SEARCH SKILLS FOR THE HEALTH SCIENCES
IDENTIFYING THE INFORMATION NEEDS COMPONENTS: THE PICO(T) FORMAT

Clinical practice and patient questions can be broken down into essential components to make the information-seeking process easier. The most common way to begin is to use the PICO(T) format, which breaks a question apart according to:

P – Patient, population, problem
I – Intervention or Exposure
C – Comparison (optional)
O – Outcome (optional)
T – Time (optional)

An example: An elderly female patient is in the hospital for a few days after a hip replacement. You notice that the patient is not sleeping much at night. When the patient refuses medication to induce sleep, you must find alternate methods of addressing the patient’s sleeplessness. So, using the PICO(T) method, the question would be broken apart into descriptors such as:

P – female, elderly, inpatient, insomnia, post-surgery
I – earplugs or complimentary therapy to reduce anxiety and/or sleep interruptions (depends on the root causes of the lack of sleep, determined by observation)
C – soporifics
O – to be determined once the literature has been found and in conjunction with an understanding of the patient’s specific situation and the underlying causes of sleep loss.

KEYWORDS VS. SUBJECT HEADINGS

Keywords are:
- natural language terms that describe your topic
- able to be combined in any number of ways
- lacking consistency in usage, definition, and sometimes spelling (e.g. GERD vs. GORD[U.K.])
- either single words or phrases
- used to search for matching words or phrases anywhere in the records the database contains (such as title, abstract, journal title)
- used when no appropriate subject heading exists as an equivalent
- sometimes either too broad or too narrow, resulting in either too many or too few results

Subject Headings are:
- “controlled” vocabulary used by an organization (e.g. the National Library of Medicine) to describe the concepts in the literature collected by that organization or database (such as MEDLINE or CINAHL).
- consistent in their definition across the records in the database.
- less flexible and must be chosen from the thesaurus used by the database; if the incorrect subject heading is selected, none of the results will be relevant.
- only searched for in the subject heading field of the record.
- helpful for retrieving a set of articles with fewer irrelevant results.

For additional help with ECU Libraries resources, contact us at lib.ecu.edu/ask.aspx
Examples of keywords vs. subject headings using CINAHL’s subject headings:

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Subject Heading</th>
</tr>
</thead>
<tbody>
<tr>
<td>“heart attack”</td>
<td>“Myocardial Infarction”</td>
</tr>
<tr>
<td>“distance education”</td>
<td>“Education, Non-Traditional”</td>
</tr>
<tr>
<td>EHR or Electronic Health Records</td>
<td>“Computerized Patient Record”</td>
</tr>
</tbody>
</table>

‘AND’, ‘OR’, and ‘NOT’: COMBINING SEARCH TERMS

Behind every search in a database or even in Google, there are mathematical operations occurring. While it is not necessary to understand the complex mathematics behind searching, understanding the basic mechanics of the formulas can help you understand how to construct a search. Just like basic mathematics, searching utilizes operators. Instead of [+-×÷], the operators for database searching are: AND, OR, and NOT, known as Boolean operators.

**AND**
Combines search terms to retrieve articles that use the major concepts of a search, identified in the PICO(T) process. In the Venn Diagram below, the grayed area between ‘Nurse burnout’ and ‘patient satisfaction’ represents the use of AND to combine the terms—the search would only retrieve those articles that discuss nurse burnout and patient satisfaction, excluding all the articles on those two topics that did not include both concepts.

Nurse burnout AND Patient satisfaction

**OR**
Combines search terms to retrieve articles that use any of the terms that describe a concept you are interested in. This is important if multiple terms may describe the population (e.g. adolescent OR teenager OR young adulthood) or the problem (e.g. GERD OR gastroesophageal reflux). An OR may also be important if you are interested in several, more narrow, specific aspects of a broader population or problem (e.g. back pain OR neck pain), and don’t want to use the broader umbrella term (e.g. ‘pain’). In the Venn Diagram below, the dark area shows that the use of OR gathers all articles that discuss football or hockey or soccer.

Football OR Hockey OR Soccer
**NOT**
Excludes terms from the set of search results. The use of NOT is generally discouraged, since it can unintentionally exclude relevant articles from your results. In use, it is represented by the Venn Diagram below, in which the area between ‘sepsis’ and ‘burn’ represents the NOT—in this example, the articles retrieved on the subject ‘sepsis’ will not include articles that discuss sepsis in burns.

![Venn Diagram](image)

Sepsis NOT Burn

**Parentheses**
In actual usage, searches may often involve a combination of AND and OR, which may require the use of parentheses. The parentheses preserve the order of operations (*remember your algebra!*). The words combined with OR live within the parentheses.

E.g. (elderly OR aged OR geriatric)

The concepts from PICO(T) may involve one or several groups of synonyms or alternative concepts. The groups are placed in parentheses, then combined with an AND:

E.g. (elderly OR aged OR geriatric) AND (sleep disturbance OR insomnia OR sleep disorder) AND inpatient

In the database, the parentheses here result in a FOIL operation, so that the search will retrieve articles containing the terms:

- Elderly AND sleep disturbance AND inpatient
- Elderly AND insomnia
- Elderly AND sleep disorder
- Aged AND sleep disturbance
- Aged AND insomnia
- Etc.

**Quotation marks**
In CINAHL, if you choose to use a keyword in lieu of or in addition to a subject heading (e.g. sleep disturbance [keyword] OR sleep deprivation [subject heading]), if the keyword is a phrase, rather than a single word, you will need to:

Select ‘(Search as Keyword)’ from the bottom of the subject list

-or-

Turn off ‘Suggest Subject Terms’, located above the search bar

**Place the phrase in quotation marks**
- e.g. “sleep disturbance”
**Wildcards**

Wildcards represent variations within a word, either because you want multiple spellings of a word to be caught or because you are not certain of how something is spelled. Wildcards take different forms but are usually either an asterisk (*) or a question mark (?). The wildcard tells the search engine or database that you are willing to accept substitute letters in the spot where the wildcard is located.

e.g. hospital* would give you:

hospital, hospitals, hospitalized, hospitalization, hospitalize, and many other forms of the word

*Use prudently, because you may get far more results than you need when using a wildcard. The above example would also return terms such as: hospitality, hospitalocynism, and all foreign spellings.

**FILTERS AND LIMITS**

Filters and limits do exactly what they sound like they do--they remove unwanted results based on certain criteria that you select. In many databases, filters and/or limits include:

- Age--often categorized in broad groups
- Date limits
- Language
- Sex
- Article type--this can include:
  - the format of the article (e.g. Letter, Technical Report, Bibliography)
  - study type (e.g. Controlled Clinical Trial, Validation Study, Meta-Analysis)
- Journal Field or Category
  - e.g. Nursing, Dental, Allied Health journals

Using filters can be useful for many reasons--you may need to restrict your results to articles published within the last five or ten years, you may have retrieved a large number of articles that were written in another language, you may need to look at just the articles published within your field, etc.