LEARNING OBJECTIVES

After this session you should be able to:

1. **Identify & recognize the breadth of resources required to execute a systematic review search**
2. Develop an answerable research question and structure a search using the PICO format
3. Learn how to do a Scoping Search in Cochrane Library, Search Comprehensively in PubMed and use the “PICO’ search in Embase
SEARCHING FOR EVIDENCE: SYSTEMATIC REVIEWS REQUIRE SYSTEMATIC SEARCHING

ALL relevant studies published and unpublished must be found by searching

1. **Multiple databases** – Medline, Embase, Cochrane (CENTRAL), Subject specific (PsycInfo / CINAHL), Multidisciplinary (SCOPUS, WOS) & more...
2. Search for on-going Trials e.g. Clinical trials.gov
3. Languages besides English
4. Hand searching – key journals
5. Reference list of key articles
6. Meeting abstracts
7. Contact Experts / authors – contact organizations doing SRs..
8. Conference papers
9. Industrial research, policy papers, theses – never published, hard to get

Search strategies must be – refined, documented (must keep a record of all searches) and reproducible (replicable by anyone wishing to do so)
MORE SOURCES

http://libguides.nus.edu.sg/sysreviews
Look under:
Where to Search?: List of Databases & Clinical Trial Registries
Grey Literature: Grey literature sources, conference proceedings, newspapers, theses
Searching for systematic reviews: Links to organizations doing systematic reviews

Refer to: DATABASE COVERAGE GUIDE
SYSTEMATIC REVIEW PROCESS

(1) Framing the question
Write your protocol

(2) Identifying relevant literature
Searching - screening - selection (in/out criteria)

(3) Assessing the quality

(4) Summarizing the evidence

(5) Interpreting the findings

SYSTEMATIC SEARCH IS A KEY COMPONENT OF ALL SYSTEMATIC REVIEWS
• Defined search strategy
• Clear exclusion and inclusion criteria

CREATE AN ENDNOTE LIBRARY!

Khan KS 2003
LEARNING OBJECTIVES

After this session you should be able to:

1. Identify & recognize the breadth of resources required to execute a systematic review search
2. **Develop an answerable research question and structure a search using the PICO format**
3. Learn how to do a Scoping Search in Cochrane Library, Search Comprehensively in PubMed and use the “PICO’ search in Embase
PICO

PATIENT, POPULATION OR PROBLEM How would you describe a group of patients similar to yours? What are the most important characteristics of this patient population? What is the main problem or condition of interest?

INTERVENTION, EXPOSURE, PROGNOSTIC FACTOR What main intervention (diagnostic test, prevention strategy, treatment, activity, etc.) are you considering? Is there an exposure, risk, or prognostic factor of interest?

COMPARISON (if applicable) What is the main alternative being considered, if any?

OUTCOME What are you trying to accomplish, measure, improve, or affect?
**PICO(T):** Does use of **Pedometer in the workplace** encourage office workers to be more **physically active**?

<table>
<thead>
<tr>
<th>P</th>
<th>Office workers in the workplace</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Pedometer</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Increase physical activity</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>other health related outcomes</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>RCTs</td>
<td>3</td>
</tr>
</tbody>
</table>
PICO: In healthy teenagers does regular consumption of soft drinks lead to dental erosion?

<table>
<thead>
<tr>
<th>P</th>
<th>teenagers</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Soft drinks</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>Dental erosion</td>
<td>2</td>
</tr>
<tr>
<td>T</td>
<td>(Type of study)</td>
<td>??</td>
</tr>
<tr>
<td>Type of Question</td>
<td>Best type of study</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Therapy / Prevention</td>
<td>RCT &gt; Cohort &gt; Case control &gt; Case series</td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Cross sectional or Prospective, blind comparison to a gold standard</td>
<td></td>
</tr>
<tr>
<td>Etiology / Harm</td>
<td>RCT &gt; Cohort &gt; Case control &gt; Case series</td>
<td></td>
</tr>
<tr>
<td>Prognosis</td>
<td>Cohort &gt; Case control &gt; Case series</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>Cost effectiveness / Economic analysis</td>
<td></td>
</tr>
<tr>
<td>Quality of life / experience</td>
<td>Qualitative studies</td>
<td></td>
</tr>
</tbody>
</table>

