Chapter 5. Searching and identifying studies

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Key points

- Qualitative studies are published in diverse formats, requiring searches beyond databases of peer-reviewed journals.
- Searching and screening processes should allow for language and reporting variations within bibliographic records.
- Approaches to searching for studies for a qualitative evidence synthesis (QES) vary and the development of a search strategy for a QES should align to the aims of the review and its methodology.
- It is often more important to identify a set of studies to represent a diversity of viewpoints rather than all studies that exist, and this might be operationalised by iterative processes.
- Opportunities for applying automation for screening are currently limited.
- Review teams should bring a reflexive mindset to identifying and selecting studies.
- Keeping searching methods flexible can increase the usefulness and relevance of the QES and clear reporting of the rationale and methods for identifying studies strengthens accountability.

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5.1 Introduction

This chapter presents considerations for identifying studies for QES, drawing on the available literature and informed by practice. Study identification combines literature searching and study selection (through a screening or sifting process) and may be followed by a process of sampling from relevant studies (See Chapter 6). The reader is encouraged to read chapters 5 and 6 together. This chapter focuses on aspects of searching and screening that are specific to identifying qualitative research across healthcare and the social sciences as encompassed by Cochrane and Campbell reviews. The emphasis is on particular considerations rather than superseding generic guidance such as that provided in the Cochrane Systematic Reviews of Interventions Handbook (Lefebvre et al. 2019). Study identification should recognise both the nature of qualitative research and the aims of the review synthesis. Overall, review teams should bring a reflexive and continually evaluative mindset to their approach to study identification. The variety of QES types and the challenges of identifying qualitative research mean that flexibility of methods and transparency of reporting are particularly important to strengthen usefulness and accountability.

This chapter begins by outlining different search approaches and then goes onto provide guidance and considerations on operational aspects of searching, screening and documentation. The chapter also provides guidance on planning a search, considers issues in updating reviews and reflects on how automation can help to identify studies. Stakeholder engagement and involvement, issues of equity in searching and reflexivity are also considered.

5.2 General issues

5.2.1 Navigating the literature of qualitative research

Qualitative research, as included in systematic reviews, takes diverse published forms, from journal papers to standalone reports, book chapters or theses. Furthermore, it includes varied research methodologies, described by diverse terminology (Booth, 2016). Titles and abstracts (where present) vary in their reporting quality and could indicate qualitative

research via a phenomenon (e.g. people's views, experiences, expectations), study type (e.g. ethnography, phenomenology), data collection (e.g. field notes and observation, focus groups, interviews, open-ended questionnaires), types of data (e.g. stories, narratives), or analysis (e.g. grounded theory, thematic analysis). In contrast to the extensive information systems, support tools and initiatives for identifying randomised controlled trials within healthcare (including research registers and indexing), similar initiatives to organize qualitative research are limited. All these factors combine to require high sensitivity, low-precision searches, yielding research records that require considerable time to screen. Most literature on identifying qualitative research relates to the healthcare context. Beyond healthcare similar challenges persist for all types of research design and not solely within the context of qualitative research. With a small evidence base underpinning the methods for searching for qualitative research (Booth, 2016), methods are largely informed by practice, case studies and a handful of evaluations of database content and search filters. It is hoped that further development and evaluation of methods will continue as the number of QESs increases. Searching and screening require careful planning and scoping with input from someone familiar with designing and implementing literature searches, for example an information specialist. Other stakeholders, particularly practitioners and those with lived experiences, might provide useful perspectives on the concepts under investigation, search terms and suitable resources to search, as well as contributing to the wider research protocol.

5.2.2 Aims of searching

A QES often seeks to optimize the sample of studies that are diverse, rich and as free as possible from methodological limitations (trading-off the “three Rs” of relevance, richness and rigour) (Chapter 7). QESs generate theories, concepts or insights about an intervention or a phenomenon. Review authors typically try to represent the diversity of viewpoints and contexts that exist, rather than synthesise all studies that they can identify, particularly if these simply aggregate similar perspectives or contexts. However, different types of QES favour different positions on the extent to which they seek to configure all potential viewpoints or aggregate all possible studies.

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Depending on the emphasis of the QES and the review methods, the searching process aims to identify all relevant studies that exist or a purposive sample of representative studies to address the research questions, and minimising potential biases, with the overarching goal that knowledge claims arising from the synthesis are based on an appropriate survey of the literature (Brunton et al., 2017). While a comprehensive search aims to identify all studies, a selective, purposive search aims for diversity by seeking a selection of studies across populations or settings to identify every viewpoint (Glenton et al., 2018). In both cases, the review authors could sample those studies that appear suitable for synthesis (Chapter 6).

The aims of searching may be operationalised in various ways (see section 5.3) and are influenced by practical constraints. Some Cochrane QESs aim to be comprehensive in their search (e.g. Downe et al.(2019)), others might justify using a selective, focussed search while yet others aim to be expansive though not exhaustive. For example, a Cochrane QES by Houghton et al (2020) employed a resource-conscious approach, which involved searching multiple databases and other resources with searches prioritising precision over sensitivity. Focused searches were then used at a later time-point across four high-yielding resources.

While an optimal search captures all relevant studies (sensitive) without simultaneously capturing a large volume of irrelevant studies (precise), in practice highly sensitive searches are typically low precision. As a result, decisions are made regarding whether to allocate more time and resources to refining and running searches, or screening records retrieved, or another part of the review process (Lefebvre et al., 2019, Brunton et al., 2017). Furthermore, it is theoretically impossible to anticipate all possible perspectives and studies, and there are practical limitations in seeking to do so. For example, any attempt to capture all perspectives within a global context is constrained both by publication biases and the dominant profile of certain countries, institutions and regions in funding and disseminating research indexed in major databases.

