Power Searching

PubMed

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Contents

PubMed Access

➢PubMed and journal full text access

Your affiliated hospital or university home library may have activated the PubMed LinkOut software. This software allows your institutional library to upload all of their e-journal link licenses into the PubMed search platform. When you run a search using this dedicated webpage link, you will be able to immediately download and read the articles.

To check if your home library has activated the LinkOut option check their library webpage for a link to **PubMed@"name of your institution".**

See the example from the University of Toronto below

• PubMed Access – limited full-text access

Open your browser and type in the term PubMed or bookmark their URL
http://www.ncbi.nlm.nih.gov/pubmed/

If you routinely use PubMed for searching MEDLINE, the screen shots below illustrate using the MeSH database approach to finding journal references. Please note that PubMed contains only MEDLINE references, whereas aggregators such as OvidSP offer a variety of databases for searching, in particular EMBASE.

If you have institutional access to the OvidSP, ProQuest, Wiley, Embase.com or EBSCOHost search platforms and databases contact your library for more detailed training.

Cochrane Search

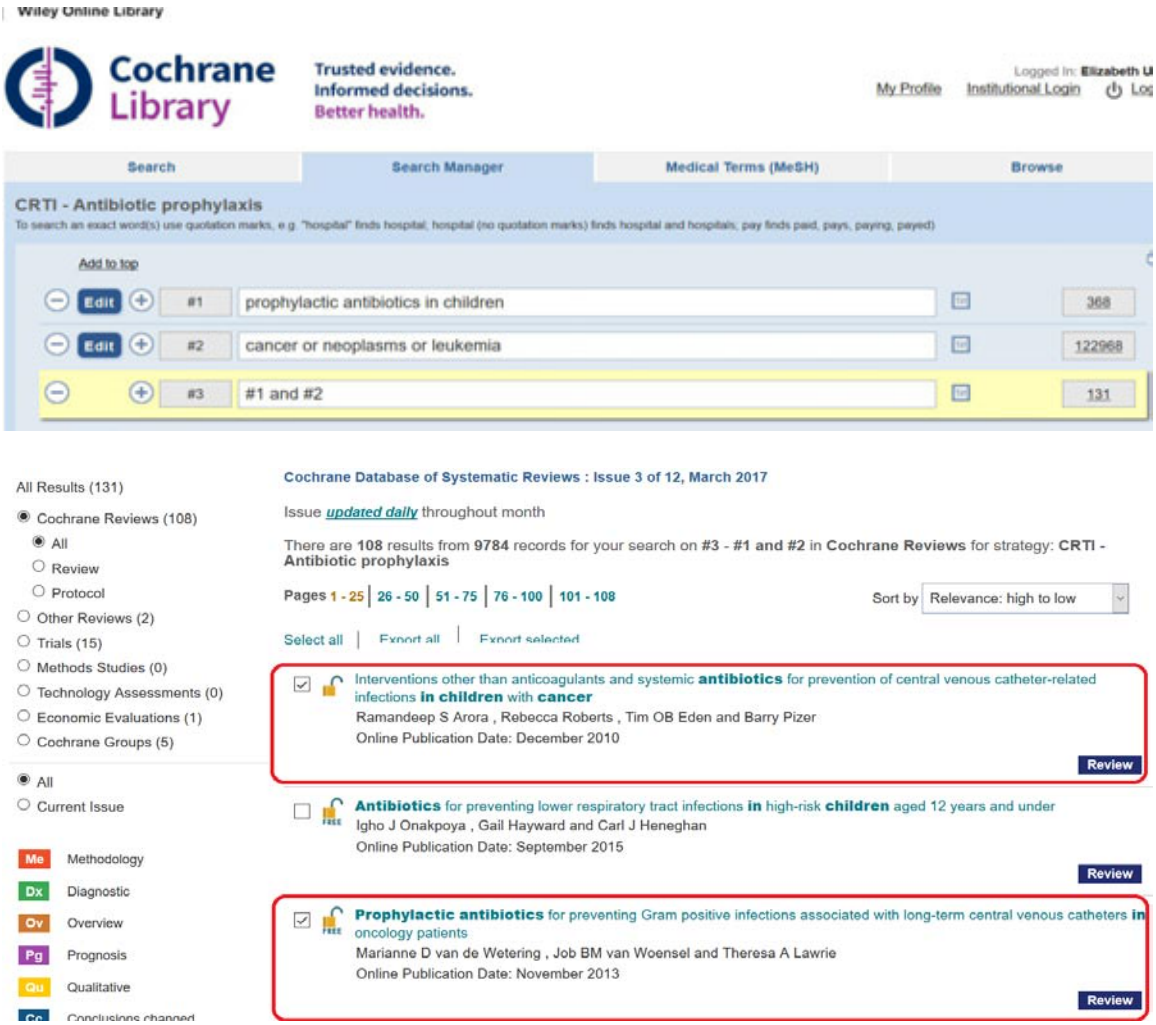
Good search practice includes checking for a Cochrane Systematic review or practice guideline. You are probably aware of ASH, POGO, COG or other association practice guidelines. However, you may not be aware of current Cochrane reviews.

To search Cochrane log in to your institutional access or the main Cochrane site at http://www.cochrane.org/. For best results you should run a complete search with medical subject headings and textwords. Run a complete search using your PubMed terms to find specific Systematic Reviews and Clinical Trials

Method 1: (Free text search)

A quick start method to check on Systematic Reviews in your area of interest. To Do this:

a) Log on to Cochrane and in the search page select Search Manager
b) run a quick search using terms you consider relevant
c) sample search strategy and results are listed below



Method 2: - Browse Cochrane Disease Study Groups

a) On the Cochrane homepage scroll to the bottom and select the Browse by Review Group

b) Select and review the 2 main groups of interest for you in your subject field

c) The Childhood cancer Group will list current reviews on various paediatric topics. The Haematological Malignancies Group is more adult focused but may provide some useful reviews

Some examples of results

Method 3: Comprehensive Subject and text word search

This method provides the most comprehensive search results. Listed below is a sample search based on our PubMed strategy listed later in this handout. The search history and brief listing of the first 3 Systematic Reviews in Cochrane are listed below.

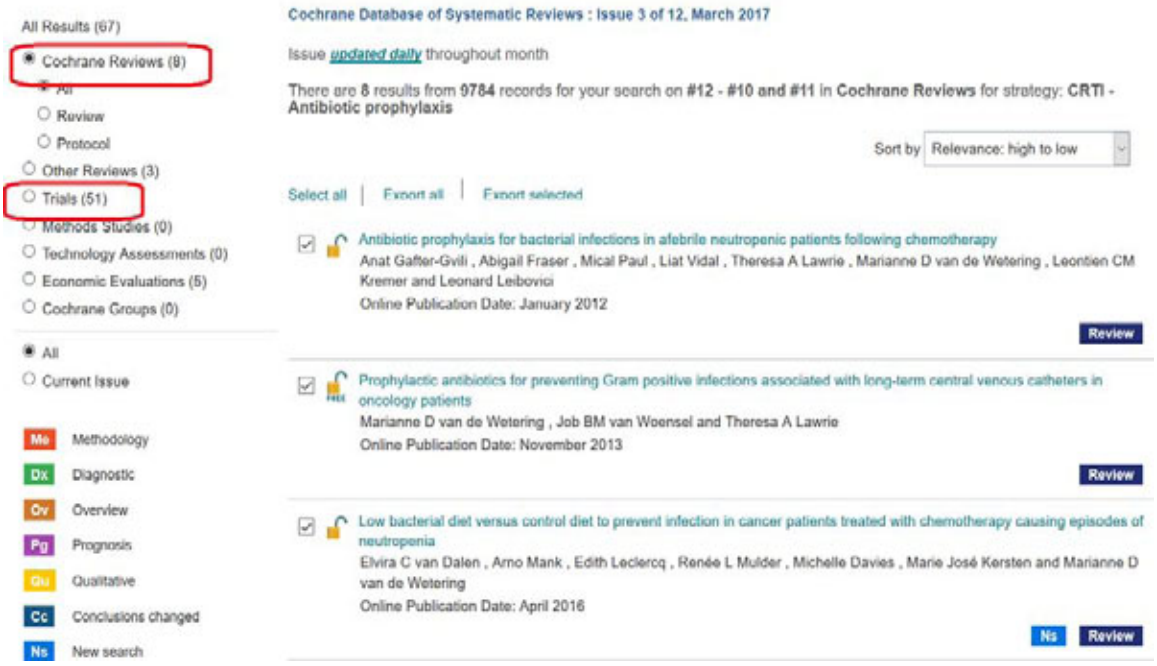
Search Strategy:

Search Name: Antibiotic prophylaxis
Date Run: 20/03/17 19:40:49.507
Description: Antibiotic prophylaxis search example March 20, 2017

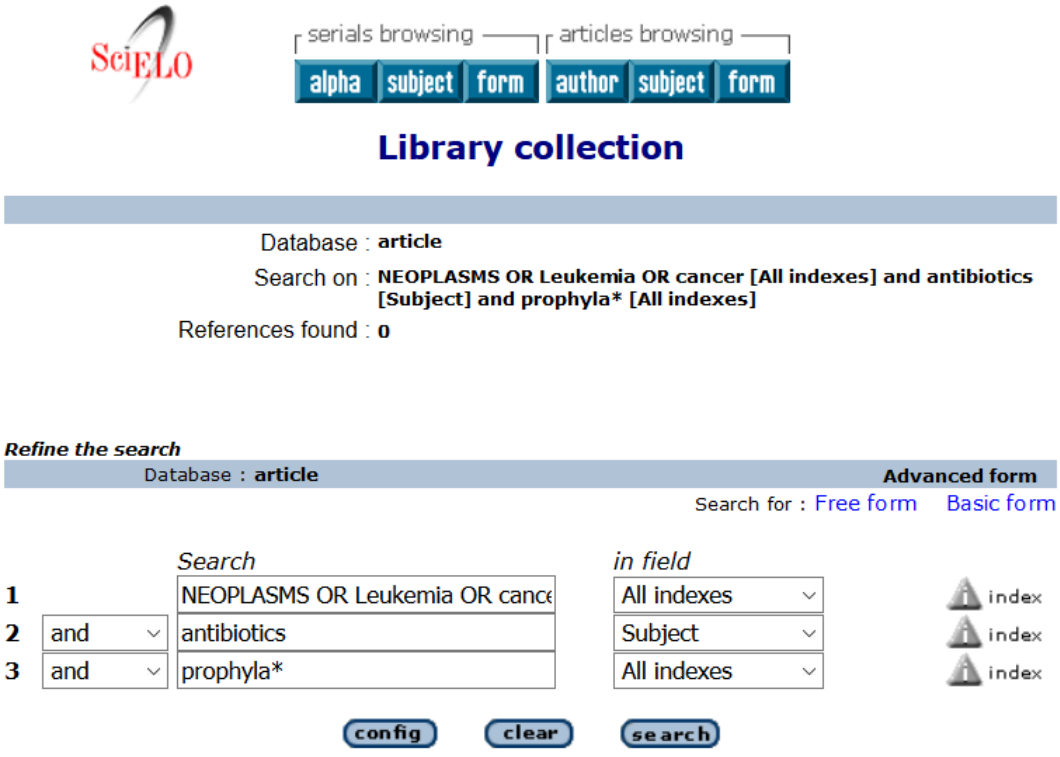
ID	Search	Hits
#1	MeSH descriptor: [Neoplasms] explode all trees	60882
#2	Antibiotic Prophylaxis:kw	2144
#3	#1 and #2	166
#4	MeSH descriptor: [Anti-Bacterial Agents] explode all trees	10652
#5	Chemoprevention:kw	382
#6	prophyla*	27511
#7	{or #5-#6}	27738
#8	#1 and #4 and #7	175
#9	#3 or #8	270
#10	(child* or infan* or teen* or adolescen* or youth* or "young adult*" or pediatric* or paediatric*)	239332

#11	#9 and #10	67

Search results:



Method 4:
Run a search in your local database such as Scielo



PubMed

- **Search Steps:**

Step 1	Change the research/clinical scenario into a search question by using the PICOT model or Concept Maps/Boxes where applicable.
Step 2	Identify the most relevant database(s) to search. Generally Cochrane Database of Systematic Reviews will be your first choice, followed by MEDLINE and EMBASE which is strong in drug literature coverage
Step 3	Identify the primary search concepts using your PICOT or Concept Map/Box chart, adding any related concepts. Decide if you need any quality filtering terms or limits to age groups, language, publication years etc. *Hint*: use disease terms rather than anatomical terms (e.g. brain diseases instead of brain) for more comprehensive results.
Step 4	Plan your search strategy (e.g. P and I and C and O or P and I and O, etc.) You will be using Boolean operators to combine your terms.
Step 5	Check for the most appropriate vocabulary terms in your selected database • MeSH for MEDLINE (Tools or mapping) • EMBASE terms for EMBASE (Tools or mapping) • CINAHL Thesaurus for CINAHL (CINAHL headings) • Psychological Abstracts Thesaurus for PsycINFO (Tools or mapping) • Textword (keyword) terms for Cochrane DSR • MeSH terms for Cochrane CCTR Remember to check: • all Scope notes for date of entry and previous indexing • the Tree structures for related terms and use the Explode function to capture those terms. • Use textwords when the vocabulary terms are inadequate
Step 6	Run your search and create your base set.
Step 7	Use the Limit function to eliminate animal, non-English language articles, or to select specific age groups as required.
Step 8	Use the most appropriate Evidence-based Quality Filtering terms as required.
Step 9	Revise search strategy as required (e.g. broaden or narrow the focus of the search, try a different angle)
Step 10	Print or Download or Email your search results. You can download references to bibliographic software management packages (e.g. Mendeley Zotero, EndNote, Reference Manager or RefWorks) Write-up your search strategy

Step 1 - Formulating a Search Question

As we discussed in the class you will need to analyze and translate your research question into a search question. Listed below are some sample questions with some preliminary analysis as to which study design or methodology would best measure the results.

