

Search PubMed

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How do I search PubMed?

1. Identify the key concepts for your search.
2. Enter the terms (or key concepts) in the search box.
3. Press the Enter key or click Search.

For many searches, it is not necessary to use special tags or syntax. PubMed uses multiple tools to help you find relevant results:

- Best Match sort order uses a state-of-the-art machine learning algorithm to place the most relevant citations at the top of your results.
- An autocomplete feature displays suggestions as you type your search terms. This feature is based on PubMed query log analysis described in "[Finding Query Suggestions for PubMed](#)".
- A spell checking feature suggests alternative spellings for search terms that may include misspellings.
- A citation sensor displays suggested results for searches that include terms characteristic of citation searching, e.g., author names, journal titles, publication dates, and article titles.

I retrieved too many citations. How can I focus my search?

To limit the number of search results:

- Replace general search terms with more specific ones (e.g., low back pain instead of back pain).

- Include additional terms in your query.
- Use the sidebar filters to restrict results by publication date, full text availability, article type, and more.

I retrieved too few citations. How can I expand my search?

- On the abstract page for a citation, see the [Similar Articles](#) section for a pre-calculated set of additional PubMed citations closely related to that article.
- Remove extraneous or specific terms from the search box.
- Try using alternative terms to describe the concepts you are searching.

Find a specific citation

Paste the article title into the search box, or enter citation details such as the author, journal name and the year the article was published in the search box and the PubMed citation sensor will automatically analyze your query for citation information to return the correct citation. The citation sensor incorporates a fuzzy matching algorithm and will retrieve the best match even if a search includes an incorrect term. You do not need to use field tags or Boolean operators.

Searching by author

Enter the author's last name and initials without punctuation in the search box, and click Search.

If you only know the author's last name, use the author search field tag [au], e.g., brody[au].

Names entered using either the lastname+initials format (e.g., smith ja) or the full name format (john a smith) and no search tag are searched as authors as well as collaborators, if they exist in PubMed.

Enter a full author name in natural or inverted order, e.g., julia s wong or wong julia s.

- Prior to 2002, full author names were not included on PubMed citations, so full author name searches will only retrieve citations from 2002 forward, when the full author name was published in the article.
- A comma following the last name for searching is optional. For some names, however, it is necessary to distinguish which name is the last name by using the comma following the last name, e.g., james, ryan.

Omit periods after initials and put all suffixes at the end, e.g., vollmer charles jr

Initials and suffixes are not required. If you include a middle initial or suffix, you will only retrieve citations for articles that were published using the middle initial or suffix.

More information about author searching:

- To search by author using the search builder, click [Advanced search](#) and then select Author from the All Fields menu. The author search box includes an autocomplete feature.
- You may click an author link on the abstract display to execute a search for the author in PubMed. Results will display using a ranking algorithm if the author name is computationally similar for additional PubMed citations.

- If an author name includes only [stopwords](#), use the author search field tag [au] to search in combination with other terms, e.g., just by[au] seizure.
- Author names are automatically [truncated](#) to account for varying initials and designations such as Jr. To turn off the truncation, use double quotes around the author's name with the author search field tag [au], e.g., "smith j"[au].
- Use the search field tag [1au] to search for the first personal author or [lastau] to search for the last personal author name in a citation.

For additional information on author names in PubMed, please see the journal article, "[Author Name Disambiguation for PubMed](#)."

Searching by journal

Enter one of the following in the search box:

- full journal title (e.g., molecular biology of the cell)
- title abbreviation (e.g., mol biol cell)
- ISSN number, a standardized international code (e.g., 1059-1524)

More information about journal searching:

- To search by journal using the search builder, click [Advanced search](#) and then select Journal from the All Fields menu. The journal search box includes an autocomplete feature.
- To find full journal names, use the [NLM Catalog](#), or mouseover the journal title abbreviation on the citation (available in abstract view).
 1. Click Journals in NCBI Databases on the PubMed homepage.
 2. Enter the journal name and click Search.
- Use the journal search field tag [ta] to limit your search to the journal only, e.g., gene therapy[ta], scanning[ta]
- Searching with the full journal title or abbreviation is recommended for complete retrieval of indexed items; older citations may not have an ISSN.
- If a journal title or abbreviation includes a special character (e.g., parentheses, brackets, &), enter the title or abbreviation without the special characters. For example, to search by the journal abbreviation j hand surg [am], enter j hand surg am.
- Searching for a journal will automatically map to the official journal title and the title associated with an alternative title, if one exists. To turn off this automatic mapping enter the journal in double quotes and tag with [ta], e.g., "science"[ta].

