Provincial Addiction & Mental Health

Systematic Literature Searching: A Resource Guide for AMH

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Alberta Health Services

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Introduction

A literature search is a systematic and methodical search for all types of literature on a specific topic. Literature searching is a key component in the identification, retrieval, and evaluation of good quality information.

This guide provides an overview of the processes and techniques involved in finding evidence-based health information. It covers the planning, development, and execution of effective literature search strategies.

Search planning

Formulating a research question and identifying concepts

Step 1: Define your topic.

You should be able to easily describe what you're looking for. Understanding your topic will make finding results easier. You will be navigating through a plethora of literature, so unless you know precisely what you need to find, searching will become a complicated and frustrating task.

Step 2: Turn your topic into a research question and break it down into concepts.

A clear, well-formulated research question will help narrow your search. After establishing a research question, break it down into concepts to make the question searchable. These concepts will become the foundation of your search. Identify the concepts that must be addressed in order to answer your question. Try to limit the number of concepts to three or four. If you find that you have more than that, your question may be too complicated.

There are several established techniques to formulate a research question and identify concepts. Two widely used models are the PICO and ECLIPSE frameworks.

Model	Description	Suitability
PICO	**P**atient, population, problem **I**ntervention (e.g., form of treatment, type of service delivery) **C**omparison (e.g., placebo) **O**utcome (e.g., side effects, morbidity)	Clinical questions
ECLIPSE	**E**xpectation – what does the search requestor want the information for? **C**lient Group – for whom is the service intended? **L**ocation – where is the service physically sited? **I**mpact – what is the service change being evaluated? What would represent success? How is this measured? **P**rofessionals – who provides or improves the service? **Se**rvice – what type of service is under consideration?	Health policy and management questions

Davies, K. S. (2011). Formulating the evidence-based practice question: A review of the frameworks. *Evidence Based Library and Information Practice*, *6*(2), 75-80.

These models are designed to get you thinking about your topic. If these models are not appropriate for your topic, you can adapt them to fit your research.

Search Request Example

"Hi, my name is Patrick Bateman; I'm a team lead with the Ministry of Human Services' Youth Initiatives branch. My team is in the process of developing an Inner-City Homeless Health Project for teenagers. We're interested in finding current, evidence-based interventions for homeless teenagers. Our team conducted a search on this topic several years ago and was unable to find much relevant literature."

The models discussed above may not be a proper fit for this request. Extract the essential information from this request and convert it into a research question to simplify searching:

What are some evidence-based interventions for homeless teenagers?

The request is now a brief, concise research question that can be broken down into concepts:

What are some evidence-based interventions for homeless teenagers?

In most cases it's worthwhile to contact the requestor and find out exactly what they want, and clear up any potential confusion. In this example, the request is fairly clear, but you would want to find out if Patrick is looking only for Canadian literature, or willing to expand to other Commonwealth countries (e.g., UK, Australia, and New Zealand) and the United States. Patrick indicated that a search was run several years ago, so he may only want research from the past 5 years; however, it would be wise to expand the search back to 10 years, in case something was missed in their original search.

Step 3: Create a concept map.

Consider all possible terms or phrases that might be used to describe your concepts. The terms that you come up with are not final, as you are likely to identify other terms as you progress with the search.

A	B	C
Teenagers	**Homeless**	**Interventions**
Adolescents	Street living	Therapies
Youth	Runaway	Mental health services

Step 4: Run a quick, preliminary search.

Search in a database and review your search terms (and if necessary, the research question and its scope) before carrying out comprehensive searches. Also consider running a quick Google search, and browse through some relevant documents to see what kind of language they are using regarding your topic.

Step 5: Combine your concepts.

Boolean operators are basic words (AND, OR, NOT) used to connect search terms. Use Boolean operators to string together your terms when searching databases.

- **OR** – Used to search for similar concepts. This will have the effect of broadening a search, thereby increasing results. For example: *teenagers OR adolescents OR youth*

- **AND** – Used to combine two or more different concepts. This will have the effect of narrowing a search and reducing the number of results. For example: *homeless AND teenagers AND interventions*

- **NOT** – Used to exclude concepts from a search. This will have the effect of removing results from a search, and should be used with caution as it may exclude relevant results. For example, *teenagers NOT adults* will include articles with *teenagers*, but will exclude articles with both *teenagers* and *adults*.

Searching databases for academic literature

Bibliographic databases

After completing the steps involved in search planning, use bibliographic databases to look for academic literature. Bibliographic databases contain details of millions of journal articles, published in thousands of journal titles. The databases you search will depend on the subject you are trying to find information on.

Major databases for health research include:

- **MEDLINE:** the National Library of Medicine's (NLM) premier bibliographic database; covers a wide range of literature on life sciences and biomedicine.
- **PubMed:** produced by the NLM, and primarily accesses the MEDLINE database. PubMed also includes "ahead of print" and "in-process" citations—articles that haven't been indexed in MEDLINE yet. Search both MEDLINE and PubMed to ensure you haven't missed anything, especially newer articles.
- **PsycINFO:** the American Psychological Association's (APA) resource for abstracts of scholarly journal articles, book chapters, books, and dissertations. It's the largest resource devoted to peer-reviewed literature in behavioral science and mental health.
- **CINAHL:** largest and most in-depth database for nursing and the allied health professions.
- **Embase**: covers a broad range of pharmacological and biomedical literature.

Subject headings

Subject headings are a controlled vocabulary that indexes the content of each item in a database. Items on the same topic are grouped together under the same subject heading. Subject headings are specific to each database; in MEDLINE they're called MeSH (Medical Subject Headings). Subject headings allow for a more accurate and focused search.

Keyword searching

Keywords are natural language words that describe your topic. Keyword searching is how you search Internet search engines. When entered into a database, keywords are matched against an article's record (title, abstract, subject headings, etc.). Keyword searches are useful when starting a search, or looking for jargon or distinctive words that wouldn't be found in a database's controlled vocabulary (subject headings). The disadvantage of using keywords is that they can often give too many, or too few, results.

Nesting

Nesting is a keyword searching technique that organizes your search and clarifies relationships between terms. Use parentheses around related terms when combining different operators to ensure that they are searched separately. For example, entering "(youth OR adolescent OR teenager) AND homeless" will retrieve records that contain the term *homeless*, as well as one or all of the terms *youth* OR *adolescent* OR *teenager*.

Field searching

Field searching limits your keywords to particular fields (e.g., title, abstract, author). It can be a useful alternative to basic keyword searching as it yields more precise results. For example, if you want articles that have the term *teenager* in the title, you would enter *teenager* and the appropriate field code (.ti): "teenager.ti." Field codes are specific to each database. To find MEDLINE field codes, refer to page 10.

Truncation

Truncation is used to retrieve words with the same root but variant endings. A truncation symbol is used to substitute any number of characters at the beginning or end of a word. In most databases, the truncation symbol is likely to be either an asterisk or dollar sign. For example, "behavior*" will search behaviors, behavioral, etc.

Wildcards

Wildcards are used to replace one or more characters within a word. This is particularly useful for managing variant spellings. The most common wildcard symbol is a question mark. For example, "behavio?r" will search behavior and behaviour.

Proximity operators

Proximity operators permit you to search for two or more words that occur within a specified number of words of each other in a record. Proximity operators vary across databases. Generally, databases will either use adjacency operators or near and within operators.

