Efficiently Searching for Systematic Reviews - How to Perform High Quality Searches More Efficiently

Wichor Bramer
Erasmus MC - Rotterdam the Netherlands
AGMB Tagung - Basel CH
44 or/18-43 (7140484)
45 random$.tw. (892218)
46 factorial$.tw. (23405)
47 crossover$.tw. (49675)
48 cross over$.tw. (22262)
49 cross-over$.tw. (22262)
50 placebo$.tw. (203743)
51 (doub|. adj blind$).tw. (147609)
52 (sing|. adj blind$).tw. (14595)
53 assign$.tw. (241607)
54 allocat$.tw. (84725)
55 volunteer$.tw. (181433)
56 Crossover Procedure/ (39305)
57 double-blind procedure.tw. (219)
58 Randomized Controlled Trial/ (347009)
59 Single Blind Procedure/ (18444)
60 or/45-59 (1428276)
61 (animal/ or nonhuman/) not human/ (4623513)
62 60 not 61 (1262127)
63 7 and 12 and 17 and 44 and 62 (952)
64 (201203* or 201204* or 201205* or 201206* or 201207* or 201208* or 201209*
or 201210* or 201011* or 201212* or 2013* or 2014*).dd. (3247786)
65 63 and 64 (263)
66 limit 65 to embase (204)
Hausner, 2015 (13); Saleh, 2014 (17); Allen, 1999 (19); Gann, 2013 (47); Lyon, 2014 (9) [1-5] and unpublished data from London Health Sciences Centre in Canada (43)
Hausner, 2015 (13); Saleh, 2014 (17); Allen, 1999 (19); Gann, 2013 (47); Lyon, 2014 (9) [1-5] and unpublished data from London Health Sciences Centre in Canada (43)
# How well do they perform?

<table>
<thead>
<tr>
<th></th>
<th>Benchmark</th>
<th>This study</th>
</tr>
</thead>
<tbody>
<tr>
<td># terms</td>
<td>46</td>
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</table>

**Benchmark:** 93 systematic reviews from 2014 with an acknowledgement or co-authorship of a medical information specialist from another Dutch academic hospital.
Success factors / Time savers

- Optimization techniques
- Macros for syntax translation
A new method of searching systematically

Is exercise therapy an effective treatment for hip osteoarthritis?
Elements : Bias

Very specific characteristics

→ **Duration of** breastfeeding and intelligence

Judgements

→ **Poor** family functioning, **harsh** parenting and **bullying** behavior
Elements : Duplicates

Pre-eclampsia AND pregnant AND women

Lichtenstein therapy AND inguinal hernias
Which elements to use:
Does eating Broccoli help in the prevention of cancer?
Which elements to use:

Is exercise therapy effective for hip osteoarthritis?
Identifying thesaurus terms

One element $\rightarrow$ One thesaurus term
One element $\rightarrow$ Multiple thesaurus terms (OR)
Multiple elements $\rightarrow$ One thesaurus term
cancer mortality
mortality, cancer use: cancer mortality
cancer *use:* neoplasm

abdomen cancer *use:* abdominal cancer
abdominal cancer
acoustic nerve cancer *use:* acoustic neurinoma
adenoid cancer *use:* adenoid cystic carcinoma
adenoid cystic cancer *use:* adenoid cystic carcinoma
adrenal cancer
advanced breast cancer *use:* breast cancer
advanced cancer
advanced gynecologic cancer *use:* gynecologic cancer
advanced pelvic cancer *use:* pelvis cancer
advanced pelvis cancer *use:* pelvis cancer
alimentary canal cancer *use:* digestive system cancer
alimentary tract cancer *use:* digestive system cancer
alpha gal pancreatic cancer vaccine *use:* algenpantucel L
alveolar cell cancer *use:* lung alveolus cell carcinoma
alveolus cell cancer *use:* lung alveolus cell carcinoma
alveolus cell cancer, lung *use:* lung alveolus cell carcinoma
american cancer society *use:* non profit organization
amplified in breast cancer 1 protein *use:* steroid receptor coactivator 3
anal canal cancer *use:* anus cancer
anal cancer *use:* anus cancer
anaplastic cancer *use:* anaplastic carcinoma
anaplastic thyroid cancer
anti cancer drug *use:* antineoplastic agent
anti-cancer gene *use:* antitumor gene
anti-cancer genes *use:* antitumor gene
antigen, cancer *use:* tumor antigen
antigen, cancer associated *use:* tumor antigen
mortality

