Great Western Hospitals NHS Foundation Trust

BUILDING AN EFFECTIVE SEARCH STRATEGY

Academy Library and Information Service

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based on *Building Search Strategies* by the University of Tasmania Library http://utas.libguides.com/SystematicReviews/SearchStrategies

1. INTRODUCTION

Building an effective search strategy is all about asking the right question, and defining that question in such a way that finds the results that you need. A planned search strategy also makes sure a search is undertaken in exactly the same way each time, and allows the search to be repeated by other researchers in the future with the same results.

In this presentation we will present the basics, but for more detailed training please contact the Academy Library.

2. FORMULATING THE QUESTION

A research question should be clear and focused – not too vague, too specific or too broad.

Use the **PICO** method to help formulate the question:

- **P** = patient or population
- **I** = intervention (or exposure)
- **C** = comparison (or control)
- **O** = outcome

So in this example: "Is animal-assisted therapy more effective than music therapy in managing aggressive behaviour in elderly people with dementia?"

- Patient = elderly people with dementia
- Intervention = animal-assisted therapy
- Comparison = music therapy
- Outcome = managing aggressive behaviour

3. IDENTIFYING THE KEY CONCEPTS

Transfer the concepts that you've identified in your question to a table:

PATIENT	INTERVENTION	COMPARISON	OUTCOME
Dementia	Animal assisted therapy	Music therapy	Aggressive behaviour

The next step will be to add 'free-text' terms and 'controlled vocabulary' terms. As the name implies, free text terms are alternative words for your concepts (synonyms, UK/US terminology, medical/laymen's terms, acronyms/abbreviations, drug brands etc); controlled vocabulary terms are strictly controlled search terms used by databases to index records.

4. ADDING FREE-TEXT TERMS

Important articles may be missed if not all relevant alternative terms are included in the search. Some authors will use the ***same terms*** as you while other authors may refer to the ***same concept using a different term***. For this reason it's useful to think of alternative words, concepts, and terms which may be relevant.

- Conduct a simple search on the topic – look at words in titles, abstracts and author's keywords
- Scan for synonyms, alternative spelling variants, acronyms, abbreviations, medical terms, laymen's terms, drug brand names, and alternative ways of ordering phrase words
- Initial literature scanning of core articles – look at titles and abstracts and author's keywords
- Speak to an expert in the field / supervisor
- Google / Wikipedia may identify additional terms
- Check for existing search strategies on the same topic

4. ADDING FREE-TEXT TERMS

List similar terms underneath the main concepts as follows:

PATIENT	INTERVENTION	COMPARISON	OUTCOME
Dementia Alzheimer Huntington Kluver Lewy	Animal assisted therapy Animal-assisted activities Animal-assisted interventions Animal therapy Pet therapy Dog therapy	Music therapy Music Singing Sing Auditory stimulation	Aggressive behaviour Neuropsychiatric Apathy inventory Cornell scale Behavior Behaviour

5. ADDING CONTROLLED VOCABULARY

A ‘controlled vocabulary’ can also be known as medical subject headings, or thesaurus terms, descriptors, or index terms. All databases use them to describe, in a consistent and systematic way, the content of each article in a database. Unlike ‘free-text’ these are specific and set terms.

Including controlled vocabulary in your search is useful because they provide a way of retrieving articles that may use different words to describe the same concept and because they can provide information beyond that which is simply contained in the words of the title and abstract.

Carry out a simple search using a few key concepts in the different databases, to find some relevant articles and see how they were indexed using controlled vocabulary. Repeat this for a number of different articles to see what subject headings have been used and decide whether you want to use them for your own search too.

5. ADDING CONTROLLED VOCABULARY

List these terms underneath the main concepts and free text terms as follows:

PATIENT	INTERVENTION	COMPARISON	OUTCOME
Dementia	Animal assisted therapy	Music therapy	Aggressive behaviour
Alzheimer	Animal-assisted activities	Music	Neuropsychiatric
Huntington	Animal-assisted interventions	Singing	Apathy inventory
Kluver	Animal therapy	Sing	Cornell scale
Lewy	Pet therapy	Auditory stimulation	Behavior
Dementia [mh]	Dog therapy	Music [mh]	Behaviour
	Animal Assisted Therapy [mh]	Music Therapy [mh]	Aggression [mh]
	Pets [mh]	Acoustic Stimulation [mh]	Personality inventory [mh]
	Dogs [mh]	Singing [mh]	Psychomotor agitation [mh]
	Bonding, Human-Pet [mh]		

6. SEARCH FIELDS

For the **free-text** terms you identified in Step 4, you need to decide in which fields you want to search. Search fields vary from database to database. It is therefore important to become familiar with each database you would like to search. Each database has a Help function which outlines the different search fields available and what they search.