Proximity operator	Example	Description
Adjacency operator (adj)	homeless adj4 youth	Finds records where *homeless* and *youth* are within four words of one another regardless of the order in which they appear
Near operator (N)	homeless N4 youth	Finds records where *homeless* and *youth* are within four words of one another regardless of the order in which they appear
Within operator (W)	homeless W4 youth	Finds records where *homeless* and *youth* are within four words of one another and in the order in which you entered them

Check the help section in databases before using truncation, wildcards, and proximity operators to see which operators apply to the database you are using.

Phrase searching

A phrase search will search for two or more words as an exact phrase. To do so, enclose the words in quotation marks. For example, entering “homeless youth” will ensure that your terms are searched next to each other.

Search limiters

Use limiters (or filters) to refine your search. Limiters allow you to focus your search and exclude irrelevant results.

Common limiters include:

- **Publication date** – to retrieve relevant results, focus on material published from 5 to 10 years ago, depending on the topic and purpose of the search.
- **Geography** – helps narrow results to a specific country or group of countries. Can be particularly useful when searching for research from specific jurisdictions.
- **Age group** – focus on a particular age demographic (e.g., children, youth, adult, elderly).
- **Language** – most databases include materials in non-English languages. Use limiters to exclude other languages.
- **Publication type** – limit results by publication type (e.g., case studies, RCTs, systematic reviews).

Document searches

It is important to record your search process systematically. A well-documented search methodology will keep you organized and clearly demonstrates how and where you found your information. Use database personal account features to save search histories and keep track of completed searches.

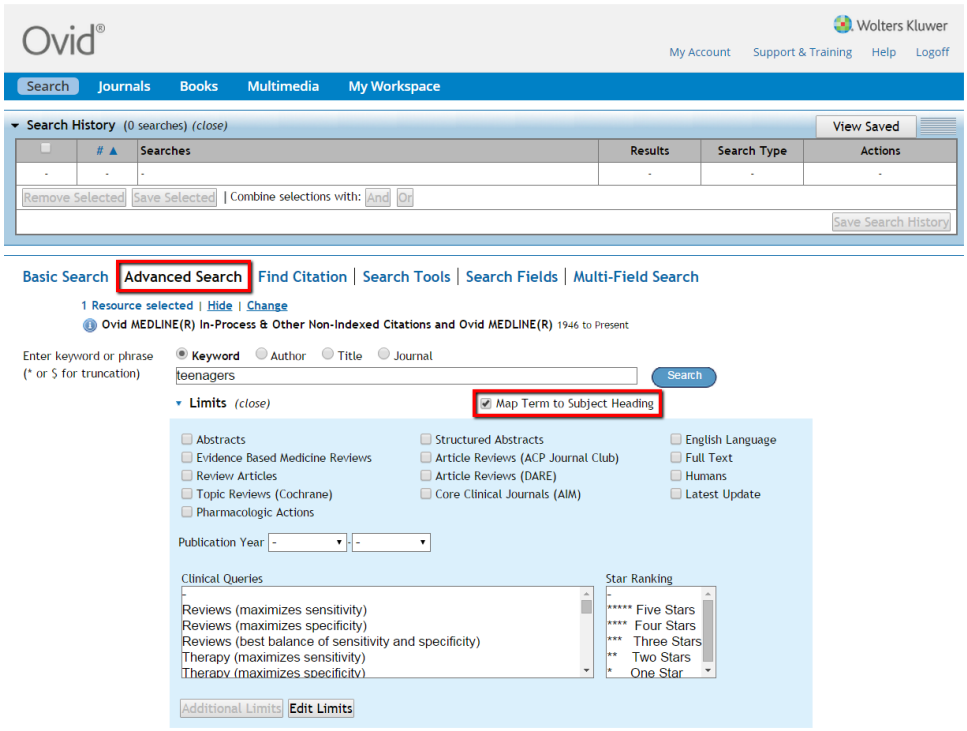
Use reference management tools to organize and retrieve references, and help manage your bibliography. Some options include: Mendeley®, Zotero®, RefWorks®, and Endnote®.

MEDLINE search example

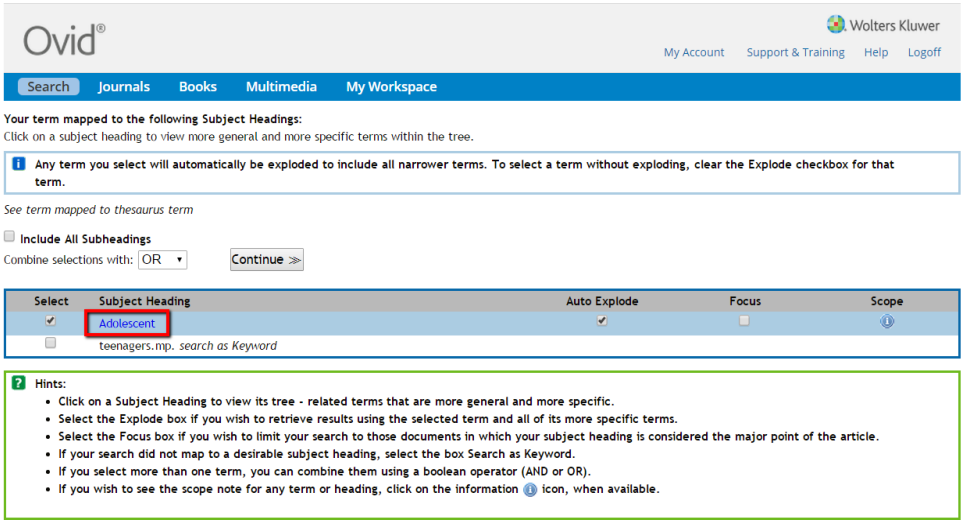
The following example is one approach to searching the MEDLINE database. Try different approaches to find the best fit for your specific topic. This brief search will include searching with a combination of MeSH terms and keywords, and applying appropriate limiters to narrow results.

Searching with MeSH terms

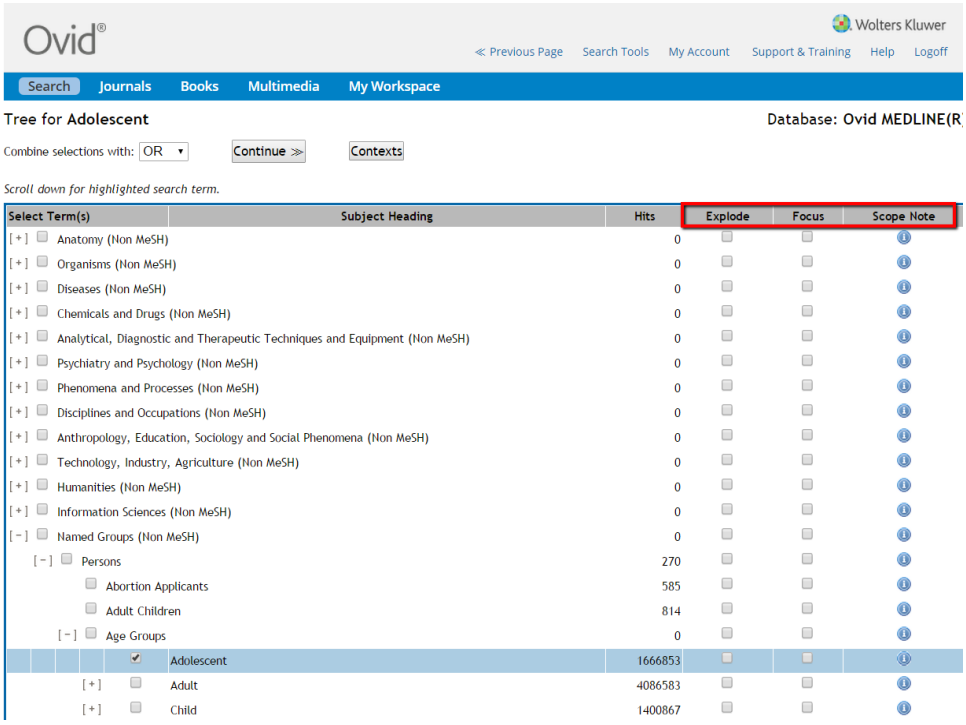
Choose the *Advanced Search* option and enter your term into the search box. Make sure the *Map Term to Subject Heading* box is checked. Click *Search*.



