اصول جستجوی اطلاعات علمی

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The scenarios

- "I just join as new graduate students and I am not sure how to do a literature search"
- "I have been into research for sometimes now but I spend a lot of time to get the articles I want"
- "I wanted to start a new research work, how can I get the right literature in the shortest possible time?"

→ → If you experience similar concerns, this module may help you to do an *effective* literature search

Reasons for Searching the Medical Literature

- To answer a specific patient case-related question (clinical practice)
- To learn more about a medical topic (education)
- To determine current best practice (guideline)
- To give the best possible care to patients using evidence-based medicine
- To do a research

How to start?

- There are many ways to begin literature search, generally we have:
  - Keywords (most commonly use)
  - Begin from a paper given by your mentor
  - References from a given paper
  - Journals in your interest of subject areas
  - Authors, if you know some …
- As a beginner, we will only talk about keyword search in topics or titles

Objectives

1. Formulate your question
2. Understand basic database structure
3. Use of Boolean Logic
4. Use Field Searching
5. Use of Controlled Vocabulary
6. Specialty techniques (truncation, etc.)
7. Building your search strategy

Simple Vs Advanced Search

Simple search

Very broad :retrieves thousands of irrelevant files

Advanced search

Narrowing the search

Boolean

Phrase searching

Field search

Truncation

Parsing the Question

- What are the main concepts in your question?

Sample question:

Does nutrition therapy improve decubitus (pressure) ulcer healing in an elderly patient?

Concepts:

Nutrition therapy

Ulcer healing

Decubitus/pressure ulcers

Elderly patients

Treatment efficacy

Searching a Database

Different search interfaces do the same things in slightly different ways

Good search interfaces should provide

- Ability to search for a specific item
- Ability to search for related items to a known item
- Ability to search in a specific field or fields
- Ability to combine search terms using Boolean Logic
- Ability to retrieve search results in a useful way

Boolean Logic

A British mathematician named George Boole (1815-1864) developed an algebraic system of logic that is now widely used in computer and electronic systems including database searching.

While Boole's algebraic system can be complex, a very simple form of Boolean Logic is used for searching most bibliographic databases.

Boolean Operators

Standard Boolean Logic for database searching uses 3 relationships among search terms.

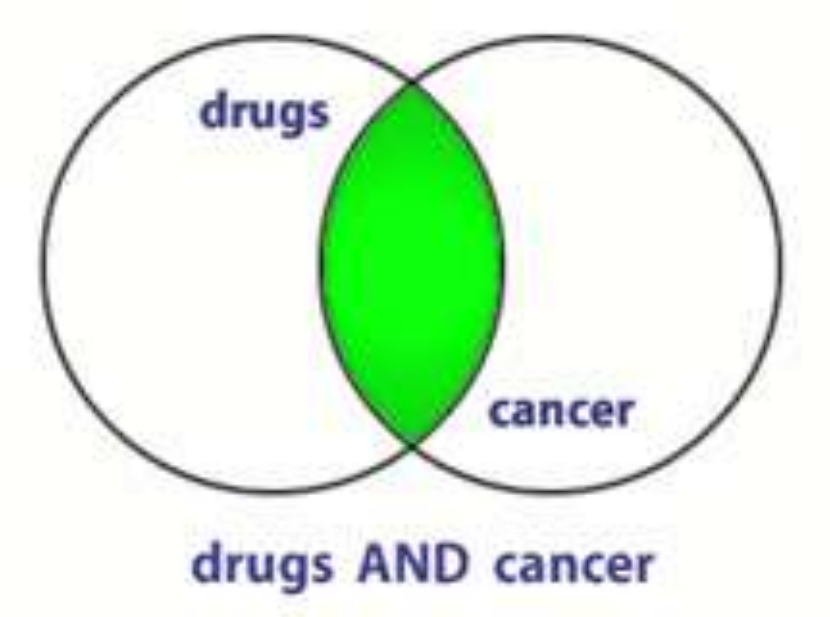
AND

OR

NOT

It is both simple and powerful.

