IsAC

NHMRC Centre of Research Excellence

IMPROVING HEALTH SERVICES FOR ABORIGINAL AND TORRES ISLANDER CHILDREN

A GUIDE TO EVIDENCE SYNTHESIS

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1 BACKGROUND

In 2014, the NHMRC Centre for Research Excellence for Improving health services for Aboriginal and Torres Strait Islander children (CRE ISAC), was awarded to Professor Karen Edmond (Director), Dr Dan McAullay, Professor David Atkinson, Professor Rhonda Marriott, Professor Ross Bailie, A/Professor Alan Ruben, A/Professor Mark Wenitong, Professor Victor Nossar, and Professor Betty Kirkwood. The CRE ISAC will be funded for five years with the **overall aim** to improve health and developmental outcomes in Aboriginal and Torres Strait Islander children in Australia through improvements in health services. The objectives of the CRE ISAC are to:

- Generate new knowledge that leads to improved health and developmental outcomes in Aboriginal and Torres Strait Islander children
- Ensure effective transfer of research outcomes into health policy and practice
- Develop the health and medical research workforce by providing opportunities to advance the training of new researchers
- Facilitate collaboration across ISAC and national and international networks
- Work across primary, secondary and tertiary level health services but have a specific focus on improving pathways within primary community care.

The CRE ISAC aims to support capacity building for individuals and teams to complete systematic reviews. It aims to reduce duplication at the initial review stage of developing preventive and clinical practice guidelines, and make important contributions to the evidence base for improving the health outcomes of Aboriginal and Torres Strait Islander children and their families.

The CRE ISAC team members are often approached by researchers, health service providers and policy makers to help provide expertise in four main areas of evidence synthesis. These areas are:

- How to determine the effectiveness of interventions
- How to determine the gaps in the evidence on a topic
- How to improve preventive and clinical practice guidelines
- What other types of synthesis are available.

This document provides practical guidance and reference to methods that will enable individuals and teams to complete these four main areas of evidence synthesis. Chapter 2 discusses what evidence synthesis is, the process of how to complete a systematic review and critical appraisal. Chapter 3 will discuss methods to determine the effectiveness of interventions. This includes review methods for systematic reviews, rapid reviews and overviews of systematic reviews, and logic models for reviews. Chapter 4 provides methods to determine gaps in the evidence through scoping reviews, 3ie gap maps and evidence maps. Chapter 5 includes information on how to improve preventive and clinical practice guidelines. Lastly, Chapter 6 looks at different methods to complete qualitative and mixed method reviews. The aim of this guide is not to duplicate reference information. Readers will be provided with summary information and directed to the appropriate methods in original documents.

2 EVIDENCE SYNTHESIS

2.1 What is evidence synthesis?

Evidence synthesis has been a major feature of the global development of evidence-informed policy and practice. The aim of evidence synthesis (or systematic reviewing) is to provide a comprehensive, up-to-date, transparent, and trustworthy picture of an identified topic. This is accomplished through searching, identifying, assessing, and compiling the findings into a coherent body of work. Systematic reviewing may often be confused with literature reviewing however there are a number of differences between these two types of reviewing as outlined in Table 2.1 (Kysh, 2013).

Table 2.1: Difference between systematic and literature review (adapted from (Kysh, 2013))

	Systematic review	**Literature review**
Goals	Answer a focussed single question Eliminates bias	Provides a summary or an overview of a topic
Question	Clearly defined and answerable question. Often uses PICO[1] or a variation of this format	A general topic or a specific question
Protocol	A peer review protocol or plan is included	No protocol is included
Components	Background Clear objectives are identified Clearly defined inclusion and exclusion criteria Comprehensive search conducted in a systematic way Selecting articles in explicit and clear Comprehensive evaluation of study quality Clear summaries of studies based on high quality evidence	Background Objectives may or may not be identified Inclusion and exclusion criteria may not be specified Strategy not explicitly stated Selection of articles may not be described Evaluation of study quality may or may not be included Summary based on studies where the quality of the articles may not be expected. May also be influenced by the reviewer's theories, needs and beliefs
Authors	At least two authors with a third person identified to review disagreements	One or more authors
Value	Results in high quality evidence and supports evidence-based practice	Provides a summary of the literature

[1]PICO= population, intervention, comparison, outcome

2.2 Systematic review process

Overall, evidence synthesis can be a minefield with inconsistent terminologies, different review designs and methodologies. However, regardless of the review that is being completed there is a common process that occurs. Figure 2.1 provides an overview for completing this process. Documentation is a key factor in ensuring transparency. This is completed by writing a clear description of the methods used, ensuring that all documents are easily accessible, and that all documents are regularly updated every 2-3 years. The completed document will vary with the type of review that is being undertaken.

Given the complexity, additional information has been provided below on types of reviews and completing a critical appraisal.

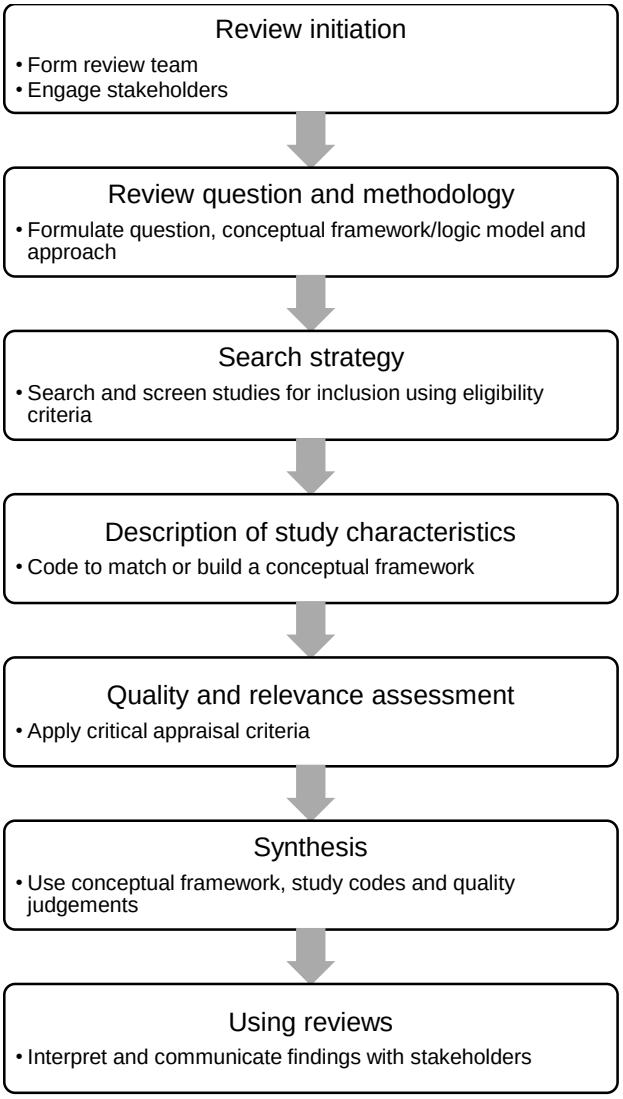

Figure 2.1: Commonly completed stages in a systematic review (adapted from (D Gough, Oliver, & Thomas, 2012))

