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Rapid reviews methods series: considerations and recommendations for evidence synthesis in rapid reviews

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Introduction

This paper provides additional education and considerations from the Cochrane Rapid Review Methods Group (RRMG) around the synthesis of findings in a rapid review (RR), including summarising included studies, providing a narrative interpretation of findings, determining the appropriateness of conducting a meta-analysis and using systematic reviews (SRs) as studies included in an RR.[1]

RRs are an increasingly common knowledge synthesis product used to support evidence synthesis needs in situations where time and other resources may limit the use of full SRs.[1] Studies of RR methods and reporting have found that most RRs provide a descriptive synthesis of results, that a minority provide a meta-analysis and that few are transparent about why particular synthesis methods were selected.[2–5] This paper summarises advice for synthesising evidence for RRs from the updated Cochrane Rapid Reviews Methods Guidance to help researchers effectively conduct RRs, including when to consider quantitative synthesis and how to integrate SRs and primary studies in the synthesis process.[1] The RRMG's four recommendations for RR evidence synthesis are summarised in table 1.

Evidence synthesis for RRs

An end-user orientation guides the development of an appropriate synthesis plan, which should be included in the protocol and informed by the involvement of knowledge users.[1 6] The analysis plan should prioritise and select key PICO (Population, Intervention, Comparator, Outcomes) elements, with particular attention to the outcomes most critical for decision-making.[1 7] The basic principles of evidence synthesis are the same between SRs and RRs, and this paper highlights opportunities to accelerate and streamline processes when conducting an RR, along with which key practices for SRs should be followed.

Provide a descriptive summary of the included studies

A descriptive summary of the included studies helps to ground the reader in what studies were included and confirm that the studies have similar PICOs to assist in determining whether it is possible to pool their results. We recommend structuring the descriptive summary of included studies around the PICO elements. Additional descriptions such as the dates of studies, locations or health systems in which the studies were conducted, study design(s) and ways in which outcomes were measured and reported should be included as appropriate to the RR question(s). Providing a summary in an evidence table or an alternative format such as a descriptive graphical display can help streamline RR production and presentation.

Evidence tables lay out the important characteristics of a study in a brief tabular form. Some evidence tables include results, or they may be presented in a separate table. Table 2 provides an example of the format of an evidence table that incorporates results, adapted from a recent RR of bariatric surgery.[8] An RR by Uhl *et al* on the use of telehealth for substance use disorder treatment includes a table with details of the treated population, the telehealth intervention, the comparator and the number of studies and participants for each combination of these elements.[9] Pisavadia *et al* conducted an RR of health economic evaluations of care for perinatal anxiety disorders that uses a table to map out how costs of maternal illness, interventions and comparators were evaluated across studies.[10] As these three examples illustrate, there is not one correct form for evidence tables, with each constructed to meet the RR's needs. Appendix K of the National Institute for Health and Care Excellence's methods document for development of public health guidance provides evidence table templates for various types of studies and reviews.[11] The Cochrane Handbook provides guidance related to summarising study characteristics, including using evidence tables to prepare for evidence synthesis.[12]

Perform a synthesis of the findings

An RR provides a narrative interpretation of the compiled evidence, with or without meta-analysis, to help users fully understand the collected evidence.[1] Even when a meta-analysis is feasible and planned, the accompanying narrative synthesis can aid readers in comprehending the outcomes by interpreting and contextualising

Table 1 Recommendations for rapid review evidence synthesis

Recommendation	Considerations for synthesis process
Provide a descriptive summary of the included studies	Evidence tables are usually the most streamlined way of summarising study characteristics and key outcome results. Characteristics of the included studies can be briefly summarised using narrative text, figures, tables or a combination. See table 2 for an example of an evidence table
Perform a synthesis of the findings	Provide a narrative interpretation of the findings whether or not a meta-analysis is performed. See table 3 for examples of evidence synthesis statements, including those derived from meta-analysis results and those using a narrative synthesis
Consider a meta-analysis if appropriate and resources permit	Consider a meta-analysis if appropriate, possible and resources permit. Meta-analysis is usually a more comprehensive way to synthesise data than a completely narrative interpretation, and may ultimately require less work, so we recommend it whenever technically possible
Consider how to synthesise evidence when including one or more SRs	When appropriate SRs are available, they can form a starting point for the rapid review (RR). ► If one or more recent and high-quality SRs are available matching the PICO and key questions, then they can be used as a base for the RR. A search should be conducted to assure decision-makers that no newer primary studies have been published. It is important that the SRs be high quality so that the RR authors can trust that the original searches did not miss important studies. If this is a concern, then it is best not to use those SRs ► If the SR included a meta-analysis, consider updating the meta-analysis by adding the newly identified primary studies to prior studies included in the eligible SRs ► If the SR did not include meta-analysis, but the additional newly identified studies make meta-analysis appropriate, consider conducting a meta-analysis

