Planning and executing a systematic search

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Objectives

- Identify article databases
- Prepare for a systematic search
  - Understanding what a systematic search is
  - Translating the research question into search concepts
  - Checking if your synthesis question has already been addressed
  - Anticipating info needed to document the search
- Use building blocks of a search strategy
  - Using subject headings, textwords, truncation, and more
  - Using relevant articles to identify search terms
  - Applying Boolean logic using OR / AND
Library course guide

https://libraryguides.mcgill.ca/epib-629
Identify article databases

For guidance on selecting article databases as well as other steps in the process:

Systematic Reviews, Scoping Reviews, and Other Knowledge Syntheses: Library Guide

https://libraryguides.mcgill.ca/knowledge-syntheses/home
Preparing for a literature search
What is a systematic search?

“Systematic reviews of interventions require a thorough, objective and reproducible search of a range of sources to identify as many relevant studies as possible (within resource limits).”

- High sensitivity (often with painfully low precision)
- Well documented

Systematic Reviews:

#7) Describe all information sources (e.g. databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.

#8) Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.

Scoping Reviews:

#7) Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.

#8) Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.

AMSTAR-2 checklist

2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?

For Partial Yes:
The authors state that they had a written protocol or guide that included ALL the following:

- [ ] review question(s)
- [x] a search strategy
- [ ] inclusion/exclusion criteria
- [ ] a risk of bias assessment

For Yes:
As for partial yes, plus the protocol should be registered and should also have specified:

- [ ] a meta-analysis/synthesis plan, if appropriate, and
- [ ] a plan for investigating causes of heterogeneity
- [ ] a plan for investigating causes of heterogeneity

3. Did the review authors explain their selection of the study designs for inclusion in the review?

For Yes, the review should satisfy ONE of the following:

- [ ] Explanation for including only RCTs
- [ ] OR Explanation for including only NRSI
- [ ] OR Explanation for including both RCTs and NRSI

4. Did the review authors use a comprehensive literature search strategy?

For Partial Yes (all the following):

- [x] searched at least 2 databases (relevant to research question)
- [x] provided key word and/or search strategy
- [x] justified publication restrictions (e.g. language)

For Yes, should also have (all the following):

- [x] searched the reference lists / bibliographies of included studies
- [x] searched trial/study registries
- [ ] included/consulted content experts in the field
- [ ] where relevant, searched for grey literature
- [ ] conducted search within 24 months of completion of the review
Has your question already been addressed?

▶ Make sure nobody has already (recently) done or is doing a synthesis on your topic
  ▶ Epistemonikos
  ▶ Cochrane Library
  ▶ PROSPERO (registry)
  ▶ PubMed/MEDLINE on Ovid
  ▶ Google Scholar

▶ See library course guide for some tips on searching

▶ Perform scoping searches to get a feel for the literature or to refine your question if needed
What are the PICO elements of this question:

Does male circumcision prevent heterosexually acquired HIV in men?
Identify concepts

P  Heterosexual males
I  Circumcision
C  HIV in men
Preparing a literature search

- Use relevant articles to help identify search terms and “reverse engineer” your search
- Use a worksheet to keep track of your terms, e.g., in Excel
- Examine search strategies for your individual concepts as documented in published systematic reviews (Note of caution: They’re not always well done/easy to follow)
Searching databases

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What is Ovid MEDLINE*?

- Mainly an article database
- Ovid = platform, MEDLINE = database
- Searching bibliographic records (not full-text)
  - Title, abstract, other indexing fields in the record...
- Over 26 million records
- Allows you to search for records using MeSH (Medical Subject Headings)

* Technically, at McGill, this includes Ovid MEDLINE(R), Epub Ahead of Print, In-Process & Other Non-Indexed Citations, and some other variations
What is MeSH?
Why bother with MeSH?