RESEARCH/CLINICAL SCENARIO	SEARCH QUESTION
Children undergoing chemotherapy are susceptible to infections. I want to know if there are any studies evaluating the prophylactic use of antibiotics to prevent these infections	Is prophylactic use of antibiotics effective in eventing infections in paediatric oncology atients? • question of therapy
We have children presenting with fever, rales, hypoxia in our emergency department. Should I routinely send them for an x-ray to confirm pneumonia or simply start them on antibiotics?	How sensitive are hypoxia, fever and rales vs. Chest x-ray in diagnosing children with suspected pneumonia? • question of diagnosis
A teenage girl is showing signs of scoliosis. Should ecommend interventions to slow down the ogression of late-onset idiopathic scoliosis in a 14- ar-old girl?	What is the natural history of scoliosis? • question of prognosis
There is increased availability and use of cell phones by young children. Has anyone studied how much radiation is actually emitted and the harm it causes young children?	Does cell phone use increase the risk of children developing brain tumours? • Question of risk/causation/harm

- **PICOT or Concept Map to select your search terms**

Clinical/Research scenario:

"Most if not all **children** (0-18 years) undergoing **cancer** chemotherapy are more susceptible to infections. I want to know if there are any studies evaluating the **prophylactic use** of **antibiotics** to prevent these infections.

Action: You can underline the key topics in your question or list them in the concept box

	Topic 1		Topic 2		Topic 3		Topic
	Cancer	AND	Prophylactic antibiotics	AND	Children Adolescents	AND	Study Designs
	Synonyms/ search terms		Synonyms/ search terms		Synonyms/ search terms		Synonyms/ search terms
OR	All cancer Specific cancer (e.g. Leukemia, etc.)		Prophylactic prophylaxis Antibiotics in general or specific drugs		Infant Child Adolescent		Guidelines RCTs Clinical trials

Write out your search question to check if you have the right combination

PubMed

Search question
Is antibiotic prophylaxis effective in reducing/preventing bacterial infections in paediatric oncology patients?

Decide on your evidence based filter – clinical trials, guidelines, etc.

Step 2: Databases

Consider the scope and coverage of the databases listed below to determine which ones you should search. Check with your library for availability

Please note that PubMed and Medline are the same database

The National Library of Medicine in Bethesda, Maryland indexes the articles that appear in the MEDLINE database. NLM is the database producer.

PubMed is the National Library of Medicine's search interface/platform and is available free of charge for searching

The National Library of Medicine sells licensed copies of the MEDLINE database to commercial database aggregators such as OvidSP, ProQuest, EBSCOHost, etc. who make MEDLINE available on their own Search platforms. This means that NLM is also the database vendor.

To access MEDLINE or other subject databases on the aggregator search platforms your home institutional library must purchase a license. You need to check with your main library to see if you have access.

- **Databases (Suggested list):**

Cochrane Database (John Wiley & Sons, Ltd **or** OvidSP**)**
Access is available to the following subsections

- Cochrane Reviews (Cochrane Database of Systematic Reviews
- Cochrane Central Register of Controlled Trials
- DARE (Database of Reviews of Effects- ceased at the end of March 2015)
- Cochrane Methodology Register
- Health Technology Assessment Database
- NHS Economic Evaluation Database

EBM Reviews - ACP Journal Club Contains the full-text of ACP Journal Club, a publication of the American College of Physicians. The editors screen approximately 90 core medical titles (including paediatric titles) and identify studies that are both methodologically sound and clinically relevant. They write an enhanced structured abstract of the chosen articles and provide a commentary on the value of the article for clinical practice. Using this source, clinicians can quickly understand and apply to their practice important changes in medical knowledge, without having to read and synthesize for themselves thousands of journal articles. Every word of the document text in ACP Journal Club is searchable; including references, captions, and footnotes back to 1991.

EBM Reviews - CCTR (formerly Cochrane Central Controlled Trials Register) is a bibliographic database of definitive controlled trials. These controlled trials have been identified by contributors

to the Cochrane Collaboration, through both online database and manual searching CCTR contains over 300,000 bibliographic references to controlled trials in health care. Cochrane groups and other organizations contribute their specialized registers; and these registers—together with references to clinical trials identified in MEDLINE and EMBASE—form the CCTR database. Contributors to the Cochrane Collaboration follow quality control standards to ensure that only reports of definite randomized controlled trials or controlled clinical trials are included.

EBM Reviews - Cochrane Database of Systematic Reviews
The Cochrane Database of Systematic Reviews (DSR) includes the full text of the regularly updated systematic reviews of the effects of healthcare prepared by The Cochrane Collaboration. The Collaboration is an international network of individuals and institutions committed to preparing, maintaining, and disseminating systematic reviews of the effects of health care. In pursuing its aims, the Cochrane Collaboration is guided by six principles: collaboration, building on people's existing enthusiasm and interests, minimizing duplication of effort, avoidance of bias, keeping up to date and ensuring access.

There are two types of reviews:

Complete reviews - Regularly updated Cochrane Reviews, prepared and maintained by Collaborative Review Groups

Protocols - Protocols for reviews currently being prepared (all include an expected date of completion). Protocols are the background, objectives and methods of reviews in preparation.

EBM Reviews – DARE ceased at the end of March 2015
The Database of Abstracts of Reviews of Effectiveness (DARE) is a Full Text database containing critical assessments of systematic reviews from a variety of medical journals. DARE is produced by the expert reviewers and information staff of the National Health Services' Centre for Reviews and Dissemination (NHS CRD) at the University of York, England, and consists of structured abstracts of systematic reviews from all over the world. DARE records cover topics such as diagnosis, prevention, rehabilitation, screening, and treatment. Every word of the document text in DARE is searchable, including references.

Clinicaltrials.gov – (National Library of Medicine) February 2000+
https://clinicaltrials.gov/
ClinicalTrials.gov is a Web-based resource that provides patients, their family members, health care professionals, researchers, and the public with easy access to information on publicly and privately supported clinical studies on a wide range of diseases and conditions.
ClinicalTrials.gov currently lists 212,866 studies with locations in all 50 States and in 193 countries.
ClinicalTrials.gov was created as a result of the Food and Drug Administration Modernization Act of 1997 (FDAMA). FDAMA required the U.S. Department of Health and Human Services, through NIH, to establish a registry of clinical trials information for both federally and privately funded trials conducted under investigational new drug applications to test the effectiveness of experimental drugs for serious or life-threatening diseases or conditions. NIH and the Food and Drug Administration (FDA) worked together to develop the site, which was made available to the public in February 2000.
On July 1, 2005, the ICMJE (International Committee of Medical Journal Editors) established/released their policy recommending that all medical journal editors require, registration of clinical trials in a public trials registry at or before the time of first patient enrollment as a condition of consideration for publication and transparency in publishing either positive or negative results. Editors requesting inclusion of their journal on the ICMJE website recognize that the listing implies enforcement by the journal of ICMJE's trial registration policy.

CINAHL 1982+ (Available through the EBSCOHost interface)
The Cumulative Index to Nursing & Allied Health (CINAHL) database provides authoritative coverage of the literature related to nursing and allied health. Virtually all English-language publications are indexed along with the publications of the American Nurses Association and the National League for Nursing. Primary journals from the major allied health fields are included, especially the rehabilitation literature (e.g. physiotherapy and occupational therapy). Selected journals are also indexed in the areas of consumer health, biomedicine, and health sciences librarianship. In total, more than 3100 journals are regularly indexed; online abstracts are available for more than 800 of these titles. There are more than 7000 records with full text now included and 1200 records with images. The database also provides access to healthcare books, nursing dissertations, selected conference proceedings, standards of professional practice, educational software and audiovisual materials in nursing.

EMBASE Classic + EMBASE1947+ (Ovid SP or Embase.com)
Indexed and distributed by Elsevier, EMBASE indexes the biomedical literature with a more European and Asian focus. The print version was Excerpta Medica There are approximately with 30 million+ records from 8,500+ currently published journals. Embase includes six million+ records and 2,900+ journals that are not covered by MEDLINE. Also, Embase Classic provides access to data going back to 1947. Embase is a complimentary database to MEDLINE. It's coverage of the drug, rehabilitation; complementary and alternative therapy literature is more complete than in MEDLINE.

LILACS 1982 - (World Health Organization http://lilacs.bvsalud.org/en/)
LILACS is the most important and comprehensive index of scientific and technical literature of Latin America and the Caribbean. For 29 years contributing to increase visibility, access and quality of health information in the Region.

MEDLINE 1946+ (PubMed, OvidSP, EBSCOHost, ProQuest)
Produced by the U.S. National Library of Medicine, the MEDLINE database is widely recognized as the premier source for bibliographic and abstract coverage of biomedical literature. MEDLINE encompasses information from Index Medicus, Index to Dental Literature, and International Nursing, as well as other sources of coverage in the areas of allied health, biological and physical sciences, humanities and information science as they relate to medicine and health care, communication disorders, population biology, and reproductive biology. More than 15 million records from more than 4300 journals are indexed, plus selected monographs of congresses and symposia (1976-1981). Abstracts are included for about 67% of the records.

MEDLINE in -Process & Other Non-Indexed Citations (OvidSP, EBSCOHost)
Produced by the National Library of Medicine's, this is database is used to store and make available them most recently published articles in journals indexed by MEDLINE. The electronic record contains the authors, title, abstract and journal citation, and this is all that is searchable until the indexers at NLM add MeSH heading(s), publication types, GenBank accession numbers, and other indexing data. The records are then added to the main MEDLINE database usually on a weekly basis. Use this segment if you are searching for a very recent reference and remember to use as many textwords as possible.

PsycINFO 1806+ (OvidSP, EBSCOHost, ProQuest)
The PsycINFO database covers the professional and academic literature in psychology and related disciplines including medicine, psychiatry, nursing, sociology, education, pharmacology, physiology, linguistics, and other areas. Coverage is worldwide, and includes references and abstracts to over 2500 journals (and in PsycINFO, to dissertations) in more than 30 languages, and to book chapters and books in the English language. Over 50,000 references are added annually. Popular literature is excluded.

SciELO (http://scielo.org/php/index.php?lang=en)

SciELO (Scientific Electronic Library Online) is an electronic virtual library covering a collection of Spanish health scientific journals selected following pre-established quality criteria. The main aim of the SciELO project is to develop a common methodology for the preparation, storage, dissemination and evaluation of Spanish scientific literature in electronic format. The database is the product of a project developed by BIREME (the Latin American and Caribbean Center on Health Sciences Information), in partnership with FAPESP (Fundação de Amparo à Pesquisa do Estado de São Paulo). In Spain, the SciELO project is a collaboration between OPS/OMS and Carlos III Health Institute ISCIII and it is been developed by the National Library of Health Sciences. As of October 2015 the database included 1249 journal titles containing 573,525 references and 13,005,080 citations (i.e. cited references). The list of current titles included is available at http://scielo.isciii.es/scielo.php?script=sci_subject&lng=en&nrm=iso

SciELO Citation Index. **(Thomson Reuters)**
SciELO Citation Index is included in some institutional licenses of the Web of Knowledge (see below). Based on the citation analysis algorithms of Science Citation Index, this database includes approximately 650 titles (over 350 adding content to journals already covered in the Web of Science) with over 4 million cited references. It provides open access links to the full text through the SciELO site and is updated weekly from the SciELO Brazil data feed. Subject areas covered include Agricultural sciences, Applied social science, Biological sciences, Engineering, Exact and earth sciences, Health sciences, Linguistics, letters and arts, Mathematics, Physics, and Social sciences.

