

**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

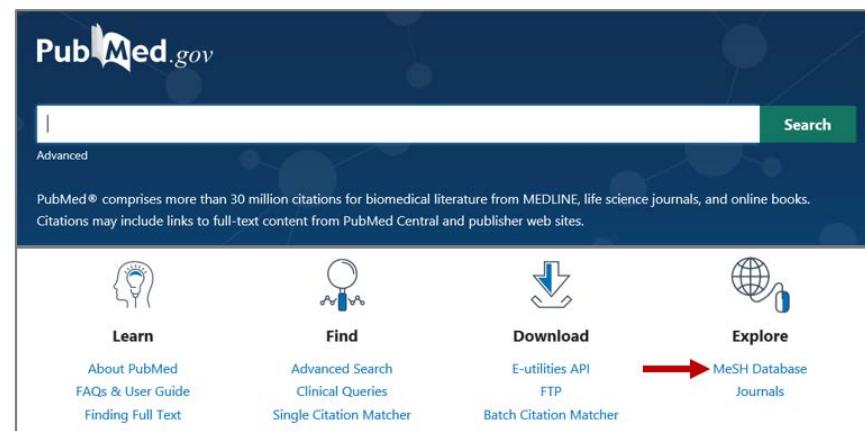
Use the concepts identified in the PICO to identify subject headings and keywords.

- **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 search box and click "Search."

The screenshot shows the NCBI MeSH search interface. The search term 'breast cancer' is entered in the search box. Below the search box, there are buttons for 'Create alert', 'Limits', and 'Advanced'. The results page shows a summary of 20 pages. The search results list 'Breast Neoplasms' as the first item, with a subdescription 'Tumors or cancer of the human BREAST.' A 'PubMed Search Builder' panel is open on the right, showing the search term 'breast cancer' and options to 'Add to search builder' and 'AND'.

PubMed automatically maps to possible subject headings.

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

**1** **Breast Neoplasms**  
Tumors or cancer of the human BREAST.

PubMed search builder options

**2**  **Subheadings:**

- analysis
- anatomy and histology
- blood
- blood supply
- cerebrospinal fluid
- chemically induced
- chemistry
- classification
- complications
- congenital
- cytology
- diagnosis
- diagnostic imaging
- diet therapy
- drug therapy
- economics
- embryology
- enzymology
- epidemiology
- ethnology
- etiology
- genetics
- history
- immunology
- legislation and jurisprudence
- metabolism
- microbiology
- mortality
- nursing
- organization and administration
- parasitology
- pathology
- physiology
- physiopathology
- prevention and control
- psychology
- radiotherapy
- rehabilitation
- secondary
- statistics and numerical data
- surgery
- therapy
- transmission
- ultrastructure
- urine
- veterinary
- virology

**Restrict to MeSH Major Topic.** **6**

**Do not include MeSH terms found below this term in the MeSH hierarchy.** **5**

Tree Number(s): C04.588.180, C17.800.090.500  
MeSH Unique ID: D001943

Entry Terms:

**3** • Breast Neoplasm  
• Neoplasm, Breast  
• Breast Tumors  
• Breast Tumor  
• Tumor, Breast  
• Tumors, Breast  
• Neoplasms, Breast

See Also:

- [Breast Cancer Lymphedema](#)
- [All MeSH Categories](#)
- [Diseases Category](#)
- [Neoplasms](#)
- [Neoplasms by Site](#)
- [Breast Neoplasms](#)

**4**

Breast Carcinoma In Situ  
Breast Neoplasms, Male  
Carcinoma, Ductal, Breast  
Carcinoma, Lobular  
Hereditary Breast and Ovarian Cancer Syndrome  
Inflammatory Breast Neoplasms  
Triple Negative Breast Neoplasms  
Unilateral Breast Neoplasms

## 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 Boolean operators and other connectors.

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

History and Search Details				
Search	Actions	Details	Query	Results Time
#4	...	>	Search: <b>quality of life</b> [MeSH Terms]	184,537 11:17:07
#3	...	>	Search: "Exercise"[Mesh]	185,762 11:16:38
#2	...	>	Search: "Survivors"[Mesh]	29,284 11:15:54
#1	<input checked="" type="checkbox"/>	Add query	<b>Breast Neoplasms</b> [Mesh]	283,308 11:10:52

Showing 1 to 4 of 4

Add query  
Delete  
Save to MyNCBI

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.