A list of subject headings is displayed. These represent the preferred terms to use in MEDLINE for the term you entered. In this instance, MEDLINE suggests you use the MeSH term *Adolescent*.



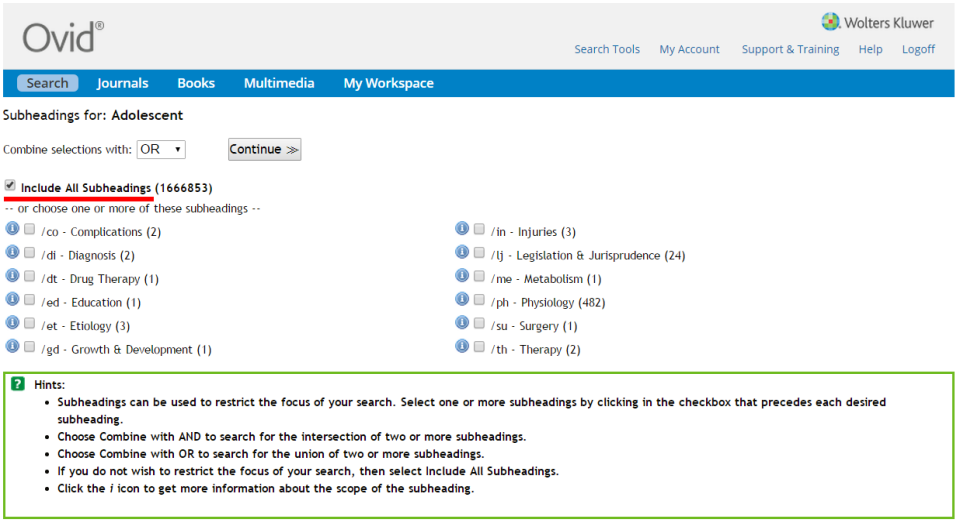
Click on *Adolescent* to see the hierarchical tree for the MeSH term. This hierarchical structure demonstrates the relationships between terms. Terms within the tree are arranged according to their relationship to the searched term, in this case *Adolescent*. In this example, *Adolescent* is a narrower term of *Age Groups*, which is a narrower term of *Persons*.



Click the *Explode* box next to the subject heading to retrieve results using the highlighted term and all of the narrower terms under it. In this instance, there are no narrower terms under *Adolescent*. Click the *Focus* box to retrieve results in which your term is considered as the primary focus of the document. This will exclude all narrower terms.

Click on the *Scope Note* icon to see the definition of the term, other terms it is used for, and additional information. Check the *Scope Note* to ensure you are using a subject heading in the manner it was intended to be used. Reviewing the *Scope Note* is a useful way to identify other terms that you may be able to use in your search. Click *Continue*.

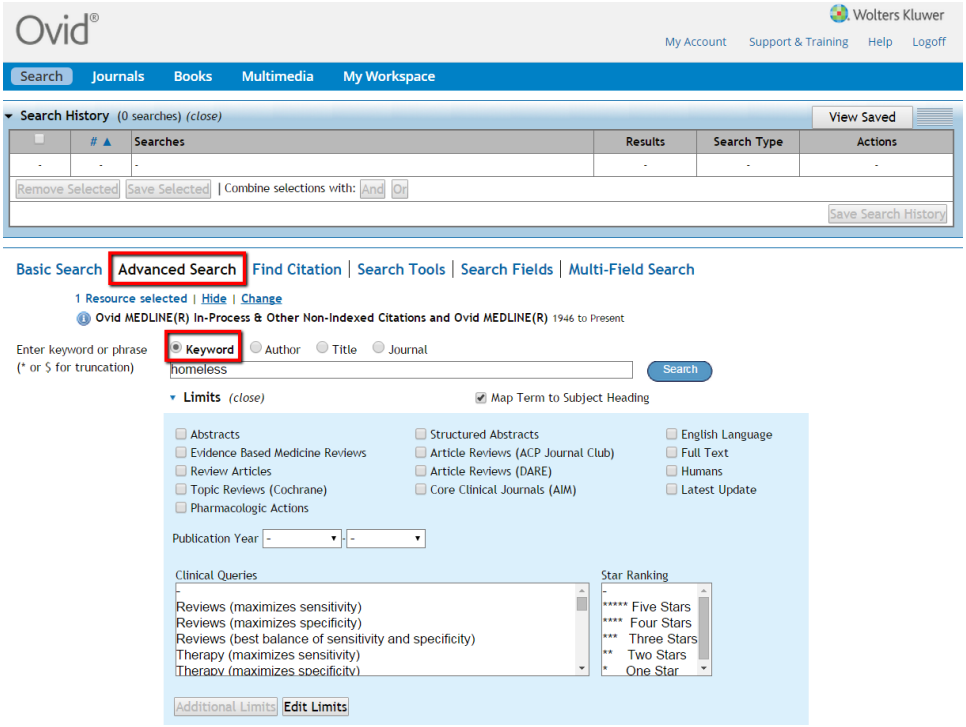
A list of subheadings for the term *Adolescent* is displayed. Selecting a subheading will narrow your results to a particular aspect (e.g., diagnosis, physiology) of the term. You can also select *Include All Subheadings*. Click *Continue* to see your results.



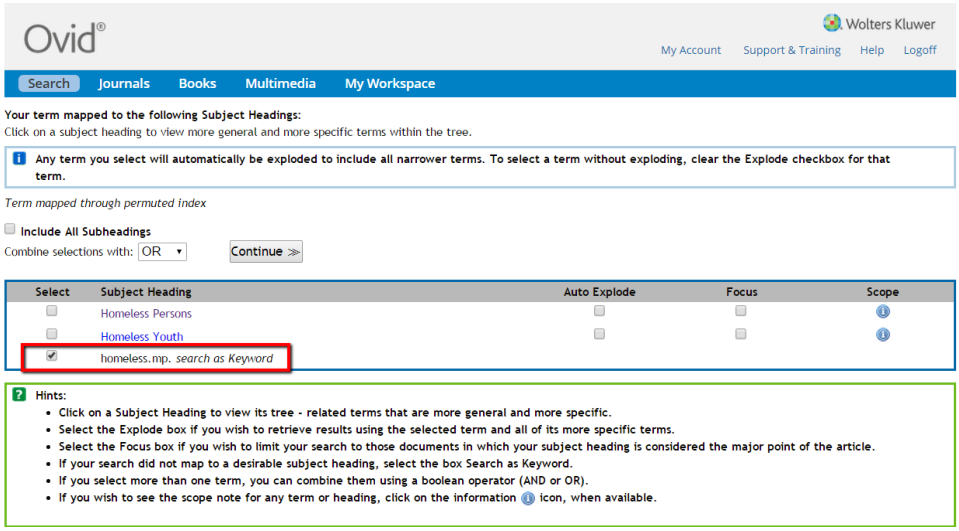
Searching with keywords

While MeSH searching is typically more accurate, there will be instances where there is no appropriate MeSH term, or you would prefer to search with natural language words. This is when keywords should be used. In MEDLINE, there are two ways to search for keywords.

