The Literature Search Process: Guidance for NHS Researchers

Developed by Thames Valley & Wessex Healthcare Librarians*

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Introduction

This document was developed in partnership with the Thames Valley Research & Development Network and is maintained by healthcare librarians in Thames Valley & Wesssex. Its aim is to support NHS researchers in carrying out effective literature searches. This will help ensure that research is not duplicated and that literature searches retrieve the best available evidence.

This document provides guidance for the following key steps:
- planning a literature search
- identifying key sources of information
- guidance in carrying out an effective literature search
- documenting the search process

Structured guidance and a checklist column are provided for each section so that researchers can quickly identify and tick off the necessary elements. You are strongly encouraged to contact your local healthcare librarian at the start of your research project, they will be able to offer professional advice and support. To find your local library, please visit http://www.hlisd.org/

This work builds on previous international work in this area, which is credited in the bibliography.

This is a working document that will evolve to meet the needs of the local NHS research community; therefore your feedback is of the utmost importance. Please contact us with comments and suggestions.

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This guidance has been updated in memory of Belinda Hylton, librarian at Buckinghamshire Shared Services who was one of the original main authors.

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Search Planning Form

Use this form to identify/clarify the key concepts and the scope of your research topic.
See the guidance notes for a worked example

Date search started: _____ Date search completed: _____

1. Your Research Topic

| |
| |
| |

2. Break down your topic into key concepts or categories to formulate a clear clinical question

(If your topic does not easily fit into these categories, see the guidance notes on page 5)

Patient/Population and/or Problem	Intervention/Exposure	Comparison/Control	Outcome
Alternative Words – list below in the appropriate column			

3. Your Research Question

| |
| |
| |

4. Search limits

Study type:	Publication date:
Age range:	Language:
Other:	

Guidance notes for use with Search Planning Form: USING PICO AS AN EXAMPLE

1. Your Research Topic – briefly describe in your own words the key aspects of your research topic

2. Break down your topic into key concepts or categories to formulate a clear clinical question
The PICO model (Richardson, 1995) is an evidence-based model for formulating a clinical question using the headings **P**atient/population and/or problem, **I**ntervention**, C**omparison and **O**utcome. By dividing your topic into these or similar categories, you will also be doing the groundwork for developing a search strategy. *If the PICO headings do not easily fit your research topic, please see page 5 for alternatives.*

- **Patient/Population/Problem** - any characteristics that define your patient or population, e.g. target clinical condition, co-existing condition, ethnicity, age group
- **Intervention/Exposure** - what you want to do with the patient/population/problem e.g. form of treatment, diagnostic test, education programme, type of service delivery. This can also include any exposures (e.g. asbestos) or factors influencing prognosis
- **Comparison/Control** (if applicable) **–** alternative(s) to main intervention, e.g. placebo
- **Outcomes** - any outcomes or effects relating to the intervention e.g. prevention, side effects, morbidity, quality of life, cost-effectiveness

The PICO headings shown in the example do not have to be applied rigidly and there are a number of variations e.g.
- **PICOT - P**atient – **I**ntervention – **C**omparison – **O**utcome –**T**ime Frame (Fineout-Overholt and Johnson, 2005)
- **PICOCs** – **P**opulation – **I**nterventions – **C**omparators – **O**utcomes – **C**ontext – **S**tudy design (Petticrew and Roberts, 2005)

When filling in each category, consider any synonyms, alternative keywords, different spellings, acronyms etc. to include in your search strategy - *see guidance notes on page 7 for more information*.

