Facilitating the use and uptake of timely evidence from rapid reviews by policymakers and other healthcare stakeholders

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FACILITATING THE USE AND UPTAKE OF TIMELY EVIDENCE FROM RAPID REVIEWS BY POLICYMAKERS AND OTHER HEALTHCARE STAKEHOLDERS

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DEDICATION

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1. TABLE OF CONTENTS

2. ABBREVIATIONS

CI	Confidence interval
IMRaD	Introduction, Methods, Results and Discussion
IQR	Interquartile range
JP	Journal published
NJP	Non-journal published
OR	Odds ratios
RAG	Rapid advice guideline
RR	Rapid review
SR	Systematic review
WHO	World Health Organization

3. INTRODUCTION

Having ready access to relevant information to inform decision-making is vital to policymakers who make decisions in healthcare. Systematic reviews (SRs), considered the gold standard in evidence synthesis, inform practice or policy in healthcare [1,2]. However, many barriers to the use and uptake of SRs render most underutilized [1, 3–5]. A significant obstacle is that SRs can be difficult and time-consuming to conduct, usually taking 1 to 2 years to complete [6]. Further, they can also be lengthy to read, especially to those who seek information conveniently and in a timely manner. Research suggests that certain format and content features of SRs are among several key barriers that can impede their uptake by policymakers and healthcare managers [7]. For example, there is often too much technical jargon used, lack of clear messaging, and insufficient relevant information to inform decision-making. An additional barrier identified is that SRs may not be presented or organized in a format that facilitates the use of evidence [7].

Since the 1950s, the predominant format of academic journal articles, including for published SRs, is the IMRaD structure, an acronym that refers to the Introduction, Methods, Results and Discussion sections of an original article [8]. The International Committee of Medical Journal Editors (ICMJE) explicitly recommends this structure as the uniform requirement for manuscript submissions [9]. Therefore, most mechanisms used to convey health research information to decision-makers employ this traditional scientific format. However, preparing a report or journal article this a way does not necessarily makes it easy for clinicians, policymakers and other stakeholders to understand and use for decision-making purposes [10]. To address this issue, several evidence-based products have been developed over the last number of years that involve summarized information from a single SR or a collection of sources, including SRs (e.g., SUPPORT Summaries [11]; Evidence Aid Summaries[12]). Many of these alternate products have been structured according to a 'graded entry format,' a structure organized to highlight decision-relevant, summarized information up front followed by more detailed information that is gradually uncovered for the reader [3]. A graded entry approach is designed to facilitate scanning key information with access to additional, more in-depth information to read should the end-user wish to do so [3, 13]. An early form of the graded entry approach in healthcare was the 1:3:5 format style developed in 2001 by what was then called the Canadian Health Services Research Foundation [14]. It is defined as one page of

main messages; followed by a 3-page executive summary; and findings presented in no more than 25 pages of writing reported in clear, easy-to-understand language.

Another short summary format, known as a 'SUPPORT Summary,' was developed to present SR findings to decision-makers in low and middle-income countries (LMICs) [11]. They comprise a summary of identified information that begins with key messages derived from the findings of the evidence and generally include other components such as background information to provide context to the findings. They also include a summary of the searching approach and studies identified; a detailed summary of the main findings, including methodological quality of the evidence for those findings; and relevance to LMICs, including reference to the applicability, impact on equity, economic considerations, need for monitoring and evaluation, and references [10, 11]. A Summary of Findings (SoF) Table (e.g., now standard in Cochrane Reviews) is another type summary format for SRs developed as part of the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach [15, 16]. They are structured to present the main findings of a SR transparently in a simple tabular format providing critical information concerning the quality of evidence, the magnitude of the effect of the interventions examined, and the sum of available data on the primary outcomes [15, 17]. For these products, the fixed IMRAD structure has been set aside, and instead, key information is tailored to meet the needs of various end-users.

Research suggests that end-users of SRs are partial to reading brief summaries of SR findings versus full SRs in their entirety [3, 7, 18]. Moreover, based on a collection of studies, we know that SR end-users favour clear, concise summaries in simple, easy-to-understand language [7, 19–21]. Studies of SR end-user preferences also suggest, for example, beyond information about 'what works,' end-users like to see articulated implications for policy, such as costs, applicability to their setting (whether local or global), and potential impacts on equity [1, 2, 22].

Emergence of Rapid Reviews

Evidence is often needed to inform an emergent issue outside the traditional SR timeline. For this reason, RRs have emerged as a form of knowledge synthesis that shortens or omits components of the SR process to produce information more quickly, often ranging from a few weeks to months [23]. A defining feature of RRs is a restricted scope. The streamlining of methodological aspects of the SR process and the tailoring of methods used are usually driven by the urgency of the request, available resources, and timeline [24, 25]. Abbreviated SR

methods may involve, for example, limiting the number of outcomes of interest, searching a limited number of sources, restricting search criteria, focusing on high-quality study designs including SRs, and/or a targeted and iterative approach to study selection and data extraction, among others. Several organizations have undertaken RRs using various approaches in their conduct [26], and these reviews have become a valuable information tool to support the use of evidence for decision-making [27]. Clinically, RRs have been used to inform frontline patient care decisions [28], to make crucial decisions about health system responses [29], and to inform routine situations to improve public health [30]. RRs are also produced and used in low and middle-income countries (LMICs) to support healthcare decisions [31].

One would expect most RRs to be less tedious to read in full versus SRs and be designed to maximize relevancy to policymakers' decisions, but to date, this has not been formally assessed. The extent to which 'tailored' alternative formats, namely, those described as 'graded entry,' are used in the production of RRs beyond the conventional IMRaD format used in academic publishing also has not been studied. Similar to SRs, the use of an IMRaD format may hinder the use of evidence derived from RRs in decision-making [22], but this too has yet to be studied. Ideally, RR producers should be guided by established best practices that include elements of good document design, including 'how' best to layout information and 'what' information or content is of most use and value to include.

In 2013, an evidence-informed framework of effective information-packaging to support policymaking was developed called the BRIDGE criteria [22, 32]. It originated as part of a research series established to meet the needs of policymakers and health systems managers in the European Union [32]. The original BRIDGE criteria is comprised of eleven questions across key domains designed to assess evidence products considered to be information-packaging mechanisms (e.g., a study summary, a SR summary, a compendium or grouping of summaries on a particular topic; a policy brief; or a policy dialogue report). The criteria address five specific domains, including: 'coverage' of a health system issue or condition, in particular, how topical or relevant the issue is along with its various facets; what type of knowledge the product includes (e.g., synthesized evidence; tacit knowledge and views of policymakers and stakeholders); how and for whom it is targeted; how clearly the information is presented; and how end-users support its use. The purpose of assessing evidence products against these criteria was to encourage debate and innovation about how information is prepared, packaged and delivered for policymakers and stakeholders as a component of an overarching knowledge-brokering approach. A previous study applied the criteria as part of an analysis of a web-

published document series prepared by various organizations to support policymaking in low- and middle-income countries [18]. Given that policymakers are increasingly using RRs in their daily decision-making [33], we deemed that the BRIDGE criteria were highly applicable to RRs in revealing how well the information is prepared and packaged for policymakers and stakeholders.

In recent years, national and international guideline developers have started incorporating RRs into guideline development processes to inform recommendations in urgent and emergent decision-making scenarios. Organizations such as the U.S. Preventative Services Task Force (USPSTF), and the Centres for Disease Control and Prevention (CDC), for example, have become important end-users of this type of knowledge synthesis [34, 35]. The World Health Organization (WHO) also develops guidelines on a broad array of clinical, public health, health system, health promotion and implementation strategies [36]. At times, WHO must provide an evidence-informed guideline within 1-3 months called 'rapid advice guidelines' (RAG) in response to a public health emergency [37]. Such guidance must follow the basic steps for full guideline development but with modifications to meet the accelerated timeline. Although the term "rapid" was used in the title of several previous WHO guidelines, these guidelines were based on an outdated approach, and none were produced rapidly or using unique or modified approaches involving the production of RRs [38]. Instead, they described standard approaches in the context of efforts to produce the guideline more quickly yet still used traditional SR methods, which can take 1 to 2 years to produce. Therefore, such guidance was not meeting the needs of WHO Member States quickly enough (i.e., 1-3 months). Until recently, WHO lacked specific guidance on how best to accelerate guideline development, especially regarding generating the evidence systematically from RRs within this timeframe.

Research Aims

Despite increased production and use of RRs, little is known regarding what information RRs contain and how information is conveyed in terms of format. Moreover, given known challenges that have hindered the optimal uptake of SRs, primarily as related to format and content [7, 39, 40], RRs may, too, be prone to some of these same obstacles. However, only indirect research exists from SRs, as no studies have carefully examined these issues for RRs. Therefore, this doctoral research aimed to broaden understanding of how evidence is presented to readers of RR reports, and in doing so, set out to establish a baseline of information on the production and design of RRs, including data on the format and included content. In addition,

given the increased use of RRs among decision-makers, the second aim of this research was to formally evaluate RRs as an information-packaging mechanism for key healthcare stakeholders. Last, with growing calls for evidence-informed public health emergency responses, there was value in demonstrating how RR methods could be applied to guideline development for urgent or emergent public health responses. As such, the third aim of this research was to showcase guidance developed on how to produce a WHO RAG, informed by RRs, within 1-3 months in the context of a public health emergency.

4. AIM OF THE COMPILED RESEARCH PAPERS

The overarching purpose of this doctoral research was to facilitate the development, use, and uptake of RRs for use in decision-making in healthcare. Specifically, this research sought better enabling getting ahead of the curve on optimal formats and packaging of RRs to maximize their uptake by healthcare professionals, policymakers, and health researchers, including guideline developers. As such, the primary objectives of this thesis research were as follows:

1. To determine the format and content of RRs based on the systematic identification of an international sample of both journal-published (JP) and non-journal-published (NJP) RRs and to compare and contrast features between them, and;
2. To examine the extent to which RRs are a useful information-packaging mechanism based on criteria for communicating clearly to support healthcare decision-making; and
3. To demonstrate how RR methods may be used to inform the development of international guidelines in an accelerated timeframe (1 to 3 months) in the face of global public health emergencies.

This doctoral dissertation is, therefore, based on three combined scientific papers:

1. Garritty C, Hersi M, Hamel C, Stevens A, Monfaredi Z, Butler C, Tricco AC, Hartling L, Stewart LA, Welch V, Thavorn K, Cheng W, Moher D. Assessing the format and content of journal published and non-journal published rapid review reports: a comparative study. PLoS ONE 2020;15(8). (JIF, 2020): 2.74

2. Garritty C, Hamel C, Hersi M, Butler C, Monfaredi Z, Stevens A, Nussbaumer-Streit B, Cheng W, Moher D. Assessing how information is packaged in rapid reviews for policy-makers and other stakeholders: a cross-sectional study. Health Res Policy Sys 18, 112 (2020). (JIF, 2020): 2.365

3. Garritty CM, Norris SL, Moher D. Developing WHO rapid advice guidelines in the setting of a public health emergency. J Clin Epidemiol. 2017 Feb;82:47–60. (JIF, 2017): 4.667

5. SCIENTIFIC CONTRIBUTION OF THE COMPILED RESEARCH PAPERS

5.1 OVERVIEW OF THE METHODOLOGY OF THE JOINT PAPERS

5.1.1 *First study: Assessing the format and content of journal published and non-journal published rapid review reports*

Study Design. This was a descriptive, comparative study of a broad selection of RRs as the unit of analysis. To reflect real-world use of RRs, we chose to compare the format and content features of both journal published (JP) and non-journal published (NJP) RRs as we know that several healthcare organizations around the globe are producing them but are not necessarily publishing them in journals. The protocol for this study is available on the Open Science Framework (https://osf.io/29xvk/).

Study Methods. We defined format or layout to mean 'how' information was presented (i.e., the visual arrangement, appearance, or presentation of information contained within a report) with content referring to the main features of a report in terms of 'what' information was presented (e.g., included sections or information).

Sample size. We did not calculate an overall sample size for this descriptive study. However, we limited our sample for the sake of practicality using a two-stage sampling strategy to ensure comparison groups were of similar sizes.

Bibliographic searching (stage 1). This stage involved first identifying JP RRs for which we developed a draft bibliographic database search strategy for MEDLINE that was peer-reviewed by a senior information specialist using the PRESS checklist [41]. We then modified the final MEDLINE search for other bibliographic databases including Embase, Ebsco, CINAHL, Educational Resources Information Center (ERIC), PsycINFO, and the Cochrane Library. All searches were run in January of 2017. We did not apply language restrictions but restricted reports to those published in 2016.

Grey literature search (stage 2). This stage involved identifying NJP RRs. For this, we searched websites listed in CADTH's Grey Matters checklist [42] and the PROSPERO register. Further, we searched the websites and a contact list of pre-identified organizations (n=148) that produce or commission RRs. If a RR did not report methodology or the reported methodology was unclear, we contacted authors for further information. As a proxy, we used any available

internal methods guidance documents as requested and provided by authors/organizations. In total, 228 NJP RRs were identified from this search.

Non-journal published (NJP) rapid reviews sampling strategy. Because we identified a mix of higher and lower RR volume-producing organizations through grey literature searching efforts, we required a sampling strategy to address this. Since a large number of identified RRs were likely to be clustered by organization, we first catalogued the retrieved sample of NJP RRs by organization and then by product per organization for those organizations that produced more than one type of RR product. Once sifting through these RRs by organization was complete, total sums per cluster were calculated (listed in rank order by size from largest to smallest). We then calculated the proportionate contribution of each cluster to the total. Those proportionate contributions were then transposed using the JP RR sample size as a guide; hence, we sampled proportionate to cluster size. In some cases, this meant that sampling took place at the organizational level and by RR type within an organization. Using the sample size of the JP group to determine the sample size in the NJP group was a feasible and practical approach, and ensured comparable group sizes.

Eligibility Criteria. To be included, RRs had to meet the working definition of RR and be reported in English or French. We defined RRs as reports where the intent is to summarize evidence for use in any form of decision-making or information/decision support, directly or indirectly related to patient or healthcare, using SR methodology that is tailored to accommodate an expedited turnaround time [23]. All types of RR research questions related to humans and healthcare were considered, and no maximum timeline of conduct was applied.

Study selection. First, we applied eligibility criteria to screen bibliographic results from the journal published domain. One person reviewed the titles and abstracts while a second person reviewed the excluded citations. Two people independently reviewed full-text reports with disagreements resolved by consensus or a third person. We pilot tested a selection of records for title/abstract and full-text screening to ensure eligibility criteria were applied consistently. Once the group of JP RRs was determined, we then finalized the sample of the NJP RR group, which underwent the same screening process at the full-text level only as these reports were not indexed by title and abstract. We outlined the reasons for exclusion in a study flow diagram.

Data collection. We extracted information specific to features of the reports across four broad categories considered to be involved in good document design, and that was most relevant given the nature of our study [43]. These included: 1) *report identifying information*; 2)

structure or document organization (Table 1 provides a definition of the types of report structures); 3) *content*; 4) *visual design* covering legibility, graphic elements, and general layout. We also collected information on additional factors (e.g., report length, content placement).

Table 1. Defining Main Types of Report Structures

Main Types of Report Structures	
IMRaD	A report format structured to include the following sections consecutively: Introduction, Methods, Results, and Discussion (IMRaD) sections of an original article. Most common format in scientific publishing.
Graded-entry	A report format organized to highlight decision-relevant, summarized information upfront with access to addition details gradually uncovered for the reader; key information is arranged to facilitate scanning of the most relevant information up front.
1:3:25 format	Type of graded-entry structure comprised of 1-page of main messages followed by a 3-page executive summary, with an additional 25 pages allotted for the main report including context, methods, main findings, and implications among information reported in clear, easy to understand language.
Inverted pyramid format	Type of graded-entry structure that emphasizes the conclusions or key messages up front followed by brief (executive) summary, followed by a lengthier report that provides specific details for the reader. For the purposes of this study, this format similarly follows a 1:3:25 format but does not strictly adhere to this page count.
SUPPORT Summary format	Type of graded-entry structure developed to present the results of SRs to decision-makers with key messages from findings up front, followed by context; search approach; search results; details of main findings including methodological quality of the evidence; applicability; equity; economic; monitoring and evaluation considerations; and references.
Multicomponent	Refers to a report with various components divided into chapters or sections beyond the typical IMRaD or general graded entry structures.

We piloted forms using a subset of ten articles. For general characteristics, one individual extracted data, while a second person verified a minimum 10% random sample of studies. We did full verification for all format and content outcomes.

Readability & Other Items. We also assessed the ease with which the reader can understand the written text of the abstract, introduction, and discussion sections of the RRs using the Simple Measure of Gobbledygook (SMOG) readability test [44], used in previous studies assessing health information [45]. An online calculator provided scores corresponding to the level of education required to understand the analyzed text. We used Microsoft Word to determine the word count of the main body of the report (i.e., all sections excluding references and appendices) and the total page length of the document.

Journal characteristics. Given the rise of illegitimate publishing entities, we confirmed peer-review by first cross-checking each journal against the Directory of Open Access Journals (DOAJ) and assessing each journal according to a list of salient characteristics of predatory

journals [46]. For NJP RRs, we noted if peer review was reported in the citation or if methods guidance or website information indicated peer review was part of their RRs process.

Reporting. To the extent possible, we followed the STROBE Statement—Checklist for cross-sectional studies [48], as a proxy given no reporting guidance exists for this type of methodological research.

Outcomes. Direct comparisons involved those between RRs published in journals versus those not published in journals. Comparisons were made regarding the features of the reports across four broad categories including report identifying information; structure (document organization); content; and visual design covering legibility, graphic elements, and general layout. Comparisons were also made across *other factors,* including the placement of certain sections in the report, how the report format was decided, whether stakeholders provided input on the layout, report length, and the readability of certain sections.

Statistical Analysis. For the main comparison (i.e., JP vs. NJP RRs), we summarized characteristics using frequencies and/or proportions accompanied by appropriate statistical tests to determine if statistically significant differences existed across variables between these groups concerning their journal or non-journal publication status. More specifically, we used Fisher's Exact Test for binomial proportions with Odd Ratios (OR) estimates based on conditional maximum likelihood method, and Welch's t-test for mean differences of continuous data items. The estimated associations were crude and based on univariate analysis and, therefore were not adjusted for other factors. For a subset of features, we only reported numerical differences between the JP and NJP RRs, given any differences noted would likely be due to direct differences in journal publishing versus the in-house publishing structures of most organizations producing RRs. Therefore, we only applied formal testing where appropriate using a significance level of $p = 0.05$.

5.1.2 Second study: Assessing how information is packaged in rapid reviews for policymakers and other stakeholders

Study Design. This was a descriptive, cross-sectional study involving a sample of RR reports that were assessed against modified criteria for communicating clearly to support healthcare decision-making. A protocol was developed for this study and is available on the Open Science Framework (https://osf.io/68tj7).

BRIDGE Criteria. We identified the BRIDGE Criteria,[1] which were designed as an evidence-informed framework comprising the building blocks of effective information-packaging to

support policymaking in healthcare [22]. The original criteria consisted of eleven questions across five key domains, with a sixth domain added in a subsequent publication in 2014 [18].

Prior to applying the criteria, we modified them to better align with RR processes and methods used in their conduct. For example, we added three questions related to 1) whether a RR was requested or commissioned for decision-making (Item A); 2) whether patient engagement was reported (Item J); and 3) how the report was labelled (i.e., was term 'rapid' used?) (Item Z). We further operationalized certain items to increase objectivity of assessments. For example, we expanded on whether the RR written in comprehensible or lay language by looking at readability [44], word count and reading time (Item M). When assessing whether the report had been prepared in a format that is readily appreciated, we provided definitions of what constitutes two key format structures (IMRaD and graded-entry) (Item N). Related to equity considerations, we included four guiding statements to help guide assessment of this item (Item Q) [47]. Last, we separated items that originally touched on more than one issue yet only allowed for one answer (i.e., double-barreled items). In this case, separate questions were then developed for each item. This resulted in a total of 26 items across six domains (Table 2).

Table 2. Adapted BRIDGE Criteria for Rapid Reviews

'Adapted' BRIDGE Criteria for Rapid Reviews (6 domains; 26 items labeled A-Z)	
1. What it covers (topical, relevant issues from the perspective of the policymakers)	A. Was the RR requested, commissioned, or conducted for decision-making purposes?* B. Was the RR conducted through a rapid response service? C. Was the RR topic identified through a priority setting exercise? D. Does this RR address at least 4 or more of the following for the issue being reviewed? *[Political and/or health system contexts; the underlying problem(s); options for addressing the problem(s); implementation considerations; cost implications]*
2. What type of knowledge is included	E. Does the RR draw on synthesized/assessed, global research evidence that has been assessed? F. Does the RR incorporate tacit knowledge of policymakers and/or stakeholders? G. Has the tacit knowledge been collected in a systematic way and reported in a transparent manner?
3. For whom its targeted	H. Does the RR explicitly target policymakers and/or stakeholders as the key audience? I. Was the RR reviewed by policymakers and/or stakeholders (not just researchers) for relevance and clarity? Patient Engagement in Research* J. Was the RR reviewed by patients/consumers for relevance and clarity? K. If applicable, were patients involved in any phases of the RR conduct? Check all that apply • Preparatory phase (agenda setting, prioritization of research topics and funding) • Execution phase (study design & procedures, screening, data collection, and/or data analysis) • Translation phase (interpretation of findings, dissemination, implementation)
4. How it is packaged	L. Was the RR organized in such a way to highlight decision-relevant information?

	For example, are benefits, harms and costs of policy/program options highlighted in some capacity in the report?
How it is packaged (con't)	M. Was the RR written in understandable, lay language?* [SMOG score of report, word count of report, estimated reading time (minutes) N. Was the RR prepared in a format that makes the information easy to absorb or readily appreciated? (e.g., graded-entry)
5. How its use is supported	O. Was the RR contextualized through online commentaries/briefings provided by policymakers/ stakeholders? P. Was the RR brought to the attention of target audiences through email, listservs, or (website postings*)?
6. Features and content	Q. Are equity considerations discussed or implicitly considered (e.g., through the topic or analysis) *In assessing, consider whether the RR addresses any of the following:** • *Which group/settings are likely to be disadvantaged relative to the policy option being considered?* • *Reasons for differences in the relative effectiveness of the option for disadvantaged groups/settings?* • *Are there likely to be baseline differences across groups/settings that could influence the effectiveness of the option? Would these baseline differences mean the problem is more or less important for disadvantaged groups or settings?* • *What should be considered when implementing the proposed option to ensure inequities are reduced?* R. Did the RR provide recommendations? S. Were the methods to conduct the RR described? T. Was quality assessment/risk of bias assessment of the included research evidence conducted? U. Were limitations of the RR approach outlined? V. Was a reference list provided? W. Was local applicability discussed in the RR? X. Were case examples included illustrating how to adapt or apply a policy or intervention locally? Y. Were key messages or summary points provided in the RR? (i.e., specifically labelled in the report) Z. Does the RR self-declare as 'rapid' (explicit phasing) in title or body?*
**new criterion or item added; RR – rapid review*	

Study Methods. We used diverse sample of 103 RRs produced in 2016 systematically identified from Study 1. Each RR was independently assessed by two reviewers against 26 factors, with any disagreements solved through discussion and consensus. In terms of reporting this study, we followed the STROBE Statement—Checklist for cross-sectional studies, as a proxy as no reporting guidance exists for this type of methodological research.

Statistical Analysis. We used descriptive summary statistics to assess the RRs against each criterion. Specifically, we calculated the median and interquartile range (IQR) for continuous data items and proportions for binomial items. Certain sub-items were only reported as counts within each category. We did do an exploratory analysis to assess any significant differences

on items between JP and NJP RRs using Fisher's exact test for binomial proportions (with Odds Ratio (OR) estimates based on conditional maximum likelihood method) and Welch's t-test for mean differences of continuous data items.

5.1.3 Third study: Developing WHO rapid advice guidelines in the setting of a public health emergency

Study Design. This study was a descriptive synopsis of detailed methods developed for the WHO Handbook on Guideline Development (Chapter 11) [36]. WHO was in need of guidance outlining the criteria that WHO staff should use when producing a RAG in 1-3 months when faced with a public health event. This guidance was to outline the steps and methods for developing such a guideline, based on evidence informed by RRs. Previously, WHO had issued 'rapid' guidelines but in fact, none were produced faster or had used a modified approach to that of a standard guideline. Moreover, none had previously conducted RRs of the evidence.

Study Methods. Importantly, this overall guidance on how to develop RAGs was informed by planned discussions with WHO staff from various programs (n=6), who deal most often with emergencies, as to important aspects to consider. As such, discussions were held with staff from the Global Influenza Programme, Department of Food Safety and Zoonoses, Global Tuberculosis Programme, HIV Department, Emergency Risk Management Department, and WHO Headquarters Library Services. Based on these discussions, a list of key issues was generated and reviewed with the WHO Guidelines Secretariat. The primary purpose of these deliberate dialogues was to become more familiar with the current WHO guideline process, and to understand staff roles, experiences, and needs with regard to familiarity with RR methods and development of RAGs in urgent and emergent public health settings. Further, we used an established 8-step process based upon widely accepted SR methods [49]. Overall, development of this guidance involved an iterative process with support provided by the WHO Guidelines Secretariat.

Analysis. The analysis involved the formal integration of a RRs approach and relevant considerations into WHO's existing process to developing standard guidelines. There was no statistical analysis required for this study. This study did not require research ethics approval as discussions were not formally structured and did not involve formal data collection, analysis or reporting.

5.2 SUMMARY OF THE RESULTS OF THE JOINED WORKS

5.2.1 First study: Assessing the format and content of journal published and non-journal published rapid review reports

Search Results. There were 2,508 records identified by the search for published RRs. After removing duplicates, there were 1,990 titles and abstracts screened that led to the exclusion of 1,034 records. Of the 956 full text articles retrieved, 52 JP RRs were deemed eligible for inclusion. The grey literature search for NJP RRs resulted in identifying 228 full-text reports from RR-producing organizations. After organizing the reports into clusters, and after proportionate sampling and subsequent screening, 51 NJP RRs were included. Therefore, for the comparison between JP and NJP RRs, a total of 103 RRs (52 JP and 51 NJP) were included for analysis.