Therapy, prevention & etiology questions that can be answered by RCT can also be answered by a systematic review or meta analysis. Etiology & harm studies can be answered by an RCT if ethical issues of the study allow it.
YOUR RESEARCH QUESTION

Can you apply PICO to your research question?
<table>
<thead>
<tr>
<th>Concept</th>
<th>MeSH</th>
<th>Keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teenagers</td>
<td>??</td>
<td>(teen OR teens OR teenager* OR adolescen* OR young adult*)</td>
</tr>
<tr>
<td>Soft drinks</td>
<td>??</td>
<td>(carbonated drink* OR carbonated beverage* OR soda OR soft drink*)</td>
</tr>
<tr>
<td>Dental Erosion</td>
<td>??</td>
<td>(Dental erosion OR teeth erosion)</td>
</tr>
<tr>
<td>Type of study</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LEARNING OBJECTIVES

After this session you should be able to:

1. Identify & recognize the breadth of resources required to execute a systematic review search
2. Develop an answerable research question and structure a search using the PICO format
3. Learn how to do a Scoping Search in Cochrane Library, Search Comprehensively in PubMed and use the “PICO’ search in Embase
BEGIN WITH..

SCOPING SEARCH

- **Protocol**: Someone already doing a similar study
- **Size of Literature**: Are there enough primary studies?
- **Cost**: Estimate cost of review

IN:

**Cochrane Library**: Find Reviews, Protocols, Trials
**PubMed Clinical Queries**
**Google / Google Scholar**
**Organizations doing systematic reviews** E.g. AHRQ, Health Evidence Canada, National Institute for Health and Clinical Excellence (NICE)

PEARL GROWING SEARCH*

**Identify Key articles** – Citing articles /References
Other closely related studies – Look at “Related Searches”, “Similar articles”
Subject coverage / Content

A collection of six databases that contain different types of high-quality, independent evidence to inform healthcare decision-making

- **Cochrane Database of Systematic Reviews (CDSR)** - full-text and Protocol of SR in healthcare. 1996 onward (9904)
- **Cochrane Central Register of Controlled Trials (CENTRAL)** - Reports of RCT and quasi-RCT. No full-text (1065341)
- Database of Abstracts of Reviews of Effects (DARE) - quality-assessed abstracts of systematic reviews not yet done by Cochrane (36,795)
- Health Technology Assessment Database (HTA) - completed and ongoing health technology assessments (16,842)
- Cochrane Methodology Register (CMR) - methods used in reviews and more general methodological studies (15,764 updating ceased in 2012)
- NHS Economic Evaluation Database (EED) -- quality appraised economic evaluations, highlighting their relative strengths and weaknesses (17,433)


Figures are as of Jul 2017
HOW TO SEARCH?

DEVELOP A SEARCH STRATEGY

1. BOOLEAN LOGIC: AND, OR, NOT
2. USE OF * AND ()
3. INDEXING TERMS: MESH / EMTREE
4. KEYWORDS
**BOOLEAN**

**OR** either terms may be present
→ more results
E.g. adolescents **OR** teenagers

**AND** both terms must be present
→ fewer results
E.g. soft drinks **AND** dental erosion

**NOT** → Use with caution
E.g. Humans **NOT** animals
PHRASE SEARCHING “ ”

Searches exact phrase

“dental erosion”
Searches spelling variants: adolescent

adolescent
adolescents
adolescence

*Pubmed searches only first 600 variants*
BRACKETS (NESTING)

Used to combine concepts in a prescribed order in a search statement:

