PubMed

UT Southwestern Medical Center
Health Sciences Digital Library & Learning Center

PubMed comprises more than 30 million citations for biomedical literature from MEDLINE, life science journals, and online books. It is maintained by the **National Center for Biotechnology Information (NCBI)** at the **U.S. National Library of Medicine (NLM)** located at the **National Institutes of Health (NIH)**.

1 What is the question?

A well-formulated question provides the foundation for a relevant and focused search. We will utilize the following clinical question to demonstrate how to search PubMed:

In breast cancer survivors (P), what is the effect of exercise (I) on quality of life (O)?

Refer to **PICO** at the Library's EBP Portal for additional information.

2 Identify possible search terms

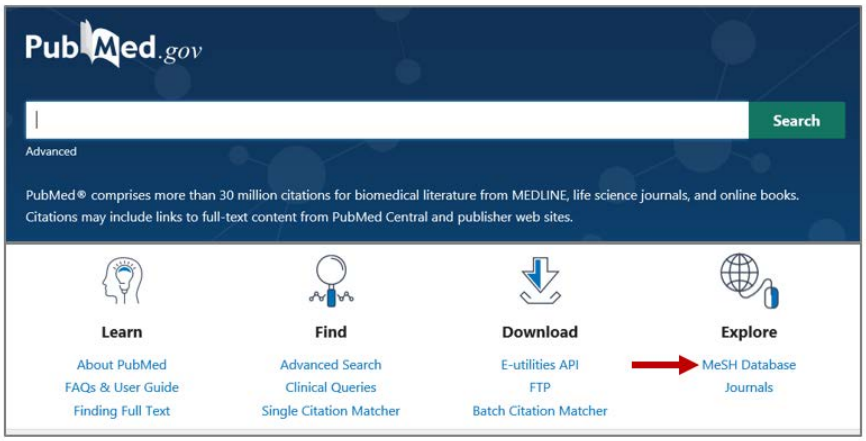
Use the concepts identified in the PICO to identify subject headings and keywords.

- ***Subject headings/controlled vocabulary*** are authoritative terms that describe given concepts.
- ***Keywords*** are assigned by the author, used in an article title, abstract or other text field in a database.

The following chart summarizes possible subject headings, keywords, truncation and wild cards by key concept for the clinical question. NOTE: the keyword lists are examples only and not exhaustive.

	PICO Component	Key Concepts	Subject Headings	Keywords/Truncation/Wild Cards
P	Patient or Problem	Breast cancer survivors	• Breast neoplasms • Survivors	• "Breast neoplasm*", "Breast cancer*", "Breast tumor*", etc. • Survivor*
I	Intervention, Indicator, Exposure, Prognostic Factor	Exercise	Exercise	exercis*, "physical activit*", walk*, run*
C	Comparison or Control	No exercise	Not applicable	Not applicable
O	Outcome	Quality of Life	Quality of life	"quality of life", "life quality"

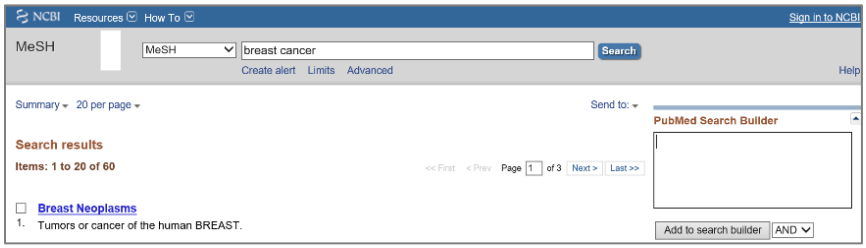
2.1 How to Use Medical Subject Headings (MeSH)



MeSH is NLM's controlled vocabulary which is used to index articles in PubMed.

