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DEFINING THE PROCESS TO LITERATURE SEARCHING IN SYSTEMATIC REVIEWS: A LITERATURE REVIEW OF GUIDANCE AND SUPPORTING STUDIES

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Methodology

DEBATE

Open Access

Defining the process to literature searching in systematic reviews: a literature review of guidance and supporting studies



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1. BACKGROUND



BACKGROUND



DEFINITION OF SYSTEMATIC REVIEW

Systematic reviews are type of literature review that uses systematic methods **to collect secondary data**, critically appraise research studies and synthesize findings qualitatively or quantitatively¹



BACKGROUND

- Literature searching is recognized as a critical component of systematic review process.
- This process, aims for :

Providing transparent report of study identification, leaving review stake holders clear about what was done to identify study

&

Explaining how the findings of the review are situated in the relevant evidences

BACKGROUND



THE PROBLEM IN LITERATURE SEARCHING MODEL

- Review teams appear to work from a shared and tacit model of the literature search process.
- How this tacit model has developed and evolved is unclear
- Research in the process of systematic literature searching will remain immature and potentially uneven
- The development of shared information models will be assumed but never articulated.

BACKGROUND



STUDY PURPOSE

To determine if a shared model of the literature searching process can be detected across systematic review guidance documents. How this process is reported in the guidance and supported by published studies



2. METHODS



METHODS

IDENTIFYING GUIDANCE

Identified based upon their accessibility to, and prominence within, United Kingdom systematic reviewing practice



1
Reviews of
intervention

2
Reviews of health
technologies

3
Reviews of
qualitative studies

4
Reviews of social
science studies

5
Reviews to inform
guidance

9
GUIDANCE DOCUMENTS

METHODS

IDENTIFYING GUIDANCE

TABLE 1. GUIDANCE DOCUMENTS AUDITED FOR THIS LITERATURE REVIEW

GUIDANCE DOCUMENT	VERSION: YEAR	CORE FOCUS	REPORTED LOCATION
Systematic Reviews: CRD's guidance for undertaking reviews in health care	2009	Systematic reviews of health care interventions	1.3 Pages 16-22
The Cochrane Handbook	Version 5.1: June 2017	Systematic reviews of interventions	Chapter 6. Searching for studies
Collaboration for environmental evidence: Guidelines for systematic reviews in environmental management	Version 4.2: March 2013	Systematic reviews of environmental evidence	Section "Other handbook exist" (pages 36-41)
Joanna Briggs Institute Reviewers' Manual	2014 Edition	Systematic reviews of qualitative studies	Chapter 7. Information retrieval (pages 28-31)
Institute for Quality and Efficiency in Health Care (IQWiG): IQWiG	2014	Systematic reviews of health care interventions	Chapter 7. Information retrieval

METHODS

IDENTIFYING GUIDANCE

TABLE 1. GUIDANCE DOCUMENTS AUDITED FOR THIS LITERATURE REVIEW (CONTINUE)

GUIDANCE DOCUMENT	VERSION: YEAR	CORE FOCUS	REPORTED LOCATION
Systematic Reviews in the Social Sciences: A Practical Guide	2006	Systematic reviews on social science topic	Chapter 4. How to find the studies: the literature search (pages 81-124)
Process of information retrieval for systematic reviews and health technology assessments on clinical effectiveness. Eunethta	Version 1.1 Dec 2016	Systematic reviews of health care interventions	Standalone guideline on literature searching
The Campbell Handbook: Searching for studies: a guide to information retrieval for Campbell systematic reviews	Version 1.1 Feb 2017	Systematic reviews on social science topic	Standalone guideline on literature searching
Developing NICE guidelines: the manual	2014	Systematic reviews to inform health care guidelines	Chapter 5. Identifying the evidence: literature searching and evidence submission

METHODS

IDENTIFYING GUIDANCE



Once a list of key guidance documents was determined, it was checked by six senior information professionals based in the UK for relevance to current literature searching in systematic reviews.