cancer mortality
cardiovascular mortality
child mortality use: childhood mortality
childhood mortality
drug mortality use: drug fatality
embryo mortality
embryonic mortality use: embryo mortality
excess mortality use: mortality
fetal mortality use: fetus mortality
fetus mortality
foetal mortality use: fetus mortality
foetus mortality use: fetus mortality
hospital mortality use: mortality
infant mortality
infantile mortality use: infant mortality
intrauterine mortality use: prenatal mortality
maternal mortality
mortality
mortality cause use: cause of death
mortality model use: mortality
mortality rate use: mortality
mortality risk use: mortality
mortality, premature use: premature mortality
mortality, cancer use: cancer mortality
mortality, childhood use: childhood mortality
mortality, fetal use: fetus mortality
mortality, foetal use: fetus mortality
mortality, infant use: infant mortality
1. **Cancer mortality in Italy, 1979**
   Decarli A., La Vecchia C.
   *Tumori* 1985 **71**:6(519-528) Cited by: 1
   Embase MEDLINE Abstract Index Terms

2. **Cancer mortality after age 65 in metropolitan France (1973-2003)**
   Rican S., Jouglia E., Kerzerho D., Gourdon G., Vaillant Z., Salem G.
   *Oncologie* 2007 **9**:3(200-203) Cited by: 0
   Embase Abstract Index Terms

3. **The effect of religious concentration and affiliation on county cancer mortality rates**
   Dwyer J.W., Clarke L.L., Miller M.K.
   *Journal of Health and Social Behavior* 1990 **31**:2(185-202) Cited by: 50
   Embase MEDLINE [No abstract available] Index Terms

4. **Cancer mortality and urbanization in China**
   Haynes R.
Identifying thesaurus terms

One element $\rightarrow$ One thesaurus term

One element $\rightarrow$ Multiple thesaurus terms (OR)

Multiple elements $\rightarrow$ One thesaurus term

('cancer mortality' OR (neoplasm AND mortality))
(neoplasm OR 'cancer mortality') AND (mortality OR 'cancer mortality')

One element $\rightarrow$ Multiple thesaurus terms (AND)

Bennett Fracture: (Fracture, Bone AND metacarpal bones AND thumb)

Alcohol metabolites: alcohols/metabolism
Identifying free text words

Optimal sensitivity only by additionally searching in title / abstract:

• Relevant, non-inverted terms from synonyms/entry terms
For term: 'shoulder'

Extend your search:  
- Explosion [ ]  
- As major focus [ ]

or

History
This term was added to Emtree in 1974

Synonyms
- glenohumeral joint; humeroscapular joint; joint, glenohumeral; joint, humeroscapular; scapulo humeral joint; scapulohumeral joint; shoulder joint

Dorland's dictionary
- glenohumeral joint = articulatio humeri.
- shoulder = the junction of the upper limb and trunk; also that part of the trunk that is bounded at the back by the scapula. See also regio deltoidea.
- shoulder joint = articulatio humeri.

Definition from Dorland's Medical Dictionary, 32nd edition, copyright © 2011 by Elsevier. For more information please go to www.dorlands.com
Shoulder

Year introduced: SHOULDER ARTHROSES was heading 1963-1964

PubMed search builder options

Subheadings:

- abnormalities
- analysis
- anatomy and histology
- blood supply
- cytology
- diagnosis
- drug effects
- embryology
- etiology
- growth and development
- injuries
- innervation
- metabolism
- microbiology
- parasitology
- pathology
- physiology
- physiopathology
- radiation effects
- radiography
- radionuclide imaging
- surgery
- therapy
- ultrasonography
- ultrastructure
- virology

Restrict to MeSH Major Topic.
Do not include MeSH terms found below this term in the MeSH hierarchy.

Tree Number(s): A01.378.800.750
MeSH Unique ID: D012782
Entry Terms:

- Shoulders

All MeSH Categories
Anatomy Category
Body Regions
Extremities
Upper Extremity
Shoulder
# Shoulder Joint

The articulation between the head of the HUMERUS and the glenoid cavity of the SCAPULA.