Scoping work is important to inform the planning of searches. Any purposive sampling informing the search (Chapter 6) needs to be underpinned by a suitable framework (Booth, 2016). For example, considering how to capture and represent a diversity of views from different groups - especially those otherwise unheard. Some search strategies aim to identify research that explores particular aspects of an intervention, such as process

evaluations, implementation studies, or those that explore or generate theory. Others focus on a particular type of qualitative research design. The search itself may address one or more review questions for a standalone QES, or contribute to a mixed-method review addressing research questions by diverse study types. Overall, a review team should be transparent about the aim of the search including any sampling decisions and be able to justify how these are achieved (Chapter 6).

5.3 Search procedures

5.3.1 Approaches to searching

Suggestions on how to search for qualitative evidence are plentiful (Booth 2016) though they draw on a limited evidence base and procedures may diverge from standards applied to effectiveness reviews. Given the difficulties in locating qualitative research, and recognising that it is not only found in peer-reviewed journals, it is helpful to think beyond a single, "big bang" Boolean search of scholarly bibliographic databases. Instead, a review team should favour a multi-stranded approach that includes searching other resources and using search techniques based on citation and similarity relations, possibly over multiple iterations. Reference checking, follow-up of citations or grey literature searches allow a team to identify diverse studies as well as mitigating the risk of missing relevant studies so they are useful techniques for both comprehensive and purposive searching. The emphasis placed on these different methods varies by topic and review type.

For some topics, it is helpful to set out the search strategy *a priori*, establishing boundaries and assumptions of the searches at the outset to eliminate scope creep. Other topics benefit from an iterative approach informed by the process of undertaking the review (for example, multi-stage searching and study-identification, a decision to search additional information sources, or to conduct targeted searches with additional terms in order to explore concepts or terminology that were unknown at the outset of the review). Published examples are rare and the reasons for adopting an iterative approach may vary. For a systematic review on self-care for minor ailments (Richardson et al. 2018) an initial search was undertaken to identify the most commonly considered minor ailments that put pressure on health systems within the UK context, in order to inform searching for specific

ailments (e.g. sore throat, cold, muscular pain), however insufficient literature from this search meant additionally drawing on other lists of ailments. Planned iteration as a component of study identification within a review is different to exploratory searching and screening as part of an *a priori* review protocol development, but may have similar purposes, with the former particularly requiring reflexivity and transparent reporting. Some search strategies may combine pre-defined and iterative methods, either within a comprehensive or within a purposive (selective) approach.

Not every QES uses a specific, named review methodology. Where a methodology is identified, the search approach should align to the expectations for the chosen synthesis type. If the synthesis is designed to include all relevant studies (e.g. meta-aggregation), then a comprehensive search is essential. Conversely, if the synthesis is designed to develop new theory (e.g. meta-ethnography) review authors could justify using a purposive (i.e. selective) search as part of a sampling approach (Chapter 6). However, undertaking a broad comprehensive search (sometimes reported as an evidence map) prior to constructing a sampling frame (Chapter 6) is also common across any type of QES that aims to generate theory or where differences in context across study findings are critical. Review authors should factor in procedures to find unusual and contradictory cases to achieve maximum diversity (and hence, richness of understanding) (Booth et al., 2013a), though this may differ between reviews within the searching or sampling stages. Some reviews may benefit from a "pearl-growing" or "snowballing" approach (identifying known papers through expert input, or a highly specific search, then working outwards using citations to collect more of the same). When using a particular qualitative review methodology for the first time, consult the best available guidance and published examples (see Sutton et al. 2019 and accompanying supplement for examples).

A typical search strategy includes multiple different approaches to searching and sampling (Chapter 6). Table 5.3.1 contrasts a comprehensive *a priori* approach with a purposive, iterative approach to illustrate differences. However, in practice, purposive or comprehensive searches may share similar approaches but have different reasons for operationalising a particular approach (Booth, 2016). Both approaches should justify the

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choice of resources searched, given that omission of studies may miss important contexts and findings (Carroll et al., 2012, Booth et al., 2013b, Booth, 2016, Tsang and Maden, 2021).

Table 5.3.1 - **Key differences in comprehensive and purposive (selective) approaches**

Component	Comprehensive, *a priori* approach	Purposive (selective), iterative approach
Sampling framework (see Chapter 6)	Used to represent the quantity and distribution of relevant references. Typically a matrix.	Used to represent variables to inform sampling. Typically logic model or a conceptual framework.
Structured question(s) (see Chapter 2)	Fixed question, pre-specified eligibility criteria.	Exploratory question, sub-questions added subsequently.
Search procedures (aims of sensitivity) (see 5.2.2)	Searches for homogeneity (i.e. closeness of match to stated scope, and may use structured question frameworks of SPICE/PICo etc. in Chapter 2).	Searches for diversity (e.g. sub-populations, exceptions, best and worst cases etc.) Searches for richness (e.g. CLUSTER searching, see 5.3.2).
Search approach (see 5.3)	Typically one-stage "big bang" (i.e. *a priori*) search to identify all references at an early stage.	Iterative approach informed by yield. May occur at multiple stages informed by emerging lines of inquiry. May include elements of "berry picking"[1].
Software and systems for investigating the search results and informing follow-up searches (see 5.4)	Bibliometric heatmaps (e.g. VOSViewer) to visualize the terminology present in retrieved studies.	Software to observe and expand range of citation networks (such as interrogating Google Scholar via Publish or Perish software).
Source selection (see 5.5)	Selects databases on basis of probability of relevant references.	May target population-specific, discipline-specific or geographic-specific databases (to explore variations).
Strategies and filters (see 5.3.2 and 5.5.3)	Topic searches (often designed using a question framework e.g. SPICE, though not all elements of the	May use study design filters, and also multi-stranded searches for different purposes, such as searching for mid-