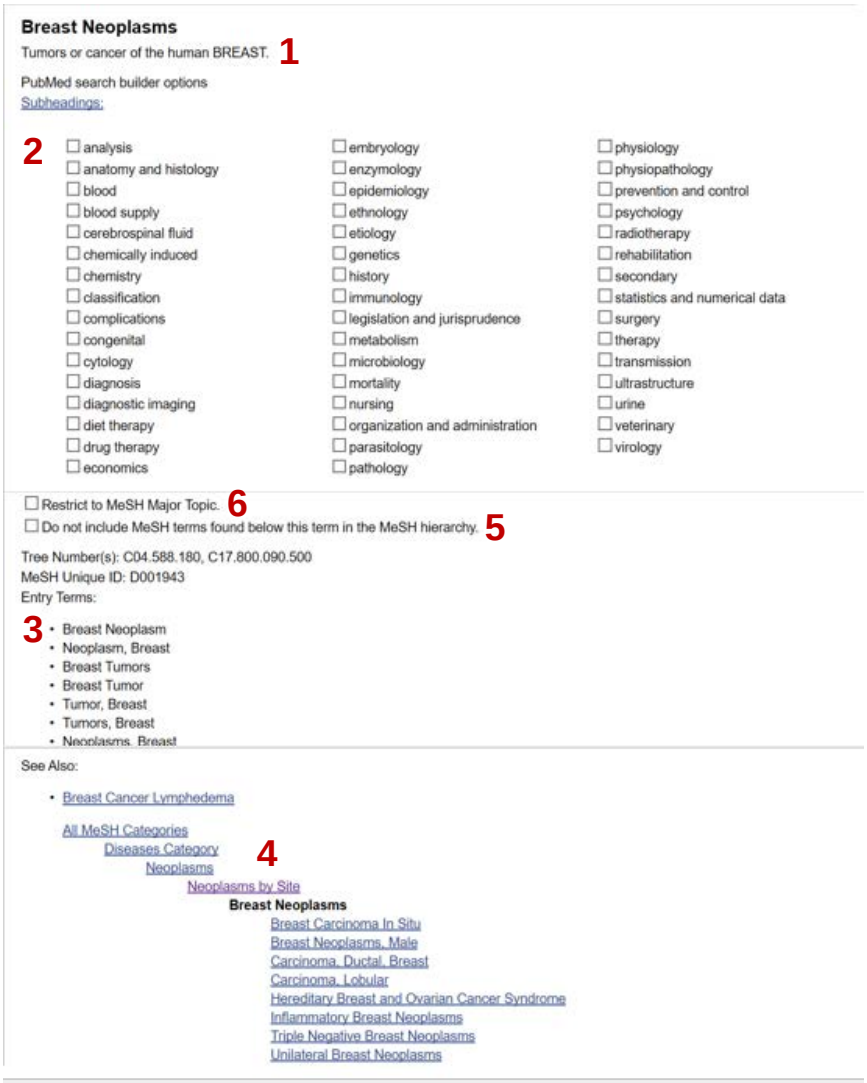
Click on the MeSH Database under the Explore icon.

Type the first concept in the seach box and click "Search."



PubMed automatically maps to possible subject headings.

Click on the most relevant subject heading to view the MeSH record details.



1. ***Scope Note*** provides a definition, explanation, or more information about the subject heading.
2. ***Subheadings*** (or "descriptors") are used with the subject heading to retrieve frequently discussed aspects of the topic (e.g., diagnosis).
3. ***Entry Terms*** are synonyms or related terms PubMed maps to the subject heading.
4. ***Tree*** shows the hierarchial relationship with the more specific or narrower terms listed under the broader term.
5. The PubMed search algorithm automatically includes or "explodes" the narrower terms unless the "Do not include MeSH terms found below this term in the MeSH hierarchy" box is checked.
6. "Restrict to MeSH Major Topic" narrows the search and retrieves results where the selected subject heading is considered the major topic.

2.2 How to Use Keywords

In PubMed, you can keyword search using PubMed's Automatic Term Mapping (ATM) feature and/or keyword/phrase searching in designated search fields.

Automatic Term Mapping

PubMed's ATM feature maps the terms typed in the search box to the MeSH term(s), if applicable, and combination of keywords in "All Fields". If there is no match, the individual terms will be combined (ANDed) together and searched in all fields. Do NOT capitalize or use any punctuation

Note: ATM is not always correct; the searcher must determine whether relevant citations were retrieved.

Keywords

Keywords can be single words or phrases. To allow the ATM feature to finds phrases, PubMed recommends to NOT use double quotation marks until you first try to search without them. If PubMed's ATM does not map the concept to a MeSH term, adding the double quotation marks will force a phrase search (e.g., "breast cancer").

From the PubMed home page, click on "Advanced" to access the **Advanced Search Builder** page.

"All Fields" is the default and will result in an ATM search.

To narrow the keyword search, use the dropdown to select the designated field (e.g., "Title", "Title/Abstract", "Author", "Publication Title", etc.

For more possible search terms, review the "Entry Terms" for the corresponding MeSH term and check the controlled vocabularies in other subject databases.