By default, most databases will search for your terms in ALL fields, but to narrow searches you can choose to search title [ti], or abstract (summary) [ab], or keywords [kw]. Some databases allow searching of more than one field, e.g. title and abstract [tiab]

Make a careful note of which fields you searched so that your search can be replicated. E.g. Dementia [tiab], music [tiab], pets [tiab]

6. SEARCH FIELDS

PATIENT	INTERVENTION	COMPARISON	OUTCOME
Dementia [tiab]	Animal assisted therapy [tiab]	Music therapy [tiab]	Aggressive behaviour [tiab]
Alzheimer [tiab]	Animal-assisted activities [tiab]	Music [tiab]	Neuropsychiatric [tiab]
Huntington [tiab]	Animal-assisted interventions [tiab]	Singing [tiab]	Apathy inventory [tiab]
Kluver [tiab]	Animal therapy[tiab]	Sing [tiab]	Cornell scale [tiab]
Lewy [tiab]	Pet therapy [tiab]	Auditory stimulation [tiab]	Behavior [tiab]
Dementia [mh]	Dog therapy [tiab]	Music [mh]	Behaviour [tiab]
	Animal Assisted Therapy [mh]	Music Therapy [mh]	Aggression [mh]
	Pets [mh]	Acoustic Stimulation [mh]	Personality inventory [mh]
	Dogs [mh]	Singing [mh]	Psychomotor agitation [mh]
	Bonding, Human-Pet [mh]		

7. PHRASE SEARCHING, TRUNCATION, WILDCARDS AND PROXIMITY OPERATORS

All databases allow each of these techniques to improve a search, but they differ from database to database in how they are used. Always use the **Search Help** function of a database first to see how they work in different databases.

Phrase searching
Phrase searching allows users to search for articles containing a phrase rather than containing a set of keywords in random order. For most databases the phrase needs to placed in double quotation marks; e.g. "skin cancer". This is particularly useful if the words on their own are common.

Truncation
Truncation is a technique that broadens your search to include various word endings. To use truncation, enter the root of the word with the truncation symbol at the end. E.g. genetic* finds genetic, genetics or genetically. Apply truncation with caution. It may cause an excessive number of irrelevant variants, especially if the root of the word is short or common.

7. PHRASE SEARCHING, TRUNCATION, WILDCARDS AND PROXIMITY OPERATORS

Wildcards
A wildcard character can be used to substitute for any other character or characters in a string. This is useful if a word is spelled in different ways but has the same meaning, e.g. American/British spell variants. E.g. wom#n finds woman or women; col?r finds color or colour

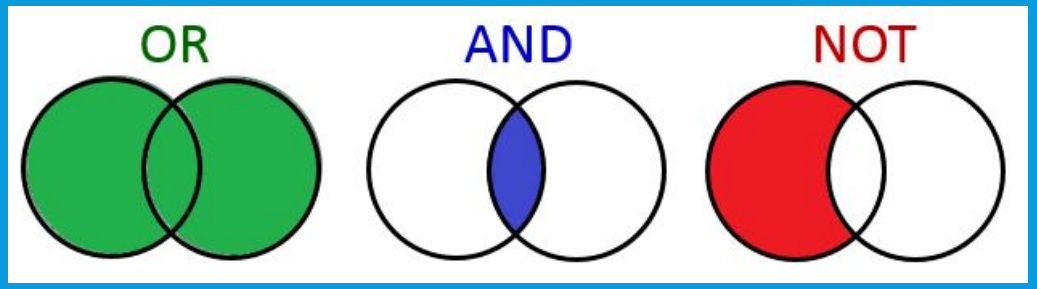
Proximity Operators
Proximity operators are sometimes called adjacency operators. They enable you to define how closely you want your search terms to be found in relation to one another. Remember to check the databases' **Search Help** to see how they do this.

7. PHRASE SEARCHING, TRUNCATION, WILDCARDS AND PROXIMITY OPERATORS

PATIENT	INTERVENTION	COMPARISON	OUTCOME
Dementia [tiab]	Animal assisted therapy [tiab]	Music therapy [tiab]	Aggressive behaviour [tiab]
Alzheimer* [tiab]	Animal-assisted activities [tiab]	Music* [tiab]	Neuropsychiatric [tiab]
Huntington* [tiab]	Animal-assisted interventions [tiab]	Singing [tiab]	"Apathy inventory" [tiab]
Kluver [tiab]	Animal therap* [tiab]	Sing [tiab]	Cornell scale [tiab]
Lewy [tiab]	Pet therap* [tiab]	"Auditory stimulation" [tiab]	Behavior [tiab]
Dementia [mh]	Dog therap* [tiab]	Music [mh]	Behaviour [tiab]
	Animal Assisted Therapy [mh]	Music Therapy [mh]	Aggression [mh]
	Pets [mh]	Acoustic Stimulation [mh]	Personality inventory [mh]
	Dogs [mh]	Singing [mh]	Psychomotor agitation [mh]
	Bonding, Human-Pet [mh]		