AND



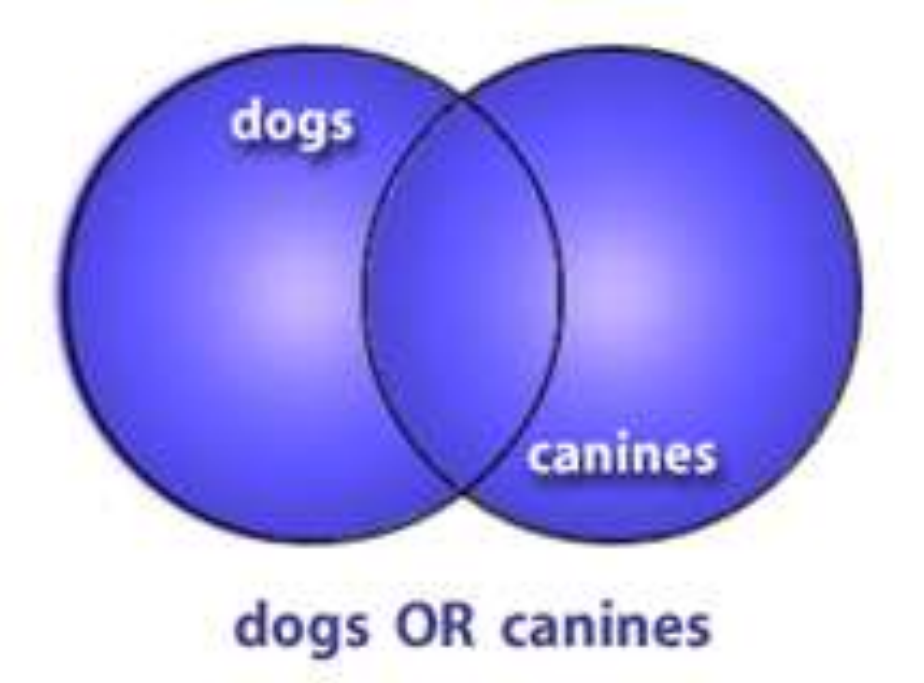
BOTH terms included in any results.

If a record has only one of the two terms, **it will not be retrieved**.

If the record has neither term, **it will not be retrieved.**

What does this do to the amount of records retrieved?

OR

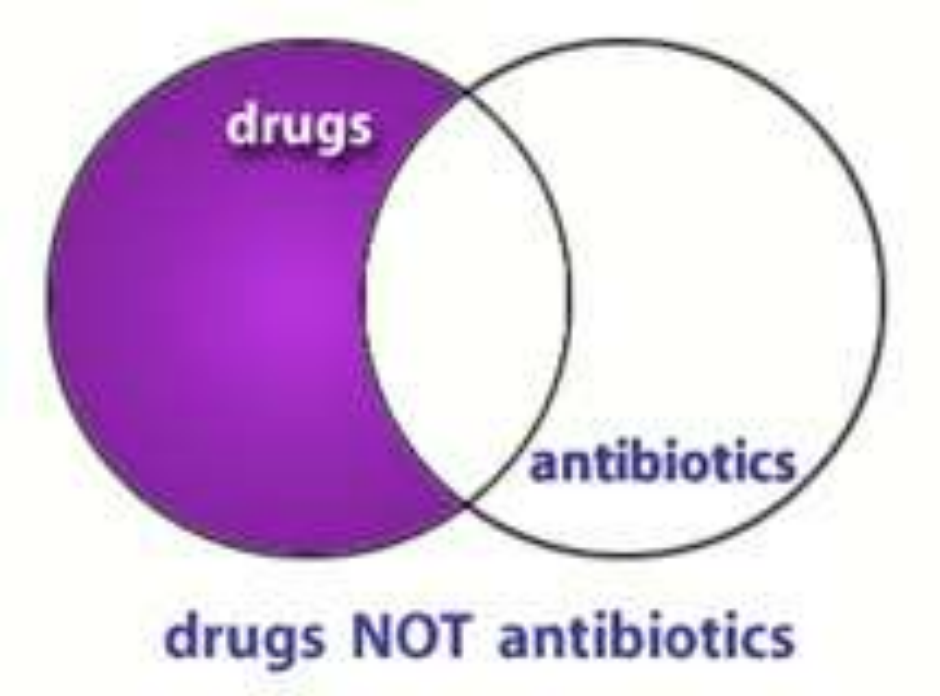


Only one (**NOT both**) of the terms are in the results

'OR' will retrieve the record if both are included.