3 Perform the Search

To be comprehensive, search using both subject headings/controlled vocabulary and keywords. Search one concept at a time versus multiple concepts to reduce errors when applying Boolen operators and other connectors.

Boolean Operator	Example	Results
OR	anorexia **OR** bulimia 	**OR** creates a set that contains *any* of the search terms. Use **OR** to combine synonyms, spelling variations or related terms. **OR** means more.
AND	anorexia **AND** bulimia 	**AND** creates a set that contains *all* of the search terms. Use **AND** to find citations which are "about" all of the concepts and answers the question. **AND** means less.
NOT	anorexia **NOT** bulimia 	**NOT** is used to create a set that *excludes* results from the unwanted concept. **NOT** is the least used Boolean operator – use carefully. **NOT** means less.

Go to the **Advanced Search Builder** page. Scroll down the page to "History and Search Details".

Use Boolean operators (**OR, AND, NOT**) to combine search terms.

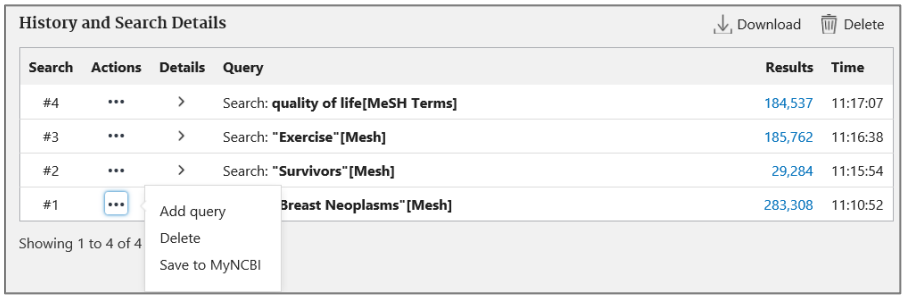
Boolean operators MUST be capitalized.

Note: Searching one concept at a time allows the searcher to try different combinations of the search terms.

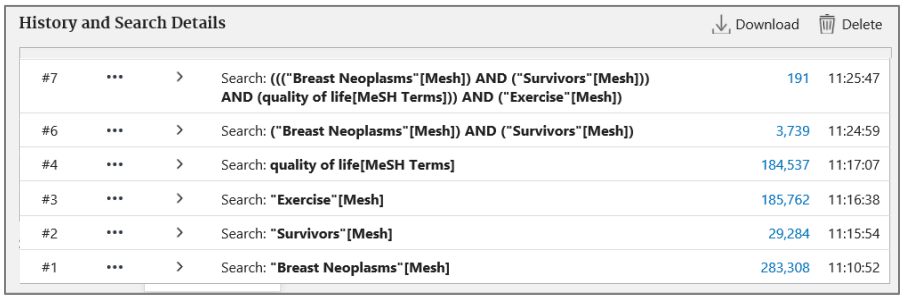
3.1 Search using MeSH

To search the selected MeSH term, click "Add to search builder" and then click "Search PubMed."

The search results will be displayed on a new page. Click on the PubMed.gov icon in upper left hand corner to return to the home page. Repeat the process to search PubMed using the MeSH terms for the remaining concepts. Go to the "History and Search Details" to review the search history.



Click the three dots under "Actions" to combine search results using the Boolean Operators. To add the first search set to the "Query Box," click "Add query." To add subsequent search set(s), you will be prompted to select the appropriate Boolean operator. Click search.

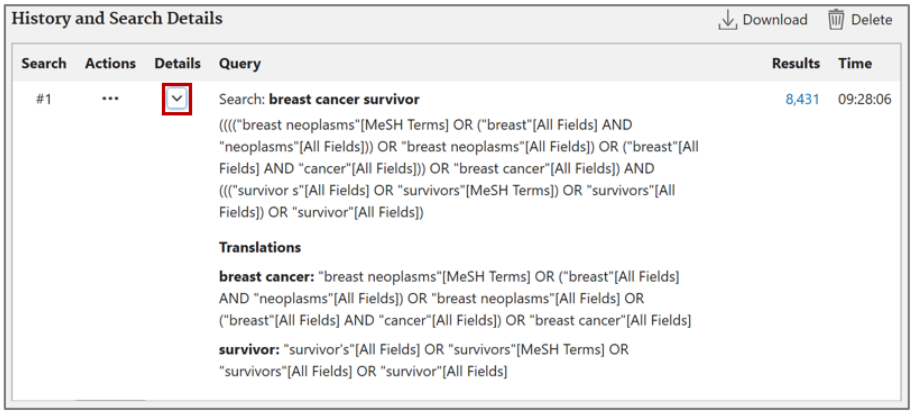


- Search #6 includes citations about breast cancer survivors from combining Search #1 **AND** Search #2.
- Search #7 combines the results of searches #6, #3, and #4 using **AND**. Retrieved citations will be about the main concepts of breast cancer survivors, exercise, and quality of life.