2.3 Types of reviews

Gough and colleagues categorise reviews as *aggregative* or *configurative* (D Gough et al., 2012; D. Gough, Thomas, & Oliver, 2012) (see Table 5.2 below). An a*ggregative* review is where the synthesis is predominantly adding up data to answer a research question. This type of review tends to be about seeking evidence to inform decision, and commonly uses quantitative data although qualitative data can also be aggregated. The *configurative* review style is where data are organised to answer the review question. These types of reviews commonly use qualitative data and are aimed at seeking and determining new concepts to how a topic is considered.

It is likely that to some extent both of these review types will be used simultaneously. In addition, the review research question must be clearly documented. It is equally important to clearly describe the rationale for the systematic review method you have used. Table 2.2 provides examples of types of reviews that would be categorised as aggregative and configurative and the corresponding review question.

Table 2.2: Examples of aggregative and configurative reviews (adapted from (D. Gough et al., 2012))

Predominant review type	Aim of the review
Aggregative	
'What works?' reviews	What is the effect of a health or social intervention?
Diagnostic test	What is the accuracy of this diagnostic tool?
Cost benefit	How effective is the benefit of an intervention relative to its cost?
Prevalence	How extensive is this condition?
Configurative	
Meta-ethnography	What theories can be generated from the conceptual literature?
Critical interpretative synthesis	What theories can be generated from the conceptual literature?
Meta narrative review	How to understand the development of research on an issue within and across different research traditions.
Configuring and aggregative	
Realist synthesis	What is the effect of a social policy in different policy areas?
Framework synthesis	What are the attributes of an intervention or activity?

FURTHER READING: To gain a deeper understanding of the systematic review process and theory the book 'An introduction to systematic reviews' provides excellent background information on this topic (D Gough et al., 2012).

2.4 Critical appraisal versus reporting guidelines

Critical appraisal assesses *quality* (a particular standard or specific characteristic of something or someone) and *relevance* (whether something is connected or important to the matter at hand) of the research (D Gough et al., 2012). Overall, critical appraisal has been defined as 'the process of carefully and systematically examining research to judge its trustworthiness, and its value and relevance in a particular context' (Burls, 2009). Critical appraisal is also a complex process and will be guided by your research question and associated review method.

When critically appraising evidence for quality and relevance, assessments are being made based on generic or review-specific judgements. A generic assessment looks at the quality of the execution of the study, however may not necessarily consider whether the study is a good fit for answering the review question (D. Gough et al., 2012). Review-specific judgements assess the appropriateness of the study design and analysis for answering the research question or how well matched the study is to the focus of the review in terms of its topic (D. Gough et al., 2012). Depending on the type of review undertaken reviews may consider all of these assessment or only one.

One type of critical appraisal is the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach which has been developed to assess the effectiveness of health interventions and is widely used among many organisations including the Cochrane Collaboration (Atkins et al., 2004). It provides a framework for judging and reporting the quality of individual findings, the overall body of evidence, the underlying quality of evidence, key statistical findings and the quality of evidence for each health outcome (Guyatt, Oxman, Vist, et al., 2008). In addition, the GRADE approach distinguishes between the quality of evidence and the strength of recommendations (Guyatt, Oxman,

Kunz, Falck-Ytter, et al., 2008). The quality of evidence component reflects the extent to which confidence in an estimate of the effect is adequate to support a particular recommendation (Guyatt, Oxman, Kunz, Vist, et al., 2008). Four key factors determine the strength of a recommendation: (i) the balance between desirable and undesirable effects; (ii) the quality of evidence; (iii) values and preferences; and (iv) costs (Guyatt, Oxman, Kunz, Falck-Ytter, et al., 2008).

The GRADE process enables the researcher to rate studies according to their level of evidence; high, moderate, low, or very low. These ratings provide a level of confidence that the true effect lies close to the estimate of effect (Balshem et al., 2011). To determine a rating, a number of factors are taken into consideration. A study's initial rank is determined by the study design. For example, randomised control studies are initially considered to be 'high' and sound observational studies 'low'. From here, the rating may be increased or decreased depending on other factors, as detailed in Table 2.3.

An in-depth explanation of the factors that may decrease or increase a rating can be found in the Cochrane Handbook Chapter 12.2 Assessing the quality of a body evidence (Higgins, Green, & (editors), 2011). In addition, the Journal of Clinical Epidemiology released a 20-part series of articles on GRADE guidelines with a full list of topics found in Guyett et al (2011) (Guyatt, Oxman, Schunemann, Tugwell, & Knottnerus, 2011).

Table 2.3: A summary of GRADE's approach to rating quality of evidence (republished from (Balshem et al., 2011)

Study design	Initial quality of a body of evidence	Lower if	Higher if	Quality of a body of evidence
Randomised trials	High ⇒	Risk of Bias −1 Serious −2 Very serious Inconsistency −1 Serious −2 Very serious Indirectness −1 Serious −2 Very serious Imprecision −1 Serious −2 Very serious Publication bias −1 Likely −2 Very likely	Large effect +1 Large +2 Very large Dose response +1 Evidence of a gradient All plausible residual confounding +1 Would reduce a demonstrated effect +1 Would suggest a spurious effect if no effect was observed	High (four plus: ⊕⊕⊕⊕) Moderate (three plus: ⊕⊕⊕○) Low (two plus: ⊕⊕○○) Very low (one plus: ⊕○○○)
Observational studies	Low ⇒			

The following links provide background, tools and tutorials on how to complete a critical appraisal.

