Methods for evidence syntheses undertaken by the HMC Evidence Collaborative

Contents:

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Purpose

This paper discusses a range of approaches to reviewing and synthesising evidence to inform decisions about healthcare. The methods and standards used for producing full systematic reviews of primary studies are now well documented and established; this paper provides guidance about undertaking evidence syntheses that are not full systematic reviews.

This guidance is not intended as a comprehensive manual of methods and, in order to accommodate a wide range of user needs and different types of available evidence, some flexibility will be needed when applying the guidance to address specific questions. The paper is, however, supported by a number of provisional reports that serve as illustrative examples of different review types and demonstrate how the guidance can be applied in practice.

Introduction

Methodological standards for systematic reviews, such as those adhering to the US Institute of Medicine standards[1] and the Cochrane Handbook (and its accompanying MECIR standards)[2] are essential for the robust review and synthesis of research evidence from primary studies of treatment effects. Similarly rigorous methods and standards apply for the synthesis of results of primary studies of aetiology and diagnostic test accuracy. Although full systematic reviews are the optimal evidence synthesis methodology for addressing most healthcare questions, they do require particular skills and can be time-consuming.

There is currently considerable interest in alternative and complementary approaches for synthesising research evidence to inform decisions in healthcare. The term 'rapid review' is now in widespread use but is poorly defined and commonly applied to a wide range of highly variable evidence products. Gough et al (2012)[3] noted a lack of consensus on the terminology for describing rapid reviews and recommended that the characteristics of different review types should be described for three dimensions of variation: (i) aims and approaches; (ii) structure and components, and; (iii) breadth and depth.

AHRQ has very recently published a report[4] about methods of rapid reviews, identifying four main types of 'rapid products', and noting that the similarity of these products lies in their close relationship with end-users in order to meet their needs in a limited timeframe. Our own experience confirms the importance of a close relationship with end-users, and has led us previously to create a range of products that meet the various needs of decision makers.

We recommend that HMC establishes arrangements for producing or procuring a number of different types of evidence synthesis product, as described below. Any notion of 'quick and dirty' reviews as an alternative to 'slow and expensive' systematic reviews should be carefully avoided. All the types of evidence synthesis we propose use a systematic approach, explicit and robust methods, and transparent reporting, so that the conclusions of reports are reliable.

Our previous paper suggested a process for the HMC Evidence Collaborative and proposed a range of different evidence synthesis types that could address the HMC requirement. Following a meeting about rapid reviews in Vancouver in early February, our naming of products has been modified slightly to avoid the term 'rapid review' because of its variable use. For the purposes of the HMC Collaborative, we suggest the term 'rapid synthesis' to replace rapid review.

Different types of evidence synthesis

Undertaking evidence syntheses requires judgements to be made about a number of key methodological variables. For full systematic reviews, the methodological standards for each of these variables are well documented and generally accepted. For other types of evidence synthesis, especially where time and other resource constraints apply, and the scope of the topic can be limited, the methodological standards of systematic reviews may be modified.

It is very important, however, that the alternative approaches for each of a number of key methodological variables are considered carefully in terms of the risk of bias that may be introduced and resulting confidence in the conclusion. Decisions made about these key methodological variables must be documented and should be discussed in the report. It may also be necessary to adjust these methodological variables as a synthesis progresses, for example, once a number of systematic reviews has been identified and assessed for relevance to the decision makers' questions.

The AHRQ report[4] identified 36 examples of 'rapid products' produced by 20 organisations, noting that the term 'rapid' can reflect the time-frame for completion of the review and the extent of synthesis undertaken. The report suggests a helpful set of considerations for creating 'rapid' evidence review products (see box). The AHRQ report suggests a typology of four different rapid reviews. We reproduce the report's typology below because many of the characteristics that it describes are features of the evidence synthesis products that we propose for the HMC Evidence Collaborative. It therefore provides a form of validation of our proposed approach in terms of existing practices.

AHRQ considerations for creating rapid products:

- products should be developed in the context of identified end-users and their specific decision-making needs and circumstances;
- a close relationship with the end-user and iterative feedback is essential;
- reliance on existing SRs require methods to summarize and interpret evidence;
- a highly skilled and experienced staff and the capacity to mobilize skilled staff quickly are critical;
- restricting scope may be necessary;
- producers and users need to accept modifications to standard SR methods, and;
- limitations need to be clearly reported, particularly in terms of potential bias and shortcomings of the conclusions.

The AHRQ report's typology is:

- Evidence inventories list what evidence is available, and often other contextual information needed for making decisions, but do no synthesis and do not attempt to present summaries or conclusions.