Example

P		I		C		O
	AND		AND		AND	
acute stroke		*blood pressure reduction*		*no treatment*		*secondary prevention*
	OR↓		OR↓ **Alternative Words**		OR↓		OR↓
cerebrovascular accident *cerebrovascular event* *ischaemic stroke*		*anti-hypertensive agents* *hypertension - drug therapy* *diuretics, atenolol etc*		*placebo*		*secondary prophylaxis* *reduce mortality* *risk reduction*

Combining terms - When searching bibliographical databases such as MEDLINE you will need to use OR/AND to put your search together:

    OR – to combine keywords for similar concepts (i.e. terms in the *same* column) use OR e.g. blood pressure OR hypertension.
    AND – to combine keywords for different concepts (i.e. terms in *separate* columns) use AND, e.g. stroke AND blood pressure reduction

3. Your Research Question – your research topic phrased as a clear, focussed question, incorporating the elements identified in the PICO (or similar) model. *Example*: in people with a prior history of stroke, is blood pressure reduction more effective than no treatment in preventing future stroke events?

4. Any Search Restrictions – anything related to your topic that you wish to exclude. Generic limits (language, publication date etc) may introduce bias, avoid using these limits if you need a systematic search.

2. Guidance notes for use with Search Planning Form: OTHER FRAMEWORKS

There are a number of other frameworks which may be more appropriate to your topic or you can create or adapt categories of your own. The bibliography in Appendix 3 includes only a few of the many texts which cover the importance of well-formulated questions for effective literature searching and the process for developing them. There are 4 main aspects of a research topic to consider and the specific focus of these may be categorised depending on whether the research relates to clinical treatment, service management, policy, education or involves a particular methodology.

1. The **situation:** patient/client, population group, problem, condition, setting, perspective, context or location,
2. The **actions:** intervention, exposure, including time factors
3. The **results**: in relation to benefits or improvements, risk or safety, cost, efficiency or quality
4. If a **comparison** is sought

A selection of existing frameworks are listed below. Further examples are available from Davies (2011) and Kloda & Bartlett (2013). For in depth guidance on the use of individual frameworks, please see the indicated references.

ECLIPSE (Wildridge & Bell 2002)
Expectation – **C**lient group – **L**ocation – **I**mpact - **P**rofessionals involved – **Se**rvice
This framework is useful for questions relating to health policy and management issues. *Expectation* encourages reflection on what the information is needed for i.e. improvement, innovation or information. *Impact* looks at what you would like to achieve e.g. improve team communication.

EPICOT (Brown et al 2006)
Evidence – **P**opulation – **I**ntervention – **C**omparison – **O**utcome – **T**imestamp
Designed to address research recommendations on the effect of treatments. In addition to the PICO elements, *Evidence* is for the current state of the evidence and *Timestamp* is for the date of the recommendations.

PECODR (Dawes et al 2007)
Population – **E**xposure – **C**omparison – **O**utcome – **D**uration - **R**esults
Useful for case control studies and cohort studies. *Duration* can be used to clarify the length of the follow up period and the *Results* could be used for Number Needed to Treat or similar.

PESTLE (CIPD 2010)
Political – **E**conomic – **S**ocial – **T**echnological – **E**nvironmental - **L**egal
An analysis tool that can be used by organizations for identifying external factors which may influence their strategic development, marketing strategies, new technologies or organizational change.

SPICE (Booth 2006)
Setting (context) – **P**erspective– **I**ntervention – **C**omparison – **E**valuation
Useful for qualitative studies that seek to evaluate a service. *Perspective* relates to users or potential users. *Evaluation* is how you plan to measure the success of the intervention.

SPIDER (Cooke, Smith & Booth 2012)
Sample - **P**henomenon of Interest – **D**esign (of study) – **E**valuation - **R**esearch type
Useful for qualitative or mixed methods research. *Phenomenon of Interest* includes behaviours and/or experiences e.g. compliance.

The Literature Search Process: Protocols for Researchers

1) **Resource Checklist**: Refer to the **Guide to sources of information** (Appendix 1) for further details about subject coverage and access for each resource listed. Please note: this list is not exhaustive. Additional resources are listed in Appendix 2 but your local healthcare librarian can also offer further advice.

<table>
<tr><td rowspan="2">Guidance notes
The resource checklist is divided into 3 levels: core, recommended and additional. Alongside each resource, tick the appropriate column: searched, not applicable (N/A) or unable to access.