Year introduced: 1965

PubMed search builder options

**Subheadings:**

- abnormalities
- analysis
- anatomy and histology
- blood supply
- chemistry
- cytology
- diagnosis
- drug effects
- embryology
- enzymology
- etiology
- growth and development
- immunology
- injuries
- innervation
- metabolism
- microbiology
- parasitology
- pathology
- physiology
- physiopathology
- radiation effects
- radiography
- radionuclide imaging
- surgery
- therapy
- transplantation
- ultrasonography
- ultrastructure
- virology

☐ Restrict to MeSH Major Topic.

☐ Do not include MeSH terms found below this term in the MeSH hierarchy.

Tree Number(s): A02.835.583.748

MeSH Unique ID: D012785

Entry Terms:

- Joint, Shoulder
- Joints, Shoulder
- Shoulder Joints
- Glenohumeral Joint
- Glenohumeral Joints
- Joint, Glenohumeral
- Joints, Glenohumeral

[All MeSH Categories](#)

[Anatomy Category](#)
Identifying free text words

Optimal sensitivity only by additionally searching in title / abstract:

• Relevant, non-inverted terms from synonyms / entry terms

Shoulder: glenohumeral joint- humeroscapular joint- scapulo humeral joint- scapulohumeral joint- articulatio humeri

• Relevant words / phrases from narrower terms
Tree Number(s): C04.588.274.476.411.307, C06.301.371.411.307, C06.405.249.411.307, C06.405.469.158.35, C06.405.469.860.180
MeSH Unique ID: D015179
Entry Terms:
- Neoplasms, Colorectal
- Colorectal Neoplasm
- Neoplasm, Colorectal
- Colorectal Tumors
- Colorectal Tumor
- Tumor, Colorectal
- Tumors, Colorectal
- Colorectal Carcinoma
- Carcinoma, Colorectal
- Carcinomas, Colorectal
- Colorectal Carcinomas
- Colorectal Cancer
- Cancer, Colorectal
- Cancers, Colorectal
- Colorectal Cancers

Previous Indexing:
- Colonic Neoplasms (1966-1988)
- Rectal Neoplasms (1966-1988)

See Also:
Digestive System Neoplasms
Gastrointestinal Neoplasms
Intestinal Neoplasms
Colorectal Neoplasms

Adenomatous Polyposis Coli
Gardner Syndrome

Colonic Neoplasms
Adenomatous Polyposis Coli +
Sigmoid Neoplasms

Colorectal Neoplasms, Hereditary Nonpolyposis
Rectal Neoplasms

Anus Neoplasms +
Identifying free text words

Optimal sensitivity only by additionally searching in title / abstract:

• Relevant, non-inverted terms from synonyms / entry terms

Shoulder: glenohumeral joint- humeroscapular joint- scapulo humeral joint- scapulohumeral joint- articulatio humeri

• Relevant words / phrases from narrower terms

Colorectal Neoplasms: Colonic cancer- Cancer of Sigmoid- Rectum tumor- Anal Neoplasms...etc...
# Standard syntax
(considered familiar)

<table>
<thead>
<tr>
<th></th>
<th>Embase.com</th>
<th>OvidSP</th>
<th>PubMed</th>
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<tbody>
<tr>
<td><strong>Boolean</strong></td>
<td></td>
<td>AND, OR, NOT</td>
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<td><strong>Thesaurus</strong></td>
<td>/exp</td>
<td>exp .../</td>
<td>[mh]</td>
</tr>
<tr>
<td>---- Unexploded</td>
<td>/de</td>
<td>.../</td>
<td>[mh:noexp]</td>
</tr>
<tr>
<td><strong>Title / abstract</strong></td>
<td>():ab,ti</td>
<td>():ab,ti.</td>
<td>[tiab]</td>
</tr>
<tr>
<td><strong>Phrases</strong></td>
<td>‘single quotes’</td>
<td>No quotes needed</td>
<td>“Double quotes” or *</td>
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<tr>
<td><strong>Proximity</strong></td>
<td>NEAR/n</td>
<td>ADJn</td>
<td>Not possible: use AND</td>
</tr>
</tbody>
</table>
physical disease by etiology and pathogenesis
  inflammation
  musculoskeletal system inflammation
    arthritis
      osteoarthritis
      hip osteoarthritis

7,890 Records

Synonyms
arthrosis, hip; arthrosis, hip joint; cox arthrosis; coxartherosis; coxarthroses; coxarthrosis; hip arthrosis; hip joint arthrosis; hip osteo-arthritis; hip osteo-arthritis; hip osteoarthritis; malum coxae senilis; osteoarthritis, hip