“dental erosion” AND (soft drink* OR canned drink*)
PROXIMITY OPERATOR

Finds terms within “n” words of each other

Pubmed Not available
Embase NEXT/n (in the same order)
Cochrane NEXT (in the same order)
Cochrane & Embase: NEAR/n (in any order)
PsycInfo (via Ovid) adjn (in any order)

E.g. tooth NEAR/2 erosion
Retrieves: tooth erosion, erosion of the tooth
## Expand PICO

<table>
<thead>
<tr>
<th>Concept</th>
<th>MeSH</th>
<th>Keywords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teenagers</td>
<td>??</td>
<td>(teen OR teens OR teenager* OR adolescen* OR young adult*)</td>
</tr>
<tr>
<td>Soft drinks</td>
<td></td>
<td>(carbonated drink* OR soft drink*)</td>
</tr>
<tr>
<td>Dental Erosion</td>
<td></td>
<td>(Dental erosion OR teeth erosion )</td>
</tr>
<tr>
<td>Type of study</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Subject Coverage: Biomedicine

How big? \(~25\) million records

MEDLINE, largest component of PubMed, has \(~22\) million records from 5600 journals.

Strengths:
Medline indexed using MESH
Updated daily – in press, ahead of print
Coverage: US & 80 other countries
Free access
Medical Subject Headings (MeSH)

Human indexers read articles in MEDLINE and assign standardized terms called MESH.
MESH ENTRY TERMS: SYNONYMYS

Entry Terms:
- Beverage, Carbonated
- Beverages, Carbonated
- Carbonated Beverage
- Carbonated Drinks
- Carbonated Drink
- Drink, Carbonated
- Drinks, Carbonated
- Soft Drinks
- Drink, Soft
- Drinks, Soft
- Soft Drink
- Soda Pop
- Pop, Soda
- Pops, Soda
- Soda Pops

All MeSH Categories
- Phenomena and Processes Category
  - Physiological Phenomena
  - Diet, Food, and Nutrition
  - Beverages
    - Carbonated Beverages
      - Carbonated Water

All MeSH Categories
- Technology and Food and Beverages Category
  - Food and Beverages
    - Beverages
      - Carbonated Beverages
        - Carbonated Water
<table>
<thead>
<tr>
<th>MeSH / EMTREE</th>
<th>Keyword</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistent way to retrieve information that may use different terminology for the same concept</td>
<td>Useful when there is no MeSH/Emtree term available to represent the concept</td>
</tr>
<tr>
<td>Retrieves citations indexed with MeSH / Emtree terms (time lag, older)</td>
<td>Retrieves all kinds of records, including the latest (as supplied by publisher)</td>
</tr>
<tr>
<td>More specific</td>
<td>Broader, less precise</td>
</tr>
</tbody>
</table>
COCHRANE STANDARD
Each concept must be searched using keywords and Index terms

Keyword(s) (added by the author)

OR

Mesh / Emtree terms (added by the indexer)

All articles on that concept
OTHER DATABASES

DOES NOT HAVE CONTROLLED VOCABULARY
Scopus
Web of Science

HAS CONTROLLED VOCABULARY
Embase - EmTree
Medline - MESH Medical Subject Headings
CINAHL - CINAHL Headings
PsycINFO - Thesaurus of Psychological Index Terms
SEARCH STRATEGY

P AND

AND

I AND

O

Dental erosion OR teeth erosion OR "Tooth Erosion"[Mesh]

AND (Dental erosion OR teeth erosion OR "Tooth Erosion"[Mesh] )

AND (teen OR teens OR teenager* OR adolescen* OR young adult* OR "Adolescent"[Mesh] OR "Young Adult"[Mesh])

P AND I AND O

(carbonated drink* OR soft drink* OR "Carbonated Beverages"[Mesh])

AND (carbonated drink* OR soft drink* OR "Carbonated Beverages"[Mesh])
Economic interventions to improve population health: a scoping study of systematic reviews