[1] "bit-at-a-time retrieval" BATES, M. 1989. The design of browsing and berrypicking techniques for the online search interface. *Online review,* 13, 407-424. By analogy to picking berries in the forest where, instead of completely exhausting all berries from a bush the searcher's query evolves dynamically once the most readily accessed and most promising berries have been retrieved.

	framework are necessarily included in the search). May use study design filters for qualitative research and process evaluations as part of managing quantity of results.	range theory or programme theories (See Chapter 15 on Realist Synthesis).
Supplementary strategies (see 5.6)	Citation checking against pre-specified eligibility criteria to mitigate risk of missing studies.	May explore citation networks (backwards/ forwards citation chasing and related articles features) to investigate other lines of inquiry.
Standards for reporting (see 5.9)	Fits PRISMA elements for reporting.	May require supplementary narrative description and amended, extended or supplemented PRISMA diagrams (e.g. when describing multi-stage searches).

5.3.2 Searching for studies relating to intervention implementation or theory

When identifying qualitative evidence that evaluates the process of an intervention, its implementation, acceptability or feasibility, four approaches can be used for study identification, ranging from the sensitive to the specific (Cargo et al., 2018).

i. Using a broad search with no methodological limits or filters, select qualitative studies alongside other eligible study types as part of the screening process;
ii. Select qualitative studies from screening results from the search for clinical trials in the expectation that these are retrieved by the trials search filter (applicable where interventions are evaluated by trials);
iii. Use search terms derived from the study type (e.g. process evaluation), the data type (e.g. process data) or the application (e.g. implementation), as appropriate;
iv. Use citation-based approaches (e.g. 'CLUSTER searching') to systematically identify outputs that relate to a known study. The CLUSTER searching method (Booth et al., 2013b) allows for the identification of "sibling" papers or "clusters" that relate to a known study (such as those by the same author,

or those which cite the study) or papers of studies undertaken within a similar context. However, this is a resource-intensive method, requiring consideration of how many "clusters" it is feasible to explore within the time available (Tsang and Maden, 2021).

A team may combine some or all of the above approaches, for example, by searching for studies linked to trials with a shared context from effectiveness reviews, as well as undertaking searches using a qualitative methods search filter (Ames et al., 2019).

Some QESs may have an emphasis on exploring or testing theory. The BeHEMoTh framework helps to guide the search strategy for studies of theory (Booth and Carroll, 2015). Other approaches may similarly help when identifying theory (see Booth et al., 2013b, Booth et al., 2018, Tsang and Maden, 2021).

5.3.3 Date, language and document format restrictions

A review team should justify any limits on date or language in both the protocol and the final report of the review. If review articles are eligible for inclusion, these contain data from earlier studies so the review team needs to decide how to handle these. Where the team is conducting complementary intervention and qualitative reviews or a mixed methods review they should consider seriously whether to use the same search parameters for both. On the one hand, research exploring experiences of a condition or a phenomenon may predate an intervention developed to address it (Lorenc et al., 2012). Conversely, changes in the context or in public attitudes may require a more recent date limit than early effectiveness studies. Overall, judiciously chosen and explicitly stated limits are preferable to unclear or arbitrary ones.

Synthesis of multilingual qualitative evidence is particularly challenging, especially if concepts do not easily translate between languages and nuances of meaning differ. However, Walpole (2019) argues that this can add important insights, and considers strategies for searching and screening. Applying limits on date or language within database searches requires care to avoid unexpected effects where indexing is incomplete. For example, applying a database limit of "English language" misses studies where no language is specified - even if they are in English. One solution is to remove records on the basis of

dates or languages not in scope (if this functionality is available), taking care to keep records of multiple languages where one language is in scope. Some searchers argue against applying limits (see Aali and Shokraneh, 2021) on the basis that teams can implement these decisions with greater accuracy at the screening stage.

It is not recommended to limit inclusion by document type at any stage, unless supported by a clear rationale, as the contextual descriptions and verbatim quotations that are part of reporting qualitative research lend themselves to publication in long form documents such as reports or book chapters (Walsh and Downe, 2005).

5.3.4 When to stop searching

See also chapter 6. If review authors decide not to conduct a comprehensive search they should justify how they decided when to stop searching (Booth, 2016). In reviews designed to develop new theory or theoretical insights "theoretical saturation" is defined as the point where finding additional data provides no new insights or perspectives. It is only possible to state with confidence that this point has been reached after making a reasonable attempt to consult a spread of sources; such further sampling should prioritise diversity (Chapter 6). Where a reviews team aims to conduct a comprehensive search they can decide to stop searching when they feel that they have reached "bibliographic sufficiency" i.e. when extending the search to include new terms or sources does not find any relevant studies beyond those already retrieved.

While it is possible to find further results by searching beyond the resources originally planned, this can lead to diminishing returns and may introduce lower quality, predatory journals (Booth et al., 2019a). For reviews which address multiple questions a final justification for stopping searching could be when the authors have no further questions to answer within the remit of the current review.