METHODS

IDENTIFYING SUPPORTING STUDIES

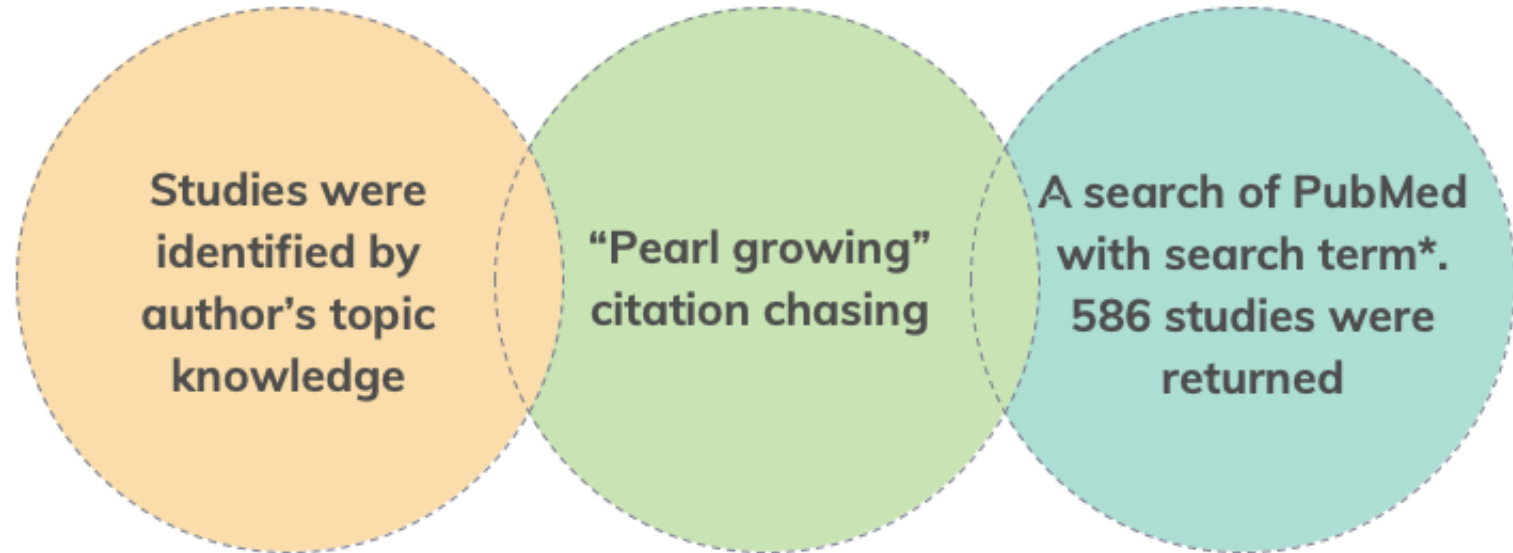
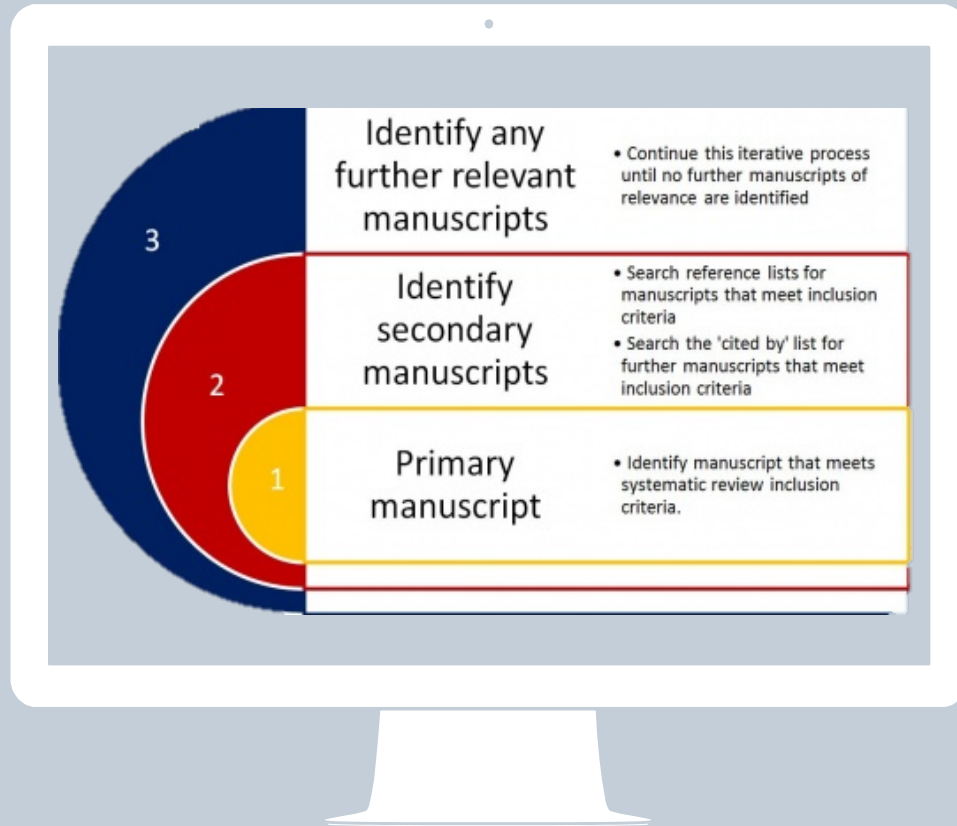