Scopus approximately 1996+ (SciVerse – Elsevier)
Scopus provides access to an abstract and citation database of peer-reviewed literature and quality web sources with smart tools to track analyze and visualize research, peer-reviewed research literature and quality web sources. With over 18,500 titles from more than 5,000 international publishers, SciVerse Scopus offers researchers a quick, easy and comprehensive resource to support their research needs in the scientific, technical, medical and social sciences fields.

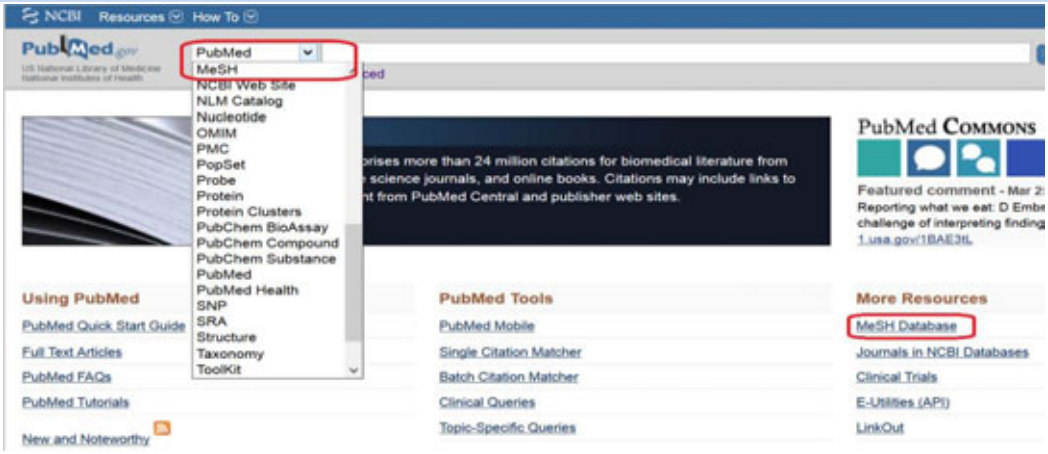
Web of Knowledge (formerly Web of Science) 1899 + (Thomson Reuters)
The *Web of Science* provides seamless access to current and retrospective multidisciplinary information from approximately 8,700 high impact research journals. *Web of Science* also provides a unique search method, cited reference searching. With it, users can navigate forward, backward, and through the literature, searching all disciplines and time spans to uncover all the information relevant to their research. Users can also navigate to electronic full-text journal articles. Researchers can also calculate their H-Index impact factor. Check to see if your institutional license to Web of Science includes SciELO Citation Index.

Step 3 - Find Search Terms

You can start to type in terms in the search box, but for a more comprehensive and controlled search use the **MeSH Database** to find your **MeSH terms**.

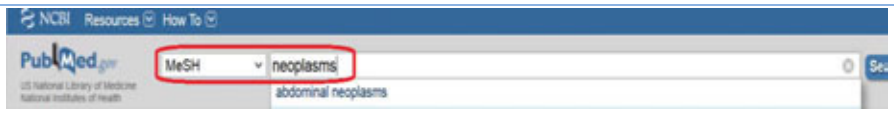
Further information concerning the MEDLINE database is available at:
https://www.nlm.nih.gov/pubs/factsheets/online_indexing_system.html
https://www.nlm.nih.gov/pubs/factsheets/pubmed.html
https://www.nlm.nih.gov/bsd/special_queries.html

Do this by clicking on the MeSH Database link under PubMed drop down menu or select the **MeSH Database** link under **More Resources**.



Find Search term 1

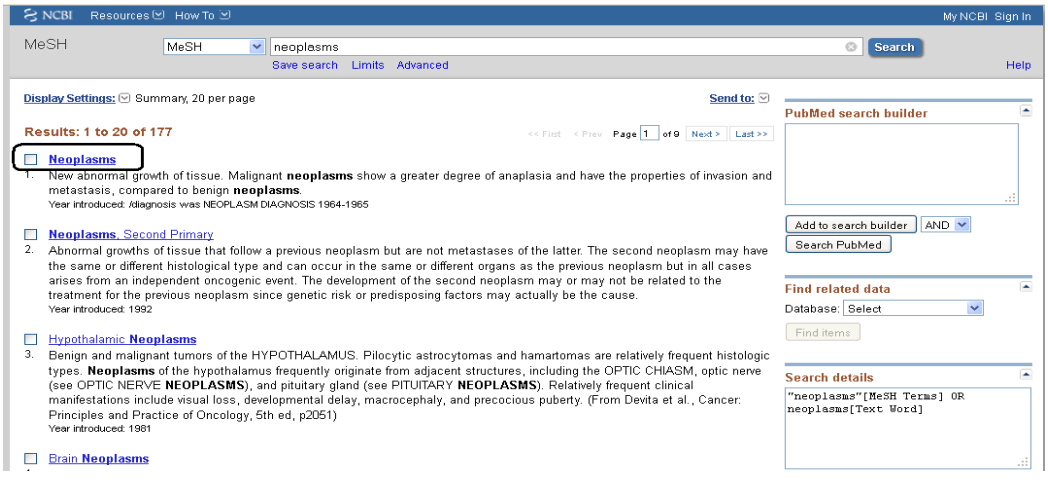
Type in the first search term from your concept Map **Neoplasms** on the MeSH Database screen and click **Search**



- **Permuted Index**

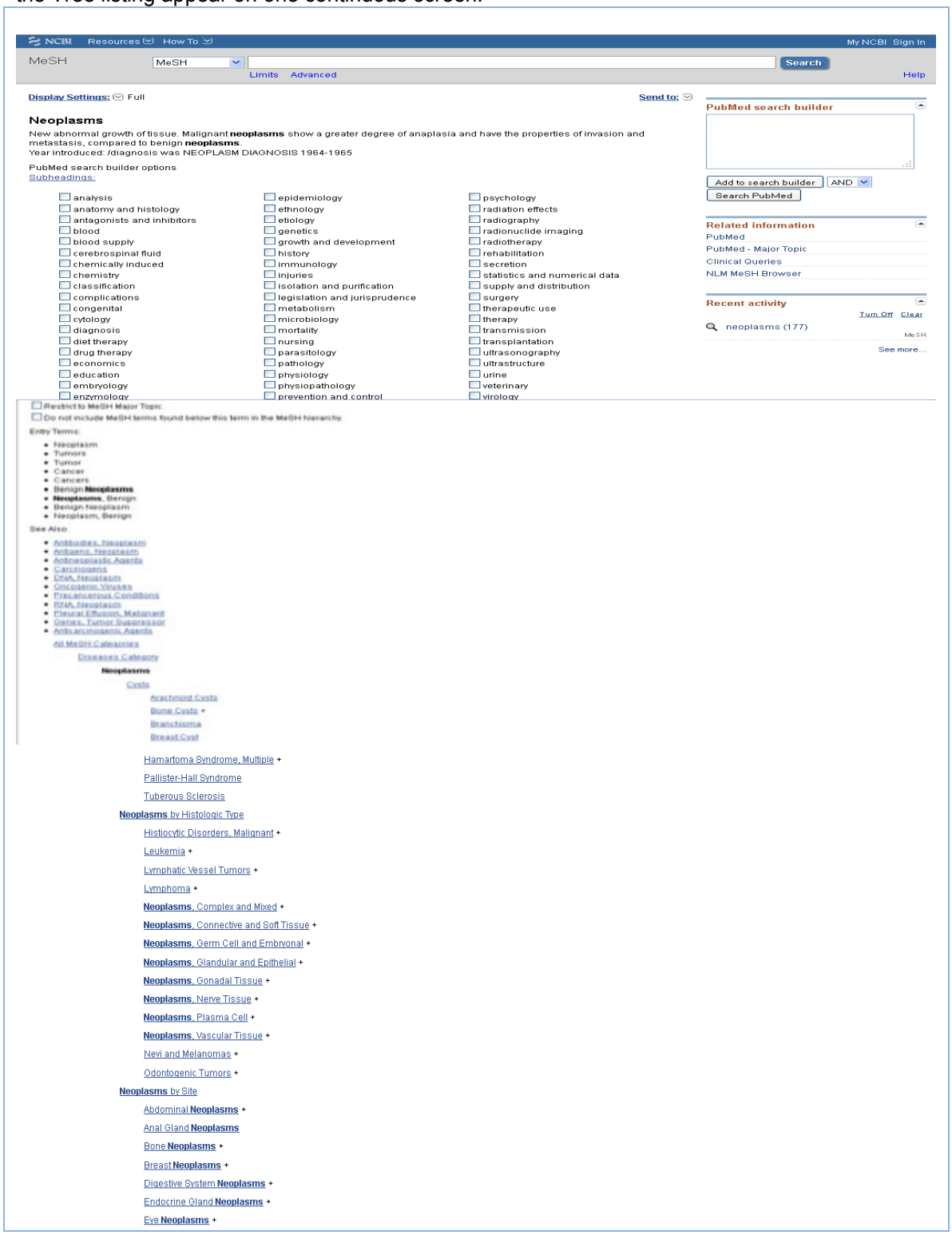
The next screen will contain a list of MeSH terms containing the word Neoplasms called a Permuted Listing.

Check for the term(s) you require in this case Neoplasms. Resist the temptation to click in the box to the left of the term **UNTIL AFTER YOU HAVE READ THE SCOPE NOTE** and checked the indexing history.



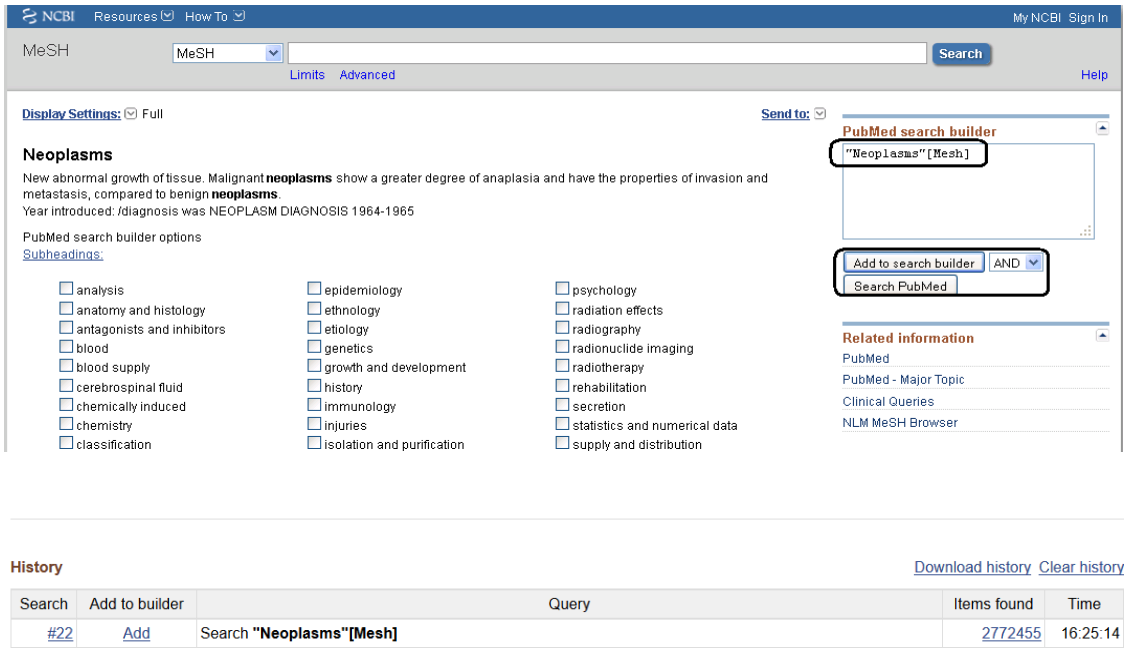
➢ Scope Note and Tree Listing

View each term by clicking on the blue hyperlink. In PubMed the scope note, subheadings and the Tree listing appear on one continuous screen.