A [list of journals](#) included in PubMed is available by FTP.

Searching by date

- [Using the results timeline](#)
- [Using the search builder](#)

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- [Searching by a single date in the search box](#)
- [Searching for a date range in the search box](#)
- [Searching for a relative date range](#)

Using the results timeline

Click and drag the sliders on the Results by Year timeline to change the date range for your search.

Note: The Results by Year timeline counts all publication dates for a citation as supplied by the publisher, e.g., print and electronic publication dates. These dates may span more than one year; for example, an article that was published online in November 2018 and published in a print issue in January 2019. This means the sum of results represented in the timeline may differ from the search results count.

Using the search builder

1. Click [Advanced search](#) and use the search builder.
2. Select a date field from the All Fields menu, e.g., Date – Publication, and enter a single date or a date range in the fill-in-the-blank boxes. Month and day are optional. If you want to search for a date range up to the current date, do not edit the ‘Present’ date box.
3. Add the date from the builder to the query box.
4. Once you have finished adding terms to the query box, click Search (or Add to History) to run the search.

Searching by a single date in the search box

Enter dates using the format yyyy/mm/dd [date field]. The month and day are optional.

Use a [Boolean operator](#) when combining a date with other search terms.

EXAMPLE

Use the Boolean operator AND to limit your search to a specific publication date.

[cancer AND 2020/06/01\[dp\]](#)

The available date fields are:

- [Date of Publication \[dp\]](#) - Date searching includes both print and electronic dates of publication. Searching for a single date does not include items when the electronic date of publication is after the print date.
- Electronic Date of Publication (if applicable) [epdat]
- Print Date of Publication (if applicable) [ppdat]
- [Entry Date \[edat\]](#) - Date used for PubMed processing, such as “Most Recent” sort order.
- [MeSH Date \[mhda\]](#) - The date the citation was indexed with MeSH terms.
- [Create Date \[crdt\]](#) - The date the PubMed record was first created.

Searching for a date range in the search box

Enter date ranges using a colon (:) between each date followed by a [date field].

Use a [Boolean operator](#) when combining a date range with other search terms.

EXAMPLE

Use the Boolean operator AND to limit your search to a date range.

[heart disease AND 2019/01/01:2019/12/01\[dp\]](#)

Comprehensive searches for a full year should be entered as 2000:2000[dp] rather than 2000[dp] to retrieve citations with a different print and electronic year of publication.

Date range searching includes both print and electronic dates of publication.

Searching for a relative date range

Use the following format to search for a relative date range:

- term="last X days"[date field]
- term="last X months"[date field]
- term="last X years"[date field]

where X is the number of days, months or years immediately preceding today's date and [date field] is the date field tag: [dp], [edat] or [crdt].

The relative date range search for publication dates will also include citations with publication dates after today's date; therefore, citations with publication dates in the future will be included in the results.

Filters

You can use filters to narrow your search results by [article type](#), [text availability](#), [publication date](#), [species](#), [article language](#), [sex](#), [age](#), and [other](#).

To apply a filter:

1. Run a search in PubMed.
2. Click the filter you would like to activate from the sidebar. A check mark will appear next to the activated filter(s).
3. Subsequent searches will be filtered until the selected filters are turned off, or until your browser data is cleared.

The most popular filters are included on the sidebar by default. To display additional filters on the sidebar:

1. Click the "Additional filters" button.
2. A pop-up menu will appear showing the available filters for each category: article type, species, article language, sex, age, and other.

3. Choose a category from the list of options on the left side of the menu: Article Type, Species, etc.
4. Within each category, select the filters you would like to add to the sidebar.
5. Click Show. This will close the pop-up menu and display your selections on the sidebar with the other filters.
6. If you would like to cancel your selections, click Cancel or click on the X in the upper right corner to close the pop-up and return to your search results.
7. To apply the filter(s) to your search, click the filter(s) on the sidebar.

More information about filters:

- When filters are selected a "Filters applied" message will display on the results page.
- Click an applied filter to turn it off.
- To turn off all applied filters, click the "Clear all" link or the "Reset all filters" button.
- Citations may be excluded for some filter selections because they have not yet completed the MEDLINE indexing process.
- You can activate additional filters with [My NCBI filters](#).
- See [Filter search strategies](#) for the equivalent PubMed query for each filter.

Article type

Select article types to narrow your results based on the type of material the article represents, such as: Clinical Trial or Review.

You can add more article types to the sidebar using the Additional Filters button. The complete list of [publication types found in PubMed](#) is available.