FIGURE 1. PROCESS OF IDENTIFYING SUPPORTING STUDIES

Search term : (literature search[Title/Abstract]) AND sysrev_methods[sb]

FIGURE 2. PROCESS OF "PEARL GROWING" CITATION CHASING



PEARL GROWING CITATION CHASING

Citation chasing was conducted by analysing the bibliography of of references for each study (backward citation chasing) and through [Google Scholar](#) (forward citation chasing)

METHODS

EXTRACTING THE DATA

Relevant chapters on literature searching were read and re-read to determine key methodological stages

The chapter for each methodological stage was extracted into a table using exact language as reported in each guidelines

Methodological stages were identified and defined. This data was reviewed to identify agreements and areas of unique guidance between guidelines.

Consensus across multiple guidance documents was used to inform selection of "key stages" in the process of literature searching

3. RESULTS AND DISCUSSION



RESULTS AND DISCUSSION

THE FINDINGS

Able to identify consensus across the guidance on literature searching, suggesting a shared implicit model within the information retrieval community.

The same key stages are reported, even where the core focus of each document is different.

Able to identify specific areas of unique guidance

RESULTS AND DISCUSSION

UNIQUE GUIDANCE

- Only one document provided guidance on the topic of **when to stop searching**²
- Two documents covered **peer review** of literature searches^{3,4}
- Four documents discussed **about text mining**^{4, 6-8}.

2. Systematic reviews in social science: a practical guide

3. Institute for quality and efficiency in health care (IQWiG) : IQWiG

4. Developing NICE guidelines: the manual

6. Systematic reviews: CRD's guidance for undertaking reviews in health care

7. Process of information retrieval for systematic reviews and health technology assessment on clinical effectiveness. Eunethhta

8. The Campbell handbook: searching for studies: a guide to information retrieval for Campbell systematic reviews

RESULTS AND DISCUSSION

AGREEMENT BETWEEN GUIDANCE: DEFINING THE KEY STAGES OF LITERATURE SEARCHING

TABLE 2. THE ORDER OF LITERATURE SEARCH METHODS AS PRESENTED IN THE GUIDANCE DOCUMENTS (GUIDELINE 1-5)

