



# **Managing the literature *in* *systematic reviews***

Marshall Dozier

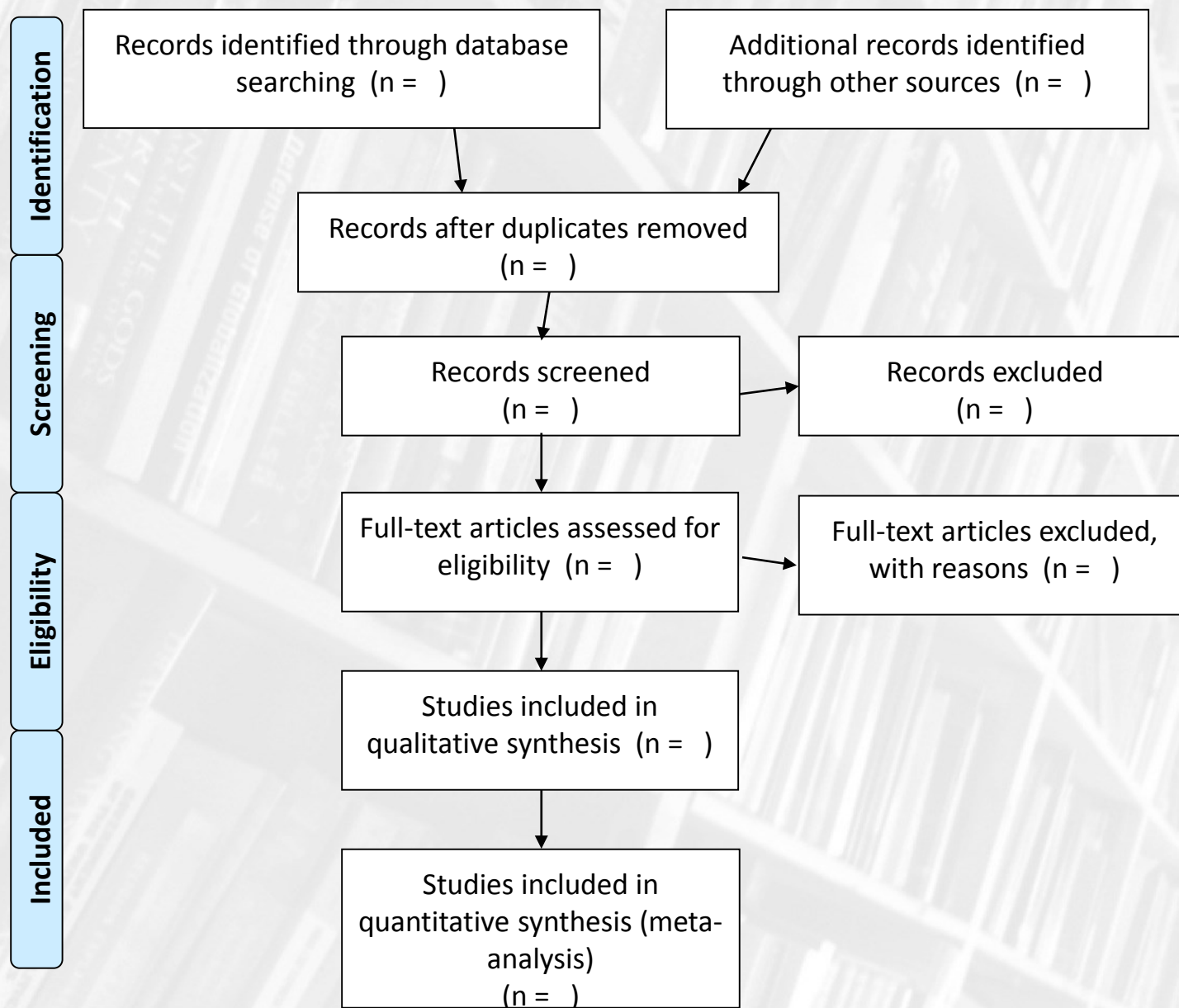
# What are we talking about?