What does OR do to the amount of records retrieved?

NOT



Excludes any results containing the term

Records containing both will not be retrieved.

What does NOT do to the amount of records retrieved?

Using OR

"OR" groupings contain terms for the same idea/concept and are usually put in parenthesis

(term OR term OR term)

where all terms are difference ways of representing the same concept

(faculty OR teachers OR professors)

(students OR learners OR pupils)

Using AND

"AND" groupings contain terms for different ideas/concepts and can combine OR groupings

Term AND (Term OR Term) where each represents a different concept

heart attack AND smoking

Diabetes AND exercise

Cancer AND (treatment OR therapy)

Using NOT

"NOT" statements are usually put last and can contain an "OR" grouping; they are often used to get rid of a common subgroup

Students NOT dental

Diabetes NOT juvenile

Putting Them Together

1. Identify the concepts (Parse the question)
2. List specific terms for each concept
3. Put the terms for each concept in an OR statements within parentheses
4. Combine OR statements with AND
5. Add any NOT statements to the end

Creating a Boolean Search

QUESTION: Is Vitamin C helpful in treating the flu?

1. Identify concepts and list terms

Concept 1 Influenza	Concept 2 Vitamin C	Concept 3 Treatment	Concept 4 helpfulness
Influenza	Vitamin C	Treatment	Outcome
Flu	Ascorbic acid	Therapy	Recovery
	Orange Juice	Management	Success

Step 2

2. Make your OR statements, one per concept
   - (influenza OR flu OR orthomyxovirus)
   - (vitamin C OR ascorbic acid OR ascorbate)
   - (treatment OR therapy OR management)
   - (outcome OR recovery OR success)

Steps 3 and 4

3. Put "AND" between each of the OR statements

(influenza OR flu) AND (vitamin C OR ascorbic acid OR orange juice) AND (treatment OR therapy OR management) AND (outcome OR recovery OR success)

4. Consider any NOT statements you might want to add.

Note: NOT isn't used very often

Parsing a Boolean Search

(emergency OR acute OR critical) AND (treatment OR therapy OR management OR care) AND (motor vehicle accident OR car crash) NOT (pedestrian OR walking)

What are the four concepts?

What terms are used for each concept?

Which three concepts must be included in all records found?

Which concept must not be included in any record found?

Beyond Basic Boolean

- Field Searching
- Controlled Vocabulary
  - Subject vs. Keyword Searching
- Specialty Features
  - Truncation
  - Phrase searching

Field Searching

Almost all databases will provide you with some ability to search a specific field or fields.

- Allows faster searching
- Allows more accurate searching

Not all databases may make all fields searchable.

Each search system will require a specific format.

All Field vs. Specific Field Searches

I would like to find articles by John Smith.

- Search all fields: John Smith
- Search Author Field only: John Smith

I would like to find an article published in 1997.

- Search all fields: 1997
- Search Publication Date Field: 1997

Why waste time searching for a date in the author field or an author in the volume field?

Formats for Field Searching

Different databases provide different formats for specifying fields.

Most use field names or nicknames

- Field ‘tags’ OR ‘labels’

which may follow a period or be placed in brackets or parentheses.

Some databases offer forms or drop-down menus.

PubMed Field Tags

http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=helppubmed.section.pubmedhelp.Search_Field_Descrip

