Royal College of Surgeons of England

ADVANCING SURGICAL CARE

Basics of literature searching for surgery

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Introduction and objectives

This guide outlines the basics of literature searching for surgery:

- How to put together a search question.
- What information you need to answer the question and where to look for it.
- How to develop a search strategy.
- How to manage your search strategy.

Who this guide is for

- For members needing a printed guide (eg due to intermittent internet access).
- To supplement a 1-2-1 training session.

Contents

I don't have time to do a search right now!

We can conduct the search on your behalf, if it is not part of an assessed assignment (eg contributing to a degree module or a thesis).
You can request a quick or comprehensive search, or a search to support a systematic review.

I need some search training!

We deliver search training for all experience levels. Get in touch to arrange a session.

Putting together a search question

Well-formulated search questions can narrow the focus of your search to find the most relevant evidence on your topic. Frameworks, like PICO, can help with this:

- P = population/patient
- I = intervention
- C = comparison/comparator
- O = outcomes

Example: The latest evidence on intraoperative tranexamic acid use and benefits to the surgical patient. Use the PICO framework to break down the topic into:

P (patients): surgical patients in all specialties
I (intervention): tranexamic acid use
C (comparison): any (eg no tranexamic acid, or aminocaproic acid use)
O (outcomes): benefits (eg lower rate of blood loss, or shorter length of stay)

Cummings Graduate Institute has a handy explainer of alternatives to PICO.

What do I need, and where should I look for it?

Before you dive into searching for information, ask yourself:

What type of information do I need?

- Guidelines, policies, reports (often called “grey literature”)?
- Book chapters or clinical overviews?
- Systematic reviews?
- Primary research (eg randomised controlled trials, cohort or case studies)?

What do I *not* want?

- Do I want research written only in the language(s) I know?
- Do I want all study designs? Or only systematic reviews because there’s a lot of research on my topic? Am I interested in editorials and letters?
- When was the information I’m interested in published? Do I want research from the last 20 or 10 or 5 or 2 years? Do I want all information from all time?

Where should I look?

I need…	**A good starting point…**
Primary research	Databases like MEDLINE, Embase, and Cochrane Library
Top-level clinical overviews	ClinicalKey, a collection of Elsevier resources. Use your RCS England login for access.
E-books	ClinicalKey, a collection of Elsevier resources.

I need…	A good starting point…
	Use your RCS England login for access.
Guidelines	TripPro, a curated collection of national and international guidelines, and some research. Use your RCS England login for access.
Systematic reviews	MEDLINE and Embase, ClinicalKey, TripPro
Grey literature	Google, Google Scholar, organisational websites.

More information on these can be found in our guides

- Getting started with Surgical Library
- Searching MEDLINE and Embase for surgery
- Searching Cochrane Library for surgery
- Reporting surgical search results

If you aren't sure where to start, or would like some further guidance, get in touch – our team is always happy to advise.

Databases

Databases are collections of journal article abstracts. Each abstract usually contains the article's title, authors, journal of publication, date of publication, and a summary of the main findings.

For most searches, we recommend using the following databases:

Database	Contents
MEDLINE	Abstracts from 5200+ journals, 1949–present day.
Embase	Abstracts from 7500+ journals, 1947–present day.
Cochrane Database of Systematic Reviews	Cochrane Systematic Reviews, Review Protocols, editorials, and supplements.
Cochrane CENTRAL	Records of controlled trials published on PubMed, Embase.com, CINAHL, ClinicalTrials.gov, and the WHO's International Clinical Trials Registry Platform.

The HMIC database may also be useful for health management searches.
Read more on our website, or contact us to find out more.

What does 'Ovid' mean?

Ovid is a publisher that hosts the MEDLINE and Embase databases and provides a search interface. Some libraries offer access to MEDLINE and Embase via different hosts, with different search interfaces. It's important to keep a record of the database host(s) you are using.

What is the difference between PubMed and MEDLINE?

PubMed and MEDLINE are related, but different…

- The US National Library of Medicine maintains both PubMed and MEDLINE.
- PubMed hosts MEDLINE (like Ovid does).
- PubMed includes a broader range of resources than journal articles, such as books and dissertations.
- The Cochrane Handbook of Systematic Reviews of Interventions recommends that systematic searches should, as a minimum, search MEDLINE (rather than PubMed), Embase and Cochrane Library.

Developing a search strategy

Which of my topics are important?

We identified four topics when using the PICO framework in **Putting together a search question**

P (population/patients): surgical patients in all specialties
I (intervention): tranexamic acid use
C (comparison): any (eg no tranexamic acid, or aminocaproic acid use)
O (outcomes): benefits (eg lower rate of blood loss, or shorter length of stay)

- We want journal articles that cover tranexamic acid use in any type of surgery.
- We don't mind what the **comparators** are (eg if the study compares tranexamic acid use to no tranexamic acid/aminocaproic acid use/desmopressin use etc).
- We also know that we want to read about patient benefits, but we're not looking at a specific **outcome**, eg need for intraoperative blood transfusion.
- In addition, many articles don't reliably report the **outcomes** in their abstract.

For those reasons, our best starting topics are **surgery** and **tranexamic acid**. In a PICO framework, these would be our **patients** and **intervention**.

Subject headings

Some journal abstracts are labelled with specific keywords called **subject headings**. These are from a set list of terms (known as a 'controlled vocabulary'). You might see the term **MeSH** used in relation to MEDLINE or PubMed. MeSH stands for **Me**dical **S**ubject **H**eadings. Embase uses Emtree subject headings instead of MeSH.
MeSH and Emtree subject headings are followed by a slash, eg **General Surgery/**

If there are articles which don't use the keywords we anticipate, we can often search using subject headings to find them.