- http://www.gradeworkinggroup.org/
- http://www.cebm.net/critical-appraisal/
- http://www.sign.ac.uk/methodology/tutorials.html
- http://www.casp-uk.net/#!who-is-casp-for/cz5t

Reporting guidelines are often confused with critical appraisal tools, however, these guidelines are used to ensure that there is sufficient information in the publication to be transparent, complete and have clarity for the research and associated findings. Reporting guidelines are available for a number of research designs including, but not limited to, systematic reviews (Moher, Liberati, Tetzlaff, Altman, & Group, 2009), randomised controlled trials (Schulz, Altman, Moher, & Group, 2010), and diagnostic studies (Bossuyt et al., 2003). The reporting guidelines for many designs can be found on the Enhancing the QUAlity and Transparency Of health Research (EQUATOR) Network (http://www.equator-network.org/) and often appear as checklists. Having appropriately reported studies definitely helps the process when completing systematic reviews and critically appraising them.

2.5 Additional resources

A number of organisations provide extensive information on how to complete evidence synthesis. These are provided in Table 2.4 below. This is not an exhaustive list, however the sources are excellent places to begin searching.

Additionally a glossary of evidence synthesis terms can be found here http://www.unisa.edu.au/Research/Sansom-Institute-for-Health-Research/Research-at-the-Sansom/Research-Concentrations/Allied-Health-Evidence/Resources/Glossary/.

Table 2.4 Organisations that provide evidence synthesis and/or methods for health

Organisation	Aim of organisation
Campbell Collaboration (http://www.campbellcollaboration.org/)	Improve decision making through systematic reviews on the effects of interventions within the areas of education, crime and justice, social welfare and international development.
Centre for Evidence Based Medicine (CEBM), University of Oxford http://www.cebm.net/	This website contains details of learning resources available from the Centre and collaborative departments. CEBM aims to develop, teach and promote evidence-based health care through conferences, workshops and evidence-based medicine tools so that all health care professionals can maintain the highest standards of medicine.
Centre for Reviews and Dissemination (CRD), The University of York (http://www.york.ac.uk/crd/)	CRD is a research department that specialises in evidence synthesis, assembling and analysing data from multiple research studies to generate policy relevant research
Cochrane Collaboration (http://www.cochrane.org/)	Promote evidence-informed health decision-making by producing high-quality, relevant, accessible systematic reviews and other synthesized research evidence.
EPPI-Centre (http://eppi.ioe.ac.uk/cms/)	The EPPI-Centre is involved in two main areas of work: undertaking, supporting and developing methods systematic reviews and their research use
Joanna Briggs Institute (JBI), University of Adelaide (http://joannabriggs.org/index.html)	JBI promotes and supports the synthesis, transfer and utilisation of evidence through identifying feasible, appropriate, meaningful and effective healthcare practices to assist in the improvement of healthcare outcomes globally.
McMaster University Health Evidence (http://www.healthevidence.org/default.aspx)	Provides free access to thousands of quality-rated systematic reviews evaluating the effectiveness of public health interventions. Health Evidence searches the published literature and compile public health relevant reviews. There are also tools, glossary and information of evidence synthesis available on their website.
The Knowledge Synthesis Group, Ottawa Hospital Research Institute (http://www.ohri.ca/ksgroup/default.asp)	Develop high quality knowledge syntheses such as systematic reviews; health technology assessments; scoping reviews; and rapid reviews.

3 EFFECTIVENESS OF INTERVENTION

There are a number of different methods available for systematic reviews to determine the effectiveness of interventions on health or process outcomes[1]. All methods use a variation on the flow chart displayed in Figure 2.1. The most comprehensive and strict is the Cochrane systematic review process. As described in chapter 5, the Cochrane approach focuses on a clear description of the PICO (P=population, I=intervention, C=control group, O=outcomes). It can be useful to develop a PICO for all systematic reviews of effectiveness of interventions. It is very important to be very specific about the words and definitions used in the PICO. The PICO is used to generate the search terms in electronic bibliographic databases.

Table 3.1 provides a summary of the three most common review methods and key references.

It is worth noting that within public health and health service delivery, interventions are often complex. There are a number of sources of complexity within these interventions, with an excellent description of these sources found in Petticrew (2013) (Petticrew et al., 2013). As a result, synthesising these interventions is difficult and requires methods that take into account these complexities yet still provide a meaningful result to the end user. Two key articles that provide information about complex interventions and how they can be appropriately synthesised are:

1. Petticrew M, Anderson L, Elder R, et al. Complex interventions and their implications for systematic reviews: A pragmatic approach. Int J Nurs Stud. 2015;52(7):1211-1216. (Petticrew et al., 2015)
2. Anderson LM, Oliver SR, Michie S, Rehfuess E, Noyes J, Shemilt I. Investigating complexity in systematic reviews of interventions by using a spectrum of methods. Journal of clinical epidemiology. 2013;66(11):1223-1229. (Anderson et al., 2013).

[1] For the purpose of this document the term ‘intervention’ is the process of intervening on people, groups, entities or objects in an experimental study.

Table 3.1 Types of evidence synthesis (adapted from (Snilstveit, Vojkova, Bhavsar, & Gaarder, 2013)

Rapid evidence review (Khangura, Konnyu, Cushman, Grimshaw, & Moher, 2012)
Provides a quick review and synthesis of the available evidence to facilitate informed decision-making about the effectiveness of an intervention or policy under time and/or resource constraints; provide a map of evidence in a topic area to identify where there is existing evidence and direct future research; or serve as interim evidence assessment until a more systematic review can be conducted.

Inclusion	Search	Critical appraisal	Data extraction	Analysis	Timeline
Primary research and/or systematic reviews.	May be more limited than a full systematic search with restrictions adopted for years, languages, publication status, search strings, and sources searched.	Limited quality appraisal. The rigor and detail of the quality appraisal may vary.	Might use PICOs. May be limited to a single person screening and extracting data. Data collection may be limited to key results and key data for simple quality assessment.	Simple narrative, descriptive or tabular analysis reporting quantities of literature and overall quality/direction of effect reported in the literature with limited interpretation of the findings	3 weeks - 6 months

Systematic reviews (Higgins et al., 2011) (http://handbook.cochrane.org/)
To provide a comprehensive, unbiased assessment and synthesis of the available evidence to answer a specific research question.