5.3.5 Timing of searches, update searches and living reviews

As with any type of literature review, findings should be as current as possible. Many organisations require no more than 12 months between the date of the searches and publication. A review team could consider the reasons for updating: 1) Is the requirement procedural? 2) Is there a legitimate concern from subject experts about the validity of the

original findings?, or 3) is the need for an update linked to the incompleteness, and impaired usefulness, of the synthesis based on the volatility of the literature? If an editor or peer reviewer is requesting an update, it is helpful if they can explain the perspectives or lines of inquiry that they fear are missing rather than universally applying an arbitrary requirement. Any update process should be designed to address these concerns while not being determined by it. For example, a missing perspective may require an update search of a specific type of source, not simply retrieval of a specific study.

Irrespective of an arbitrary timeframe, considerations include the incidence of new research, the volatility of the context, the potential contribution of additional insights, and the completeness of coverage of any sampling frame or conceptual framework. The decision on whether to update, or on the extent of the update process, may also depend upon what the funder requires and what they are prepared to fund. Rather than impose an arbitrary expiry date, qualitative research requires flexibility, justification of the chosen approach and clarity on how the update is to be implemented. This includes considering if an update period is implemented using date of publication or the date when a database record was updated.

Given that any review publication represents a time-specific cross-sectional slice through relevant literature, a review team may choose to acknowledge incident literature in the discussion section of their review report, and make it transparent that these studies are not included within the synthesis. Such reporting might simply describe the newly-identified studies or alternatively the review team might suggest how the findings of these new studies could impact on the review synthesis.

An evidence-based approach to search updates is determined by the prevalence and incidence of relevant studies. Specific considerations link to the four GRADE-CERQual criteria (Table 5.3.5) (see chapter 13).

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Table 5.3.5 Study-based considerations of the need for a search update

	Considerations of prevalence of studies (original synthesis)	Considerations of incidence of studies (newly emerging studies)
Relevance	1. Are important contexts, perspectives or geographical regions omitted from the original synthesis?	1. Do new studies represent contexts, perspectives or geographical regions omitted from the original synthesis?
Adequacy	2. Are themes/findings from the original synthesis only supported by few studies	2. Do new studies add rich support for previously less-supported themes/ findings from the original synthesis
Coherence	3. Do areas of the synthesis represent a poor fit between the data and the review question?	3. Do new studies improve the fit between the data from the original synthesis and the review question?
Methodological Limitations	4. Are themes/findings only supported by studies with serious methodological limitations?	4. Do new studies with few methodological limitations support themes/findings previously supported by studies with serious methodological limitations?

Asking the questions in Table 5.3.5 requires a good knowledge of newly published studies in the topic area. However, a scoping search cannot replicate the original search strategy simply to establish whether a complete search strategy is needed Four alternatives suggest themselves:

1. Conduct a scoping search on the principal database (in terms of yield of original studies)
2. Conduct citation searches only (for included studies) limited to studies published during the update period.
3. Conduct supplementary searches of databases omitted from the original search to address specific gaps (e.g. regional or disciplinary databases).
4. Use additional/alternative search terms absent from the original search strategy (usually less common given that this limitation may extend backwards beyond the

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update period. However, if a new term rose to prominence within the update period (e.g. “vape”) this might harness additional records).

A review team might select one of the above approaches to explore the need (or not) for updating their review. Full guidance for search updates is available in the online supplementary material. (Also see Chapter 6 on Sampling and Chapter 15 on conducting time-sensitive QES).

Having established the need for an update search, review authors then face a choice between a blanket search update, replicating the original strategies together with terminology changes or additions, or seeking to populate specific underpopulated areas of the framework with missing concepts, perspectives or settings. While a review team may justify either of these decisions, ultimately they should remain true to how the original review was conceived; whether requiring a comprehensive search and inclusion of all relevant studies, or a purposive search using a sampling framework. Similarly, arguments about potential research waste vary according to whether a new study simply replicates existing findings or adds meaningfully to an overall conceptualisation.

The information specialist should save their search history to enable the strategy to be re-run on the original database platforms as required. Authors of Cochrane Reviews are expected to rerun search updates across all the original sources. If time constraints limit the number of sources to be included in an update, authors need to consider the risk of missing relevant evidence from a specific discipline or perspective. A similar situation exists for Living QES (See Chapter 15 on Time Sensitive Reviews), which involve continuous updates to assimilate the findings of newly published research; current Cochrane guidance focuses on effectiveness evidence from trials (Brooker et al., 2019).

5.4 Planning the search

All searches require careful planning. This involves familiarisation with the topic, identifying which resources to search and testing how to search them. Always ensure the search is consistent with subsequent screening processes (e.g. via the review protocol and the review team), as although they are separate processes, they collectively form the study identification method. A review team needs to select a conceptual framework (e.g. defining

the scope using structured questions or logic models). The PICO format that is integral to guiding reviews of effectiveness is less helpful for the questions posed by qualitative syntheses. Instead, useful formats may include PICo (where Co represents Context); SPICE; SPIDER or PerSPe(c)TIF (See Chapter 2) (Booth et al., 2019b). These frameworks are tools, rather than definitive methods, used to structure the scope of the review into viable search concepts, such as population, topic (or phenomenon) of interest and context. Exploratory searches help to discover how authors and indexers have expressed these concepts. Screening samples of search results aids further understanding particularly for difficult-to-define topics. This exploratory phase may be reported within the search strategy.