- cancer
- tumor(s)
- tumour(s)
- neoplasm(s)
- neoplastic

There are tens of thousands of MeSH terms
Another MeSH Example

Poverty/

- poverty
- social disparity
- poor
- breadline
- financially disadvantaged

financial distress
extreme need
social inequity
low income
destitute

MeSH

Keywords / Textwords
Heart Arrest in MeSH

Cardiovascular Diseases

Heart Diseases

Heart Arrest

Death, Sudden, Cardiac

Karoshi Death

Out-of-Hospital Cardiac Arrest
Identify concepts: MeSH

▶ Search each concept via MEDLINE on Ovid

▶ Other ways to identify MeSH terms:
  ▶ Plug titles of relevant articles into MEDLINE on Ovid and check complete reference for subject headings
  ▶ Plug PMIDs/accession numbers of known relevant articles into tools like PubReminer* or Yale MeSH Analyzer* to see patterns in assignment of MeSH terms
  ▶ Plug an abstract of a relevant article into MeSH on Demand to see how the automatic indexing software would assign MeSH terms

* For PubMed/MEDLINE; EndNote can be used for frequency analyses of subject heading assignments in other databases like Embase
Record Owner: From MEDLINE, a database of the U.S. National Library of Medicine.

Status: MEDLINE

Authors: Gray RH; Kigozi G; Serwadda D; Makumbi F; Watya S; Nalugoda F; Kiwanuka N; Moulton LH; Chaudhary MA; Chen MZ; Sewankambo NK; Wabwire-Mangen F; Bacon MC; Williams CF; Opendi P; Reynolds SJ; Laeyendecker O; Quinn TC; Wawer MJ.

Authors Full Name: Gray, Ronald H; Kigozi, Godfrey; Serwadda, David; Makumbi, Frederick; Watya, Stephen; Nalugoda, Fred; Kiwanuka, Noah; Moulton, Lawrence H; Chaudhary, Mohammad A; Chen, Michael Z; Sewankambo, Nelson K; Wabwire-Mangen, Fred; Bacon, Melanie C; Williams, Carolyn F M; Opendi, Pius; Reynolds, Steven J; Laeyendecker, Oliver; Quinn, Thomas C; Wawer, Maria J.

Institution: Gray, Ronald H. Johns Hopkins University, Bloomberg School of Public Health, Baltimore, MD 21215, USA. rgray@jhspih.edu

Title: Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial.

Comment in: Lancet. 2007 Feb 24;369(9562):617-9; PMID: 17321292
Comment in: Lancet. 2007 May 12;369(9573):1597-8; author reply 1598-9; PMID: 17499589
Comment in: Lancet. 2007 May 12;369(9573):1597; author reply 1598-9; PMID: 17499591
Comment in: Lancet. 2007 May 12;369(9573):1597; author reply 1598-9; PMID: 17499590


NLM Journal Name: Lancet (London, England)

Publishing Model: Journal available in: Print
Citation processed from: Internet
Abstract: **BACKGROUND:** Ecological and observational studies suggest that male circumcision reduces the risk of HIV acquisition in men. Our aim was to investigate the effect of male circumcision on HIV incidence in men.

**METHODS:** 4996 uncircumcised, HIV-negative men aged 15-49 years who agreed to HIV testing and counselling were enrolled in this randomised trial in rural Rakai district, Uganda. Men were randomly assigned to receive immediate circumcision (n=2474) or circumcision delayed for 24 months (2522). HIV testing, physical examination, and interviews were repeated at 6, 12, and 24 month follow-up visits. The primary outcome was HIV incidence. Analyses were done on a modified intention-to-treat basis. This trial is registered with ClinicalTrials.gov, with the number NCT00425984.

**FINDINGS:** Baseline characteristics of the men in the intervention and control groups were much the same at enrollment. Retention rates were much the same in the two groups, with 90-92% of participants retained at all time points. In the modified intention-to-treat analysis, HIV incidence over 24 months was 0.66 cases per 100 person-years in the intervention group and 1.33 cases per 100 person-years in the control group (estimated efficacy of intervention 51%, 95% CI 16-72; p=0.006). The as-treated efficacy was 55% (95% CI 22-75; p=0.002); efficacy from the Kaplan-Meier time-to-HIV-detection as-treated analysis was 60% (30-77; p=0.003). HIV incidence was lower in the intervention group than it was in the control group in all sociodemographic, behavioural, and sexually transmitted disease symptom subgroups. Moderate or severe adverse events occurred in 84 (3.6%) circumcisions; all resolved with treatment. Behaviours were much the same in both groups during follow-up.