[au] = author

[ti] = title

[tw] = textword

[tiab] = title and abstract

[mh] = medical subject heading

[dp] = date of publication

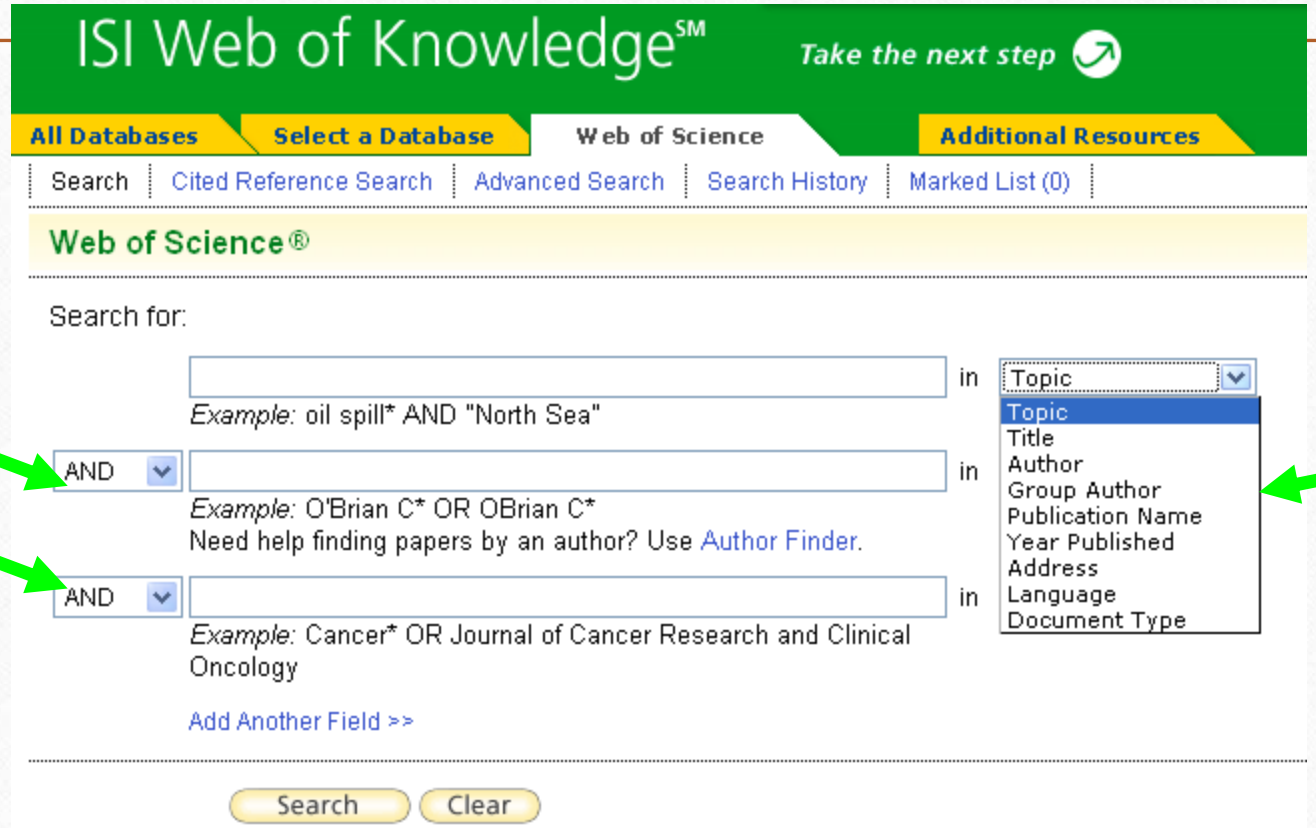
[la] = language

[gr] = grant number

[ta] = journal name

[ad] = affiliation

Some databases, such as the Web of Science (Science Citation Index Expanded) provide forms to fill out.



Select Boolean Operator

Select Field from drop-down menu

Combining Field Searches

Multiple field searches can be combined using Boolean logic.

Find a 2005 article by an author named Hubble about ankle fractures.

Combine with AND:

- 2005 in date/year field
- Hubble in author field
- Ankle fractures in title field

2005[dp] AND Hubble[au] AND ankle fractures[ti]

Subject vs. Keyword Searching

Free-text (keyword) searching

- Some concepts have many synonyms. A free-text search statement would mean "OR"ing all those terms together

