Using The PICOS Model To Design And Conduct A Systematic Search: A Speech Pathology Case Study

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http://ro.ecu.edu.au/creswk/63
Using the PICOS model to design and conduct a systematic search:

A Speech Pathology case study.

A collaborative effort by Charn Nang, Bianca Piano, Abigail Lewis, Karen Lycett and Maria Woodhouse
Session overview:

- Introduction (Charn)

- Using the PICOS model to design a search strategy (Maria)

- Building a systematic search (Karen)

- Final words: our case study experience (Charn)
Introduction to the session

• Setting the context
  – What is a systematic review?
  – Why would you conduct one?
Why do one?

- Summarises large bodies of work
  - Determine quality of research in a particular
  - Compares studies to determine what has the strongest evidence?
  - Directions for future research
- Useful for clinical decision making
- Becoming more widely used to inform health policy
# Systematic review

- **It is different to a traditional narrative review**

<table>
<thead>
<tr>
<th>Narrative Review</th>
<th>Systematic Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>synthesises primary studies only</td>
<td>aims to identify, appraise and synthesise <em>all</em> relevant studies on a given topic</td>
</tr>
<tr>
<td>explores heterogeneity descriptively</td>
<td>used to test a single hypothesis or series of related hypotheses</td>
</tr>
<tr>
<td>a narrative review is more qualitative and more subject to bias</td>
<td>when coupled with meta-analysis critiques and quantifies studies statistically</td>
</tr>
<tr>
<td>methodology usually not replicable</td>
<td>Methodology is systematic and should be replicable</td>
</tr>
<tr>
<td>Petticrew and Roberts (2006)</td>
<td></td>
</tr>
</tbody>
</table>
‘Systematic’ in systematic review

- Objectives are very clear
- Eligibility criteria is pre-defined
- Methodology is replicable
  - Systematic search
  - Evaluation of study quality (validity and reliability)
  - Systematic synthesis and presentation of findings
- A team of researchers required
- Time is required
Cochrane methodology – one way of doing it

Steps of the Cochrane systematic review include (http://handbook.cochrane.org/):

- **defining the review question and developing criteria for including studies;**
- searching for studies;
- selecting studies and collecting data;
- assessing risk of bias in included studies;
- analysing data and undertaking meta-analyses; addressing reporting biases;
- presenting results and ‘Summary of findings’ tables and;
- interpreting results and drawing conclusions.
Step 1!

• defining the review question and developing criteria for including studies;
  – The systematic review tests a hypothesis(es)
  – Does therapy work for XXX?
  – A comparison of Therapy A versus Therapy B.

• searching for studies;
Honours research project

• Supervised by Dr Charn Nang and Abigail Lewis

• Bianca Piano
  – Management of paediatric feeding and swallowing (dysphagia) difficulties
  – Getting in contact with the key people!
    • Librarians
    • Statistician
Maria

Using the PICOS model to design a systematic search strategy
The question

Does therapy work for pediatric dysphagia?

Direct, indirect and mixed approaches:
A systematic review of pediatric dysphagia
<table>
<thead>
<tr>
<th>Concepts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population, Patient or Problem:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Intervention:</strong></td>
<td></td>
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<tr>
<td><strong>Comparison:</strong></td>
<td></td>
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<tr>
<td><strong>Outcome:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Study design:</strong></td>
<td></td>
</tr>
</tbody>
</table>
## PICOS Search strategy

### Concepts

**Population, Patient or Problem:**
(Children with dysphagia)

**Intervention:**
(Speech Pathology)

**Comparison:**
(No Speech Pathology)

**Outcome:**
(Better feeding)

**Study design:**
(Treatment outcome studies)
<table>
<thead>
<tr>
<th>Concepts</th>
<th>Keywords/Synonyms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population, Patient or Problem:</strong></td>
<td></td>
</tr>
<tr>
<td>(Children with dysphagia)</td>
<td>child* OR children OR pediatric* OR paediatric* OR infant* OR under 18 OR MeSH ?</td>
</tr>
<tr>
<td><strong>Intervention:</strong></td>
<td></td>
</tr>
<tr>
<td>(Speech Pathology)</td>
<td>Speech pathology OR speech language pathology OR Speech therap*</td>
</tr>
<tr>
<td><strong>Comparison:</strong></td>
<td></td>
</tr>
<tr>
<td>(No Speech Pathology)</td>
<td></td>
</tr>
<tr>
<td><strong>Outcome:</strong></td>
<td>Dysphagia OR swallowing OR swallowing disorders OR deglutition OR feeding OR feeding disorders OR eating disorders</td>
</tr>
<tr>
<td><strong>Study design:</strong></td>
<td></td>
</tr>
<tr>
<td>(Treatment outcome studies)</td>
<td>Treatment study OR RCT OR Randomised controlled OR clinical OR evidence based OR meta-analysis OR stud* OR rehabilitation OR case series OR Systematic review OR Group studies OR non-randomised OR non-randomized</td>
</tr>
</tbody>
</table>