History and Search Details				
Search	Actions	Details	Query	Results Time
#7	...	>	Search: ((( <b>Breast Neoplasms</b> [Mesh]) AND ("Survivors"[Mesh])) AND (quality of life[MeSH Terms])) AND ("Exercise"[Mesh])	191 11:25:47
#6	...	>	Search: (" <b>Breast Neoplasms</b> [Mesh]) AND ("Survivors"[Mesh])	3,739 11:24:59
#4	...	>	Search: <b>quality of life</b> [MeSH Terms]	184,537 11:17:07
#3	...	>	Search: "Exercise"[Mesh]	185,762 11:16:38
#2	...	>	Search: "Survivors"[Mesh]	29,284 11:15:54
#1	...	>	Search: " <b>Breast Neoplasms</b> [Mesh]	283,308 11:10:52

### 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.

History and Search Details				
Search	Actions	Details	Query	Results Time
#1	...	<input checked="" type="checkbox"/>	Search: <b>breast cancer survivor</b>	8,431 09:28:06

(((**breast neoplasms**[MeSH Terms] OR ("breast"[All Fields] AND "neoplasms"[All Fields]) OR "breast neoplasms"[All Fields]) OR ("breast"[All Fields] AND "cancer"[All Fields])) OR "breast cancer"[All Fields]) AND ((**survivor**s"[All Fields] OR "survivors"[MeSH Terms]) OR "survivors"[All Fields]) OR "survivor"[All Fields])

**Translations**

**breast cancer:** "breast neoplasms"[MeSH Terms] OR ("breast"[All Fields] AND "neoplasms"[All Fields]) OR "breast neoplasms"[All Fields] OR ("breast"[All Fields] AND "cancer"[All Fields]) OR "breast cancer"[All Fields]

**survivor:** "survivor"s"[All Fields] OR "survivors"[MeSH Terms] OR "survivors"[All Fields] OR "survivor"[All Fields]

In the “Details” column, click on the right caret (>) to review how ATM translated the key concepts.

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

History and Search Details				
Search	Actions	Details	Query	Results Time
#5	...	>	Search: (( <b>breast cancer survivor</b> ) AND (exercis*[Title/Abstract] OR "physical activit*[Title/Abstract] OR walk*[Title/Abstract] OR run*[Title/Abstract])) AND ("quality of life"[Title/Abstract] OR "life quality"[Title/Abstract])	512 09:47:48
#4	...	>	Search: "quality of life"[Title/Abstract] OR "life quality"[Title/Abstract]	269,412 09:41:16
#3	...	>	Search: exercis*[Title/Abstract] OR "physical activit*[Title/Abstract] OR walk*[Title/Abstract] OR run*[Title/Abstract]	545,464 09:40:26
#1	...	>	Search: <b>breast cancer survivor</b>	8,431 09:28:06

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).

The screenshot shows the PubMed search results for the query: D ("Survivors"[Mesh]) AND ("Exercise"[Mesh]) AND ("Quality of Life"[Mesh]). The results are sorted by Best match and there are 80 results. The sidebar on the left contains the following filters:

- UT Southwestern default filters:** A red box highlights the "All (517)" section, which includes filters for Ahead of Print, Diagnosis, English & Humans, Meta-analysis, Prognosis, Randomized Controlled Trial, Therapy, and In Process.
- PubMed default filters:** A red box highlights the "All (80)" section, which includes filters for Abstract, Free full text, and Full text.
- Show more filters or Reset filters:** A red box highlights the "Additional filters" and "Reset all filters" buttons.