➢ PubMed Explode

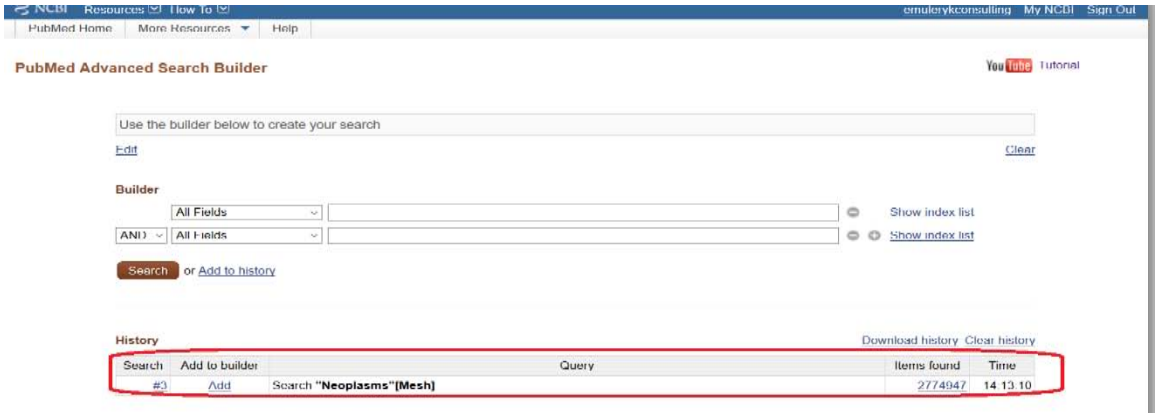
In the case of **neoplasms** there is only one term to add to our search. By selecting the general term **neoplasms** you have gone to the Top or Head of the Tree Listing. This results in an **Automatic Explode** or **Automatic OR** of all neoplasm terms. Adding Neoplasms with the Add to search builder will result in an automatic explode of all of the terms.
This will search for all the Neoplasms articles and create 1 set.



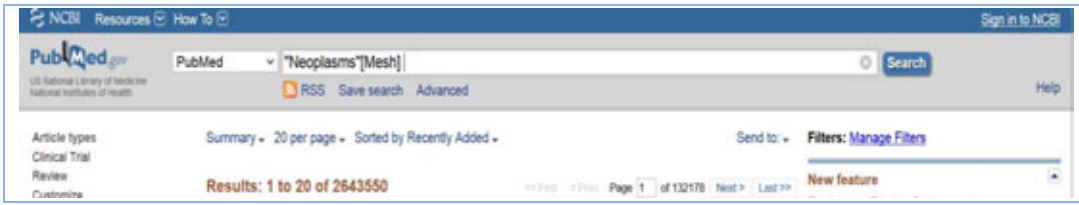
➢Search Results for Neoplasms

Listed below is the results page for all of your articles discussing Neoplasms.

Advanced Search history



List of results for rview



Find Search term 2:

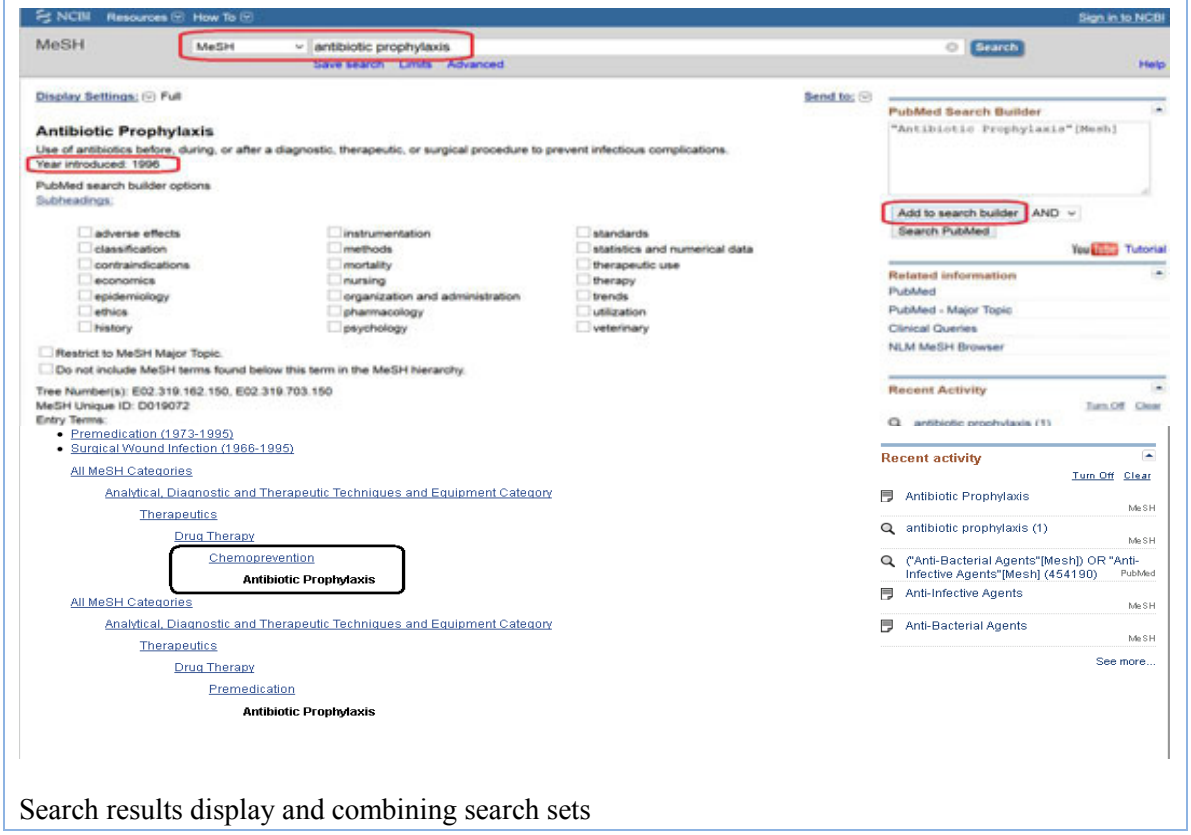
Find and select the MeSH Database link on the dropdown menu and type in your second search concept **Antibiotic prophylaxis.**

There is no Permuted Index display for **Antibiotic prophylaxis** because it is the only term. You will see the full Scope Note and Tree Listing immediately. Make sure to check and read the Scope Note and Tree Listing.

The term **Antibiotic Prophylaxis** is a relatively new subject heading (since 1996) that was previously indexed under Premedication or the individual antibiotic with the subheading Therapeutic Use. Since we are searching for all Antibiotics we have some of the previous indexing covered. We will use some textwording for the general prophylaxis terms to make up the gap in indexing.

In addition, you will notice that **Antibiotic prophylaxis** is listed in 2 separate Tree Listings. We will use the Chemoprevention Tree

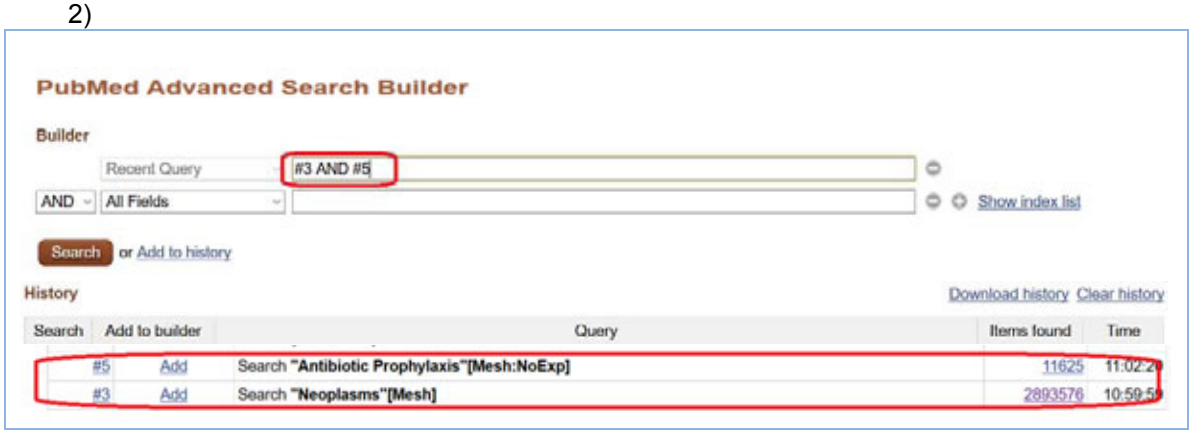
Add the term to your Add to search builder button and then click on the Search PubMed button



Search results display and combining search sets

Combine your first search using the terms for Neoplasms and Antibiotic prophylaxis in the first search box. To do this make sure you are in the Advanced search page

1) Type in the set number for Neoplasms in search box 1 (.e.g. **#3 AND #5**)
2)



➢ Textword searching for prophylactic antibiotics

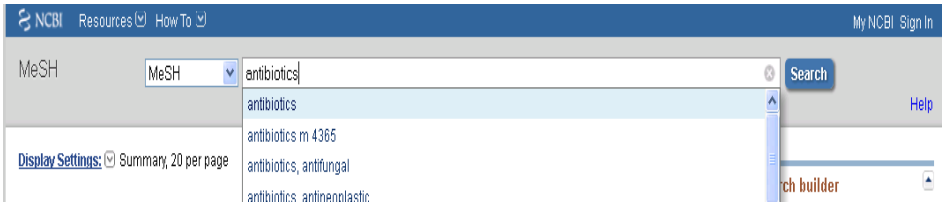
Since the term Antibiotic Prophylaxis is a relatively new term we should add some textword terms to catch any articles that may not have been indexed completely.

Remember TextWord searching is usually limited to the Title, abstract and institutional address fields. To add textwords for antibiotic prophylaxis, break-up the concept into 2 parts

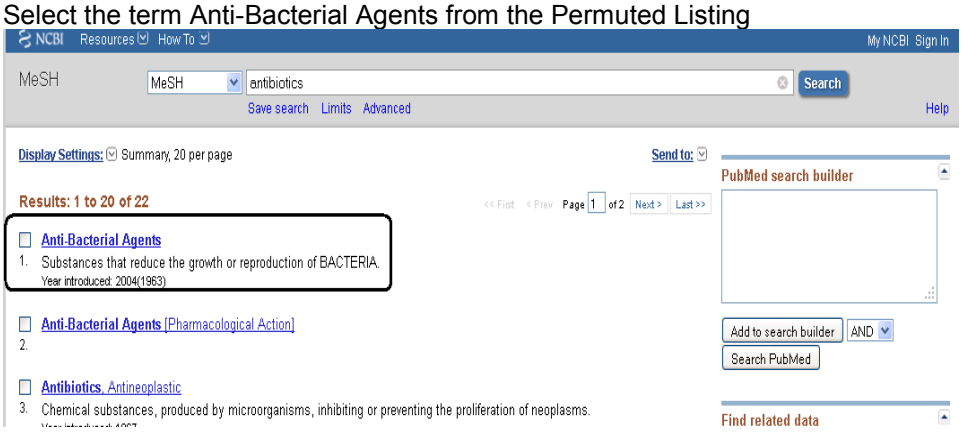
1) search for all antibiotics
2) search for variations on the word prophylaxis, prophylactic, etc.

To do this use **MeSH** to find your Antibiotics subject terms. Repeat the steps for Finding Search Term 1 – Neoplasms.

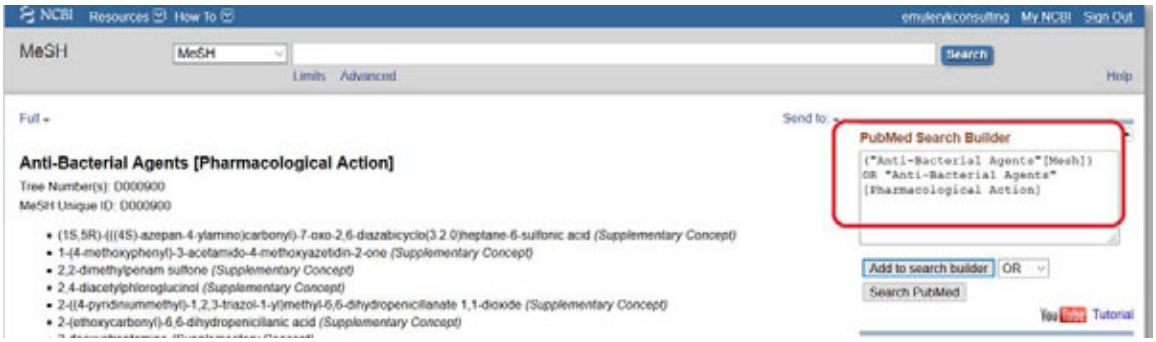
a) Type in the term antibiotics in the MeSH search box



b) Select the term Anti-Bacterial Agents from the Permuted Listing



c) Add the term to the Search Builder
d) Repeat the process by including Antibacterial Agents [Pharmacological Actions] - this is an updated method of searching for drugs in MEDLINE
e) Click on the Search PubMed button to retrieve the results



f) Display your results

- **Add subject and textwords for prophylaxis**

Method1:

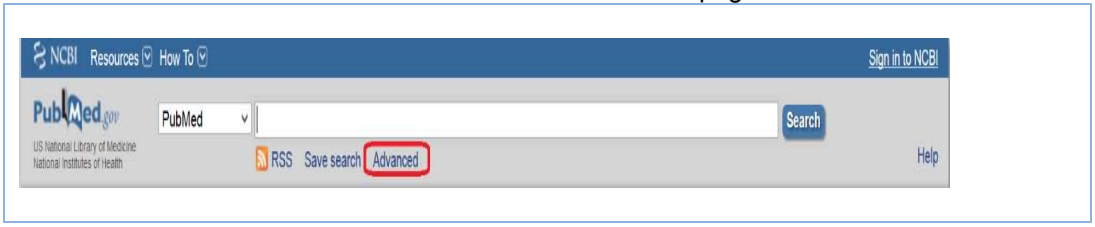
When we checked MeSH for the term Antibiotic prophylaxis, we saw a more general term for Chemoprevention in the Tree Listing. This is one term we should consider adding to find additional articles. Repeat the steps above to search Mesh for Chemoprevention

a) click on the **Chemoprevention** term hyperlink
b) Click on the **Add to the search builder** button to include the MeSH terms for both Chemoprevention or Antibiotic Prophylaxis. This is an **EXPLODE** for Chemoprevention
c) Add/type the textword term for prophylaxis using the asterisk as a truncation symbol (e.g. prophyla*) directly into the Search Builder box with Chemoprevention (see below

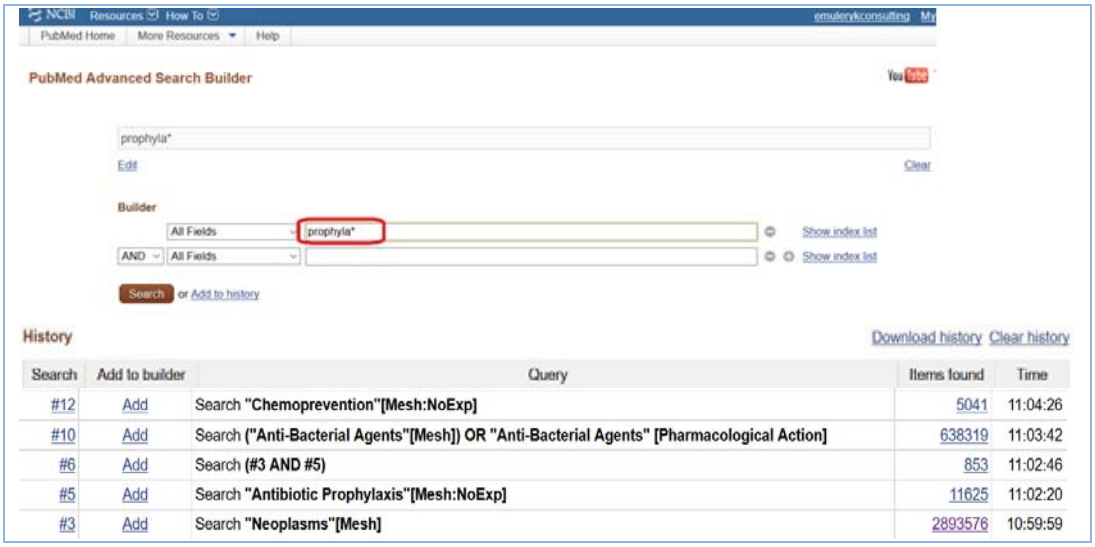
Method 2:

Use the Advanced Search screen to type in the required term to list the results on separate search lines. To add the textword terms for prophylaxis word variations

1) Click on the Advanced Search button on the main search page of PubMed



2) Type in the term **prophyla* -** the asterisk is a wildcard symbol and will pick up all variations on the spelling of this term
3) Click on search to retrieve all of the results



You are now ready to combine your search results according to your PICO or Concept Map needs. To do this you can

1) combine the sets one by one or
2) use the Advanced Search builder to combine multiple sets

➢ Textword searching in PubMed

Searching for a phrase

1) **PubMed does not perform adjacency searching**. However, many phrases are recognized by the MeSH Translation Table used in PubMed's Automatic Term Mapping (ATM). For example, if you enter the phrase

fever of unknown origin

PubMed recognizes this phrase as a MeSH Term. If a phrase is not recognized you can bypass ATM and search for a phrase using the following formats:

Enclose the phrase in double quotes	“antibiotic prophylaxis”
Use a search tag	antibiotic prophylaxis[tw]
Use a hyphen	First-line
Truncate: antibiotic(s) prophylaxis	“antibiotic* prophyla*”

2) Other phrase searching tips:

- **Using hyphen or quotes** and the phrase is not found, the hyphen or quotes are ignored and the phrase is processed using automatic term mapping. Phrases may appear in a PubMed record but not be in the phrase index.
- **Entering your search terms as a phrase** PubMed will not perform automatic term mapping that includes the MeSH term and any specific terms indented under that term in the MeSH hierarchy. For example, "health planning" will include citations that are indexed to the MeSH term, Health Planning, but will not include the more specific terms, e.g., Health Care Rationing, Health Care Reform, Health Plan Implementation, that are included in the automatic MeSH mapping.
- **Truncating a word in a multi-word** search may result in an unexpected phrase search. For example the search, fetus infection* maternal will treat fetus infection* as a phrase. The results page search details box includes the search translations.
- **Using the Advanced search builder show index** list to browse the indexed phrases,. Select a search field, enter the beginning of a phrase, and then click Show index list.

3) Truncating search terms

To search for all terms that begin with a word stem, enter the word followed by an asterisk (*), the wildcard character – Remember to include British and American spelling variations

e.g. **hemophili* -** Finds terms that begin with the root term flavor, such as hemophilia or hemophelias or hemophiliac or hemophiliacs

e,g, **haemophili*** - Finds terms that begin with the root term flavor, such as haemophilia or haemophelias or haemophiliac or haemophiliacs

4) More information about truncation:

- PubMed searches for the first 600 variations of a truncated term. If a truncated term (e.g., tox*) produces more than 600 variations, a warning message displays to lengthen the root word to search for all endings. Use toxic* instead.
- Truncation turns off automatic term mapping and the process that includes the MeSH term and any specific terms indented under that term in the MeSH hierarchy. For example, heart attack* will not map to the MeSH term Myocardial

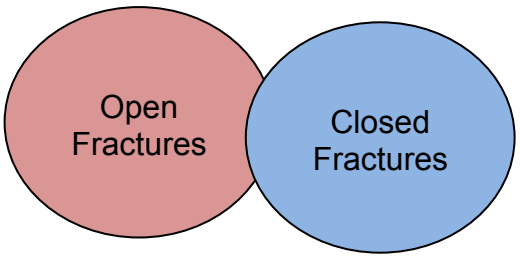
Infarction or include any of the more specific terms, e.g., Myocardial Stunning; Shock, Cardiogenic.

- Truncating a word in a multi-word search may result in an unexpected phrase search. For example the search, fetus infection* maternal will treat fetus infection* as a phrase.
- Truncation stops at the end of a term and does not process beyond a space.

Step 4 -Combining Search Terms

Boolean Searching

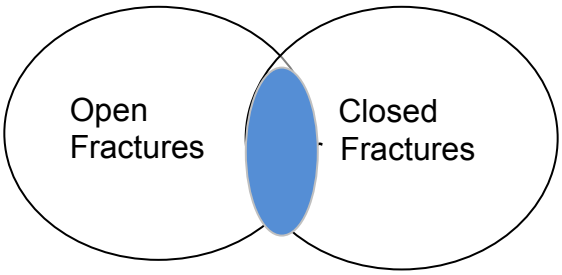
All database search platforms use Boolean logic operators to combine your search terms.



OR

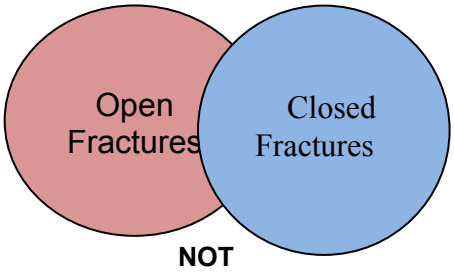
Open Fractures OR Closed Fractures

'OR' MEANS 'mORe'



AND

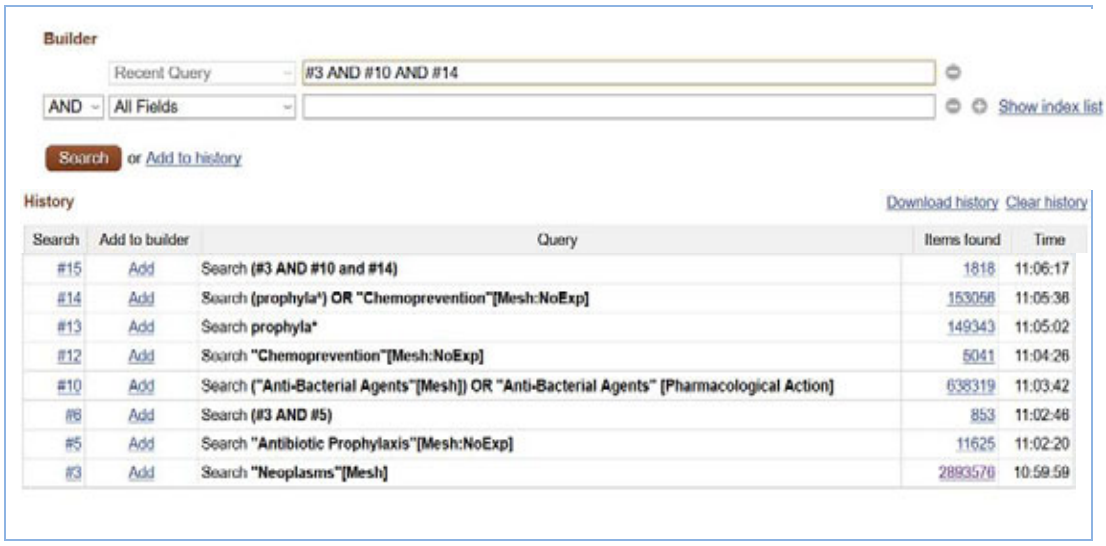
Open Fractures AND Closed Fractures
(in the same article)



Open Fractures NOT Closed Fractures

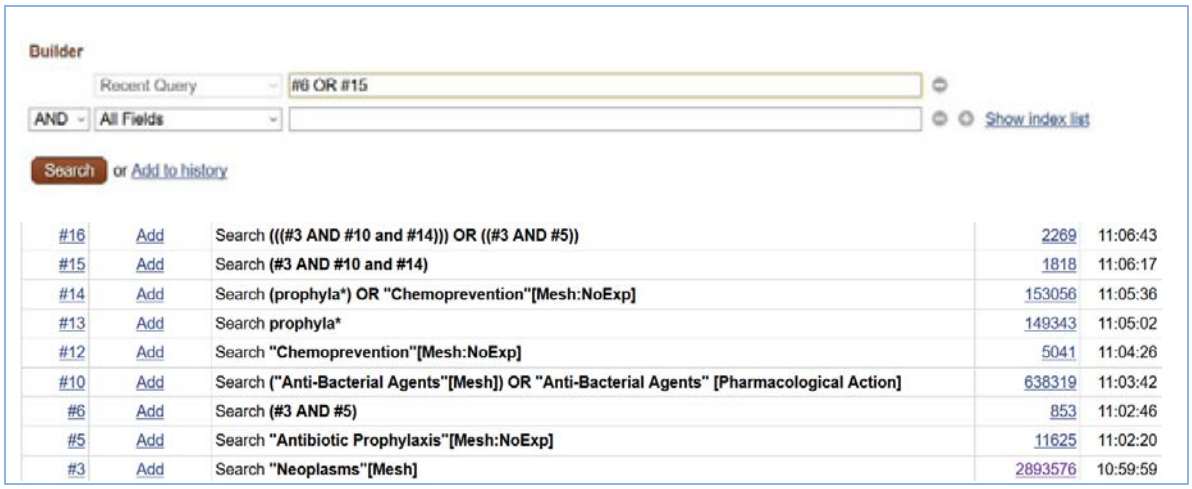
Combine your search terms – combining terms with **OR** first and then combine the terms with **AND**. To do this make sure you are in the Advanced search page

1. Type in the set number for Neoplasms in search box 1 (e.g. **#3**)
2. Type in the set number for the Anti-Bacterial Agents results in search box 2 (e.g. **#21**)
3. Type in the set numbers for chemoprevention and the prophylaxis textword terms in search box 3 – remember to include your OR (e.g. **#23 OR** #24)
4. Click on the Search button



Search	Add to builder	Query	Items found	Time
#15	Add	Search **(#3 AND #10 and #14)**	1818	11:06:17
#14	Add	Search **(prophyla*) OR "Chemoprevention"[Mesh:NoExp]**	153056	11:05:38
#13	Add	Search **prophyla***	149343	11:05:02
#12	Add	Search **"Chemoprevention"[Mesh:NoExp]**	5041	11:04:26
#10	Add	Search **("Anti-Bacterial Agents"[Mesh]) OR "Anti-Bacterial Agents" [Pharmacological Action]**	638319	11:03:42
#8	Add	Search **(#3 AND #5)**	853	11:02:48
#5	Add	Search **"Antibiotic Prophylaxis"[Mesh:NoExp]**	11625	11:02:20
#3	Add	Search **"Neoplasms"[Mesh]**	2893576	10:59:59

