

## Step 3 – Acquire

To find the evidence, writers are encouraged to follow a hierarchical literature retrieval to answer questions.

1. Search for pre-filtered information, such as a systematic review of the literature or a guideline that used a rigorously conducted systematic review that matches the PICO. (The [AGREE II tool](#) can be used to assess the quality of the guideline.) Systematic reviews and guidelines can be found in PubMed using '[clinical queries](#)' and in [Trip database](#).
2. If more than one systematic review is identified, pick the most recent highest quality review or the one that most closely represents the PICO. A meta-analysis is preferred over a narrative summary of results. ([Health Evidence Quality Assessment Tool – Review Articles](#) or [AMSTAR 2](#) can be used to evaluate the quality of a systematic review.)
3. If no high quality secondary research is identified, a recent narrative review can be used to summarize primary research. Such a review should include a search strategy and be balanced and objective.
4. When systematic reviews are not available or not current, PubMed can be searched for individual randomized controlled trials (RCTs); when RCTs are not available or not current, search for non-randomized studies (NRS).
5. Finally, country-specific guidelines (from Australia, Canada and the UK) may need to be considered if they provide recommendations related to the question. These can be found by searching the grey literature using the Trip database and specific and relevant organizational databases such as National Health and Medical Research Council (NHMRC), National Institute for Health and Care Excellence (NICE), and nutrition specific organizations such as Food Standards, Health Canada etc.

### Databases

[PubMed](#) is a freely available database that provides access to MEDLINE, life science journals and online books. Citations include abstracts and may link to free full -text content from PubMed Central and open access publishers' websites.

We highly recommend using the [Trip Premium database](#). The Trip database is a large search engine that searches multiple databases, including guidelines from many international associations; synopses from many reputable services; health technology assessments and systematic reviews from NICE, Canadian Agency for Drugs and Technologies in Health (CADTH) and The Cochrane Library; electronic textbooks; and individual studies from PubMed. All search results are organized according to the hierarchy of evidence. Searching this database can provide a 'one-stop-shopping site'.

When searching for evidence, document your search strategy including:

- ☐ Search terms (e.g. MeSH terms and text words)
- ☐ Databases searched
- ☐ Date search completed
- ☐ Search limits (including date range, English language\*)
- ☐ Reasons for excluding reviews or studies using a hierarchical literature search
- ☐ See section on [Documenting Your Search Strategy](#).

### Grey Literature

Grey literature refers to non-peer reviewed but still credible sources of information such as publications issued by government, academia, business, and industry, in both print and electronic formats, but not controlled by commercial publishing interests, and where publishing is not the primary business activity of the organization. Authors are encouraged to limit themselves to government, research and credible non-government organization (NGO) websites (such as professional associations, universities, health organizations etc.) to locate pertinent grey literature. For further info see: "Grey-Matters: a practical tool for searching health-related grey literature", April 2019 available from: <https://www.cadth.ca/grey-matters> (focus on Health Technology Assessment Agencies and Clinical Practice Guidelines from partner countries)

NB – we generally recommend a focus on human studies, English language\*, and current information. An older item may be considered if it sets the foundation for future research (e.g., a Surgeon General's report) or if no newer information on the issue is available. \*If author/contributor is bilingual, we encourage utilizing materials published in other languages, however, funding for translation is extremely limited. Contact your PEN mentor if you are not able to access the full text of potential articles to review.

Recommendation: review the PEN Author Training module:

[Searching PubMed Module](#)

[https://www.pennutrition.com/resources/PEN%20Writers%20Page/PENPubMedModule\(Dec20 18\).pdf](https://www.pennutrition.com/resources/PEN%20Writers%20Page/PENPubMedModule(Dec20%2018).pdf)

## Conducting Your Search Strategy

Using the [PEN Search Strategy Worksheet](#):

