Conducting a Literature for a Systematic Review

2011 SMP Research Skills Program

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› We wish to extend our thanks to the following staff for sharing their time, research and expertise in developing this program.

› Margot Day, Sub-Dean USydMP Honours Post-graduate Co-ordinator

› Pauline Kennedy, Medical Program Administration Unit

› Asbestos Disease Research Institute, Bernie Banton Centre

› Cochrane Collaboration
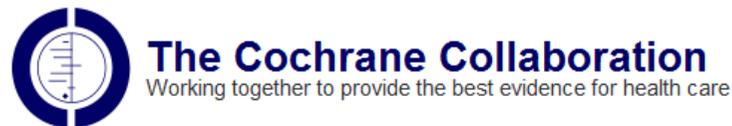
› You will learn to:

- Identify the differences between the different types of review article.

- Know where literature searching falls in the systematic review process.

- Identify the databases and resources required for a comprehensive review search.

- Construct a search strategy for use in a systematic review.

- Search databases using a combination of subject headings and keyword search techniques.

- Document and report a search strategy.

What's the difference?

Image generated from Wordle http://www.wordle.net/

Literature Review

› Also known as "Narrative' or 'Overviews'

› Section of a dissertation/thesis or a paper in their own right.

› gives an overview and provides comprehensive knowledge of what has been written on a particular topic.

› Conveys...what has been said, who the key writer's are, what are the prevailing theories and hypotheses, what questions are being asked.

› summarises and synthesises the arguments and ideas of others and highlights the strengths and weaknesses of these ideas and arguments

› provides a solid background for a research paper's investigation.

Queensland University of Technology. Writing literature reviews [Internet]; 2010 [updated 2010 Jul 27; cited 2010 Dec 6]; Available from: http://www.citewrite.qut.edu.au/write/litreviews.jsp.

Systematic Reviews

"attempts to collate all empirical evidence that fits pre-specified eligibility criteria to answer a specific research question"

Key characteristics:

- Clearly stated set of objectives with pre-defined eligibility criteria for studies;

- An explicit reproducible methodology;

- A systematic search that attempts to identify all studies that meet the eligibility criteria;

- An assessment of the validity of the findings of the studies, through the assessment of risk of bias;

- A systematic presentation and synthesis of the characteristics and findings of the included studies;

- May or may not include a meta-analsysis.

Higgins J, Green S, Cochrane Collaboration. Cochrane handbook for systematic reviews of interventions. Chichester, England ; Hoboken, NJ: Wiley-Blackwell; 2008.

Radiotherapy for malignant pleural mesothelioma (Review)

Chapman E, García Diéguez M

THE COCHRANE COLLABORATION®

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2010, Issue 4

http://www.thecochranelibrary.com

WILEY
Publishers Since 1807

Radiotherapy for malignant pleural mesothelioma (Review)
Copyright © 2010 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Differences between Narrative and Systematic Reviews

› Traditional reviews are prone to bias. The author may:

- Only choose studies which they are familiar with or support their view-point [selection bias]

- Only select studies which have been published [publication bias]

- Only select studies written in English [language bias]

- Only search a limited number of databases or use a limited choice of search terms [indexing bias]

South African Cochrane Centre. What is a Systematic Review? [updated 2010, Dec 23; cited 2011, Mar 18]; Available from: http://www.mrc.ac.za/cochrane/systematic.htm.

What is a meta-analysis?

› A research review method that combines the evidence of multiple primary studies by employing statistical methods, enhancing the objectivity and validity of findings.

› The research design and hypotheses of primary studies need to be very similar if not identical.

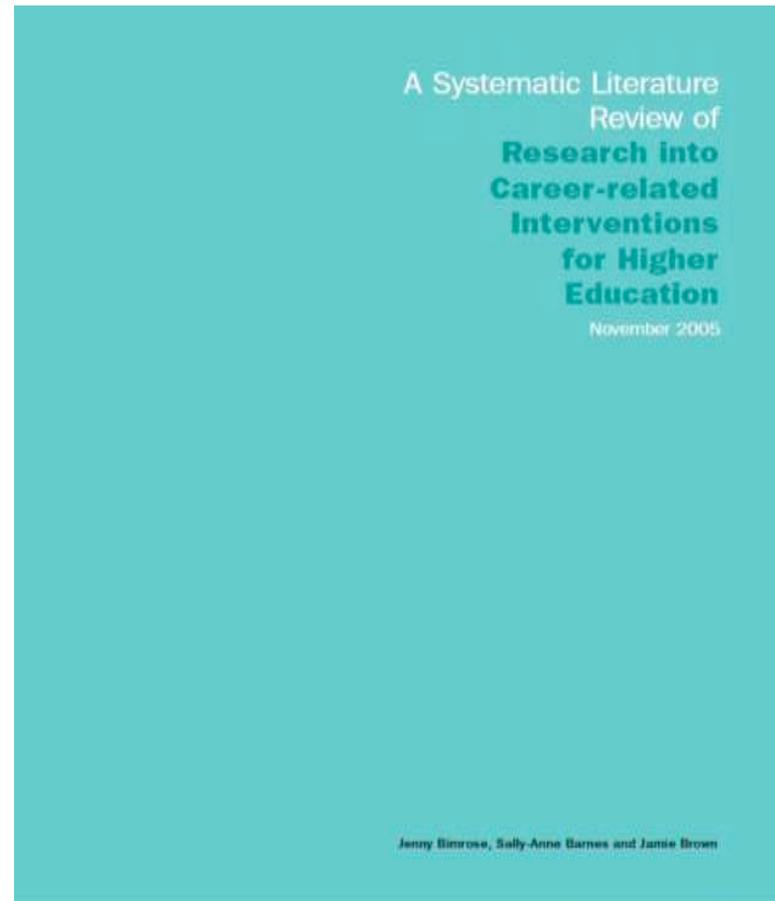› Not always appropriate for use in a systematic review.