Steps	The CRD Handbook	The Cochrane Handbook	Collaboration for environmental evidence	Joanna Briggs reviewers manual	IQWiG
1	Searching electronic databases	Searching bibliographic databases	Searching online literature databases and catalogues	Databases (development of searches strategy, phase one)	Bibliographic databases (1. search for primary literature, 2. search for SRs)
2	Scanning references lists of relevant studies	Handsearching	Searching website of organizations and professional networks	Database searching (phase two)	Search trial in registries
3	Handsearching key journals	Conference abstracts/ proceedings	Searching the world-wide-web	Review references list	Clinical practice guideline databases and providers
4	Searching trials registers	Other reviews	Searching bibliographic of key articles/ reviews	Handsearching	Request to manufactures
5	Contacting experts and manufactures	Web-searching	Contact key individuals who work in the area	-	Other data sources
6	Searching relevant internet resources	Unpublished and ongoing studies (inc. author contact)	Citation searches for key papers/ included papers	-	-

RESULTS AND DISCUSSION

AGREEMENT BETWEEN GUIDANCE: DEFINING THE KEY STAGES OF LITERATURE SEARCHING

TABLE 2. THE ORDER OF LITERATURE SEARCH METHODS AS PRESENTED IN THE GUIDANCE DOCUMENTS (CONTINUE)

Steps	The CRD Handbook	The Cochrane Handbook	Collaboration for environmental evidence	Joanna Briggs reviewers manual	IQWiG
7	Citation searching	-	-	-	-
8	Using a project website to canvas for studies	-	-	-	-
9	-	-	-	-	-

RESULTS AND DISCUSSION

AGREEMENT BETWEEN GUIDANCE: DEFINING THE KEY STAGES OF LITERATURE SEARCHING

TABLE 2. THE ORDER OF LITERATURE SEARCH METHODS AS PRESENTED IN THE GUIDANCE DOCUMENTS (GUIDELINE 6-9)

Steps	Systematic reviews in the science: a practical guide	Eunethta	Campbell Handbook	Developing NICE guidelines: the manual
1	Databases	Bibliographic databases	Bibliographic databases (1. subject database, 2. general database)	No list of research methods but guidance distinguishes between database searching (first) and supplementary searching (second)
2	Grey literature	Study registries	Conference proceedings and meeting abstracts	
3	Identifying ongoing research	Searching for unpublished company documents	Existing review and publication reference lists	
4	Theses	Regulatory documents	Web searching	
5	Conference proceeding	Queries to author	Unpublished studies	
6	Citation searching	Further search techniques	Ongoing studies	

RESULTS AND DISCUSSION

AGREEMENT BETWEEN GUIDANCE: DEFINING THE KEY STAGES OF LITERATURE SEARCHING

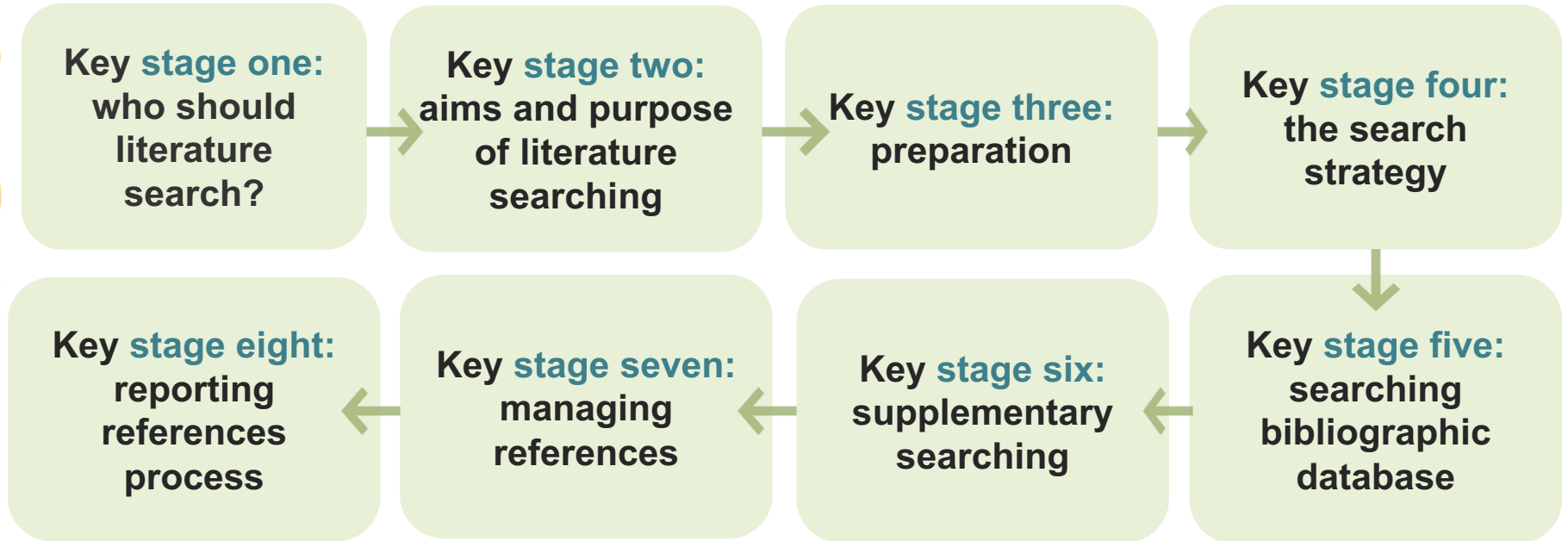
TABLE 2. THE ORDER OF LITERATURE SEARCH METHODS AS PRESENTED IN THE GUIDANCE DOCUMENTS (CONTINUE)