('hip osteoarthritis'/exp OR (coxarth* OR ((hip OR cox) NEAR/3 (arthros* OR arthrit* OR osteoarth*)))) OR 'malum coxae senilis'):ab,ti)
Ovid (Medline) syntax

() 
(exp ")")
(exp "osteoarthritis, hip")
(exp "osteoarthritis, hip"/ OR ().ab,ti.)
(exp "osteoarthritis, hip"/ OR (coxarth*).ab,ti.)
(exp "osteoarthritis, hip"/ OR (coxarth* OR (() ADJ3 ())).ab,ti.)
(exp "osteoarthritis, hip"/ OR (coxarth* OR ((hip OR cox) ADJ3 (arthrit* OR arthros* OR osteoarth*)))).ab,ti.)
PubMed syntax (not optimal)

()

(""[mh])

("osteoarthritis, hip"[mh])

(exp "osteoarthritis, hip"/ OR coxarth*[tiab])

(exp "osteoarthritis, hip"/ OR coxarth*[tiab] OR ((hip[tiab] OR cox[tiab]) AND (arthrit*[tiab] OR arthros*[tiab] OR ...))))

Basic Query – 461 hits

('hip osteoarthritis'/exp OR (Coxarthros* OR 'malum coxae sinilis' OR ((hip OR cox) NEAR/3 (arthrit* OR arthros* OR osteoarthr*)))):ab,ti) AND

('kinesiotherapy'/exp OR (kinesiotherap* OR kinesitherap* OR ((exercise) NEAR/3 (technique* OR treat* OR therap*)))):ab,ti)
Optimization

('hip osteoarthritis'/exp OR (Coxarthros* OR 'malum coxae sinilis' OR ((hip OR cox) NEAR/3 (arthrit* OR arthros* OR osteoarthr*)))):ab,ti) AND ('kinesiotherapy'/exp NOT (kinesiotherap* OR kinesitherap* OR ((exercise) NEAR/3 (technique* OR treat* OR therap*)))):ab,ti)
1. Osteoarthritis of the hip
   Lequesne M.

2. Long-term follow-up study of conservative therapy for coxarthrosis: Two case studies
   Nakajima M., Nagashima T.
   *Physiotherapy* 2001 87:10 (530-535) Cited by: 0

3. Coxarthrosis and physical work load
   Vinggaard E., Hogstedt C., Alfredsson L., Fellenius E., Goldie I., Koster M.

4. Physical and physiotherapeutic measures to restore function in coxarthrosis
   Neff G.
   *Munchener Medizinische Wochenschrift* 1978 120:25 (869-873) Cited by: 0

5. Immediate efficacy of neuromuscular exercise in patients with severe osteoarthritis of the hip or knee: A secondary analysis from a randomized controlled trial
   Villadsen A., Overgaard S., Holgaard-Larsen A., Christensen R., Roos E.M.
   *Journal of Rheumatology* 2014 41:7 (1385-1394)

6. Ipsilateral total hip arthroplasty in a dysvascular below-knee amputee for advanced hip osteoarthritis: A case report and review of the literature
   Mak J., Solomon M., Faux S.
   *Prosthetics and Orthotics International* 2008 32:2 (155-159) Cited by: 4

7. Questions and answers on the care of the motor system. Early release of a patient following surgery of coxarthrosis
   Suzuki M., Megumi H.
683 hits

('hip osteoarthritis'/exp OR (Coxarthros* OR 'malum coxae sinilis' OR ((hip OR cox) NEAR/3 (arthrit* OR arthros* OR osteoarthr*)))):ab,ti) AND
('kinesiotherapy'/exp OR (kinesiotherap* OR kinesitherap* OR ((exercise) NEAR/3 (technique* OR treat* OR therap* OR neuromusc*)) OR (conservativ* NEAR/3 therap*) OR physiotherap*):ab,ti)
Optimization

('hip osteoarthritis'/exp OR (Coxarthros* OR 'malum coxae sinilis' OR ((hip OR cox) NEAR/3 (arthrit* OR arthros* OR osteoarthr*)))):ab,ti) AND ((kinesiotherap* OR kinesitherap* OR ((exercise) NEAR/3 (technique* OR treat* OR therap* OR neuromusc*))) OR (conservativ* NEAR/3 therap*) OR physiotherap*):ab,ti) NOT 'kinesiotherapy'/exp
1. Osteoarthritis of the hip and/or knee in Dutch general practice and physiotherapy practice
   Barten D.J., Swinkels I.C., Dorsman S.A., Veenhof C.
   *Osteoarthritis and Cartilage* 2012 20 SUPPL. 1 (S187-S188)