Systematic Literature Review

› A systematic literature review is a review where all procedures are documented – the research trail of databases and search terms used is made explicit.

- ...involves adopting a "replicable, scientific and transparent" approach and providing an "audit trail of reviewers' decisions, procedures and conclusions.

- Based upon work by down by researches in the medical and health sciences but expanded to other disciplines such as education and management.

Moustaghfir, K. The dynamics of knowledge assets and their link with firm performance". Measuring Business Excellence 2008;12(2):10-24
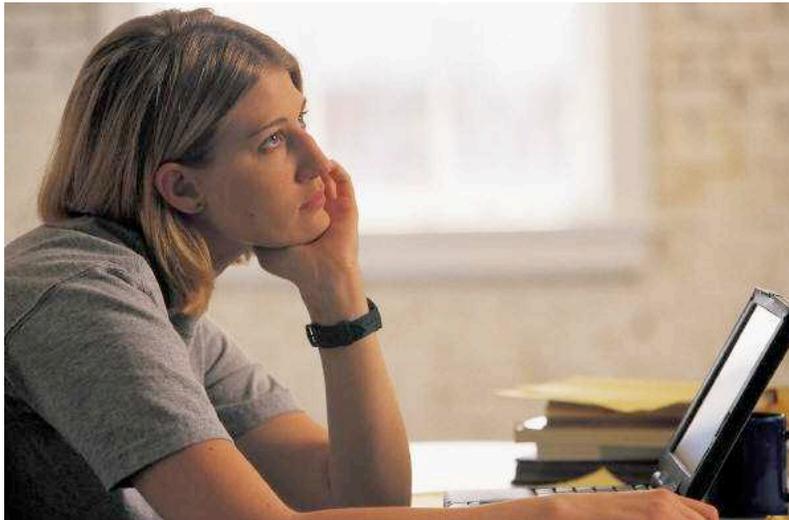
Systematic Literature Reviews

› Systematic literature reviews include the following

- The type of literature searched, and excluded (e.g. articles in particular types of journals, but not conference papers, dissertations, textbooks) giving the reason.

- The method of classification – for example, years of publication, theme.

- Databases searched, search and thesaurus terms used.

- Any other type of searching used, for example hand searching.

- Limiting criteria, for example dates, geographical coverage, type of publication etc

- Tracking method for citations.

- What the criteria were for inclusion and exclusion in the final review.

- How the papers were analysed.