Inclusion	Search	Critical appraisal	Data extraction	Analysis	Timeline
Primary studies. For non-effectiveness questions may include other types of evidence.	Comprehensive and systematic search	Rigorous critical appraisal with a comprehensive risk of bias assessment of effectiveness studies.	PICOs, study characteristics, risk of bias/critical appraisal categories and study findings / information necessary to calculate effect sizes. Two people independently screen studies and extract data.	Meta-analysis or narrative / thematic synthesis of findings from all included studies. Additional analysis such as moderator analysis may be conducted. A network statistical analysis may also be completed in these reviews.	1 to 2 years

Overviews of systematic reviews (Becker & Oxman, 2011)
To provide users with an accessible overview of systematic reviews available in a particular area summarizing systematic review findings of effects of two or more interventions or systematic review findings addressing the effectiveness of the same intervention on different outcomes

Inclusion	Search	Critical appraisal	Data extraction	Analysis	Timeline
Systematic reviews (of intervention effectiveness)	Comprehensive search for systematic reviews, focusing on databases of systematic reviews	Critical appraisal of systematic reviews.	Data from included systematic reviews, in some cases additional data from included studies.	Summarize results from all included reviews. Additional analysis may be conducted.	Not clear

3.1 Logic models

The use of conceptual frameworks or logic models supports the systematic reviewing of complex interventions and can be a valuable and often essential part of any method of systematic reviews. Although these two concepts are often used interchangeably there are subtle differences between the two. For the purpose of this guide both conceptual frameworks and logic models will be referred to as logic models. Anderson et al. (2011 and 2013) provides methods and discusses how these models can provide:

1. A common initial understanding between authors and others regarding evidence requirements before the evidence synthesis stage
2. A platform for authors and others to consider and debate alternative model structures and other a priori decisions regarding the proposed approach to evidence synthesis
3. A reference point for the design and conduct of all stages of the systematic review process, up to and including the synthesis of evidence
4. A conceptual basis for explicit reporting of the methods and assumptions used within the synthesis (Anderson et al., 2013; Anderson et al., 2011).

For example a systematic review currently being completed by McCalman et al. developed the logic model in Figure 3.1 to help guide their systematic review (McCalman et al., (unpublished)).

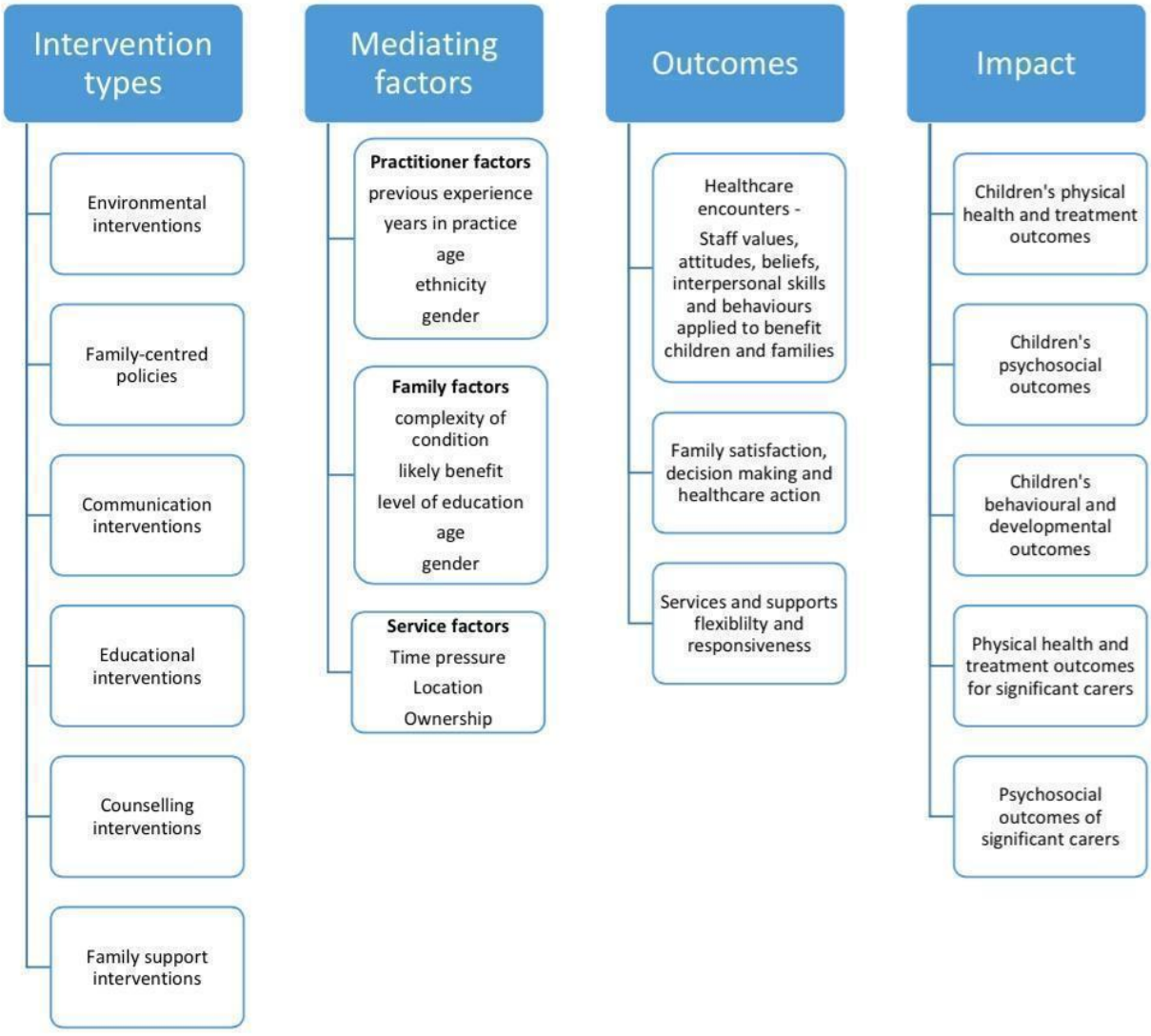

Figure 3.1: Example of conceptual framework

It is important that all methods begin with a logic model that outlines all relevant (i) interventions and exposures; (ii) process, intermediate and long term health outcomes; and (iii) the links (e.g. with arrows in a flow chart) between intervention or exposure through to the process and health outcomes. Mediating and confounding variables should also be included where possible. Figure 3.2 provides an example of how a logic model can be developed. The factors in the model include:

- The **components** which are the planned elements of the intervention or program being assessed
- **Moderators** (who responds and who doesn't) and **mediators** (how an intervention works)
- **Process outcomes** measures the components of the intervention or program
- **Intermediate outcomes** that the components might lead to. Intermediate outcomes can be based on the information from the other evidence synthesis reviews or *a priori* as relevant in the review of effectiveness.
- **Longer-term outcomes** are those that the components might ultimately lead to. All longer-term outcomes are based on outcome measures that are identified *a priori* as relevant to the review being completed (Glenton et al., 2013).