Steps	Systematic reviews in the science: a practical guide	Eunetha	Campbell Handbook	Developing NICE guidelines: the manual
7	Searching the web	-	Institutional repositories	No list of research methods but guidance distinguishes between database searching (first) and supplementary searching (second)
8	Contact with experts	-	Handsearching	
9	Trial Registries	-	-	

RESULTS AND DISCUSSION

THERE ARE 8 THE KEY STAGES OF LITERATURE SEARCHING

FIG. 3 KEY STAGES OF LITERATURE SEARCH GUIDANCE AS IDENTIFIED FROM NINE KEY TEXTS



KEY STAGE ONE

Deciding who should undertake the literature search



KEY STAGE ONE : DECIDING WHO SHOULD UNDERTAKE THE LITERATURE SEARCH

THE GUIDANCE^{2,4,6-11} :

8 documents provided guidance on who should undertake the literature searching in systematic reviews.

The guidance affirms that **people with relevant expertise of literature searching** should 'ideally' be included within the review team

Information specialists (or information scientists), **librarians or trial search co-ordinators** (TSCs) are indicated as **appropriate** researchers

KEY STAGE ONE : DECIDING WHO SHOULD UNDERTAKE THE LITERATURE SEARCH

HOW THE GUIDANCE CORRESPONDS TO THE PUBLISHED STUDIES :

The **guidance is consistent with studies** that call for the involvement of information specialists and librarians in systematic reviews¹²⁻²⁶

The **involvement of information specialists/ librarians** would be **associated with better reporting and better quality** literature searching²⁹

While including information specialists and librarians in the process of systematic review might be considered self-evident, Koffel and Rethlefsen have **questioned if the involvement is actually happening**³¹

KEY STAGE TWO

Determining the aim and purpose of a literature search



KEY STAGE TWO : DETERMINING THE AIM AND PURPOSE OF A LITERATURE SEARCH

THE GUIDANCE'S AIMS :

8 out of 9 documents clearly stated that that **thorough and comprehensive literature searches** are required as a potential mechanism for **minimising bias in the resultant review**^{2-4, 6-10}

KEY STAGE TWO : DETERMINING THE AIM AND PURPOSE OF A LITERATURE SEARCH HOW THE GUIDANCE CORRESPONDS TO THE PUBLISHED STUDIES :

The need for **comprehensive literature searches** focuses almost **exclusively on reviews of intervention effectiveness and meta-analysis.**

It is essentially important for such reviews to **transparently produce a reliable estimate of intervention effect.**

A decorative border in a light purple color with a wavy, scalloped pattern surrounds the entire content of the slide.