- Rapid responses organise and evaluate the literature to present the end-use with an answer based on the best available evidence but do not attempt to formally synthesise the evidence into a new conclusion. Usually this means reporting the conclusions of guidelines or systematic reviews, but some rapid response products apply a best evidence approach and report the results of primary studies if no secondary sources are available.

- "True" rapid reviews perform a synthesis (qualitative, quantitative, or both) to provide the end-user with an answer about the direction of evidence and possibly the strength of the evidence.

- Automated approaches are databases of extracted study elements that use computer algorithms to generate meta-analyses in response to questions. These are very different than other rapid products or systematic reviews, in that the search, extraction and grading are dissociated from the analysis, which is performed according to preset computer programs.

Considerations in developing different types of evidence synthesis

The elements of full systematic reviews that are most often modified in the conduct of 'rapid reviews' are well summarised by the AHRQ report, and coincide with our own recommended methodological approaches. It is, however, critical that alternative types of evidence synthesis maintain high methodological standards so that readers can still have confidence in their conclusions. This is most likely to be the case where relevant systematic reviews exist and can be quality assessed and summarised to address well-focused questions. Where other types of synthesis are indicated, the impact of decisions taken to use a more abbreviated methodology must be considered carefully, and these must be fully documented and discussed in the report in terms of the potential introduction of bias.

A number of elements, occurring at different stages in the evidence synthesis process, can be modified to produce reports adapted to particular situations or circumstances, or tailored to the specific needs of end users. Examples might include one or more of the following:

Review stage	**Potential alteration to methods in different types of evidence synthesis**
Identifying studies	• Limiting the number of bibliographic databases searched • Not searching grey literature • Not attempting to identify additional studies from reference lists • Not searching citation databases • Limiting search strategies by date • Limiting search strategies by language • Limiting search to study type, eg systematic reviews • Screening studies for relevance by one only screener
Data extraction	• Single rather than dual data extraction • Single data extraction with checks by second reviewer
Quality assessment	• Limiting quality assessment of included studies • Single rather than dual quality assessment • Single quality assessment with checks by second reviewer
Type of synthesis	• Qualitative (narrative) rather than quantitative synthesis • Limited or no synthesis
Report layout	• Abbreviated background/context • Abbreviated description of results • Abbreviated discussion • Use of tables rather than text

Types of report proposed as part of the HMC Evidence Service

We suggest that the HMC Evidence Collaborative should produce several different types of report, as summarised in Table 1, and recommend that HMC adopts an approach in which:

1. a mechanism for liaison with staff is developed to elicit priority topics and refine questions appropriate to the Evidence Collaborative;
2. a simple decision model is used to guide the type of evidence synthesis product required (see figure 1 below);
3. an 'expert librarian service' is established to answer questions that are simple and specific, and that are not related to topics that have been identified as priorities for more formal review work;
4. key methodological variables are routinely documented for all evidence synthesis reports;
5. the risk of bias associated with the methodological components of included studies is routinely considered and documented, and;
6. potential biases in the evidence synthesis process and their impact on the conclusions of the report are documented and discussed in the report.

As described in Table 1, many questions arising in day to day practice can be addressed by a simple **Evidence Enquiry Response**. There are also likely to be occasions when **Evidence Scoping Reports** are needed to map the evidence base in general terms; to focus questions, and; to specify subsequent evidence review(s). For some well specified review topics of limited scope, a single key source, such as a recent systematic review, will be available and the questions will be answered by a **Rapid Appraisal Report** which provides a quality assessment and summary of that single source. Some topics require a **Rapid Synthesis** of secondary evidence using one/several quality assessed systematic reviews and/or a small number of key primary studies. Where systematic reviews are not available to address the review questions, a **Full Systematic Review** of primary studies should be considered.

Table 1: Types of report to be produced as part of the HMC Evidence Collaborative