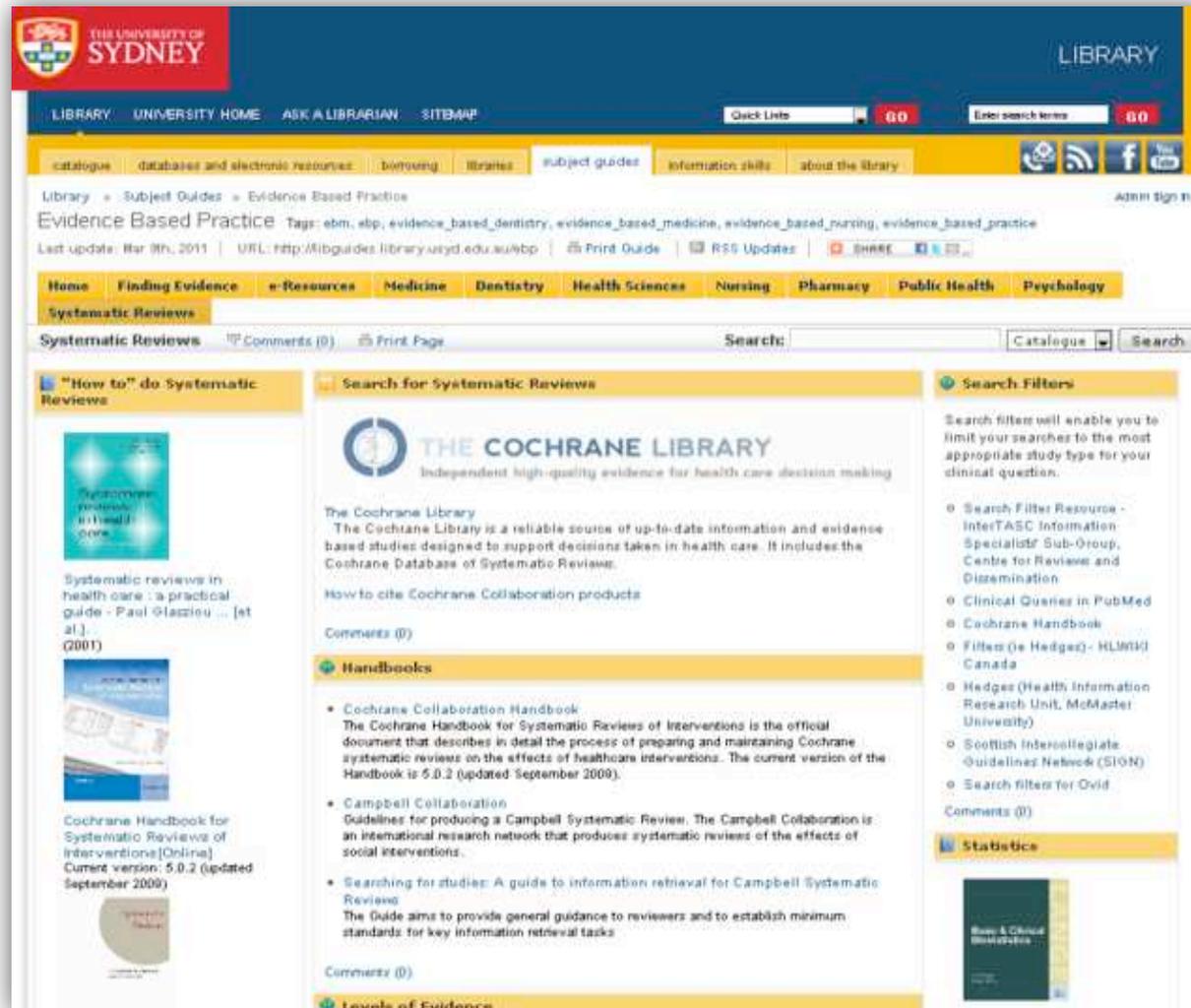Adolphus, Margaret. How to....carry out a literature review for a dissertation or paper [Internet]; 2010 [cited February 16, 2010]; Available from: http://www.emeraldinsight.com/research/guides/methods/literature2.htm?part=4 .

A Systematic Literature Review

A Systematic Literature
Review of
**Research into
Career-related
Interventions
for Higher
Education**
November 2005

Jenny Bimrose, Sally-Anne Barnes and Jamie Brown

Institute for Employment Research,
University of Warwick

WARWICK INSTITUTE for
EMPLOYMENT RESEARCH IER

You've decided to do a systematic review – where do you begin?

Where can I find info on systematic reviews?

Investigate Cochrane Collaboration resources

› Australasian Cochrane Centre

  - Individual Cochrane Review Groups:

    - Renal Group (Children's Hospital at Westmead):
      http://www.cochrane-renal.org/

    - Public Health (Melbourne): http://ph.cochrane.org/welcome

› Campbell Collaboration (Education, Crime & Justice, Social Welfare)

  - http://www.campbellcollaboration.org/

Process of undertaking a Systematic Review

1. Question formulation & protocol development.

2. Finding studies: searching the literature.

3. Study selection and appraisal.

4. Summary and synthesis of relevant studies.

5. Determining the applicability of results.

Advisable to develope a protocol outlining the question and proposed methodology before proceeding with the review

A 1999 analysis of 37 meta-analyses showed that the average hours for a review was 1139 (median 1110) or about 30 person weeks of full-time work.

Breakdown:

› 588 hours protocol development, searching & retrieval.

› 144 hours statistical analysis.

› 206 hours writing.

› 201 hours administration.

Allen, I. E., Olkin, I. Estimating time to conduct a meta-analysis from number of citations retrieved. JAMA : the journal of the American Medical Association 1999;282(7):634-5.

Depends on the resources available:

Cochrane Reviews:

› Title to Protocol stage: approximately 3 months

› Protocol to Review: 6-12 months

› Updates at least every 2 years.