3) Results of your final search set – combine your antibiotic MeSH results with your antibiotic textwords results



Steps 5, 6, and 7: Study Design Search Filters or PowerSearch and Age Group Limits

PubMed has posted filtering terms developed by the Brian Haynes group from McMaster University in the Clinical Queries section. However, in this case you can select the filter for Clinical Trials available on the main search page. To do this

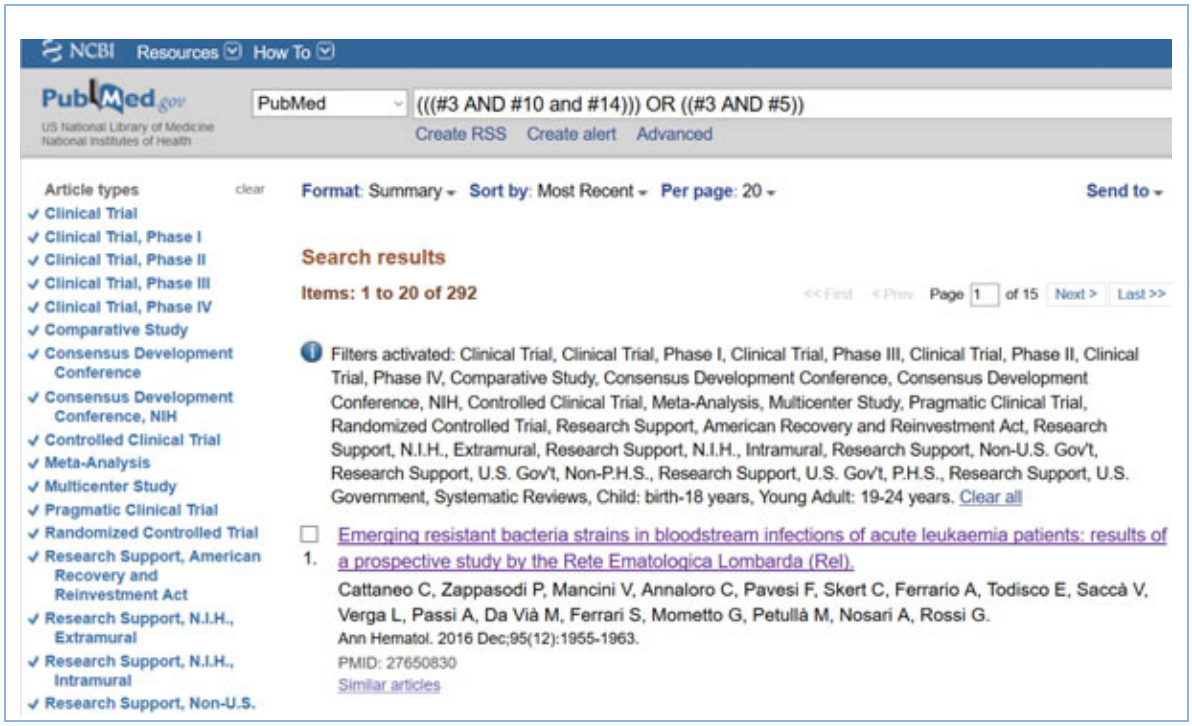
1) Click on the Customize hyperlink
2) Select the all of the article types listed for clinical trials (see below)
3) Your Base Clinical set will automatically be limited to these publication type

4) Next Customize and Select your required Age Groups

5) Review your final search results by clicking on the hyperlink from the Advanced search page

Step 8 - Results Display

Your search history will look like this, click on the results number to view the results.



Step 9 - Printing, downloading

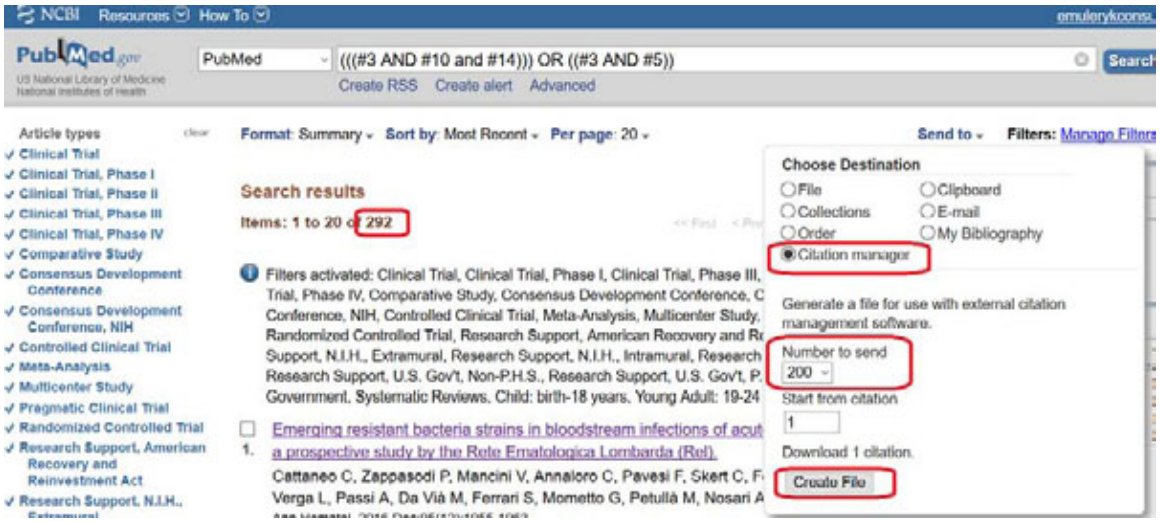
Select the references you need and click on the Send To link. Select the format you wish to print, email or save for importing into management software.

Mendeley is a free Bibliographic Management Software. EndNote is a commercially available Bibliographic Management Software. At a minimum, using either software will enable you to

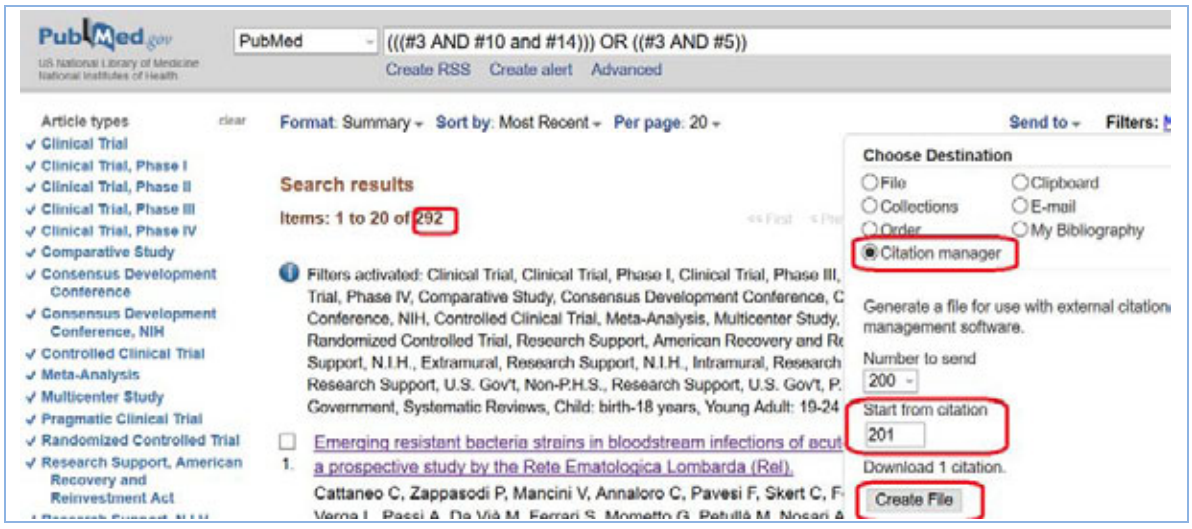
1) import references from database searches, web searches
2) add pdf copies of the full-text of articles
3) add notes concerning the contents of the articles
4) import and list your references for submission to a journal

➢ Import into EndNote

1) Click on the **Send To** button
2) Select Citation Manager – this PubMed format automatically will search for your Bibliographic Management Software on your computer
3) Select Number to send - PubMed will download a maximum of 200 references at a time. In this case we have 292 references which means we need to break the group into 2 segments. Select the first 200 references

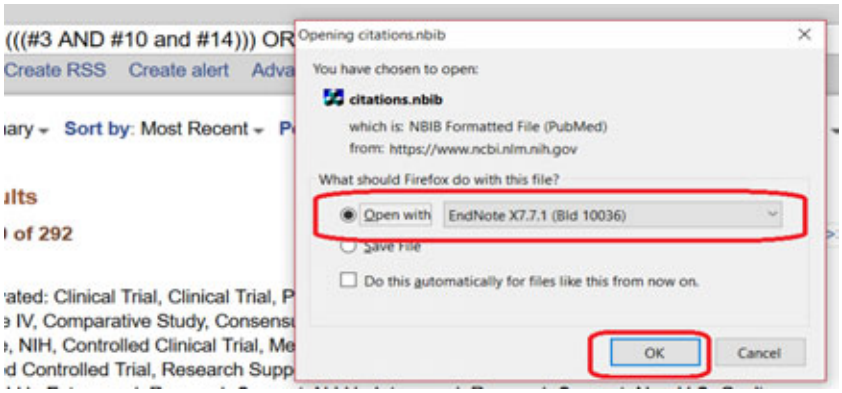


4) Click on Create a file
5) Select the remaining 92 references and change the Start from citation to 201