- What makes a literature review 'systematic'?
- What's the difference between a systematic review and meta-analysis?
- There's plenty of debate about systematic review methods – see reading list



## PRISMA 2009 Flow Diagram

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097  
For more information, visit [www.prisma-statement.org](http://www.prisma-statement.org).



# Topics for this session

- What about avoiding bias?
- Where do you start?
- Your search strategy might include...
- How do you keep track of everything?
- How do you describe your search methods?
- Some detailed techniques...



# What about avoiding bias?

- Publication bias – mitigate by using grey literature, looking for unpublished studies usually via research registers and contacting experts.
- Database bias – mitigate by search regional specialist databases like the Global Health Library
- Language bias – avoid limits that aren't directly linked to inclusion criteria congruent with your research question
- Multiple publication bias – mitigate by noting studies with common authors, equal numbers of participants and common grant numbers.
- Reviewer bias – mitigate by sticking to your clearly stated question and your inclusion/exclusion criteria.

# Supporting the principles of the SR

- Minimise bias
  - e.g. search should allow positive and negative findings
- Include all comparable data
  - e.g. include unpublished studies
- Methods are explicit
  - Like a laboratory experiment
- “Reproducible”
  - Record all activities and report explicitly

# Where do you start?

Initial scoping search...

- Has a review already been done?
- Informs almost every aspect of the protocol

For the review proper...

- Make a strategic selection of literature databases, organisation websites and expert contacts
- Get ideas for your search terms by looking at prior reviews and known relevant studies
- Develop your search in one core database, then adapt that for other databases

Is the database search good enough?

- Test your search to see if known relevant papers are retrieved

# Your search strategy might include...

- Literature databases (like Medline, Web of Science)
- Grey literature (not commercially published)
  - Theses/Dissertations (special databases)
  - Reports (specific web sites, or Google with format limit)
- Key organisations' websites
- Unpublished studies
  - Search trials registers
- Contact experts in field
- Citation tracking
- Hand-searching



# How do you keep track of everything?

- Download database results to work on selection process. If you select directly from database results sets,
  - Results sets change when databases are updated
  - More likely to spend time on duplicate records
- Save your search histories on the database platform if possible, or on local computer files (eg word doc) if needed
- Record dates of downloads, and year coverage of search

## More

# How do you keep track of everything?

- EndNote or similar to de-duplicate results
  - Don't waste time rejecting the same record more than once!
- EndNote (or similar) can also be used to manage process of selection and feed directly into PRISMA flow diagram

# How do you describe your search methods?

- Be transparent in describing your methods
- Give enough detail for someone else to reproduce your methods
- For each database searched, report
  - platform used
  - date of download
  - span of years searched
  - search history



Some detailed techniques...



# Formulating the search queries

- PICOS / SPIDER framework as appropriate
- Reverse engineer from ideal data
- Identify synonyms, alternative spellings, related terms
- Link to criteria for relevance
- Not all essential concepts are good search terms – may work better as selection criteria
- Adapt the queries to best suit the resource

# PICOS

- Patient/population/problem
- Intervention/exposure
- Comparison/control
- Outcome
- Study design

# SPIDER

- Sample
- Phenomenon of Interest
- Design
- Evaluation
- Research type

# Reverse engineering...

- What kind(s) of data are appropriate?
- How are those data generated?
  - Instruments
- What types of study designs are valid?
  - Not sure? See e.g. [www.cebm.net/index.aspx?o=1039](http://www.cebm.net/index.aspx?o=1039)
- Criteria for generalisability
  - e.g. age, sex, co-morbidities, health infrastructure, health policy, cultural requirements