<table>
<thead>
<tr>
<th>Economic interventions</th>
<th>Definition</th>
<th>Search terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price Interventions - Taxes and Subsidies</td>
<td>Interventions that target prices for goods and services paid/received by households or firms</td>
<td>“tax”, “subsidy”, “subsidized”, “subsidies”, “penalty”, “penalties”, “voucher”, “vouchers”</td>
</tr>
<tr>
<td>Income Transfer Programs</td>
<td>Interventions that transfer resources directly to households</td>
<td>“income support”, “financial supplement”, “income supplement”, “financial assistance”, “welfare benefits”, “social security”, “cash assistance”, “income transfer”, “asset transfer”, “pensions”, “welfare payments”, “cash transfer”, “cash support”, “bonus”, “economic support”</td>
</tr>
<tr>
<td>Incentive Programs</td>
<td>Interventions that provide rewards or penalties to motivate specific behaviours/outcomes</td>
<td>“results-based financing”, “pay for performance”, “performance pay”, “performance incentives”, “financial incentives”, “activity based funding”, “provider payment”</td>
</tr>
<tr>
<td>Livelihood Support Programs</td>
<td>Interventions that provide resources or skills to support income generation</td>
<td>“livelihood support”, “entrepreneurship training”, “business training”, “vocational skills training”, “vocational training”</td>
</tr>
</tbody>
</table>
Searching Embase (Embase.com)

Research Question:

Does regular consumption of soft drinks lead to dental erosion in healthy teenagers?
Subject coverage
• Biomedical (in-depth coverage of pharmacology, pharmaceutical science and clinical research), medical devices; life sciences & allied health

Content:
• >32 million published and peer-reviewed records, in-press publications
• Coverage of 8,500 indexed peer-reviewed journals from 1947 (including MEDLINE titles)
• Over 2.3 million conference abstracts indexed from more than 7,000 conferences dating from 2009

Strengths:
• Deep full-text indexing with Emtree thesaurus (75,000+ terms), includes all MESH terms, particularly strong in drug, disease and medical device terms
• >30% of Embase journal titles are unique (i.e., not covered by MEDLINE)
1. Click SEARCH tab
2. Select PICO tab
3. Select ‘Find best term’
4. Fill in the PICO Search Form

Fill in Population terms (Combine Emtree headings + Synonyms)

Fill in Intervention terms (Combine Emtree headings + Synonyms)
In the ‘Find best term’ box, type the population (P) term ‘dental erosion’. EMTREE suggested to use the preferred term ‘Tooth disease’ and ‘dental erosion’ as a free text term.
EMTREE ‘Tooth disease’ and 27 synonyms were selected into the PICO form.
Select the appropriate synonyms to expand your search terms or just accept the default synonyms.

Click at the triangle sign to see the drop down box below.

Check the radio button next to the 'Title or abstract' to focus the search of synonyms to either title or abstract field.
Type ‘carbonated drink’ into the ‘Intervention’ PICO search form, EMTREE suggested to use the preferred term ‘carbonated beverage’ and ‘carbonated drink’ as a free text term.
Apart from searching ‘carbonated drink’, you can also search ‘soft drink’. Search the free text terms in the Title/Abstract field.
The PICO Search Form – Search Results

The PICO Search form will automatically combine the ‘Population’ and ‘Intervention’ terms to display the search results.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Device</th>
<th>Article</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>tooth disease /exp</td>
<td>+ 27 synonyms:ti,ab</td>
<td>or</td>
<td>dental erosion :ti,ab</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>carbonated beverage /exp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g. risk</td>
</tr>
</tbody>
</table>

Show 749 results
Searching The Cochrane Library
Magnetic pull of electrotherapy for the elderly
The Straits Times [Home 12 JUN 2017]

Many seniors flock regularly to such free sessions conducted in neighbourhood shops

Ng Huiwen

Almost every day for the past two months, retiree Seng Sung Huay has been going to the same shop at Block 825, Tampines Street 81.