Note: No need to use all the concepts. We excluded: **Comparison:** (No Speech Pathology) and **Outcome:** (Better feeding) as these did not add value to the search.
<table>
<thead>
<tr>
<th>PICOS concepts</th>
<th>Keywords/synonyms</th>
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</thead>
<tbody>
<tr>
<td><strong>Population, Patient or Problem:</strong></td>
<td>child* OR children OR pediatric* OR paediatric* OR infan* OR under 18 OR MeSH ?</td>
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<tr>
<td>(Children with dysphagia)</td>
<td>Dysphagia OR swallowing OR swallowing disorders OR deglutition OR feeding OR feeding disorders OR eating disorders</td>
</tr>
<tr>
<td><strong>Intervention:</strong></td>
<td>Speech pathology OR speech language pathology OR Speech therap*</td>
</tr>
<tr>
<td>(Speech Pathology)</td>
<td></td>
</tr>
<tr>
<td><strong>Study design:</strong></td>
<td>Treatment study OR RCT OR Randomised controlled OR clinical OR evidence based OR meta-analysis OR stud* OR rehabilitation OR case series OR Systematic review OR Group studies OR non-randomised OR non-randomized</td>
</tr>
</tbody>
</table>
Boolean operators: AND, OR . . .

Construct your search by using **Boolean operators** to combine concepts and keywords:

- **OR** expands your search:
  - (Use **OR** to combine **keywords** in a PICOS table)

- **AND** narrows your search:
  - (Use **AND** to combine **concepts** in a PICOS table)

- *** (asterisk symbol)** at the stem of a word:
  - provides spelling variations

- **“ . . . ” quotation marks**:
  - searches for phrases e.g. “pulmonary embolism”
## PICOS Search strategy: Boolean operators

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<th>PICOS concepts</th>
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<tr>
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<td>child* OR children OR pediatric* OR paediatric* OR infant* OR under 18 OR MeSH? AND Dysphagia OR swallowing OR swallowing disorders OR deglutition OR feeding OR feeding disorders OR eating disorders</td>
</tr>
<tr>
<td><strong>Intervention:</strong></td>
<td>AND Speech pathology OR speech language pathology OR Speech therapy*</td>
</tr>
<tr>
<td><strong>Study design:</strong></td>
<td>AND Treatment study OR RCT OR Randomised controlled OR clinical OR evidence based OR meta-analysis OR stud* OR rehabilitation OR case series OR Systematic review OR Group studies OR non-randomised OR non-randomized</td>
</tr>
</tbody>
</table>
Karen

Building a systematic search
Before you start conduct a Scoping Search

Use a scoping search to:

• Help you understand what has been done on a topic.

• Develop a list of search terms.

• Useful tools for your “scoping search” include Library One Search and some of the key databases in your field.
When using Library One Search for your scoping search remember to add results beyond your library’s collection.
Finding existing systematic reviews

Click on the **Subject Guides** link on the Library homepage.
Systematic Reviews in the Health Sciences

A guide to finding resources for a systematic review in the health sciences.

Click here for information on where to find existing systematic reviews.

Prior to starting a systematic review it’s helpful to find out if a systematic review has been done or is under way. Published reviews also provide a starting point for identifying studies in your area of research.

Some databases focus specifically on indexing evidence-based medicine, systematic reviews, etc. e.g. Cochrane databases.

You can also search the larger subject databases such as MEDLINE, CINAHL, PsycINFO and limit the search to “systematic review”. Some databases have a filter or limit option to limit the search to ‘systematic review’.

It’s also useful to search the large multidisciplinary citation databases Web of Science and Scopus, particularly if your research is cross-disciplinary.

Databases that include Systematic Reviews

- Cochrane Library
  The Cochrane Library contains high-quality, independent evidence to inform healthcare decision-making. It includes reliable evidence from Cochrane and other systematic reviews, clinical trials, and more.

- Best practice [electronic resource]
  Published by BMJ Publishing Group.
  Links to Clinical Evidence systematic reviews are provided for relevant and available topics.

- The Campbell Collaboration Library of Systematic Reviews

- Centre for Reviews and Dissemination databases (includes DARE)
  Centre for Reviews and Dissemination, National Institute for Health Research (UK), CRD databases provide free access to DARE, NHS EED and HTA.