3.2 Search using Keywords

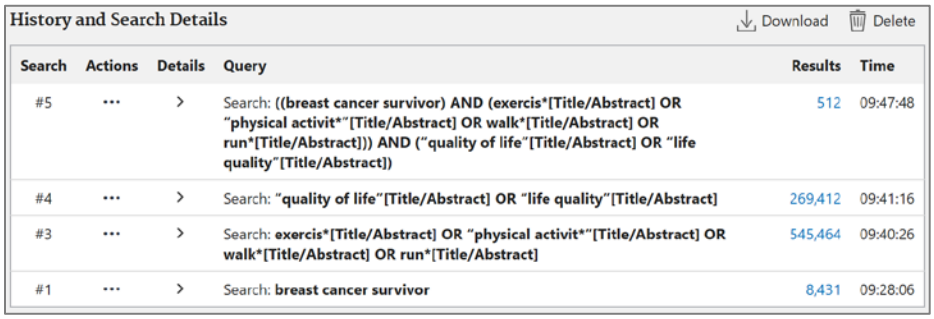
NOTE: this search example will include both ATM and keywords.

Go to the "History and Search Details" to review the search history.



In the "Details" column, click on the right carat (**>**) to review how ATM translated the key concepts.

Note: ATM searches relevant MeSH terms and keywords and applies Boolean logic to combine terms.