Searching and sampling operate together within study selection (Chapter 6). A small-scale study suggests that qualitative research of a healthcare intervention or phenomenon of interest is likely to contain population and research type elements (Frandsen et al., 2021), but other elements such as context, outcome, intervention or phenomenon of interest are less common. Therefore, a team may decide to conflate or even omit some conceptual elements from the search strategy in the expectation of filtering these concepts at the screening stage, to reduce the risk of missing relevant studies. However, a team needs to weigh up this benefit against the potential screening workload.

Where a search appears to identify an unmanageable number of results a review team might consider:

i. revising the scope;
ii. screening a small percentage of records before modifying and re-running the search to improve its precision; or
iii. dealing with records in "tiers" according to publication date or likelihood of relevance (e.g. "probable" terms ahead of "possible" terms; or the presence of search terms in titles/indexing over those that appear in the abstract).

The team may use bibliometric tools to investigate the search results during the planning stage or apply them subsequently to the sample of eligible studies. Analysis of terms and phrases may help inform the search strings (also see Section 5.5.2 on developing search strings for database searching). Tools such as citationchaser may be used to explore

citation networks and thus help to focus citation searches or assist in sampling of research findings from specific sub-topic areas (Haddaway et al. 2021). Finally, creating a search log or spreadsheet to keep track of searches ensures the intended searches are implemented at the scheduled stages in the review (e.g. see Rader et al., 2014).

5.5 Sources to search

General

The review team should always consider the type of qualitative studies required and from where these might be found, as sources differ from those for reports of controlled trials. Given that researchers publish qualitative studies in diverse formats, a search of databases that only contain journal articles is not sufficient. For example, MEDLINE or CINAHL alone are not suitable for a healthcare topic (although CINAHL has proved an especially useful source for identifying qualitative studies in nursing (Flemming and Briggs, 2007) and dementia (Rogers et al., 2018)). While other topic-curated databases, such as PsycINFO and ERIC, contain a greater variety of publication formats, review teams should also consider searching thesis databases, library catalogues, specialist repositories, and other topic-specific resources such as the websites of relevant organisations as advised in Cochrane and Campbell guidance (Lefebvre et al., 2022, Kugley et al., 2017). Where reviews focus on multiple geographical areas, a review team should be aware that different geographical regions or individual communities could provide different research findings, and that they must avoid geographical bias through their selection of sources (Stansfield et al., 2012).

Access to resources may prove challenging, particularly when databases are behind a pay-wall, as in the case of PsycINFO and many social sciences databases that support long Boolean searches. Full text reports, theses and book chapters might require to subscription access or may not be available electronically, and access to some electronic research reports may only be available via individual websites, institutional repositories or within certain countries. The Research4Life initiative (www.research4life.org) aims to address inequities in access to research literature by providing free or discounted access to lower income countries. Academic search engines (e.g. BASE, Google Scholar, Lens, OpenAlex, Semantic Scholar) offer another way of mitigating some of these challenges. These can be searched at their own websites, or in some cases via third-party interfaces such as Publish

or Perish or EPPI-Reviewer (in the case of OpenAlex, and free of charge for Cochrane and Campbell reviews). However, challenges exist when searching beyond conventional bibliographic databases in terms of achieving a high recall, exporting the results and documenting the search history.

5.5.1 Bibliographic databases

Evaluations and case studies have estimated which sources contain qualitative research, or have explored yield when searching in the course of conducting a review. Many case studies show that searching more resources yields greater numbers of references, though few case studies explore the impact on their findings, so any recommendations are tentative.

Within healthcare databases CINAHL, PubMed (or Medline), and EMBASE each individually contained over 55% of qualitative studies identified from a set of 71 Cochrane or JBI reviews while PsycINFO contained 43% (Frandsen et al. 2019). The same four databases were recommended from an analysis focusing on qualitative research in diabetes (Justesen et al., 2021). While this research established the definitive presence of studies within each database, real-world retrieval from searches is likely to be lower. Searching multiple databases with overlapping content offers multiple access points for retrieving records via different indexing methods, and being able to mitigate time lags in adding records to a database (Rogers et al., 2018, Stansfield and Liabo, 2017). Individual cases also demonstrate topic variation: a greater yield for dementia studies from CINAHL and PsycINFO (DeJean et al., 2016) and unique retrieval from CINAHL and MEDLINE, although with differing trends for the topics of chronic obstructive pulmonary disease and early breast cancer. Some authors suggest the added value of searching a generic social sciences resource in addition to topic-specific resources, although this is a particularly limited evidence base. Case studies of specific health and social care topics support the use of the Social Sciences Citation Index (SSCI) (DeJean et al., 2016) and Sociological Abstracts (Stansfield et al., 2013). Other social science databases, such as ASSIA and IBSS (Stansfield et al., 2013), may add incremental value for certain public health topics.

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Guidance on finding qualitative research outside the healthcare domain is scarce. However, generic principles of choosing appropriate resources within these domains still apply. Databases in education and criminology (e.g. ERIC and Criminal Justice Database, respectively) index diverse publication types. Furthermore, sources such as PsycINFO and social science and interdisciplinary sources offer important coverage of multiple study designs, pointing to their likely usefulness for qualitative research.

5.5.2 Designing database search strings

Typically, searchers develop a search string (strategy) based on Boolean logic for a database; pilot it (to estimate the size of the literature, and to ensure that it retrieves known relevant papers); and then adapt as required for use on other databases. Search strings should be structured logically around the key conceptual elements of the research question, using a combination of free text terms (in fields such as titles and abstracts) with subject headings (in sources which use a controlled vocabulary). Considerable variation exists within the subject headings used for qualitative research across CINAHL, Embase, PsycINFO and PubMed, therefore, a reviewer should always browse the thesaurus for the best match available (Rogers et al., 2018). Adapting a search to databases may involve searching them differently, depending on their topic focus, indexing or search functionality. For example, this might include using fewer search concepts or search terms, or applying broader subject headings. The purpose is to increase the sensitivity of the search rather than fundamentally changing the intention of the search.