- Database of Abstracts of Reviews of Effects (DARE)
  The Database of Abstracts of Reviews of Effects (DARE) is the only database to contain abstracts of systematic reviews that have been quality-assessed. Each abstract includes a summary of the review together with a critical commentary about the overall quality.
The Cochrane Library is made up of 6 different databases including the Cochrane Database of Systematic Reviews (CDSR) and the Cochrane central register of controlled trials (CENTRAL).
Subject databases

1. Click on the **Subject Guides** link on the Library homepage.

2. Choose your subject.
Your Subject Guide will list key databases for your field.
Key databases will also be listed in the Systematic Reviews in the Health Sciences subject guide.
Grey literature

The term grey literature refers to research that is either unpublished or has been published in a non-commercial form. Examples include:

• government reports
• theses
• research reports
• newsletters and bulletins
• fact sheets.
Systematic Reviews in the Health Sciences

A guide to finding resources for a systematic review in the health sciences.

Last Updated: May 25, 2015  URL: http://ecu.edu.au/libguides/systematicreviews

For a list of Grey Literature sources check the Grey Literature tab of the Systematic Reviews in the Health Sciences subject guide.

What is Grey Literature?

Grey Literature refers to material that is not available through an officially recognized publication protocol, and may include:

- conference proceedings
- technical specifications & standards
- translations
- bibliographies
- technical & commercial documentation
- official documents

Useful sources

- Australian
- Australian Bureau of Statistics
- Australian Indigenous HealthInfoNet
- Australian Institute of Health & Welfare
- Department of Health & Ageing
- National Health & Medical Research Council
- Roadmap of Australian primary health care Research
- Western Australian Department of Health
- International
- Grey matters: A practical search tool for evidence based medicine
  Details where to look for grey literature in Australia and other countries.
- National Technical Information Service
  Provides access to a large collection of historical and current government technical reports that exists in many academic, public, government, and corporate libraries.
- OAIster
  Worldwide library catalogue
- The Grey Literature Report
- World Health Organization

Reference
For a list of where to search for theses check the Theses tab on the Systematic Reviews in the Health Sciences subject guide.
Access the database by the link in your Subject Guide…

…or the Databases link on the library homepage.
CINAHL – Creating a personal account

Set up a personal account so that you can save search results, re-run searches and create search alerts.
Subject headings vs. keyword searching

There are two main methods of conducting a literature search: subject heading searching and keyword searching.

- **Subject heading** searching can be conducted in databases that have a formal thesaurus. The thesaurus is basically a controlled vocabulary of pre-defined terms that are assigned to articles on the basis of content. Subject headings are referred to differently in different databases. In MEDLINE, they are referred to as MeSH Headings, and in CINAHL they are referred to as CINAHL headings.

- **Keyword searching** (or free-text searching) returns all records that contain a given word or phrase, in specified fields of the database record.
Subject headings vs. keyword searching

Subject headings (e.g. CINAHL/MeSH headings):
• Subject headings are valuable because they capture all variants of a given term.
• Using subject headings for a search can provide focus and precision to your results.

Keywords:
• Fast and easy and often allows you to find what you need.
• Will capture articles not properly indexed for a variety of reasons.
• Deals with new techniques, products etc. that MeSH hasn’t caught up with.
• Keyword searching tends to bring up larger numbers of results than searching by subject heading, but will include proportionately more irrelevant results.

As you want your search to be exhaustive, you should use a combination of both MeSH terms and keywords.
To search CINAHL or MeSH headings, tick the **Suggest Subject Terms** box, and enter your search term.
Click here to see the tree view
### Tree View For: Deglutition Disorders

<table>
<thead>
<tr>
<th>Digestive System Diseases</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal Diseases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Esophageal Diseases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Esophageal Motility Disorders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CREST Syndrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deglutition Disorders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Esophageal Achalasia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastroesophageal Reflux</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plummer-Vinson Syndrome</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
View the CINAHL/MeSH headings tutorial.
Search each PICOS element separately, then combine your searches via Search History.
Combining searches in Search History

Select your searches and combine with AND

<table>
<thead>
<tr>
<th>Search ID#</th>
<th>Search Terms</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>S4</td>
<td>(trial OR study OR studies OR RCT OR randomised control trial OR clinical OR evidence based OR treatment outcome OR group study OR control* trial OR systematic review* OR non-randomised OR case studies OR case series)</td>
<td>View Results (1,565,638)</td>
</tr>
<tr>
<td>S3</td>
<td>(speech path* OR speech language path* OR speech therap*)</td>
<td>View Results (14,232)</td>
</tr>
<tr>
<td>S2</td>
<td>(dysphagia OR swallowing OR deglutition OR swallowing difficulty OR (feeding OR feeding disorder*))</td>
<td>View Results (38,060)</td>
</tr>
<tr>
<td>S1</td>
<td>(child* OR pediatric* OR paediatric* OR infant* OR under 18)</td>
<td>View Results (580,060)</td>
</tr>
</tbody>
</table>
## Final Search Results