A systematic review is best done by a team of people rather than one person, consisting of:

- Someone to write the review

- Content or subject experts;

- A methodologist, or someone experienced in the methods of a conducting a review;

- A statistician;

- Someone experienced in literature searching;

› Two people to do the:

- Study selection and appraisal.

- Data collection and analysis

.

Question Formulation

- Need to develope a relevant and answerable question – this can take some time.

- Has a review been published on the topic – do a scoping search!

Let's think about your review question

How broadly or narrowly focused should it be?

A narrow review question:

Easy for reviewer but less useful for the reader.

A broad review question :

More difficult for the reviewer but more useful for the reader.

› Broad Review Questions:

- Surgical interventions for patients with malignant mesothelioma

- Incentive-based interventions to increase physical activity

Narrow Review Questions

- Extra-corporeal shock wave lithotripsy versus ureteroscopic management for ureteri calculi in middle-aged men

- Antibiotic prophylaxis to reduce respiratory tract infections and mortality in adults receiving intensive care
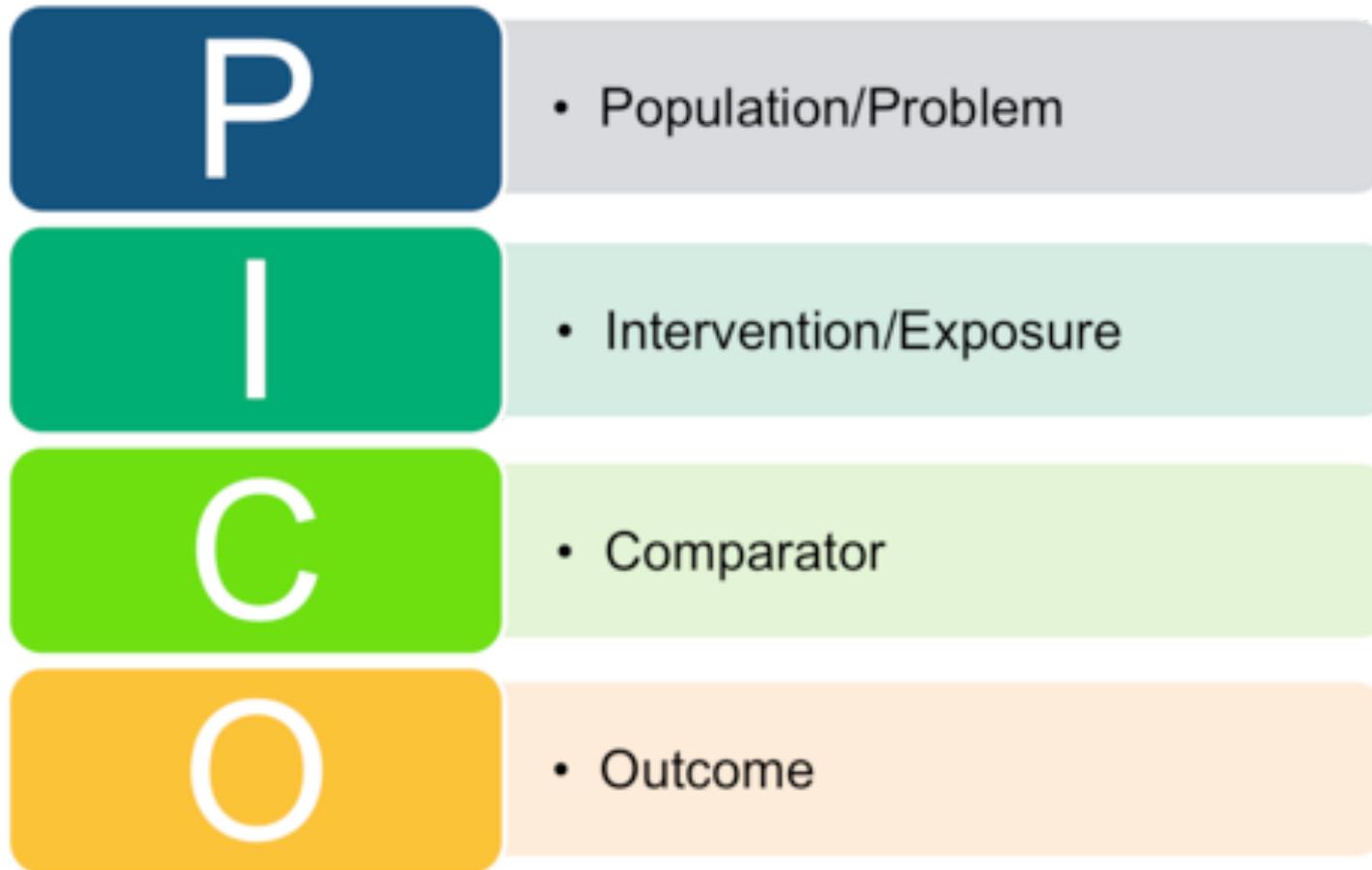
Surgical interventions for patients with malignant mesothelioma