2. Out-patient physiotherapy for people with bilateral coxarthrosis
   Bolach E., Bolach B., Trzonkowski J.
   *Fizjoterapia* 2007 15:2 (9-16) Cited by: 2

3. Efficacy of a multimodal physiotherapy treatment program for hip osteoarthritis: A randomised placebo-controlled trial protocol
   *BMC Musculoskeletal Disorders* 2010 11 Article Number 238 Cited by: 7

4. A randomized controlled trial comparing hydrotherapy and conventional physiotherapy to patients with hip osteoarthritis (HOA)
   Patru S., Marcu I.R., Bighea A.C., Caimac D., Popescu R.S., Matei D.
   *Osteoporosis International* 2014 25 SUPPL. 2 (S255-)

5. Physiotherapy in osteoarthritis--a review of literature on conservative therapy of knee and hip osteoarthritis
   Hoffmann S., Theiler R.
2362 hits

('hip osteoarthritis'/exp OR (Coxarthros* OR 'malum coxae sinilis' OR ((hip OR cox) NEAR/3 (arthrit* OR arthros* OR osteoarthr*)))):ab,ti) AND ('kinesiotherapy'/exp OR physiotherapy/exp OR physiotherapist/exp OR 'physiotherapy practice'/exp OR exercise/exp OR 'manipulative medicine'/exp OR 'physical activity'/exp OR (kinesiotherap* OR kinesitherap* OR ((exercise) NEAR/3 (technique* OR treat* OR therap* OR neuromusc*)) OR (conservativ* NEAR/3 therap*) OR physiotherap*):ab,ti)
Optimized for sensitivity – 3571 hits

('hip osteoarthritis'/exp OR (Coxarthros* OR 'malum coxae sinilis' OR ((hip OR cox) NEAR/4 (arthrit* OR arthros* OR osteoarthr* OR OA)))):ab,ti) AND
('kinesiotherapy'/exp OR Kinesiology/exp OR walking/exp OR physiotherapy/exp OR 'conservative treatment'/exp OR physiotherapist/exp OR 'manipulative medicine'/exp OR exercise/exp OR 'movement (physiology)'/exp OR 'physiotherapy practice'/exp OR 'physical activity'/exp OR (kinesiotherap* OR kinesitherap* OR exercis* OR ((motion OR conservative OR manual OR manipulat*) NEAR/3 (technique* OR treat* OR therap*)) OR Chiropract* OR physiotherap* OR (phys* NEAR/3 (therap* OR activ*)))):ab,ti)
Minutes per term
Translating the strategy between databases

Embase.com (Embase and Medline)
Thorough optimization of thesaurus terms and title / abstract terms in search strategy

- Macro and edit thesaurus
- Add extra terms
- Macro and edit
- Remove thesaurus

Medline (OvidSP)
MeSH terms in PubMed / Optimization
- Macro and edit thesaurus
- Macro

PsyCINFO (OvidSP)
edit thesaurus

CINAHL (EBSCO)
Macro and edit thesaurus

PubMed publisher [sb]

