The Literature Search: PubMed and Zotero

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About Deb Werner (She/her)

• BA, Biology
• MLIS (Master of Library and Information Science)
• Worked in libraries at:
  • San Francisco
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  • University of Minnesota
• University of Chicago since 2006
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Interesting fact
Fun fact
What about you?

Poll: Do you have any pets?
Learning Objectives

Develop a search strategy using keywords and controlled vocabulary in order to find relevant articles.

Retrieve the full text of articles in order to read and evaluate them.

Organize references using Zotero in order to easily find and cite articles.
Outline

PubMed
- Accessing PubMed
- Developing a search strategy
- Retrieving the full text of articles

Zotero
- Overview
- Setting up online sync
- Saving citations
- Creating a bibliography
The literature search in PubMed
PubMed

Biomedical database with 33 million citations from:

- MEDLINE
- PubMed Central (PMC)
- life science journals
- online books

PubMed is the public interface for searching MEDLINE
Poll: What is your experience using PubMed?
Getting Started

- PubMed
  » more
- E-Journals database
  » more
- MEDLINE (Ovid)
  » more
- AccessMedicine
  » more
- STATiRef
  » more
- UpToDate
  » more

Medical Collection in the Library

Biomedical Resources in the Library

The online and print collections of the Library encompass all areas of the medical & health sciences and related basic biological sciences, with emphasis given to current and emerging areas of biomedical research, teaching, and patient care at the University of Chicago.

See the Collection Policy Statements for Medicine, the Biological Sciences, and Health Sciences for specific details about holdings in the Library.
Start with Keywords (aka text words)

Pros
• Retrieves newest citations
• Uses current terminology
• Necessary when MeSH term does not exist

Cons
• Does not search synonyms
• Ignores context
  • Homonyms (cold, residents, etc.)
  • Negating expressions (but, except, never…)
Exercise: PubMed Search

Construct a search strategy for the question:
*Do hormonal contraceptives increase risk of breast cancer?*
Identify individual concepts & synonyms

Do hormonal contraceptives increase risk of breast cancer?

What are the individual concepts?
• Contraceptives / breast cancer / risk?

What are some synonyms for each concept?
• Contraceptive
• Birth control
• estrogen/progestin
• Breast cancer
• Breast neoplasms
• Breast tumor
Search concepts separately, then combine with Boolean Operators (AND/OR)

1. birth control OR contraceptive

2. breast cancer OR breast neoplasms

3. #1 AND #2

(birth control OR contraceptive) AND (breast cancer OR breast neoplasms)
But what did PubMed *actually* search?

Go to the Advanced Search screen...

...and review the search Details

<table>
<thead>
<tr>
<th>Search</th>
<th>Actions</th>
<th>Details</th>
<th>Query</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>#8</td>
<td>⋮</td>
<td>⋮</td>
<td>(birth control OR contraceptive) AND (breast cancer OR breast neoplasms)</td>
<td>6,327</td>
</tr>
<tr>
<td>#6</td>
<td>⋮</td>
<td>⋮</td>
<td>hormonal contraceptives AND risk AND breast cancer</td>
<td>1,512</td>
</tr>
<tr>
<td>#5</td>
<td>⋮</td>
<td>⋮</td>
<td>hormonal contraceptives risk breast cancer</td>
<td>1,512</td>
</tr>
</tbody>
</table>
PubMed search details

What I searched
Search: (birth control OR contraceptive) AND (breast cancer OR breast neoplasms)

What PubMed actually searched
("contraception"[MeSH Terms] OR "contraception"[All Fields] OR
  ("birth"[All Fields] AND "control"[All Fields]) OR "birth control"[All Fields]
  OR ("contracept"[All Fields] OR "contracepted"[All Fields] OR
  "contracting"[All Fields] OR "contraception"[MeSH Terms] OR
  "contraception"[All Fields] OR "contraceptions"[All Fields] OR
  "contrceptive agents"[Pharmacological Action] OR "contrceptive
  agents"[MeSH Terms] OR ("contrceptive"[All Fields] AND "agents"[All
  Fields]) OR "contrceptive agents"[All Fields] OR "contraceptives"[All
  Fields] OR "contraceptive devices"[MeSH Terms] OR ("contrceptive"[All
  Fields] AND "devices"[All Fields]) OR "contraceptive devices"[All Fields] OR
  "contrceptive"[All Fields] OR "contrceptive s"[All Fields] OR
  "contractively"[All Fields]) AND ("breast neoplasms"[MeSH Terms] OR
  ("breast"[All Fields] AND "neoplasms"[All Fields]) OR "breast
  neoplasms"[All Fields] OR ("breast"[All Fields] AND "cancer"[All Fields]) OR
  "breast cancer"[All Fields] OR ("breast neoplasms"[MeSH Terms] OR
  ("breast"[All Fields] AND "neoplasms"[All Fields]) OR "breast
  neoplasms"[All Fields]))