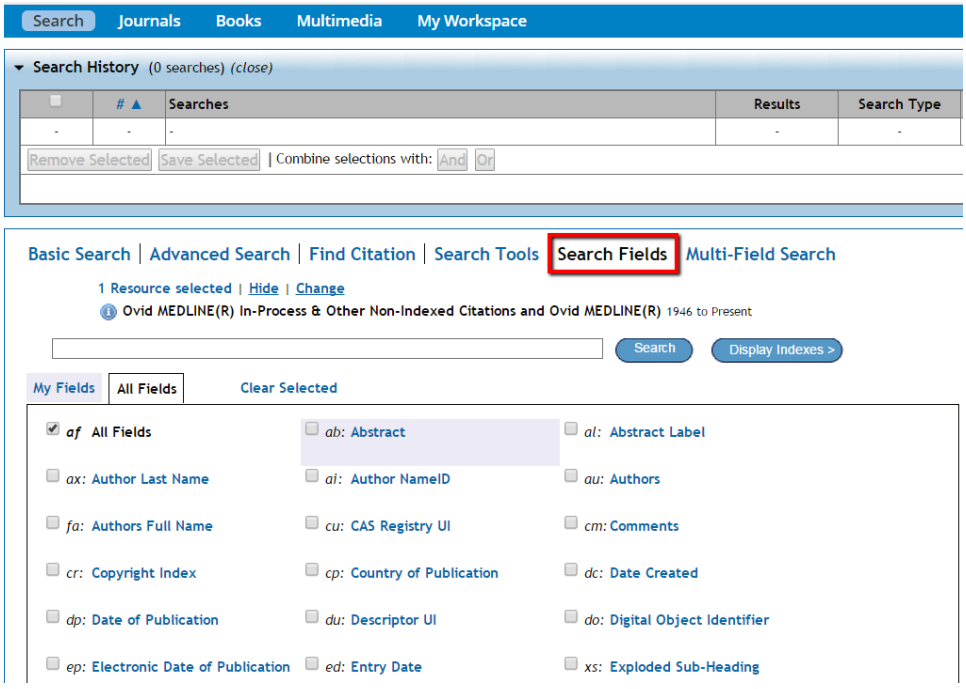
First, you can choose the *Advanced Search* option and select to search by *Keyword*. Enter your term and leave the *Map Term to Subject Heading* box checked. Click *Search*.



Your original term will be located after the list of MeSH terms. Your term will have ".mp" at the end of it; this is the default multipurpose field code, meaning your term will be searched in multiple fields of a record (e.g., title, original title, subject headings, abstract). Select your term and click *Continue* for results.

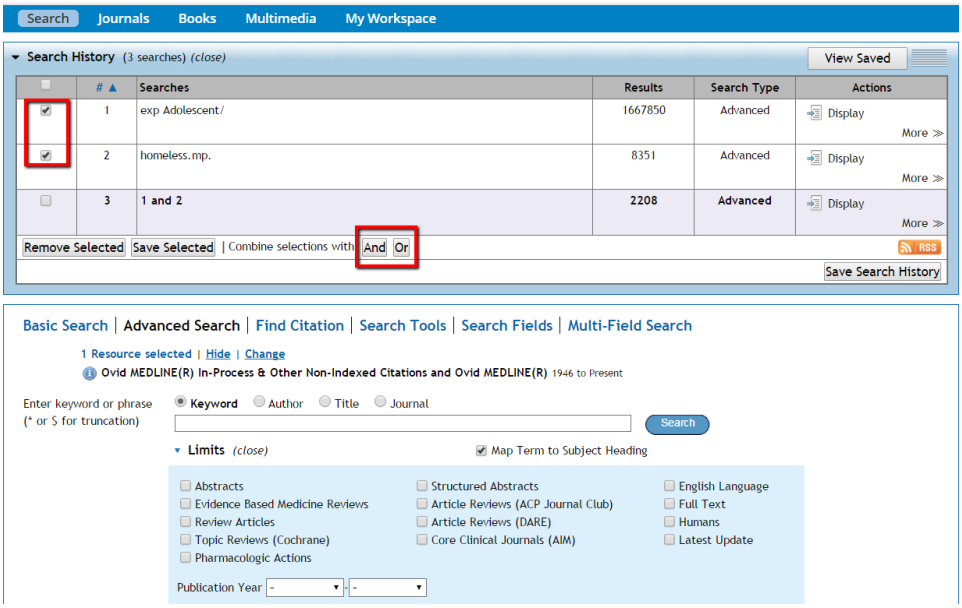


You can also search for keywords with field codes. For example, in *Advanced Search* enter your term, and add ".tw" at the end (e.g., homeless.tw) and click *Search*. This is a field code that means text word. This will focus your search to titles and abstracts only. See the *Search Fields* option for a complete list of field codes.



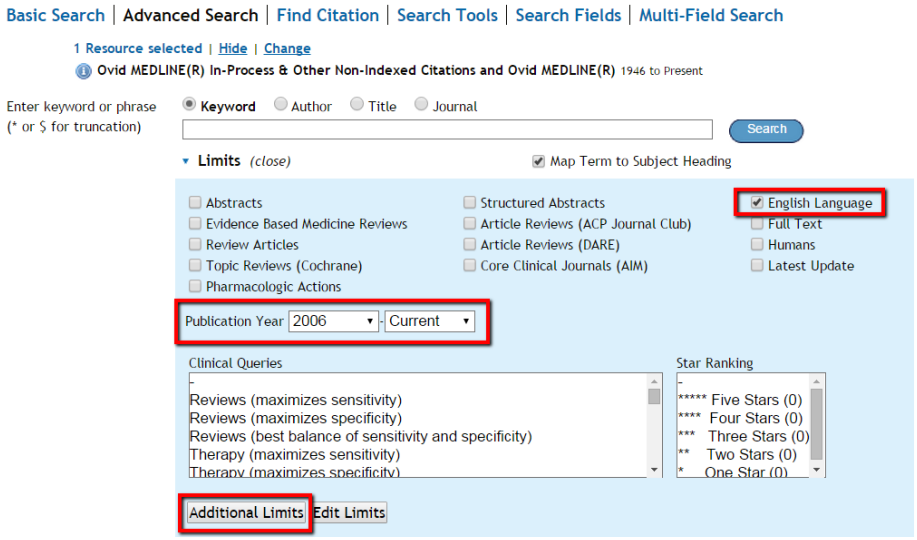
Combining searches

After you have searched for two or more terms you can begin combining searches (both subject headings and keywords can be combined). Select the search sets you want to combine by checking the appropriate boxes, and choose *AND* or *OR*.