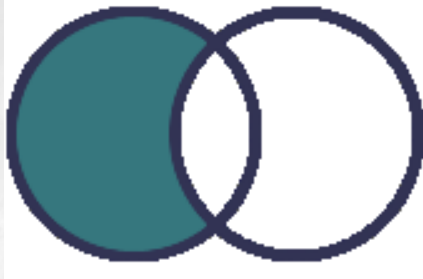
# Boolean combining operators



**AND** for the different essential topics

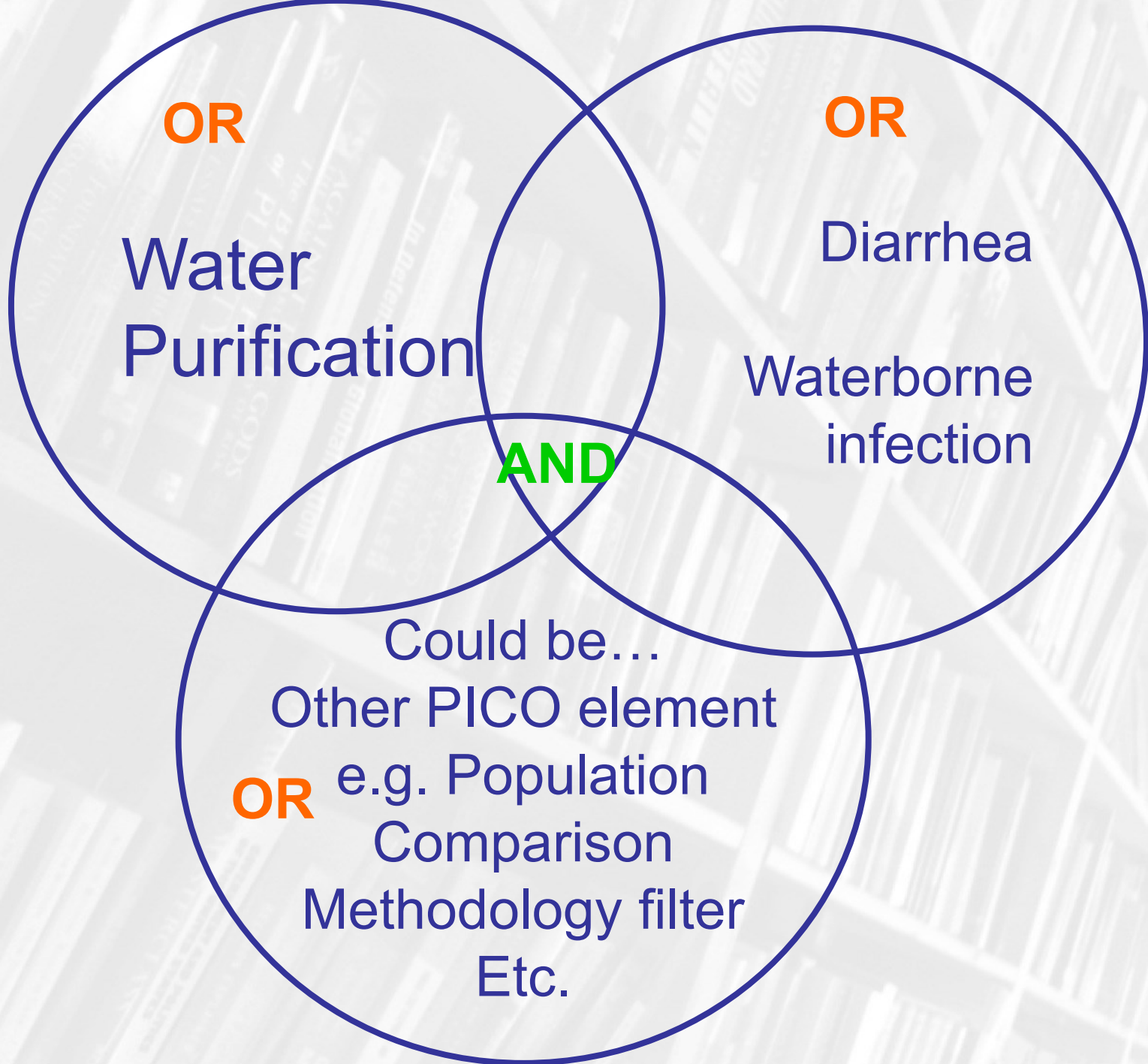


**OR** for synonymous topics



**NOT** to exclude a topic (use with caution!)





Search set	CIDG SR <sup>a</sup>	CENTRAL	MEDLINE <sup>b</sup>	EMBASE <sup>b</sup>	LILACS <sup>b</sup>
1	water	WATER PURIFICATION	WATER PURIFICATION	WATER PURIFICATION	water
2	purification OR treatment OR chlorination OR decontamination OR filtration OR supply OR storage OR consumption	WATER MICROBIOLOGY	WATER MICROBIOLOGY	WATER MICROBIOLOGY	purification OR treatment OR chlorination OR decontamination OR filtration OR supply OR storage OR consumption
3	diarrhea	1 OR 2	1 OR 2	1 OR 2	diarrhea
4	1 AND 2 AND 3	water	water	water	1 AND 2 AND 3
5	-	purification OR treatment OR chlorination OR decontamination OR filtration OR supply OR storage OR consumption OR drink*	purification OR treatment OR chlorination OR decontamination OR filtration OR supply OR storage OR consumption OR drink*	purification OR treatment OR chlorination OR decontamination OR filtration OR supply OR storage OR consumption OR drink\$	-
6	-	4 AND 5	4 AND 5	4 AND 5	-
7	-	3 OR 6	3 OR 6	3 OR 6	-
8	-	DIARRHEA/EPIDEMIOLOGY	DIARRHEA/EPIDEMIOLOGY	DIARRHEA/EPIDEMIOLOGY	-
9	-	DIARRHEA/MICROBIOLOGY	DIARRHEA/MICROBIOLOGY	DIARRHEA/PREVENTION	-
10	-	DIARRHEA/PREVENTION AND CONTROL	DIARRHEA/PREVENTION AND CONTROL	waterborne infection\$	-
11	-	waterborne infection*	waterborne infection*	cholera OR shigell\$ OR dysenter\$ OR cryptosporidi\$ OR giardia\$ OR Escherichia coli OR salmonella	-

Clasen TF, Roberts IG, Rabie T, Schmidt WP, Cairncross S. Interventions to improve water quality for preventing diarrhoea. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD004794. DOI: 10.1002/14651858.CD004794.pub2.

# ‘Reverse engineering’ subject headings

MeSH Subject Headings    [\\*Education, Medical, Undergraduate](#)  
[Faculty, Medical](#)  
[Humans](#)  
[\\*Interviews as Topic](#) / [mt \[Methods\]](#)  
[\\*Medical History Taking](#) / [mt \[Methods\]](#)  
[Patient Simulation](#)  
[\\*Physician-Patient Relations](#)  
[Students, Medical](#) / [px \[Psychology\]](#)  
[\\*Teaching](#) / [mt \[Methods\]](#)

These are Medline’s  
subject headings  