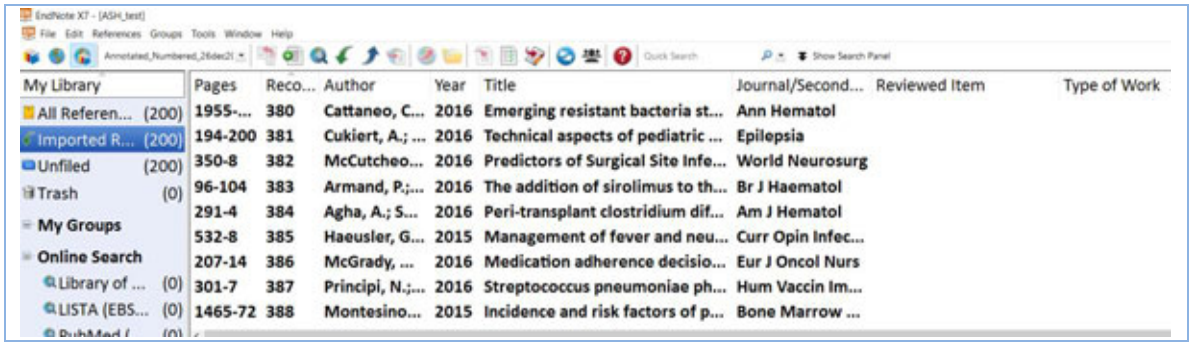


6) EndNote helper software opens automatically

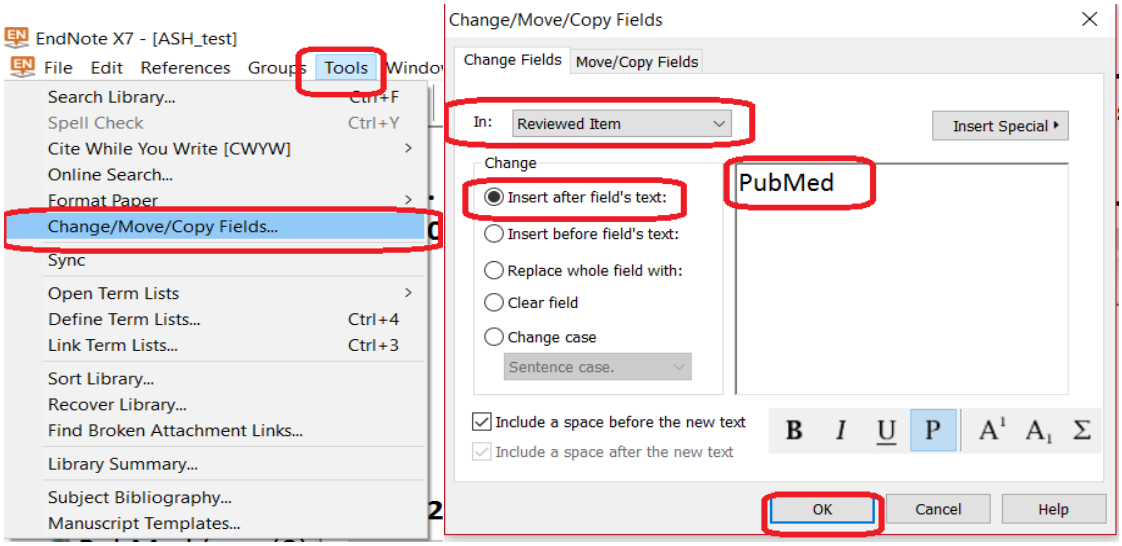
7) Click on OK to import references



8) References imported

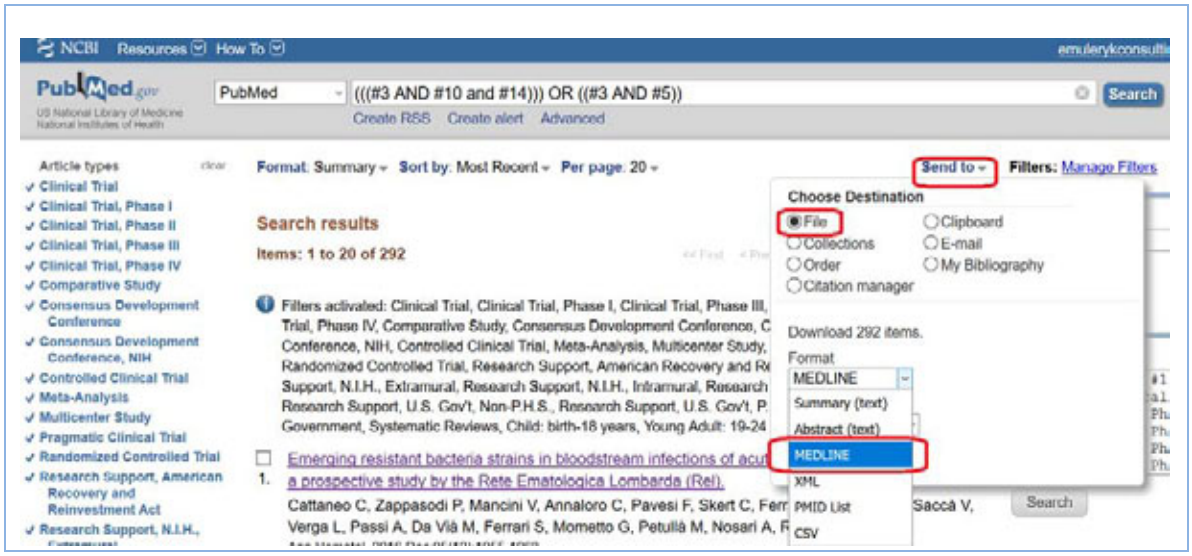


9) Add Reviewed Item notes- from the **Tools** DropDown menu select the Change/Move/Copy Fields function to add the name of the database used to find these references or add any other notes about the articles.

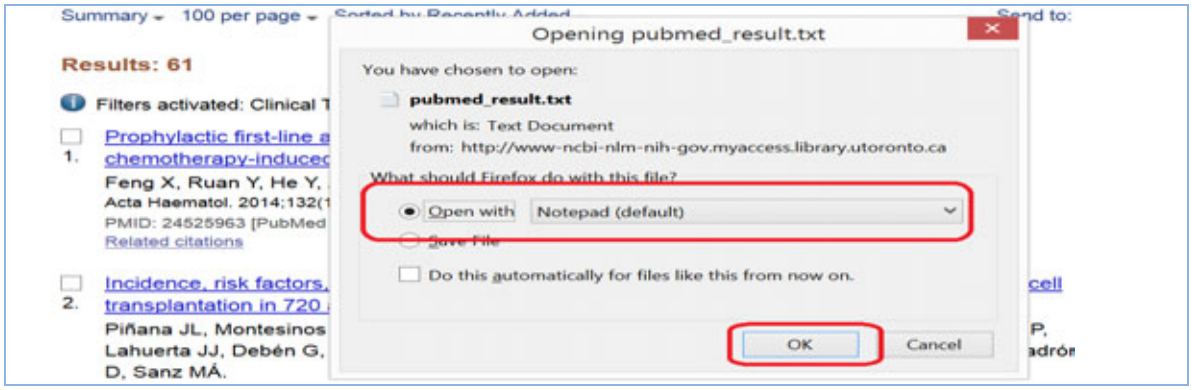


➢ Import into Mendeley

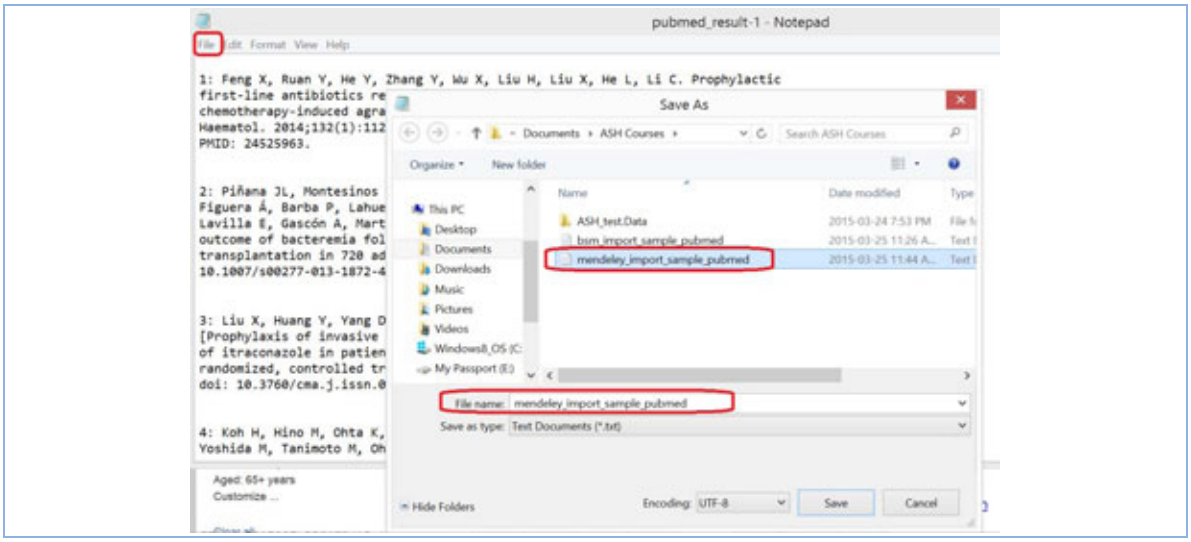
1) Click on the Send To button
2) Select File
3) Select MEDLINE in the format – this is a generic import format called RIS used in most Bibliographic Management Software programs



4) The file will open in Notepad – **leave it as a text file**



5) Name and Save the text file to your hard drive and name as

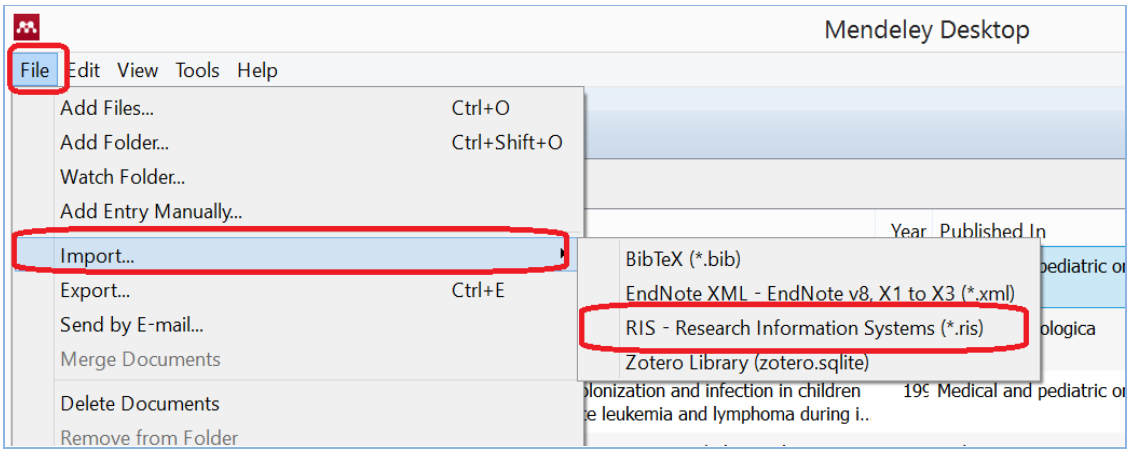


➢ **Import into Mendeley**

To do this

1) Open your Mendeley software

2) Select File – Import- RIS format



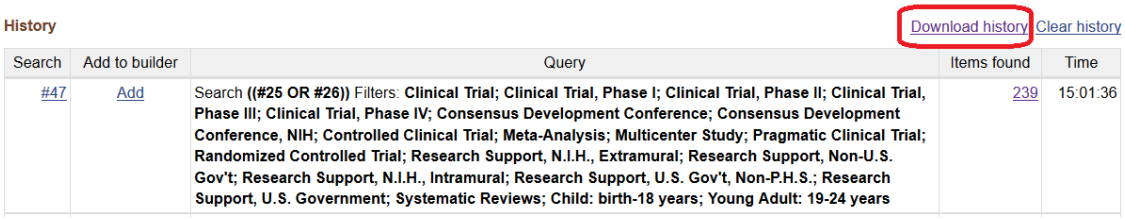
Step 10 – Search strategy write-up

Increasingly journal publishers require authors to provide a copy of their search strategy not only to verify the quality of the literature search but also to provide their readers with the ability to reproduce the search. This is especially true for systematic review searches. To save word count we suggest incorporating the search strategy into an Appendix.

If you require a flow diagram, you can use your bibliographic management software to provide you with the total number of references, the duplicate citations from multiple database searches, the number of excluded and included studies.

Included below is a sample the search strategy for this search

1) Click on the Download History button on the Advanced Search page

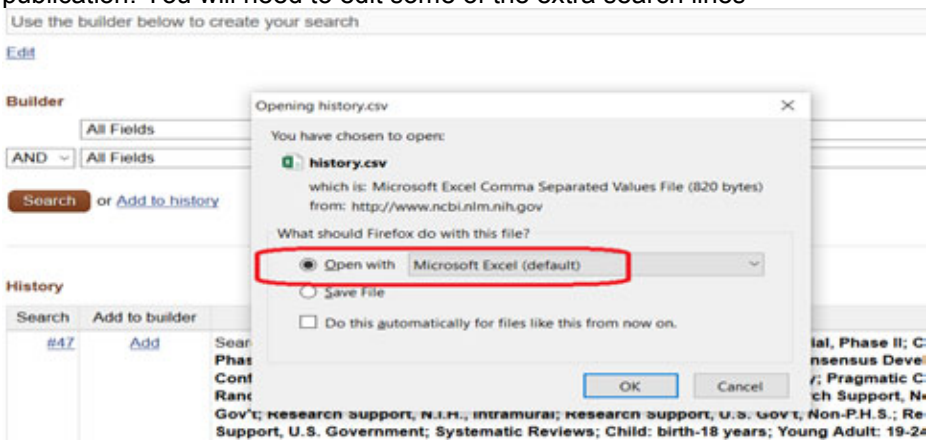


History

Download history Clear history

Search	Add to builder	Query	Items found	Time
#47	Add	Search **((#25 OR #26))** Filters: **Clinical Trial; Clinical Trial, Phase I; Clinical Trial, Phase II; Clinical Trial, Phase III; Clinical Trial, Phase IV; Consensus Development Conference; Consensus Development Conference, NIH; Controlled Clinical Trial; Meta-Analysis; Multicenter Study; Pragmatic Clinical Trial; Randomized Controlled Trial; Research Support, N.I.H., Extramural; Research Support, Non-U.S. Gov't; Research Support, N.I.H., Intramural; Research Support, U.S. Gov't, Non-P.H.S.; Research Support, U.S. Government; Systematic Reviews; Child: birth-18 years; Young Adult: 19-24 years**	239	15:01:36

2) Copy the excel spreadsheet information into your word document that you submit for publication. You will need to edit some of the extra search lines



PubMed was searched on March 20, 2017 using the following strategy (edited version)

Search	Query	Items found
#1	Search "Neoplasms"[Mesh]	2893576
#2	Search "Antibiotic Prophylaxis"[Mesh:NoExp]	853
#3	Search (#1 AND #2)	788
#4	Search ("Anti-Bacterial Agents"[Mesh]) OR "Anti-Bacterial Agents" [Pharmacological Action]	638319
#5	Search "Chemoprevention"[Mesh:NoExp]	5041
#6	Search prophyla*	149343
#7	Search #5 OR #6	153056
#8	Search #1 AND #4 AND #7	1818
#9	Search ((#3 OR #8))	2269
#10	Search ((#3 OR #8)) Filters: Clinical Trial; Clinical Trial, Phase I; Clinical Trial, Phase II; Clinical Trial, Phase III; Clinical Trial, Phase IV; Consensus Development Conference; Consensus Development Conference, NIH; Controlled Clinical Trial; Meta-Analysis; Multicenter Study; Pragmatic Clinical Trial; Randomized Controlled Trial; Research Support, N.I.H., Extramural; Research Support, Non-U.S. Gov't; Research Support, N.I.H., Intramural; Research Support, U.S. Gov't, Non-P.H.S.; Research Support, U.S. Government; Systematic Reviews; Child: birth-18 years; Young Adult: 19-24 years	292