These filters may exclude some citations that have not yet completed the MEDLINE indexing process because they rely on the Publication Type [pt] data for the citation; publication type data may be supplied by the publisher or assigned during the MEDLINE indexing process. However, the [Systematic Review article type filter](#) uses a search strategy to capture non-MEDLINE citations and citations that have not yet completed MEDLINE indexing in addition to citations assigned the systematic review publication type.

Systematic reviews

To search for systematic reviews in PubMed, use the Systematic Review article type filter on the sidebar, or enter your search terms followed by AND systematic[sb] in the search box. For example, lyme disease AND systematic[sb].

The Systematic Review filter uses a [search strategy](#) in addition to the Systematic Review publication type [pt] to find systematic reviews in PubMed. To limit your search to only those citations with the Systematic Review publication type, use the [publication type](#) search tag[pt], i.e., systematic review[pt]; however, this may exclude some relevant citations that have not yet completed the MEDLINE indexing process.

Text availability

To filter your results to only citations that include a link to full text, a link to free full text, or an abstract, click the appropriate selections.

Alternatively, you may search for citations with links to full text, free full text or include an abstract using the values: full text[sb], free full text[sb], or 'hasabstract'. No search field tag is required for hasabstract. You may also search for all MEDLINE citations with a structured abstract with 'hasstructuredabstract'.

Note: Most citations in PubMed to articles published before 1975 do not include abstracts.

Publication date

To filter your results by Publication Date, click 1 year, 5 years, 10 years, or enter a custom range. These filters include both electronic and print publication dates.

Species

Species selections restrict your results to human or animal studies.

You can add species filters to the sidebar using the Additional Filters button.

These filters may exclude some citations because they have not yet completed the MEDLINE indexing process.

Article language

Language filters restrict your search to articles published in the selected language(s). You can add language filters to the sidebar using the Additional Filters button.

By default, PubMed displays English language titles and abstracts when provided by the publisher. Check the Abstract display for links to view the abstract in other languages (when available).

Sex

Sex restricts your search results to a specific sex for an animal or human study.

You can add sex filters to the sidebar using the Additional Filters button.

This filter may exclude some citations because they have not yet completed the MEDLINE indexing process.

Age

Age filters restrict results to a specific age group for a human study.

You can add age filters to the sidebar using the Additional Filters button.

Age filters include:

- Child: birth-18 years
- Newborn: birth-1 month
- Infant: birth-23 months

- Infant: 1-23 months
- Preschool Child: 2-5 years
- Child: 6-12 years
- Adolescent: 13-18 years
- Adult: 19+ years
- Young Adult: 19-24 years
- Adult: 19-44 years
- Middle Aged + Aged: 45+ years
- Middle Aged: 45-64 years
- Aged: 65+ years
- 80 and over: 80+ years

These filters may exclude some citations because they have not yet completed the MEDLINE indexing process.

Other filters & more subsets

Exclude preprints

The Exclude preprints filter can be added to the sidebar using the Additional Filters button. Alternatively, you can exclude preprints from your search results by including NOT preprint[pt] at the end of your query.

See [Preprints](#) for more information about preprint citations in PubMed.

MEDLINE Subset

The MEDLINE filter can be added to the sidebar using the Additional Filters button. To use this filter in a query, add medline[sb] to your search. The MEDLINE filter limits results to citations that are [indexed for MEDLINE](#).

PubMed Central Subset

To restrict retrieval to citations that have a free full text article available in [PubMed Central](#) (PMC), search "pubmed pmc"[sb].

Use the [PMID/PMCID/NIHMSID Converter](#) to convert IDs for publications referenced in PubMed and PMC. To retrieve citations that include an NIHMS ID use the query, hasnihmsid.

Citation Status Subsets

The citation status indicates the internal processing stage of an article in the PubMed database (see [PubMed Citation Status Subsets](#)).

To search for a particular citation status, enter one of the search terms below followed by the [sb] search tag:

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- publisher
- inprocess
- medline
- pubmednotmedline

To search for the total number of PubMed citations, enter all[sb] in the search box.

Ahead of Print Citations

Publishers may submit citations for articles that appear on the web prior to their publication in final or print format. To search for these ahead-of-print citations, enter pubstatusaheadofprint.

Searching for a phrase

Many phrases are recognized by the subject translation table used in [PubMed's Automatic Term Mapping \(ATM\)](#). For example, if you enter fever of unknown origin, PubMed recognizes this phrase as a MeSH Term.