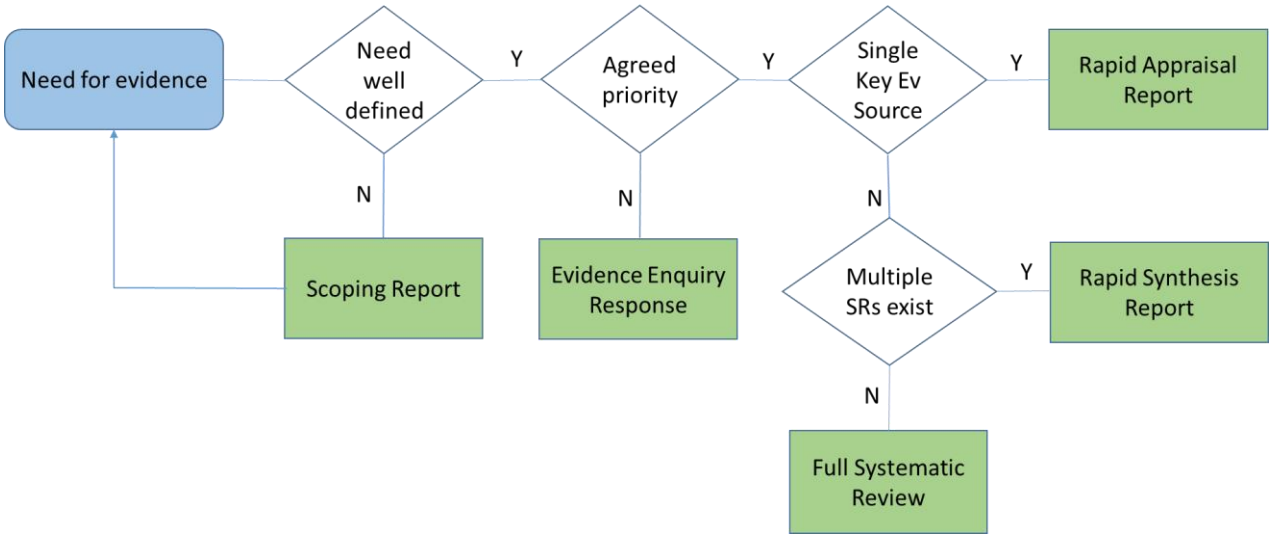
Type of report	Description	Purpose
Evidence Enquiry Response	An inquiry service to *search for and briefly describe evidence* in response to ad hoc enquiries on topics that have not been prioritized as part of a programme for more formal evidence review. Such enquiries may also be the first step towards identifying and prioritising a topic for more formal review. A small number of selected high quality clinical evidence sources (such as Cochrane Reviews) are used, but no formal review or critical appraisal or synthesis of evidence is undertaken.	• An expert health policy-oriented 'library response service', drawing upon the HMC project team's experience, sources and search strategies. • A 'rapid response' clinical question answering service
Evidence Scoping Report	Assessment of the state of the evidence in a broad topic area. Uses a comprehensive and robust search strategy but critical appraisal is not usually performed. Intended to facilitate discussion about evidence needs. This report is usually a foundation for further project work in the area.	• To assist the closer definition of issues important to needs of HMC stakeholders. • To assist in framing specific questions to be answered through review(s) of evidence.
Rapid Appraisal Report	A short evidence report stating the issue and specific question(s) of importance to HMC stakeholders, and providing brief evidence-based answers where high quality and reliable evidence, usually from existing evidence syntheses, can be easily assembled. Only reliable evidence syntheses are used, and these source documents would usually be critically appraised. If individual studies/reports are included (for example, as supplementary information), these would not usually be critically appraised. These reports might also include proposals for further evidence review as appropriate.	• Conveys simple evidence-based answers to narrowly focused and well-defined questions. • May indicate that, at least in some areas, a more comprehensive review of evidence is needed (Rapid Synthesis or Full Systematic Review).
Rapid Synthesis Report	A report providing a rapid synthesis of the available systematic reviews and/or a small number of key primary studies. Involves robust but potentially abbreviated search strategy, critical appraisal, description of contributing studies/reports, use of a simple synthesis and interpretation to answer clearly defined questions. Appropriate where evidence exists but requires higher level of assembly and interpretation than undertaken for a Rapid Appraisal. Would generally be peer-reviewed.	• Conveys evidence-based answers to well-defined questions, with full description of evidence sources upon which answers are based. • May indicate that, at least in some areas, a more comprehensive review is needed, ie a 'Full Systematic Review'.
Full Systematic Review	A comprehensive evidence report, usually resulting from a full systematic review. Appropriate where high quality and reliable primary evidence sources (such as systematic reviews or evidence-based guidelines) are not currently available. Would always be peer reviewed and likely to be published in peer reviewed journal.	• Generates new evidence by formal synthesis of existing research studies.

Deciding which type of evidence synthesis should be undertaken for a topic

The recommended approaches should be applied flexibly depending on the topic of the review, the requirements of the end user, and the type of studies that are available for review. For all methodological decisions that are made, reviewers should consider the potential for bias in the review process and whether the resulting report will be 'fit for purpose' for the end user.

A simple decision model (see Figure 1), together with the table above, should allow an initial decision to be made about the type of evidence synthesis that is most likely to be appropriate to a specific topic. It may, however, be necessary to modify the approach once an initial search has been performed. For example, if an initial search identifies a single, recent, systematic review from a credible organisation, a Rapid Appraisal Report is likely to generate a satisfactory response to the question(s). Alternatively, a search that reveals multiple systematic reviews and, perhaps, more recently published RCTs, is likely to lead towards a more comprehensive Rapid Synthesis Report.