for the Novack paper  
(*image from OvidSP Medline*)

**Abstract**

Recent advances in educational theory and methodology have made it possible to teach medical interviewing with as much rigor as other clinical skills. We describe a first-semester, first-year medical student course that effectively teaches basic interviewing skills. This course provides faculty development, small group learning, detailed faculty and student coursebooks, and an interview checklist that delineates specific interviewing skills and content areas, serving as a template for teaching, practice, and feedback. Students have many opportunities for practice in role play and with patients, followed by feedback by self, peers, and faculty. Use of audiotape and videotape reviews enhances the learning experience. This article describes our course, suggests educational principles and standards for the teaching of medical interviewing, and presents educational research demonstrating significant gains in students’ skills associated with improvement in standardized patient satisfaction.

# Testing a systematic search

<input type="checkbox"/>	10	Clinical Clerkship/	Check to see if known papers are retrieved by your search. If not, look closely at the database record and adjust your search <i>(image from OvidSP Medline)</i>		
<input type="checkbox"/>	11	hospitals, teaching/ or hospitals, university/			
<input type="checkbox"/>	12	Curriculum/			
<input type="checkbox"/>	13	education, medical/ or education, medical, undergraduate/		64102	Advanced
<input type="checkbox"/>	14	(5 or 10 or 11 or 8) and (12 or 13)		15289	Advanced
<input type="checkbox"/>	15	"Novack\$" [Author Surname] and "1814" [Article First Page]		1	Advanced
<input type="checkbox"/>	16	14 and 15		0	Advanced

| Combine selections with:



## Quick Search

Search for

in All My References

Search

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All My References (463)

[Unfiled] (21)

Quick List (0)

Trash (0)

▼ My Groups

1st phase reject (323)

2nd phase reject - interventi... (4)

2nd phase reject - population (5)

2nd phase reject - study desi... (1)

3rd phase - reject quality is... (2)

3rd phase reject - quality is... (1)

Duplicates (106)

Build a profile to  
showcase your own work.