General study characteristics. JP RRs were published in 47 unique journals, all deemed as legitimate. NJP RRs were identified from 25 individual organizations. Substantial differences between JP and NJP RRs were noted, for example, for reporting the corresponding author (88% vs 6%), reporting of funding (75% vs 55%), and if the RR had undergone peer review (96% vs. 6%). However, more NJP RRs were, for example, requested or commissioned (53% vs 25%) and were publicly available compared to RRs published in open access journals free of charge (98% vs. 69%). The purpose or rationale for undertaking a RR was similarly reported across both groups (JP, 63% vs NJP, 59%). Only three (6%) of RRs in each group indicated the time it took to produce the review, which ranged between 8-32 weeks for the JP RRs and 4-17 weeks for the NJP RRs. More NJP RRs reported end-user consultation during development of the RR compared to JP RRs (57% vs 35%). See Tables 1-2 in S1 Table of the study publication for full details [50].

Comparison of layout and content features. Only notable findings are presented below. For full results, see Table 3 in S1 Table of the study publication [50]. Under the category of *report identifying information*, all JP RRs (100%) reported the authors compared to NJP RRs (73%; p<0. 0001). In terms of *structure (document organization)*, as typical with journal publications, a higher proportion of JP RRs was constructed according to the traditional IMRaD format type when compared to NJP RRs [92% vs 8%; OR 125.49, 95% CI: 28.75-792.06]. Instead, almost half of NJP RRs (47%) were organized using a graded entry format type, while no JP RRs used this structure (Figure 1). Graded entry front end combined with an IMRaD structured report was more common in NJP RRs than JP RRs, 22% vs 4%, respectively (Figure 1). We also deemed nearly one-quarter of the NJP RRs (24%) to be multicomponent reports

that consisted of various chapters or sections beyond the typical IMRaD and graded entry styles. In comparison, few JP RRs used this format (4%) (Figure 1).

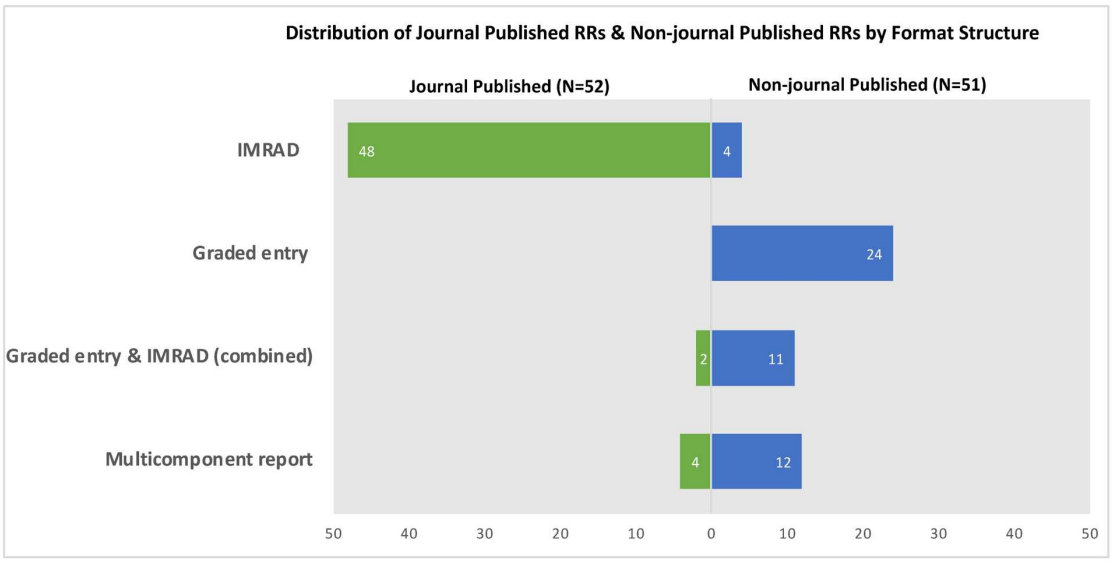

Figure 1. Rapid Review Format Structures (types) Identified.

Among NJP, the most common type of graded entry report was a mix of graded entry styles within the same report structure (n=16) (Figure 2). These reports did not ascribe to any of the other graded-entry formats but did aim to highlight conclusions or key findings upfront followed by other report components that provided additional details.

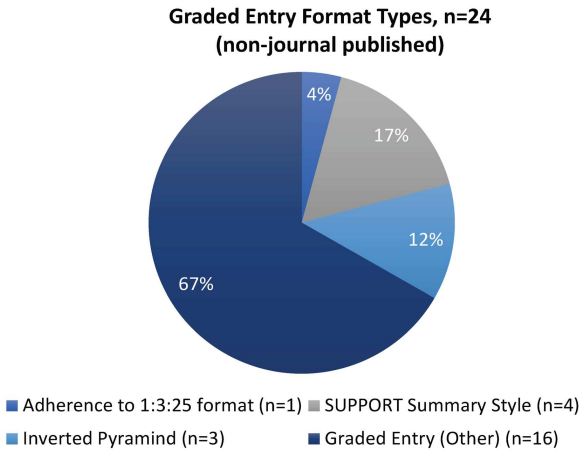

Figure 2. Graded-entry Formats Identified

We examined the components of the individual reports regarding *labelled content* (Figure 3). We found a high number of sections labelled across JP RRs when compared to NJP RRs. Sections included the following: abstracts; discussion; conclusions; acknowledgements; conflicts of interest; and author contributions. See Table 3 in S1 Table of the study publication

for corresponding ORs, 95% CI's, and p-values [50]. However, we found that NJP RRs were more likely to include sections bannered as executive summary; key messages; disclaimer; policy options or implications; cost implications; and appendices. We did not find any notable differences for other labelled sections, including introduction or background, results, limitations, recommendations for future research, references or abbreviations. Few RRs from either group included an implications section or reported on the quality of the body of evidence. Only the NJP RRs included bannered sections on equity (n=2), local applicability of results (n=5), and implementation considerations (n=3). Of the labels we identified, some of them potentially overlap and could refer to similar concepts (e.g., recommendations for future research, implications, and implementation). However, in this study, we did not formally assess the specific content of the bannered sections.

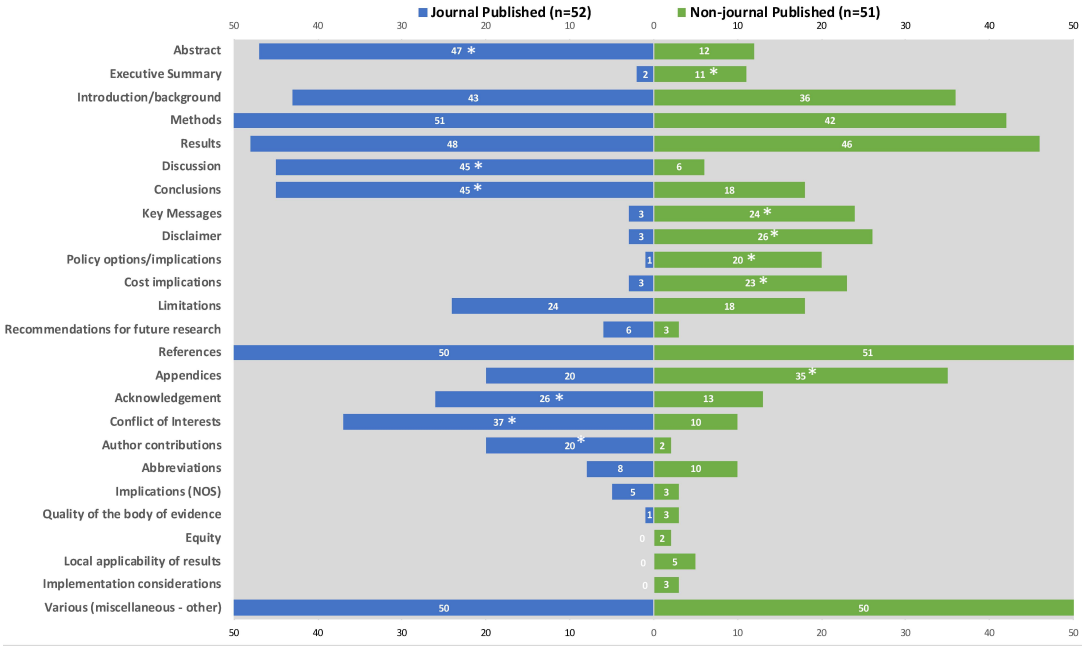

Figure 3. Bannering of content in rapid review reports.

In terms of other key findings, a higher percentage of JP RRs were more likely to include use of figures in the main document with the PRISMA flow diagram most common. For NJP RRs, a higher percentage of features were observed for example, the use of typographic cues (i.e., using bolded text, underlining, and bullet lists), including outcome-specific data tables in the main document, and providing materials in appendices. Overall, JP RRs were considerably shorter than NJP RRs in page length of the main report [JP Mean (SD) 12.17(10.40); NJP Mean (SD) 27.14(25.22)], as well as for the complete report and the executive summary. Although

there were no differences in the readability scores of JP RRs and NJP RRs in the abstract/summary, introduction/background, or discussion/conclusions sections, SMOG scores indicated that between 13.57-14.35 years of education would be needed to understand the writing contained in these selected sections of the RRs.

5.2.2 Second study: Assessing how information is packaged in rapid reviews for policymakers and other stakeholders

As identified from the first study, a total of 103 RRs were included from 15 countries, with the majority produced by Canada, followed by the United Kingdom, Australia and the United States. The 51 non-journal published (NJP) RRs were identified from 25 unique organizations based in six different countries. Figures 4 and 5 show the proportion of RRs that adequately met the individual adapted BRIDGE criteria, for which yes/no responses were obtained. See the main publication, Tables 2 and 3 for general study characteristics and full results of the adapted BRIDGE criteria as applied to our sample [51].

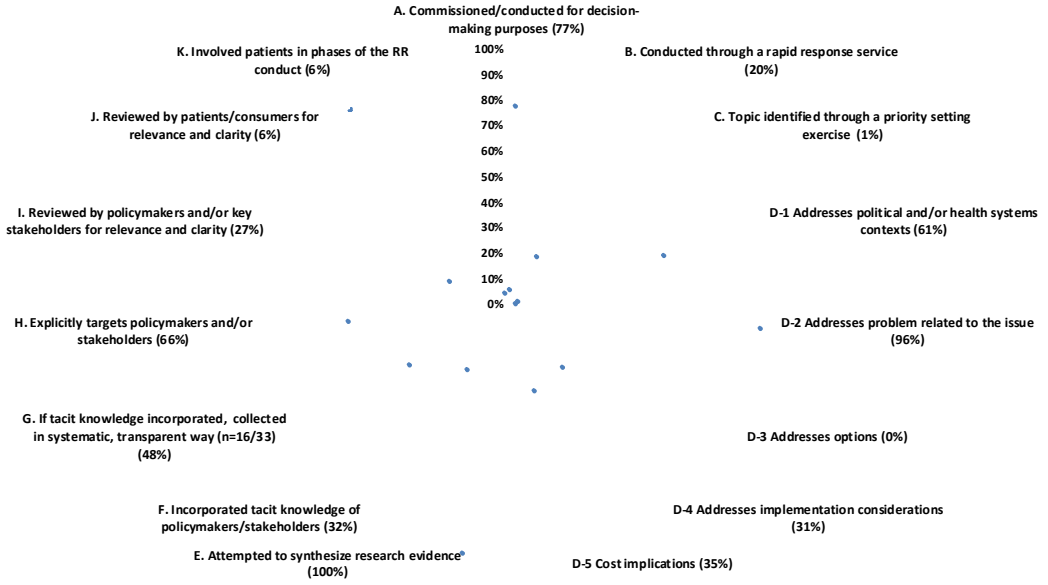

Figure 4. Radar chart depicting proportions of rapid reviews adequately meeting adapted BRIDGE Criteria (n=103) [Items A-K]

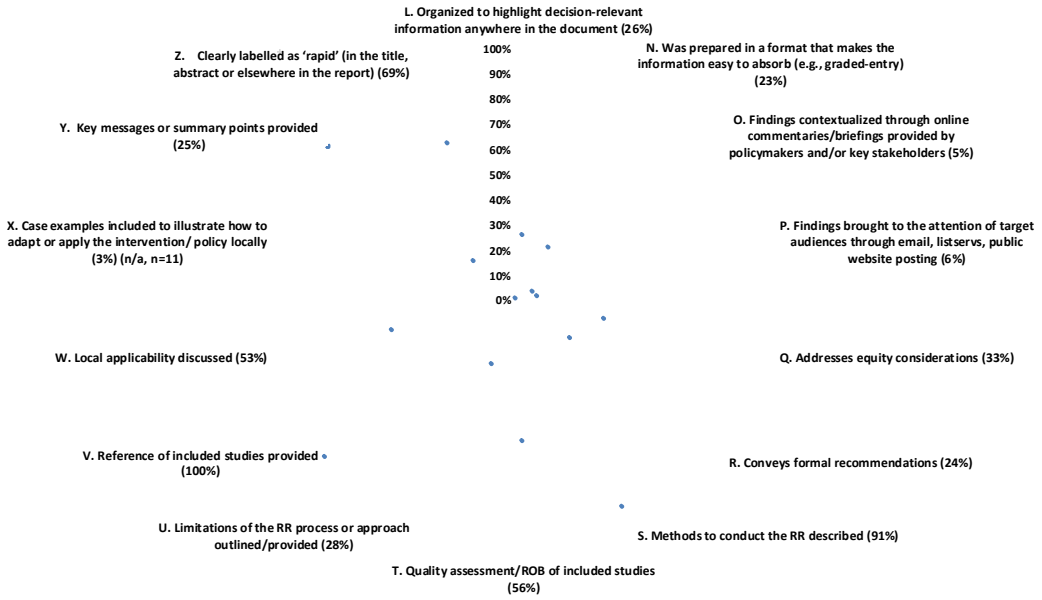

Figure 5. Radar chart depicting proportions of rapid reviews adequately meeting adapted BRIDGE Criteria (n=103) [Items L-Z]

Overall, conformity to the adapted BRIDGE criteria was modest. There were some useful features identified in the sample of RRs including, for example, that most were commissioned or conducted for decision-making purposes, directly outlined the problem related to the issue being reviewed, described methods used to conduct the RR, and all attempted to synthesize research evidence and provided references of the included studies. In addition, several RRs were judged to have explicitly targeted policymakers and/or stakeholders as key end-users, and were clearly labelled as 'rapid' in the title, abstract or elsewhere in the report.

There were also certain items not well-covered. Such criteria included, for example, that very few RRs were identified through a priority-setting exercise, directly involved patient partners in phases of developing the reviews, contextualized findings through the use of online commentaries provided by policymakers and/or key stakeholders, or brought findings to the attention of target audiences through email or public website postings. We also observed that few RRs were, for example, conducted through a rapid response service, addressed implementation considerations, incorporated the tacit knowledge of policymakers or key stakeholders, conveyed equity considerations, conveyed formal recommendations, or stated limitations of the RR process. Additionally, the average reading time of the main body of reports was a mean (standard deviation) of 42 (36) minutes.

Exploratory analysis showed that several differences between JP and NJP RRs are likely due to the nature of academic journal publishing that stipulates the format, type and length of the content present in articles, for example JP RRs were shorter in length, more often described review methods and acknowledged limitations of the process. Conversely, NJP RRs were for example, more often were organized to highlight key messages and decision-relevant information using non-traditional report formats to convey findings. For full results of the exploratory analysis including corresponding ORs, 95% CIs, and p-values see Table 3 of the full publication [51].

5.2.3 Third study: Developing WHO rapid advice guidelines in the setting of a public health emergency

This research culminated in a description of newly established guidance for guideline developers at the WHO on the process and procedures for developing a rapid guideline in the context of a public health emergency. This guidance outlines nine key steps involved in development of a RAG (Figure 6), including for example, the roles of various contributors across the phases of development, and the need to prepare and maintain the planning proposal.

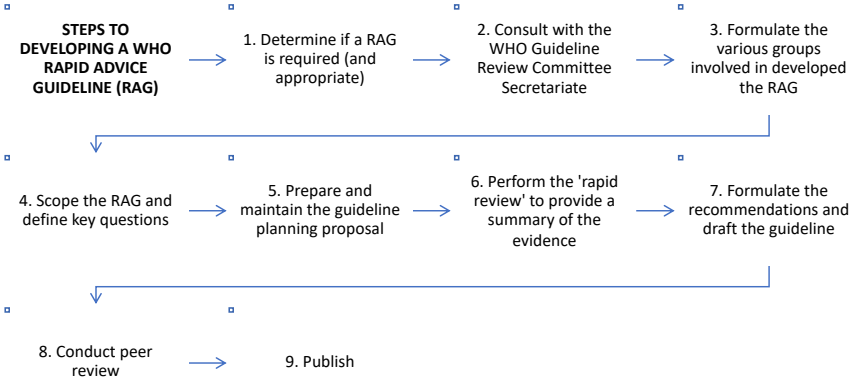

Figure 6. Steps to Developing a WHO Rapid Advice Guideline (RAG)

Original to this paper, we outlined considerations as to whether a RAG may be appropriate and feasible. In the guidance, we suggest it is important to examine the public health event that is driving the request for a RAG and the risk to public health. If the event is novel, it may require a new guideline in the face of a new or re-emerging situation. It is also important to assess the extent to which uncertainty exists and how urgently it needs to be addressed (e.g., is advice needed in the field?). Determining the anticipated timeframe for the event is also crucial. If the event is likely to be prolonged, a RAG may not be warranted. It is also important to clarify at

the outset the feasibility of rapidly implementing recommendations from a RAG. Various factors need to be carefully considered: the existence of functioning health systems; adequate health workforce; necessary infrastructure; the acceptability of the proposed intervention; training requirements; and resource availability.

Also unique to this guidance, we outlined that RRs are to provide a summary of the evidence that underpins the RAG. More specifically, we have presented key differences in RRs compared to standard SRs, and describe the process for performing RRs and developing summaries of the evidence including a proposed a RR taxonomy (See Table 3).

Table 3. Types of Rapid Reviews Used to Inform Recommendations in WHO Rapid Advice Guidelines (RAGs)

Types of rapid reviews[a]	Traditional systematic review (conducted rapidly)	Rapid review of systematic reviews	Rapid review of systematic reviews plus primary studies	Rapid review of primary studies only
Timeframe	Up to 16 weeks	Up to 12 weeks	Up to 12 weeks	Up to 12 weeks
Methods				
Question types	Clinical effectiveness, clinical efficacy; safety/harms; diagnostic or screening test accuracy; cost-effectiveness; health systems, education, public health, policy/programs, or prevention interventions			
Number of questions	Multiple (targeted and narrow in scope)	1 primary question (targeted)		
Literature search	No restrictions	Restrictions (e.g., date, study design, language, setting)		
Number of databases searched	No restrictions (comprehensive)	2-3 databases		
Use of systematic reviews	Systematic reviews and primary studies	Systematic reviews only	Systematic reviews plus primary studies	Primary studies only
Grey literature	Yes, as appropriate	Limited (e.g., key websites)		
Screening	2 reviewers	2 reviewers: second reviewer may only review excluded studies at title/abstract phase of screening		
Types of study designs included	RCTs and observational studies as appropriate	Systematic reviews and guidelines only (highest quality)	Systematic reviews and guidelines plus RCTs or observational studies (highest quality)	RCTs or observational studies only (highest quality)
Data extraction	Complete verification	Selected verification		
Outcomes	Restricted to 4 critical outcomes or fewer	2-4 critical outcomes only: more if data are available		
Assessment of risk of bias at the individual study level	Yes (using validated instruments when available)			
Assessment of the quality of the body of evidence	GRADE for critical outcomes as appropriate	Reliance on GRADE as reported in the included systematic review(s); or perform *de novo* for each systematic review		GRADE for critical outcomes as appropriate

GRADE: Grading of Recommendations Assessment, Development and Evaluation; RCTs: randomized controlled trials

Further, because quantitative syntheses of primary studies (i.e. meta-analyses) may not be feasible for RRs unless time and resources permit; the results of previously published SRs (including with meta-analyses) should be reported. Therefore, this guidance has also delineated the various steps and decisions involved in selecting the type of evidence and approach to data synthesis. Also described is the use of the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework to assess the certainty of a body of evidence, and to formulate the RAG recommendations.

5.3 DISCUSSION

For this doctoral dissertation, three scientific papers have been published that centre on the production, design and content of RRs; how well RRs perform as an information-packaging mechanism for use in decision-making; and developing a rapid guideline in the setting of a public health emergency involving the use of RRs.

We analyzed a diverse international sample of RRs and found inconsistencies between those published in peer-reviewed journals and those RRs in the unpublished domain produced or commissioned by healthcare organizations. At the outset, we understood that the nature of biomedical journal publishing would drive specific differences between these groups of RRs especially given that journals regulate the presentation of findings in their published papers. Similarly, we expected that NJP RRs would likely differ from JP RRs given the specific mandates of healthcare organizations and the degree of independence to design and develop RR products for various knowledge-user audiences. As expected, nearly all JP RRs followed the traditional IMRaD structure, a stronghold in academic publishing. In contrast, most NJP RRs instead used other formats, including graded entry. It underscores that groups are looking for alternatives to IMRaD to organize content within a report. In future, it will be necessary to formally evaluate which format structures and design features are well-received, in what contexts, and by whom. Also unknown is the extent to which various formats impact perceived usefulness and levels of comprehension of the evidence. Ideally, the best features from each publication type should be combined to inform best practices and future recommendations for how RRs are packaged. Moreover, it is not known how formats and features, the subject matter of the reviews, and individual factors intersect to impact the use of RRs. Regardless, any future research in this realm needs to directly involve the input of key end-users (e.g., policymakers, clinicians, patients).

Through this doctoral research, we also identified certain aspects to consider from a decision-maker's perspective as a key end-user of RRs. For example, the main reports of NJP RRs were more than double in length compared to those published in journals. Although most NJP RRs used an alternative graded entry format, a lengthy report, regardless of structure, may limit usability and runs counter to evidence suggesting brief summaries are favoured among decision-makers [7, 19, 21]. Other considerations include providing a brief summary of the findings and key messages stated upfront in the RR report, given that policymakers appear to favour this [19, 33]. Further, our results reflected particular distinctions in content between JP

and NJP RRs. We suggest further exploring what specific content preferences exist for RRs across various groups of stakeholders. For example, some end-users may prefer more details on actionable information (e.g., cost implications, local applicability, equity considerations, and/or training and resources required) to better inform the application and implementation of findings [33]. However, this may not apply to all RRs. Therefore, at the outset, producers of RRs, through dialogue with the requestors or commissioners of RRs, should discuss what relevant information to solicit and incorporate into the report to ensure the RR is fit for purpose. Use of the recently developed SelecTing Approaches for Rapid Reviews (STARR) tool may assist review authors in various approaches to planning a RR [52]. The use of the tool emphasizes developing shared understanding between RR teams and commissioners as to the purpose and context of the RR, questions to be addressed, and how the review will be conducted and used.

By applying adapted BRIDGE criteria to our sample, we were also able to further analyze our sample of RRs more holistically as an information-packaging mechanism and the extent to which RRs may help bridge the gap between evidence research and policy. As noted, overall conformity with the BRIDGE criteria was modest, with findings highlighting several areas for future consideration or improvement. For example, one such consideration is using an explicit process (i.e., a rapid response service and/or priority setting exercise) to determine the topic's relevancy and scope. If establishing rapid response-type services, they should be run by experienced reviewers and start with an intake process that facilitates discussions between the requestor and the review team to identify and refine answerable, priority questions that best meet the information needs of the requestor. Also, specific priority-setting exercises can assist stakeholders groups that have competing topics in need of review. It is also important to determine the RR's urgency and whether rapid implementation is part of priority-setting plans.

Another area for improvement is increasing the participation of key stakeholders (e.g., policymakers, patient partners) in the planning, conduct and dissemination of RRs, including their input on draft and final reports for relevance and clarity. Those producing RRs for decision-making purposes should consider how best to elicit both tacit and explicit knowledge from stakeholders through direct engagement that is meaningful [53]. It will serve to enhance the relevance and applicability of RRs in decision-making [33, 54]. Research has shown that individuals engaged in their health are more likely to achieve better health outcomes [55]. Therefore, patients need to be recognized as important knowledge users and benefactors of

research evidence stemming from RRs. We, therefore, need to find innovative ways to better involve patients in the planning, conduct and knowledge translation of RRs.

In addition to better organizing RRs to highlight decision-relevant information, RRs should aim to reduce the writing complexity without being overly simplistic so that readers will comprehend and retain ideas more reliably. For example, research suggests that written health information should be aimed at Grade 8 or below in the United States and Grade level 12 in the United Kingdom [56], and therefore, written in understandable language geared to the general population. However, we caution that a more comprehensive evaluation of the text of RRs is needed and should involve other readability measures and assess additional factors such as reading time, amount recalled, and overall comprehension.

In terms of better supporting the use of RRs, producers and commissioners should consider mechanisms by which concise online summaries or briefings are provided by the policy or stakeholder leaders that the RRs were intended to inform. Further, efforts to disseminate findings to key audiences using various communication channels, for example, email, listservs, websites and blog posts, should be considered. Social media platforms also offer the potential to promote RR evidence.

Other notable considerations include the need for RRs to better address quality assessment or risk of bias of the included studies. Part of clearly communicating research findings to end-users is to provide an accurate assessment of research underpinning the topic or intervention of the review. It means each included study in a RR should be critically appraised if possible and include an assessment of key sources of potential bias. Further, providing limitations of the evidence at the study level needs to be described to help interpret overall confidence in the results. RR authors should also be encouraged to highlight potential sources of bias introduced into the RR process itself, depending on the abbreviated methods used and any other methodological concerns. However, very few RRs in our sample outlined such limitations. Although there is no specific instrument for RRs to assess the quality of conduct, with some adjustments, AMSTAR-2 [57] and ROBIS [58] could be applied to assess methodological restrictions compared to SR the risk of bias and validity of the results. In addition, a PRISMA reporting guideline extension for RRs [59], currently under development, will be a valuable tool for researchers to improve the accuracy, completeness and transparency of reporting.