- a. Define your topic (1 or 2 sentences in the form of a well-built question – remember PICO). The research question can evolve with the search but the main concepts related to population and intervention will likely apply.
- b. Identify main concepts (come up with 2 or 3 keywords that define your topic). The keywords should all be separate terms that represent your main ideas. Focus key concepts on Population and Intervention from your PICO question.
- c. Search for systematic reviews
  - When searching for systematic reviews on the main page for [PubMed](#), combine your terms using AND and OR. **Type the following directly after your terms:** “(systematic review [filter] or meta-analysis [filter])”
    - This ensures your search is not limited to only abstracts that contain the words “systematic review” or “meta-analysis”.
  - After your systematic review search, visit the [PubMed Clinical Queries](#) page to search for primary studies that were published after the most recent systematic review.
    - Selecting “therapy” and “broad” will help to ensure articles are not missed; however, keep in mind that irrelevant articles may also be retrieved.
    - Selecting “COVID-19” as a filter will focus your search on COVID-19 articles.
    - Typing “preprint [filter]” directly after your terms provides access to early release, non-peer reviewed articles. This also ensures your search is not limited to only abstracts that contain the word “preprint”.
- d. Refine your search
  - On PubMed’s main page, click the “Advanced” link found underneath the search box. Scroll to the “History and Search Details”. Click on “>” to reveal MeSH terms for each search statement.
    - If the terms you used to conduct the search does not link to a MeSH term, repeat your search using alternate terms and recheck MeSH terms. Use PubMed’s [MeSH Database](#) to find appropriate terms or look for MeSH terms in related articles.
    - Note that it is not advisable to restrict to a MeSH search, as this does not identify recent, non-indexed articles
- e. Incorporate other options for searching as needed to expand search
  - MeSH headings e.g. [mh]
  - Field searching title and abstract only e.g. [tiab]
  - Truncation to expand term e.g. nutr\*
- f. PubMed [Advanced Search Builder](#) can be used to help build the search strategy
- g. Identify exclusion criteria or limits (e.g. publication dates, English language)
- h. Document reasons for excluding reviews or other studies identified using a hierarchical literature search (e.g. if two systematic reviews were identified that were published in the same year, what was the reason for excluding one of the systematic reviews).
- i. List other methods used to find information and record strategies used (e.g. reviewing references lists from key articles, searching the web for grey literature, other sources)

Using the following form, authors of questions are asked to document, for each question if applicable, their search strategy in the WORD document they are producing.

## Documenting Your Search Strategy

### Content

Practice Question

### Search Terms

MeSH Terms

Text Words

Databases and Grey Literature Sources (e.g. international guidelines) Searched

Reasons for excluding reviews or studies identified using a hierarchical literature search

Date Search Completed:

Search Limits (e.g. date, language):

### PubMed Search Strategy Examples

#### Example 1

**PEN Question:** Should diets lower in glycemic index (GI) or glycemic load (GL) be recommended for the primary prevention of cardiovascular disease (CVD) or the secondary prevention of CVD (i.e. individuals with a history of CVD or with multiple CVD risk factors e.g. metabolic syndrome)?

#### SEARCH TERMS

##### MeSH Terms

Cardiovascular diseases  
Glycemic index  
Glycemic load  
Dietary carbohydrates

##### Text Words

Cardiovascular disease  
Glycemic  
Glycaemic

#### PubMed Search – illustrative example only

*This is an illustrative example showing how keywords can be incorporated into search terms – note how PubMed identifies MeSH headings and text word combinations to create the search string*

Search #1: cardiovascular disease AND (glycemic index or glycemic load) (systematic review [filter] or meta-analysis [filter])

Retrieved 108 results

Clicking on 'Advanced search' shows this was what was entered in PubMed:

((("cardiovascular diseases"[MeSH Terms] OR ("cardiovascular"[All Fields] AND "diseases"[All Fields]) OR "cardiovascular diseases"[All Fields] OR ("cardiovascular"[All Fields] AND "disease"[All Fields]) OR "cardiovascular disease"[All Fields]) AND ("glycaemic index"[All Fields] OR "glycemic index"[MeSH Terms] OR ("glycemic"[All Fields] AND "index"[All Fields]) OR "glycemic index"[All Fields] OR ("glycemic load"[MeSH Terms] OR ("glycemic"[All Fields] AND "load"[All Fields]) OR "glycemic load"[All Fields]))) AND ("systematic review"[Filter] OR "meta analysis"[Publication Type]))