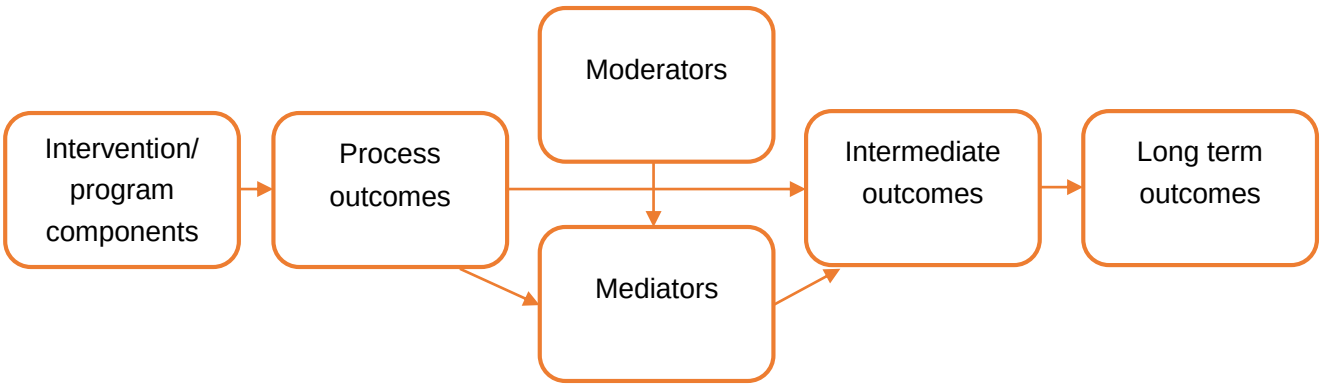

Figure 3.2: Example of logic model

As part of a systematic review a meta-analysis may also be completed. The meta-analysis often includes a stratified or sub-group analysis. A logic model can help to decide on important sub-group analysis through consideration of moderating factors, which should be decided *a priori*.

Alternatively systematic reviews can help to *develop* logic models. An example of two studies that have used a systematic process to *develop* logic models are:

1. Baxter SK, Blank L, Woods HB, Payne N, Rimmer M, Goyder E. Using logic model methods in systematic review synthesis: describing complex pathways in referral management interventions. BMC medical research methodology. 2014;14:62. (Baxter et al., 2014)
2. Allmark P, Baxter S, Goyder E, Guillaume L, Crofton-Martin G. Assessing the health benefits of advice services: using research evidence and logic model methods to explore complex pathways. Health Soc Care Community. 2013;21(1):59-68. (Allmark, Baxter, Goyder, Guillaume, & Crofton-Martin, 2013)

4 DETERMINING THE GAPS IN RESEARCH EVIDENCE

Prior to understanding what is an effective intervention in a given area, broader questions about what research has been done in this area and where there has been no research completed (e.g. the gaps in research evidence) are often asked. A number of methods can be used to determine what these may be, namely scoping and gap map reviews. Table 7.1 provides references to methods that provide information about how to determine the gaps in research evidence in a particular area.

Often determining the gaps in the evidence is followed by a prioritisation process of potential research questions. This can be completed by a number of different methods including the James Lind Priority Setting Partnership methodology (Cowan & Oliver, 2013) or the Delphi method (Hsu & Sandford, 2007). Tong et al. provides a succinct example of how they prioritised research using an adapted James Lind approach (Tong et al., 2015) and Ntoburi et al. of the Delphi technique (Ntoburi et al., 2010). An example of the Delphi method is provided in Figure 4.1 (below).