There, the 70-year-old joins a group of about 50 elderly people in a free electrotherapy session, lasting 30 minutes to an hour each time.

They sit on an electrostatic pad, in rows of chairs, as a Cosmo Goodness staff member briefly introduces the device, before delving into topics relating to wellness and health.

“I was here on the second day the showroom opened in Tampines,” said Mr Seng. “I first heard about this machine from a friend a few months ago. Using it has helped to cure the pains in my body.”

At the company’s two other locations in Ang Mo Kio Avenue 4 and Lorong 4 Toa Payoh, hundreds of elderly people pack its premises from about 10am to 7pm, six days a week.

The company, which originated in Japan and began operating here in 2007, promotes its range of electrotherapeutic devices. These are said to be able to generate an electric field through the body.

According to its website, these devices “alleviate headaches, shoulder stiffness, insomnia and chronic constipation”.

While the company has been running its “showrooms” for free since 2009, those who wish to own the devices have to pay up to $26,000. The price includes an armchair that can be wired to the machine.

The cheapest set costs $14,600, according to a brochure seen by The Straits Times.

“Initially, I didn’t believe that the device would work. But, after trying it out a few times, I can feel the effects,” said Mr Kian Doh Lian, 63. “I feel more energised and refreshed.”

The delivery driver, who spoke to ST at the Ang Mo Kio Avenue 4 shop, said he has decided to put down $18,000 for a set, which was discounted from $26,000. He has

WHAT CASE SAYS continued on B2
Search Manager

Search Manager Tab to build complex search

- Create and edit search
- Name and save search
- View Saved Searches
- View results
Keyword Search for ‘Patient’ (‘P’)

1. In the Search Manager search box, type the following

   (pain* OR ache OR aches OR aching OR ached):ti,ab

2. Click at the icon to look up for the MeSH term on ‘pain’. Run a MeSH search, select your term and “Add to Search manager”

3. Combine #1 AND #2 with ‘OR’ operator
MeSH Search for ‘Patient’ (‘P’) Term

1. Enter Search term in this box
2. Hit Enter or Lookup button to view results
3. View your results

Search results
- There are 38216 results for your search on:
  - MeSH descriptor [Pain]
  - explode all trees

Update Search Manager

- Cochrane Reviews: 500
- Other Reviews: 1859
- Trials: 34777
- Methods Studies: 0
- Technology Assessments: 469
- Economic Evaluations: 611
- Cochrane Groups: 0

View Results
Search For ‘Intervention’ (‘I’) Term

1. **Keyword Search**

   In the Search Manager box, type the following search strings into the search field line by line:

   - #4 (electric* and stimulat*):ti,ab
   - #5 (electric* and therap*):ti,ab
   - #6 (electrotherapy or electrotherapies):ti,ab

2. **MeSH search**

   Look up the Mesh term on by typing ‘electrotherapy’ into the search box. You will see the following MeSH suggested when you click ‘Add to Search Manager’ option:

   - #7 MeSH descriptor: [Electric Stimulation Therapy] explode all trees

3. **Combine keyword and MeSH search**

   #8 #4 OR #5 OR #6 OR #7
**Question:** Does electrotherapy help to reduce pain for the elderly?