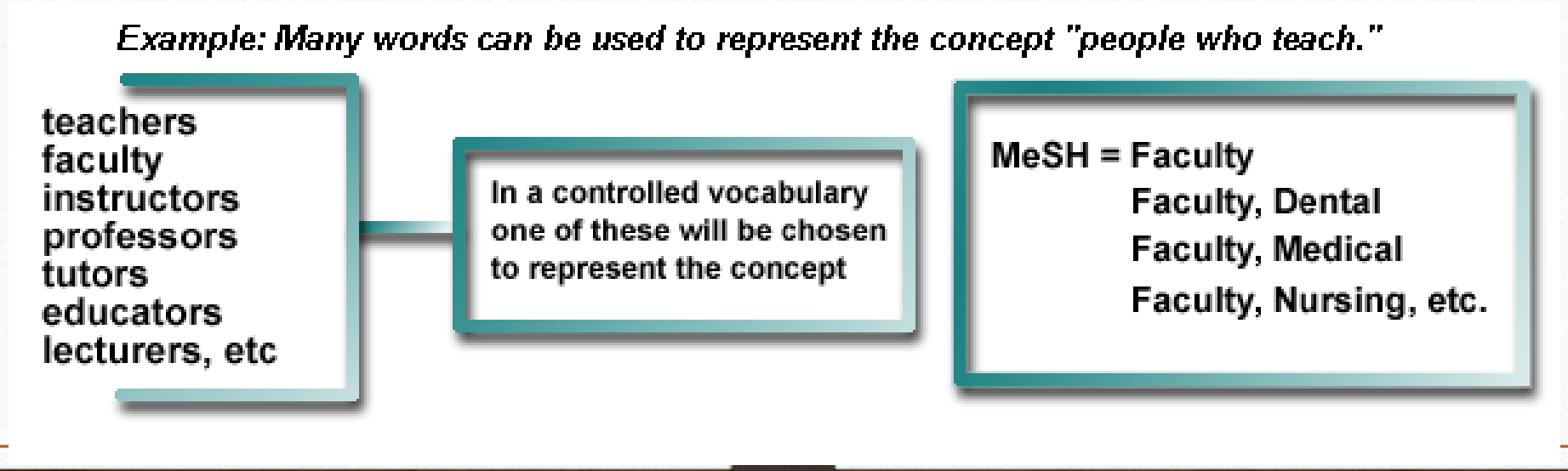
Controlled vocabulary searching

- You need to consult a thesaurus (paper or online) to find out what the controlled vocabulary term is for each concept.

Controlled Vocabulary

A controlled vocabulary is a set of established terms where

- every term represents a single concept
- only one term is used for that concept



Another example

- How many words could you think of for the idea of "cancer"?
  - Cancer, tumor, malignancy, neoplasm, sarcoma…
- Articles in a database
  - Article one: "Breast tumors in young women"
  - Article two: "Surgery for prostrate cancer."
  - Article three: "Diagnosing Melanoma."

All three articles are about types of cancer but different terms are used in titles.

In a controlled vocabulary ONE word (*i.e.*, cancer) is chosen and placed in a special field, usually called a subject field.

For all three articles

- Article one: "Breast tumors in young women"
- Article two: "Surgery for prostrate cancer."
- Article three: "Diagnosing Melanoma."

The subject term (concept term) "cancer" is placed in the subject field by database indexers.

' find?

Advantages to Controlled Vocabularies

- Using the controlled vocabulary can make your search more precise and easier.
- Increases the relevancy of results (fewer false drops)
- The indexers have already done much of the work for you.
- Searchable tree structures of terms can help you find new terms to use.

education

physiology

Restrict to MeSH Major Topic.

Do not include MeSH terms found below this term in the MeSH hierarchy.