Results: 6,327
Mapping to MeSH terms

PubMed tries to find an appropriate Medical Subject Heading, or MeSH term for each concept.

MeSH terms improve your results.
What is MeSH?

Medical Subject Headings

A controlled vocabulary (thesaurus)

Gives uniformity and consistency to describing and searching the biomedical literature

Developed and maintained by NLM

MeSH terms found in MeSH Database: http://www.ncbi.nlm.nih.gov.proxy.uchicago.edu/mesh
MeSH

Pros

• Searches synonyms, multiple word endings, variant spellings
• Disambiguation of terms
• Targeted results

Cons

• **Newest citations do not have MeSH terms and so not searched**
• Some concepts (e.g. newer treatments) do not have MeSH terms
MeSH examples

Cold
• Air temperature
• Condition caused by a virus

MeSH terms:
• “Cold Temperature”
• “Common Cold”

Residents
• People in medical training
• People in long-term care facilities

MeSH terms:
• “Internship and Residency”
• “Nursing Homes”
Accessing MeSH database

PubMed® comprises more than 30 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites.
Exercise: MeSH search

Find a MeSH term that will retrieve articles from the last five years on the detrimental effects of chocolate.

1. What MeSH term(s) represent the concept of chocolate?
2. What year was the term introduced?
3. How are the ‘detrimental aspects’ represented with MeSH?
Back to the example search - review your results

Do your results appear to answer the question?

How many results did you retrieve?

Is that too many or too few?
Improving your search

Narrow results
• Use more specific search terms
• Apply additional filters: Language, Publication Date, Article Type

Broaden results
• Use additional synonyms
• Broaden the search terms
• Remove filters

Find an article right on target?
• Look at its MeSH terms to identify other potential search terms

Searching is an iterative process; revise your search until you are satisfied with the results or satisfied you’ve done all you can
Limit results with Filters

Use the Language filter to filter for English articles only

- Select Additional Filters to access the Languages Filter

Use the Publication Dates filter for recent publications

Some Filters are MeSH!

- Age
- Species
- Sex
- Article Type*
Search tips for any database

Use multiple synonyms for concepts

Use controlled vocabulary (e.g. MeSH)

Glean additional search terms from article titles and abstracts

Use citation chaining to locate more articles

Take advantage of database functionality and personal accounts
Use titles & abstracts for search terms

Contact Allergy: A Review of Current Problems from a Clinical Perspective.

Uter W¹, Werfel T², White IR³, Johansen JD⁴.

Author information

Abstract
Contact allergy is common, affecting 27% of the general population in Europe. Original publications, including case reports, published since 2016 (inclusive) were identified with the aim of collating a full review of current problems in the field. To this end, a literature search employing methods of systematic reviewing was performed in the Medline® and Web of Science™ databases on 28 January 2018, using the search terms "contact sensitization" or "contact allergy". Of 446 non-duplicate publications identified by above search, 147 were excluded based on scrutiny of title, abstract and key words. Of the remaining 299 examined in full text, 291 were deemed appropriate for inclusion, and main findings were summarised in topic sections. In conclusion, diverse sources of exposures to chemicals of widely differing types and structures, continue to induce sensitisation in man and may result in allergic contact dermatitis. Many of the chemicals are "evergreen" but others are "newcomers". Vigilance and proper investigation (patch testing) are required to detect and inform of the presence of these hapten to which our populations remain exposed.