Level 1 – core resources

Effective searches across these sources will help ensure that your literature review covers a significant proportion of published research. Consider how retrospective the search needs to be, e.g. from the time when a drug was introduced; also consider whether the coverage of your source is sufficiently retrospective and/or up-to-date.

These resources should be searched as a minimum requirement unless they are not appropriate to your research topic. If there are time constraints, section a) minimum core resources should be given priority.

How far you proceed beyond Level 1 will depend on:
• The subject of your research
• The type of studies you need to locate (e.g. RCTs)
• The time available
• Availability of sources
• How essential it is to ensure your research is not duplicating research elsewhere
• How likely it is that specialist databases will have additional references not found elsewhere.

* Resources marked with a * are not available through NHS Athens or free on the Internet. Access is through subscription only, but may be accessible at your local health or academic library.

See next page for continued guidance notes</td><td>LEVEL 1: CORE RESOURCES</td><td><i>Searched</i></td><td><i>N/A</i></td><td><i>Unable to access</i></td></tr>
<tr><td>a) Minimum core resources:</td><td></td><td></td><td></td></tr>
<tr><td>• Cochrane Library</td><td></td><td></td><td></td></tr>
<tr><td>• Centre for Reviews and Dissemination (CRD) for latest updates</td><td></td><td></td><td></td></tr>
<tr><td>• MEDLINE OR PubMed</td><td></td><td></td><td></td></tr>
<tr><td>• EMBASE</td><td></td><td></td><td></td></tr>
<tr><td>• Key health and social care databases as appropriate</td><td></td><td></td><td></td></tr>
<tr><td>   o   AMED (Allied Medicine)</td><td></td><td></td><td></td></tr>
<tr><td>   o   BNI (Nursing)</td><td></td><td></td><td></td></tr>
<tr><td>   o   Campbell Library of Systematic Reviews</td><td></td><td></td><td></td></tr>
<tr><td>   o   CINAHL (Nursing and Allied Health)</td><td></td><td></td><td></td></tr>
<tr><td>   o   HMIC / Kings Fund Library (Health Management)</td><td></td><td></td><td></td></tr>
<tr><td>   o   NHS Networks Commissioning Zone</td><td></td><td></td><td></td></tr>
<tr><td>   o   OTseeker (Occupational Therapy)</td><td></td><td></td><td></td></tr>
<tr><td>   o   PeDRO (Physiotherapy)</td><td></td><td></td><td></td></tr>
<tr><td>   o   PsycINFO</td><td></td><td></td><td></td></tr>
<tr><td>   o   Social Care Online</td><td></td><td></td><td></td></tr>
<tr><td>b) Other core resources:</td><td></td><td></td><td></td></tr>
<tr><td>• BioMed Central</td><td></td><td></td><td></td></tr>
<tr><td>• Evidence summaries e.g. Clinical Evidence *, Clinical Knowledge Summaries</td><td></td><td></td><td></td></tr>
<tr><td>• Evidence-based gateways e.g. NHS Evidence, TRIP, SumSearch2</td><td></td><td></td><td></td></tr>
<tr><td>• Guidelines sites e.g. NHS Evidence, NICE</td><td></td><td></td><td></td></tr>
<tr><td>• Websites of relevant associations / bodies</td><td></td><td></td><td></td></tr>
</table>