NCBI Login – Save search strategies or Alerts

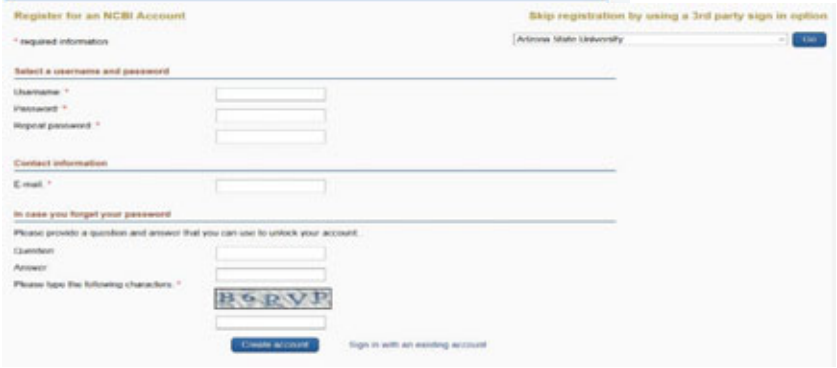
Every search platform provides you with the opportunity to

1) save your search strategies to re-run at a later date
2) receive regular updates of new articles on your topic

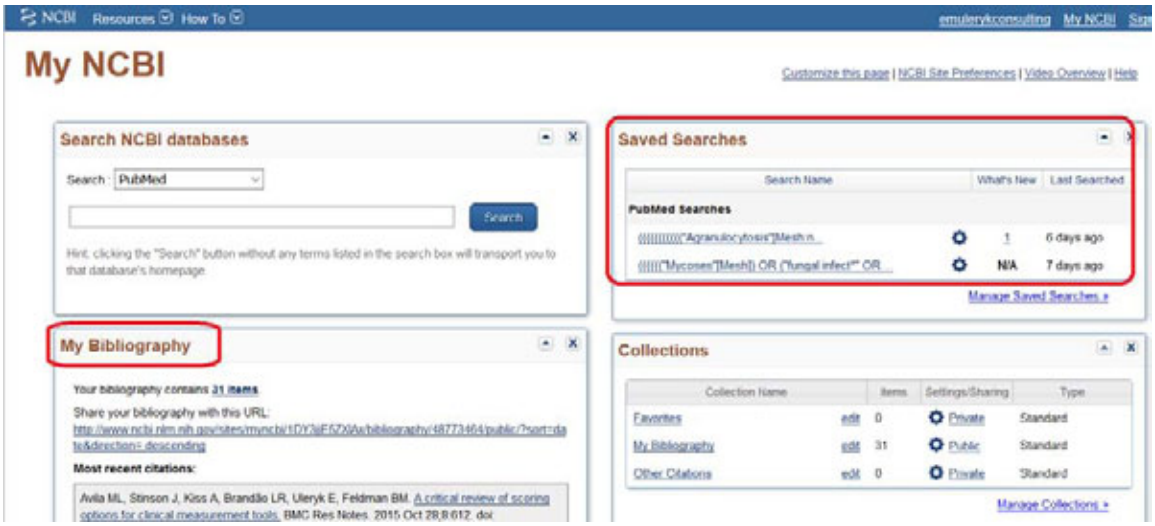
In PubMed to take advantage of this search feature you need to create a NCBI account and then save your search strategies for future use. To do this

a) Create your NCBI account login by clicking on the **Sign in to NCBI** link in the upper right hand corner of the main PubMed page

b) Click on the Register for an NCBI account link and fill in the required information



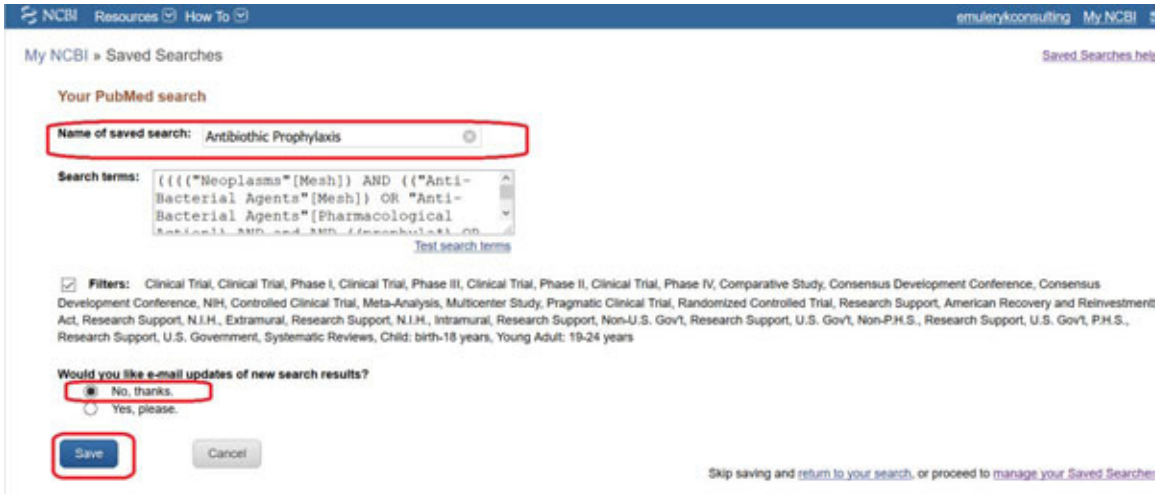
c) Once you have created your account and signed in you are ready to open a saved search or create a new one.



Save the current search:

1) Click on the Create Alerts link – make sure you are signed in to your NCBI account

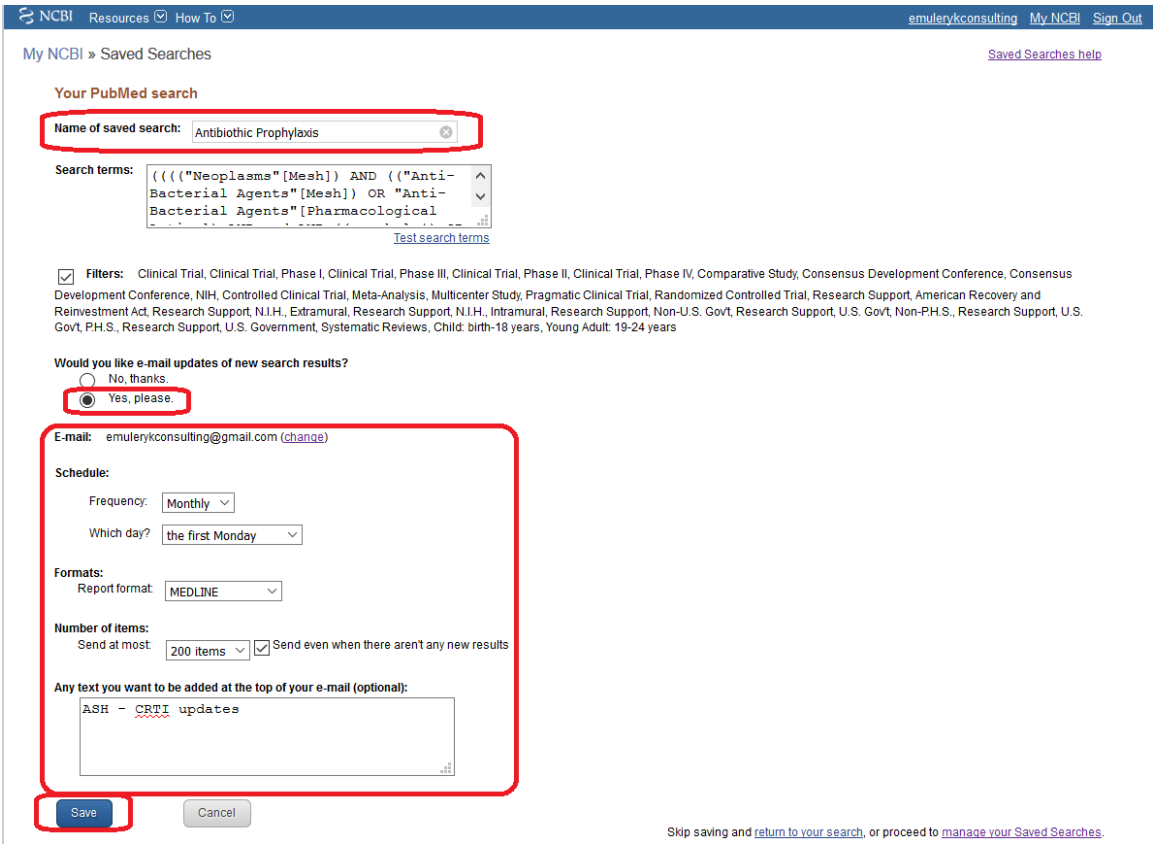
2) Name your search (e.g. Prophylactic Antibiotics). Do this by deleting the search terms automatically placed here with your preference search name
3) Click in the No option to save just the search strategy for future use
4) Click on the Save button



Save an Automatic Search Update

1) Click on the Create Alert hyperlink

2) Fill in the required information making sure you change the highlighted default settings to what appears in the example below
   a) Indicate you need an update. By clicking **YES**
   b) Check your email address
   c) Change the maximum **Number if items** to 200 and click on the send an email notification even if there are no results
   d) Add a note to your email subject line indicating the search topic to identify your various search updates



Suggested MEDLINE Quality Filtering Search Terms –

(Derived and updated from filters in the Cochrane Handbook, McMaster University and University of Alberta (Evidence-Based Medicine Toolkit **http://www.ebm.med.ualberta.ca/**)

Therapy (Effectiveness)

Set	
1	("clinical trial, all" or clinical trial).pt. or clinical trials as topic/
2	clinical trial, phase i.pt. or clinical trials, phase i as topic/
3	clinical trial, phase ii.pt. or clinical trials, phase ii as topic/
4	clinical trial, phase iii.pt. or clinical trials, phase iii as topic/
5	clinical trial, phase iv.pt. or clinical trials, phase iv as topic/
6	meta-analysis.pt. or meta-analysis as topic/
7	controlled clinical trial.pt. or controlled clinical trials as topic/
8	multicenter study.pt. or multicenter studies as topic/
9	randomized controlled trial.pt. or randomized controlled trials as topic/
10	pragmatic clinical trial.pt. or Pragmatic Clinical Trials as Topic/ or ((preference or practical or pragmatic or "real world" or naturalistic) adj5 trial*).ti,ab. [****New MeSH term 2014****]
11	Comparative Effectiveness Research/ or ((comparative adj2 effectiveness) or (CER adj5 (research* or method* or framework* or compari* or statement*))).ti,ab. [****New MeSH term 2010 related to Pragmatic Clinical Trials as Topic****]
12	Or/1-11

Diagnostic Tests (Effectiveness)

Set	
1	evaluation studies.pt. or evaluation studies as topic/
2	validation studies.pt. or validation studies as topic/
3	exp “sensitivity and specificity”/
4	predictive value of tests/
5	roc curve/
6	exp diagnostic errors/
7	false negative reactions/
8	false positive reactions/
9	observer variation/

10	likelihood functions/
11	likelihood.mp. or (likelihood ratio:).mp.
12	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11

Prognosis/ Natural History (Sensitive)

Set	
1	cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/
2	case-control studies/ or retrospective studies/ or cross-sectional studies/
3	exp prognosis/
4	exp disease progression/
5	exp morbidity/
6	exp mortality/
7	exp survival analysis/
8	natural history.mp.
9	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8

Prognosis/ Natural History (Specific)

Set	
1	cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/
2	case-control studies/ or retrospective studies/ or cross-sectional studies/
3	exp prognosis/
4	exp disease progression/
5	exp morbidity/
6	exp mortality/
7	exp survival analysis/
8	natural history.mp.
9	Or/1-2
10	Or/3-8
11	9 and 10

Etiology/ Causation/ Harm (Sensitive)

Set	
1	cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/

2	case-control studies/ or retrospective studies/ or cross-sectional studies/
3	risk/ or logistic models/ or risk assessment/ or risk factors/
4	causality/ or precipitating factors/ or risk factors/
5	risk.mp.
6	(cause or causal or causation).mp.
7	odds ratio.mp.
8	relative risk.mp.
9	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8

Etiology/ Causation/ Harm (Specific)

Set	
1	cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/
2	case-control studies/ or retrospective studies/ or cross-sectional studies/
3	risk/ or logistic models/ or risk assessment/ or risk factors/
4	causality/ or precipitating factors/ or risk factors/
5	risk.mp.
6	(cause or causal or causation).mp.
7	odds ratio.mp.
8	relative risk.mp.
9	or/1-2
10	Or/3-8
11	9 and 10