“

Have we performed a comprehensive
literature search?

What defines a “comprehensive” literature search ?

— • —

A COMPREHENSIVE LITERATURE SEARCH

EGGER ET AL (2003) DEFINED A COMPREHENSIVE LITERATURE SEARCH FOR TRIALS AS³⁴:

a search **not restricted to English** language

where **Cochrane CENTRAL** or **at least two other electronic databases** had been searched (such as MEDLINE or EMBASE) and

at least one of the following methods has been used to identify unpublished trial. **(I)** conference abstracts, **(II)** theses, **(III)** trial registries, **(IV)** contacts with experts in the field

34. Egger M, Juni P, Bartlett C, Hohenstein F, Sterne J. How important are comprehensive literature searches and the assessment of trial quality in systematic reviews? Empirical study. Health technology assessment (Winchester, England). 2003;7(1):1-76.

A COMPREHENSIVE LITERATURE SEARCH

Comprehensive literature searching requires the use of BOTH **bibliographic database searching AND supplementary search method**

However, how **much searching** should be undertaken remains **unclear**

Egger et al (2003) suggested investigator should consider : literature type and degree of comprehension that is appropriate for research question

as well as taking into account budget and time constraints

WHAT IS THE POINT OF COMPREHENSIVE LITERATURE SEARCHING?

To **avoid missing key studies and minimize bias**^{6,8,10,34,37-39} since a SR based only on published (or easily accessible) studies may have an exaggerated effect size.

The key biases, non-publication of studies, publication bias, language bias, MEDLINE bias (location bias, **could affect the estimate effect** in meta-analysis^{34,35,40-46}

DOES COMPREHENSIVE LITERATURE SEARCHING WORK?

‘comprehensive’ searches still missed studies and that comprehensive searches could. Rather than preventing bias, this can introduce it **if the low-quality studies/ grey literature studies is included in meta-analysis**³⁴

AIM AND PURPOSE BEYOND REVIEWS OF EFFECTIVENESS (FOR QUALITATIVE STUDY)

The need for comprehensive literature search **in qualitative reviews is less certain**, since the study data do not typically support meta-analysis

Nussbaumer-Streit et al. (2018) conclude that **abbreviated literature searches** are viable options for **rapid review**. But if we **demand detailed scrutiny** should still be based on **comprehensive literature searches**

KEY STAGE THREE

Preparing for the literature search



KEY STAGE THREE : PREPARING FOR THE LITERATURE SEARCH

THE GUIDANCE :

The Cochrane Handbook stated that authors should **seek advice from experts** in literature searching before starting literature search⁹

TWO KEY TASKS WERE PERCEPTIBLE IN PREPARING/ SCOPING FOR LITERATURE SEARCHING

- 1 Determining if there are any existing or on-going reviews, or if a new review is justified
- 2 Developing an initial literature search strategy to estimate the volume of relevant literature



“

Where to search to determine if a
new review was justified?

— • —

KEY STAGE THREE : PREPARING FOR THE LITERATURE SEARCH

WHERE TO SEARCH TO DETERMINE IF A NEW REVIEW WAS JUSTIFIED

The **Cochrane Database** of Systematic review (CDSR)

The **Database of Abstracts of Reviews of Effect (DARE)***

Institutional registries (including **PROSPERO**) and **MEDLINE**

* that as of 2015 DARE are no longer being updated so the relevance of this resource will diminish overtime

KEY STAGE THREE : PREPARING FOR THE LITERATURE SEARCH

HOW THE GUIDANCE CORRESPONDS TO THE PUBLISHED STUDIES :

The published studies **not typically reporting** how their **preparation informed** the **development of their search strategies nor how their search approaches** were developed.

Text mining has been proposed as a technique to develop search strategies in the preparation stages. Although **this work is still exploratory**⁶⁵.