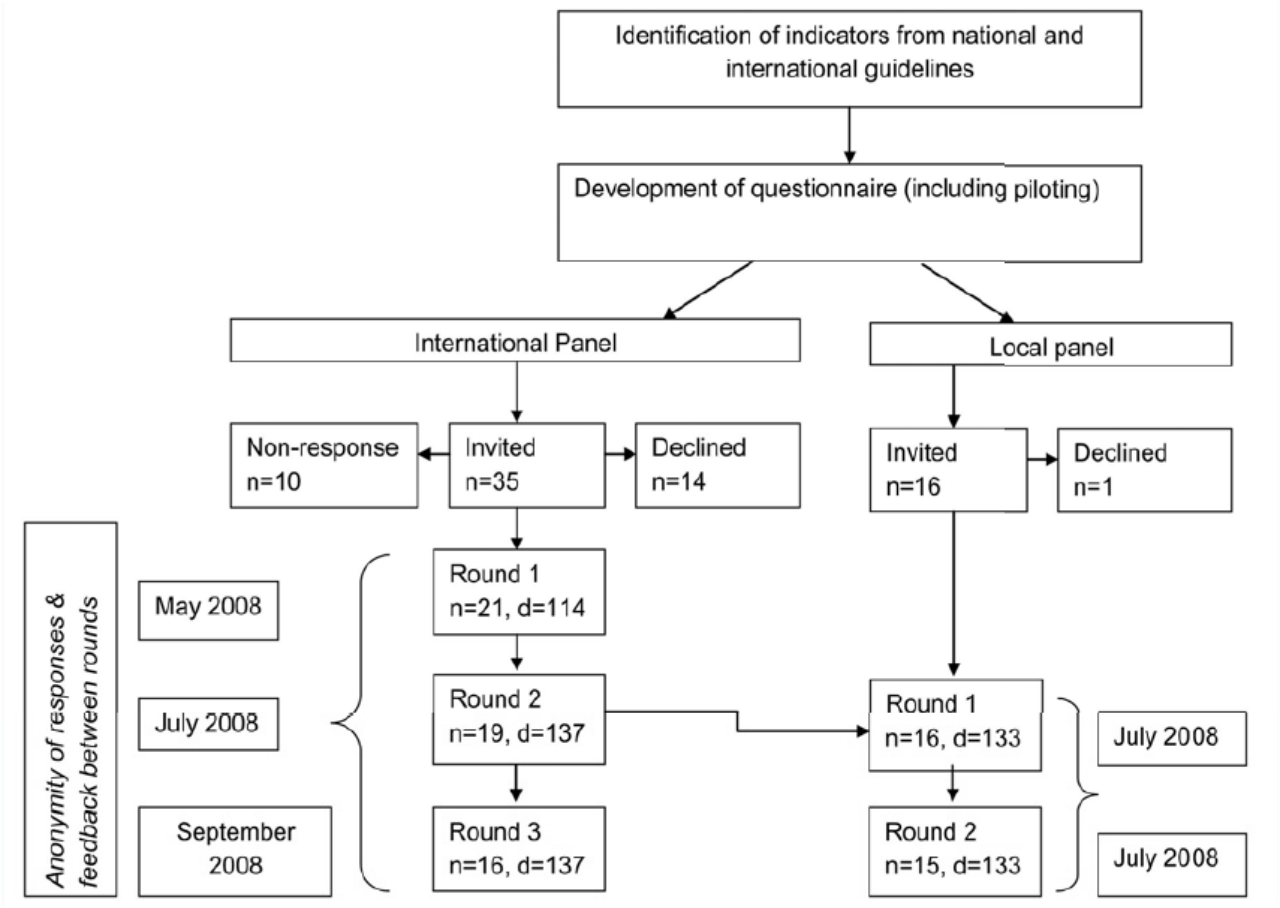

Figure 4.1: Procedural flow chart from Ntoburi (2010) showing the development of quality indicators rated using the Delphi technique (republished from (Ntoburi et al., 2010))
(n denotes the number of indicators rated in the round. d is the number of experts in the round).

Table 4.1 Methods to determine the gaps in research evidence (adapted from (Snilstveit et al., 2013)

Scoping review (Arksey & O'Malley, 2005; Levac, Colquhoun, & O'Brien, 2010)

Examines the extent, range and nature of research activity, identifies gaps in the evidence base, determines the value of undertaking a full systematic review or summarises and disseminates research findings in a particular field of enquiry. These studies may be used to inform policy and practice and/or to research planning.

Inclusion	Search	Critical appraisal	Data extraction	Analysis	Timeline
Determined by the topic and question. All relevant literature able to be included.	Determined by time and resources available. May be more limited than systematic review searches.	None	Determined by topic. Typically study population, intervention, outcome measures, study design; may include findings relating to effectiveness and gaps in research.	This is followed by an analytic framework, or thematic construction to present a narrative account of existing literature, using descriptive thematic narratives or descriptive summaries of statistical data.	6 months to 1 year

3ie gapmap (Snilstveit et al., 2013)

The 3ie gapmap visualises the existing systematic reviews and/or primary studies in a particular topic area. These may also inform policy and practice and/or research planning

Inclusion	Search	Critical appraisal	Data extraction	Analysis	Timeline
Systematic reviews and primary studies. Some gap maps may only have systematic reviews.	Comprehensive and systematic for systematic reviews. More purposive for primary studies.	Rigorous for systematic reviews. Dependent on purpose of primary studies.	Intervention, outcome measure; summary of findings; critical appraisal categories. May be limited to a single person screening and extracting data	Summary of the quality and quality of available evidence. Descriptive summary of key findings of systematic reviews	2-3 months

Evidence map (GEM, headspace) (Bragge et al., 2011; Clavisi, Bragge, Tavender, Turner, & Gruen, 2013; Parkhill et al., 2011)

The methods for this Evidence map describes the nature, characteristics and volume of research in a particular area. It identifies evidence gaps by comparing the key research questions identified by stakeholders with the available literature. This process has a larger consumer and qualitative component.

Inclusion	Search	Critical appraisal	Data extraction	Analysis	Timeline
Systematic reviews and primary studies	Comprehensive and systematic. More specific and less sensitive than systematic reviews searches	None mentioned in the literature, however have used the AMSTAR (critical appraisal tool for systematic reviews) rating online	Intervention, study design and detailed study characteristics	Summary of identified studies by study design, context, population, condition, and outcomes for each intervention. Often includes a commentary on the evidence base	Not clear (up to 2 years)

5 IMPROVING CURRENT PREVENTIVE AND CLINICAL PRACTICE GUIDELINES

Guidelines are a set of instructions, protocols, principles and recommendations for procedures or practices. They should be accompanied by documentation of the evidence underpinning the guidelines. This then allows health policy makers, health service providers and consumers to make informed decisions about the most appropriate procedure or practice.

Full guideline development can take 18 months to 2 years, is resource intensive, requires updating every 3-5 years and often requires the completion of systematic reviews if the evidence has not been adequately assessed. Within Australia there have been 1046 guidelines published between 2005 and 2013, which are either active, updated, rescinded or expired (National Health and Medical Research Council, 2014). These guidelines have been sourced through a number of avenues including, but not limited to, literature searches, invited and unsolicited developer submissions, National Health and Medical Research Committee (NHMRC) guidelines in development register, NHMRC's guideline approval program and hand searching (National Health and Medical Research Council, 2014). Despite the large number of guidelines available to health service providers many are of poor quality. They do not describe the process of developing them and lack transparency in methods and authorship (National Health and Medical Research Council, 2014). In addition, less than one in five guidelines makes any reference to the evidence underpinning the recommendations made, and fewer than one in 10 are informed by systematic reviews of the evidence (National Health and Medical Research Council, 2014). It is therefore of great interest within CRE ISAC to improve the evidence underpinning guidelines relating to Aboriginal and Torres Strait Islander children and support those organisations who are actively moving towards this goal.

In Australia, methods for guideline development have been provided by the National Health and Medical Research Committee (NHMRC). Information on how to develop guidelines utilising these methods can be found here https://www.nhmrc.gov.au/guidelines-publications/how-nhmrc-develops-its-guidelines.

Internationally, the World Health Organization (WHO) (http://www.who.int/kms/guidelines_review_committee/en/) and National Institute for Health Care Excellence (NICE) (http://www.nice.org.uk/about/what-we-do/our-programmes/nice-guidance/nice-guidelines/nice-clinical-guidelines) also have clear processes on how to develop guidelines.

The Central Australian Rural Practitioners Association (CARPA) developed the Remote Primary Health Care Manuals (RPHCM) in 1991. The manuals are evidence based, regularly up-dated and have been extensively used by remote practitioners to support good clinical practice within primary health care in central, northern and remote Australia. The manuals are produced by a large team of volunteers who are experts in their field. CARPA has recently endeavoured to improve their guideline development. Due to the large resources required to develop guidelines, CARPA in collaboration with the Centre for Research in Evidence-Based Practice (Bond University) have worked towards a systematic process for finding evidence and formulating guidelines utilising available resources. This framework has been included in this guide to help

improve preventive and clinical practice guidelines. Figure 5.1 provides a diagram representing this process (Central Australian Rural Practitioner's Association Inc, 2015). In addition, as discussed in Section 2.2, key components of this process are documentation and transparency.