PICO, Population, Intervention, Comparator, Outcome; RR, rapid review; SR, systematic review.

them rather than solely presenting numerical data. Campbell and colleagues study of SRs of public health interventions employing narrative synthesis of quantitative data found that most fall short in terms of describing the method and theory used, investigation of heterogeneity, and discussion of limitations.[13] Their study gives an overview of best practices for narrative synthesis, particularly for complex interventions, based largely on the Economic and Social Research Council guidance by Popay and colleagues.[14]

Table 3 contains several examples of evidence synthesis statements for several outcomes from the RR of bariatric surgery by Durbin and colleagues, including statements based on meta-analyses as well as narrative summaries of study findings.[8] A summary of findings (SOF) table, as described by GRADE (Grading of Recommendations, Assessment, Development and Evaluation), is also an approach to organise the quantitative findings of studies for each selected outcome, along with the finding's certainty of evidence. The RR of telehealth interventions for substance use disorders by Uhl *et al* includes such an SOF table.[9]

The Cochrane Handbook includes a chapter regarding the development of SOF tables.[15] While the Cochrane guidance was written with SRs in mind, the principles and formats can easily be adapted for RRs and another Cochrane RRMG article in this series specifically addresses their application of GRADE and certainty of evidence rating for RRs.[7]

If a meta-analysis is not possible RR authors may also consider using the Synthesis Without Meta-analysis (SWiM) reporting guideline as a guide to help promote transparency and completeness in the narrative presentation of evidence synthesis.[16] The SWiM guidelines suggest that authors describe the synthesis of findings for each comparison and outcome, that the synthesis addresses each key question and specifies which included studies contributed to the findings.[16]

Table 2 Example of a combined study characteristics and key outcome evidence table

Author, year Risk of bias	Total N Follow-up	Inclusion criteria	Exclusion criteria	Intervention and control	Weight change, BMI
Cohen, 2020 Moderate	N=100 2 years	Age: 18–65 years; BMI: 30–34.9 kg/m^2; >15 years history of T2DM; early stage chronic kidney disease	Autoimmune or T1DM; prior abdominal surgery; alcoholism or severe hepatic disease	Intervention: RYGB Control: MT Best medical treatment consistent with updated 2019 ADA and EASD guidelines	Baseline: RYGB: 32.5 kg/m^2 MT: 32.6 kg/m^2 2 years: RYGB: 24.5 kg/m^2 MT: 31.2 kg/m^2 Mean difference: −6.9 kg/m^2 (range −8.0 to −5.8 kg/m^2), p<0.001

Adapted from Durbin *et al*.[8]

ADA, American Diabetes Association; BMI, body mass index; EASD, European Association for Study of Diabetes; MT, medical therapy; RYGB, Roux-en-Y gastric bypass; T1DM, type 1 diabetes; T2DM, type 2 diabetes.