Google Scholar

Cochrane library

- Macro

Web-of-science

Scopus

Lilacs / Scielo / Eric / Clinical trials etc etc

Macro and edit
<table>
<thead>
<tr>
<th>Database</th>
<th>Searched Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embase.com</td>
<td>328 ('anterior cruciate ligament reconstruction'/exp OR 'anterior cruciate ligament injury'/exp OR 'knee ligament surgery'/de OR 'knee arthroscopy'/exp) OR ((anterior NEAR/6 ligament* NEAR/6 reconstruct* OR surg* OR repair*)) OR (acl NEAR/3 reconstruct* OR surg* OR repair*).</td>
</tr>
<tr>
<td>Embase.com</td>
<td>327 (vessel* OR arter* OR vein* OR vascul*) NEAR/3 (damage* OR injur* OR complication* OR trauma OR accident* OR lesion* OR disease*) OR embolism OR thrombo* OR claudicat* OR aneurism* OR ischam* OR ischaem* OR extravasat* OR reperfusion* OR hemorrhos* OR haemarthros* OR phlebothrombo* OR ((compartment* OR 'anterior tibial') NEAR/3 syndrome*).</td>
</tr>
<tr>
<td>Medline (ovidSP)</td>
<td>211 (exp anterior cruciate ligament reconstruction/ OR anterior cruciate ligament/su OR (anterior cruciate ligament/ AND (arthroscopy/)) OR ((anterior AD6 ligament* AD6 (reconstruct* OR surg* OR repair*)) OR (acl AD3 (reconstruct* OR surg* OR repair*)).</td>
</tr>
<tr>
<td>Medline (ovidSP)</td>
<td>AND (exp vascular diseases/ OR exp Blood Vessels/in OR hemorrhosis/ OR Anterior Compartment Syndrome/ OR (((vessel* OR arter* OR vein* OR vascul*) ADJ3 (damage* OR injur* OR complication* OR trauma OR accident* OR lesion* OR disease*) OR embolism OR thrombo* OR claudicat* OR aneurism* OR ischam* OR ischaem* OR extravasat* OR reperfusion* OR hemorrhos* OR haemarthros* OR phlebothrombo* OR ((compartment* OR 'anterior tibial') ADJ3 syndrome*).)</td>
</tr>
<tr>
<td>Cochrane</td>
<td>16 (((anterior NEAR/6 ligament* NEAR/6 (reconstruct* OR surg* OR repair*)) OR (acl NEAR/3 reconstruct* OR surg* OR repair*))) OR (((vessel* OR arter* OR vein* OR vascul*) NEAR/3 (damage* OR injur* OR complication* OR trauma OR accident* OR lesion* OR disease*) OR embolism OR thrombo* OR claudicat* OR aneurism* OR ischam* OR ischaem* OR extravasat* OR reperfusion* OR</td>
</tr>
</tbody>
</table>
Minutes per database

![Scatter plot showing the relationship between the number of databases searched and the minutes needed to create a search.](image)
Success factors / Time savers

• Single-line search strategies
• Create query in Word and paste in databases (watch out for spelling check and smart quotes)
• Database order and interface choice
• Optimization techniques
• Direct feedback by researcher
• Macros for syntax translation
• More variation in PICO
• Experience (be pro-active)
• Computer literacy
Quality is the norm, not speed!

Not a blueprint for speed but for confidence by standardization

Speed can only be a result of experience

By gaining speed more customers can be helped and overall review quality will improve
The effect for our organization

- not assisted
- assisted but not acknowledged
- acknowledged
- co-authored

Number of published Systematic Reviews by Erasmus MC

- 2012
- 2013
- 2014
- 2015 (aug)
More information:

Treffpunkt 4 (15:20-16:15 / 17:05-18:00)
Efficient searching methods demonstrated –
Live searches on participants' research questions

Send research questions to:
  w.bramer@erasmusmc.nl
  @wichor
Contact details

E-mail: w.bramer@erasmusmc.nl
Twitter: @wichor
LinkedIn: nl.linkedin.com/in/wichor
Slideshare: www.slideshare.net/wichor
ResearchGate: researchgate.net/profile/Wichor_Bramer
Further reading:

- Bramer WM, Holland L, Mollema J, Hannon T, Bekhuis T. Removing duplicates in retrieval sets from electronic databases: comparing the efficiency and accuracy of the Bramer-method with other methods and software packages (Eahil conference, Rome)
- Embase webinar (25 feb 2015) : Systematic searching with Wichor Bramer
- Bramer WM, Pols DHJ, Bindels PJE, Bohnen AM. A fast, reliable and objective method for creating thematic search filters in bibliographic databases [in process]

- Work in progress on coverage, retrieval and relevance ranking of the major databases for systematic reviews (>520 exhaustive searches; >115 reviews finished; >5000 included references)
- Two articles in progress about this methodology (how to, and how well)
References


Single line approach or set numbers?

Well structured?

#1 brassica[mh]
#2 brassica*[tiab]
#3 broccoli[tiab]
#4 #1 OR #2 OR #3
#5 neoplasm[mh]
#6 neoplas*[tiab]
#7 cancer*[tiab]
#8 tumor*[tiab]
#9 #5 OR #6 OR #7 OR #8
#10 #4 AND #9
#11 animals[mh]
#12 humans[mh]
#13 #11 AND #12
#14 #11 NOT #13
#15 #10 NOT #14

Unstructured?