In the final section of this doctoral thesis, we outlined how WHO must produce high-quality, evidence-informed guidelines in the context of public health emergencies when there are no

existing guidelines for the WHO Member States to implement. Further, we presented the processes and methods by which WHO can produce RAGs in this context. It is important to note that the development of a RAG differs in important ways from that of a WHO standard guideline in that they are narrower in scope given the timeframe, and that WHO staff and external experts need to be engaged early on and expedited processes put in place with technical support available. Moreover, the evidence-based recommendations are derived from RRs, with abbreviated methods that differ from traditional SRs. These differences, in turn, may affect the credibility of the review and the validity of the review's conclusions. Nevertheless, the following core principles and standards for WHO guidelines apply: minimize bias; apply transparent processes and explicit, reproducible methods; acknowledge potential limitations; and attend to the target audience's needs and the interests of the individuals and populations affected by the recommendations. Applying these principles and meeting these standards in the face of an emergency involves trade-offs and expertise in guideline development methods, RR methods, and the guideline topic. To date, this guidance has been successfully applied in the production of subsequent WHO RAGs, for example, in the context of the filovirus (Ebola) outbreak [29, 60, 61], Zika virus [62], and the current COVID-19 pandemic [63].

Together, the research studies comprising this doctoral work are novel in many ways. This research is the first to gather a baseline assessment of the format and content features of RRs. This research is also the first to assess RRs as an information product, namely, how well they are packaged for decision-making use by policymakers and other stakeholders. Therefore, this research is intended to help guide researchers who want to communicate their RRs findings more effectively. Importantly, this suite of research promotes innovation in how future RRs are reported and packaged and encourages the involvement of key healthcare stakeholders in their future development. Last, this research has illustrated the processes and stages involved in developing an international guideline rapidly in the face of a public health emergency and the utility of RRs to inform recommendations.

5.4 CONCLUSIONS

Rapid reviews (RRs) have become a practical tool to get evidence to healthcare policymakers and other stakeholders more quickly. However, limited research exists regarding what and how information is structured in RR reports or how well RRs convey useful information in a format that is easy to understand so that decision-makers can best use evidence to inform healthcare policy and practice.

The first study found that certain differences exist between RRs published in journals and those not journal-published regarding format and content, and suggests that both groups would benefit from better use of plain language and could be more concise in design. Importantly, this study has established a baseline of data on the production and design of RRs and highlights future considerations to enhance features to increase use and uptake.

The second study found that conformity to the adapted BRIDGE criteria was modest. However, by assessing RRs against these criteria, we now understand possible ways in which RRs could be improved to best meet the information needs of healthcare decision-makers and their potential for innovation as an information-packaging mechanism. Together, the first two studies fill an important information gap related to the suitability and usability of RRs as a knowledge translation product. Moreover, for producers of future RRs, including those produced by new or existing rapid response services worldwide, these findings highlight potential implications regarding a range of operational, content and design elements for consideration when undertaking RRs.

The final study informs considerations relevant to deciding if a WHO RAG should be developed in the context of a public health emergency and outlines the processes and methods for developing such guidelines. Thus, this paper advances the transparency of WHO's guideline development process and demonstrates it is possible to apply RR and RAG methods to complex public health interventions in urgent situations where the end-users may be very diverse.

Collectively, these studies contribute to a broader research platform for RRs that, in partnership with other international initiatives underway, aim to achieve consensus on key issues around the conduct and reporting of RRs and their integration into broader healthcare decision-making.

6. SAŽETAK

Naslov: OLAKŠAVANJE UPOTREBE I KORIŠTENJA DOKAZA IZ BRZIH PREGLEDA LITERATURE DONOSITELJIMA ODLUKA I DRUGIM DIONICIMA ZDRAVSTVENE ZAŠTITE

Uvod: Brzi pregledi literature (engl. *rapid reviews*, RR) korisni su proizvodi za donositelje odluka o zdravstvenim politikama i druge dionike kojima su potrebni pravodobni dokazi. Znanje kako učinkovito prenijeti dokaze o RR raznim krajnjim korisnicima ključno je, s obzirom na to da oni izravno informiraju donošenje odluka. Međutim, do danas je malo poznato o formatu i sadržaju RR-ova koji jesu ili nisu objavljeni, ili o tome koliko su RR-ovi prilagođeni za upotrebu u odlučivanju. Posljednjih godina, nacionalni i međunarodni autori smjernica također su počeli ugrađivati RR-ove u procese izrade smjernica kako bi pružili preporuke u hitnim situacijama. Svjetska zdravstvena organizacija (SZO) jedna je od takvih organizacija koja mora pružiti smjernice utemeljene na dokazima u roku od 1-3 mjeseca, a koje se zovu brze savjetodavne smjernice (engl. *rapid advice guideline*, RAG), kao odgovor na hitne slučajeve u javnom zdravstvu. Međutim, SZO su nedostajale specifične smjernice o tome kako najbolje ubrzati njihov standardni razvoj smjernica kako bi se sustavno generirali dokazi u roku od nekoliko mjeseci. Stoga je cilj ove doktorske disertacije bio trostruki i obuhvaćao je sljedeća istraživanja: istraživanje kojem je cilj bio utvrđivanje osnovnih podataka o proizvodnji i dizajnu RR-ova, uključujući specifične formate koji se koriste za predstavljanje informacija i koje se informacije prenose unutar svakog RR-a; istraživanje koje je formalno ocijenilo RR kao mehanizam za pripremu informacija namijenjen dionicima u zdravstvu; i, istraživanje koja je dalo detaljne smjernice o tome kako proizvesti RAG SZO-a temeljem RR-a, u roku od 1-3 mjeseca u kontekstu hitne situacije u javnom zdravstvu.

Metodologija objedinjenih radova: Prvo istraživanje uključivalo je formalnu usporedbu RR objavljenih u časopisu i RR-a koji nisu objavljeni u časopisima s obzirom na format i značajke sadržaja. Uzorak RR-a identificiran je prvo iz pretraživanja ključnih baza podataka, a zatim je pretražena siva literatura 148 organizacija koje proizvode RR.

Koristeći isti uzorak RR-ova, drugo je istraživanje uključivalo formalnu procjenu ovih pregleda prema kriterijima BRIDGE koji su prilagođeni usklađivanju s RR-ima i obuhvaćalo je ukupno 26 stavki.

Treće istraživanje uključivalo je razgovore s osobljem Svjetske zdravstvene organizacije (SZO) iz različitih programa koji se najčešće bave hitnim situacijama u vezi s ključnim aspektima koje treba uzeti u obzir za izradu RAG. Smjernice su dalje revidirane u skladu s

informacijama o postojećim pristupima RR metodama koji su ugrađeni u postojeći postupak izrade standardnih smjernica SZO-a.

Rezultati: Istraživanje 1. Za ovu usporedbu pronađena su ukupno 103 RR-a (52 objavljena u časopisu i 51 koji nisu objavljeni u časopisu) od 2016. godine. Veći postotak određenih značajki zabilježen je u RR-ovima objavljenim u časopisu u usporedbi s onima koji nisu bili objavljeni u časopisu (npr. navođenje autora; uporaba tradicionalne strukture znanstvenog članka; naslovi odjeljaka, uključujući sažetak, metode, raspravu, zaključke, zahvale, sukob interesa i doprinose autora, i upotrebu slika (npr. dijagram tijeka istraživanja) u glavnom dokumentu). Za RR koji nisu bili objavljeni u časopisu uočen je veći postotak značajki (npr. korištenje netradicionalne strukture izvještaja; označavanje odjeljaka u sažetku i prilozima; upotreba tipografskih oznaka; uključivanje tablica s ishodima). RR koji nisu bili objavljeni u časopisu bili su više nego dvostruko duži u odnosu na RR objavljene u časopisu. Uključivanje ključnih poruka (engl. *key messages*) bilo je rijetko u obje skupine.

Istraživanje 2. Rezultati su pokazali da je usklađenost s prilagođenim BRIDGE kriterijima bila uglavnom nedostatna. U uzorku RR uočene su neke korisne značajke, uključujući, na primjer, to što su sve male za cilj napraviti sintezu dokaza o istraživanju i sve su navele reference uključenih istraživanja. Nadalje, većina RR-a navela je detalje o problemu koji se istražuje i opisala metode provođenja RR-a, dok se nekoliko RR-a odnosilo na kontekst političkog ili zdravstvenog sustava. Dvije trećine RR-a bile su pripremljene kao da su usmjerene na donositelje odluka i ključne dionike kao predviđenu publiku, no samo trećina RR-a uzela je u obzir njihovo neizravno znanje (engl. *tacit knowledge*). Još ih je manje bilo izravno uključeno u pregled sadržaja RR-a. Samo šest RR uključilo je pacijente partnere u proces. Gotovo četvrtina RR-ova pripremljena je u formatu za koji se smatra da olakšava prijenos znanja (npr. stupnjevani unos), a sličan broj RR je naveo specifične ključne poruke. Procjena čitljivosti (engl. *readability*) ukazala je na to da bi tekst ključnih RR odjeljaka bio teško razumljiv za prosječnog čitatelja (tj. zahtijeva više obrazovanje od srednjoškolskoga) i da bi bilo potrebno 42 (± 36) minuta za njihovo čitanje.

Istraživanje 3. Analizirano je jesu li kriteriji Svjetske zdravstvene organizacije za izradu brzih smjernica prikladni i izvodljivi. Među devet glavnih koraka koji su navedeni, opisane su i uloge različitih suradnika u fazama razvoja. Nadalje, detaljno su objašnjene metode i faze koje su uključene u izvođenje RR-a i naknadne preporuke.

Zaključak: Prvo istraživanje ukazuje na određene razlike između RR koji jesu i onih koji nisu objavljeni u časopisu, vezano za format i sadržaj; rezultati prvog istraživanja ukazuju da bi obje skupine RR trebale koristiti jednostavniji jezik i biti napisane kraće. Procjenom RR prema prilagođenim BRIDGE kriterijima u drugom istraživanju predloženi su mogući načini na koje bi se RR mogli poboljšane kako bi se bolje zadovoljile informacijske potrebe donositelja odluka u zdravstvu i njihov potencijal za inovacije tijekom pripreme informacija. Treći rad unapređuje transparentnost procesa razvoja smjernica Svjetske zdravstvene organizacije i pokazuje da je moguće primijeniti metode RR i procese izrade brzih smjernica na složene javnozdravstvene intervencije u hitnim situacijama u kojima krajnji korisnici mogu biti vrlo raznoliki.

7. SUMMARY ABSTRACT

Background: Rapid reviews (RRs) are useful products to healthcare policy-makers and other stakeholders who require timely evidence. Knowing how to convey RR evidence to various end-users efficiently is crucial, given that they directly inform decision-making. However, to date, little is known about the format and content of RRs produced in the published or unpublished domains or how well RRs are packaged for use in decision-making. In recent years, national and international guideline developers have also started incorporating RRs into guideline development processes to inform recommendations in urgent and emergent decision-making scenarios. The WHO is one such organization that must provide an evidence-informed guideline within 1-3 months, labelled a rapid advice guideline (RAG), in response to a public health emergency or event. However, WHO lacked specific guidance on how best to accelerate their standard guideline development process to systematically generate the evidence within this timeline of a few months. Therefore, the aim of this doctoral dissertation was threefold and included the following research: a study to establish a baseline of data on the production and design of RRs, including specific formats used to present information and what information is conveyed within each RR; a study that formally assessed RRs as an information-packaging mechanism intended for healthcare stakeholders; and, a study that outlined detailed guidance on how to produce WHO RAG informed by RRs, within 1-3 months in the context of an urgent public health situation.

Methods: The first study involved a formal comparison of journal-published (JP) and non-journal published (NJP) RRs regarding format and content features. The sample of RRs was identified first from key database searches followed by a grey literature search of 148 RR producing organizations. Using this same sample of RRs, the second study involved formally assessing these reviews against the BRIDGE criteria that were adapted to align with RRs and included a total of 26 items. The final study involved discussions with WHO staff from various programs that most often deal with emergencies regarding key aspects to consider for developing a RAG. The guidance was further informed by an existing RR methods approach that was incorporated into the existing WHO standard guideline development process.

Results: *Study 1.* For this comparison, a total of 103 RRs were identified (52 JP and 51 NJP) from 2016. A higher percentage of certain features were observed in JP RRs compared to NJP RRs (e.g., reporting authors; use of a traditional journal article structure; section headers including abstract, methods, discussion, conclusions, acknowledgments, conflict of interests, and author contributions; and use of figures (e.g., Study Flow Diagram) in the main document).

For NJP RRs, a higher percentage of features were observed (e.g., use non-traditional report structures; labelling of executive summary sections and appendices; use of typographic cues; and including outcome tables). NJP RRs were more than double in length versus JP RRs. The inclusion of key messages was uncommon in both groups.

Study 2. Results indicated that overall, conformity to the adapted BRIDGE criteria was modest. Some useful features were identified in the sample of RRs, including, for example, all aimed to synthesize research evidence and all provided references of included studies. Further, most RRs provided detail on the problem or issue and described methods to conduct the RRs, while several RRs addressed political or health systems contexts. Two-thirds of the RRs appeared to target policy-makers and key stakeholders as the intended audience, yet only a third of the RRs involved their tacit knowledge. Even fewer directly involved them in reviewing the content of the RR. Only six RRs involved patient partners in the process. Nearly a quarter of the RRs were prepared in a format considered to make information easy to absorb (i.e. graded entry) with a similar number that provided specific key messages. Readability assessment indicated that the text of key RR sections would be hard to understand for an average reader (i.e., require post-secondary education) and take 42 (± 36) minutes to read.

Study 3. Criteria for considering if a WHO RAG is appropriate and feasible are discussed. Among the nine main steps outlined, the roles of various contributors across phases of development are also described. Further, methods and stages involved in performing RRs and subsequent recommendations are explained in detail.

Conclusion: The first study highlights certain differences between JP and NJP RRs regarding format and content, and suggests that both groups would benefit from better use of plain language and could be more concise in design. By assessing RRs against the adapted BRIDGE criteria in the second study, we now understand possible ways in which RRs could be improved to better meet the information needs of healthcare decision-makers and their potential for innovation as an information-packaging mechanism. The last paper advances the transparency of WHO's guideline development process and demonstrates it is possible to apply RR methods and RAG processes to complex public health interventions in urgent situations where the end-users may be very diverse.

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Dec. 2019-2020 **Canadian Association of Radiologists (CAR)** – provided consultation on referral guideline development process; helped to update/revise accreditation standards for various imaging modalities. (Contract through Garritty Consulting & Research Inc.)

July-Oct. 2019 **World Federation of Hemophilia (WFH)** – provided general methods support for the development and update of the 'Guidelines for the Management of Hemophilia'. (Contract through Garritty Consulting & Research Inc.)

2013-14 **World Health Organization (WHO), Guidelines Review Committee** – commissioned to write a chapter on rapid advice guidelines in the setting of a public health emergency for the WHO Handbook for Guideline Development (2nd Edition).

2009 **Health Canada,** Marketed Health Products Directorate (Sintera Inc. subcontract) – survey development and data analyses for the Canadian Adverse Reaction Newsletter Reach and Update (CARN) Questionnaire (2009)

2009 **Public Health Agency of Canada (PHAC)** (Sintera Inc. subcontract) – survey development and data analyses for the Canadian Hypertension Education Program (CHEP) Questionnaire (2009)

2007 **Canadian Agency for Drugs and Technologies in Health (CADTH)** - data extractions and quality assessments for the *Optimal Therapy Report – COMPUS* 2007;1(2),

'Evidence for PPI use in gastro esophageal reflux disease, dyspepsia and peptic ulcer disease: scientific report.'

Clinical Positions

2000 **Neuropsychometrist** (Dept. of Psychology) & **Sickle Cell/Thalassemia Program Education Coordinator** (Department of Haematology/Oncology)
Hospital for Sick Kids, *Toronto, Canada*

1998-1999 **Youth Facility Worker** *(part-time)*
Kilburn Hall Youth Detention Centre, Government of Saskatchewan, *Saskatoon, Canada*

1996-1997 **Clinical Psychologist (Level I)**
Child & Youth Services, Saskatchewan East Central Health District, Yorkton Mental Health Centre, *Yorkton, Canada* (maternity leave coverage)

1995-1996 **Clinical Neuropsychology Intern**
Paediatric Inpatient Acquired Brain Injury Program,
Holland Bloorview Hospital (formerly Hugh MacMillan Children's Centre),
Toronto, Canada

RESEARCH FUNDING

12/2020-11/2021 COVID-19 Evidence Network to support Decision-making (COVID-END)
Co-Applicant (Principal Applicant: Dr. John Lavis; Co-Principal Applicants: Drs. J Grimshaw, N Santesso, and AC Tricco)
Funding source: Canadian Institutes for Health Research (CIHR) Operating Grant, COVID-19 Knowledge Synthesis Network
Total funding: $1,000,000 (CAD) (Competitive)

01/2021-01/2022 Development of a checklist of multicomponent non-pharmacological interventions for delirium prevention: Identifying the evidence base for a complex intervention.
Co-applicant (Principal Applicant: Dr. Shirley Bush)
Funding source: Bruyère Academic Medical Organization Incentive Fund Application
Total funding - $18,250 (CAD) (Competitive)

01/2019-12/2019 Workplan to assess feasibility of Cochrane Rapid Reviews
Lead consultant
Funding source: Cochrane Collaboration
Total funding: $61,000 (CAD) (Non-competitive)

06/2018-07/2018 Scoping review of medical imaging accreditation standards
Lead consultant
Funding source: Canadian Association of Radiologists
Total funding: $15,000 (CAD) (Non-competitive)

07/2016-01/2020 Systematic Prospective Assessment of Rapid Knowledge Synthesis (SPARKS) Study
Co-applicant (Principal Applicant: Dr. Andrea Tricco)
Funding Source: Canadian Institutes of Health Research (CIHR) Project Grant
Total Funding: $279,000 (CAD) (Competitive)

06/2015-06/2018 Getting knowledge now: are rapid reviews the way to go?
Co-applicant (Principal Applicant: Dr. David Moher)
Funding Source: Canadian Institutes of Health Research (CIHR) Operating Grant
Total Funding: $231,000 (CAD) (Competitive)

01/2014-08/2014 Processes and procedures for developing rapid evidence reviews
Lead Consultant
Funding Source: World Health Organization
Total Funding: $24,700 (USD) (Non-competitive)

PUBLICATIONS

In progress

1. Peters MDJ, Casey M, Colquhoun H, Garritty C et al. Scoping reviews: reinforcing and advancing the methodology and application. J Clin Epi, Oct. 2020 (commissioned commentary; under review).

Published

2. Hamel C, Garritty C, Hersi M, Butler C, Esmaeilisaraji L, Rice D, et al. (2021) Models of provider care in long-term care: A rapid scoping review. PLoS ONE 16(7): e0254527. https://doi.org/10.1371/journal.pone.0254527
3. Wieland LS, Piechotta V, Feinberg T, Ludeman E, Hutton B, Kanji S, Seeley D, Garritty C. Elderberry for prevention and treatment of viral respiratory illnesses: a systematic review. BMC Complement Med Ther. 2021 Apr 7;21(1):112. Doi: 10.1186/s12906-021-03283-5
4. Barbeau P, Michaud A, Hamel C, Rice D, Skidmore B, Hutton B, Garritty C, da Silva D, Semeniuk K, Adamo K. Musculoskeletal Injuries Among Females in the Military: A Scoping Review, Military Medicine, 2020 Dec 24 https://doi.org/10.1093/milmed/usaa555.
5. Garritty C, Gartlehner G, Nussbaumer-Streit B, King VJ, Hamel C, Kamel C, Affengruber L, Stevens A, Cochrane Rapid Reviews Methods Group offers evidence-informed guidance to conduct rapid reviews, J Clin Epi. 2020 Oct. 15. doi: https://doi.org/10.1016/j.jclinepi.2020.10.007.
6. Hamel C, Michaud A, Thuku M, Skidmore B, Stevens A, Nussbaumer-Streit B, Garritty C. Defining rapid reviews: a systematic scoping review and thematic analysis of definitions and defining characteristics of rapid reviews. J Clin Epi. 2020 Oct. 7. https://doi.org/10.1016/j.jclinepi.2020.09.041
7. Garritty, C., Hamel, C., Hersi, M. et al. Assessing how information is packaged in rapid reviews for policy-makers and other stakeholders: a cross-sectional study. Health Res Policy Sys. 18, 112 (2020). https://doi.org/10.1186/s12961-020-00624-7
8. Garritty C, Hersi M, Hamel C, Stevens A, Monfaredi Z, Butler C, Tricco AC, Hartling L, Stewart LA, Welsh V, Thavorn K, Cheng W, Moher D. Assessing the format and content of journal published and non-journal published rapid review reports: a comparative study. PLoS ONE 2020;15(8):e0238025.
9. Pratt, M., Garritty, C., Thuku, M. et al. Application of exome sequencing for prenatal diagnosis: a rapid scoping review. Genet Med. 2020. https://doi.org/10.1038/s41436-020-0918-y
10. Tricco AC, Garritty CM, Boulos L, Lockwood C, Wilson M, McGowan, McCaul M, Hutton B, Clement F, Mittmann N et al. Rapid review methods even more challenging during COVID-19: Commentary. J Clin Epi. 2020 Jun 29. DOI:https://doi.org/10.1016/j.jclinepi.2020.06.029
11. Hamel C, Michaud A, Thuku M, Affengruber L, Stevens A, Nussbaumer-Streit B, Garritty C. Few evaluative studies exist examining rapid review methodology across stages of conduct: a systematic scoping review. J Clin Epi. 2020 Jun. 26. DOI:https://doi.org/10.1016/j.jclinepi.2020.06.027
12. McGowan J, Straus S, Moher D, Langlois E, O'Brian K, Horsley T, Aldcroft A, Zarin W, Garritty C, Hempel S, Lillie E, Tuncalp O, Tricco A. Reporting scoping reviews – PRISMA ScR extension (commentary). J Clin Epi. 2020 March 27. https://doi.org/10.1016/j.jclinepi.2020.03.016

13. Nussbaumer-Streit B, Klerings I, Dobrescu AI, Persad E, Stevens A, Garritty C, et al. Excluding non-English publications from evidence-syntheses did not change conclusions: a meta-epidemiological study. J Clin Epi. 2020 Feb. DOI: https://doi.org/10.1016/j.jclinepi.2019.10.011.

14. Wolfe D, Corace K, Rice D, Smith A, Kanji S, Conn D, Willows M, Garber G, Puxty J, Moghadam E, Skidmore B, Garritty C, Thavorn K, Moher D, Hutton B. Effects of medical and non-medical cannabis use in older adults: protocol for a scoping review. BMJ Open BMJ Open. 2020 Feb 28;10(2):e034301. doi: 10.1136/bmjopen-2019-034301.

15. Bergman H, Buckley BS, Villanueva G, Petkovic J, Garritty C, Lutje V, Riveros-Balta AX, Low N, Henschke N. Comparison of different human papillomavirus (HPV) vaccine types and dose schedules for prevention of HPV-related disease in females and males. Cochrane Database of Systematic Reviews 2019, Issue 11. Art. No.: CD013479. DOI: 10.1002/14651858.CD013479.

16. Buckley BS, Henschke N, Bergman H, Skidmore B, Klemm EJ, Villanueva G, Garritty C, Paul M, Impact of vaccination on antibiotic usage: a systematic review and meta-analysis. Clinical Microbiology and Infection. 2019 June. https://doi.org/10.1016/j.cmi.2019.06.030.

17. Sigfrid L, Moore C, Salam AP, Maayan N, Hamel C, Garritty C, Lutje V, Buckley B, Soares-Weiser K, Marshall R, Clarke M, Horby P. A rapid research needs appraisal methodology to identify evidence gaps to inform clinical research priorities in response to outbreak-results from the Lassa fever pilot. BMC Medicine. 2019 June. 17:107. https://doi.org/10.1186/s12916-019-1338-1.

18. Garritty C, Stevens A, Hamel C, Golfam MD, Hutton B, Wolfe DVM. Knowledge Synthesis in Evidence-Based Medicine. Seminars in Nuclear Medicine. 2019, Volume 49, Issue 2, March 2019, Pages 136-144. https://doi.org/10.1053/j.semnuclmed.2018.11.006

19. Garritty CM, Hamel CD, Wolfe DM, Thavorn K, Presseau J, Skidmore B, et al. Safety and Effectiveness of Influenza Vaccines during Pregnancy for Women and Newborns: a systematic review protocol 2020. doi:10.17605/OSF.IO/XEY2K.

20. Tricco AC, Lillie E, Zarin W, O'Brien K, Colquhoun H, Levac D, Moher D, Peters M, Horsley T, Weeks L, Hempel S, Akl E, Chang C, McGowan, Stewart L, Hartling L, Aldcroft A, Wilson M, Garritty C, Lewin S et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. [Internet]. Ann Intern Med. 2018;169(7):467-473.

21. Fergusson D, Monfaredi Z, Pussegoda K, Garritty C, Lyddiatt A, Shea B, et al. The prevalence of patient engagement in published trials: a systematic review. Research Involvement and Engagement. 2018 May 22;4(1):17.

22. Hamel C, Ghannad M, McInnes MDF, Marshall J, Earnshaw J, Ward R, Skidmore B, Garritty C. Potential benefits and harms of offering ultrasound surveillance to men aged 65 years and older with a subaneurysmal (2.5-2.9 cm) infrarenal aorta. Journal of Vascular Surgery. 2018 Apr 1;67(4):1298–307.

23. Bergman H, Henschke N, Buckley B, Villanueva G, Petkovic J, Garritty CM, et al. Protocol for an update of a systematic review and meta-analysis of the immunogenicity and efficacy of the HPV vaccines in females and males aged 9-26 years. [Internet]. Open Science Framework; 2018. Available from: osf.io/bjac72.