Table 3 Examples of evidence synthesis and interpretation statements

Outcome	Evidence statement
Weight loss	Bariatric surgery groups experienced statistically greater per cent total body weight loss (22%–30% vs 5%–9%; p<0.001) and had lower mean BMIs (25–28 kg/m^2 vs 29–32 kg/m^2; p<0.001) compared with medical therapy groups across 1–5 years of follow-up. Five RCTs; N=391
Diabetes	Across 1–5 years of follow-up, bariatric surgery groups experienced better T2DM outcomes compared with medical therapy, as indicated by comparatively higher rates of remission (RR range, 2.7–36.4) and statistically significant lower mean HbA1c values (6.0%–7.2% vs 7.5%–9.1%; p<0.007) at all reported timepoints. Six RCTs; N=433
Hypertension	There were mixed results on the effect of bariatric surgery on hypertension. Pooled analyses of mean systolic and diastolic blood pressure showed inconsistent results across 5 years of follow-up, suggesting that bariatric surgery groups may either have statistically significant lower blood pressure values or no difference compared with medical therapy groups. Both bariatric surgery and medical therapy groups achieved mean blood pressure values at or below the thresholds for hypertension at most follow-up timepoints. Five RCTs; N=391
Quality of life	At 2 years of follow-up, participants randomised to bariatric surgery had statistically significant higher quality of life scores (SF-36 scale) in most general health domains, except for mental health, compared with medical therapy controls. One RCT; N=100

Adapted from Durbin *et al*.[8]

BMI, body mass index; HgA1c, glycated haemoglobin; RCT, randomised controlled trial; RR, risk ratio; SF-36, Short Form-36 Survey; T2DM, type 2 diabetes.

Consider a meta-analysis if appropriate and resources permit

If sufficient data, both in quantity and quality, are available, then a meta-analysis is often the most useful and efficient way of providing data synthesis in an RR. Meta-analysis may be inappropriate not only when there are insufficient studies for a given comparison, but also in situations where, despite having several eligible studies, factors such as heterogeneity in study design, PICO elements or concerns about the quality and consistency of the data, may render it an inappropriate synthesis method.[17] The standards for conducting an SR meta-analyses generally apply to RRs, and authors should consult the Cochrane Handbook for the full details regarding meta-analytic techniques.[17] When performed, meta-analysis for an RR can be streamlined by conducting only the pooled analyses on comparisons most critical for the decision-making process. Single reviewer data entry with checking by another reviewer is another common shortcut used in RRs.

Consider how to synthesise evidence when including one or more SRs

Some RRs include only primary studies and others may incorporate additional primary studies with one or more existing SRs. Overviews of SRs without additional primary studies are not included in our RR guidance but are addressed in the Cochrane Handbook chapter on overviews of reviews.[18] When one or more SRs are available to help address an RR question, the selection criteria for incorporating SRs may include using the most recent, most methodologically robust, or most comprehensive, of the SRs most closely matching the RR research question. We recommend that if multiple SRs are included, the RR also considers the overlap of any primary studies to avoid statistical errors from double counting in meta-analysis. A formal study of overlap does not need to be undertaken, overlapping studies may be presented in a table that identifies which are included in each SR.

When SRs are included in an RR, synthesis may involve adding new primary studies to an existing meta-analysis. Typically, once a primary SR is identified that matches the research question then primary studies that meet the inclusion criteria and were published after the search date of the included SR are added for meta-analyses presented in the RR.

If an updated meta-analysis incorporating new primary studies is planned, it is usually necessary to abstract data from each study in the SR for entry into the software package along with data from the new primary studies. If the included SR does not use meta-analysis, authors should assess whether meta-analysis is now appropriate, combining primary studies from the SR and the additional studies. When it is not possible or feasible to conduct a new meta-analysis then the narrative synthesis should provide an interpretation of the additional studies in the context of the existing SR, exploring the similarities and differences in their PICO elements, settings, study designs and results.

Conclusions

RRs should always include a descriptive summary of included studies and provide a narrative interpretation of the findings. When feasible, authors should consider conducting meta-analyses since this is often the most time efficient way of presenting synthesised evidence and drawing conclusions from the data. Synthesis methods are similar in SR and RR, but authors of RRs can accelerate the evidence synthesis by addressing more tightly focused questions, emphasising only the most critical PICO elements, using an experienced team, and performing single reviewer data abstraction with checking for tables and meta-analyses. Authors can also limit the amount of descriptive text written when the data are presented elsewhere in the RR, such as in evidence tables. Authors should provide transparency about the shortcuts employed and their potential impact on the bias of the RR given that some shortcuts may be more (ie, omission of a protocol) or less (ie, limitation to English language publications) likely to introduce bias.[19] Finally, although decision-makers need and want information quickly, RR authors should clearly express the potential limitations of RRs compared with SRs and how certain we may be in the interpretation and implementation of RR findings in the realms of clinical care, health policy and public health.[20]

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