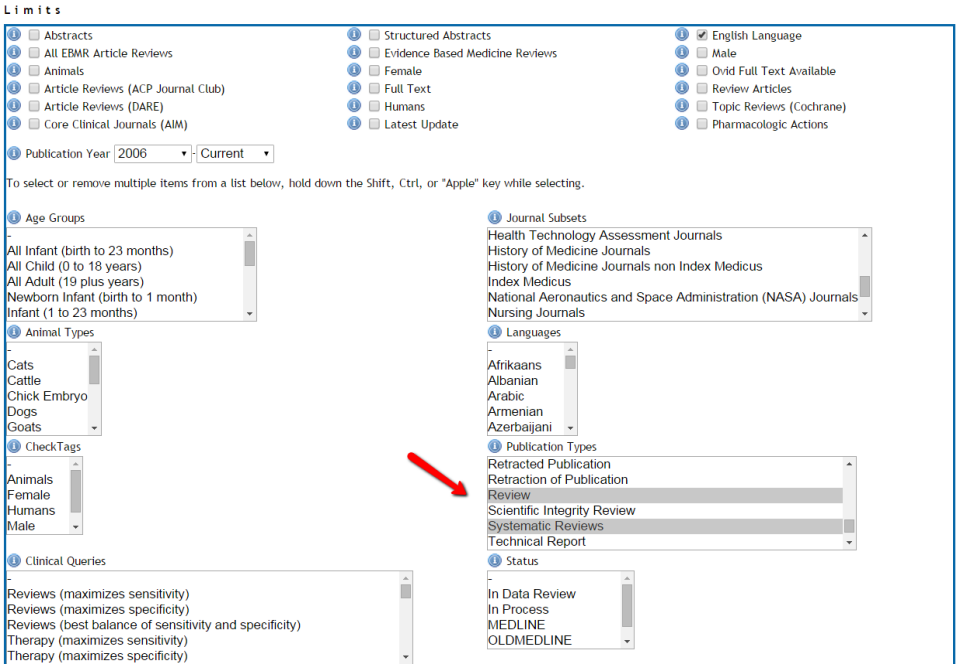


Limiters

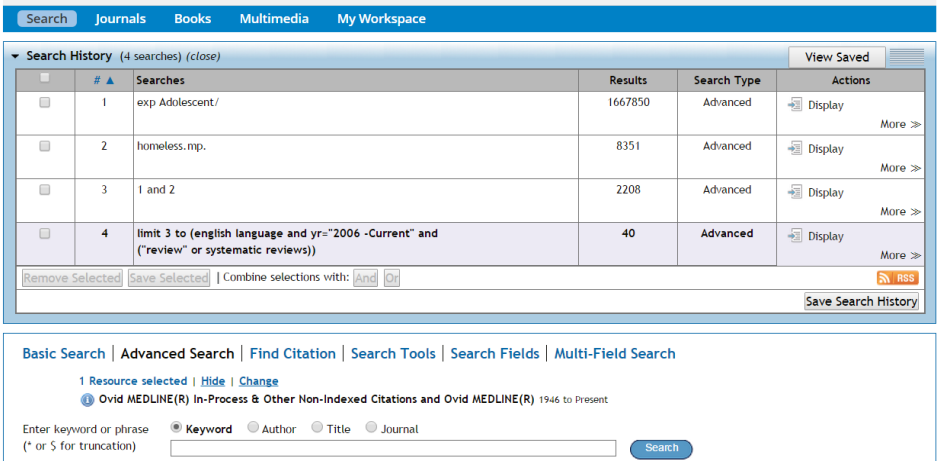
Choose the limits you would like to use and click *Search*. For a more comprehensive list of limiters, select *Additional Limits*.



In *Additional Limits*, you have the option of limiting results by publication type.

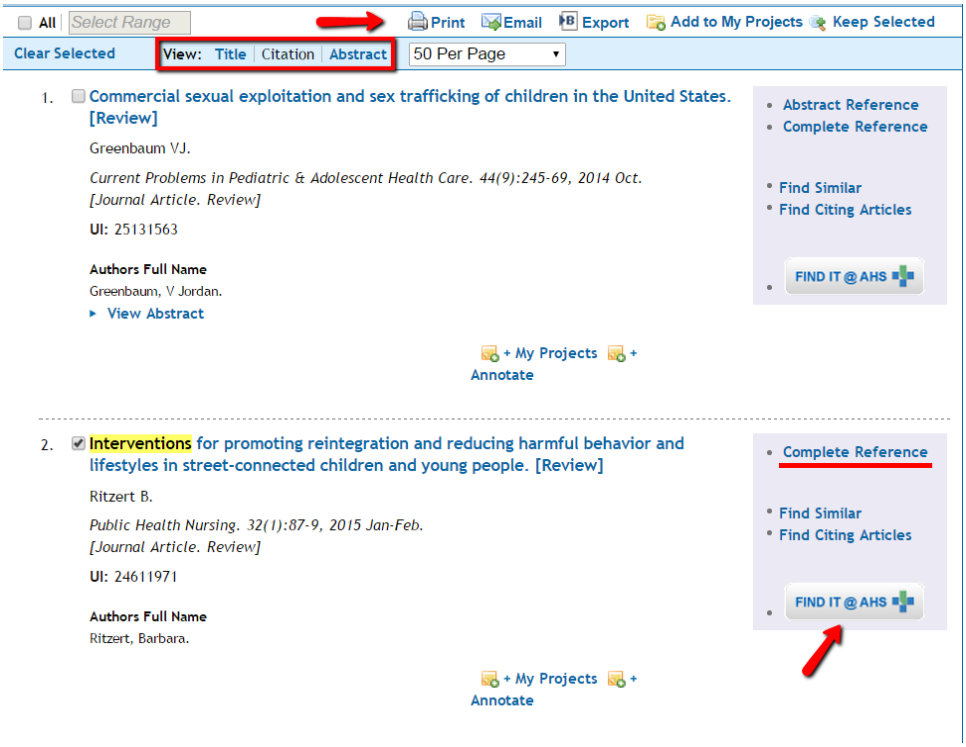


After imposing limiters, your results will be narrowed considerably.



Results

Scroll down to see the search results. A list of records is displayed. You can view records by *Title*, *Citation*, or *Abstract*. You can also *Print*, *Email*, or *Export* selected records. Click on *Complete Reference* to see the full record. This allows you to see the list of MeSH terms assigned to this particular record, and is a useful way to identify subject headings relevant to your topic. In this example, MEDLINE was accessed through Alberta Health Services, so you would click *Find it @ AHS* to see if the full-text article is available. Accessing the full-text article will depend on the institution you used to access the database.



Grey literature

Grey literature refers to materials not commercially published (e.g., scholarly journal articles), and that are mostly inaccessible via bibliographic databases. Grey literature includes: government and agency reports, guidelines, conference proceedings, publications from national and international organizations, and dissertations.

Journal articles are an excellent information source, but may not provide a broad overview of a topic. The focus is usually on the outcomes of clinical trials, and may not have information about practical application of the results.

Grey literature, on the other hand, is helpful because:

- it provides background history and more context to a topic
- it is essential if you are looking for best practices, because it is much easier to find guidelines and policies in grey literature than in academic literature
- unlike academic literature, which needs to go through a lengthy editing process, grey literature publishing is immediate, so you are getting timely information
- serves to complement the information that you find in academic literature by filling in the gaps
- grey literature is becoming a necessary part of systematic literature searching, and for some topics it is where the best information is found.