Search #2: cardiovascular disease AND dietary carbohydrates (systematic review [filter] or meta-analysis [filter])

Retrieved 108 results

Clicking on 'Advanced search' shows this was what was entered in PubMed:

((("cardiovascular diseases"[MeSH Terms] OR ("cardiovascular"[All Fields] AND "diseases"[All Fields]) OR "cardiovascular diseases"[All Fields] OR ("cardiovascular"[All Fields] AND "disease"[All Fields]) OR "cardiovascular disease"[All Fields]) AND ("dietary carbohydrates"[MeSH Terms] OR ("dietary"[All Fields] AND "carbohydrates"[All Fields]) OR "dietary carbohydrates"[All Fields])) AND ("systematic review"[Filter] OR "meta analysis"[Publication Type])) AND (systematicreview[Filter])

Set #3 – using clinical queries (cardiovascular disease AND glycemic index) AND (Therapy/Broad[filter])

Retrieved 56 results when limited to 1 year

Clicking on 'Advanced search' shows this was what was entered in PubMed:  
 (("cardiovascular diseases"[MeSH Terms] OR ("cardiovascular"[All Fields] AND "diseases"[All Fields]) OR "cardiovascular diseases"[All Fields] OR ("cardiovascular"[All Fields] AND "disease"[All Fields]) OR "cardiovascular disease"[All Fields]) AND ("glycaemic index"[All Fields] OR "glycemic index"[MeSH Terms] OR ("glycemic"[All Fields] AND "index"[All Fields]) OR "glycemic index"[All Fields]) AND (("clinical"[Title/Abstract] AND "trial"[Title/Abstract]) OR "clinical trials as topic"[MeSH Terms] OR "clinical trial"[Publication Type] OR "random\*" [Title/Abstract] OR "random allocation"[MeSH Terms] OR "therapeutic use"[MeSH Subheading])) AND (y\_1[Filter])

## Example 2

**PEN Question: What is the clinical effectiveness of the ketogenic diet to promote weight loss in adults with overweight / obesity?**

### SEARCH TERMS

#### MeSH Terms

Overweight  
 Obesity  
 Diet, ketogenic  
 Diet, Carbohydrate restricted

#### Text Words

Low carbohydrate diet  
 Ketogenic  
 Carbohydrate restricted  
 Carbohydrate-restricted diet  
 Low carbohydrate diet

### PubMed Search – illustrative example only

Search #1: ketogenic AND (overweight or obesity) (systematic review [filter] or meta-analysis [filter])

Retrieved 18 results

Clicking on 'Advanced search' shows this was what was entered in PubMed:  
 ("ketogenic"[All Fields] AND ("overweight"[MeSH Terms] OR "overweight"[All Fields] OR "overweighted"[All Fields] OR "overweightness"[All Fields] OR "overweights"[All Fields] OR ("obeses"[All Fields] OR "obesity"[MeSH Terms] OR "obesity"[All Fields] OR "obese"[All Fields] OR "obesities"[All Fields] OR "obesity s"[All Fields]))) AND ("systematic review"[Filter] OR "meta analysis"[Publication Type])

Search #2: low carbohydrate diet AND (overweight or obesity) (systematic review [filter] or meta-analysis [filter])Ketogenic diet

Retrieved 87 results

Clicking on 'Advanced search' shows this was what was entered in PubMed:  
 (("diet, carbohydrate restricted"[MeSH Terms] OR ("diet"[All Fields] AND "carbohydrate restricted"[All Fields]) OR "carbohydrate-restricted diet"[All Fields] OR ("low"[All Fields] AND "carbohydrate"[All Fields] AND "diet"[All Fields]) OR "low carbohydrate diet"[All Fields]) AND ("overweight"[MeSH Terms] OR "overweight"[All Fields] OR "overweighted"[All Fields] OR "overweightness"[All Fields] OR "overweights"[All Fields] OR ("obeses"[All Fields] OR "obesity"[MeSH Terms] OR "obesity"[All Fields] OR "obese"[All Fields] OR "obesities"[All Fields] OR "obesity s"[All Fields]))) AND ("systematic review"[Filter] OR "meta analysis"[Publication Type])