You can bypass ATM and search for a specific phrase using the following formats:

- Enclose the phrase in double quotes: "kidney allograft"
 - If you use quotes and the phrase is not found in the [phrase index](#), the quotes are ignored and the terms are processed using automatic term mapping. The message "Quoted phrase not found in phrase index" will display at the top of your search results.
- Use a search tag: kidney allograft[tw]
 - If you use a search tag and the phrase is not found in the [phrase index](#), the phrase will be broken into separate terms, e.g., "psittacine flight" is not in the phrase index, so a search for psittacine flight[tw] is broken up and translated as:
(((("psittaciformes"[MeSH Terms] OR "psittaciformes"[All Fields]) OR "psittacine"[All Fields]) OR "psittacines"[All Fields]) AND "flight"[Text Word])
- Use a hyphen: kidney-allograft
 - If you use a hyphen and the phrase is not found in the [phrase index](#), the search will not return any results for that phrase.

When you enter 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.

Phrase index

PubMed uses a phrase index to provide phrase searching. To browse the phrase index, use the [Show Index feature](#) included in the [Advanced Search](#) builder: select a search field, enter the beginning of a phrase, and then click Show Index.

Quoted phrase not found

Phrases may appear in a PubMed record but not be in the phrase index. To search for a phrase that is not found in the phrase index, use a [proximity search](#) with a distance of 0 (e.g., "[cognitive impairment in multiple sclerosis](#)"[tiab:~0]); this will search for the quoted terms appearing next to each other, in any order.

Automated processes regularly add new phrases to the index based on standard criteria such as phrase frequency and length. If you would like to request a phrase be added to the phrase index, please [write to the NLM Help Desk](#).

Truncating search terms

To search for all terms that begin with a word, enter the word followed by an asterisk (*): the wildcard character.

To search for a phrase including a truncated term, use the following formats:

- Enclose the phrase in double quotes: "breast feed*"
- Use a search tag: breast feed*[tiab]
- Use a hyphen: breast-feed*

At least four characters must be provided in the truncated term.

The truncated term must be the last word in the phrase.

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.

Combining search terms with Boolean operators (AND, OR, NOT)

PubMed applies an AND operator between concepts, e.g., "vitamin c common cold" is translated as vitamin c AND common cold. Enter Boolean operators in uppercase characters to combine or exclude search terms:

- AND retrieves results that include all the search terms.
- OR retrieves results that include at least one of the search terms.
- NOT excludes the retrieval of terms from your search.

PubMed processes searches in a left-to-right sequence. Use parentheses to "nest" concepts that should be processed as a unit and then incorporated into the overall search.

- PubMed uses automatic term mapping to identify concepts. For example, for the search air bladder fistula, PubMed will search "air bladder" as a phrase. If you do not want this automatic phrase parsing, enter each term separated by the Boolean operator AND, e.g., air AND bladder AND fistula.
- [Search Details](#) show how a search was translated.

Using search field tags

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You can search for a term in a specific field by including a [search field tag](#) after the term; for example, UCLA[ad] will search for the term “UCLA” in the affiliation field only.

More information about using search field tags:

- The search field tag must be enclosed in square brackets.
- Case and spacing do not matter: crabs [mh] = Crabs[mh].
- Search field tags turn off [Automatic Term Mapping \(ATM\)](#), limiting your search to the specified term only.
- Using a search field tag after multiple terms will attempt to [search those terms as a phrase](#): kidney allograft[tiab].
- To search multiple terms in the same field, each term must be tagged individually: covid-19[ti] vaccine[ti] children[ti].
- The [Advanced Search builder](#) can help you search for terms in specific fields and build large, complex search strings.

Search field tags

- [Affiliation \[ad\]](#)
- [All Fields \[all\]](#)
- [Article Identifier \[aid\]](#)
- [Author \[au\]](#)
- [Author Identifier \[auid\]](#)
- [Book \[book\]](#)
- [Comment Correction Type](#)
- [Completion Date \[dcom\]](#)
- [Conflict of Interest Statement \[cois\]](#)
- [Corporate Author \[cn\]](#)
- [Create Date \[crdt\]](#)
- [EC/RN Number \[rn\]](#)
- [Editor \[ed\]](#)
- [Entry Date \[edat\]](#)
- [Filter \[filter\] \[sb\]](#)
- [First Author Name \[1au\]](#)
- [Full Author Name \[fau\]](#)
- [Full Investigator Name \[fir\]](#)