### Search History/Alerts

<table>
<thead>
<tr>
<th>Search ID#</th>
<th>Search Terms</th>
<th>Search Options</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>S5</td>
<td>S1 AND S2 AND S3 AND S4</td>
<td>Search modes - Boolean/Phrase</td>
<td>View Results (98)</td>
</tr>
<tr>
<td>S4</td>
<td>trial OR study OR studies OR RCT OR randomised control trial OR clinical OR evidence based OR treatment outcome OR group study OR control* trial OR systematic review* OR non-randomised OR case studies OR case series</td>
<td>Search modes - Boolean/Phrase</td>
<td>View Results (1,565,638)</td>
</tr>
<tr>
<td>S3</td>
<td>speech path* OR speech language path* OR speech therap*</td>
<td>Search modes - Boolean/Phrase</td>
<td>View Results (14,232)</td>
</tr>
<tr>
<td>S2</td>
<td>(dysphagia OR swallowing OR deglutition OR swallowing difficulty OR feeding OR feeding disorder*)</td>
<td>Search modes - Boolean/Phrase</td>
<td>View Results (38,060)</td>
</tr>
<tr>
<td>S1</td>
<td>child* OR pediatric* OR paediatric* OR infant* OR under 18</td>
<td>Search modes - Boolean/Phrase</td>
<td>View Results (580,060)</td>
</tr>
</tbody>
</table>

To save your search permanently, or set up alerts click here.
Documenting your search

The search process needs to be documented in enough detail to ensure that it can be reported correctly in the review and reproduced for verification.

For each database search record:

- Database searched
- Database provider (e.g. EBSCO)
- Search strategy - keywords used and how these were combined in the search
- Years searched
- Date search was run
- Any filters used
- Number of studies identified.
## Documenting your search

<table>
<thead>
<tr>
<th>#</th>
<th>EBSCO: CINAHL Plus with full text database search</th>
<th>Results 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>S5</td>
<td>S1 AND S2 AND S3 AND S4</td>
<td>95</td>
</tr>
<tr>
<td>S4</td>
<td>trial OR study OR studies OR RCT OR randomised control trial OR clinical OR evidence based OR treatment outcome OR group study OR control* trial OR systematic review* OR non-randomised OR case studies OR case series</td>
<td>1,542,120</td>
</tr>
<tr>
<td>S3</td>
<td>speech path* OR speech language path* OR speech therap*</td>
<td>14,073</td>
</tr>
<tr>
<td>S2</td>
<td>(dysphagia OR swallowing OR deglutition OR swallowing difficulty ) OR ( feeding OR feeding disorder* )</td>
<td>37,562</td>
</tr>
<tr>
<td>S1</td>
<td>child* OR pediatric* OR paediatric* OR infant* OR under 18</td>
<td>572,483</td>
</tr>
</tbody>
</table>
Click on Share to add the results to your Folder.
In Folder view click on Export, then choose Direct Export in RIS format.
Different search strategies for different databases

(dysphagia OR swallowing OR deglutition OR feeding) AND (speech OR pathology OR therapy) AND (child OR children OR pediatric OR paediatric OR infant).
Limit to Thesis.
The Cochrane Handbook

Systematic Reviews in the Health Sciences

A guide to finding resources for a systematic review in the health sciences.

Last Updated: Aug 26, 2015  URL: http://ecu.au.libguides.com/systematicreviews  Print Guide  RSS Updates

What is a systematic review?

According to the Cochrane Library

“A systematic review attempts to identify, appraise and synthesize all the empirical evidence that meets pre-specified eligibility criteria to answer a given research question. Researchers conducting systematic reviews use explicit methods aimed at minimizing bias, in order to produce more reliable findings that can be used to inform decision making. (See Section 1.2 in the Cochrane Handbook for Systematic Reviews of Interventions.)"
The Cochrane Handbook for Systematic Reviews of Interventions

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Preface

Acknowledgements

The Handbook editors

Major contributors

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2 Preparing a Cochrane review

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Part 2 GENERAL METHODS FOR COCHRANE REVIEWS

5 Defining the review question and developing criteria for including studies

6 Searching for studies

7 Selecting studies and collecting data

8 Assessing risk of bias in included studies

9 Analysing data and undertaking meta-analyses
Our case study experience

- Honours research project
- **defining the review question and developing criteria for including studies;**
  - Scoping: Getting search terms correct
  - Trial search terms in each database
  - Convene to discuss discrepancies after searching in each database
- Currently assessing inclusion criteria
  - Know exactly what this is before you start your search
  - Study designs
How the library can help

ECU subject Librarians can support researchers in the systematic review process by:

• Assisting in the design of an effective search strategy
• Identifying appropriate sources for the systematic review search
• Proving training in the effective use of online databases and other search tools
• Advising on appropriate ways to document the systematic review search
• Providing training and support in the use of EndNote bibliographic management software.
References