Some of the major differences between grey and academic literature include:

Issues	Grey literature	Academic literature
# of documents being published	Increasing at exponential rate	Increasing, but at a more measured pace
Speed of production	Instant, due to self-publishing on the web	Slower, due to costs and editing process
Cost	Low or free (in most cases)	High, increasing all the time
Access	Free, open, immediate in most cases	Locked, gated access, (some Open Access)
Quality	Highly variable	Excellent, edited, peer-reviewed
Findability	Improving but 'hit and miss'	Generally stable

Giustini, D. (2012). *Finding the hard to finds: Searching for grey literature*. Vancouver, BC: University of British Columbia.

Finding grey literature

Find grey literature with:

- Major internet search engines (e.g., Google, Bing, and Yahoo): if you are running a comprehensive search, you should consider using different engines, as they use different algorithms to rank their results.
- Government websites: government publications are an excellent source of information.
- Organization websites: identify the organizations and associations relevant to your topic, and browse their websites or contact them directly for information on your topic.
- Hand-searching journals: look through the references of full text academic articles for cited grey literature sources.
- Experts: find out who the experts are on your topic, and contact them.

Google search example

Keep Google searches simple. Complex searches involving too many terms will often give irrelevant results. To begin, try a basic search (e.g., homeless youth interventions) and browse through the results. Next, use Boolean operators to search for different term combinations.

For example:

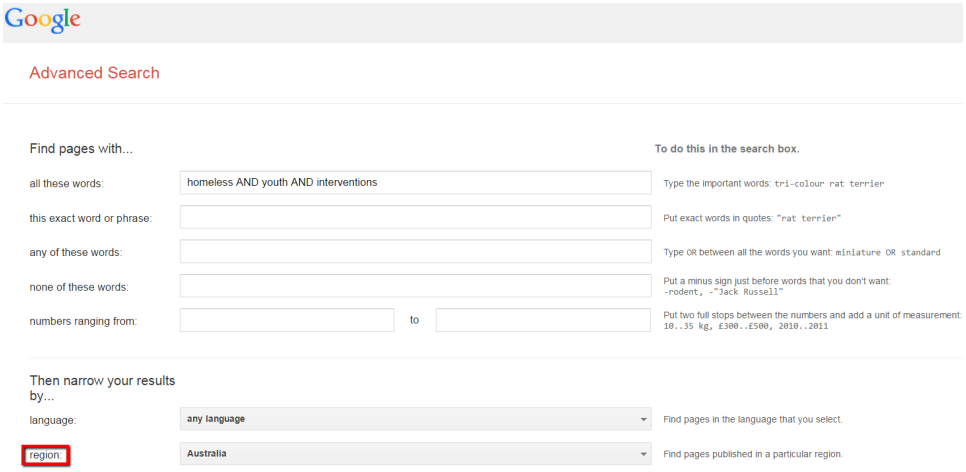
- homeless AND youth AND interventions
- homeless AND adolescents AND interventions

Use your concept map, and the terms you generated, to guide this process. It's tedious and repetitive, but thorough, and will help you identify more information. As a rule, try browsing through 10 pages of results, approximately 100 hits, for each search. It is easy to dismiss a search after only browsing through the first 10 hits, but often the best information is found beyond the first page.

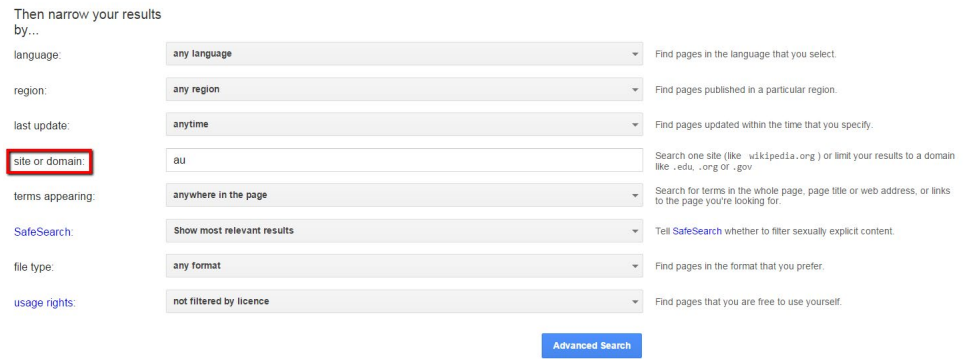
Location

Your geographic location influences your Google search results. Your default Google search engine will most likely be Google Canada. Searching in Google Canada will skew search results towards Canadian content. If you're trying to find information from other countries it's essential to add location into your search. Try using country specific search engines (Google UK, Google Australia) or Google *Advanced Search* options.

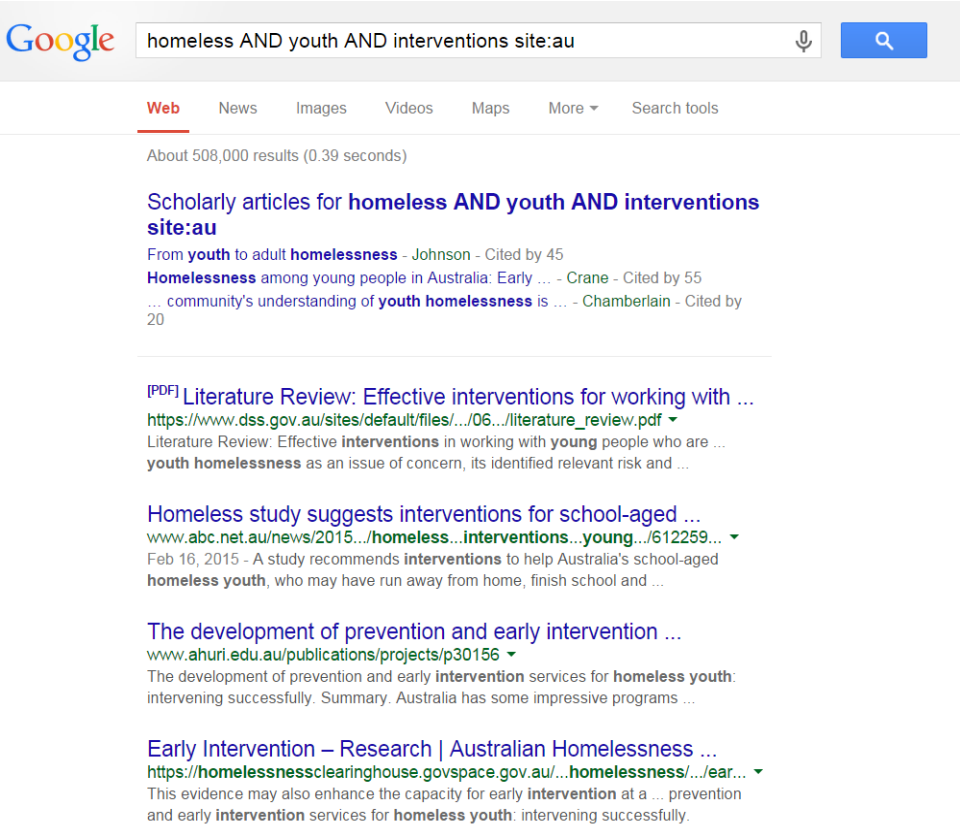
Use Google *Advanced Search* to narrow results by region.