As shown in Figure 5.1 CARPA follows a simple process where the reviewers are advised to stop at the appropriate place where there is quality evidence available. At this point the reviewer is advised to rigorously assess the quality of all documents using standardised tools.

5.1 Assessing the quality of guidelines

There are a number tools for assessing the quality of guidelines. The Agree II checklist is a high quality tool and provided in Appendix 1 (Brouwers et al., 2010). It is recommended at least two people and preferably four people appraise the guidelines through the use of the AGREE-II instrument (Brouwers et al., 2010).

5.2 Assessing the quality of systematic reviews and primary studies

Critical appraisal should be used to evaluate the systematic reviews and primary studies to determine the quality and relevance to the guideline that is being developed. For systematic reviews and primary studies the GRADE approach is highly recommended for assessing and documenting the level of evidence available (Atkins et al., 2004).

5.3 Expert opinion with additional evidence

If high quality guidelines are not available then it is important to separate out the 'practices' or 'recommendations' and to follow the diagram in Figure 5.1 for each recommendation. Each recommendation can be written in full followed by the level of evidence available. Examples of this process can be found in Chang (Chang et al., 2008).

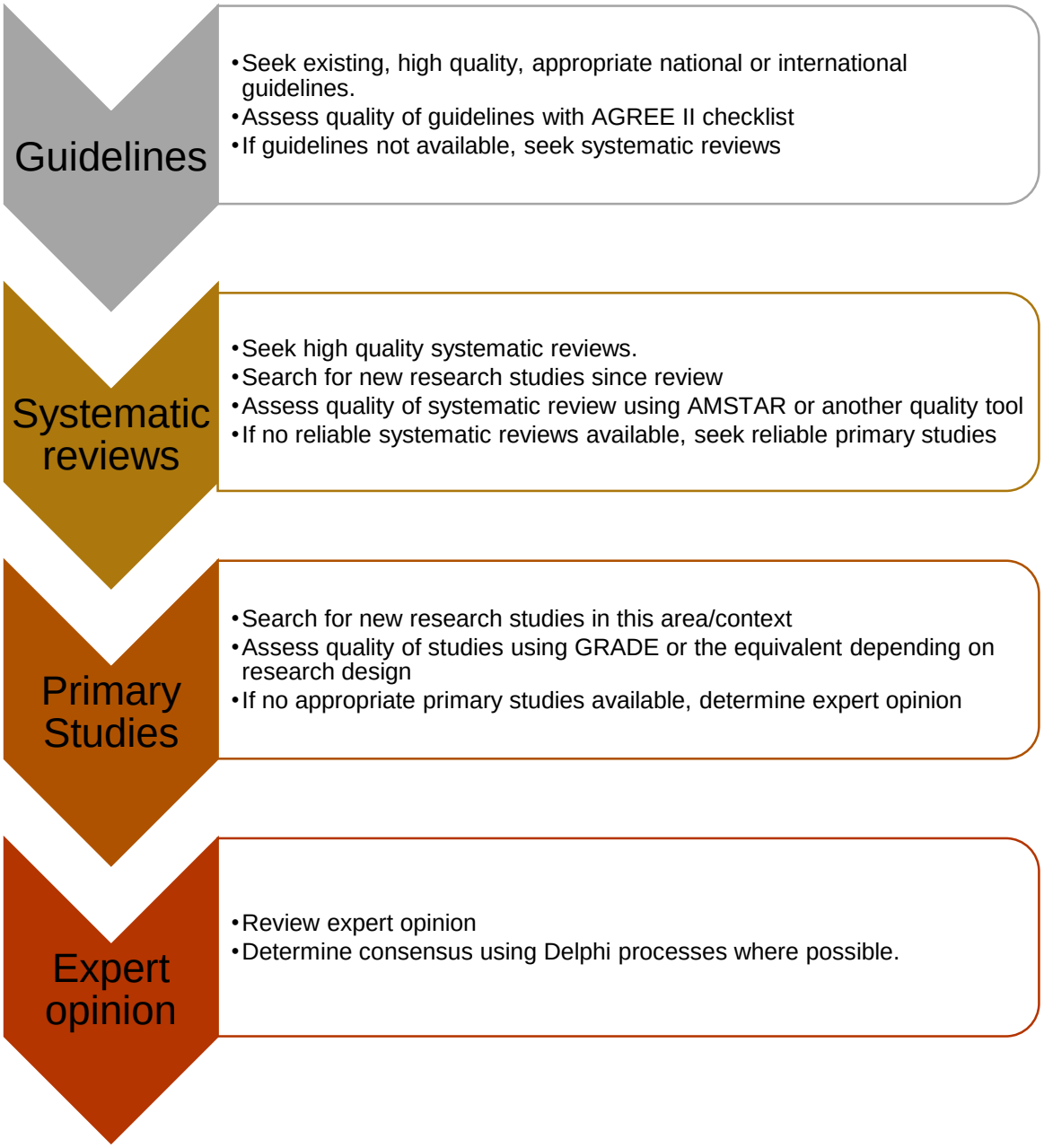

Figure 5.1: Adapted CARPA flow diagram for improving preventive and clinical guidelines (adapted from (Central Australian Rural Practitioner's Association Inc, 2015))

6 OTHER TYPES OF SYNTHESIS

There are two additional types of systematic reviews that are often completed: qualitative and mixed method reviews.

Qualitative reviews aim to configure, summarise, or integrate qualitative data to address specific research questions. Qualitative reviews include a thematic analysis with theory generation and provide narrative findings from a range of papers. These reviews may be presented as independent reviews or in addition to an effectiveness systematic review to determine barriers and facilitators of implementing programs. An example of the latter is:

- Lewin S, Munabi-Babigumira S, Glenton C, et al. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. Cochrane Database Syst Rev. 2010(3):CD004015. (Lewin et al., 2010)
- Glenton C, Colvin CJ, Carlsen B, et al. Barriers and facilitators to the implementation of lay health worker programmes to improve access to maternal and child health: qualitative evidence synthesis. Cochrane Database Syst Rev. 2013;10:CD010414. (Glenton et al., 2013)

Table 6.1 provides a summary of qualitative synthesis with accompanying examples.