The search results list includes:

- Diet, Physical Activity, and Body Weight in Cancer Survivorship.** (Mafra K, et al. *Med Clin North Am* 2017 - Review. PMID: 28892860)
- Review of systematic reviews of non-pharmacological interventions to improve quality of life in cancer survivors.** (Duncan M, et al. *BMJ Open* 2017 - Review. PMID: 29187408 Free PMC article)
- The association between physical activity and health-related quality of life among breast cancer survivors.** (Shin WC, et al. *Health Qual Life Outcomes* 2017. PMID: 28666401 Free PMC article)
- The in-study exercise research (WISER) survivor trial: The innovative randomized controlled trial of exercise and weight-cancer survivors with lymphedema.** (Rogers IJ, et al. *Clinical Trial*. PMID: 28739540 Free PMC article)
- Physical Activity and Sleep Quality in Breast Cancer Survivors: A Randomized Trial.** (Rogers IJ, et al. *Med Sci Sports Exerc* 2017 - Clinical Trial. PMID: 26533211 Free PMC article)

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, Output Options and Save

The screenshot shows the PubMed search results for the query: ((("Breast Neoplasms"[Mesh]) AND ("Survivors"[Mesh])) AND ("Exercise"[Mesh])). The results are sorted by Best match and there are 80 results. The sidebar on the left contains the following filters:

**Filters applied:** Meta-Analysis, Randomized Controlled Trial, Systematic Review

The search results list includes:

- 1 Aerobic and resistance exercise improves physical quality of life in overweight and obese breast cancer survivors: a randomized controlled trial.** (Dielu-Connwright CM, Courneya KS, Demark-Wahnefried W, Sami N, Lee K, Sweeney FC, Stewart C, Buchanan TA, Spicer D, Tripathy D, Bernstein L, Mortimer JE)

The right side of the screen shows the "DISPLAY OPTIONS" panel with:

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.

From the list of retrieved citations:

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

## 5.1 Review



Randomized Controlled Trial > Breast Cancer Res. 2018 Oct 19;20(1):124.  
doi: 10.1186/s13058-018-1051-6.

**Aerobic and Resistance Exercise Improves Physical Fitness, Bone Health, and Quality of Life in Overweight and Obese Breast Cancer Survivors: A Randomized Controlled Trial**

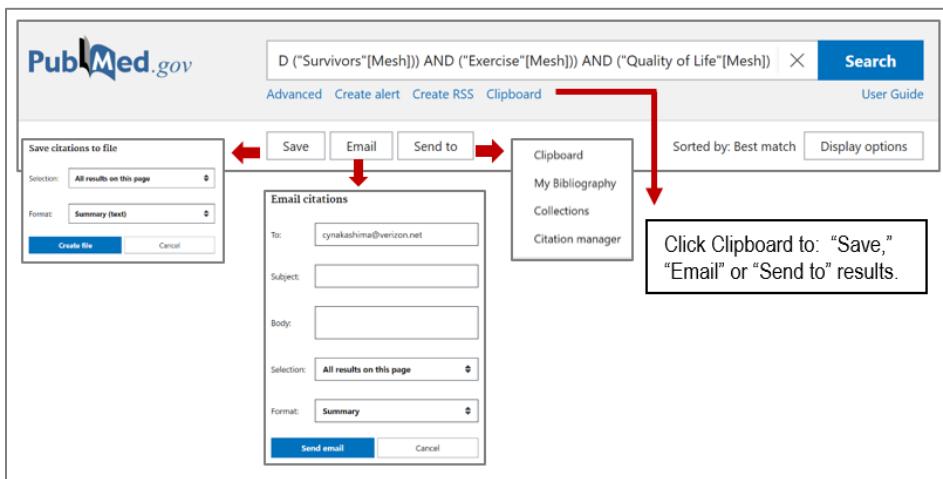
Christina M Dieli-Conwright <sup>1 2</sup>, Kerry S Courneya <sup>3</sup>, Wendy Demark-Wahnefried <sup>4</sup>, Nathalie Sami <sup>5</sup>, Kyuan Lee <sup>5</sup>, Frank C Sweeney <sup>5</sup>, Christina Stewart <sup>5</sup>, Thomas A Buchanan <sup>6</sup>, Darcy Spicer <sup>7</sup>, Debu