You can also use Google *Advanced Search* to limit your results by country domain. For example, the following domains may be relevant for your search: “au” (Australia), “ca” (Canada), “nz” (New Zealand), and “uk” (United Kingdom).

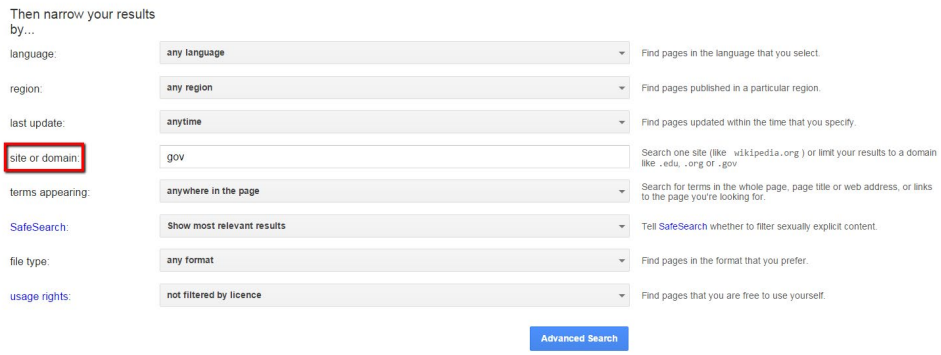


You can also manually enter this command into Google *Basic Search*. In the search box, enter "site:au" for Australia.

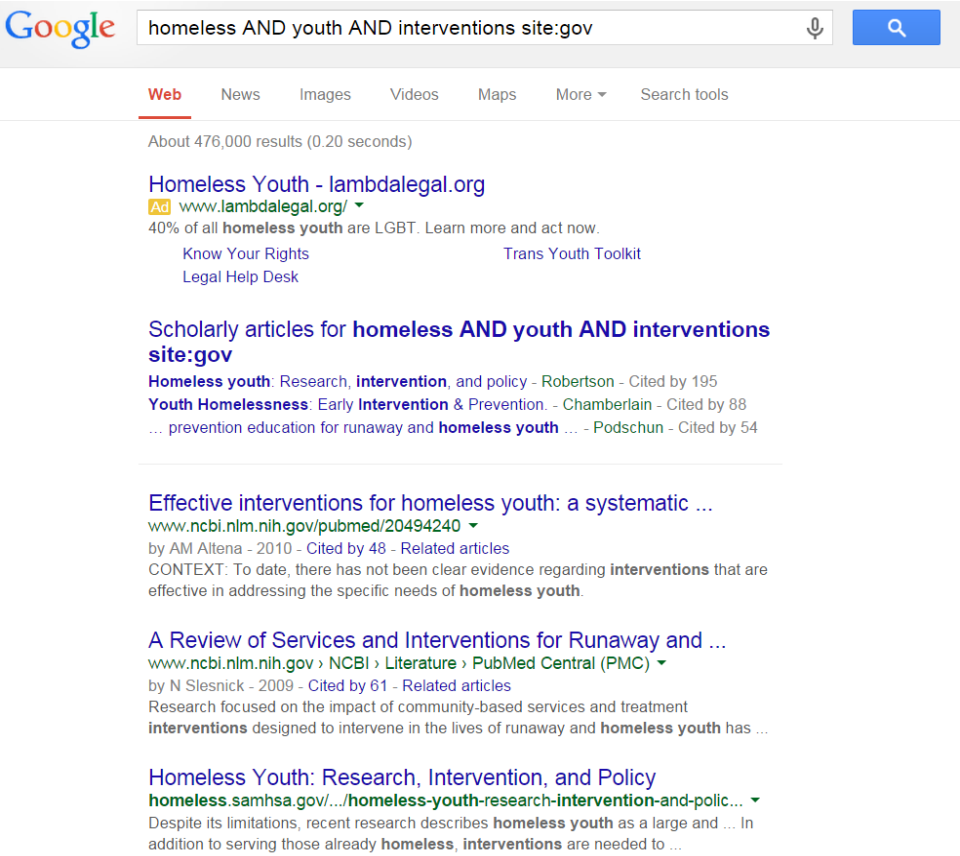


Other advanced search options

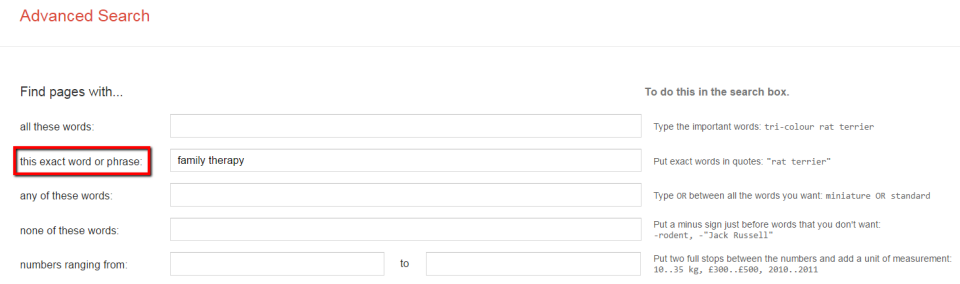
Use domains to also limit your results to high quality information sources. Use credible and authoritative domains used by governments and reputable organizations (e.g., gov, org, edu).



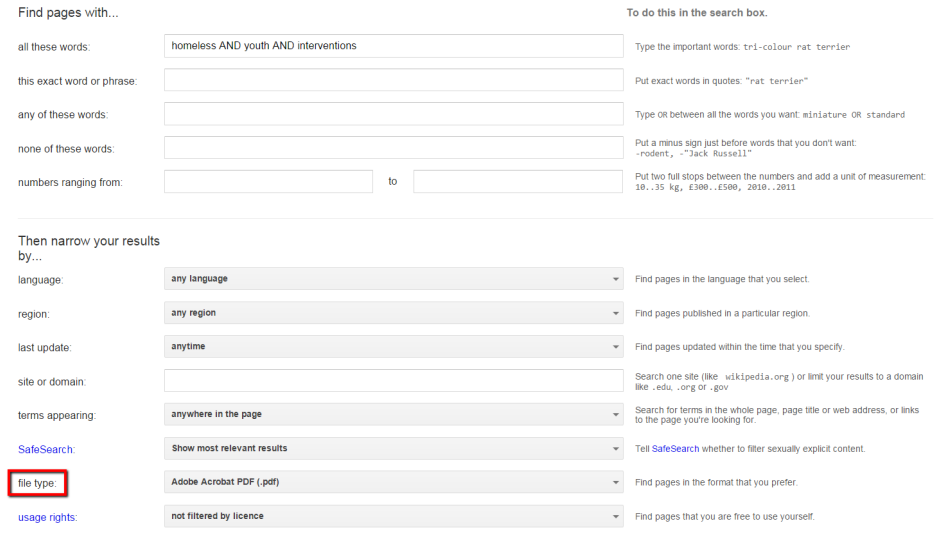
You can also enter this command manually in *Basic Search* by typing “site:gov”.