	Question	Search Terms
P	Malignant mesothelioma patients	Malignant mesothelioma
I	Surgical interventions	Pneumonectomy, Extrapleual pneumonectomy, pleurectomy, decortication,
C	Surgical interventions	
O	Quality of life Survival Improvement in symptoms	
Question Type: Intervention / Therapy		
Best Study Design: Meta-Analysis / Systematic Review > Randomized Controlled Trial		

Resources to Help you with Brainstorming your question

› Literature you have already read

› Subject experts

› Drug information

- eTG: Treatment guidelines for Australia (what drugs are used?)

- AusDI / MIMS: Class, Generic and Brand Names

› Synonyms

- Dictionaries

- Encyclopaedias

- eMedicine (synonym tool)

- MediLexicon for acronyms

- Plurals, truncation, phrasing

› Spelling: US / English

› Prognostic Indicators

- Think of every possible outcome (big picture to the minutiae)

Therapy / Intervention
- To determine the most appropriate treatment for a particular condition (drug treatment, surgical procedure, other)

Diagnosis
- Questions the validity and reliability of a particular diagnostic test or screening method

Prognosis
- To find likely outcomes for patients where their illness is identified early

Aetiology / Harm
- Is there a relationship between exposure to a potentially harmful agent and developing a particular condition

T. Greenhalgh (2010) How to Read a Paper: the basics of evidence-based medicine. **Pg 36.**

Duke University Medical Centre Library (2005)
Evidence-Based Medicine Resources
http://www.mclibrary.duke.edu/subject/ebm/searching/ebmresources.pdf

Table 2 Appropriate study designs for addressing different clinical questions

Question type	Generic examples	Best design†	Other possible designs
Intervention	• Drug vs control • Drug vs drug • Procedure vs control • Decision support system vs usual practice	Randomized controlled trial	Cohort study Case–control study
Diagnostic accuracy	• Test A vs reference test • Test A vs Test B vs reference	Cross-sectional study	–
Aetiology	• Exposure present vs absent	Cohort study	Case–control study
Prognosis	• Exposure present vs absent	Cohort study	–

†In all cases, a systematic review of all available studies of the best type is preferable to single studies.

Cross, Nicholas B., Craig, Jonathan C., Webster, Angela C. Asking the right question and finding the right answers. Nephrology 2010;15(1):8-11.

› A scoping search is designed to give an overview of the published literature on your research question.

› Can be done quite quickly using a simple search strategy.

› Use it to find out if any systematic reviews have already been published, and to get an idea of how much literature is available.

- Use Database limits to find systematic reviews or RCT's etc.

Once you have your question you should prepare a protocol

A protocol is:

A pre-defined plan or methodology that outlines the approach to a systematic review.

About Cochrane Systematic Reviews and Protocols. Oxford, UK: The Cochrane Collaboration; c2004-2006 [cited 2011 22nd February]; Available from: http://www.thecochranelibrary.com/view/0/AboutCochraneSystematicReviews.html.

What does a protocol look like?

Title*
Protocol information:
    Authors*
    Contact person*
    Dates
    What's new
    History
The protocol:
    Background*
    Objectives*
    Methods:
        Criteria for selecting studies for this review:
            Types of studies*
            Types of participants*
            Types of interventions*
            Types of outcome measures*
        Search methods for identification of studies*
        Data collection and analysis*
    Acknowledgements
    References:
        Other references:
            Additional references
            Other published versions of this review
    Tables and figures:
        Additional tables
        Figures
Supplementary information:
    Appendices
    Feedback:
        Title
        Summary
        Reply
        Contributors
About the article:
    Contributions of authors
    Declarations of interest*
    Sources of support:
        Internal sources
        External sources
    Published notes

Green S, Higgins JPT (editors). Chapter 2: Preparing a Cochrane review. In: Higgins JPT, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.0.1 (updated September 2008). The Cochrane Collaboration, 2008. Available from www.cochrane-handbook.org.

Mycophenolic acid versus azathioprine as primary immunosuppression for kidney transplant recipients (Protocol)

Wagner M, Balk EM, Webster AC, Raman G, Trikalinos TA, Schmid CH, Uhlig K

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It's systematic:

› Focused question

› Comprehensive search of all resources

› Free of bias

› Be **Sensitive**

- use multiple sources and try to find all the available literature

› Be **efficient**

- start where you expect highest yield, keep your search within reason

› Minimise **bias**

- don't limit your search by language, year, publication status

Structure of a search strategy

› The strategy should be based on your eligibility criteria

› Use the 2 or 3 most important concepts in your question

› Use those most likely to be found in the title and the abstract of an article.