**Combine Searches for ‘P’ AND ‘I’ Terms**

<table>
<thead>
<tr>
<th>Search</th>
<th>Search Manager</th>
<th>Medical Terms (MeSH)</th>
<th>Browse</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>(Pain* or acho or aches or aching):ti.ab</td>
<td></td>
<td>89082</td>
</tr>
<tr>
<td>#2</td>
<td>MeSH descriptor: [Pain] explode all trees</td>
<td></td>
<td>38216</td>
</tr>
<tr>
<td>#3</td>
<td>#1 or #2</td>
<td>#1 or #2</td>
<td>98787</td>
</tr>
<tr>
<td>#4</td>
<td>(electric* and stimulat*):ti.ab</td>
<td></td>
<td>5146</td>
</tr>
<tr>
<td>#5</td>
<td>(electric* and therap*):ti.ab</td>
<td></td>
<td>2056</td>
</tr>
<tr>
<td>#6</td>
<td>(electrotherapy or electrotherapies):ti.ab</td>
<td></td>
<td>257</td>
</tr>
<tr>
<td>#7</td>
<td>MeSH descriptor: [Electric Stimulation Therapy] explode all trees</td>
<td></td>
<td>6190</td>
</tr>
<tr>
<td>#8</td>
<td>#4 or #5 or #6 or #7</td>
<td>#4 or #5 or #6 or #7</td>
<td>10405</td>
</tr>
<tr>
<td>#9</td>
<td>#3 and #8</td>
<td>#3 and #8</td>
<td>2714</td>
</tr>
</tbody>
</table>

**Combining ‘P’ with ‘OR’**

**Combining ‘I’ with ‘OR’**

**Combining ‘P’ & ‘I’ terms using ‘AND’**
View Search Results

- Electrotherapy modalities for adhesive capsulitis (frozen shoulder)
  Matthew J Page, Sally Green, Sharon Kramer, Renea V Johnston, Brodwen McBain and Rachelle Buchbinder
  Online Publication Date: October 2014

- Electrotherapy for neck pain
  Peter Krooling, Anita Gross, Nadine Graham, Stephen J Burnio, Grace Szeto, Charles H Goldsmith, Ted Haines and Mario Forget
  Online Publication Date: August 2013

- Transcutaneous electric nerve stimulation (TENS) for cancer pain in adults
  Adam Hurlow, Michael I Bennett, Karen A Robb, Mark I Johnson, Karen H Simpson and Stephen G Oxberry
  Online Publication Date: March 2012

- Transcutaneous electrical nerve stimulation (TENS) for phantom pain and stump pain following amputation in adults
  Mark I Johnson, Matthew R Mulvey and Anne-Marie Bagnall
  Online Publication Date: August 2015

- Transcutaneous electrical nerve stimulation (TENS) versus placebo for chronic low-back pain
  Amole Khadilkar, Daniel Oluwafemi Odebiyi, Lucie Brosseau and George A Wells
  Online Publication Date: October 2008
EXPORTING RESULTS TO ENDNOTE LIBRARY
PUBMED: EXPORT TO ENDNOTE (More than 200 citations – 2 steps)

Choose Destination

- File
- Clipboard
- Collections
- E-mail
- Order
- My Bibliography
- Citation manager

Send to

Filters: Manage Filters

IMPORTING INTO ENDNOTE

Import File

- Import File: [pubmed_result.txt]
- Import Option: PubMed (NLM)
- Duplicates: Import All
- Text Translation: No Translation

Import

Download 41975 items.

Format

- MEDLINE
- Summary (text)
- Abstract (text)
- MEDLINE
- XML
- PMID List
- CSV

doi: 10.1111/jcb.12443. Review
In Endote – import the text file:
EMBASE : EXPORT TO ENDNOTE
TO SUMMARIZE

1. Search in Multiple Databases
2. Search Grey literature
3. Do a Scoping search
4. Frame your question using PICO
5. Write your Protocol – Define scope, inclusion & exclusion criteria
6. Register your protocol
7. Start your systematic review search
8. Save your search and create “alerts”
9. Use Reference Manager E.g. Endnote to manage your articles
10. Document you search strategies
11. Refine and replicate your search in other databases
12. Adapt your search to different database platforms
13. Search strategies have to reported as part of systematic review study

Ask librarians for help!
CONTACT US

Medical Library
Level 5, MD6
Telephone: 65162046
Email: mdlib@nus.edu.sg
www.lib.nus.edu.sg