Mixed method reviews include systematic reviews of mixed method research designs or using qualitative and quantitative studies to complete a mixed method synthesis. There are a number of different designs that can be used for mixed method synthesis. Often mixed method reviews are time and resource intensive as there is a greater amount of evidence that needs to be synthesised. These reviews may cover a broader research question, and may take a number of reviews to understand the complexity of the issues as shown in (Figure 6.1).

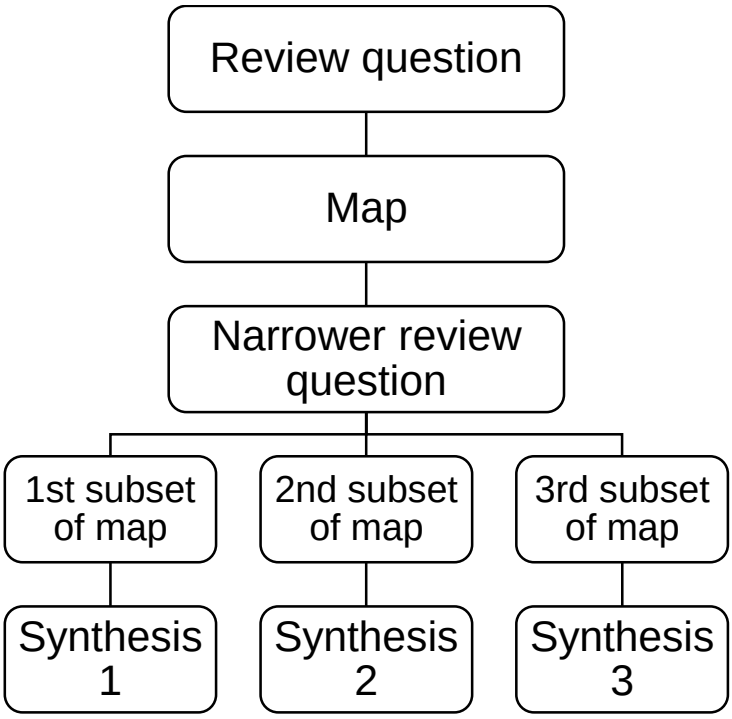

Figure 6.1: Examples of a broad question and several syntheses (republished from (D Gough et al., 2012))

Or they might be separate qualitative and quantitative reviews that are combined into a third review that compares the data within these two separate reviews (Figure 6.2). Overall, mixed method reviews offer an abundance of synthesised evidence on a topic, however time and resources needed to complete them has resulted in few of these reviews being published. Table 6.1 provides a summary mixed method synthesis with accompanying examples.

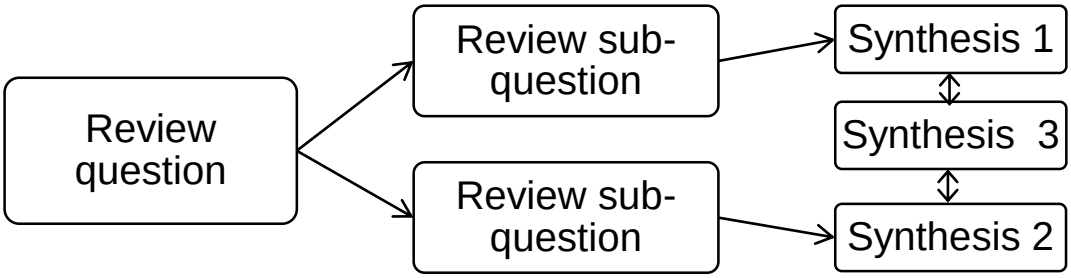

Figure 6.2: Example of two reviews with multiple syntheses (republished from (D Gough et al., 2012))

Table 6.1: Qualitative and mixed method approaches (adapted from (Petticrew et al., 2013))

Approach	Description	Examples
Qualitative approaches		
Meta-ethnography (Noblit & Hare, 1988) .	1. translate the findings of different primary research studies on the same phenomenon into each other to generate overarching themes, concepts or metaphors (reciprocal translational analysis) 2. identify and explain contradictions and differences that exist between the various studies (refutational synthesis) 3. develop a picture of the whole phenomenon under study from studies of its parts (line-of-argument synthesis)	An example of this approach is in Campbell et al. on lay experiences of diabetes and diabetes (Campbell et al., 2003)
Thematic synthesis (various traditions) (Thomas & Harden, 2008)	This type of synthesis uses thematic analysis techniques to identify themes across primary research studies. The synthesis component entails an iterative process of inductively grouping themes into overarching categories that capture the similarities, differences, and relationships between the themes for the purpose of generating hypotheses about the phenomenon under study. Broadly, this process comprises two main steps, that is, line-by-line coding of the relevant parts of individual studies and the iterative generation of categories.	An example of this method is used in Harden et al. (Harden et al., 2004) which is a review of studies which placed people's own voices at the centre of their analysis.
Mixed-method approaches		
Critical interpretative synthesis	An adaptation of meta-ethnography as well as grounded theory in the synthesis of both qualitative and quantitative evidence. This method aims to generate a synthesising argument or theory, which entails a highly iterative approach to refining the research question and obtaining the primary research sample, including data analysis. Consequently, critical interpretative synthesis applies a method of assessing quality of primary research studies according to their contribution to theory development rather than methodological attributes (M Dixon-Woods et al., 2006).	A review by Dixon-Woods et al. on access to healthcare by vulnerable groups provides an example of the methods and how they are applied to topic (M. Dixon-Woods et al., 2006).
Realist synthesis	A ''realist'' review aims to determine what works for whom, in what circumstances, and why/how mechanisms work or not (Pawson, Greenhalgh, Harvey, & Walshe, 2005).	Pawson's realist review on the US sex offender notification and registration programme provides an example of how this evidence synthesis works with policy (Pawson, 2002).
Narrative synthesis	A mixed-method synthesis approach that starts with developing a preliminary theory of why the intervention and or implementation works. Includes a toolbox for transforming and translating qualitative and quantitative evidence (Popay et al., 2006).	This approach is illustrated in a review of the implementation of smoke alarm interventions (Arai et al., 2007).

7 CONCLUSION

Overall, evidence synthesis compiles vast amounts of information into more feasible and user friendly evidence. It may further highlight the lack of quality evidence and information in an identified topic. The CRE ISAC aims to support individuals and teams in completing these varying types of reviews. We hope that this guide provides an introduction and an appropriate starting place for you to begin your next review.

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