KEYWORDS: allergic contact dermatitis; contact allergy; exposure; review
Citation chaining

Search citations backward and forward in time

Search an article’s references to find older articles

Use Google Scholar and PubMed to find newer articles a relevant article

Example:
Search an article’s references

References (39)

   Google Scholar

   CrossRef Web of Science Medline Google Scholar

   CrossRef Web of Science Medline Google Scholar

   CrossRef Web of Science Medline Google Scholar

   CrossRef Web of Science Medline Google Scholar

   CrossRef Web of Science Medline Google Scholar

   CrossRef Medline Google Scholar

   CrossRef Web of Science Medline Google Scholar

   CrossRef Web of Science Medline Google Scholar

    CrossRef Web of Science Medline Google Scholar
Use PubMed to find newer articles

Cited by 80 articles

Reece AS, Hulse GK.
PMID: 35386387 Free PMC article.

Far migration of an intrauterine contraceptive device from the uterus to the small bowel.
Carroll A, Paradise C, Schuermann K, Schellhammer PS, Carlan SJ.
PMID: 35310311 Free PMC article.

PMID: 35158842 Free PMC article. Review.

Zhang S, Yang Z, Qiu P, Li J, Zhou C.
PMID: 35127805 Free PMC article.

Oral Contraceptive Use in BRCA1 and BRCA2 Mutation Carriers: Absolute Cancer Risks and Benefits.
PMID: 35048054 Free PMC article.
Use Google Scholar to find newer articles
Contemporary hormonal contraception and the risk of breast cancer

Breast cancer
N Harbeck, E Penault-Llorca, J Cortes... - Nature reviews Disease ..., 2019 - nature.com
Breast cancer is the most frequent malignancy in women worldwide and is curable in~ 70–80% of patients with early-stage, non-metastatic disease. Advanced breast cancer with ...
☆ Save  Cite  Cited by 152  Related articles  Web of Science: 590

Impact of statins on cardiovascular outcomes following coronary artery calcium scoring
JD Mitchell, N Forgestrom, BF Gage, R Paisley... - Journal of the American ..., 2018 - jacc.org
Background. Compared with traditional risk factors, coronary artery calcium (CAC) scores improve prognostic accuracy for atherosclerotic cardiovascular disease (ASCVD) outcomes ...
☆ Save  Cite  Cited by 144  Related articles  All 9 versions  Web of Science: 111

Key steps for effective breast cancer prevention
KL Britt, J Cuzick, KA Phillips - Nature Reviews Cancer, 2020 - nature.com
Despite decades of laboratory, epidemiological and clinical research, breast cancer incidence continues to rise. Breast cancer remains the leading cancer-related cause of ...
☆ Save  Cite  Cited by 144  Related articles  All 6 versions  Web of Science: 77

ESO–ESMO 4th International consensus guidelines for breast cancer in young women (BCY4)
S Paluch-Shimon, F Cardoso, AH Partridge... - Annals of ..., 2020 - Elsevier
The 4th International Consensus Conference for Breast Cancer in Young Women (BCY4) took place in October 2018, in Lugano, Switzerland, organized by the European School of ...
☆ Save  Cite  Cited by 97  Related articles  All 12 versions  Web of Science: 85
Create a personal account

• Highlight search terms
• Save searches/create alerts
• Have PubMed run search and email results to you
• Create collections and save citations
• Create a Bibliography of your own work
Finding Full Text
Finding full text – click Find It!

Find It links a citation to the full text, if the Library subscribes to it.


Management of Critically Ill Adults With COVID-19

Jason T Poston 1, Bhakti K Patel 1, Andrew M Davis 2

Affiliations  + expand
PMID: 32215647  DOI: 10.1001/jama.2020.4914

Similar articles

FULL TEXT LINKS

JAMA FULL TEXT

Cite

Favorites
Contemporary Hormonal Contraception and the Risk of Breast Cancer.
March, Lina


Online

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New England Journal of Medicine
1812 volume: 1 issue: 1

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OR Search the Library Catalog for works with this journal title

Other Libraries

☑️ Request via Interlibrary Loan

Interlibrary Loan now includes the UBorrow and BorrowDirect delivery services
Other off-campus options
http://guides.lib.uchicago.edu/off-campus

How do I access Library resources from off-campus?
Tips for using online resources when you’re away from campus

Library Buildings Are Closed

The Library is Online and Ready to Help
Learn more about our online services.