Free text searches achieve greater sensitivity by using truncation and wildcards to find variant spellings and word endings; phrases may be searched using proximity operators (such as adj / near / next). Most databases provide informative help pages with examples of the correct syntax to use.

Text analytic tools can be used to explore frequently-used terms and phrases within a text corpus, to prompt consideration of synonyms and related terms and to reveal irrelevant concepts. This can support understanding of some diverse topics as part of an iterative exploratory process (Stansfield et al., 2017). Popular tools are developed for PubMed and

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others support analysis from any text corpus (Glanville and Wood, 2018; Lefebvre et al., 2022; Marshall et al.. 2022).

When retrieving qualitative research across diverse disciplines, a review team should bear in mind that titles are typically less descriptive, and abstracts less detailed, than for corresponding quantitative studies. Using additional searches targeted at the title or keywords fields may help to reduce the risk of missing relevant records (e.g. searches of title field using fewer concepts, or less specific terms than if searching abstracts). If the search approach incorporates looking for studies relating to known trials, identifiers such as the ISRCTN or trial name may be helpful (Booth, 2016). Search filters - "off-the-shelf" strings developed by experts for the purpose of identifying for identifying qualitative research - are less dependable than their counterparts for identifying RCTs. The InterTASC Information Specialists' Sub-Group (ISSG) Search Filters Resource curates an archive of methodological work on the development of filters, including those designed to retrieve qualitative research. However, not all of these have been validated (tested for accuracy against a gold standard set); and those which have score significantly lower for measures of specificity and sensitivity than filters for identifying other study types. For example, tests of the McMaster University qualitative filter (on which MEDLINE's "clinical queries" limit is based) retrieved less than two-thirds of eligible studies (Wong et al., 2004). A subsequent validation study found that an alternative, sensitivity-maximising version of the same filter retrieved over 90% of eligible studies, but this came at the expense of retrieving more irrelevant studies (Wagner et al., 2020). Meanwhile, the best-balanced filter (by the University of Texas) retrieved only four out of every five relevant studies. An equivalent evaluation found that filters for PsycINFO and CINAHL similarly only retrieved four out of five relevant studies when sensitivity was balanced with specificity and that no single filter could provide completeness (Rosumeck et al., 2020).

For this reason, it may be appropriate to supplement a qualitative filter with additional words relating to qualitative research and specific types of data of interest. The ESCAPADE mnemonic, devised for the University of Sheffield's ESQUIRE workshops[2], prompts

[2] Methods workshops on Qualitative Evidence Synthesis

reviewers to consider additional terms that indicate if an article contains qualitative data, such as: Exploratory methods (e.g. focus group, grounded theory); Software (e.g. NVivo); Citations (e.g. Glaser & Strauss); Application (e.g. ethnology); Phenomenon (e.g. perceptions, attitudes); Approaches (e.g. ethnographic); Data (e.g. narratives, descriptions); and Experiences (e.g. encounters). The usefulness of qualitative search filters appears to be heavily topic dependent (DeJean et al., 2016, Flemming and Briggs, 2007); where the literature is already scarce, it may be preferable to simply run a topic search without a filter and identify qualitative studies at the screening stage (a method used by Campbell et al., (2020)). However, when the size of the literature necessitates the use of a filter, a review team should seek advice from an information specialist.

While the above advice seeks to optimise retrieval from bibliographic databases, a simpler method may occasionally suffice. For example, when undertaking citation searches on Google Scholar, searching for the word "qualitative" within citing articles is surprisingly effective, due to the high proportion of papers indexed as full text within this resource.

5.5.3 Other sources

Sources beyond conventional journal article databases offer access to book chapters, theses and other types of research reports ("grey literature") that are eligible for inclusion. Norms of publication within a particular topic area should determine whether these should be prioritised; for example, research commissioned by non-governmental organisations. Flexibility and careful judgement is often required to manage the quantity of search results, given variations in search functionality and the content searched. For example, broad title and keyword searching is useful for reports and book chapters that lack an abstract, or where long summaries or full-text content reduce search precision.

Recommendations on grey literature sources and approaches exist for some research fields e.g. healthcare (Lefebvre et al., 2022) and management studies (Adams et al., 2016). Lefebvre et al have also detailed sections on sources for theses and clinical trials registries. Searching trials registry databases might be particularly appropriate for behavioural interventions, as the use of qualitative methods in evaluations of trials is increasing (Clement et al., 2018).

Numerous websites exist for organisations that may represent stakeholders, charities and research groups for a particular topic area. Appropriate sources depend upon the topic of each review and only those most aligned to the purpose of searching should be chosen, according to an explicit rationale (Stansfield et al., 2016). Another approach is contact with authors, organisations, or other experts. Contacting over 200 organisations and searching 36 websites was found to yield more useful results than searching 22 bibliographic databases to identify qualitative research for a Cochrane review on the health benefits of environmental enhancement (Cooper et al., 2017b).