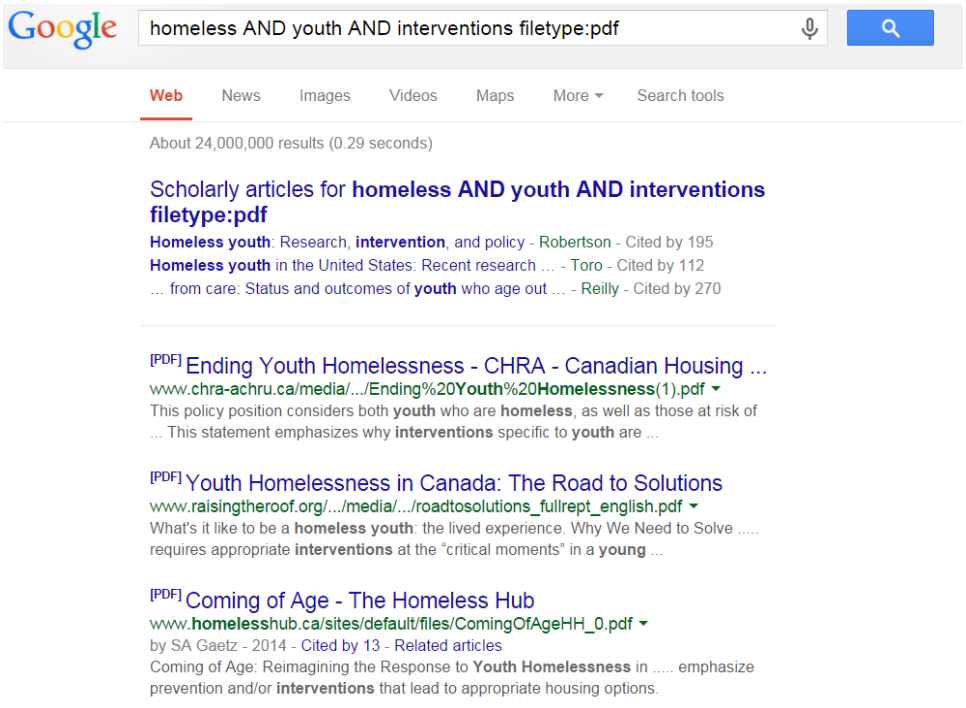
Use phrase searching in *Advanced Search*. Enter this command manually in *Basic Search* by using quotation marks (e.g., “family therapy”).



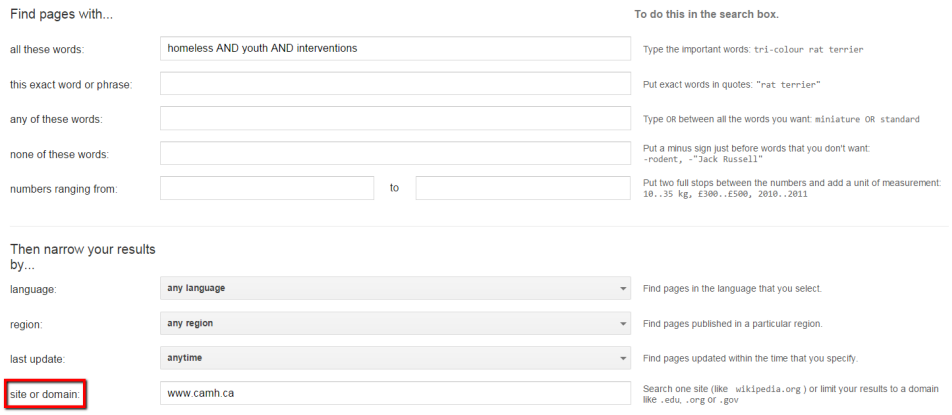
Narrow your results by file type. For example, if you want to search for only PDFs, choose that option from the drop down menu.



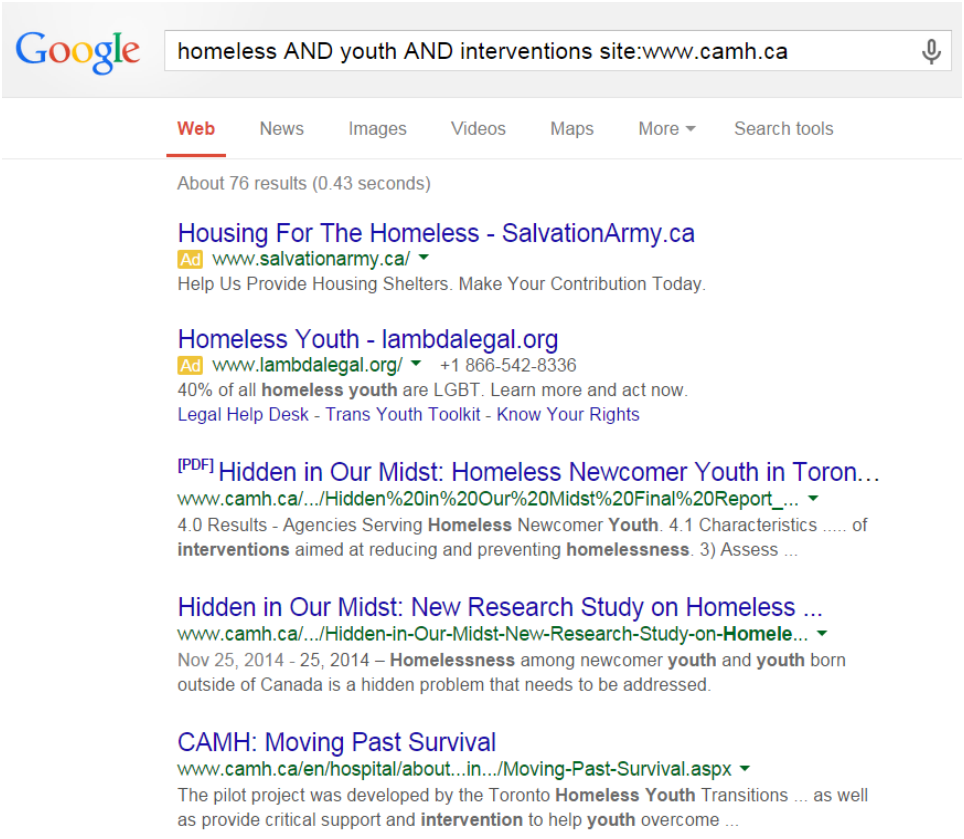
You can also do this manually in *Basic Search* by entering “filetype:pdf”.



Search through the contents of a specific website by entering its URL in the *site or domain* box. This allows you to use Google's functionality to search the site, rather than browsing through it manually.



This will only give you hits from the CAMH website.



Evaluating information

Information on the Internet can come from a variety of sources. It is important to critically appraise the quality of this information. Use the mnemonic PROMPT to evaluate information.

PROMPT	Description
Presentation	Is the information presented in a clear and readable way?
Relevance	Is the information appropriate and relevant to the purpose in hand?
Objectivity	Is the content balanced or is there some bias?
Method	How was the information gathered together?
Provenance (authority)	Who or what originated the information and are they reliable sources?
Timeliness	Is the information up to date and does this matter in the context of your topic?

Social Services Knowledge Scotland. (2009). *Information literacy: Evaluate*. Edinburgh, UK: Institute for Research and Innovation in Social Services.

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Davies, K. S. (2011). Formulating the evidence-based practice question: A review of the frameworks. *Evidence Based Library and Information Practice*, *6*(2), 75-80.

Giustini, D. (2012). *Finding the hard to finds: Searching for grey literature*. Vancouver, BC: University of British Columbia.

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