NOT (animals[mh] NOT humans[mh])
Single line approach or set numbers?

Well structured?

1. brassica[mh]
2. brassica*[tiab]
3. broccoli[tiab]
4. #1 OR #2 OR #3
5. neoplasm[mh]
6. neoplas*[tiab]
7. cancer*[tiab]
8. tumor*[tiab]
9. #5 OR #6 OR #7 OR #8
10. #4 AND #9
11. animals[mh]
12. humans[mh]
13. #11 AND #12
14. #11 NOT #13
15. #10 NOT #14
16. cauliflower*[tiab]
17. #1 OR #2 OR #3 OR #16
18. #17 AND #9
19. #18 NOT #14

Unstructured?

What to do with subheadings

Separate element
(brassica[mh] OR broccoli*[tiab] OR brassica*[tiab]) AND (neoplasms[mh] OR cancer*[tiab] OR neoplasm*[tiab]) AND ("prevention and control"[sh] OR prevent*[tiab])

Combined element
(brassica[mh] OR broccoli*[tiab] OR brassica*[tiab]) AND ("neoplasms/prevention and control"[mh] OR cancer prevent*[tiab] OR neoplasm prevent*[tiab] OR ...)

Sensitive
- More hits: 353
- Less chance of missing relevant articles
- Recommended for start
- For SRs highly recommended

Specific
- Less hits: 268
- Higher chance of missing relevant articles
- To reduce the number of hits
- Sensitive with proximity specific with phrases
Why start in embase?

Source: Unpublished research Bramer (5182 included references from 118 reviews)
<table>
<thead>
<tr>
<th>Database</th>
<th># includes</th>
<th>Sensitivity</th>
<th>Minimum Sensitivity</th>
<th>Percentage 100% Sens</th>
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<td>medline</td>
<td>1009</td>
<td>78%</td>
<td>53%</td>
<td>5%</td>
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<td>embase</td>
<td>1126</td>
<td>87%</td>
<td>67%</td>
<td>13%</td>
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<td>1203</td>
<td>93%</td>
<td>76%</td>
<td>20%</td>
</tr>
<tr>
<td>em-wos</td>
<td>1195</td>
<td>93%</td>
<td>69%</td>
<td>25%</td>
</tr>
<tr>
<td>em-gs</td>
<td>1165</td>
<td>90%</td>
<td>73%</td>
<td>23%</td>
</tr>
<tr>
<td>em-wos-ml</td>
<td>1253</td>
<td>97%</td>
<td>86%</td>
<td>38%</td>
</tr>
<tr>
<td>em-wos-gs</td>
<td>1226</td>
<td>95%</td>
<td>76%</td>
<td>48%</td>
</tr>
<tr>
<td>em-wos-ml-gs</td>
<td>1277</td>
<td>99%</td>
<td>94%</td>
<td>78%</td>
</tr>
<tr>
<td>total</td>
<td>1290</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The databases I use:

<table>
<thead>
<tr>
<th>Database</th>
<th>Used in % of SRs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embase.com</td>
<td>100%</td>
</tr>
<tr>
<td>Medline (Ovid)</td>
<td>99%</td>
</tr>
<tr>
<td>(PubMed)</td>
<td><em>the other 1%</em></td>
</tr>
<tr>
<td>Cochrane library (central)</td>
<td>98%</td>
</tr>
<tr>
<td>Web-of-Science</td>
<td>95%</td>
</tr>
<tr>
<td>Google Scholar</td>
<td>92%</td>
</tr>
<tr>
<td>PubMed (publisher)</td>
<td>91%</td>
</tr>
<tr>
<td>Scopus</td>
<td>39%</td>
</tr>
<tr>
<td>Cinahl</td>
<td>31%</td>
</tr>
<tr>
<td>PsycINFO</td>
<td>22%</td>
</tr>
<tr>
<td>Others (proquest, sportdiscus, lilacs, scielo, eric, amed etc)</td>
<td>15%</td>
</tr>
</tbody>
</table>
## Interface choice for embase