Academic search engines and library catalogues (such as WorldCat) may contain certain types of grey literature and searching a subset (e.g. excluding journal articles already retrieved via database searches) can prove an efficient option. With so many options for identifying grey literature, Jordan et al. (2016) provides an example of a Cochrane review that uses several options described in this chapter. Online variants of what used to be labelled "hand searching" might involve browsing electronic tables of contents of relevant journals or searching within the journal websites, to find recent studies and to access full-text retrieval beyond that available from bibliographic databases.

5.6 Citation and related-item searches

The technique of "citation snowballing" or "pearl growing" uses papers already known to the review team (e.g. through expert advice or searching) to find more of the same (Cooper et al., 2017a, Cooper et al., 2017b) or to identify differing lines of enquiry. This can be achieved through the "find similar" features available in certain databases; through searching for other papers by the same authors (or those citing them); by using their indexing as a source of potential search terms; or by citation searching and examining reference lists. Such searches outward from known papers may require a preliminary high-precision search to identify candidate studies. These searches might be undertaken as part of scoping work or the actual review, or may be undertaken on eligible studies after screening and sampling. Resources for citation and similarity searching are described by Lefebvre et al (2022).

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5.7 Screening and selecting studies

Selecting studies from the searches involves screening against eligibility criteria and, may be followed by sampling (see Chapter 6), depending on multiple considerations, such as the aims of the search or the number of studies identified. Refer to Cochrane Handbook sections 4.6.3, 4.6.4, 4.6.6.2 for guidance on screening procedures. As some titles and abstracts may contain limited description this has implications on how inclusive to be where elements are not clearly reported, and on the performance of any automation tools. Piloting and cross-checking screening consistency is necessary to interpret inclusion criteria; it may prove challenging to decide if a study has used "qualitative research", when taking an inclusive approach for study design and analytical methods for a review (Skalidou and Oya, 2018). Data collection methods often go unreported in some journal papers, and published articles could risk being excluded in the absence of a fuller companion report of the methods for the same study (report, thesis, working paper). It is also important to have a process for retaining any retracted publications, errata and comments where such records would meet the inclusion criteria, apart from their publication type, (as described in Section 4.6. of the Cochrane Handbook for Systematic Reviews of Interventions). For example, during screening these could be marked as ‘linked records’. They also might be identified from rechecking the literature search results and aided by functionalities available in some citation managers (Bakker et al. 2022). Such records can be cross-checked against the included studies to support use of the most recent version of a published study and mitigate use of ‘fraudulent studies’.

5.8 Machine learning and qualitative research

As in many areas of research, new technologies, including machine learning and natural language processing, are increasingly used to (partially) automate tasks that were traditionally carried out manually. Some of these tools can be helpful when identifying relevant terms to use in a search. They are also useful when: screening search results, automatically classifying research; identifying new records for updating reviews; and may change study identification itself. However, there are challenges in using these tools for identifying qualitative research.

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The use of machine learning to assist in eligibility screening is used comparatively widely (O'Mara-Eves et al., 2015). The way this works is for review authors to screen a title and abstract record one at a time, and for the system to 'learn' in the background which records are relevant in order to rank the remaining records for manual screening according to likely relevance. Although reviewers find the most relevant records early in the screening process, they do not usually know at what point in the process they have found *all* relevant records. This prioritization process is thus most often used as a means of finding relevant records quickly, rather than truncating the manual screening process. While there is a limited evidence base evaluating machine learning methods to truncate manual screening (e.g. Gates et al 2018), its use in QES has not yet been evaluated.

Machine learning models are becoming increasingly popular for classifying records within a specified category. For example, Cochrane's RCT Classifier uses machine learning to separate randomized trials from other types of research (Thomas et al., 2021), saving considerable screening effort. The RCT Classifier is extremely accurate, having been built from manual assessment of several hundred thousand records. Efforts are underway to use PICO to classify the population, intervention(s) and outcome of all Cochrane reviews and their primary studies so that trials with these terms applied can be located very precisely. This involves a great deal of manual effort prior to developing an automated approach. However, the tool is unsuitable to apply to many qualitative studies. Both these examples illustrate the effort involved to develop accurate and useful automation tools to identify and categorise randomized trials. However, qualitative research receives less attention when compared with randomized controlled trials, and consequently, opportunities to use such tools are reduced. Moreover, the language used in qualitative research may not be as amenable to machine learning as for effectiveness reviews; for example, there are fewer technical terms, and concepts are 'fuzzier'. On top of this, machine learning, by focusing on a sub-set of eligible studies, may risk mistakenly down-ranking other eligible studies. This is known as 'hasty generalisation', and few published methods exist to correct for its impact. In a QES, where diversity in perspective and context is often key for developing robust theory, hasty generalisation might mean that some relevant perspectives are identified much later in the screening process, limiting the benefits gained from using the

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tool. Thus, new technologies and tools may only have limited use and value for a QES. Machine learning essentially can help users to identify 'more of the same', but where they have not been trained on 'the same' types of record (i.e. the tools designed for randomized trials) or where 'the same' is not the sole objective (where diversity is sought), then they may only offer limited assistance in a QES.

However, when a review is being updated, machine learning can potentially be helpful, as there is usually a complete set of search results (both those excluded, and those included) from which the machine can 'learn'. In this context, the original search results can be used to train a machine learning classifier to rank the update search results by relevance. The historic screening data from the original review provides an empirical basis for decisions to truncate screening.