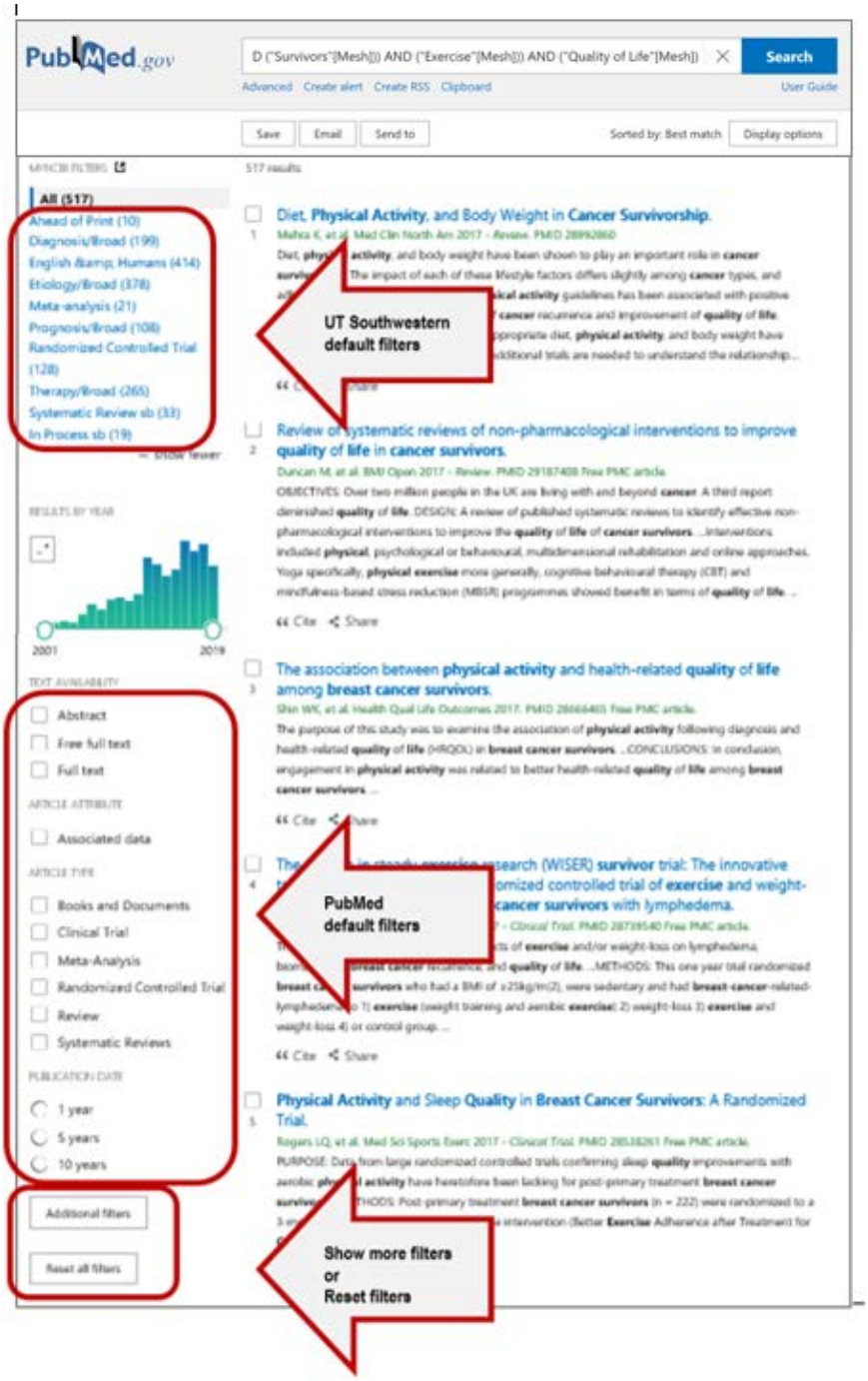


Searches #3 and #4 use the Boolean Operator **OR** to combine synonyms, related terms, and/or phrases.

Search #5 uses **AND** to combine the keywords for the concepts of breast cancer survivors, exercise, and quality of life.

4 Apply Limits

The terms "limits" and "filters" are often used interchangeably. Limits focus the search results to specific aspects of information (e.g., publication types, language, years).



In PubMed, the limits are located on the left sidebar.

- UT Southwestern has added the Clinical Queries in the default filters to improve the timely retrieval of scientifically strong and clinically relevant articles.
- The basic PubMed limits/filters are listed under the UT Southwestern default filters.
- Select “Additional filters” for more options (Ages, Languages, Species, etc).
- Checking the boxes will limit the results.

Note: limits from an existing search will carry over in a subsequent search unless manually reset by the searcher.

Review, Ouput Options and Save

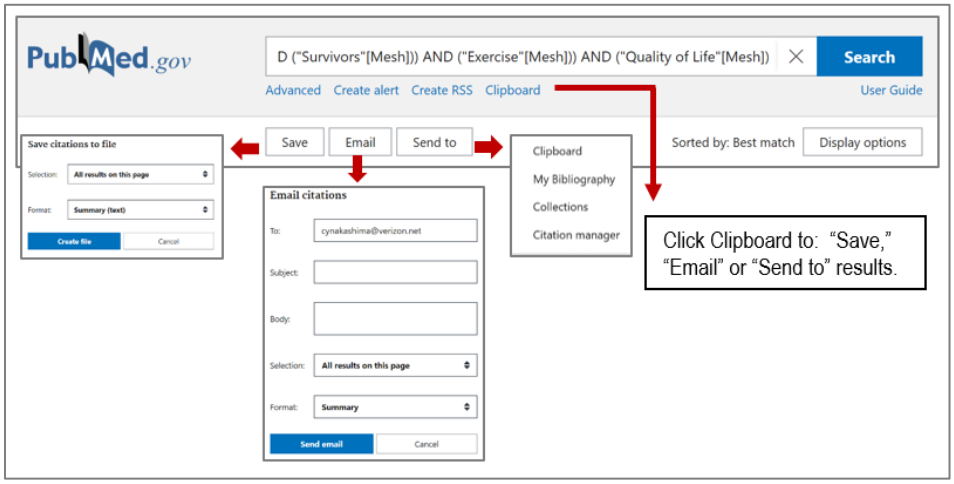
From the list of retrieved citations:

1. Check the box to develop a list of citations.
2. Click “Display Options” to select display options: Summary, Abstract, citations #/page.
3. Click the article title to view the details.
4. Click “Send to” to open the dropdown and use “Clipboard” to build a list of selected articles.

5.1 Review

Click on the "Find it!" icon or "Publisher full-text" link to check if the Library subscribes to a journal.

