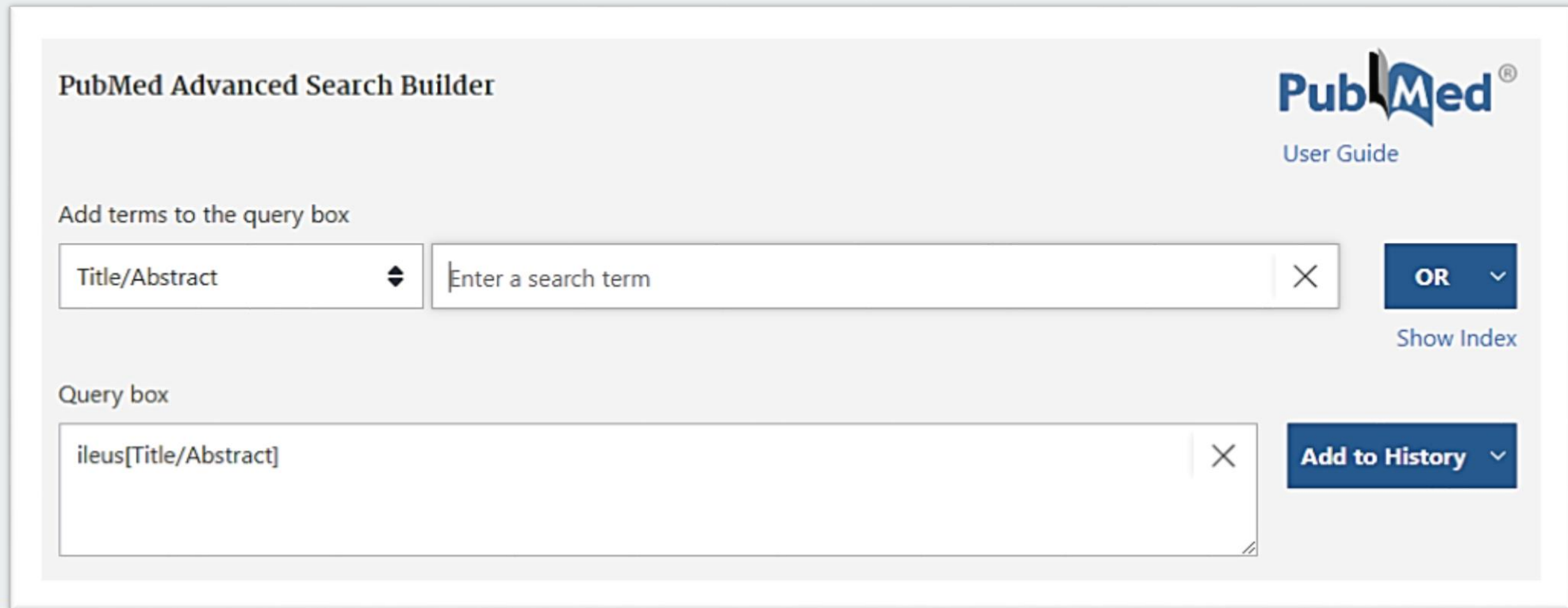
- **I(Intervention):**Start a new search for the Intervention .



The screenshot displays the PubMed Advanced Search Builder interface. At the top left, the title "PubMed Advanced Search Builder" is visible. At the top right, the PubMed logo and a "User Guide" link are present. Below the title, the instruction "Add terms to the query box" is shown. The main search area consists of a dropdown menu set to "Title/Abstract", a text input field containing "Enter a search term", and a blue button labeled "OR" with a downward arrow. To the right of the input field is a close button (X). Below this section, the "Query box" is shown, containing the search query: ("Chewing Gum"[Title/Abstract]) OR (Gum[Title/Abstract]). To the right of the query box is a blue button labeled "Add to History" with a downward arrow. A "Show Index" link is located between the "OR" button and the "Add to History" button.

Exclude the search

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



The screenshot displays the PubMed Advanced Search Builder interface. At the top left, it says "PubMed Advanced Search Builder". At the top right is the PubMed logo and a "User Guide" link. Below the title, there is a section "Add terms to the query box". This section contains a dropdown menu with "Title/Abstract" selected, a text input field with the placeholder "Enter a search term", a clear button (X), and a blue button labeled "OR" with a dropdown arrow. Below the "OR" button is a link "Show Index". Below the "Add terms to the query box" section is a "Query box" section. It contains a text input field with the text "ileus[Title/Abstract]", a clear button (X), and a blue button labeled "Add to History" with a dropdown arrow.

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.

The screenshot displays a 'History and Search Details' window. At the top right, there are 'Download' and 'Delete' icons. Below this is a table with columns: Search, Actions, Details, Query, Results, and Time. Three search entries are listed: #3, #2, and #1. A context menu is open for search #2, showing options: 'Add with AND', 'Add with OR', 'Add with NOT', 'Delete', and 'Create alert'. The 'Add with AND' option is highlighted. The table data is as follows:

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

Showing 1 to 3 of 3

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