<table>
<thead>
<tr>
<th><strong>Embase.com</strong></th>
<th><strong>OvidSP</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
<td><strong>Pros</strong></td>
</tr>
<tr>
<td>- Very good relevance ranking</td>
<td>- Equal syntax to medline (Ovid)</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td><strong>Cons</strong></td>
</tr>
<tr>
<td>- Translating between embase and medline more complicated</td>
<td>- No relevance ranking on complicated queries</td>
</tr>
<tr>
<td>- No wildcard (?) in truncation</td>
<td>- Complex thesaurus interface</td>
</tr>
<tr>
<td>- Special characters not normalized (VO$_2$max)</td>
<td><strong>My advice</strong>: relevance ranking is very helpful during optimization. Problems are only minor. Using embase.com and translate with macros</td>
</tr>
</tbody>
</table>
Embase.com syntax

()  
("/exp")  
('hip osteoarthritis'/exp)  
('hip osteoarthritis'/exp OR ():ab,ti)  
('hip osteoarthritis'/exp OR (coxarth*):ab,ti)  
('hip osteoarthritis'/exp OR (coxarth* OR ((() NEAR/3 ())):ab,ti)  
('hip osteoarthritis'/exp OR (coxarth* OR (hip OR cox) NEAR/3 (arthrit* OR arthros* OR osteoarth*)))):ab,ti)
Ovid (Medline) syntax

()  
(exp ""/)
(exp "osteoarthritis, hip"/
(exp "osteoarthritis, hip"/ OR (coxarth*).ab,ti.)
(exp "osteoarthritis, hip"/ OR (coxarth* OR ((() ADJ3 ()))).ab,ti.)
(exp "osteoarthritis, hip"/ OR (coxarth* OR ((hip OR cox) ADJ3 (arthrit* OR arthros* OR osteoarth*)))).ab,ti.)
EBSCO (Medline) syntax

() 
(MH "+") 
(MH "osteoarthritis, hip+") 
(MH "osteoarthritis, hip+" OR AB ()) 
(MH "osteoarthritis, hip+" OR AB (coxarth*)) 
(MH "osteoarthritis, hip+" OR AB (coxarth* OR ((() N3 ())))) 
(MH "osteoarthritis, hip+" OR AB (coxarth* ((hip OR cox) N3 (arthrit* OR arthros* OR osteoarth*)))) 
→(MH "osteoarthritis, hip+" OR SU (coxarth* ((hip OR cox) N3 (arthrit* OR arthros* OR osteoarth*))))
PubMed syntax (not optimal)

()  
(""[mh])  
("osteoarthritis, hip"[mh])  
(exp "osteoarthritis, hip"/ OR coxarth*[tiab])

(exp "osteoarthritis, hip"/ OR coxarth*[tiab] OR ((hip[tiab] OR cox[tiab]) AND (arthrit*[tiab] OR arthros*[tiab] OR ...)))

Do you need to fully understand the research question?

What is the Cell contribution to chondroid / endochondreal / intramembranous bone formation

((('bone development'/de OR 'bone mineralization'/de OR 'bone maturation'/de OR ossification/de OR 'bone conduction'/de OR 'bone conduction'/de OR 'bone transplantation'/de OR 'bone matrix'/de OR 'bone growth'/de OR 'bone remodeling'/de OR ((bone* NEAR/6 (minerali* OR develop* OR format* OR synthesis* OR growth* OR graft* OR transplant* OR engineer* OR defect* OR matri* OR remodel* OR conduct* OR maturat*)) OR osteogen* OR ossificat*):ab,ti) AND (chondroid* OR transchondroid* OR enchondr* OR endochondr* OR intermembran* OR cartilagin* OR (inter NEXT/1 membran*)):ab,ti) OR 'enchondral ossification'/de) AND ('cell death'/de OR 'cell survival'/de OR apoptosis/de OR 'cell differentiation'/de OR 'cell fate'/de OR 'host cell'/de OR 'cell lineage'/de OR (((cell* OR msc OR osteoblast* OR osteocyte* OR osteoclast* OR preosteoblast*) NEAR/3 (death OR senescen* OR contribut* OR differentiat* OR fate OR plasticit* OR reprogram* OR donor* OR host* OR recruit* OR surviv* OR viabilit* OR lineage*)) OR apoptosis):ab,ti)
Relevance ranking

![Graph showing the number of includes retrieved (N=68 reviews) as a function of position in the relevance ranking. The graph compares four methods: GS, EM, and PM. The total number of includes is 2690.]
How long to publication?

![Graph showing cumulative percentage of reviews over time between first search date and entrance in PubMed. The graph includes a linear equation y = 0.25x with an R² value of 0.90. Key percentages: 23% at 1 year, 59% at 2 years, and 89% at 5 years.](image-url)