- [Grants and Funding \[gr\]](#)
- [Investigator \[ir\]](#)
- [ISBN \[isbn\]](#)
- [Issue \[ip\]](#)
- [Journal \[ta\]](#)
- [Language \[la\]](#)
- [Last Author Name \[lastau\]](#)
- [Location ID \[lid\]](#)
- [MeSH Date \[mhda\]](#)
- [MeSH Major Topic \[majr\]](#)
- [MeSH Subheadings \[sh\]](#)
- [MeSH Terms \[mh\]](#)
- [Modification Date \[lr\]](#)
- [NLM Unique ID \[jid\]](#)
- [Other Term \[ot\]](#)
- [Owner](#)
- [Pagination \[pg\]](#)
- [Personal Name as Subject \[ps\]](#)
- [Pharmacological Action \[pa\]](#)
- [Place of Publication \[pl\]](#)
- [PMCID and MID](#)
- [PMID \[pmid\]](#)
- [Publication Date \[dp\]](#)
- [Publication Type \[pt\]](#)
- [Publisher \[pubn\]](#)
- [Secondary Source ID \[si\]](#)
- [Subset \[sb\]](#)
- [Supplementary Concept \[nm\]](#)
- [Text Words \[tw\]](#)
- [Title \[ti\]](#)

- [Title/Abstract \[tiab\]](#)
- [Transliterated Title \[tt\]](#)
- [Volume \[vi\]](#)

Proximity searching

You can use proximity searching to search for multiple terms appearing in any order within a specified distance of one another in the [Title], [Title/Abstract], or [Affiliation] fields.

To create a proximity search in PubMed, enter your terms using the following format:

"search terms"[field:~N]

- **Search terms** = Two or more words enclosed in double quotes.
 - There is no limit to the number of words you can search together in proximity; however, the more terms you enter, the more restrictive your search becomes. Using the [Boolean operator](#) AND to combine terms may be more appropriate than combining many terms into one proximity search.
- **Field** = The search field tag for [Title], [Title/Abstract], or [Affiliation] fields.
 - Proximity searching is only available in the [Title](#), [Title/Abstract](#), and [Affiliation](#) search fields.
 - You can use the full search field tags [Title], [Title/Abstract], and [Affiliation], or the abbreviated versions [ti], [tiab], and [ad].
- **N** = The maximum number of words appearing between your search terms.
 - What N value to use will depend on your search. Try changing the N value and comparing the results to find what works best for your search.
 - A higher N creates a broader, more comprehensive search; this will typically retrieve more results overall, but some of these results may be less relevant. Using the [Boolean operator](#) AND to combine terms may be more appropriate than proximity searching with a large N value.
 - A lower N creates a narrower, more precise search; this will typically retrieve fewer results that are highly relevant, but may exclude other relevant results.
 - If N=0, the quoted terms will appear next to each other--with no other words in between.
 - For the affiliation field only, an N value of 1,000 or less will search for the double quoted terms together within the same affiliation, rather than spread across all affiliations on the record. See [Affiliation \[ad\] for an example proximity search in the affiliation field](#) and more information about searching for affiliations.

More information about proximity searching:

- Results will include your quoted terms in any order. If you would like to search for an exact phrase with terms appearing in a specific order, use a phrase search instead.

- Automatic Term Mapping is not applied to the quoted terms.
- Proximity searching is not compatible with [truncation](#) (*). If the double quoted terms in a proximity search include a wildcard (*), the proximity operator will be ignored.
- You can combine proximity searches with other terms using Boolean operators; for example, "hip pain"[Title:~4] AND stretching
- Booleans and [stopwords](#) included in quoted terms for proximity search are searched like regular keywords.

EXAMPLE

Search PubMed for citations with the terms "rationing" and "healthcare" appearing within 2 words of each other--in any order--in the Title field:

["rationing healthcare"\[Title:~2\]](#)

Search results may include: rationing healthcare, healthcare rationing, rationing of healthcare, rationing in healthcare, rationing universal healthcare, rationing strategies in healthcare, rationing limited healthcare... and more.

EXAMPLE

Search PubMed for citations with the terms "patient," "physician," and "relationship" appearing next to each other—in any order—in the Title/Abstract fields:

["patient physician relationship"\[Title/Abstract:~0\]](#)

Since N=0, the quoted terms must appear next to each other with no other words in between them, although they can still appear in any order.

EXAMPLE

You can build queries that combine proximity searches with other terms using Boolean operators (AND, OR, NOT):

["accidental overdose"\[Title/Abstract:~3\] AND acetaminophen"patient physician relationship"\[tiab:~0\] OR "patient doctor relationship"\[tiab:~0\]](#)