› Use PICO

› Aim for high sensitivity

› Use synonyms – express your concepts as in many ways as you can.

› Use the controlled vocabulary of each database you search.

› Use textwords in addition to your subject headings.

› Test and revise your strategy for each database you search – this may lead to more results.

Initial Search Strategy for all databases	
Patient Population	Intervention
malignant mesothelioma [as subject heading]	Pneumonectomy [as subject heading]
malignant mesothelioma [as textword]	Pneumonectomy [as textword]
	Extrapleural pneumonectomy [as subject heading]
	Extrapleural pneumonectomy [as textword]
	EPP [as textword]
	pleurectomy [as subject heading]
	pleurectomy [as keyword]
	decortication [as subject heading]
	decortication [as textword]

Using a Controlled Vocabulary

› Use the subject terms (known as the controlled vocabulary) for each database you search.

› Will find relevant articles even if different terms are used for each concept.

› Use the database interface to find the best subject heading – they will guide you through the process.

› For databases such as Embase and Medline, don't automatically explode – take care in selecting your subject headings.

› Subject headings may be different for each database.
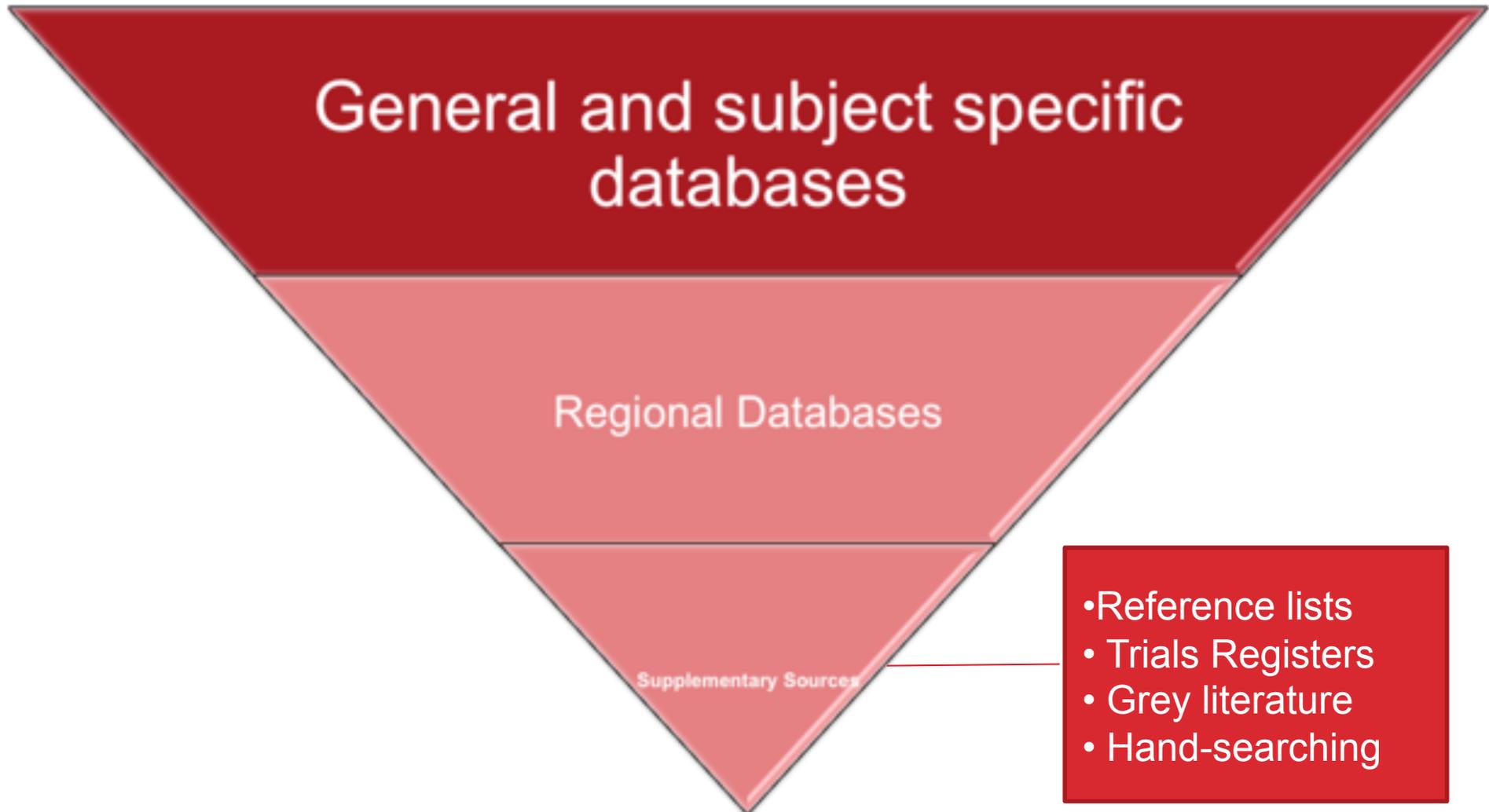
› Indexers are human, therefore you need to use textwords.