24. Hutton B Dr, Forster A, Stevens A, Davies B, Chan J, Jennings A, McCurdy A, Garritty CM. Patient Navigation Systems for Coordination of Patients with Rare Diseases or Chronic Disease Multimorbidity: protocol for a scoping review [Internet]. Open Science Framework; 2018. Available from: osf.io/gxf86

25. Sigfrid L, Moore C, Garritty CM, Maayan N, Lutje V, Marshall R, et al. Rapid research needs appraisal methodology. Open Science Framework; 2018. Available from: osf.io/8qn6v

26. Garritty CM, Stevens A, Hersi M, Monfaredi Z, Hamel C, Ahmadzai N, et al. Assessing rapid reviews as an evidence product for policymakers: a protocol for a cross-sectional study [Internet]. Open Science Framework; 2018. Available from: osf.io/68tj7

27. Garritty CM, Stevens A, Hartling L, Stewart L, Tricco A, Welch VA, et al. Taking a close look at the layout and content structure of journal published and non-journal published rapid review reports:

protocol for a cross-sectional, methodological study. [Internet]. Open Science Framework; 2018. Available from: osf.io/29xvk

28. Potter BK, Hutton B, Clifford TJ, Pallone N, Smith M, Stockler S, Chakraborty P, Barbeau P, Garritty CM, Pugliese M, Rahman A, Skidmore B, Tessier L, Tingley K, Coyle D, Greenberg C, Korngut L, MacKenzie A, Mitchell JJ, Nicholls S, Offringa M, Schulze A, Taljaard M and In collaboration with the Canadian Inherited Metabolic Diseases Research Network. Establishing core outcome sets for phenylketonuria (PKU) and medium-chain Acyl-CoA dehydrogenase (MCAD) deficiency in children: study protocol for systematic reviews and Delphi surveys. Trials. 2017 Dec 19;18(1):603.

29. Pussegoda K, Turner L, Garritty C, Mayhew A, Skidmore B, Stevens A, et al. Identifying approaches for assessing methodological and reporting quality of systematic reviews: a descriptive study. Systematic Reviews [Internet]. 2017 Jun 19 [cited 2018 Sep 2];6(1):117. Available from: https://doi.org/10.1186/s13643-017-0507-6

30. Pussegoda K, Turner L, Garritty C, Mayhew A, Skidmore B, Stevens A, et al. Systematic review adherence to methodological or reporting quality. Systematic Reviews [Internet]. 2017 Jul 19 [cited 2018 Sep 2];6(1):131. Available from: https://doi.org/10.1186/s13643-017-0527-2

31. Stevens A, Garritty C, Pussegoda K, Hartling L, Stewart L, Thavorn K, Tricco A, Welch VA, Moher D. Relation of the completeness of reporting of rapid reviews to journal publication status: protocol for a comparative, cross-sectional methodological study [Internet]. Open Science Framework; May 2017. Available from: osf.io/2av37

32. Garritty CM, Norris SL, Moher D. Developing WHO rapid advice guidelines in the setting of a public health emergency. J Clin Epidemiol. 2017 Feb;82:47–60.

33. Catalá-López F, Stevens A, Garritty C, Hutton B. Revisiones rápidas para la síntesis de la evidencia [Rapid reviews for evidence synthesis]. [Med Clin (Barc). 2017 Jan 30. pii: S0025-7753(16)30708-4. doi: 10.1016/j.medcli.2016.12.016.

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36. Ahmadzai N, Alabousi M, Avey M, Cobey K, Daniel R, Galipeau J, Garritty C, Ghannad M, Hamel C, Hersi M, Hutton B, Isupov I, Lalu M, Langer F, et al. 2016. "Epidemiological and reporting characteristics of predatory journal articles: protocol." Available at: https://www.ruor.uottawa.ca/handle/10393/34253.

37. Hersi M, Stevens A , Quach P, Hamel C, Thavorn K, Garritty C, Skidmore B, Vallenas C, Norris SL, Egger M, Eremin S, Ferri M, Shindo N, Moher D. Effectiveness of Personal Protective Equipment for Healthcare Workers Caring for Patients with Filovirus Disease: A Rapid Review. PLoS ONE, 2015;10(10): e0140290. doi:10.1371/journal.pone.0140290.

38. Polisena J, Garritty C, Umscheid CA, Kamel C, Samra K, Smith J, and Vosilla A. Rapid Review Summit: an overview and initiation of a research agenda. Syst Rev. 2015; 4: 111. doi: 10.1186/s13643-015-0111-6

39. Polisena J, Garritty C, Kamel C, Stevens A, Abou-Setta AM. Rapid review programs to support health care and policy decision making: a descriptive analysis of processes and methods. Systematic Reviews 2015; 4:26. DOI: 10.1186/s13643-015-0022-6.

40. Hutton B, Alvarez G, Pease C, Yazdi F, Wolfe D, Garrity C, Skidmore B, Shor R, Moher D. Side Effects and Completion Rates of Treatment Regimens for Latent Tuberculosis Infection: A Rapid Review with Network Meta-Analyses. Available at: https://137.122.14.44/bitstream/10393/33429/3/LTBI%20protocol-03DEC2015.PDF

41. Young MM, Stevens A, Galipeau J, Pirie T, Garritty C, Singh K, Yazdi F, Golfam M, Pratt M, Turner L, Porath-Waller A, Arratoon C, Haley N, Leslie K, Reardon R, Sproule B, Grimshaw J, Moher D. Effectiveness of brief interventions as part of the Screening, Brief Intervention and Referral to Treatment (SBIRT) model for reducing the nonmedical use of psychoactive substances: a systematic review. Syst Rev. 2014 May 24;3:50. doi: 10.1186/2046-4053-3-50.

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48. Turner L, Singh K, Garritty C, Tsertsvadze A, Manheimer E, Wieland S, Galipeau J, Moher D. An Evaluation of the Completeness of Safety Reporting in Reports of Complementary and Alternative Medicine Trials. BMC Complement Altern Med. 2011 Aug:11(67). doi:10.1186/1472-6882-11-67

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Book Chapters

1. WHO. WHO Handbook for Guideline Development. 2nd Edition. Chapter 11. Rapid advice guidelines in the setting of a public health emergency. Pg.133-156. 2014. Geneva, Switzerland, WHO Library Cataloguing-in-Publication Data. [Authored by Chantelle Garritty, Susan Norris, David Moher]

2. Garritty C. Practical Concepts and Methods for Electronic Screening & Data Abstraction in O'Blenis P. The Electronic Systematic Review Handbook. First Edition. TrialStat Corporation. Ottawa, 2004.

Reports

* I have authored/co-authored 30 reports, of which the most recent 15 are provided below

1. Garritty C, Skidmore B, Hutton B. An Environmental Scan of Policies, Procedures, and Available Evidence-based Practices of Armed Forces in Relation to Pregnancy, Postpartum and Musculoskeletal Injuries (MSKi). Developed for the Department of National Defence (Government of Canada), Innovation for Defence Excellence and Security (IDEaS) 1b grant. March, 2021.
2. Garritty C, Barbeau P, Hamel C, Thayaparan P, Patel Y, Skidmore B, Hutton B. The impact of meal timing on health outcomes related to over-weight, obesity, type 2 diabetes and cardiovascular disease: findings from a rapid scoping review. Developed for the Office of Nutrition Policy & Promotion, Health Canada. March, 2021.
3. Hamel C, Garritty C, Hersi M, Butler C, Esmaeilisaraji L, Rice D, Skidmore B, Hutton B. Effective models of provider care in long-term care: a rapid scoping review. Prepared for the SPOR Evidence Alliance and the Royal Society of Canada. Knowledge Synthesis Group, Ottawa Hospital Research Institute (OHRI). Oct., 2020.
4. Garritty C, Hamel C, Skidmore B, Hutton B. Effective models of provider care in long-term care: a rapid scoping review protocol. Knowledge Synthesis Group, Ottawa Hospital Research Institute (OHRI). July, 2020. Commissioned through the SPOR Evidence Alliance and the Royal Society of Canada.
5. Rice D, Wolfe D, Garritty C, Hersi H, Esmaeilisaraji L, Butler C, Hamel C, Ahmadzai N, Skidmore B, Hutton B. Best practice in pain management: rapid reviews of guidelines and knowledge syntheses (DSEN Technical Report). Prepared for the CIHR Drug Safety and Evaluation Network (DSEN). Knowledge Synthesis Group, Ottawa Hospital Research Institute (OHRI). July, 2020.
6. Jørgensen KJ, Garritty G, Featherstone R, Henschke N, Villaneuva G. Changing physical environments to change behaviours to reduce transmission of SARS-CoV-2: A scoping review. June, 2020. Developed by Cochrane Response. Commissioned by the ESRC (Economic and Social Research Council), UK Research and Innovation (UKRI). Evidence Briefing (August 2020) - https://esrc.ukri.org/news-events-and-publications/evidence-briefings/encouraging-behaviour-change-to-reduce-covid-19-transmission-a-summary-of-two-rapid-evidence-reviews/
7. Garritty C, Gartlehner G, Kamel C, King VJ, Nussbaumer-Streit B, Stevens A, Hamel C, Affengruber L. Cochrane Rapid Reviews. Interim Guidance from the Cochrane Rapid Reviews Methods Group. March 2020. https://methods.cochrane.org/rapidreviews/cochrane-rr-methods.
8. Pratt M, Garritty C, Thuku M, Esmaeilisaraji L, Hamel C, Skidmore B. Prenatal Whole Exome Sequencing: A Rapid Scoping Review. Knowledge Synthesis Group, Ottawa Hospital Research Institute (OHRI). June, 2019. Commissioned by BORN Ontario.
9. Barbeau P, Michaud A, Rice D, Cukier S, Hamel C, Butler C, Hutton B, Garritty C. Musculoskeletal Injuries Among Females in the Military: A Rapid Scoping Review. Commissioned by Department of National Defense, Government of Canada. Knowledge Synthesis Group, Ottawa Hospital Research Institute (OHRI). June, 2019.
10. Buckley B, Henschke N, Bergman H, Villanueva G, Petkovic J, Sguassero Y, Garritty C. Anogenital warts: Incidence, prevalence, self-reported history & quality of life. Commissioned by the WHO Initiative for Vaccines Research Department (IVR), Geneva Switzerland. March 2018.
11. Bergman H, Henschke N, Buckley B, Villanueva G, Petkovic J, Garritty C. Currently licensed HPV vaccines in females and males aged 9-26 years: Systematic review and meta-analysis of immunogenicity and efficacy data from published and unpublished studies. Commissioned by the WHO Initiative for Vaccines Research Department (IVR), Geneva Switzerland. March 2018.

12. Stevens A, Pussegoda K, Barbeau P, Dorrence K, Rice D, Skidmore B, Garritty C, Hutton B, Forster A, Davies B, Chan J, Jennings A, McCurdy A. A Scoping Review of Patient Navigation Systems for Coordination of Patients with Rare Diseases or Chronic Disease Multimorbidity. May, 2018. Commissioned by IQ@TOH, The Ottawa Hospital.
13. King J, Garritty C, Stevens A, Nussbaumer-Steit B, Hartling L, Harrod CS, Guise J, Kamel C. Chapter 2-Performing Rapid Reviews. In: Tricco AC, Langlois EV, Straus SE, editors. World Health Organization, Alliance for Health Policy and Systems Research. Rapid reviews to strengthen health policy and systems: a practical guide. 2017. http://apps.who.int/iris/bitstream/10665/258698/1/9789241512763-eng.pdf.
14. Hamel C, Ghanned M, McInnes M, Marshall J, Earnshaw J, Ward R, Skidmore B, Garritty C. Should men screening positive for subaneurysmal aortas be entered in a lifelong ultrasound surveillance programme? A Rapid Evidence Summary. Ottawa Hospital Research Institute (OHRI). August, 2016. Commissioned by the UK National Screening Committee.
15. Hersi M, Stevens A, Quach P, Hamel C, Thavorn K, Garritty C, Moher D. Effectiveness of personal protective equipment for healthcare workers managing patients with filovirus (WHO) disease: a rapid review. Knowledge Synthesis Group, Ottawa Hospital Research Institute (OHRI). September, 2014. Commissioned by the WHO.

PRESENTATIONS, WORKSHOPS & EDUCATION/TRAINING

* I have delivered/facilitated over 70 sessions to date (only a recent selection is provided below):

1. Garritty C. The role of rapid reviews in the pandemic. 13th Croatian Cochrane Symposium: COVID-19 Lessons Learned. 2021, June (virtual).
2. Nicholls SG, Monfaredi Z, Garritty C, Lyddiatt A, Maybee A, Presseau J, Shea B, Fergusson D. The Impact Of Patient Engagement On Trials And Trialists: An Interview Study With Impact Awardees. 42nd Annual Society for Clinical Trials. 2021, May (virtual)
3. Garritty C. Introduction to rapid reviews and scoping reviews (virtual session). OMNI Research Group (ObGyn Residents), Ottawa Hospital Research Institute (OHRI). Jan. 27, 2021
4. Garritty C. An overview of the newly published Cochrane Rapid Reviews Methods Guidance. Methods and Review Support (MARS) Unit, Cochrane Editorial and Methods Department (virtual session). 7 Dec. 2020.
5. Nussbaumer-Streit B, Garritty C, Hamel C. Introduction to Cochrane Rapid Review Methods (virtual workshop). Cochrane Sweden. Dec. 1, 2020.
6. Garritty C. How to perform a rigorous systematic review. Interdisciplinary School of Health Sciences. HSS5903 Seminar series (virtual session), University of Ottawa. Dec. 1, 2020.
7. Garritty C. Discussing the new Cochrane Rapid Review Methods. Cochrane Public Health and Health Systems Network (virtual session). Oct. 14, 2020.
8. Garritty C. Learning Initiative For Experienced Authors (LIXA) in Africa: Session - Cochrane Rapid Reviews - Discussing the Interim Methods Guidance (virtual session). May 28, 2020.
9. Kew K & Garritty C. COVID-19 Rapid Reviews: Cochrane's response so far (Cochrane Learning Live webinar series). April 23, 2020.
10. Garritty C & Stevens A. General introduction to rapid reviews. Short course offered through the Ottawa Methods Centre. Ottawa Hospital Research Institute. 2019 Nov.27-28, Ottawa, Canada.
11. Garritty C. An introduction to rapid reviews and scoping reviews. Summer Medical Resident Education Rounds – OMNI Research Group. Ottawa Hospital Research Institute. 2019 July, Ottawa, Canada.

12. Garritty C. Rapid Reviews – An Introduction to Rapid Reviews (March 15, 2019 session). EPI6188 Systematic Reviews and Meta-analysis course. Department of Epidemiology and Community Medicine. University of Ottawa. 2019 March, Ottawa, Canada.
13. Garritty C, Stevens A. Rapid reviews and scoping reviews – 5 day introductory short-course. Institute for Mental Health. January 21-25th, 2019. Singapore.
14. Garritty C. A panoramic view of rapid reviews. Symposium speaker: The role of rapid reviews and policy briefs, and their synergistic effects. Organised jointly by the Institute of Social and Preventive Medicine and Cochrane Switzerland, University of Lausanne - (lead institution) and the University of Lucerne (co-lead), partner institutions of the Swiss Learning Health System (SLHS). Nov. 28, 2018. Lausanne, Switzerland.
15. Garritty C, Nussbaumer-Streit B. Introduction to Rapid Reviews (A Cochrane Rapid Reviews Methods Group short course). Cochrane Switzerland and the Institute of Social and Preventative Medicine, University of Lausanne, Nov. 29, 2018. Lausanne, Switzerland.
16. Garritty C, Stevens A, King V, Nussbaumer-Streit, Gartlehner G, Skidmore B. An introduction to rapid reviews: developing timely evidence summaries for decision-makers (A Cochrane Rapid Reviews Methods Group Workshop). The 25th Cochrane Colloquium, Sept. 2018, Edinburgh, Scotland.
17. Garritty C, O'Blenis P, O'Connor A, Stefanison I. Training your robot: best practices for leveraging artificial intelligence (AI) in reference screening. The 25th Cochrane Colloquium, Sept. 2018, Edinburgh, Scotland.
18. Garritty C, Stevens A, King V, Nussbaumer-Streit, Gartlehner G, Skidmore B. An introduction to rapid reviews: developing timely evidence summaries for decision-makers (A Cochrane Rapid Reviews Methods Group Workshop). Global Evidence Summit (GES), Sept. 2017, Cape Town, South Africa.
19. Garritty C, King V, Stevens A, Soares-Weiser K, Phillips D. Norris SL, Laurence M, Akl E. Nussbaumer-Streit B, Gartlehner G. A panoramic view of rapid reviews – uses and perspectives from global collaborations and networks (Special Session). Global Evidence Summit (GES), Sept. 2017, Cape Town, South Africa.
20. Moore C, Garritty C, Pestridge C, Rapid needs appraisal to inform outbreak response research (workshop). Global Evidence Summit (GES), Sept. 2017, Cape Town, South Africa.
21. Tricco AC, Peters M, Godfrey C, Garritty C, Horsley T, Lewin S, Macdonald M, Straus, S. PRISMA extension for scoping reviews (PRISMA-ScR) checklist workshop. Global Evidence Summit (GES), Sept. 2017, Cape Town, South Africa.
22. Garritty C, Stevens, A. Formation à la méthodologie des revues rapides (Introduction to Rapid Reviews). Faculty of Nursing, Université Laval. 24-25 May. 2017, Quebec City, Quebec, Canada.
23. Garritty C. Rapid Reviews – An Introduction (April 1, 2016 session). EPI6188 Systematic Reviews and Meta-analysis course. Department of Epidemiology and Community Medicine. University of Ottawa. 2016 April, Ottawa, Canada.
24. Garritty C, Stevens A, Hamel C. An introductory course of rapid reviews. 2016. Institute for Healthcare Knowledge and Innovations. Rapid Review Course. University Manitoba. 24-26 Feb. 2016, Winnipeg, Manitoba, Canada.
25. Garritty C, Stevens A. Putting Evidence into Practice (PEP) workshop – Rapid Review Course. University of Alberta. 21-23 Nov. 2015, Edmonton, Alberta, Canada.
26. Garritty C, Guise JM, Hartling L, King V, Mavergames C, Pestridege C, Rada G, Stevens A, Tricco A, Umscheid C. Rapid Reviews: terminology, methodology, and potential utility for Cochrane (Special Session). The 23rd Cochrane Colloquium. 2015 Vienna, Austria.
27. Stevens A, Garritty C. Rapid review on the effectiveness of personal protective equipment for healthcare workers caring for patients with filovirus disease. The 23rd Cochrane Colloquium. 2015 Vienna, Austria.

28. Garritty C, Griebler U, Heise T, King V, Lhachimi S, Mutsch M, Polisena J, Stevens A. Rapid review workshop: timely evidence synthesis for decision makers. The 23rd Cochrane Colloquium. 2015 Vienna, Austria.
29. Garritty C, King V, Polisena J. Rapid Reviews: A Practical Knowledge Synthesis Tool for Decision Makers (workshop). Evidence Live 2015. Oxford University. 14 April 2015, Oxford, UK.
30. Garritty C. Rapid Reviews – An Introduction. Ontario Strategy for Patient Oriented Research (SPOR) Methods Centre Training. Ottawa Hospital Research Institute. 4 March 2015, Ottawa, Canada.
31. Garritty C. Mind the gap: an overview of rapid review initiatives. Rapid Reviews Summit. 4 Feb. 2015, Vancouver, Canada.

Poster Presentations/Conference Abstracts

*Below is a sample of 5 of the 16 posters I have presented.

1. Garritty C, Hamel C, Hersi M, Butler C, Monfaredi Z, Stevens A, Nussbaumer-Streit B, Cheng W, Moher D. Assessing how information is packaged in rapid reviews for policymakers and other stakeholders: a cross-sectional study (oral). The 26th Cochrane Colloquium. 2019, Santiago, Chile (virtual).
2. Hamel C, Michaud A, Affengruber L, Skidmore B, Stevens A, Nussbaumer-Streit B, Garritty C. Rapid review definition and methods: two scoping reviews (poster). The 26th Cochrane Colloquium. 2019, Santiago, Chile (virtual).
3. Skidmore B, Allen T, Chou D, Ganatra B, Garritty C, Henschke N, Moller AB, Pestridge C, Say L, Villanueva G. Identifying national and sub-national data of maternal cause of death: Challenges in epidemiologic searching of bibliographic databases (poster). The 25th Cochrane Colloquium. 2018, Edinburgh, Scotland.
4. Garritty C, Norris SL, Moher D. Rapid Advice Guidelines in the Setting of a Public Health Emergency (poster). The 23rd Cochrane Colloquium. 2015 October, Vienna, Austria.
5. King V, Garritty C, Polisena J, Stevens A. Rapid reviews: appropriateness and applicability (poster). The 23rd Cochrane Colloquium. 2015 October, Vienna, Austria.

Research Committee/Working Group Involvement

Mar 2020-Present	Steering Committee Member, Rapid Review Methodology Priority Setting Partnership (PRioRiTy III) - Evidence Synthesis Ireland/Cochrane Ireland
Mar 2020-Present	Health-Climate Change Exploratory Cochrane Field Working Group member
June 2018-Present	Advisory Board Member, Cochrane Complementary Medicine Field Advisory Board
Nov 2015-Present	PRISMA statement extension for Rapid Reviews project working group member
Mar 2017-Apr 2019	Developing a Global Relay Model for Emerging and Re-emerging Infectious Diseases Working Group (Oxford University). Pilot coordinated by the Epidemic Diseases Research Group Oxford (ERGO) on behalf of the UK Public Health Rapid Support Team
Mar 2017	Global Evidence Summit (Cape Town, South Africa) Abstract Review Committee
May 2016	23rd Cochrane Colloquium (Seoul, Korea) Abstract Review Committee
Jun 2014-2017	Clinical Operations Research Committee (CORC), The Ottawa Hospital Research Institute
Nov 2014-Feb 2015	Rapid Reviews Summit (Feb. 2015) – member of the planning committee
Nov 2013-2016	Pan-Canadian HTA Collaborative Committee Hospital/Regional HTA Working Group
Oct 2011-2013	Cochrane Innovations – Cochrane Rapid Response Consortium Executive
2003-Present	Cochrane Bias Methods Group member
May 2013	21st Cochrane Colloquium (Quebec City, Canada) Abstract Review Committee
Apr 2012	20th Cochrane Colloquium (Auckland, New Zealand) Abstract Review Committee

May 2011	19th Cochrane Colloquium (Madrid, Spain) Abstract Review Committee
May 2011	OHRI Clinical Research Day Advisory Committee
May 2006	International Working Group on Updating of Systematic Reviews

Peer Review Contributions

Manuscript Peer Review

- BMC Medical Research Methodology; BMC Systematic Reviews Journal; Canadian Journal of Public Health; Canadian Agency for Drugs and Technologies in Health (CADTH) - Clinical Methods Peer Review; International Journal of Nursing; International Journal of Technology Assessment in Health Care; Journal of Clinical Epidemiology; Journal of Comparative Effectiveness Research; Journal of Medical Internet Research; PLoS One; Research Synthesis Methods; U.S. Agency for Healthcare Research and Quality – Evidence-based Practice Program

Grants & Awards

- Knowledge Translation (KT Canada): Strategic Training Initiative in Health Research (STIHR) grant - formal reviewer for post-doctoral and trainee awards (2011, 2012, 2013)
- Grant Peer Review: Choroideremia Foundation of Canada awards (2005, 2006, 2007)

Volunteering

- Member of the Board of Directors, Choroideremia Research Foundation Canada (CRFC), Inc. (2007-15)
- Research Grants Manager, Choroideremia Research Foundation Canada (CRFC), Inc. (2006-15)

10. PAPERS COMBINED IN THE DISSERTATION

1. Garritty C, Hersi M, Hamel C, Stevens A, Monfaredi Z, Butler C, Tricco AC, Hartling L, Stewart LA, Welch V, Thavorn K, Cheng W, Moher D. Assessing the format and content of journal published and non-journal published rapid review reports: a comparative study. PLoS ONE 2020;15(8). (JIF, 2020): 2.74

2. Garritty C, Hamel C, Hersi M, Butler C, Monfaredi Z, Stevens A, Nussbaumer-Streit B, Cheng W, Moher D. Assessing how information is packaged in rapid reviews for policy-makers and other stakeholders: a cross-sectional study. Health Res Policy Sys 18, 112 (2020). (JIF, 2020): 2.365

3. Garritty CM, Norris SL, Moher D. Developing WHO rapid advice guidelines in the setting of a public health emergency. J Clin Epidemiol. 2017 Feb;82:47–60. (JIF, 2017): 4.667

PLOS ONE

RESEARCH ARTICLE

Assessing the format and content of journal published and non-journal published rapid review reports: A comparative study

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Abstract

Background

As production of rapid reviews (RRs) increases in healthcare, knowing how to efficiently convey RR evidence to various end-users is important given they are often intended to directly inform decision-making. Little is known about how often RRs are produced in the published or unpublished domains, and what and how information is structured.

Objectives

To compare and contrast report format and content features of journal-published (JP) and non-journal published (NJP) RRs.

Methods

JP RRs were identified from key databases, and NJP RRs were identified from a grey literature search of 148 RR producing organizations and were sampled proportionate to cluster size by organization and product type to match the JP RR group. We extracted and formally compared 'how' (i.e., visual arrangement) and 'what' information was presented.

Results

We identified 103 RRs (52 JP and 51 NJP) from 2016. A higher percentage of certain features were observed in JP RRs compared to NJP RRs (e.g., reporting authors; use of a traditional journal article structure; section headers including abstract, methods, discussion, conclusions, acknowledgments, conflict of interests, and author contributions; and use of figures (e.g., Study Flow Diagram) in the main document). For NJP RRs, a higher percentage of features were observed (e.g., use non-traditional report structures; bannering of

decision to publish, or preparation of the manuscript.

Competing interests: The authors have declared that no competing interests exist.

Abbreviations: RR, rapid review; SR, systematic review; IMRaD, introduction, methods, results, and discussion; GE, graded entry; MD, mean difference; OR, odds ratio; SD, standard deviation; MD, mean difference; OR, odd ratio; IQR, interquartile range.

executive summary sections and appendices; use of typographic cues; and including outcome tables). NJP RRs were more than double in length versus JP RRs. Including key messages was uncommon in both groups.

Conclusions

This comparative study highlights differences between JP and NJP RRs. Both groups may benefit from better use of plain language, and more clear and concise design. Alternative innovative formats and end-user preferences for content and layout should be studied further with thought given to other considerations to ensure better packaging of RR results to facilitate uptake into policy and practice.

Study registration

The full protocol is available at: https://osf.io/29xvk/.