KEY STAGE FOUR

Designing the search strategy



KEY STAGE FOUR : DESIGNING THE SEARCH STRATEGY

THE GUIDANCE* :

The **Population, Intervention, Comparator and Outcome** (PICO) was the commonly used structure ^{1,4,7-9}

NICE handbook introduced : **PICO, SPICE** (Setting, Perspective, Intervention, Comparison, Evaluation), and **multi-stranded** approaches.

The Joanna Briggs Institute reviewers' manual **offered details** to select search term : **synonym, Boolean language, database indexing terms and combining search term.**

*The use of limits, such as language or date limits, were discussed in all documents

KEY STAGE FOUR : DESIGNING THE SEARCH STRATEGY

HOW THE GUIDANCE CORRESPONDS TO THE PUBLISHED STUIDES :

Dominant model for **review of effectiveness intervention** : PICO or PICOs-
where the S denotes study design^{6,68}

ALTERNATIVES TO THE PICO STRUCTURE :

**Behavior of interest, Health contexts, Exclusion, Models or Theories (BeHEMOTH) –
for review to identify theory.**

**SPICE and SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) –
review for social science and evaluation studies.**

KEY STAGE FOUR : DESIGNING THE SEARCH STRATEGY

EXAMPLE OF SEARCH STRATEGY MODEL (SIMILARITIES AND DIFFERENCES) :

Setting	Perspective	Interest	Comparison	Evaluation	
Rural communities	Pregnant woman	Caesarian section	Vaginal birth	Woman's perceptions or experience	SPICE
PICO(S)	Population	Intervention	Comparison	Outcome	*Study design
	Pregnant woman	Caesarian section	Vaginal birth	Perinatal mortality	Retrospective cohort
SPIDER	Sample	Phenomenon of Interest	Design	Evaluation	Research type
	Pregnant woman	Caesarian section	FGD or In-depth Interview	Woman's perceptions or experience	Qualitative

KEY STAGE FIVE

Determining the process of literature searching and deciding where to search (**bibliographic database searching**)



KEY STAGE FIVE : DETERMINING THE PROCESS OF LITERATURE SEARCHING AND DECIDING WHERE TO SEARCH (BIBLIOGRAPHIC DATABASE SEARCHING)

THE GUIDANCE :

Searching bibliographic databases was consistently reported as “**first step**” to literature searching in all 9 guidelines.

3 documents mentions **specific guidance on where to search**, in case specific to the type of review their guidance informed, and as **a minimum requirement**

7 key guidance documents reports the **selection of databases depends on the topic of review**^{2-4,6-8}

KEY STAGE FIVE : DETERMINING THE PROCESS OF LITERATURE SEARCHING AND DECIDING WHERE TO SEARCH
(BIBLIOGRAPHIC DATABASE SEARCHING)

HOW THE GUIDANCE CORRESPONDS TO THE PUBLISHED STUDIES :

Acceptable in The Cochrane Handbook : search in **Cochrane CENTRAL, MEDLINE and EMBASE**

CINAHL has contribution in identifying qualitative study⁷⁶, but in **clinical study it remains questioned**⁷⁷

The average number of bibliographic database search in SR has risen in the period 1994-2014 from (1-4)⁸⁰. but acceptable **number of database searched remains unclear**⁴⁸.

KEY STAGE SIX

Determining the process of literature searching and deciding where to search (**supplementary search** method)



KEY STAGE FIVE : DETERMINING THE PROCESS OF LITERATURE SEARCHING AND DECIDING
WHERE TO SEARCH (SUPPLEMENTARY SEARCH METHOD)

THE GUIDANCE :

Supplementary literature search methods **should be used in systematic reviews recurs across documents**

However, **which methods** are used and the extent **to which they are used varied.**

It was found that **inconsistency in the labelling of supplementary search methods** between guidance documents.