**INTERPRETATION:** Male circumcision reduced HIV incidence in men without behavioural disinhibition. Circumcision can be recommended for HIV prevention in men.
Using PMIDs of relevant articles

- The PMID = PubMed identifier
  - In PubMed, in [PMID] field
  - In Ovid MEDLINE, in the .ui. (unique identifier) field

- In PubReminer and Yale MeSH Analyzer: copy and paste list of PMIDs for batch analysis of records
What are MeSH headings relevant to our question?

| Circumcision | HIV |

Keep track of useful subject headings
<table>
<thead>
<tr>
<th>Concept #1</th>
<th>Concept #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumcision, Male/</td>
<td>exp HIV Infections/</td>
</tr>
<tr>
<td>exp HIV/</td>
<td>exp HIV/</td>
</tr>
</tbody>
</table>

Subject Headings

Text Words

**Concept table starting with subject headings**
- Do not alter the subject headings
Why?

1. Not all citations have subject headings, i.e., in data review.st., in process.st., publisher.st., pubmed-not-medline.st.

2. Not all concepts have subject headings, e.g., Pokemon

3. Indexers are mostly human (they make mistakes, and some indexing is automated)
<table>
<thead>
<tr>
<th>Concept #1</th>
<th>Concept #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumcision, Male/</td>
<td>exp HIV Infections/</td>
</tr>
<tr>
<td>OR</td>
<td>exp HIV/</td>
</tr>
<tr>
<td>OR</td>
<td>(hiv or human immune deficiency virus* or human immunodeficiency virus* or human immunodeficiency virus*).mp.</td>
</tr>
<tr>
<td>OR</td>
<td>(aids or acquired immune deficiency syndrome* or acquired immunodeficiency syndrome* or acquired immunodeficiency syndrome*).mp.</td>
</tr>
</tbody>
</table>

**Identify concepts: Textwords**

- Use truncation to pick up variants of textwords
### Concept #1

<table>
<thead>
<tr>
<th>Subject Headings</th>
<th>Text Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumcision, Male/</td>
<td>Circumcis*.mp.</td>
</tr>
</tbody>
</table>

OR

### Concept #2

| AND |
| exp HIV Infections/ |
| exp HIV/ |
| hiv.mp. |
| human immun* adj2 virus*.mp. |

OR

| OR |
| aids.mp. |
| acquired immun* adj2 syndrome*.mp. |

**Advanced textword/phrase searching:** adj for adjacency searching
**Boolean Operators: AND/OR**

**AND** directs the computer to search for every reference that contains all of the search terms specified. Each term must be present in every reference.

**OR** tells the computer to retrieve every reference that has at least one of the search terms—all terms do not have to be present in every reference.
Boolean Operators: AND/OR

HIV OR AIDS

HIV AND CIRCUMCISION
How to search

Concept 1
Line 1 =
Line 2 =
Line 3 =
Line 4 =

Line 5 = 1 OR 2 OR 3 OR 4

Concept 2
Line 6 =
Line 7 =
Line 8 =
Line 9 =

Line 10 = 6 OR 7 OR 8 OR 9

Line 11 = 5 AND 10

Results
Using search hedges/filters


(we will apply an RCT filter in next class)
Don’t forget to save your search!
Next up: More database searching, exporting records to EndNote
Questions?

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Other useful resources

- Ovid Technologies, Inc. OvidSP online training. http://www.ovid.com/site/support/training.jsp

- Systematic Review Service @ the Library: https://www.mcgill.ca/library/services/systematic-review-service
Additional references