Figure 1 HMC Evidence Collaborative Decision Model



Notes to figure

1. Need for evidence is assumed to have been established by a topic selection and prioritisation process or to emerge 'de novo' as a request from a stakeholder of the Evidence Collaborative.
2. A scoping report will often identify one or more needs for evidence review.

Methodological approaches in HMC evidence syntheses

All reports produced by the HMC Evidence Collaborative should be driven by clearly formulated and jointly agreed questions (recorded on a designated proforma) and should address the methodological issues set out in Table 2, documenting the approaches taken to: searching for studies and reports; considering studies against eligibility criteria for included studies; applying inclusion and exclusion criteria; extracting data; assessing quality of studies; synthesising information; peer review or other quality assurance; reporting findings.

Table 2: Methodological approaches in HMC Evidence Reports

	Identifying studies			Data extraction	Quality assessment of included studies	Type of synthesis	Format of report
	Literature search - sources	**Literature search - limits**	**Screening for relevance**				
Evidence Enquiry Response	Use one or two bibliographic databases chosen according to topic. No attempt to search grey literature or to identify additional publications from reference lists	Start with last five years and limit to English language and SRs - extend if necessary.	Single screener to screen on basis of title and abstract (or full text where abstract not available).	Short descriptions of key findings from small number of key resources (such as clinical guideline or SR). Data extracted by single reviewer.	Simple quality assessment, eg AMSTAR for SRs	No synthesis	Report provides simple statements extracted from key sources that relate to enquiry/ question(s). Provides reference list.
Evidence Scoping Report	Must be as comprehensive as possible. Search multiple databases and grey literature, and identify additional publications from reference lists.	No limit in terms of dates or language. Include (and describe) all study types.	Single screener to screen on basis of title and abstract (or full text where abstract not available). Discuss with second reviewer in cases of uncertainty.	Studies and study types recorded according to a set of issues and questions relevant to the topic. Data extracted by single reviewer. Discuss with second reviewer in cases of uncertainty.	No quality assessment required.	No synthesis.	Report provides a description of types and volume of studies identified for each issue/question. May suggest where evidence synthesis is required.
Rapid Appraisal Report	Use one or two bibliographic databases chosen according to topic and stop once recent, relevant SRs or 'rapid reviews' identified.	Start with last five years and limit to English language and SRs - extend if necessary.	Single screener to screen on basis of title and abstract (or full text where abstract not available). Discuss with second reviewer in cases of uncertainty.	Short descriptions of key findings from one or a small number of key resources. Data extracted by single reviewer. Discuss with second	Quality assessment of appraised studies.	No synthesis.	Report provides a summary of the findings of one or a small number of key resources together with a description of the quality of sources based on critical

	Identifying studies			Data extraction	Quality assessment of included studies	Type of synthesis	Format of report
	Literature search - sources	**Literature search - limits**	**Screening for relevance**				
	Unlikely to search grey literature but may identify additional publications after date of SRs from reference lists.			reviewer in cases of uncertainty.			appraisal and quality assessment.
Rapid Synthesis Report	Use one or two bibliographic databases chosen according to topic but be prepared to search further if key sources not found. Unlikely to search grey literature. Check to identify additional SRs or other key studies from reference lists.	Limit to English language but no limit on dates. Start with SRs and other appropriate study types (depending on topic/questions). Search further if key sources not identified.	Single screener to screen on basis of title and abstract (or full text where abstract not available). Discuss with second reviewer in cases of uncertainty.	Data extracted by one reviewer into 'outcomes/findings' table. Second reviewer checks data extraction for a proportion of studies and discusses in cases of uncertainty.	Quality assessment at level expected of SR, eg ROBIS[5]. Quality assessed by one reviewer. Second reviewer checks assessment for a proportion of included studies.	Usually a narrative synthesis. Quantitative synthesis may be appropriate, for example a new meta-analysis of studies identified by two or more SRs.	Report follows similar pattern of SR, providing a synthesis of key sources and giving evidence-based answers to questions.
Full Systematic Review (to follow pre-defined protocol)	Comprehensive covering a wide range of databases, grey literature and reference lists of key references as appropriate.	Ideally unrestricted and without language, date or other limits.	*A priori* stipulation about screening criteria essential. Single or dual screening, depending on complexity of topic. Always discussion with second reviewer.	Data extracted independently by two reviewers onto pre-defined data extraction form. All data cross-checked and agreed.	Quality assessment of all included primary studies using appropriate tool, eg Cochrane RoB[2].	Always a narrative synthesis with a quantitative synthesis where appropriate.	Report follows formal structure based on methods set out in pre-defined protocol. See Cochrane Handbook[2].

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