1) **Resource Checklist** *(continued)*	LEVEL 2: RECOMMENDED RESOURCES	*Searched*	*N/A*	*Unable to access*
Level 2: Recommended resources				
Some of these resources may help to locate unpublished literature including theses & conference proceedings.	**Case reports**			
	• CasesDatabase			
	Conference proceedings			
They are useful if you need a greater level of confidence that you are not duplicating other research. However, access to some of these sources may be limited.	• ZeTOC*			
	Dissertations and Theses			
	• DART Europe E-Thesis Portal			
There may also be other subject specific databases of interest.	• Dissertation and Theses Database *			
	• EThOS			
* Resources marked with a * are not available through NHS Athens or free on the Internet. Access is through subscription only, but may be accessible at your local health or academic library.	• Index to Theses*			
	• Networked Digital Library of Theses and Dissertations			
	Drug Information			
	• Drug and Therapeutics Bulletin *			
	• Micromedex *			
	• Medicines Information			
	• Pharmaceutical and device manufacturers			
	Grey Literature			
	• Open Grey			
	Library catalogues			
	Other resources			
	• NIHR Journals Library			
	• QIPP (Quality, Innovation, Productivity and Prevention)			
	• UK Duets (Database of Uncertainties about the Effects of Treatments)			
	Subject Specific Databases - *see Appendix 2 for more options*			
	• ASSIA (Applied Social Sciences Index and Abstracts)*			
	• BIOSIS Citation Index* / Biosis Previews * (Life Sciences)			
	• Biological Abstracts*			
	• ERIC (Education Resources Information Center)			

	RECOMMENDED RESOURCES CONTINUED	*Searched*	*N/A*	*Unable to*
	• Global Health *			
	• Health Business Elite			
	• Maternity and Infant Care*			
	• SciVerse Scopus*			
	• Social Policy and Practice*			
	• Science Citation Index Expanded*			
	• Social Sciences Citation Index *			
	• TOXNET (Toxicology)			
	• World Health Organisation Regional Databases			
	Research in progress / specialist health research resources			
	• ClinicalTrials.gov			
	• metaRegister of Controlled Trials (mRCT)			
	• NIHR Clinical Research Network Portfolio Database			
	• Prospero (International Prospective Register of Systematic Reviews)			
	Web search engines e.g. Google; Google Scholar			
Level 3: Additional resources These resources will further increase the comprehensiveness of your search. N.B. you may want to weigh up the likelihood of locating significantly new information before investing the time needed to explore these methods.	**LEVEL 3 : ADDITIONAL SEARCH METHODS**			
	• Contacting centres of excellence and experts in the field			
	• Email / online discussion groups			
	• Hand searching of key journals			
	• Citation tracking / reference list checking			

2)   Search Strategy Checklist

Before carrying out your search you will need to identify your research question and plan your search strategy. You will already have identified your research question and broken it down into different concepts when completing the Search Planning Form.

This section will help you identify a range of keywords relevant to your research question.   It includes essential search techniques that should be used, wherever possible, to carry out an effective search of your chosen sources. Contact your local healthcare librarian for further advice / training

Guidance notes	a) Range of search terms	Used / Identified
Often, initial searches will highlight other appropriate text words (words or phrases that might appear in the text of an article) and database subject headings. Therefore, it is useful to carry out a pilot search in each database and review your search terms (and if necessary, your research question and its scope) before carrying out your final searches.	Identify a range of search terms for each of your identified search concepts, considering: • Synonyms, e.g. *aged; elderly* • Acronyms, e.g. *AIDS, CHD* etc. • Differences in terminology across national boundaries, e.g. *Accident and Emergency / Emergency Room* • Differences in spellings, e.g. *anaemia / anemia* • Old and new terminology, e.g. *mongolism / down syndrome* • Brand and generic names, e.g. *coumadin / warfarin* • Lay and medical terminology e.g. *stroke / cerebrovascular accident*	
Subject headings are used to index the content of most bibliographic databases (MEDLINE, EMBASE etc.) Example: heart attack is indexed under MYOCARDIAL INFARCTION	b) Database subject headings • Identify appropriate subject headings for each database used	
The subject headings list used in MEDLINE is called MeSH (Medical Subject Headings). Look for the MeSH or Thesaurus options to identify the most appropriate subject heading for the keyword you have entered. Correct use of subject headings improves the accuracy of your results and is essential to an effective search. (See section 2c) **See next page for continued guidance notes.**	• Check coverage, scope and definition of each subject heading NB: Sometimes subject headings are not defined as you might expect, e.g. the MeSH heading "SURGERY" is used to index material on the <u>discipline</u> of surgery, not surgical <u>procedures</u> (this is indexed under SURGICAL PROCEDURES, OPERATIVE).	