Introduction

There are many obstacles to the use and uptake of systematic reviews (SRs) that render most underutilized [1–4]. A significant barrier is that SRs can be difficult and time-consuming to conduct, usually taking 1 to 2 years to complete [5, 6]. They can also be lengthy to read, especially to those who seek information in a convenient, portable, and timely manner. Format and content features of SRs have been identified among the main barriers to their uptake by policymakers and healthcare managers [7]. Studies that have examined tailoring of SR content and format for end-users (i.e., clinicians, health policymakers, and health system managers) [8–14], suggest that users favour clear, concise summaries in simple, easy to understand language [9, 11–14]. Further, evidence summaries of SRs are likely more straightforward to understand than complete SRs [14]

Rapid reviews (RRs) have emerged as a form of knowledge synthesis that shortens or omit components of the SR process to produce information in a timelier manner than most SRs [5, 15–17]. Researchers often tailor the methods used in RRs according to the knowledge user request, available budget, and timeline of usually a few weeks to six months (S1 File) [18]. Several organizations have undertaken RRs using various approaches in their conduct [19–21], and they have become a valuable information tool to support the use of evidence for decision-making [22]. Yet, we know little about what and how information is conveyed in RRs or the extent to which tailored formats are used beyond the conventional IMRaD (introduction, methods, results and discussion) structure widely used by journals across many disciplines, including healthcare. IMRaD is the standard format of academic biomedical journal articles, including published SRs [23] and is explicitly recommended by the International Committee of Medical Journal Editors (ICMJE) [24].

Although health research is often conveyed to decision-makers using the IMRaD format, some suggest this format may hinder use for decision-making purposes by clinicians, policymakers and other stakeholders [25]. In contrast to this, others have developed alternative formats; namely, those described as 'graded entry' involving material organized to highlight decision-relevant, summarized information upfront with access to more detailed information gradually uncovered for the reader [1, 11, 26, 27] (S2 File). For these products, the fixed IMRaD structure has been set aside and instead, key information is arranged to facilitate scanning of the most relevant information upfront.

As the production of RRs grows, it is increasingly vital that we understand the most effective and efficient ways to deliver RR evidence to various end-users. Ideally, RR producers should be guided by elements of good document design, including 'how' best to layout information and 'what' information or content is of most use and value to include. Given what we know about the challenges SRs have faced regarding adequate content and format [1, 7, 11, 28, 29], RRs may, too, be prone to some of these same obstacles. However, to date, only indirect research exists from SRs, as no studies have carefully examined this issue for RRs. Therefore, the main objective of this study was to determine the format and content of RRs based on the systematic identification of an international sample of both journal-published (JP) and non-journal-published (NJP) RRs and to compare and contrast features between them. We chose this comparison to reflect real-world use of RRs, as we know that several organizations around the globe are producing them but are not necessarily publishing them in journals. By eliciting this information, we aim to establish a baseline of data on the production and design of RRs and to highlight future considerations to enhance features leading to better use and uptake in decision-making.

Methods

Below is an abridged version of the methods. Full methods details are provided elsewhere (S3 File).

Study design

We conducted a descriptive, comparative study of a broad selection of RRs. All variables and analyses were determined a priori as per the protocol (https://osf.io/29xvk/).

Defining 'format' and 'content'

We defined format or layout to mean 'how' information was presented (i.e., the visual arrangement, appearance, or presentation of information contained within a report) with content referring to the main features of a report in terms of 'what' information was presented (e.g., included sections or information).

Search strategy and process

Bibliographic searching to identify journal published (JP) RRs. We developed a draft bibliographic database search strategy for MEDLINE (CG and AS) vis-à-vis key 'seed' articles. This was peer-reviewed by a senior information specialist (BS) using the PRESS checklist [30]. We then modified final MEDLINE search for eight other bibliographic databases (S4 File). We did not apply language restrictions but restricted reports to those published in 2016.

Grey literature searching to identify non-journal published (NJP) RRs. We searched websites listed in CADTH's Grey Matters checklist [31] and the PROSPERO register. Further, we searched the websites and a contact list of pre-identified organizations (n = 148) that produce or commission RRs. If a RR did not report methodology or the reported methodology was unclear, we contacted authors for further information. As a proxy, we used any available internal methods guidance documents as requested and provided by authors/organizations.

Non-journal published (NJP) RRs sampling strategy. We identified a mix of higher and lower RR volume-producing organizations through grey literature searching efforts. Since a large number of identified RRs were likely to be clustered by organization, we first catalogued the retrieved sample of NJP RRs by organization and then by product per organization. Next, we identified the total number of clusters from across all of the organizations and sampled RRs

from each proportionate to cluster size. In some cases, this meant that sampling took place at the organizational level and by RR type within an organization. For the sake of feasibility, we used the sample size of the JP group to determine the sample size in the NJP group.

Sample size

We did not calculate a sample size for this descriptive study. However, we limited our sample for the sake of practicality using the abovementioned sampling strategy and to ensure comparison groups of similar sizes.

Study selection

First, we applied eligibility criteria (S5 File) to screen bibliographic results from the journal published domain. One person reviewed the titles and abstracts while a second person reviewed the excluded citations. Two people independently reviewed full-text reports with disagreements resolved by consensus or a third person. We pilot tested a selection of records for title/abstract and full-text screening. Based on the screening of the JP group, we determined the number of RRs from the grey literature results needed to create a similar sample size in the NJP RR group. After sampling, the NJP group underwent the same screening process. We outlined the reasons for exclusion in a study flow diagram.

Data collection

We extracted information specific to features of the reports across four broad categories considered to be involved in good document design, and that was most relevant given the nature of our study [32]. These included: 1) *report identifying information*; 2) *structure* (document organization); 3) *content*; 4) *visual design* covering legibility, graphic elements, and general layout. We also collected information on *other factors*, including the placement of certain sections in the report, how the report format was decided, and whether stakeholders provided input on the layout (S6 File). We piloted forms using a subset of articles. For general characteristics, one individual extracted data, while a second person verified a minimum 10% random sample of studies. We did full verification for all format outcomes.

We also assessed the *readability* (or the ease with which the reader can understand the written text) of the abstract, introduction, and discussion sections of the RRs using the Simple Measure of Gobbledygook (SMOG) readability test [33], used in studies assessing health information [34]. An online calculator provided scores corresponding to the level of education required to understand the analyzed text. We used Microsoft Word to give the *word count* of the main body of the report (i.e., all sections excluding references and appendices) and the total length of the document.

Given the rise of illegitimate publishing entities, we confirmed peer-review by first cross-checking each journal against the Directory of Open Access Journals (DOAJ) and assessing each journal according to a list of salient characteristics of predatory journals [35]. For NJP RRs, we noted if peer review was reported in the citation or if methods guidance or website information indicated peer review was part of their RR process.

Data analysis

We reported the study characteristics of the RRs in tables and figures. For the main comparison (i.e., JP vs. NJP), we summarized characteristics using frequencies and/or proportions accompanied by appropriate statistical tests to determine if significant differences existed across variables between these groups concerning their journal or non-publication status. The

estimated associations were crude and based on univariate analysis and, therefore were not adjusted for other factors. For a subset of features, we only reported numerical differences between the JP and NJP RRs, given any differences noted would likely be due to the distinct nature of biomedical journal publishing versus the in-house publishing structures of most healthcare research organizations producing RRs. Therefore, we only applied formal testing to a select group of variables where appropriate using a significance level of 0.05. Planned subgroup analyses (i.e., according to report structure, report production, the purpose of the RR, timeframe of conduct, peer review status, and funding sources) were not possible due to insufficient data.

To the extent possible, we followed the STROBE Statement—Checklist for cross-sectional studies as a proxy as no reporting guidance exists for this type of methodological research.

Results

Search results

There were 2,508 records identified by the search for published RRs. After removing duplicates, there were 1,990 titles and abstracts screened that led to the exclusion of 1,034 records. Of the 956 full text articles retrieved, 52 JP RRs were eligible for inclusion. We identified NJP RRs by contacting RR producing organizations that resulted in 228 full-text reports; we organized these into clusters, which after sampling, resulted in 51 eligible full-text RR reports. In total, 103 RRs were included for analysis, as outlined in the study flow diagram (Fig 1).

Characteristics of the identified RRs

General study characteristics and specific features of the included RRs reports are reported elsewhere (Tables 1 and 2 in S1 Table). JP RRs were published in 47 unique journals, all deemed legitimate (S2 Table). NJP RRs were identified from 25 individual organizations (S7 File). Substantial differences between JP and NJP RRs were noted, for example, for reporting the corresponding author (88% vs 6%), reporting of funding (75% vs 55%), and if the RR had undergone peer review (96% vs 12%). However, more NJP RRs were, for example, requested or commissioned (53% vs 25%) and were publicly available compared to RRs published in open access journals free of charge (98% vs 69%). Only one NJP RR was in French; all other RRs were in English.

A purpose or rationale for undertaking a RR was similarly reported across both groups (JP, 63% vs NJP, 59%). Only three (6%) RRs in each group indicated the time it took to produce the review, which ranged between 8–32 weeks for the JP RRs and 4–17 weeks for the NJP RRs. More NJP RRs reported end-user consultations during the development of the RR compared to JP RRs (57% vs 35%).

Comparison of layout and content between published and non-journal published RRs

We present only notable findings in detail. For full results see Table 3 in S1 Table.

Report identifying information. *Authorship Reported*. All JP RRs (100%) reported the authors compared to NJP RRs (73%; $p<0.0001$). For JP RRs, authorship was primarily cited in the byline of the article following the title (83%); authorship was rarely included here for NJP RRs (6%), with most (42%) listed in other places throughout the document (e.g., in the header).

Structure (document organization). *Type of report structure*. As typical with journal publications, a higher proportion of JP RRs was constructed according to the traditional IMRaD

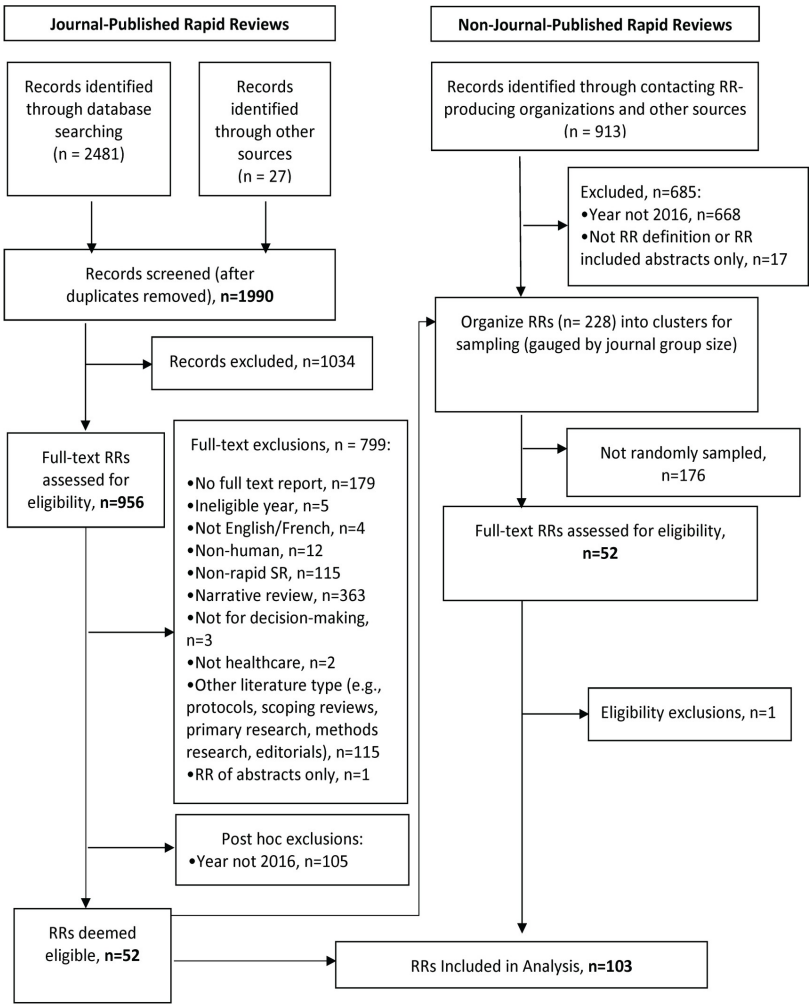

Fig 1. Study flow diagram. Breakdown of the number of rapid review reports identified, assessed for eligibly, and finally included in the main sample.

https://doi.org/10.1371/journal.pone.0238025.g001

format when compared to NJP RRs [92% vs 8%; OR 125.49, 95% CI: 28.75–792.06]. Instead, almost half of NJP RRs (47%) were organized using a graded entry format, while no JP RRs used this structure (Fig 2). Graded entry front end combined with an IMRaD structured report was more common in NJP RRs than JP RRs, 22% vs 4%, respectively (Fig 2). We deemed nearly one-quarter of the NJP RRs (24%) to be multicomponent reports while few JP RRs used this format (4%) (Fig 2). The multicomponent report format type was added during the conduct of the study to capture those reports that were comprised of various components divided into lengthier 'chapters' or 'sections' beyond typical sections found in either the IMRAD or

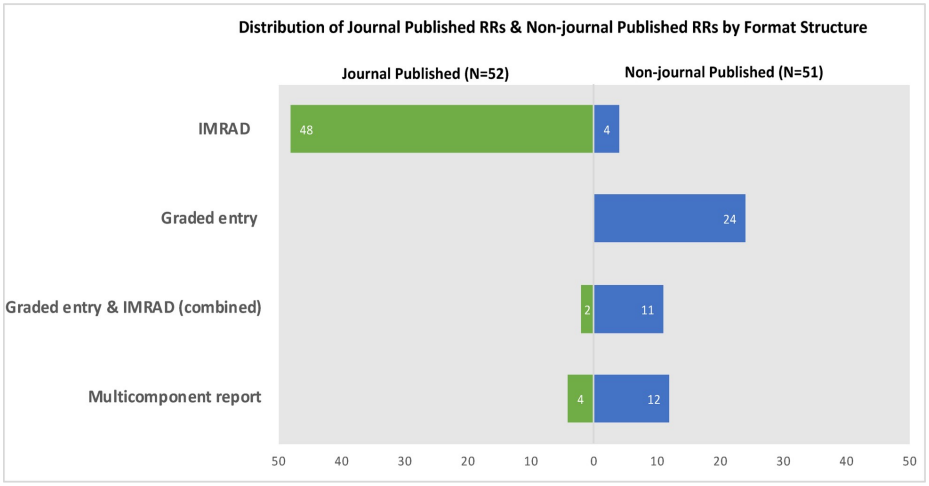

Fig 2. Rapid review format structures identified. Breakdown and comparison of the types of different rapid review report format structures identified across the journal published and non-journal published groups.

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main graded entry structures. Additional chapters or sections of these reports included, for example, recommendations to guide policy and practice; health coverage information; and comparative information from other jurisdictions. Among NJP, the most common type of graded-entry report was a mix of graded entry styles within the same report structure (n = 16) (Fig 3). These reports did not ascribe to any of the other graded entry formats but did aim to highlight conclusions or key findings upfront followed by other report components that provided additional details. For example, some reports started with key messages, a brief description of methods in call-out boxes, and a summary of findings in a table, with additional information provided in appendices. Among other examples, there were reports that provided context and key points on the first page, with a synopsis of the methods that appeared before the introduction, or those that first provided a short summary of the methodological approach taken, the scope of the review, followed by a two-page evidence summary, and included additional abridged sections outlining the background, aims, and an overview of the evidence informing the review, ending with a section on the RR methods.

Page numbering in the document and page length. All RRs, except for three NJP RRs, had page numbering. Overall, JP RRs were considerably shorter than NJP RRs in page length of the main report [JP Mean (SD) 12.17(10.40); NJP Mean (SD) 27.14(25.22)], as well as for the complete report and the executive summary (Table 3 in S1 Table).

Content. *Included banners and headers*. When we examined the components of the individual reports (Fig 4), we found a higher number of sections labelled across JP RRs when compared to the NJP RR reports. Sections included the following: abstracts; methods; discussion; conclusions; acknowledgements; conflicts of interest; and author contributions (See Table 3 in S1 Table for corresponding ORs, 95% CIs, and p-values). However, we found that JP RRs were less likely to include sections bannered as executive summary; key messages; disclaimer; policy options or implications; cost implications; and appendices. We did not find any notable differences for other bannered sections, including introduction or background, results, limitations, recommendations for future research, references or abbreviations. Few RRs from either group

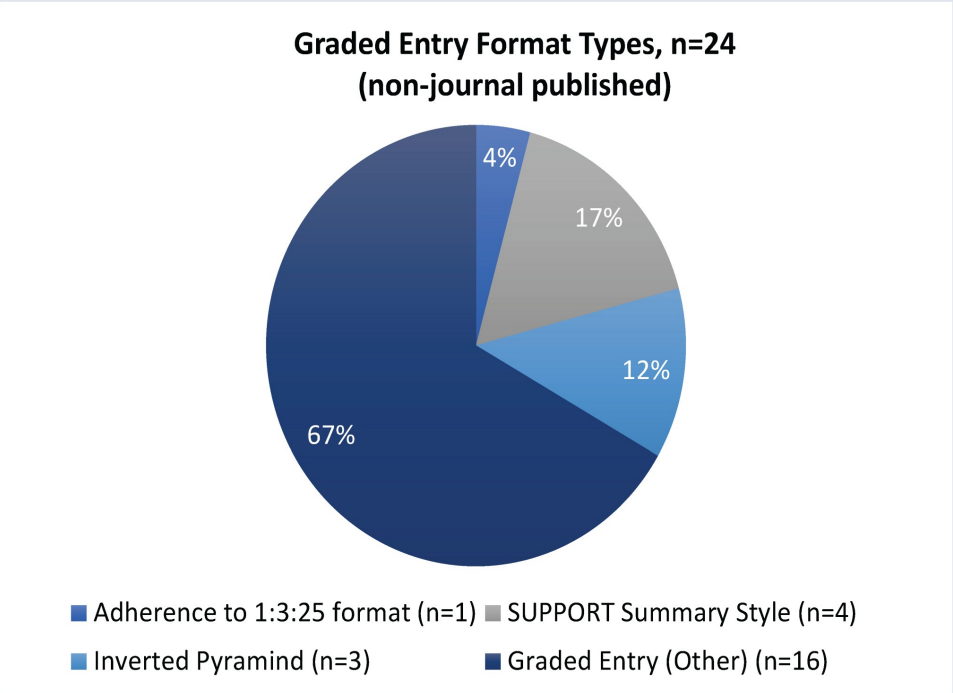

Fig 3. Graded entry formats identified. Breakdown of the subtypes of graded entry formats identified from the non-journal published rapid review reports.

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included an implications section or reported on the quality of the body of evidence. Only the NJP RRs included bannered sections on equity (n = 2), local applicability of results (n = 5), and implementation considerations (n = 3). Of the labels we identified, some of them potentially overlap and could refer to similar concepts (e.g., recommendations for future research, implications, and implementation). However, in this study, we did not formally assess the specific content of the bannered sections.

Visual design

Legibility. *Document preparation system and typeface*. When examining components of *legibility*, or the ease with which a reader can recognize individual characters in the text, we judged the majority of the JP RRs to have been prepared using a professional publishing platform (92%). However, four JP RRs appear to have been prepared for publication using a desktop publishing software. We determined that most NJP RRs (76%) were likely developed using a desktop publishing software or produced in Microsoft Word and then converted to a portable document file (PDF) to be made publicly available online. When we assessed typeface, more JP RRs were prepared using a serif font for the *main text* when compared to NJP RRs [85% vs 25%; OR 15.51, 95% CI: 5.51–48.98)] that more often used a san-serif font. The typeface of the *headers* in the main text was predominantly serif for the JP RRs (69%) and sans-serif typeface for NJP RRs (86%).

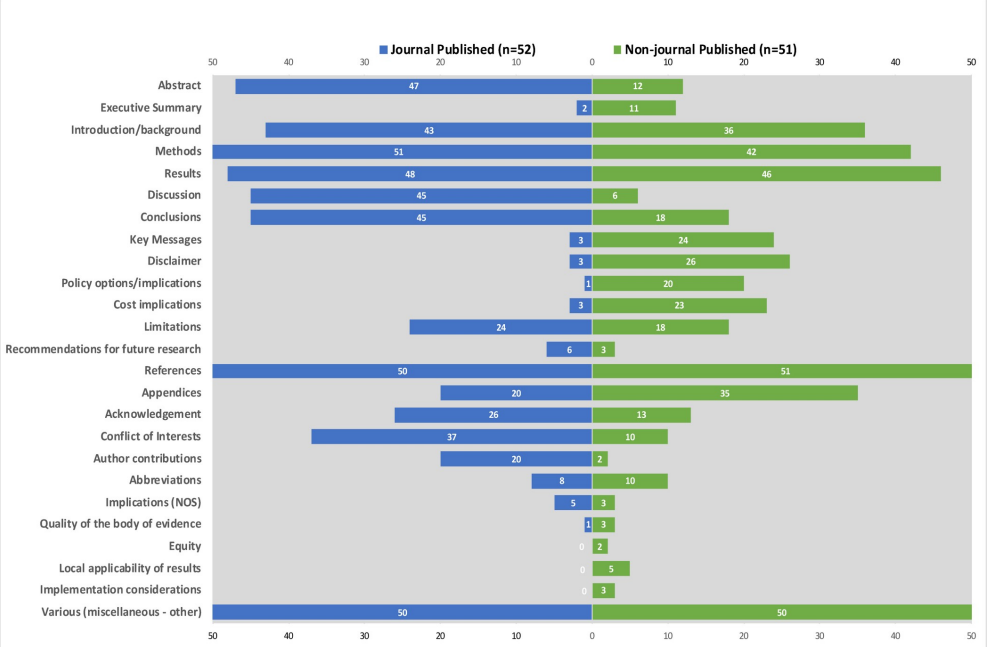

Fig 4. Bannering of content in rapid review reports. Breakdown and comparison of labelled sections identified across the journal published and non-journal published groups.

https://doi.org/10.1371/journal.pone.0238025.g004

Graphic elements. *Use of typographic cues and main document text*. When examining use of *typographic cues* in the RRs, fewer JP RRs used bolded text, keywords or phrases [10% vs 33%; OR 0.22, 95% CI: 0.06–0.69], underlining of text, keywords or phrases [2% vs 57%; OR 0.02, 95%: 0.00–0.12], and the use of bullet lists [48% vs 86%; OR 0.15, 95% CI: 0.05–0.42)]. We did not find any other variances in the use of bolded headers, use of colour to highlight text, keywords or phrases, call-out boxes, and use of italics to highlight text, keywords or phrases. For both JP and NJP RRs, the main body of the reports were mainly presented in monochrome (black, white or greyscale) (JP, 75% vs. NJP, 71%). Of the RRs that employed colour, all used a white background, with text black or dark blue, with various accent colours (e.g., blue, green).

Tables in the main document and tables types. Most RRs presented tables in the main body of the RR (JP, 87% vs. NJP, 88%), with a median (range; IQR) of 2 (1–17; 3) for JP RRs and 6 (1–33; 8.75) for NJP RRs. JP RRs were less likely to include outcome-specific data tables when compared to NJP RRs [6 vs 18; OR 0.24, 95% CI: 0.07–0.72]. Other types of tables included characteristics of included studies, general summary of findings tables, and quality assessment tables (Table 3 in S1 Table). Only one JP and one NJP RR included GRADE Summary of Findings tables in the main report.

Materials provided in appendices. Fewer JP RRs provided materials in the appendices when compared to NJP RRs [52% vs 73%; OR 0.41, 95% CI: 0.17–1.00]. Table 3 in S1 Table provides a list of the types of content provided in the appendices (e.g., search strategies, evidence tables).

Figures in the main document, figure types, and figures in the appendices. A greater proportion of JP RRs included figures in the main body of the RRs when compared to NJP RRs [73% vs 49%; OR 2.79, 95% CI: 1.15–7.01] with a median (range; IQR) of 1 (1–8; 1) for the JP RRs and 2 (1–11; 3) for the NJP RRs. However, JP RRs were more likely to include a PRISMA flow diagram (n = 34) versus NJP RRs (n = 12) [OR 6.02, 95% CI: 2.40–16.03]. Other types of drawings or schematics (e.g., analytic framework) were often included (JP = 15; NJP = 22). Only one RR from each group included Forest plots, while none included funnel plots. JP RRs were less likely to include figures in the appendices when compared to NJP RRs [4% vs 41%; OR 0.06, 95% CI: 0.01–0.27]. For many NJP RRs, we identified the PRISMA flow diagrams (15/21) in the appendices.

Other factors related to layout. *Placement of the methods section, key messages, and disclaimer*. All but one JP RR included the 'methods section' at the front end of the report, while only half of NJP RRs of the 42 RRs that had a labelled methods section did [98% vs 50%; OR 48.94, 95% CI: 7.01–2123.17]. The rest of the NJP RRs placed the methods section in either at the back end (n = 4) of the main report or in the appendices (n = 17). Only three JP RRs contained key messages compared to 24 NJP RRs. Similarly, three JP RRs included a disclaimer, while 26 NJP RRs provided this. We found key messages and disclaimers commonly reported at the front end of the report for both review types.

Determination of the final report format, stakeholder input, availability of additional materials. The final report layout for JP RRs was determined by the journals in which they were published. However, the majority of NJP RRs (94%) did not report how the final format was established, with only one report determined by the producer and two reports decided by the requestor/commissioner. Moreover, none of the NJP RRs reported if stakeholders had any input with regards to the final layout of the end-product. Few RRs indicated that additional material was available upon request (JP, 4% vs. NJP, 6%).

Readability. *SMOG index and word count*. According to the SMOG formula, there were no differences in the readability scores of JP RRs and NJP RRs in the abstract/summary, introduction/background, or discussion/conclusions sections. Across the RRs, SMOG scores indicated that between 13. 57–14.35 years of education would be needed to understand the writing contained in these selected sections of the RRs. JP RRs had significantly fewer words than NJP RRs in both the main body of the text [MD (SE): -3,561 (1,388), p = 0.01] and the entire document MD (SE): -7,050 (2,566); p = 0.01)].