Using Textwords

› These are words appearing in the title and abstract of a database record.

› In Medline add the field suffix .tw to your word:

  - For example: pleurectomy.tw

› Allows you to use synonyms, related terms, alternative spelling, abbreviations, acronyms:

  - For example: lung cancer, lung neoplasms

› Use truncation and wildcards - * $?

  - For example: transplant* will retrieve transplants, transplantation

› Proximity indicators – ADJ, NEAR, NEXT

  - For example: malignant ADJ3 meothelioma*.tw will retrieve malignant mesothelioma, malignant pleural mesothelioma etc.

› Syntax may be different for each database you search. Use the help for each database.

What study design filter should I use?

› A search strategy designed to limit your results to specific study types.

   - For example, randomised controlled trials

› Research by different organisations has been done to identify the most sensitive and efficient search terms

› Select your filter:

   - Database and interface to be searched

   - Study design required for your review.

› You can use:

   - Built in database filters

   - Filters developed by Cochrane or Health Information Research Unit at McMaster University etc.

› Need to document what you have used

Be Comprehensive – but efficient

General and subject specific databases

Regional Databases

Supplementary Sources

- •Reference lists
- • Trials Registers
- • Grey literature
- • Hand-searching

Where do you look for studies?

Start where you expect to retrieve the most evidence

› General Medical databases

  - Medline

  - Embase

  - CENTRAL

› Subject Specific databases:

  - Cinahl - Nursing

  - ERIC - Education

  - PsycInfo - Psychology

Ask your Faculty Liaison Librarian for advice
http://www.library.usyd.edu.au/contacts/subjectcontacts.html

One of the major medical databases containing:

› Over 18 million **citations** from more than 5,500 international journals

› Indexes content published in over 39 languages

› Primarily scholarly content as selected by the US National Institutes of Health Literature Selection Technical Review Committee

› Uses the Medical Subject Headings (MeSH)

› 1948 – Present

› Strong North American focus (~52% of journals are of US origin)

> See the Fact Sheets a@
> http://www.nlm.nih.gov/pubs/factsheets/medline.html

Biomedical database with a major strength in pharmacological / drug :

› 1966 to present

› Incorporates Medline

› 24 million records

› Indexes 7,500 peer-reviewed journals in 30 languages

› Includes 2000 journals not indexed in Medline

› Over 260,000 conference abstracts

› Extensive citations to drug/pharmaceutical research

› EMTREE thesaurus

› Search interfaces and limits specific to drugs and diseases

› Medline overlap on average 34% but can range from 10-70% depending on tje topic.

embase
BIOMEDICAL ANSWERS

Cochrane Central Register of Controlled Trials

- Available via OvidSP and The Cochrane Library.

- Includes Randomised Controlled Trials & Controlled Clinical Trials.

- 625,000 records from:

  - Medline (360,000)

  - Embase (95,000)

  - Other (175,000)

    - Cochrane Review Group specialised registers (unpublished records, non-randomised studies, on-going studies.

    - Hand-searched records from 3000+ journals and conference proceedings

› LILACS (Latin American and Caribbean Health)

- http://bases.bireme.br/cgi-bin/wxislind.exe/iah/online/?IsisScript=iah/iah.xis&base=LILACS&lang=i&form=F

› AIM - African Index Medicus

- http://indexmedicus.afro.who.int/

› IMSEAR – Index Medicus for the South East Asian Region:

- http://imsear.hellis.org/

› Health Collection via Informit (Australian)

- Available through University of Sydney Library Databases list

See Chapter 6: Cochrane Handbook for Systematic Reviews of Interventions(2009) for a complete list http://www.cochrane-handbook.org

LILACS

> LILACS (from the Latin American and Caribbean Health Science Information Center)

> Uses Medical Subject headings (MeSH)

> 1982 to present

> Articles from 19 Latin and Caribbean countries

> 825 journals (~40 journals overlap Medline & Embase)

> 544,157 records

- 437,400 articles

- 75, 087 monographs

- 25, 543 theses

> 169, 513 full-text records

› United States

- http://clinicaltrials.gov

› Australia/New Zealand (ANZCTR)

- http://www.anzctr.org,au

› International

- http://www.who.int/ictrp

› Individual pharmaeutical company registers

› Up to date database for locating both US govt and privately funded clinical trials.