ResearcherID

## [Unfiled]

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Delete

Author↑ Year Title

- |                          |                   |      |   |
|--------------------------|-------------------|------|---|
| <input type="checkbox"/> | Weisburger, J. H. | 2000 | Eat to live, not live to eat<br>Nutrition<br>Added to Library: 16 May 2013 Last Update<br>WEB OF KNOWLEDGE <sup>SM</sup> → Source Record,<br>Times Cited: 60<br>   <a href="#">findit@edinburgh</a>  |
| <input type="checkbox"/> | Weisburger, J. H. | 2001 | Chemopreventive effects of cocoa polyph<br>diseases<br>Experimental Biology and Medicine<br>Added to Library: 16 May 2013 Last Update<br>WEB OF KNOWLEDGE <sup>SM</sup> → Source Record,<br>Times Cited: 42<br>   <a href="#">findit@edinburgh</a> |
| <input type="checkbox"/> | Weisburger, J. H. | 2002 | Lifestyle, health and disease prevention:<br>mechanisms<br>European Journal of Cancer Prevention  |

# Citation Tracking

Find more recent/additional research in same area

Example 'starter' paper:

Novack DH, Dube C, Goldstein MG. Teaching medical interviewing - a basic course on interviewing and the physician-patient relationship. *Arc Int Med* 1992 152(9):1814-1820.



Search

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## Cited Reference Search

Find the articles that cite a person's work.

**Step 1:** Enter information about the cited work. Fields are combined with the Boolean AND operator.

\* Note: Entering the title, volume, issue, or page in combination with other fields may reduce the number of cited reference variants found.

Novack D\*

Cited Author

Select from Index

Example: J Comp\* Appl\* Math\*

Cited Work

Select from Index

1992

Cited Year(s)

Search

+ Add Another Field | Reset Form

*View our Cited  
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tutorial.*


<input type="checkbox"/>	GOLDBERG, RJ...NOVACK, DH	SOC SCI MED	1992	35	3	261	10.1016/0277-9536(92)90022-I	20	<a href="#">View Record in Web of Science Core Collection</a>
<input type="checkbox"/>	GOLDBERG, RJ...NOVACK, D + <a href="#">[Show all authors]</a>	SOUTHERN MED J	1992	85	5	491	10.1097/00007611-199205000-00008	2	<a href="#">View Record in Web of Science Core Collection</a>
<input type="checkbox"/>	NOVACK D	THEOL NAHMANIDES SYS	1992					1	
<input checked="" type="checkbox"/>	NOVACK, DH + <a href="#">[Show all authors]</a>	ARCH INTERN MED	1992	152	9	1814	10.1001/archinte.152.9.1814	63	<a href="#">View Record in Web of Science Core Collection</a>
Select	Cited Author	Cited Work	Year	Volume	Issue	Page	Identifier	Citing Articles **	View Record



**Results: 63**

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: (Novack D\*) **AND CITED YEAR:** (1992) ...[More](#)

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- ☐ HEALTH CARE SCIENCES SERVICES (24)
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◀ Page **1** of 7 ▶

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- ☐ 1. **The Group Objective Structured Clinical Experience: Building communication skills in the clinical reasoning context**
- By: Konopasek, Lyuba; Kelly, Kevin V.; Bylund, Carma L.; et al.  
PATIENT EDUCATION AND COUNSELING Volume: 96 Issue: 1  
Pages: 79-85 Published: JUL 2014

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**Times Cited: 0**  
(from Web of Science Core Collection)

- ☐ 2. **Training Students with Patient Actors Improves Communication: A Pilot Study**
- By: Anderson, Heather A.; Young, Jack; Marrelli, Danica; et al.  
OPTOMETRY AND VISION SCIENCE Volume: 91 Issue: 1  
Pages: 121-128 Published: JAN 2014

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**Times Cited: 0**  
(from Web of Science Core Collection)

- ☐ 3. **Treating the whole patient: passing time-honoured skills for building doctor-patient relationships on to generations of doctors**
- By: Branch, William T., Jr.  
MEDICAL EDUCATION Volume: 48 Issue: 4 Pages: 67-74

**Times Cited: 0**  
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"communication skills" OR "interpersonal skills" "medical students" OR "nursin ▾



Scholar

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Articles

Legal documents

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- Since 2012
- Since 2011
- Since 2008
- Custom range...