KEY STAGE SIX : DETERMINING THE PROCESS OF LITERATURE SEARCHING AND DECIDING WHERE TO SEARCH
(SUPPLEMENTARY SEARCH METHOD)

HOW THE GUIDANCE CORRESPONDS TO THE PUBLISHED STUDIES :

Four guidance documents acknowledge **searching beyond databases was necessary** since databases are not the only source of literature^{2,3,6,9}

However, the IQWiG handbook reported that **handsearching method is optional**. This is **contrary with the guidance** above in the bibliographic database searching

A review by Cooper et al (2017) reported the advantages disadvantages and resource implications of using supplementary search method

KEY STAGE SIX : DETERMINING THE PROCESS OF LITERATURE SEARCHING AND DECIDING WHERE TO SEARCH (SUPPLEMENTARY SEARCH METHOD)

HOW THE GUIDANCE CORRESPONDS TO THE PUBLISHED STUDIES :

COOPER ET AL'S (2017) FINDINGS ON SUPPLEMENTARY SEARCHING METHOD

- **Advantage** : Unique study identification, increased sensitivity; identifying studies missed or not indexed in databases
- **Disadvantage** : Studies still missed by handsearching; time and access to resources; low precision
- **Resource requirement** : range between 6 min to 1 hour per journal

KEY STAGE SEVEN

Managing the references



KEY STAGE SEVEN : MANAGING THE REFERENCES

THE GUIDANCE :

5 guidelines covered on **how references should be managed**, for example^{2,4,6,8,20} :

- Downloading directly from the databases
- Deduplicating
- Managing the output of literature search through reference manager

If the sources **do not allow to import references directly**. It is recommended to **save the results into spreadsheet or Word file**, and these may be **manually entered** into reference manager software¹⁰

KEY STAGE SEVEN : MANAGING THE REFERENCES

HOW THE GUIDANCE CORRESPONDS TO THE PUBLISHED STUIDES :

The literature on using bibliographic management tools is not large relative to the number of 'how to' videos on platforms such as **YouTube**¹⁰². This confirms the **overall lack of guidance on how to manage reference** in the manager software

Managing the reference is **a key administrative function** in the process for documenting **PRISMA** guidance

KEY STAGE EIGHT

Documenting the search



KEY STAGE EIGHT : DOCUMENTING THE SEARCH

THE GUIDANCE :

The Cochrane Handbook was the only guideline document to recommend a specific reporting guideline : **PRISMA**

Other guidance recommended to report:

- **number of study identified^{3,6,10}**
- **number of duplicates identified¹⁰**
- **screening decision³**
- **a comprehensive list of grey literature source searched⁸**
- full detail of supplementary search method⁸
- search strategy used⁶
- any use of limits (date/ language)⁶

KEY STAGE EIGHT : DOCUMENTING THE SEARCH

HOW THE GUIDANCE CORRESPONDS TO THE PUBLISHED STUIDES :

All guidance documents should ultimately deliver completed systematic reviews that **fulfil the requirements of the PRISMA** reporting guidelines. It is unclear why the collective guidance does not more explicitly endorse adherence to the PRISMA guidance.

THERE ARE OTHER GUIDANCE RELATED TO REPORTING SEARCH :

- **ENTREQ – for qualitative evidence synthesis**
- **STROBE – for reviews of observational studies**

LIMITATION



LIMITATION

OTHER HANDBOOKS EXIST :

This literature review focused on guidance produced in **the UK and Australia**

THE HANDBOOKS ARE POTENTIALLY LINKED TO ONE ANOTHER

It is unclear whether unincluded guidelines **would alter the findings or develop further support** for the process model

THIS IS A LITERATURE REVIEW

The review from published studies is **not a systematic review of the evidence in each key stage**. Other relevant studies may contribute to the development of key stages in this review

4. CONCLUSION



CONCLUSIONS

- The findings reported above reveal eight key stages in the process of literature searching for systematic reviews
- These key stages are consistently reported in the nine guidance documents which suggests consensus on the key stages of literature searching
- This review calls for further research to determine whether the process which they each report remains valid for current systematic literature searching
- This may be useful to test whether the same model can be applied for qualitative review or interventions effectiveness review



Thank you!



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