Example: Looking for articles discussing 'gerontology', we miss some studies because the authors used the phrase 'elder care' instead. If the missing studies are labelled with the MeSH heading **Geriatrics/** though, we can still find them by searching with that subject heading.

Which keywords and subject headings are relevant?

Different authors can use different terms to refer to the same concept, so it's a good idea to look for alternative keywords and Subject headings.

In our example:

Key topics	Keyword	Alternative terms	Subject headings (MeSH only)
Surgical patients	Surgery	• Surgeries • Surgical • Operation	• Surgical Procedures, Operative/
Tranexamic acid	Tranexamic acid	• TXA	• Tranexamic Acid/

Are there different ways to spell my search terms?

Look out for variation between English spellings in words like pediatric (American) vs paediatric (British).

- To pick up both spellings, use the wildcard symbol '?' to get 'p?ediatric'.
- This asks the database to look for words spelled 'pediatric' that may have an additional letter where the '?' is.

In our example, 'tranexamic acid' is often misspelled as 'tran**s**examic acid'. To save us typing out both spellings, we use '?' and enter 'tran?examic acid' into the database.

What other special functions of the database should I consider?

Truncation

Truncation shortens a word that could have lots of different endings. This cuts down the time spent typing out variations of that word into the database.

- 'surgery', 'surgical', and 'surgeon' have the same root (**surg-)** but different endings.
- To look for all those words, we truncate to **surg***. The star on the end shows the database that any letters can follow 'surg'. The database will look for surgery, surgeries, surgical, surgeon, surgeons etc… so we don't have to type out every variation.

⚠ **Beware:** truncation needs thought. To look for variations on 'artery' (arteries, arterial etc), we could truncate to **art***. But then we'd get studies on art therapy, arthroscopy, and other irrelevant topics. So truncating to **arter*** would be more useful.

Adjacency

Adjacency refers to the position of words in a phrase or sentence. In a phrase like 'blood loss', **blood** and **loss** are directly next to each other (or directly adjacent). So, we might search for 'blood loss' as our keywords.

- But what about 'loss of blood'? **Blood** and **loss** are separated by another word. They are near to each other, but not directly next to each other.
- To cover both 'blood loss' and 'loss of blood', we can ask the database to look for **blood** and **loss** where they appear within two words of each other.
- To do this, use 'adj' (for adjacency) and add '2' (the maximum number of words that we want to appear between **blood** and **loss**), to give **blood adj2 loss**
- You may not need to use adjacency in your search at all – it's an optional extra!

Combining your topics

Once you have all your keywords and subject headings, you combine them so that the database can retrieve relevant journal articles. To do this, we use two words:

- AND
- OR

You may have seen these referred to as Boolean search terms or operators.

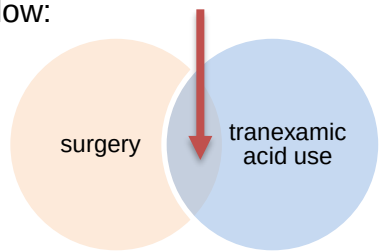
We use OR to combine keywords and subject headings that refer to the same topic:

Topic	Alternative terms	Subject headings	Wildcards, truncation	Combination with OR
Surgery	• Surgeries • Surgical • Operation	Surgical Procedures, Operative/	Surg* Operat*	surg* **OR** operat* **OR** Surgical Procedures, Operative/
Tranexamic acid	• TXA	Tranexamic Acid/	Tran?examic acid	tran?examic acid **OR** TXA

We then use AND to combine each group of keywords:
((surg* **OR** operat* **OR** Surgical Procedures, Operative/) **AND** (tran?examic acid **OR** TXA **OR** Tranexamic Acid/))

By using OR and AND like this, we ask the database to:

- **only** look for articles which discuss surgery (whether referred to as surgery, surgical, operation etc)
- **AND** also discuss tranexamic acid (referred to as TXA or Tranexamic Acid/ etc)
  In other words, we want articles from where the two topics overlap, as shown below:



Managing your search strategy

Recording your search strategy is important. It can:

- Save you time and effort from having to duplicate your work.
- Allow you to improve your strategy and keep records of how it’s changed.
- Help you with reporting your strategy if you publish your results.

You can record or save your strategies in:

- The database where you conducted your search.
- Programmes like Microsoft Word or Excel.
- A dedicated reference manager, such as Zotero.

More information on recording your strategy can be found in our guide, Reporting your surgical search results.

Library services

RCS England members and fellows can get free help and advice on literature searching from: evidencesupport@rcseng.ac.uk

Literature search help

- Ask one of our experienced Information Specialists to search the literature on your behalf. Choose from a quick search, comprehensive search, or search to support systematic review.
- Have your search strategy reviewed by an Information Specialist, with helpful feedback.
- Book one-to-one online sessions on literature searching tailored to your experience and needs. We can train you on searching databases, including MEDLINE, Embase, and the Cochrane Library.

For literature search or training enquiries, email evidencesupport@rcseng.ac.uk

Other searching training guides

- Getting started with Surgical Library
- Searching MEDLINE and Embase for surgery
- Searching Cochrane Library for surgery
- Reporting surgical search results

Contact details

Library and Archives Team
The Royal College of Surgeons of England
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London WC2A 3PE

General library enquiries: Library@rcseng.ac.uk or 020 7869 6555 (9am - 5pm)
Or Contact us via a web form.

This training guide has been produced by the Evidence Support Team, Library & Archives, Royal College of Surgeons of England, January 2025.