2) <u>Search Strategy Checklist</u> *(continued)*	c) Search techniques	Used / Identified	N/A

Guidance Notes
Most of these search techniques are for use with bibliographic databases, e.g. MEDLINE. If a particular search technique is not applicable, tick the box in the N/A column.
	• Carry out separate searches for each individual concept and then combine at a later stage
	
	    Example search
	    1. diabetic OR diabetes
	    2. retina OR eye
	    3. 1 AND 2		

Truncation Truncation symbols (also known as wildcards) are used to replace any number of characters at the end of the word *e.g. behavio* will also find behaviors, behaviour behavioural etc.* The actual symbols used vary depending on the database service provider. As a database can be made available through more than one service provider, you will need to check the database help section to find out which symbol to use. The most common symbol * is used by Pubmed and the NHS Evidence Healthcare Databases. Other databases or service providers may use $ or ?	• Use a combination of text words (free text) and subject heading searches		
	• Use appropriate truncation for text word searches where applicable, e.g. nurs* to find *nurse, nurses, nursing* etc.		
	• 'Explode' (i.e. expand) database subject headings where appropriate to include narrower terms		
	• Avoid restricting database subject heading searches using the '*major descriptors'* or '*subheading*' options in the first instance (to avoid missing relevant material)		
Combining search results Use **AND** to combine two <u>different</u> concepts, e.g. diabetes AND insulin	• Use AND / OR appropriately to combine results of separate searches		
(AND will narrow your search – your results must include ALL your stated concepts)	• Avoid limiting your search to English language (to help prevent bias)		
Use **OR** to search for <u>similar</u> concepts, e.g. retina OR eye (OR will widen your search - your results will include a MINIMUM OF ONE of your named concepts)	• When searching websites or other electronic sources, use the 'Advanced' search option where available		

	• If appropriate, use search filters (pre-prepared search strategies) to identify particular types of research studies e.g. randomised controlled trials. Sources of search filters include:
	    • PubMed's Clinical Queries
	    • Cochrane Library Handbook
	    • InterTASC Information Specialists' Sub-Group Search Filter Resource
	    • Contact your local healthcare librarian for advice.		

Updating searches: this process can have many pitfalls. If you have a pre-prepared search that you wish to update or re-run at a later date, please contact your local healthcare librarian.	• Use the PubMed 'related articles' function and lists of references in CINAHL		
	• Check the references cited in any research / other relevant material retrieved		

3) Search Documentation Checklist

Guidance Notes	Please ensure your research proposal includes:	Included
This checklist outlines the minimum required to document the search process carried out in support of any research proposal. All elements must be clearly documented for each resource searched. See the **Guide to Sources of Information** in the Appendices for details of each resource listed in the checklist.	**a) Clearly stated research question**	
	b) Explanation of the scope of the research question	
	c) For <u>database searches</u>, specification of the following:	
	• Title of database searched (e.g. MEDLINE)	
	• Name of the database provider (e.g. NHS Evidence)	
	• Date search conducted	
	• Complete search strategy used including the number of hits *Attach print outs of search strategies for each database used*	
	• Dates covered by the search (e.g. 1990-present)	
	d) For specific <u>websites</u> (other than online databases above), specification of the following:	
	• Name of the resource, (e.g. metaRegister of Controlled Trials)	
	• Publisher of the resource (e.g. US National Library of Medicine)	
	• Web address (URL)	
	• Search terms used	
	• Date accessed	
	• It may be useful to print out the first page in case its subsequently removed	
	e) For <u>search engine</u> searches, specification of the following:	
	• Search engines used (when searching across the Internet, e.g. Google, or searching within a website, e.g. NHS Evidence)	
	• Web address	
	• Search terms used	
	• Date searched	

NOTES