Discussion

This study systematically identified a diverse sample of RRs and discovered some similarities as well as differences between the published and unpublished RRs. At the outset, we understood that the nature of biomedical journal publishing would drive specific differences between groups and the fact that journals regulate the presentation of findings in the papers they publish. Similarly, we anticipated that NJP RRs would likely differ from JP RRs, given the specific mandates of healthcare organizations and the degree of independence to design and develop RR products for various knowledge-user audiences. Our results did reflect particular distinctions in format and content.

Report structures. Given journal publication requirements, as expected, nearly all of the JP RRs followed the traditional IMRaD report structure, a stronghold in academic publishing for the last 70 years [23]. IMRaD represents a pattern for structure more than the actual words covered by the abbreviation, and journals do not all follow a standard or uniform style. Nonetheless, IMRaD provides a level of uniformity in the way scientific evidence is presented [36]. In contrast, few NJP RRs reflected IMRaD, and instead, used graded entry formats, a

combined graded entry frontend with an IMRaD backend or were part of multicomponent reports. What is unclear is the degree to which end-users informed these alternative formats identified, or if determined by an organizational mandate or what the producers thought was best. Collectively, this suggests a variety of formats are being used in the unpublished realm of RRs and underscores that groups are looking to alternative ways to organize content contained within a report. Although the use of IMRaD is engrained in journal publishing, it may be time to rethink whether this format is versatile or adaptable enough for new emerging research synthesis methods (e.g., rapid reviews).

Considerations for decision-makers. We found RRs published in journals were considerably shorter in page length and word count, a finding likely indicative of journal publishing restrictions. However, the main reports of the NJP RRs were more than double in length. Even though several NJP RRs used an alternative graded entry format, a lengthy report regardless of the structure may limit usability, and runs counter to evidence suggesting brief summaries are favoured among decision-makers [7, 12, 14]. Further, among both groups of RRs, the inclusion of key messages was relatively low. Recent findings indicate that decision-makers like having key messages upfront as part of a brief SR summary [37] and should be considered for all RRs, whether published or unpublished. Also, sections on equity, local applicability of results, and implementation considerations were not commonly included and only identified in NJP RRs. It may be JP RRs did capture such content, but that word restrictions limited the ability to publish full details. Nonetheless, given that many RRs are undertaken specifically for decision-making purposes, producers of RRs may be requested to include more details on actionable information (e.g., cost, training and resources required) to better support the application and implementation of findings. If so, such considerations should be thought through early in the process to best tailor RRs accordingly to meet the specific needs of decision-makers [1, 11, 37].

In terms of choice of font, JP RRs tended to use a serif font (e.g., Times Roman) for the main text while NJP RRs commonly used a sans serif font (e.g., Arial or Calibri). In print design, serif fonts are generally considered more readable than sans-serif fonts as the serifs reportedly serve aids readers moving from one letter to the next in a smoother fashion. However, differences in the legibility or reading speed of printed text between these fonts are negligible [38]. If reading electronic text, using sans serif typeface may improve reading time and accuracy [39]. Early research suggests that for alternative SR formats, use of certain sans serif fonts is preferred, and that reading materials on a computer is somewhat more favourable than print [29]. Whether these findings hold for RRs remains to be studied. However, knowing that certain fonts may be better suited for different mediums (e.g., print versus on screen) may be helpful in the design of future RR reports.

Specific to unpublished RRs, authorship or a corresponding author was not reported as part of the review identifying information in one-quarter of NJP RRs. Although all NJP RRs included a branded institutional logo, without an identifiable author, this could diminish the credibility of these reports. Also, over three-quarters of NJP RRs had no abstract (vs. 10% of JP RRs), and very few included an executive summary. A brief upfront summary would be beneficial given policymakers favour their use [11, 29, 37]. As well, the placement of a methods section for NJP RRs varied across reports in contrast to most JP RRs, where the methods sections followed the introduction as per IMRaD. Evidence suggests that methods details may not be as meaningful to decision-makers when compared to other included content [11, 29, 37, 40]. Nonetheless, from a reporting perspective, although a methods section does not necessarily need to be front and centre of a RR, these details need to be accessible somewhere in the report. Based on our entire sample, we encourage the improved use of a PRISMA flow diagram as part of the transparent reporting of methods.

Directions for future research

We suggest exploring what content preferences exist for RRs. Beyond substance, we also need to evaluate our understanding of which design features are well received, in what contexts, and by whom. We need to develop RR prototypes and formally test usability to identify barriers and facilitators to their effective use. In particular, what remains unknown and requires further examination is the extent to which using IMRaD or alternative styles by end-users impacts perceived usefulness and levels of comprehension. Importantly, end-users (e.g., policymakers, clinicians, and patients) should drive this process of determining the most suitable formats as part of good knowledge translation practice. To fully assess the impact on uptake and use of RRs in decision-making, we must rigorously evaluate end-user format preferences, while also factoring in levels of health literacy and expertise in interpreting and using evidence among end-users. Given there is a general trend from print to electronic modes for receiving information, different mediums for delivering RR evidence should also be explored and take into account legibility, readability and aesthetic preferences. This study also highlights the need for producers of RRs to be transparent when reporting their review methods to facilitate quality assessment [41].

Strengths and limitations

We used a broad working definition of RR and included RRs that addressed a variety of research questions beyond 'what works.' Thus, we erred on the side of inclusion, which may have resulted in a more heterogeneous set of RRs. However, we speculate that our findings are more broadly transferable and reflect the current state of RR methods in healthcare. To keep higher RR producing organizations from driving the results in the unpublished domain, we used a sampling approach aimed to control for potential clustering effect. In doing this, we increased the representativeness of our sample and overall generalizability. However, in taking this approach, we were unable to examine the full spectrum of RRs, primarily those from lower producing organizations. Therefore, our findings may not reflect the entire array of RR format and content features.

Further, although we noted whether RRs possessed certain features, we did not assess the quality of the characteristics, or whether the RRs were well conducted. Moreover, we only did a cursory examination of readability scores using one formulaic test. In the future, other readability measures, including reading time, amount recalled, and overall comprehension, would contribute to a more comprehensive evaluation of the text of RRs. Last, because we imposed language restrictions on our sample given resource limitations, our data set may be incomplete and likely does not reflect the entirety of RRs produced in 2016 in languages beyond English and French.

Conclusions

Our findings highlight differences in certain format features between published and unpublished RRs, likely due to the use of distinct format structures (i.e., IMRaD use for journal articles while unpublished RRs tended to use alternative formats). There were also notable differences in labelled content likely driven in large part to the variances in format structures used. Our findings suggest that both sets of RRs may benefit from better use of plain language and more clear and concise reporting with a focus on key messages. Further, the information gleaned from the identified reports will directly inform those who conduct RRs. Importantly, this study provides a foundation for future research directed at better packaging of research results from RRs for policymakers and other key end-users to facilitate the uptake of evidence in policy and practice.

Supporting information

S1 Checklist.
(PDF)

S1 File. Common streamlined methods for rapid reviews.
(PDF)

S2 File. Types of graded entry formats.
(PDF)

S3 File. Full methods details.
(PDF)

S4 File. Search strategies.
(PDF)

S5 File. Eligibility criteria.
(PDF)

S6 File. Data collection forms.
(PDF)

S7 File. List of organizations producing rapid reviews included in the final non-journal published (NJP) sample.
(PDF)

S1 Table. Results presented in tables.
(PDF)

S2 Table. Peer review status and salient characteristics of potential predatory journals.
(PDF)

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Assessing how information is packaged in rapid reviews for policy-makers and other stakeholders: a cross-sectional study

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Abstract

Background: Rapid reviews (RRs) are useful products to healthcare policy-makers and other stakeholders, who require timely evidence. Therefore, it is important to assess how well RRs convey useful information in a format that is easy to understand so that decision-makers can make best use of evidence to inform policy and practice.

Methods: We assessed a diverse sample of 103 RRs against the BRIDGE criteria, originally developed for communicating clearly to support healthcare policy-making. We modified the criteria to increase assessability and to align with RRs. We identified RRs from key database searches and through searching organisations known to produce RRs. We assessed each RR on 26 factors (e.g. organisation of information, lay language use). Results were descriptively analysed. Further, we explored differences between RRs published in journals and those published elsewhere.

Results: Certain criteria were well covered across the RRs (e.g. all aimed to synthesise research evidence and all provided references of included studies). Further, most RRs provided detail on the problem or issue (96%; $n = 99$) and described methods to conduct the RR (91%; $n = 94$), while several addressed political or health systems contexts (61%; $n = 63$). Many RRs targeted policy-makers and key stakeholders as the intended audience (66%; $n = 68$), yet only 32% ($n = 33$) involved their tacit knowledge, while fewer (27%; $n = 28$) directly involved them reviewing the content of the RR. Only six RRs involved patient partners in the process. Only 23% ($n = 24$) of RRs were prepared in a format considered to make information easy to absorb (i.e. graded entry) and 25% ($n = 26$) provided specific key messages. Readability assessment indicated that the text of key RR sections would be hard to understand for an average reader (i.e. would require post-secondary education) and would take 42 (± 36) minutes to read.

Conclusions: Overall, conformity of the RRs with the modified BRIDGE criteria was modest. By assessing RRs against these criteria, we now understand possible ways in which they could be improved to better meet the information needs of healthcare decision-makers and their potential for innovation as an information-packaging mechanism. The utility and validity of these items should be further explored.

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Protocol availability: The protocol, published on the Open Science Framework, is available at: osf.io/68tj7

Keywords: rapid reviews, health policy, health systems, decision-making, evidence synthesis

Background

Having ready access to relevant information to inform decision-making is vital to policy-makers who make decisions in healthcare that affect populations. Often, systematic reviews (SRs), a benchmark tool in evidence synthesis, are used to inform practice or policy [1, 2]. However, when evidence is needed to inform an emergent issue outside the traditional SR timeline of 1–2 years [3, 4], 'rapid reviews' (RRs) have become a practical tool to get evidence to decision-makers more quickly, often ranging from a few weeks to usually no more than 6 months [3, 5, 6]. A defining feature of RRs is the streamlining of methodological aspects of the SR process to produce information faster than most SRs [3, 5, 7, 8].

Clinically, RRs have been used to inform frontline patient care decisions [9–11], to make crucial decisions about health system responses [12–14], and to inform routine situations to improve public health [15–17]. They are also produced and used in low- and middle-income countries to support healthcare decisions [18–20]. RRs should therefore include relevant content and be designed to maximise relevancy for key stakeholders, including policy-makers, health system managers, administrators and clinicians, who are likely to use research to inform choices about the practice and delivery of care.

RRs may include summaries of SRs as well as primary studies and grey literature and have become attractive products for decision-making [21, 22]. It remains unclear, however, how well they are packaged so that evidence may be readily consumed and applied. Some studies have looked at ways to better parcel SR content and format, including ways to tailor information for clinicians, health policy-makers and health system managers by developing summaries of SRs [23–29]. Assessment of these summaries suggest that they are likely easier to understand than complete SRs by such end-users [29], who favour clear, concise summaries in simple, easy to understand language [24, 26–29]. Because RRs can take many forms and, similarly, are intended to provide a summation of evidence, knowledge on summaries of SRs may be useful for the packaging of RRs.

The BRIDGE criteria is an evidence-informed framework of building blocks of effective information-packaging to support policy-making and originated as part of a research series established to meet the needs of policy-makers and health systems managers [30]. The original BRIDGE criteria, with an emphasis on health systems research, is comprised of 11 questions across key domains designed to assess evidence products considered to be information-packaging mechanisms (e.g. a study summary, a SR summary, a compendium or grouping of summaries on a particular topic, a policy brief, or a policy dialogue report). The criteria address five specific domains, including 'coverage' of a health system issue or condition, in particular how topical or relevant the issue is along with its various facets, what type of knowledge the product includes (e.g. synthesised evidence, tacit knowledge and views of policy-makers and stakeholders), how and for whom it is targeted, how clearly the information is presented, and how its use is supported by end-users. According to the BRIDGE study authors, the purpose of assessing evidence products against these criteria was to encourage debate and innovation about the ways in which information is prepared and packaged for policy-makers and stakeholders as a component of an overarching knowledge-brokering approach. Given increases in the production and use of RRs, we used the BRIDGE criteria to assess a sample of RRs as a type of information-packaging mechanism. Previously applied to evidence products [30, 31], we further modified the criteria by operationalising some original items to make them more assessable and by including new criteria relevant to the context of RRs.

Objective and research question

To date, the question of how well RRs are packaged for use in decision-making for policy-makers and other stakeholders has not been explored. Therefore, the objective of this study was to examine the extent to which RRs are a useful information-packaging mechanism based on criteria for communicating clearly to support healthcare decision-making. Our research question was: How well do rapid reviews (RRs) perform when evaluated against adapted BRIDGE criteria developed to assess information-packaging mechanisms of evidence products?

Methods

Study design

This was a descriptive, cross-sectional study involving a diverse sample of RR reports. The protocol for this study is available at: https://osf.io/68tj7.

Although there is no specifically endorsed definition of a *RR*, we defined it as a report where the intent is to summarise evidence for use in any form of decision-making, directly or indirectly related to a patient or to

healthcare, using abbreviated and/or accelerated SR methodology to accommodate an expedited turnaround time [3, 5, 32]. We considered the 'key stakeholders' to be the major knowledge users in the healthcare system, comprised of policy-makers at various levels of government as well as individuals likely to use research results to make informed decisions about health policies, programmes or practices.

Identifying RRs for inclusion (dataset)

We based our analysis on a sample of 103 RRs that included both journal-published (JP) and non-journal-published (NJP) RRs, which were identified from a parallel methods project [33]. Briefly, the JP RRs were identified by searching Ovid MEDLINE, Ovid MEDLINE In-Process and Other Non-Indexed Citations, Ovid EMBASE, Ebsco CINAHL, Proquest Educational Resources Information Center (ERIC), PsycINFO, and the Cochrane Library using search strategies that were developed in conjunction with and peer reviewed by experienced information specialists. We first completed screening of the JP literature and then conducted a grey literature search in order to identify NJP RRs. This involved reviewing the websites of 148 organisations from across five continents that produce or commission RRs as well as websites listed in CADTH's Grey Matters checklist [34], among other sources. Because there were several hundred NJP reports identified across a mix of higher and lower RR-producing organisations, we needed an appropriate sampling strategy that took volume and product type into account knowing that some organisations produce more than one form of RR. Hence, we sampled proportionate to cluster size by organisation and RR type, using the sample size of the JP group as a guide. Given this was a descriptive, exploratory study and was therefore hypothesis generating, no formal sample size was calculated.

We assessed the eligibility of the RRs following a pilot testing of screening forms. Two reviewers independently assessed records against inclusion criteria developed a priori at title and abstract level, and then at full-text, with disagreements resolved by consensus or, if needed, by a third reviewer. Reasons for exclusion of full text reports is documented in a flow diagram (Fig. 1) that details the study selection process. We limited inclusion of RRs to those published or produced in 2016. All types of RRs related to humans and healthcare covering various topics were eligible. We did not limit by length of time it took to perform the RR, but we did exclude reports that appeared to be annotated bibliographies of relevant papers. In addition, only studies in English and French were considered for inclusion. Further details on the search strategies developed to identify the sample, eligibility criteria and the sampling frame are provided elsewhere [33].

Applying modified criteria

Table 1 represents the original BRIDGE criteria, including the major categories covered [30], that were modified for a previously reported study [31]. Taken together, we made additional adaptations and operationalised certain items to increase the objectivity of our assessments. In addition to design and document organisation, we extended the criteria to convey broader attributes of RRs, including relevancy of content, quality of the evidence, reporting and stakeholder engagement.

Specifically, we added three further items. The first item added, in order to help assess whether the RR addressed a topical/relevant issue, was whether or not the request for RR had been reported, commissioned, or conducted for decision-making purposes (Table 1 – Criterion 1, Item A). The second item added pertained to patient engagement in the development of the RR (Table 1 – Criterion 6, Item J), and if applicable, at which stages of the process patients may have been involved. The term 'patient' refers to anyone who has personally lived the experience of a health issue as well as their informal caregivers, including family and friends [36]. Research has shown that individuals who are engaged in their health are more likely to achieve better health outcomes [37]. In Canada and elsewhere, a key component to patient engagement are strategies involving their participation as partners in research. Therefore, we sought to capture the extent of patient/partner involvement in our sample of RRs. The third item added was how each RR report was labelled (i.e. did the report self-declare as 'rapid' in its title or body?) (Table 1 – Criterion 19, Item Z) to determine how similar or varied the nomenclature used across the spectrum of RRs may be and to highlight the potential impact this may have on RRs collectively as an information product.

In addition, we also operationalised certain items with the aim to increase clarity and consistency when applying the criteria. In particular, we expanded on components that assessed if the RR was written in comprehensible or lay language (Table 1 – Criterion 8, Item M) by examining the readability and estimated reading time of the RRs based on word count. Previously, we collected data on the reading level across three key sections of each RR (i.e. abstract/summary, introduction/background and discussions/conclusions) according to the Simple Measure of Gobbledygook (SMOG) readability test, using an online calculator (https://www.learningandwork.org.uk/SMOG-calculator/smogcalc.php) to generate the SMOG scores that estimate the years of education a person needs to understand a piece of writing [38]. Evidence suggests that the SMOG is the most

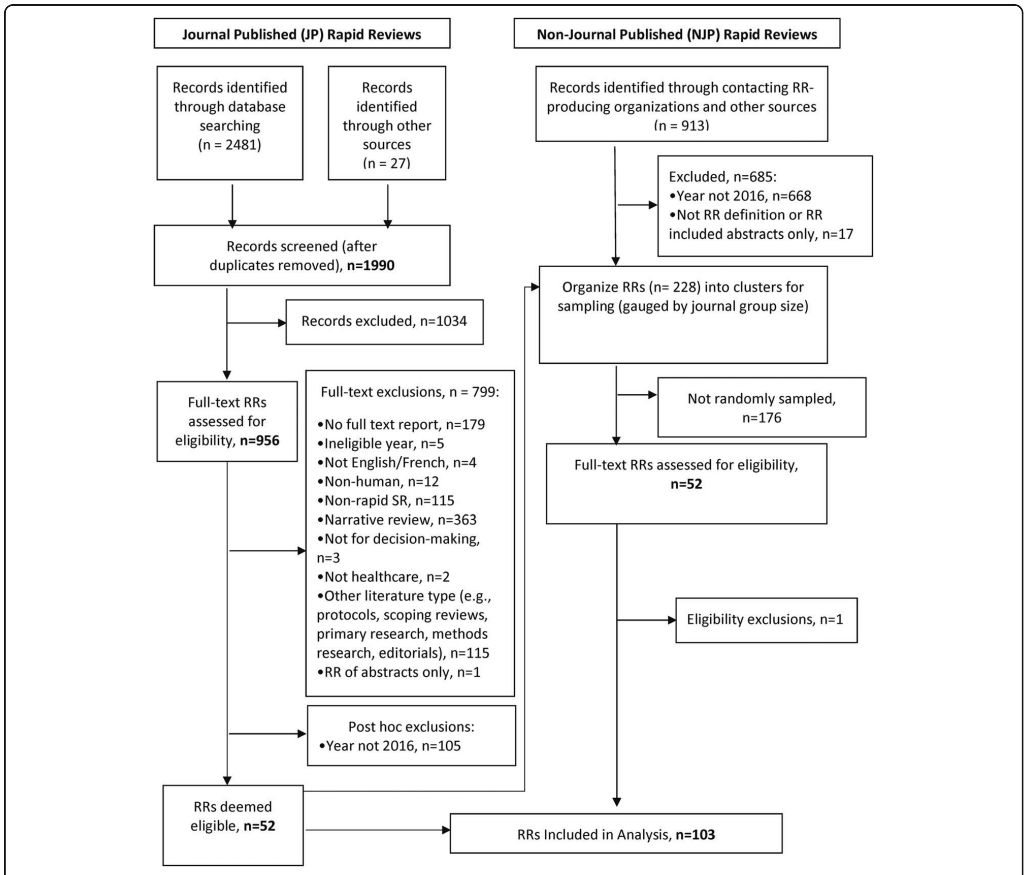

Fig. 1 Study flow diagram. Breakdown of the number of rapid review reports identified, assessed for eligibility and included in the main sample

appropriate readability measure for assessing written health information [39]. In addition, we further examined the word count for each RR for both the main body of the report and the total word count (including references and appendices) using the Microsoft Word built-in word-count function. From this, we estimated the reading time of the RRs by dividing the total word count of each report by 200, which is the number of words on average a person is able to read per minute for comprehension [40].

In terms of item clarity, when assessing if the RR has been prepared in a format that is readily appreciated (Table 1 - Criterion 9, Item N), we provided guiding definitions of what constitutes two key format structures (i.e. IMRaD and graded entry). IMRaD is an acronym that refers to the Introduction, Methods, Results and Discussion sections of an original article and is the standard format of academic journal articles [41]. A graded entry format structure is organised differently to highlight decision-relevant, summarised information upfront followed by more detailed information that is gradually uncovered for the reader [42, 43]. Graded entry structures typically include most IMRaD components but may present them in a different order to facilitate the uptake of information. Therefore, when assessing readability (Table 1 – Criteria 8, Item M), we needed to adjust which sections to assess depending on whether the RRs adhered to a traditional publication format type (i.e. IMRaD) or more non-traditional formats (e.g. graded-entry, multicomponent report or other types of structures, including any combination of format types).

With regards to equity considerations, we provided four statements to guide assessment of this item (Table 1 – Criteria 12, Item Q) originally developed as part of a

Table 1 Adapted BRIDGE criteria

BRIDGE category [30]	Criteria [30, 31]	Adapted BRIDGE criteria for rapid reviews
I. What it covers	1. **Topical/relevant issue** from the perspective of the policy-makers with an explicit process for determining topically/relevance (e.g. periodic priority-setting exercise, rapid response service)	A. *Was the RR requested, commissioned or conducted for decision-making purposes?* [a] B. *Was the RR conducted through a rapid response service?* C. *Was the RR topic identified through a priority-setting exercise?*
	2. Document explicitly addresses at least four or more of the following: political and/or health system contexts, problem, options, implementation considerations, and cost implications Note: it addresses the many features of an issue, including the underlying problem(s)/objective(s), options for addressing/achieving it, and key implementation considerations (and if only some features are addressed, acknowledges the importance of the others)	D. *Does this RR address at least four or more of the following for the issue being reviewed:* • *Political and/or health system contexts* • *Problems* • *Options* • *Implementation considerations* • *Cost implications*
II. What it includes	**3. Draws on synthesised/assessed (global) research evidence** that has been assessed for its quality and local applicability	E. *Does the RR draw on synthesised/assessed, global research evidence?*
	4. Incorporates the tacit knowledge of policy-makers/stakeholders that has been collected in a systematic way and report in a transparent manner	F. *Does the RR incorporate tacit knowledge of policy-makers and/or stakeholders?* G. *Has the tacit knowledge been collected in a systematic way and reported in a transparent manner?*
III. For whom it is targeted	5. **Explicitly targets policy-makers/stakeholders** as the key audience Note: it targets policy-makers and stakeholders with an explicit statement about them being a key audience (not just a policy implications section)	H. *Does the RR explicitly report target policy-makers and/or stakeholders as the key audience?*
	6. **Engages policy-makers/stakeholders in reviewing the product for relevance and clarity?**	I. *Was the RR report reviewed by policy-makers and/or stakeholders (not just researchers) for relevance and clarity?* ***Patient engagement in research*** [a] J. *Was the RR reviewed by patients/consumers for relevance and clarity?* K. *If applicable, were patients involved in any phases of the rapid review conduct? Check all that apply* o *Preparatory phase (agenda-setting, prioritisation of research topics and funding)* o *Execution phase (study design and procedures, screening, data collection, and/or data analysis)* o *Translation phase (interpretation of findings, dissemination, implementation or evaluation)*
IV. How it is packaged	7. **Organised to highlight decision-relevant information**	L. *Was the RR organised in such a way to highlight decision-relevant information? For example, are benefits, harms and costs of policy/programme options highlighted in some capacity in the report?*
	8. **Written in understandable/lay language**	M. *Was understandable, lay language used?* [a] • *SMOG score of report* • *Word count of report* • *Estimated reading time (minutes)*
	9. **Prepared in a format that makes the information easy to absorb? Is readily appreciated** (e.g. graded entry)	N. *Was the prepared in a format that makes the information easy to absorb? (e.g. graded-entry)*[b]
V. How its use is supported	10. **Contextualised through online commentaries/briefings** provided by policy-makers/stakeholders	O. *Was the RR contextualised through online commentaries/briefings provided by policy-makers/stakeholders?*
	11. **Brought to the attention of target audiences through email/listserv**	P. *Was the RR brought to the attention of target audiences through email, listservs or website postings* [a]*?*
VI. Features and content [18]	12. **Equity considerations** discussed or implicitly considered (e.g. through topic or analysis)	Q. *Are equity considerations discussed or implicitly considered (e.g. through the topic or analysis)?* *In assessing, consider whether the rapid review addresses any of the following* [35]:[a] 1. *Which group or settings are likely to be disadvantaged relative to the policy option being considered?* 2. *Are there reasons for differences in the relative effectiveness of the option for disadvantaged groups or settings?* 3. *Are there likely to be baseline differences across groups or settings that could influence the effectiveness of the option? Would these baseline differences mean the problem is more or less important for disadvantaged groups or settings?*

Table 1 Adapted BRIDGE criteria *(Continued)*

BRIDGE category [30]	Criteria [30, 31]	Adapted BRIDGE criteria for rapid reviews
		4. *What should be considered when implementing the proposed option to ensure that inequities are reduced and/or not increased?*
	13. **Recommendations provided**	R. *Did the RR provide recommendations?*
	14. **Methods described**	S. *Were the methods to conduct the RR described?*
	15. **Quality of research evidence and/or limitations outlined**	T. *Was quality assessment/risk of bias assessment of the included research evidence conducted?* U. *Were limitations of the RR approach outlined?*
	16. **Reference list provided**	V. *Was a reference list provided?*
	17. **Local applicability discussed,** including case examples to highlight how a particular policy might be adapted to local circumstances	W. *Was local applicability discussed in the RR?* X. *Were case examples included illustrating how to adapt or apply a policy or intervention locally?*
	18. **Key messages or summary points provided**	Y. *Were key messages or summary points provided in the RR? (i.e. specifically labelled in the report as such)*
	19. **How is the rapid review labelled?**[a]	Z. *Does the RR self-declare as 'rapid' (explicit phasing) in title or body?*

RR rapid review
[a]New criterion or item added
[b]GRADED Entry – a report structure organised to highlight decision-relevant summarised information upfront followed by more detailed information that is gradually uncovered for the reader [42, 43] versus IMRAD – the predominant format of academic journal articles (Introduction, Methods, Results, and Discussion)

package of tools for policy-making specifically taking parity into consideration when assessing the findings of a SR [35].