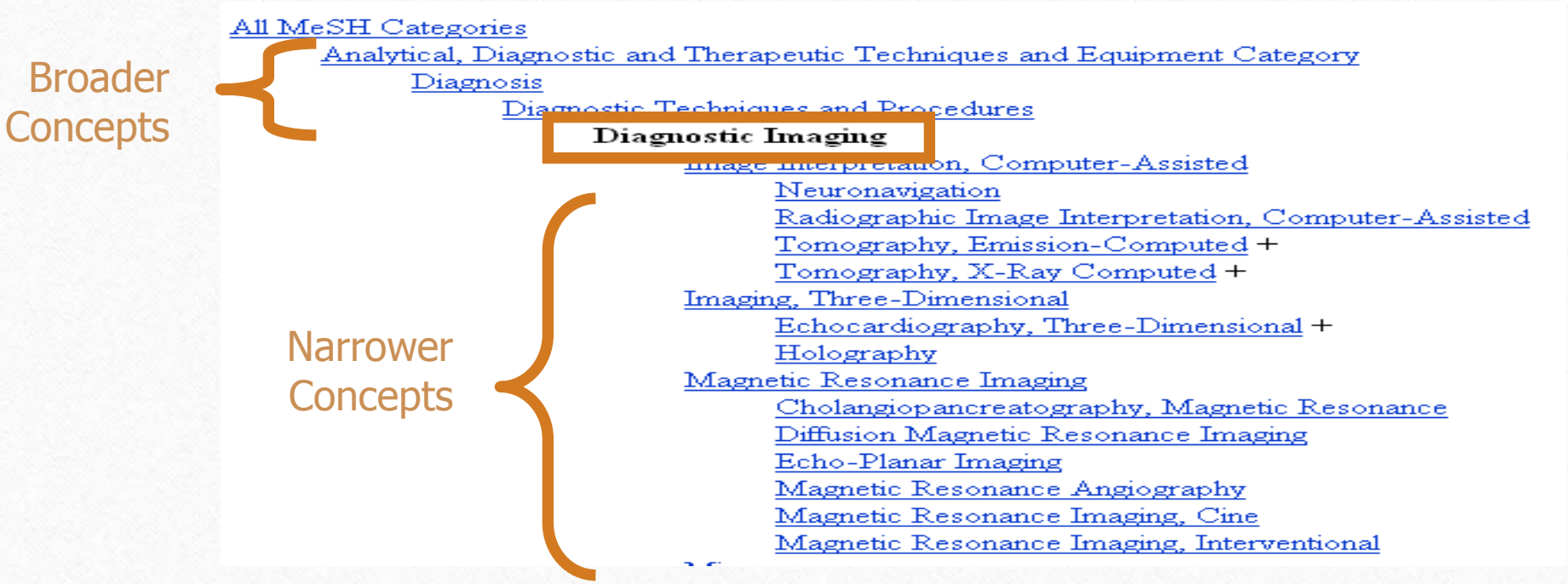
Tree Number(s): C04
MeSH Unique ID: D009369
Entry Terms:

- Neoplasm
- Tumors
- Tumor
- Neoplasia
- Cancer
- Cancers
- Benign Neoplasms
- Neoplasms, Benign
- Benign Neoplasm
- Neoplasm, Benign

See Also:

- Antibodies, Neoplasm
- Antigens, Neoplasm
- Antineoplastic Agents
- Carcinogens
- DNA, Neoplasm
- Oncogenic Viruses
- Precancerous Conditions
- RNA, Neoplasm
- Pleural Effusion, Malignant
- Genes, Tumor Suppressor
- Anticarcinogenic Agents

Structure of Controlled Vocabulary



Problems with Controlled Vocabularies

- NOT all databases use a controlled vocabulary
- New concepts take time to be added
- There is often a lag phase during which the newest articles aren't indexed
- Controlled vocabularies can contain some very strange things and some concepts may not be handled well
- The controlled vocabulary must be easily searchable

Some Specialty Features

- **Truncation**
- **Phrase searching**
- **Neighboring and other rarer Boolean operators**

Truncation

What about including the singular and plural versions of words as well as other word variations?

For example: **therapy, therapies, therapeutics,**

You could combine them all in an OR relationship:

(therapy OR therapies OR therapeutics OR therapeutic)

But an easier way is by the use of truncation.

therap*

Each database handles truncation in a unique way.

The ‘*’ and ‘$’ are the most common wildcard symbols.

More on Truncation

Some examples:

Bacter$

Proc*
Vir?
Staph?

Be cautious when truncating!

If the word stem is too short, there may be too many possible variations and you might pick up unrelated terms.

For example, using proc* for finding procaine-like drugs will also include words like proceedings and process.

Phrase Searching

- Sometimes you want to force the database to search for a set of words in exact order

  "fever of unknown origin"

Most databases will accept a phrase in quotes.