› 104,582 clinical trials

› Contains:

  - Summary of the purpose of the trial

  - Recruiting status

  - Criteria for participation

  - Location of the trial and contact information

  - Research design

  - Phase of the trial

  - Disease/condition & drug/therapy under study

› Study Results new feature – Only a few studies have results available online

› Conference papers, dissertations, government reports, proceedings, technical reports, research reports, in-house journals.

› Hard to track down, much un-published.

› OpenSIGL – http://opensigl.inist.fr

› Grey-Matters: A practical tool for evidence based searching

- http://cadth.ca/media/pdf/Grey-Matters_A-Practical-Search-Tool-for-Evidence-Based-Medicine.doc

› Reference lists of relevant articles

› References from existing systematic reviews in similar topic areas

› Consultation with subject experts

› Hand-searching

- Not all journals are indexed in databases

- Articles may be indexed incorrectly.

- Journals may be indexed selectively

- It may pay to select a 'high yield' journal in your subject area and search it.

- Organisations such as Cochrane hand-search in their subject areas.

For each database:

Need to include:

- Name of database

- name of database platform (optional)

- years covered by search

- one or two sentence summary of the search strategy, including information on what filter you used.

- complete search strategy

- language restrictions (if any)

› Any other sources of studies

TIP: Copy and paste search strategies from the database saved searches – reduces risk of error!

Medline via OvidSP

Medline via OvidSP (1948 to most recent) using the
optimally sensitive search strategy developed for
the Cochrane Collaboration for the identification of
RCT's (Lefebvre, 2008):
1. Mesothelioma/
2. (malignant adj3 mesothelioma*).tw.
3. or/1-2
4. Pneumonectomy/
5. Pneumonectom*.tw.
6. extrapleural pneumonectom*.tw.
7. epp.tw.
8. pleurectom*.tw.
9. decortication.tw.
10. or/4-9
11. and/3,10

CENTRAL via OvidSP

The Cochrane Central Register of Controlled Trials (CENTRAL)
via OvidSP (Issue 1, 4 Jan 2011) will be searched using the
following terms:

1. Mesothelioma/

2. (malignant adj3 mesothelioma*).tw.

3. or/1-2

4. Pneumonectomy/

5. Pneumonectom*.tw.

6. extrapleural pneumonectom*.tw.

7. epp.tw.

8. pleurectom*.tw.

9. decortication.tw.

10. or/4-9

11. and/3,10

Embase.com

Embase.com (1966 to the most recent) was searched using a filter based on research by the UK
Cochrane Centre "What is in The Cochrane Central Register of Controlled Trials (CENTRAL) from
EMBASE? (Lefebvre 2008)." From: Cochrane Handbook, chapter 6.3.2.2.], notation as a search
string by Ket (Jan. 2009) http://www.ubvu.vu.nl/pub/index.cfm?
objecttype=page&objectid=387&lang=

#4 #1 AND #2 AND #3

#3 random* OR factorial* OR crossover* OR cross AND over* OR placebo* OR (doubl* AND blind*)
OR (singl* AND blind*) OR assign* OR allocat* OR volunteer* OR 'crossover procedure'/exp OR
'double blind procedure'/exp OR 'randomized controlled trial'/exp OR 'single blind procedure'/exp
AND [embase]/lim

#2 'lung resection'/de AND [embase]/lim OR ('pleurectomy'/de AND [embase]/lim) OR
pneumonectom*:ab,ti AND [embase]/lim) OR (pleurectom*:ab,ti AND [embase]/lim) OR epp:ab,ti
OR ('decortication' AND [embase]/lim) OR ('decortication':ab,ti AND [embase]/lim) OR 'extrapleural
pneumonectomy'

#1 'malignant mesothelioma'/de AND [embase]/lim OR ('mesothelioma'/de AND [embase]/lim) OR
(malignant NEXT/3 mesothelioma* AND [embase]/lim)

LILACS

LILACS (1982 to most recent) was searched using the following search strategy

(((([MH]"MESOTHELIOMA") or ([TI] (mesothelioma$)) or ([AB] (mesothelioma$)))) and
  (((([MH]"PNEUMONECTOMY") or ([TI] (pneumonectom$ or pleurectom$ or epp or decortication or
  extra and pleural and pneumonectom$)) or ([AB] (pneumonectom$ or pleurectom$ or epp or
  decortication or extra and pleural and pneumonectom$))))

Any other searching done?

Insert another section into your Search Methods for Identification of studies,

Detailing:

- Details of any hand-searching done – for example, journals searched.
- Any other means of identifying studies – For example, a statement of experts contacted.

› Have a look at a Cochrane review.

- Identify the differences between the different types of review article.

- Know where literature searching falls in the systematic review process.

- Identify the databases and resources required for a comprehensive review search.

- Construct a search strategy for use in a systematic review.

- Search databases using a combination of subject headings and keyword search techniques.

- Document and report a search strategy.

FOR MORE HELP!!