Lastly, we reduced the number of double-direct item questions that originally touched upon more than one issue, yet previously allowed only for one answer. Where appropriate, we separated these items into discrete criteria to decrease ambiguity when assessing the RRs. For example, 'quality of the research evidence and/or limitations outlined' [31] was presented as two items in our assessment (Table 1 – Criteria 15, Items T & U). In addition, Criteria 3, 4 and 17 were similarly modified. In total, each RR was assessed against a total of 26 factors.

Data extraction process

Prior to data extraction, we conducted a pilot extraction of five articles to ensure consistent interpretation of criteria were applied to the studies. One reviewer extracted data using pre-tested data extraction forms (available at www.osf.io/68tj7) (CG, ZM, CB). A second reviewer crosschecked all extracted data (CG, CB, CH). We gathered general study characteristics (e.g. country of corresponding author or producer, funding, time to completion, purpose or rationale for the RR conveyed) for each RR prior to applying the criteria, for which most items were coded as yes or no/not reported. We resolved disagreements through consensus by referring to the study report. Because it was our intent to evaluate each report in the same manner it was made available (packaged) for end-users, we did not follow-up with producers for further clarification. We used Reference Manager [44] to manage all citations and an online software to screen and extract eligible studies (DistillerSR by Evidence Partners) [45].

Data analysis

Given the nature of this study, we used descriptive summary statistics to assess the RRs against each criterion. Specifically, we calculated the median and interquartile range for continuous data items and proportions for binomial items. Categorical sub-items were reported as counts within each category.

Exploratory analysis

Using Fisher's exact test for binomial proportions (with odds ratio (OR) estimates based on conditional maximum likelihood method) and Welch's t test for mean differences of continuous data items, we explored whether there were significant differences on items between JP and NJP RRs. All analyses were performed using Microsoft Excel and R version 3.5.3 (http://www.R-project.org/).

Although no reporting guideline exists for this type of methodology study, we completed the STROBE Statement—Checklist for cross-sectional studies to the extent possible (Additional file 1).

Results

Amendment to the protocol – we did not include sentiment analysis as originally planned as we deemed this not to be informative to the readability of the RR documents identified. This represents a deviation from the original protocol but had no impact on the results of the study (https://osf.io/68tj7/).

Search results

As identified from a parallel methods project [33], following the screening of 1990 JP records and 227 full-text reports produced by various RR-producing organisations, a total of 103 RRs were included (Fig. 1). Overall, we applied the modified BRIDGE criteria to 52 JP and 51 NJP RRs reports. All RRs were in English with the exception of one French JP RR.

Table 2 provides full details on the general study characteristics of the included reports. RRs were identified from a total of 15 countries, with the majority produced by Canada, followed by the United Kingdom, Australia and the United States. The 52 JP RRs were identified from 47 unique journals (across 21 distinct publishers) that were primarily speciality journals (37/52; 71%) (Additional file 2). Further, the median (interquartile range; range) journal impact factor of these RRs was 2 (1; 0.57–47.83). The 51 NJP RRs were identified from 25 unique organisations based in six different countries.

Modified BRIDGE criteria

Figures 2 and 3 show the proportion of RRs ($n = 103$) that adequately met the individual adapted BRIDGE criteria, for which yes/no responses were obtained. Full results of the adapted BRIDGE criteria as applied to our sample of RRs are available in Table 3.

What was covered

A large portion of the RRs (77%; $n = 79$) were reportedly commissioned or produced for decision-making purposes. Fewer (20%; $n = 21$) were conducted as part of a rapid response service while only one RR was part of a priority-setting exercise used to guide the focus of another SR. Most RRs (96%; $n = 99$) described a problem or the issue at hand, while a large segment of the RRs (61%; $n = 63$) addressed aspects of political and/or health systems context. Cost implications (35%; $n = 36$) and implementation considerations (31%; $n = 32$) were covered by a lesser proportion of the RRs. None outlined possible options to address policy, treatment or implementation.

What was included

By virtue of the fact that the information products being assessed in this case were all RRs, every report was deemed to have provided a level of research evidence synthesis. We further assessed that nearly a third of the RRs (32%; $n = 33$) involved the tacit knowledge of policy-makers or stakeholders in the process in some capacity, for which this knowledge was collected in a systematic and transparent way in nearly half of these instances (48%; $n = 16$). Type of involvement included, for example, establishing formal advisory or working groups, round table policy discussions, the use of semi-structured interviews, key informant interviews and use of a Delphi method.

For whom its targeted

The majority of RRs (66%; $n = 68$) seemed to target policy-makers and key stakeholders as the intended audience but fewer (27%; $n = 28$) reported to engage with them directly to discuss and review the content of the RRs for relevance and clarity. Further, only six RRs (6%) were reviewed by patients or consumers for content and clarity. This mostly included patient/partner involvement in dissemination of the report versus planning or conducting the review.

How it is packaged

Only 26% ($n = 27$) of RRs were organised to highlight decision-relevant information anywhere in the report. Less than a quarter of the RRs (23%; $n = 24$) used a graded entry format that decision-makers could easily scan for pertinent information. Most RRs were structured according to the traditional IMRaD approach (50%; $n = 52$), a graded entry front end with the remainder of the report in IMRaD format (13%; $n = 13$) or a lengthier, multicomponent report format (14%; $n = 14$). Additionally, based on the word counts for each RR, the average reading time of the main body of reports was a mean (standard deviation) of 42 (36) minutes. Further, we assessed the reading level a person would need in order to understand the text of the RRs easily on first reading. SMOG scores of the abstract/summary, introduction/background and discussion/conclusion sections were 13.97, 13.80 and 14.03, respectively, corresponding to the years of formal education past the age of six needed to understand the text across these sections.

How its use is supported

Only five RRs (5%) reported that policy-makers or stakeholders had provided online contextualisation or briefings. Similarly, six RRs (6%) reported disseminating report findings by targeting key stakeholders through email, listservs or through website postings.

Features and content

Equity considerations were discussed or implicitly considered by the nature of the topic in one-third of the RRs (33%; $n = 34$). Nearly one-quarter of the RRs (24%; $n = 25$) stated formal recommendations. A high proportion of RRs described the methods employed (91%; $n = 94$) and all RRs provided a reference list of included studies (100%; $n = 103$). Several RRs involved quality assessment of the included studies (56%; $n = 58$), while reference to limitations of the RR process as compared to a traditional SR (28%; $n = 29$) or providing a specifically labelled list of key messages or summary points (25%; $n = 26$) was less

Table 2 General characteristics of included rapid reviews

Characteristics	All (***n*** = 103)	Journal published (***n*** = 52)	Non-journal published (***n*** = 51)
Country of corresponding author or producer, n (%)			
Canada	42 (41)	12 (23)	30 (59)
United Kingdom	21 (20)	20 (38)	1 (2)
Australia	14 (14)	4 (8)	10 (20)
United States	10 (10)	3 (6)	7 (14)
Belgium	3 (3)	2 (4)	1 (1)
Scotland	3 (3)	1 (2)	2 (4)
Italy	2 (2)	2 (4)	0
China, Denmark, Germany, Netherlands, Saudi Arabia, Spain, Sweden, Taiwan[a]	1 (1)	1 (2)	0
List of authors cited, *n* (%)	89 (86)	52 (100)	37 (73)
Reported funding, *n* (%)	67 (65)	39 (75)	28 (55)
Funding source, *n*			
External, peer-reviewed grant	8	6	2
External, non-commercial (fee for service)	47	22	25
External, commercial (fee for service)	2	2	0
Internal	1	0	1
Specified no funding received	9	9	0
Purpose or rationale for RR conveyed by the authors	63 (61)	33 (63)	30 (59)
Time to conduct the RR reported, *n* (%)	6 (6)	3 (6)	3 (6)
4 weeks	2	0	2
8 weeks	1	1	0
17 weeks	1	0	1
24 weeks	1	1	0
32 weeks	1	1	0
Main intervention, *n* (%)			
Pharmacological	17 (17)	4 (8)	13 (25)
Non-pharmacological	57 (55)	29 (56)	28 (55)
Mixed	5 (5)	1 (2)	4 (8)
Other (does not address an intervention or exposure)	24 (23)	18 (35)	6 (12)
Number of study designs included in the RRs, *n* (%)			
One	37 (36)	14 (27)	23 (45)
Two or more	66 (64)	38 (73)	28 (55)
Frequency of included study designs, *n*[b]			
Systematic reviews	40	15	25
Randomised controlled trials	41	17	24
Observations studies (cohorts, case-control, cross-sectional)	61	36	25
Other[c]	37	21	16
Unclear	40	28	12
Peer reviewed, *n* (%)	56 (54)	50 (96)[d]	6 (12)[e]
RRs publicly available, *n* (%)	86 (83)	36 (69)	50 (98)
Journal Impact Factor, median (inter-quartile range)[range][f]	n/a	2 (1) [0.57–47.83]	n/a
Language of the RRs in English, *n* (%)	102 (99)	52 (100)	50 (98)

RR rapid review
[a]Per country
[b]Other may qualitative, quasi-experimental design including interrupted time series, controlled before/after, case series etc.
[c]Denotes the frequency of the included study designs
[d]Peer review confirmed if journal listed on the DOAJ or if specifically stated as a policy of the journal
[e]Non-journal-published RRs peer review status based on reporting of methods in each report and/or from available methods guidance from respective institutions
[f]Based on unique journals (*n* = 47), of which 39 reported impact factors for 2016 (Additional file 2)

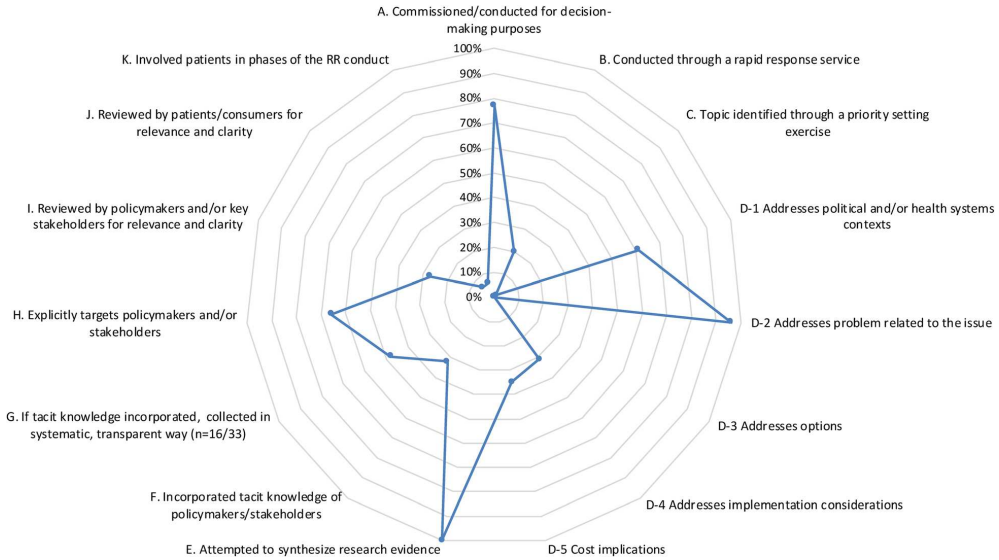

Fig. 2 Radar chart depicting proportions of rapid reviews adequately meeting adapted BRIDGE criteria (n = 103) (Items A–K)

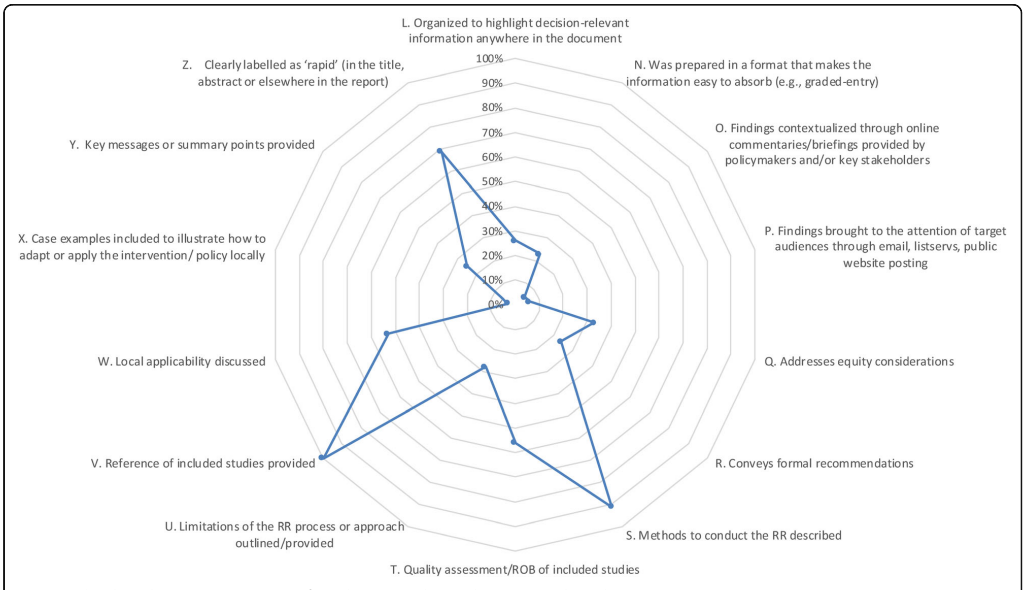

Fig. 3 Radar chart depicting proportions of rapid reviews adequately meeting adapted BRIDGE criteria (n = 103) (Items L–Z)

Table 3 Adapted BRIDGE criteria applied to 2016 rapid review reports

Criteria	All (***n*** = 103)	Journal published (***n*** = 52)	Non-journal published (***n*** = 51)	OR (95% CI)	***P*** value[a]
		n (%)	***n*** (%)		
A. RR commissioned or conducted for decision-making purposes	79 (77)	34 (65)	45 (88)	**0.26 (0.09–0.74)**	**0.01**
B. RR conducted through a rapid response service	21 (20)	1 (2)	20 (39)	**0.03 (0.00–0.20)**	**< 0.0001**
C. Topic identified through a priority-setting exercise	1 (1)	0 (0)	1 (2)	0.00 (0.00–18.63)	0.50
D. RR addresses					
Political and/or health systems contexts	63 (61)	30 (58)	33 (65)	0.75 (0.32–1.69)	0.55
Problem related to the issue	99 (96)	52 (100)	47 (92)	OR not available	0.06
Options	0 (0)	0 (0)	0 (0)	OR not available	1.00
Implementation considerations	32 (31)	15 (29)	17 (33)	0.81 (0.35–1.95)	0.67
Cost implications	36 (35)	13 (25)	23 (45)	**0.41 (0.17–0.98)**	**0.04**
RR addressed at least four or more of the above issues	14 (14)	6 (12)	8 (16)	0.70 (0.22–2.35)	0.58
E. RR attempted to synthesise research evidence	103 (100)	52 (100)	51 (100)	OR not available	1.00
F. RR incorporates tacit knowledge of policy-makers/ stakeholders	33 (32)	15 (29)	18 (35)	0.75 (0.32–1.83)	0.54
G. If yes, knowledge collected in systematic, transparent way[b]	16 (48) (*n* = 33)	11 (73) (*n* = 15)	5 (28) (*n* = 18)	**6.67 (1.42–33.76)**	**0.01**
H. RR explicitly targets policy-makers and/or stakeholders	68 (66)	27 (52)	41 (80)	**0.27 (0.11–0.67)**	**0.003**
I. RR was reviewed by policy-makers and/or key stakeholders for relevance and clarity	28 (27)	10 (19)	18 (35)	0.44 (0.17–1.08)	0.08
J. RR reviewed by patients/consumers for relevance and clarity	6 (6)	3 (6)	3 (6)	0.98 (0.17–5.67)	1.00
K. RR formally involved patients in phases of the RR conduct	6 (6)	3 (6)	3 (6)	0.98 (0.17–5.67)	1.00
Across any of following phases:					
Preparatory phase	3	1	2		
Execution phase	1	1	0		
Translation phase	5	2	3		
L. RR organised to highlight decision-relevant information anywhere in the document[c]	27 (26)	6 (12)	21 (41)	**0.19 (0.07–0.53)**	**0.001**
		Mean (SD)		***MD (SE)***	***P value***
M. RR written in understandable/lay language					
Readability: SMOG Index (years of education)					
Abstract/Summary	13.97 (1.51)	13.91 (1.55)	14.24 (1.36)	−0.33 (0.29)	0.25
Introduction/Background	13.80 (1.75)	14.01 (1.91)	13.57 (1.55)	0.44 (0.34)	0.20
Discussions/Conclusions	14.03 (1.98)	13.79 (1.68)	14.35 (2.29)	−0.56 (0.40)	0.16
Word count					
Main body of the report	8471 (7196)	6708 (4575)	10,269 (8818)	**− 3561 (1388)**	**0.01**
Total word count (including references and appendices)	13,834 (13,382)	10,343 (10,051)	17,393 (15,385)	**− 7050 (2566)**	**0.01**
Reading time (minutes)					
Main body of the report	42 (36)	33 (23)	51 (44)	**−18 (6.94)**	**0.01**
Total report (all pages)	69 (67)	52 (50)	87 (77)	**−35 (12.82**)	**0.01**
N. RR prepared in a format that makes the information easy to absorb					
Yes, graded entry[d]	24 (23)	0 (0)	24 (47)	**0.00 (0.00–0.10)**	**< 0.0001**
Traditional IMRaD[e]	52 (50)	48 (92)	4 (8)	**125.49 (28.88–586.53)**	**< 0.0001**
Graded entry front end followed by IMRaD[f]	13 (13)	2 (4)	11 (22)	**0.15 (0.02–0.68)**	**0.01**
Multicomponent report[g]	14 (14)	2 (4)	12 (24)	**0.13 (0.02–0.59)**	**0.004**

Table 3 Adapted BRIDGE criteria applied to 2016 rapid review reports *(Continued)*

Criteria	All (***n*** = 103)	Journal published (***n*** = 52)	Non-journal published (***n*** = 51)	OR (95% CI)	***P*** value[a]
		n (%)	***n*** (%)		
O. RR findings contextualised through online commentaries/briefings provided by policy-makers and/or key stakeholders	5 (5)	3 (6)	2 (4)	1.49 (0.22–12.50)	1.00
P. RR brought to the attention of target audiences through email, listservs, public website posting	6 (6)	2 (4)	4 (8)	0.47 (0.06–2.67)	0.44
Q. RR addresses equity considerations	34 (33)	14 (27)	20 (39)	0.57 (0.24–1.38)	0.21
R. RR conveys formal recommendations	25 (24)	11 (21)	14 (27)	0.71 (0.29–1.86)	0.50
S. Methods to conduct the RR described	94 (91)	51 (98)	43 (84)	**9.32 (1.31–211.38)**	**0.02**
T. Quality assessment/risk of bias assessment of included studies	58 (56)	26 (50)	32 (63)	0.60 (0.26–1.31)	0.23
U. Limitations of the RR process or approach outlined/ provided	29 (28)	24 (46)	5 (10)	**7.72 (2.62–23.47)**	**< 0.0001**
V. Reference of included studies provided	103 (100)	52 (100)	51 (100)	Not estimable	1.00
W. Local applicability discussed	55 (53)	19 (37)	36 (71)	**0.24 (0.10–0.56)**	**0.001**
X. Case examples included to illustrate how to adapt or apply the intervention/policy locally					
Yes	3	0	3	0.00 (0.00–1.66)	0.12
Not applicable (non-interventional RR)	11	10	1		
Y. Key messages or summary points provided	26 (25)	8 (15)	18 (35)	**0.34 (0.13–0.88)**	**0.02**
Z. Clearly labelled as 'rapid' (explicit phrasing or derivative)					
Yes, 'rapid' stated in the title	35 (34)	29 (56)	6 (12)	**9.23 (3.42–25.79)**	**< 0.0001**
If not stated in title, term labelled in the abstract/elsewhere in report	36 (35)	17 (33)	19 (37)		
Other term used to indicate abbreviated/timely (e.g. targeted review, mini-systematic)	19 (18)	4 (8)	15 (29)		
Non-descript label used (e.g. evidence note, evidence summary)	13 (13)	2 (4)	11 (22)		
Rapid review terminology consistently used to describe the report[h]	73 (71)	35 (67)	38 (75)		

OR odds ratio, *CI* confidence interval, *SD* standard deviation, *MD* mean difference, *SE* standard error
[a]*P* value based on Fisher's Exact Test for binomial counts or Welch's *t* test for continuous score
[b]Systematic collection may include, for example, formal feedback from an expert panel or working group; through surveys, key informant interviews, or Delphi process
[c]Reviewers were asked of the report need to fish around the report in order to pull out key information to make a decision or what this information easily identified in the report?
[d]Graded entry is a report format organised to highlight decision-relevant, summarised information upfront with access to additional, more in-depth information
[e]IMRaD: a report format structured to include the following sections consecutively: Introduction, Methods, Results and Discussion sections of an original article
[f]Graded entry plus IMRaD refers to a document that combines a graded entry front end followed by a structure that includes the various IMRaD components
[g]Multicomponent report refers to a report divided into various 'chapters' or 'sections' beyond the typical IMRaD or general graded entry structures
[h]Reports using inconsistent terminology include those, for example, that use the term 'rapid' but also label as 'systematic review' somewhere in the report

common. Although local applicability was discussed to some degree in several of the RRs (53%; $n = 55$), only three RRs included specific case examples to illustrate how to apply or adapt a policy or intervention locally.

Collectively, the majority of RRs (69%; $n = 71$) explicitly used the term 'rapid' in the title (34%; $n = 35$) or in the abstract or elsewhere in the document (35%; $n = 36$). However, other terms implying rapid or abbreviated (e.g. targeted review, mini-systematic review) were also identified in a portion of the RRs (18%; $n = 19$). For some RRs (13%; $n = 13$), there was no indication of the term 'rapid' in the labelling as non-descript terms were used (e.g. evidence summary, evidence note) yet the methods reflected a RR approach. Further, for a majority of RRs (71%; $n = 73$) there was consistent labelling used within reports.

Exploratory analysis of JP versus NJP rapid reviews

This analysis revealed that, for certain items, there were differences noted between JP and NJP RRs (Table 3). For example, although a similar number of RRs incorporated

the tacit knowledge of policy-makers and stakeholders in the process across both groups (Item F), a greater number of JP RRs collected this knowledge in a systematic and transparent way (Item G) (JP 73% vs. NJP 28%; OR 6.67, 95% confidence interval (CI) 1.42–33.76). In addition, we also observed a higher percentage of JP RRs meeting additional criteria as compared to the NJP RRs, including using an IMRaD format (JP 92% vs. NJP 8%; OR 125.49, 95% CI 28.88–586.53); providing a description of the methods used to conduct the reviews (Item S) (JP 98% vs. NJP 84%; OR 9.32, 95% CI 1.31–211.38); stating the limitations of the RR approach or process (Item U) (JP 46% vs. NJP 10%; OR 7.72, 95% CI 2.62–23.47); and declaring the review as 'rapid' in the title (Item Z) (JP 56% vs. NJP 12%; OR 9.23 (95% CI 3.42–25.79).

With regards to the NJP RRs, certain criteria were found to be proportionately higher in comparison to JP RRs (Table 3). This included a higher percentage of RRs commissioned or conducted for decision-making purposes (Item A) (JP 65% vs. NJP 88%; OR 0.26, 95% CI 0.09–0.74) and RRs conducted through a rapid response service (Item B) (JP 2% vs. NJP 39%; OR 0.03, 95% CI 0.00–0.20). Further, the NJP RRs were more likely to have addressed cost implications (Item D) (JP 25% vs. NJP 45%; OR 0.41, 95% CI 0.17–0.98) and explicitly targeted policy-makers and key stakeholders (Item H) (JP 52% vs. NJP 80%; OR 0.27, 95% CI 0.11–0.67). In addition, a higher proportion of NJP RRs were organised to highlight decision-relevant information (Item L) (JP 12% vs. NJP 41%; OR 0.19, 95% CI 0.07–0.53) and used a graded entry format (JP 0% vs. NJP 47%; OR 0.00, 95% CI 0.00–0.10), graded entry plus IMRaD format (JP 4% vs. NJP 22%; OR 0.15, 95% CI 0.02–0.68), or were integrated into a multi-component report (Item N) (JP 4% vs. NJP 24%; OR 0.13, 95% CI 0.02–0.59). Further, a greater number of NJP RRs made reference to local applicability (Item W) (JP 37% vs. NJP 71%; OR 0.24, 95% CI 0.10–0.56) and presented key messages or summary points for the end-users (Item Y) (JP 15% vs. NJP 35%; OR 0.34, 95% CI 0.13–0.88). In addition, RRs that were NJP had significantly higher word counts for both the main body of the report and when assessing the entire document. Therefore, it follows that reading time was also significantly longer for these RRs (i.e. on average 18 minutes longer to read, JP 33 minutes vs. NJP 51 minutes) (Item M – Main body of the report). In terms of labelling (Item Z), NJP RRs were more likely to use non-descript labels (JP 4% vs. NJP 22%) or alternate terms to 'rapid' more often to indicate timely or abbreviated methods (JP 8% vs. NJP 29%).

Discussion

Evaluating the extent to which RRs do in fact help bridge the gap between evidence research and policy is important. Applying the modified BRIDGE criteria to our sample, we were able to do an initial assessment of RRs as an information-packaging mechanism intended to gather relevant evidence in one place, to provide contextualised information for a current region or jurisdiction, and to make health information easier to understand and use. Overall, conformity with the BRIDGE criteria was modest. Further, findings suggest that many of the RRs identified had several useful features when examined against the criteria but also highlight areas for potential improvement (Box 1).