FULL TEXT LINKS  
Read free full text at **BMC**  
**PMC** FREE Full text  
**UTSW**

**5** ACTIONS  
Cite  
Favorites

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

## 5.2 Output Options



PubMed.gov

D ("Survivors"[Mesh]) AND ("Exercise"[Mesh]) AND ("Quality of Life"[Mesh])  Advanced Create alert Create RSS Clipboard User Guide

Save citations to file    Clipboard My Bibliography Collections Citation manager

Email citations To: cynamashima@verizon.net Subject: Body: Selection: All results on this page Format: Summary

Sorted by: Best match Display options

Click Clipboard to: “Save,” “Email” or “Send to” results.

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



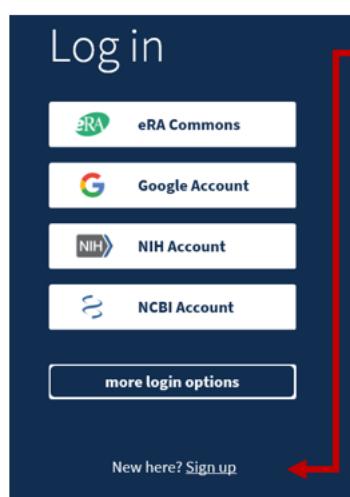
NIH U.S. National Library of Medicine National Center for Biotechnology Information

PubMed.gov

Advanced

Log in

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



Log in

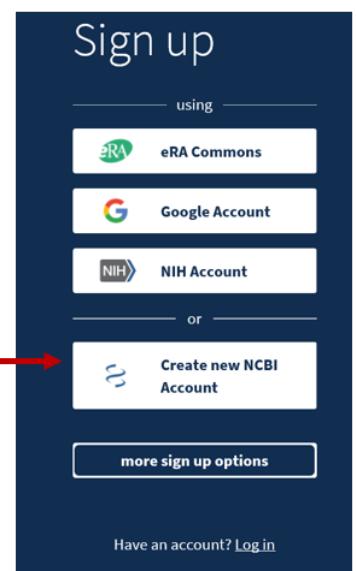
eRA Commons  
Google Account  
NIH Account  
NCBI Account  
more login options

New here? [Sign up](#)

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.



Sign up

using

eRA Commons  
Google Account  
NIH Account

or

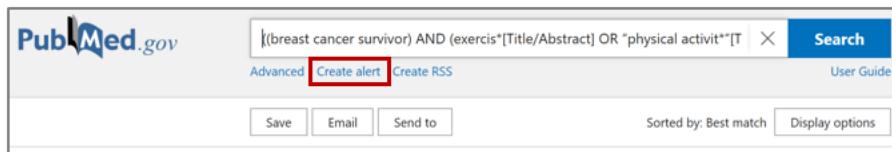
Create new NCBI Account

more sign up options

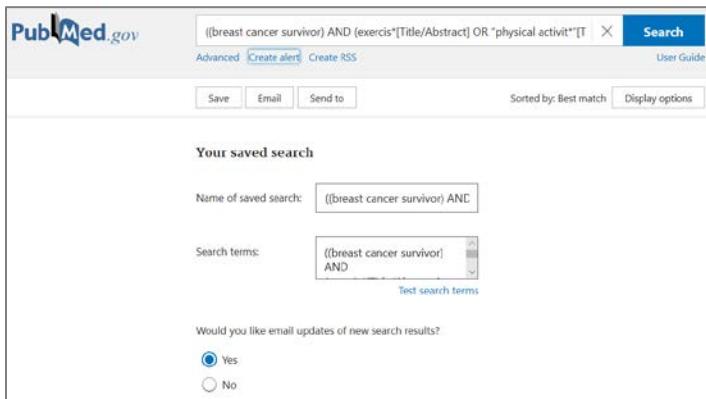
Have an account? [Log in](#)

### 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

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