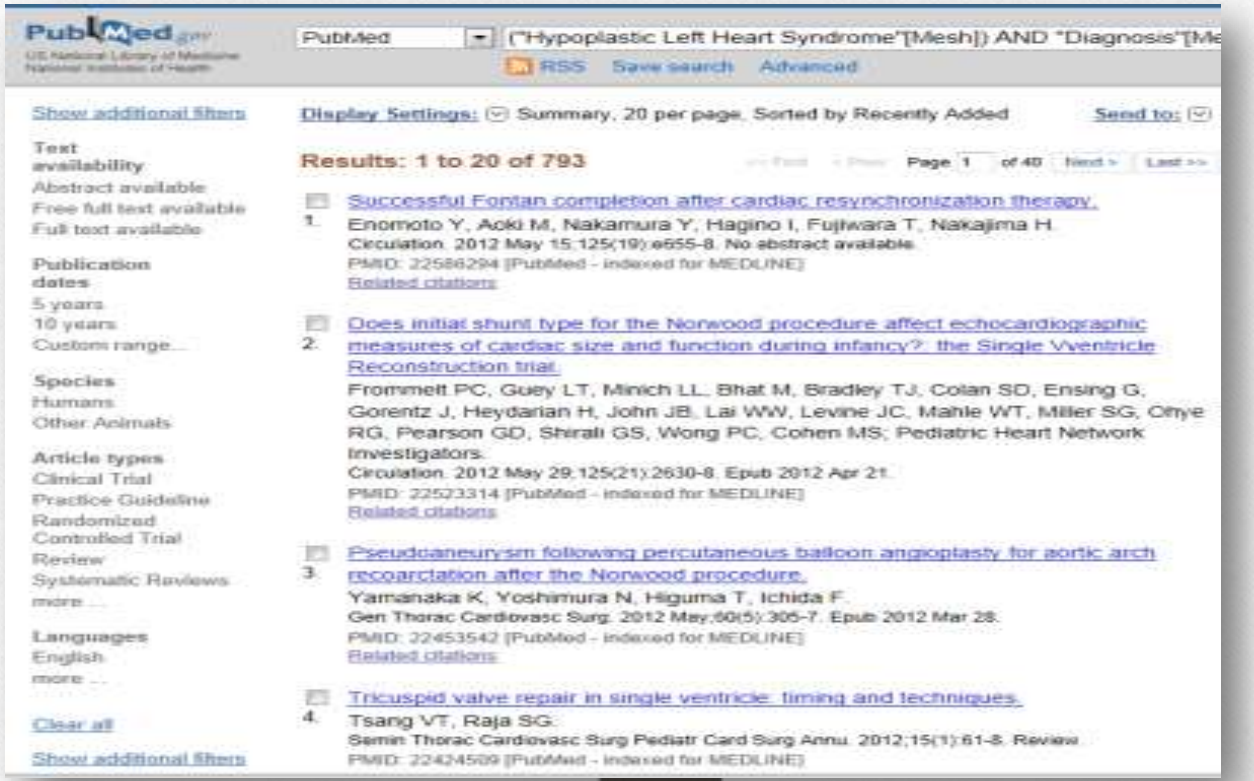
BUT…some do not handle phrases well and will automatically break them up – usually 'AND'-ing the terms

Check how the database handles phrase searching before doing it!

Limits Options

- Many databases provide “limits” pages that make it easier for you to select common options such as language, article type, publication dates, human or animal, gender, age groups, etc.
- Each database’s limits options are unique
- Most limits can be done ‘by hand’ using field tags, but sometimes limit pages save time

PubMed Limits Page



Step-By-Step Search Construction

1. State the question
2. Identify the concepts in the question
3. For each concept, determine keywords and subject terms
4. Specify field tags after terms if needed
5. Combine terms for the same concept with "OR" in parenthesis
6. Combine "OR" statements with AND
7. Put any NOT terms at the end

Keep track of your searches, how many articles were found total, and how many you selected as relevant

Final Notes on Fields

- Each database provides its own specific fields
- Each database requires a specific format to designate field searching
- When searching a new database, take a moment to read the help documentation; most will provide a list of fields and how to search them.

Don't forget…

- Boolean logic to combine terms
- Use of other search fields in combination with subject terms

A Complex Search:

(head[mh] OR head[tw]) AND (wound and injuries[mh] OR trauma[ti] OR injury[ti]) AND 2005[dp] AND English[la]

Example

- Question: What is the appropriate ED medical management of adult patients with intracranial hemorrhage (either trauma or spontaneous)?

Thank You for your attention

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