5.2 Output Options



Output options include:

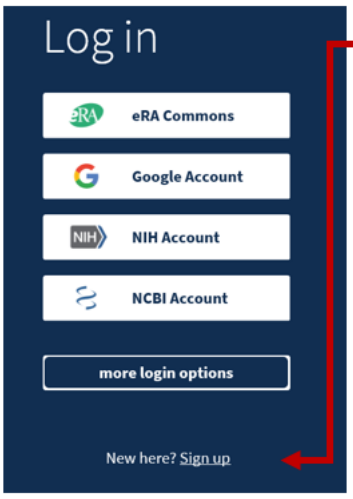
- Save
- Email
- Send to
- Clipboard

Log into your MyNCBI account for the following options:

- "Collections" saves a list of articles.
- To save your search strategy, click on "Create alert."
- MyBibliography allows you to keep a list of your publications.

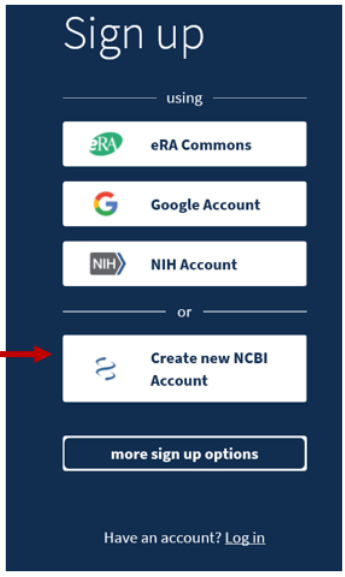
5.3 Setting up an Account

1. At the PubMed home page, click on "Log in."



2. At the Log in page, click on the link to the right of "New here?"

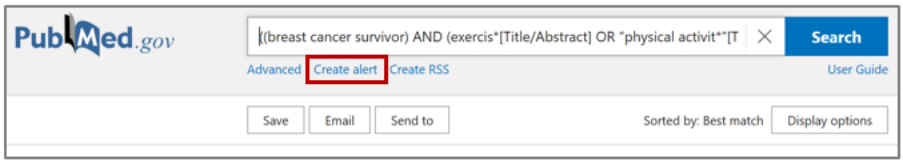
3. At the Sign up page, click "Create new NCBI Account."



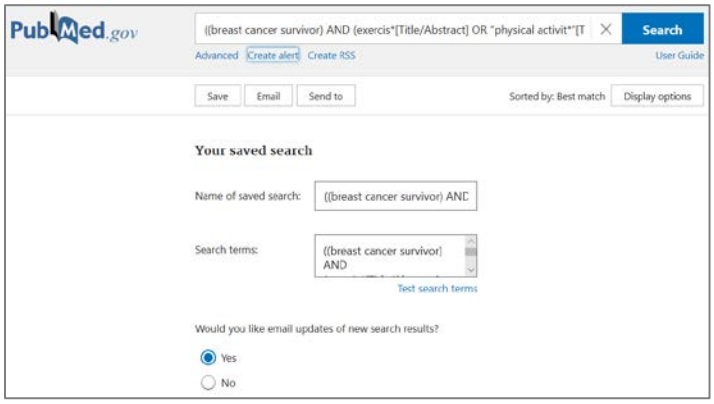
Complete form.

5.4 Saved Searches and Alerts

Retrieving and re-running a saved search saves time and allows the searcher, researcher, or clinician to edit and document changes to the search strategy.



Click “Create Alert” to either save the search or set up an alert.



The searcher can:

- Name the search/alert.
- Select “yes” button if the search is an alert. Determine email update frequency and other parameters.
- Select “no” button if not an alert.
- Click “save” at the bottom of the page to save alert/search.

Retrieve saved search from NCBI dashboard, under “Saved Searches.”

REFERENCES

Jankowski, T. A. (2008). The Medical Library Association Essential Guide to Becoming an Expert Searcher: Proven Techniques, Strategies, and Tips for Finding Health Information. New York: Neal-Schuman Publishers.

Patrick, L. J., & Munro, S. (2004). The literature review: demystifying the literature search. Diabetes Educ, 30(1), 30-34, 36-38. doi:10.1177/014572170403000106

U.S. National Library of Medicine. (2020, April 27, 2020). PubMed User Guide. Retrieved from https://pubmed.ncbi.nlm.nih.gov/help.

Walker, G., & Janes, J. (1999). Online Retrieval. A Dialogue of Theory and Practice (Second ed.). Englewood, Colorado: Libraries Unlimited.

Waltho, D., Kaur, M. N., Haynes, R. B., Farrokhyar, F., & Thoma, A. (2015). Users' guide to the surgical literature: how to perform a high-quality literature search. Can J Surg, 58(5), 349-358. doi:10.1503/cjs.017314