- Resources for Remote Research and Learning
- Proxy & Off-Campus Access
- Ask a Librarian via Email or Chat
- Changes to Access, Due Dates & Fines
- Suggest a Purchase

About Access to Electronic Resources

Access Library Resources off Campus

Access Electronic Library Resources Off Campus
Activity

Come up with search terms for research topic (keywords and MeSH terms)

Find 3 citations that might work (will use these in next section)

Save the search strategy (create alert)

Save the citations as a collection
Poll: Do you already use a reference manager?
Zotero is a reference manager that facilitates collecting and organizing references.
<table>
<thead>
<tr>
<th>Title</th>
<th>Creator</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Case Study: Using Social Tagging to Engage Students in Learning Medical Subject Headings</td>
<td>Maggio et al.</td>
</tr>
<tr>
<td>A centralized practice-based learning and improvement curriculum for residents and fellows: a ...</td>
<td>Bradley et al.</td>
</tr>
<tr>
<td>A Collaboration Between Faculty and Librarians to Develop and Assess a Science Literacy Labor...</td>
<td>Kearns and Hybl</td>
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<tr>
<td>A Curriculum Review and Mapping Process Supported by an Electronic Database System</td>
<td>Britton et al.</td>
</tr>
<tr>
<td>A more perfect union: Campus collaborations for curriculum mapping information literacy outc...</td>
<td>Moser et al.</td>
</tr>
<tr>
<td>An Introduction to Almetrics</td>
<td>Brigham</td>
</tr>
<tr>
<td>Assessment of the integration of AAMC medical informatics objectives into the medical school</td>
<td>Seago et al.</td>
</tr>
<tr>
<td>Basic information access skills: curriculum design using a matrix approach</td>
<td>Wright and Larson</td>
</tr>
<tr>
<td>Book Discussion Course: Timely Topics for Medical Students</td>
<td>Timms et al.</td>
</tr>
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<td>Building a Sustainable Life Science Information Literacy Program Using the Train-the-Trainer Mo...</td>
<td>Hartman et al.</td>
</tr>
<tr>
<td>Can't Get No Respect: Helping Faculty to Understand the Educational Power of Information Lit...</td>
<td>Badke</td>
</tr>
<tr>
<td>Capturing curricula</td>
<td>Curry</td>
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<tr>
<td>Case-based approach for improving student MEDLINE searches</td>
<td>Wood et al.</td>
</tr>
<tr>
<td>Charting Your Course: Using Curriculum Mapping to Enhance Information Literacy</td>
<td>Archambault</td>
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<tr>
<td>Cleveland Health Sciences Library Stakes New Ground for Libraries in Symbolic Hyperlinking of ...</td>
<td>McGraw</td>
</tr>
<tr>
<td>Comparing the self-described searching knowledge of first-year medical and dental students b...</td>
<td>Lawrence and Levy</td>
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<td>Current practices in library/informatics instruction in academic libraries serving medical schools ...</td>
<td>Eldredge et al.</td>
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<tr>
<td>Data Information Literacy</td>
<td>e-Science Portal for New England Librarians</td>
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<td>Defining and Assessing Medical Informatics Competencies</td>
<td>Blumenthal et al.</td>
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<tr>
<td>Developing an ‘Evidence-Based Medicine and Use of the Biomedical Literature’ component as a...</td>
<td>Burrows et al.</td>
</tr>
<tr>
<td>Embedding a librarian in the classroom: an intensive information literacy model</td>
<td>Hearn</td>
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<tr>
<td>Embedding information literacy in an undergraduate management degree: Lecturers’ and student...</td>
<td>Cochrane</td>
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<tr>
<td>Expediency-based practice? Medical students’ reliance on Google and Wikipedia for biomedical...</td>
<td>Judd et al.</td>
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<tr>
<td>Foundations of Database Searching: Integrating Evidence-Based Medicine into the Medical Curricula ...</td>
<td>Lynn</td>
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<tr>
<td>Impact of an evidence-based medicine curriculum on medical students’ attitudes and skills</td>
<td>Ayler et al.</td>
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<tr>
<td>Integrating Health Sciences Library Resources Into Course Management Systems</td>
<td>Blevins and Inman</td>
</tr>
<tr>
<td>Integration of information literacy into a revised medical school curriculum</td>
<td>Brown and Nelson</td>
</tr>
<tr>
<td>Isolated to Integrated: An Evolving Medical Informatics Curriculum</td>
<td>Geyer and ...</td>
</tr>
<tr>
<td>Laboratory Logistics: Strategies for Integrating Information Literacy Instruction into Science Lab...</td>
<td>Gregory</td>
</tr>
<tr>
<td>Looking for Infolit: Using syllabi to map strategic information literacy instruction</td>
<td>Boss and Drabinski</td>
</tr>
</tbody>
</table>
Zotero Connector