5.9 Documenting and reporting the searching and screening process

Given that many search sources, tools and techniques are generic, a review team can use the PRISMA 2020 reporting guidance, along with its search extension (PRISMA-S), as their overall template (Page et al. 2021, Rethlefsen et al. 2021). The three main search-related requirements are *Eligibility criteria*, *Information sources* and *Search strategy* (Items 5, 6 and 7). Screening requirements are in Item 8. They also include reporting on measures taken to assure internal rigour. There is also guidance specific to QES. The search-related PRISMA items broadly translate to Items 4, 5 and 6 of the ENTREQ guidance (Tong et al., 2012) even though the latter are labelled differently as *Inclusion criteria*, *Data sources* and *Electronic Search strategy*. The ENTREQ guidance is enhanced by a more complete listing of potential data sources and by the need to "provide the rationale for using the data sources". In addition, ENTREQ includes *Item 3 -Approach to searching* and acknowledges potential decisions on "whether the search was pre-planned (comprehensive search strategies to seek all available studies) or iterative (to seek all available concepts until theoretical saturation is achieved)". Essentially, therefore, ENTREQ, includes all the elements specified by the more granular STARLITE mnemonic (sampling strategy, type of study, approaches, range of years, limits, inclusion and exclusions, terms used, electronic sources) (Booth, 2006). The eMERGe guidance, specifically for meta-ethnography, condenses reporting of the search into two items: "*5 - Search strategy*: Describe the rationale for the literature

search strategy" and "*6 - Search processes*: Describe how the literature searching was carried out *and by whom*" (France et al., 2019). eMERGe places particular emphasis on communicating the rationale for decisions, such as "whether the approach to searching was comprehensive, purposeful, or a combination of approaches" and "a rationale for the selection of bibliographic databases and other sources of literature; when searching was stopped if purposeful searches were used; and any search limiters". Meta-narrative reviews (Wong et al., 2013a) and realist syntheses (Wong et al., 2013b) have both attracted method-specific reporting guidance (see also Flemming et al., 2018).

5.10 Stakeholder engagement and involvement

Stakeholders can offer insights that may enhance study identification, for example, informing decisions on sources and search terms, undertaking screening or crowdsourcing studies (Rees and Oliver 2017). Often stakeholder-supplied information for study identification is explored within the wider context of protocol development. However, stakeholders may also identify gaps in the review findings, as a starting point for additional searching. Stakeholders may also help inform how methods for study identification may be enhanced to ensure inclusion of specific populations. Saan et al. (2015) reflect on their experiences of stakeholder involvement in study identification and present a tool for recording changes in search term development. In addition, specific resources provide stakeholder perspectives, such as websites or online forums of particular groups of interest, for example, the UK website healthtalk.org contains narratives for lived experiences of life with a health condition.

5.11 Equity, diversity and inclusion

Diverse perspectives may be captured by searching population-specific resources or using equity-related search terms. While it is challenging to find useful information resources to capture the views of particular populations, especially where a phenomenon of interest extends across multiple population sub-groups, a review team needs to consider how study identification will address this. Ultimately, the review team should ensure that aspects of equity, diversity and inclusion are considered within the review question and the eligibility criteria, and the information specialist can operationalise these in selecting sources and

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search terms. This might mean searching the global health literature to capture studies in resource-limited settings and economies (see section 5.5) or using an appropriate framework to consider how the information resources and search terms target research of underserved groups. For example, the PROGRESS-Plus framework (O'Neill et al., 2014) introduced into chapter 1 provides a lens to consider underserved groups according to ethnicity, religion, sexuality, disability, socioeconomic status and other variables. Equity considerations relate to the visibility of research, access to information resources, full-text availability of research, language and publication types. Steps taken to address these considerations will be review-specific. Overall, the review team should reflect on how the study identification processes enhance or hinder equity, diversity and inclusion and document this in their review report.

5.12 Reflexivity

It is essential for review teams to bring a reflexive and continually evaluative mindset to all the elements of study identification. Review-specific choices will impact on where and how to search and how to implement screening. These choices are made against a context of available resources and the challenges of identifying qualitative research, the aims of study identification and the overall aims and methods of the review. No guidance has yet been written on how information specialists or others undertaking searching and screening can be reflexive in the context of study identification. However, within the context of evidence-based practice, they may apply a model of reflection described by Booth (2010) which encourages the review team to reflect on their actions and decisions at all stages from planning the search through to reflecting on the implementation of the finalized search strategy to identify studies. Flexible use of retrieval methods requires that reflexivity is combined with transparent reporting in order to ensure the usefulness and relevance of QES.

It is increasingly important to reflect on the integrity of the research identified. With day-to-day familiarity with information sources and publication types an information specialist is in a front-line position to alert the team to studies that may be produced by publication mills, be fraudulent, retracted or “salami sliced” (where small parts of one study are reported across a set of papers). Further opportunities for information specialist input may

come during full-text retrieval of papers. Collective responsibility for identifying research integrity issues continues through the review stages (e.g. sampling and quality appraisal of study methods). The Cochrane website houses resources for research integrity and readers are referred here for the latest information on this.

5.13 Chapter information

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Mark Clowes and Andrew Booth are co-authors on review types and information retrieval requirements (Sutton et al. 2019), and Claire Stansfield and James Thomas are co-authors of a book chapter on finding relevant studies (Brunton et al 2017). Andrew Booth is lead author on numerous tools (e.g. BeHEMoTh, CLUSTER, STARLITE) relating to qualitative searching methods. Andrew Booth and James Thomas are co-convenors of the Cochrane Qualitative & Implementation Methods Group. James Thomas designed and directs the development of review management software EPPI-Reviewer including the integration of automation technologies. He is also the senior editor of the Cochrane Handbook for Systematic Reviews of Interventions. The authors declare no other potential conflicts of interest relevant to the topic of this chapter.

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