8. BOOLEAN OPERATORS

Conceptualised by George Boole in the 1840s, Boolean operators are used in modern computing today to combine variables. In database searching we can use the operators OR, AND, and NOT, to include, exclude, and/or combine our database search terms.



Once all free-text terms and controlled vocabulary terms have been identified, you can start the searching process. Search for each identified search term individually, then use the correct Boolean operators to combine the terms. This allows you to see which search terms add value to the search and if a particular search term produces too many irrelevant results.

The **Search Help** of most databases will guide you on how they apply these operators.

8. BOOLEAN OPERATORS

OR

An OR search will find information which includes either search term. All free text and controlled vocabulary terms identified for a concept are to be combined with an OR. This is to broaden the search and to capture all articles on a topic regardless of which term is used in the article.

e.g. Dementia OR Alzheimer* OR Huntington*

8. BOOLEAN OPERATORS

AND

An AND search will find results with information common to both search terms. Once all relevant information for each concept has been found, the concepts are joined with AND. This is to narrow the search and to only capture articles in which all concepts appear.

e.g. (Dementia OR Alzheimer* OR Huntington*) AND (Animal assisted therapy OR Animal-assisted activities OR Animal therap*)

8. BOOLEAN OPERATORS

NOT

A NOT search will exclude words from your search results. This is to narrow your search, telling the database to ignore concepts that may be implied by your search terms. If you are interested in only finding animal studies you may be tempted to type NOT animals. This means that articles that include the word animals are excluded, including studies on animals as well as humans, which potentially are relevant. As a NOT search has the potential to exclude relevant articles, it is not normally recommended for a systematic review.

e.g. (Dementia OR Alzheimer* OR Huntington*) AND (Animal assisted therapy OR Animal-assisted activities OR Animal therap*) NOT (veterinary)

N.B. All databases support these Boolean operators. The syntax for the NOT operator may vary slightly.

8. BOOLEAN OPERATORS

Concept 1	Concept 2	Concept 3	Concept 4
Variety of free-text and controlled vocabulary terms Combine all terms with **OR**	Variety of free-text and controlled vocabulary terms Combine all terms with **OR**	Variety of free-text and controlled vocabulary terms Combine all terms with **OR**	Variety of free-text and controlled vocabulary terms Combine all terms with **OR**

AND **AND** **AND**

9. SEARCH LIMITS

Once you have completed your search, combining all the concepts in free-text and controlled vocabulary, you can then limit your search. Common limits include: date/year, language, country, you can also limit by research type: RCT, systematic review, etc. It's also useful to prepare a justification of your reasons for limiting the search as this will effect your results.

Methodological search filters are search terms/strategies to identify a topic or aspect (e.g. study type, age group). They are "tried and tested" strategies intended for repeated use. If there is a relevant study type filter available, add it to your search.

See an example of a systematic review filter here.

10. SEARCH DEVELOPMENT

Searching is an iterative process, and it may take several attempts to get the results you need. If you need to expand a search (because you got no hits) or reduce a search (because you got too many) make a note of why and re run your search as required.

Always keep copies of your search, printing out your **Search History** as you go and constantly look at the search results to determine whether the results are relevant.

Remember you may have to adjust your search to use it on different databases. The controlled language, the search fields, the symbols used for proximity/wildcards, the use of Boolean operators may differ across each.

10. SEARCH DEVELOPMENT

Remember to note the following for every search:

- Databases searched, including database provider/platform (eg. OVID Medline, ProQuest PsycINFO, Ebsco CINAHL)
- Date search was conducted
- Search strategy: subject headings and keywords used, including whether terms were exploded, truncated, and how terms were combined
- Years searched
- Filters used
- Number of results retrieved for each search
- Total number of records
- Duplicates identified
- Numbers pre-screening and post-screening (i.e. what you filter out/in as irrelevant/relevant

FURTHER HELP

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If you would like to know more about searching, to learn how to search databases, or find help with a search please contact the Academy Library.

We provide:

- A library catalogue with access to collections around the South West
- Local, regional, and national health care databases (with access to e-books and journals)
- Database training for individuals and groups, plus bespoke training on finding information
- Literature searching and current awareness services

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