Connects your browser to Zotero

Install Chrome Connector

Firefox connector
Install

Safari connector
Install

Edge connector
Install
Set Up Online Sync

1. Go to Zotero.org
2. Click ‘Log In’ in upper right
3. Click ‘Register for a free account’
4. Create your account
5. Verify your account
6. Open Zotero (desktop app)

7. Go to Preferences:

**Windows**

- File
- Edit
- Tools
- Help
- Undo Ctrl+Z
- Redo Ctrl+Shift+Z
- Cut Ctrl+X
- Copy Ctrl+C
- Paste Ctrl+V
- Delete Del
- Select All Ctrl+A
- Find Ctrl+F
- Advanced Search
- Preferences

**Mac**

- File
- Edit
- View
- About Zotero
- Services
- Hide Zotero
- Hide Others
- Show All
- Quit Zotero
Set Up Online Sync (continued)

8. Set Sync preferences
Save Citations

Zotero icon appears in browser location bar

Click icon to save citations to Zotero

Firefox

Chrome

Safari
Save Citations from PubMed

Select which items you'd like to add to your library:

☑ Limits of search filter development.
☑ Redesigning printed educational materials for primary care physicians: design improvements increase usability.
☑ Empirical relationships between numeracy and treatment decision making: A scoping review of the literature.
☑ A scoping review of classification schemes of interventions to promote and integrate evidence into practice in health care.
☐ Towards a common terminology: a simplified framework of interventions to promote and integrate evidence into practice in health care.
☐ Engaging with a Wiki related to knowledge translation: a survey of WhatisKT Wiki users.
☑ Net improvement of correct answers to therapy questions after pubmed searches: pre/post comparison.
☑ Development of two shortened systematic review formats for clinicians.
☑ Sustainability of knowledge translation interventions in healthcare decision making: protocol for a scoping review.
☐ WhatisKT wiki: a case study of a platform for knowledge translation terms and definitions—descriptive analysis.
☐ MEDLINE clinical queries are robust when searching in recent publishing years.
☐ Correction: Development and validation of filters for the retrieval of studies of clinical examination from medline.
☐ Glomerular disease search filters for Pubmed, Ovid Medline, and Embase: a development and validation study.
☐ Search filters can find some but not all knowledge translation articles in MEDLINE: an analytic survey.
☐ How well are journal and clinical article characteristics associated with the journal impact factor? a retrospective cohort study.

Select All  Deselect All  Cancel  OK
Save Multiple Pages from PubMed

Select “Send to”

Select “Citation Manager”

Click “Create File” button

In Zotero, Import file
Drag & Drop PDFs

Zotero creates an item record from dropped PDF and attaches the PDF to it.

If it fails, right click and select Retrieve Metadata for PDF.
Find Full Text

Right click and select “Find Available PDF.”

The item needs a DOI or URL for this to work.

If on campus or using the VPN, will try institutional subscriptions, then will look for Open Access (OA) copies.

If off campus and not using the VPN, will only look for OA PDFs.
Activity – Add citations to Zotero

Go to the citations you previously identified and add them to Zotero.

Try to get the full text of a few of the articles.
Zotero with Word

Zotero Plugin installed in Word ribbon with Zotero installation

Add citations and bibliographies to papers

Windows

Mac
Create a standalone bibliography

Right-Click > Create Bibliography from Items
Create a standalone bibliography

Choose a citation style

Output Mode: Bibliography

Output Method: Save as RTF (for best results)
Activity – Create a bibliography

Using your SRP citations, create a bibliography.

This is what you will have to do when your references are due on June 12.
Learn More & Get Help

Library's Zotero Guide: guides.lib.uchicago.edu/zotero

Zotero.org
• Quick Start Guide
• Screencast tutorials
• Discussion forums
Questions?