Sort by date (1 year)

- ☒ include patents
- ☒ include citations

Create alert

Did you mean: "communication skills" OR "interpersonal skills" "medical students" OR "nursing students" curriculum OR **curricula** OR **curriculum** OR "course design"

[Teaching communication skills to medical students, a challenge in the curriculum?](#)

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M Deveugele, A Derese, SD Maesschalck... - Patient Education and ... , 2005 - Elsevier

INTRODUCTION:: As **communication skills** become more and more important in medical practice, the new medical **curriculum** at Ghent University (1999) implemented a **communication curriculum**. METHOD:: Communication training or experiences in 'real life' ...

Cited by 84 - [Related articles](#) - [All 12 versions](#)

[\[PDF\] The influence of the New Pathway curriculum on Harvard medical students](#)

nih.gov [\[PDF\]](#)  
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GT Moore, SD Block, CB Style, R Mitchell - Academic Medicine, 1994 - nibib.nih.gov

The Influence of the New Pathway **Curriculum** on Harvard **Medical Students** GORDON T. MOORE, MD. ... NPIRF), used Likert rat- ing scales to measure five dimensions: **communication skills**, empathy, use ... 68.21 38 19.12 60.93 15 14.29 -If Observer-rated **interpersonal skills** w ?c ...

Cited by 190 - [Related articles](#) - [BL Direct](#) - [All 9 versions](#)

[Assessing the development of communication skills in undergraduate medical students](#)

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GM Humphris, S Kaney - Medical education, 2001 - Wiley Online Library

... between knowledge of interaction skills at an early stage of the **curriculum** and later ... Rating scales have been utilized extensively in the area of assessing **interpersonal skills**. 26 The use of simulated patients in assessing **medical students' communication skills** is well accepted. ...

Cited by 61 - [Related articles](#) - [BL Direct](#) - [All 7 versions](#)

[Care at the end of life: a novel curriculum module implemented by medical students](#)

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JW Magnani, MA Minor, JM Aldrich - Academic Medicine, 2002 - journals.lww.com

... The module provides students with opportunities to practice **communication skills** and to assess their ... of List 1 shows the six open-ended questions graduating **medical students** received ... We simultaneously reviewed Stanford School of Medicine's preclinical **curriculum** for content ...

Cited by 27 - [Related articles](#) - [BL Direct](#) - [All 4 versions](#)

[Comparing self-reported communication skills of medical students in traditional and integrated](#)

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# Theory/Jargon 1

- **Boolean Operator** AND, OR and NOT are 'logical operators' that search software uses to combine search terms.
- **Controlled index or thesaurus** A controlled thesaurus is a list of standard subject terms from which indexers select subject headings to describe the content of articles or other publications in a consistent manner.
- **Free-text search** A search that will look for a word or phrase in all available fields of the database records, regardless of contextual meaning.
- **Methodology filter** A 'ready-made' search of terms that will retrieve specific types of reports, e.g. cohort studies, controlled trials, diagnostic use, etc. Filters are not usually subject specific – they are meant to be applicable to any subject search.

# Theory/Jargon 2

- **Sensitivity** When referring to a literature search, means inclusive, so that you get more hits, and may get some irrelevant ones. Synonymous with 'recall'.
- **Specificity** When referring to a literature search, means exclusive, so that you get fewer hits to sift through, but may miss some relevant information. Synonymous with 'precision'.
- **Subject heading** A term used to describe the content of a publication – usually derived from a Controlled thesaurus.
- **Truncation** (or wildcard searching) is the substitution of a character to retrieve variations in spelling and word ending. It cannot be utilised with the set terms of a controlled vocabulary, but is a powerful aid in improving the sensitivity of free text searches.