Across criteria, the majority of RRs were judged to have been commissioned or undertaken specifically for decision-making purposes and were therefore deemed to be topical or focused on issues of relevance to policy-makers and key stakeholders. However, as a collective, it

Box 1 Potential areas for improvements to better meet the information needs for policy-makers and other stakeholders

- Use an explicit process (i.e. a rapid response service and/or priority-setting exercise) to determine relevant and priority topics from the perspective of the policy-maker or other stakeholders
- Consider information on cost implications and implementation considerations as well as options for addressing the underlying problem or objectives of the stated issue being reviewed
- Include the tacit knowledge of policy-makers and other stakeholders in the rapid review (RR) process
- Provide as assessment of methodological quality/risk of bias of the included studies to aid in the interpretation of findings and confidence in the results of the RR
- Address equity considerations
- Address local applicability by placing evidence in context
- Involve policy-makers and other stakeholders in review of draft reports or manuscripts to improve relevance and clarity
- Consider ways to involve patients as relevant knowledge users of RRs
- Organise RRs to highlight decision-relevant information (e.g. benefits and harms, costs of policy or programme options)
- Design RR reports so that information is easy to absorb (i.e. use a graded entry report format)
- Prepare RRs that are succinct and are clearly written in plain language so they are easily read and understood
- Contextualise the RR through online commentaries/briefings provided by policy-makers or stakeholders
- Consider various communication channels to disseminate findings to key audiences
- Provide clear consistent labelling of RR products

did not appear to be common practice to use an explicit process of determining topic relevancy (i.e. using a rapid response service or priority-setting exercise to determine the topic), although a closer look showed that NJP RRs were more apt to have come through a response service as compared to JP RRs. Rapid response-type services run by experienced reviewers, through the totality of the intake process, should include discussions between the requestor and the review team, and lead to identification and refinement of answerable questions, and understanding of priority and feasibility to best meet information needs. Further, specific priority-setting exercises should be considered for those stakeholder groups that have competing topics in need of review. The practicalities of producing timely evidence should be aligned with the need for a timely decision and/or rapid implementation and be included as part of priority-setting plans.

As outlined in the criteria, information-packaging mechanisms should address the many features of the issue being covered. Describing the underlying problem or objectives of each review and including information on related political or health system contexts was well covered by this sample. However, cost implications and implementation considerations were addressed less often and none of the RRs referred to options for addressing the underlying problem or other ways to achieve the objectives of the stated issue. RR producers, through dialogue with requestors or commissioners of RRs, at the outset should ensure this information is solicited and incorporated into the report as part of contextual information provided in the background and integrated into the rationale presented for doing the RR. Recently, the SelecTing Approaches for Rapid Reviews (STARR) tool was developed to aid review authors in planning approaches when conducting RRs [46]. Importantly, it emphasises a shared understanding between RR teams and commissioners and clear communication to ensure a common awareness as to the purpose and context of the RR, questions to be answered, and how the review will be conducted and used.

Although a large portion of the identified RRs targeted healthcare policy-makers or specific stakeholders, only one-third formally incorporated the tacit knowledge of these end-users into the RR process. Of those that did, few collected and reported such knowledge in a systematic and transparent manner. In addition, policy-makers or key stakeholders were involved in reviewing less than one-third of the RR draft reports or manuscripts. Going forward, those producing RRs for decision-making purposes should give consideration as to how best to elicit tacit as well as explicit knowledge using open communication and conversation directly with stakeholders as engagement serves to enhance the relevance and applicability of the reviews in the decision-making process [47, 48]. Based on existing guidance, the level of engagement should be meaningful, yet designed in accordance with available resources with partnerships established early in RR the process [49].

Patients should also be recognised as relevant knowledge users and benefactors of research evidence stemming from RRs. Therefore, we modified the BRIDGE criteria to capture patient engagement, which findings indicate is minimal across the RRs. Although not a new concept, patient-oriented research is often overlooked in large part because researchers lack guidance and promising practices on how to effectively engage patients and their families in designing and conducting research [50]. To date, patient/partner involvement in knowledge synthesis has been limited despite the demonstrated success of how patients can play a role in the production of SRs [51]. By extension, we need to find innovative ways to feasibly involve patients in the planning, conduct and knowledge translation of RRs.

When we examined how RRs are packaged, roughly one-quarter of our sample were judged as organised in some manner to highlight decision-relevant information, including, for example, benefits and harms, costs of policy or programme options. Most often, this information was not easily identifiable and required searching through various sections of text to locate. Key messages or summary points were also provided in only one-quarter of our sample. Further, only 23% of our sample was prepared in a format that makes the information easy to absorb (i.e. graded entry), while 50% were prepared using the standard publishing format used in academic journal articles (i.e. IMRaD) [41]. Although several studies indicate that policy-makers are more partial to the graded entry format [42, 52, 53], a recent study showed that, while policy-makers favoured an alternative order to IMRaD, healthcare managers preferred a more conventional ordering of information [54]. Therefore, further research is needed to determine which report structures are perceived as most useful and for which end-users and, importantly, which formats result in better comprehension and uptake of RR findings. At the moment, it is not known how formats and features, subject matter of the reviews, and individual factors intersect to impact the use of RRs.

Cursory assessment of readability suggests that, as a collective, the packaging of RRs for stakeholders could also be improved if documents were more succinct (i.e. took less time to read) and were clearly written in plain language so that end-users are able to make the most sense of the evidence they examine [27, 55, 56]. The written content of the RRs (i.e. requiring approximately 13–14 years of formal schooling to comprehend the text) is quite complex and equates to a university reading level [38]. Although there are no reading level standards

specific for healthcare professionals, including policy-makers, in order to reach people with low levels of literacy, research suggests that written health materials should be aimed at Grade 8 or below in the United States and Grade level 12 in the United Kingdom [57]. The lesson from this study is that RR producers should aim to reduce writing complexity as much as possible without being overly simplistic so readers will comprehend and retain ideas more reliably. We caution that a more comprehensive evaluation of the text of RRs is needed and should involve other readability measures and assess additional factors such as reading time, amount recalled and overall comprehension.

In terms of better supporting the use of RRs, producers and commissioners should consider mechanisms by which concise online commentaries or briefings could be provided by the policy or stakeholder leaders that the RRs were intended to target (e.g. AHRQ Views). In addition, efforts to disseminate findings to key audiences using various communication channels, for example, email, listservs, websites and blog posts, should be considered. Social media platforms also offer the potential to promote RR evidence.

As for additional features and content, we found that 44% of our sample did not include quality assessment or risk of bias of the included studies, which is less than previously reported [7]. Part of clearly communicating research findings to end-users is providing an accurate overall assessment of research underpinning the topic or intervention being reviewed. This means that each included study in a RR, to the extent possible, should be critically appraised and include an assessment of key sources of bias. Providing limitations of the evidence (e.g. risk of bias, publication bias) at the study level should be described in order to help interpret overall confidence in the results, as is done when conducting SRs.

RR authors should also be encouraged to highlight potential sources of bias introduced into the RR process itself, depending on the abbreviated methods used as well as any other methodological concerns. However, less than half of the RRs in our sample outlined such limitations. Although there is no instrument specific to RRs to assess the quality of conduct or bias, with some adjustments, AMSTAR-2 [58] and ROBIS [59] could both be applied to assess the methodological restrictions compared to a SR, risk of bias and validity of the results. In addition, a reporting guideline extension for RRs, currently under development [60], will be a useful tool for researchers to improve accuracy, completeness and transparency of reporting.

The exploratory analysis showed that several differences between JP and NJP RRs are likely due to the nature of academic journal publishing that stipulates the format, type and length of the content presented in articles. For example, JP RRs were shorter in length, more often described review methods and acknowledged the limitations of the process. Conversely, NJP RRs are produced by organisations, with varying mandates, that can freely design and tailor RR products for various knowledge-user audiences. Paradoxically, this autonomy may not always facilitate better use of RRs for end-users, for example, if they are lengthier to read. However, more often, NJP RRs were organised to highlight key messages and decision-relevant information using non-traditional report formats to convey findings. Ideally, the best features from each publication type should be combined to inform best practices and future recommendations for how RRs are packaged. The needs and preferences of different end-users (e.g. policy-makers, clinicians, health systems managers, researchers) should also be evaluated and considered in further shaping RRs as an information product. Currently, we have little knowledge about the specific target audiences for the JP and NJP RRs and whether they vary across publication types and, if so, to what extent. It, too, requires further research and exploration.

Limitations

For most items, we judged 'yes' or 'no' as to whether an item was met but did not assess how well items were reported in the RRs as this was beyond the scope of our study. Although the original authors of the BRIDGE criteria openly encouraged its further adaptation, we may not have interpreted the previous criteria in the same manner as was originally intended, as modifications made to the criteria were meant to align with the context of producing RRs to inform decision-making in healthcare. Nonetheless, future studies involving RRs should explore both the face and content validity of these items with a variety of stakeholder groups. An additional limitation of our study was that we restricted our sample to only those RRs produced in 2016 in English or French due to resource limitations. It is important to acknowledge that there are many productive RR initiatives from various regions around the globe that produce RRs in other languages (e.g. Portuguese, Spanish, German), which are not reflected in our findings. Therefore, we recognise our sample is not representative of the entire population of RRs. However, we did aim to increase the generalisability of our results by including a heterogeneous group of RRs produced in various countries.

We also recognise that some of the BRIDGE criteria may not apply to all RRs depending on their purpose or intended use, the topic under review, and the degree of tailoring involved. For example, some RRs may present and aid interpretation of the evidence only rather than provide formal recommendations as the criteria suggest. Another example is that not all RRs are publicly available due to proprietary reasons or require a fee or

subscription to access them from the producer. Therefore, support of their use publicly through online commentaries, website posting, emails or listservs would not be allowed and, consequently, related BRIDGE criteria not applicable. Last, we acknowledge the potential issue of multiple testing related to exploratory analyses and often unknown inflation of the alpha-level with selective reporting of tests and their impact on *P* values. However, as laid out in our protocol, our exploratory analysis was planned and carried out as documented.

Conclusions

Findings suggest that, of the 103 RRs assessed, adherence to the modified BRIDGE criteria was modest. Many RRs had several useful features when examined against these criteria for communicating clearly and document features recognised to be valued by end-users of research. However, there were several RRs for which elements of the modified BRIDGE criteria were not well demonstrated or lacking and that represent areas for potential improvement. Our research findings fill an information gap related to the suitability and usability of RRs as a knowledge translation product. Moreover, for producers of future RRs, including those produced by new or existing rapid response services around the world, these findings highlight potential implications regarding a range of operational, content and design elements for consideration when undertaking RRs. Importantly, the packaging of information in RRs is relevant and, ideally, should best meet the information needs of policymakers and key stakeholders to optimise the uptake of evidence from RRs in healthcare decision-making.

Contributions to the literature

This study is novel in that it is the first to assess RRs as an information product; namely, how well they are parcelled for use in decision-making for policy-makers and other stakeholders. This study is also intended to help guide researchers who want to communicate their RR findings more effectively so that decision-makers can make use of the best available health research evidence. Importantly, this work is intended to promote innovation in how future RRs are reported and packaged and encourages the importance of key healthcare stakeholders being involved in their future development.

Supplementary information

Supplementary information accompanies this paper at https://doi.org/10.1186/s12961-020-00624-7.

Additional file 1. STROBE Statement — Checklist of items that should be included in reports of cross-sectional studies.

Additional file 2. Journal characteristics of the journal-published rapid reviews (2016).

Abbreviations

CI: confidence interval; IMRaD: introduction, methods, results, and discussion; JP: journal published; NJP: non-journal published; OR: odds ratio; RR: rapid review; SMOG: Simple Measure of Gobbledygook; SR: systematic review

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Authors' contributions

CG led the study conception and design, analysed and interpreted data, drafted the manuscript, and reviewed and revised the final manuscript for important intellectual content and its final approval. DM, CH, MH, CB, BNS, AS and ZM contributed to study design conception, refinement and revisions to the draft manuscript. The following individuals contributed to study selection (AS, CB, CG, MH, ZM) and data extraction (CG, CB, CH, ZM). WC conducted the statistical analyses and was involved in reviewing the draft manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The dataset(s) supporting the conclusions of this article is (are) included within the article (and its additional file(s)).

Ethics approval and consent to participate

Not required.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests. This study represents work conducted in partial fulfilment of a doctoral thesis (CG).

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Developing WHO rapid advice guidelines in the setting of a public health emergency

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Abstract

Objectives: We describe newly established guidance for guideline developers at the World Health Organization (WHO) on the process and procedures for developing a rapid advice guideline in the context of a public health emergency (e.g., the 2014 Ebola epidemic).

Study Design and Setting: We based our approach on established rapid review methods, which were incorporated into existing WHO guideline development processes. Guidance was further informed by in-depth discussions of issues related to rapid guideline development with WHO staff ($n = 6$), who oversee the Organization's response to emergencies.

Results: We discuss criteria for considering if a rapid advice guideline is appropriate and feasible and outline the roles of various contributors across the phases of development. Further, we describe the methods and steps involved in performing rapid reviews, which are more fluid and iterative than for a standard guideline process. In general, rapid advice guidelines involve a shorter timeline, narrower scope, and the use of abbreviated methods for the evidence review.

Conclusion: Important differences exist between developing a standard guideline and a rapid advice guideline. However, the core principles for WHO guidelines apply to rapid advice guidelines including minimizing bias, applying transparent processes and the use of explicit methods.

Keywords: Rapid reviews; Methodology; Guideline; Policy making; Public health; Recommendations; Accelerated development

1. Introduction

The World Health Organization (WHO) produces global guidelines for the 193 Member States of the United Nations. WHO defines guidelines broadly, as ''any document developed by the WHO containing recommendations for clinical practice or public health. A recommendation tells the intended end user of the guideline what he or she can or should do in specific situations to achieve the best health outcomes possible individually or collectively'' [1]. Each guideline developed by WHO (or any organization) needs to best fit the intended purpose and meet the end users' needs, and this determines the methods, resources, and timeline for development, dissemination, and implementation.

The WHO Handbook for Guideline Development, 2nd Edition (2014) (''WHO Handbook''), outlines four main types of guidelines: standard guidelines, consolidated guidelines, interim guidelines, and guidelines developed in response to a public health emergency or urgent need such as a natural disaster, warfare, biologic or chemical exposures, or an unforeseen disease epidemic (Box 1) [1]. In the context of such emergencies, WHO must at times provide global leadership within hours to days. Such

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What is new?

Key findings

- Rapid advice guideline processes used in other contexts have been tailored to WHOs mandate to produce high-quality guidelines in the context of public health emergencies.
- The principles underlying rapid advice guidelines are the same as for standard guidelines.
- All steps should be tailored to the situation, and some can be appropriately abbreviated from standard processes.

What this adds to what was known?

- This paper describes the considerations that are relevant to deciding if a rapid advice guideline should be developed in the context of a public health emergency and outlines the processes and methods for developing such guidelines.
- To date, WHO has published two rapid advice guidelines based on this approach, both developed in 2014 in the context of the filovirus (Ebola) outbreak.
- It is possible to apply rapid review and rapid advice guidelines methods to complex public health interventions in emergency situations where the end users may be very diverse.

What is the implication and what should change now?

- WHO has a transparent process for producing evidence-based recommendations in the context of public health emergencies.
- Further research is needed comparing rapid advice guidelines to standard guidelines with regard to utility, implementation, and health impact.

guidelines are termed as ''emergency (rapid response) guidelines'' and processes and methods for producing such guidelines are currently under development at WHO [1]. However, if a public health emergency continues and as response efforts evolve into recovery and rebuilding, guidelines are needed that are developed using more rigorous methods and generally with a somewhat longer timeline: perhaps 1 to 3 months. These are termed ''rapid advice guidelines'' and are the focus of this paper.

Rapid advice guidelines must meet minimum standards, the recommendations must be based on evidence and they are subject to an internal quality control and assurance process. The process and methods used for their development may be modified from those of standard guidelines, to meet the accelerated timeline necessitated by Member States' needs in the context of the emergency [1].

The objective of this paper is to describe the criteria that WHO staff use to assess the need for developing a rapid advice guideline and to outline the steps and methods for developing such a guideline in the context of a public health emergency. This article is a synopsis of more detailed methods for developing rapid advice guidelines, which can be found in the WHO Handbook on Guideline Development (2nd Edition, 2014) [1] (see Chapter 11).

Our purpose is to advance transparency of WHOs guideline development process and to provide external organizations with a description of an approach that might be useful and applicable to their contexts. To date, WHO has published two rapid advice guidelines based on this approach, both developed in 2014 in the context of the filovirus (Ebola) outbreak: one examining hand hygiene and the use of chlorine; [2] the other on the effectiveness of various components of personal protective equipment for healthcare workers [3]. Although we began development of methods specific to WHO rapid advice guidelines before the Ebola crisis emerged, it is a compelling example of how we were able to apply these newly developed methods and finalize them based on lessons learned in the context of Ebola (see Box 2).

WHO has issued guidelines labeled as ''rapid'' in the past. A 2007 publication describes the production of a guideline where most all of the standard steps and methods were executed within an 8- to 10-week time frame [5]. Since that publication, the term ''rapid'' has been used in the title of several WHO guidelines. However, none of these guidelines was, in fact, produced rapidly, and none reported using unique or modified approaches: rather they described standard approaches in the context of efforts to produce the guideline rapidly. The current work builds on that prior work, focusing on when standard guideline methods can and should be abbreviated to meet the needs of Member States in a timely manner.

2. Methods

This guidance on rapid advice guideline development is based upon an existing rapid review approach, which was modified to meet WHOs needs and to allow integration with the organization's existing approach to developing standard guidelines. The rapid review approach [6] and typology [7] were developed by the Knowledge Synthesis Group at the Ottawa Hospital Research Institute. This approach consists of an eight-step process based upon widely accepted systematic review methods, particularly those of the Cochrane Collaboration [6]. This approach has been used to develop rapid reviews for a variety of types of decision makers and has undergone modifications as needed to optimize the approach.

Box 1 Types of WHO guidelines [1]

There are four main types of guidelines produced by WHO that comprise a broad spectrum of products that vary mainly in terms of the following features:

- Purpose;
- Scope;
- The point in time at which the guideline is being developed relative to the life span of an intervention;
- The organizations or entities developing the guideline;
- The presence in the guideline of new vs. previously published recommendations; and
- The timeline.

1. Standard guidelines
   - Purpose—to provide recommendations on a specific topic or condition;
   - Scope—focused or comprehensive;
   - Developer—WHO technical staff;
   - New or existing recommendations—usually new; may contain existing recommendations if they have been evaluated and updated as appropriate;
   - Development period—6 months to 2 years.
2. Consolidated guidelines
   - Purpose—to aggregate all the existing guidance on a disease or condition;
   - Scope—comprehensive;
   - Developer—WHO technical staff;
   - New or existing recommendations—existing recommendations that have been evaluated and found to be up to date; may contain some new recommendations;
   - Development period—1 to 2 years.
3. Interim guidelines
   - Purpose—to provide guidance when new interventions, exposures, or diseases arise or when new evidence becomes available or data are likely to be incomplete;
   - Scope—focused;
   - Developer—WHO technical staff;
   - New or existing recommendations—new;
   - Development period—6 to 9 months.
4. Guidelines in response to an emergency or urgent need

   There are two basic types:
   Emergency (rapid response) guidelines
   - Purpose—produced when public health emergencies may necessitate a response from WHO within hours to days;
   - Further guidance on this type of guideline is under development at WHO.

   Rapid advice guidelines
   - Purpose—to meet an emergent or urgent public health need when the short timeline mandates a modified process;
   - Scope—focused;
   - Developer—WHO technical staff;
   - New or existing recommendations—usually new; may contain existing recommendations if they have been evaluated and updated as appropriate;
   - Development period—usually 1 to 3 months.

Abbreviation: WHO, World Health Organization.

In addition, this guidance on how to develop rapid advice guidelines was informed by discussions with WHO staff involved in emergency response ($n = 6$), including staff from the Global Influenza Programme, Department of Food Safety and Zoonoses, Global TB programme, HIV Department, Emergency Risk Management Department, and the WHO Headquarters Library. The primary purpose of these informal dialogues was to become more familiar with the current WHO guideline process and to understand staff roles, experiences, and needs with regard to development of rapid advice guidelines. This was not considered research as there was no formal structure to the discussions and no data collection, analysis, or reporting. These discussions therefore did not require research ethics approval.

3. Assessing the need for a rapid advice guideline

The first step when planning the development of any guideline, including a rapid advice guideline, is to search for relevant, high-quality existing guidelines. If such a guideline already exists, it may be adopted or adapted by WHO staff at headquarters or in regional or country-level offices or at the subnational and facility level. However, if no relevant guidelines are identified, there are a number of important considerations when deciding to develop a rapid advice guideline vs. a standard guideline or to defer development of a guideline altogether.

3.1. What is the type of emergency and the risk to public health?

The first step is to examine the public health event that is driving the request for a rapid advice guideline. Emergencies may be classified as natural, technological, or conflict related and may be of sudden onset (e.g., earthquakes, tsunamis, chemical crises) or more gradual onset (e.g.,

Box 2 An example of a rapid advice guideline developed

Personal protective equipment in the context of filovirus disease outbreak response: Rapid advice guideline (2014). World Health Organization.

Context

- A public health emergency of international concern.

Issue

- Healthcare workers caring for individuals with Ebola were at an increased risk of contracting Ebola virus disease during the outbreak in West Africa starting in 2013.
- There was uncertainty in the field as to the most effective types of personal protective equipment (PPE).

Development of a WHO rapid advice guideline

- A rapid review (RR) was conducted over 7 weeks to inform the recommendations [4].
- Initially, the RR focused on the comparative effectiveness and disadvantages of PPE (gloves, gowns, and face protection) for healthcare workers working with Ebola patients. However, only noncomparative studies were identified.
- Concurrent with the RR, a survey of values and preferences was administered to expatriated healthcare workers over a 3-week period, which helped to inform recommendations.
- The noncomparative data from the RR, the survey data, and information from experts in virology and bloodborne pathogens and materials science formed the basis for the recommendations which were formulated at an expert meeting.

Significance

- Produced over a 12-week time frame [3], this marked the first rapid advice guideline produced by WHO following the approaches outlined herein.

Abbreviation: WHO, World Health Organization.

deteriorating situations in armed conflict, progressive disease outbreaks, drought, or food insecurities). All types of emergencies can evolve into protracted situations.

WHO and the Member States of the United Nations use the Rapid risk assessment of acute public health events manual to assess "any outbreak or other rapidly evolving situation that may have negative consequences for human health and requires immediate assessment and action" [8]. Risk is characterized by level and is based on broad descriptive definitions of likelihood and consequences, represented in the form of risk matrices. The WHO Emergency Response Framework describes WHOs roles and responsibilities between the initial alert of an event and its subsequent classification [9]. WHO categorizes emergencies from grade 1 (those with minimal expected public health consequences) to grade 3 (those involving events in one or more countries and having significant public health consequences that call for a substantial regional and/or international response).

3.2. Is the event novel?

WHO staff may consider producing a rapid advice guideline in the face of either a new situation (e.g., a new strain of influenza, the Middle East respiratory syndrome coronavirus, or an earthquake) or an event encountered previously but causing problems in a different context (e.g., a change in disease pattern such as the Ebola virus disease outbreak in West Africa in 2013 or a prolonged armed conflict compounded by a disease outbreak). If the event is not novel, high-quality relevant guidelines may already exist and a new guideline may not be needed.

3.3. Does uncertainty need to be urgently addressed?

Guidelines are indicated when there is uncertainty about what to do in a specific situation. WHO staff may be uncertain about what advice to provide or there may be uncertainty in the field, with different stakeholders having different viewpoints and approaches. In determining if a rapid advice guideline is appropriate, the key question is how quickly the uncertainty needs to be dealt with.

3.4. What is the anticipated time frame for the event?

Rapid advice guidelines can generally be developed within 1 to 3 months. If an event is likely to persist beyond 6 months, a rapid advice guideline may not be optimal and a standard guideline may be the best

approach. On the other hand, if the emergency is likely to be transient, then existing guidelines should be reviewed for applicability, with the production of emergency (rapid response) guidelines as appropriate. It is important to weigh the impact of developing recommendations using standard processes and timelines vs. producing a guideline that may be prone to serious limitations under an accelerated timeline.

3.5. Will the rapid advice guideline be rapidly implemented?

Rapid advice guidelines should only be developed if a mechanism is either already in place or likely will be in place for disseminating and implementing the recommendations in the guideline in the context of the emergency. Various factors need to be carefully considered: the existence of functioning health systems; adequate health workforce; necessary infrastructure; the acceptability of the proposed intervention; the training requirements; and resource availability.

4. Steps to developing a rapid advice guideline

The basic steps for developing a rapid advice guideline are depicted in Tables 1 and 2 and are generally the same as those that apply to standard guidelines. There are, however, some differences and additional considerations when developing a rapid advice guideline.

4.1. Consult the WHO Guidelines Review Committee Secretariat

Once the relevant WHO technical unit determines that a guideline is needed, the unit contacts the Guidelines Review Committee Secretariat whose remit is to support the WHO Guidelines Review Committee, which is responsible for setting the standards, developing the methods, and assuring the quality of all guidelines issued by WHO [1]. The Secretariat will assist the technical unit in deciding if the topic is suitable for a rapid advice or other type of guideline and will provide technical support if the unit moves ahead with guideline development.

4.2. Formulate the various groups involved in developing a rapid advice guideline

When developing a rapid advice guideline, four key groups need to be established quickly. First is the internal WHO Steering Group whose primary responsibility is to oversee the rapid advice guideline development process. Second, the review team will produce a rapid, yet comprehensive and objective synthesis of the evidence to inform each recommendation. A methodologist with expertise in guideline development processes and methods is also identified early in the development process. Third, the external review group contributes diverse and real-world perspectives at the peer-review stage. Fourth, the Steering Group assembles the Guideline Development Group, which provides input on the scope and content of the rapid advice guideline, and is primarily responsible for formulating the recommendations. The Guideline Development Group must include a broad range of relevant clinical and public health technical and programmatic expertise, as well as representation from key stakeholders such as persons who will be affected by the recommendations in the guideline. The Guideline Development Group must have geographic representation from all WHO regions and must be gender balanced to the extent possible (Fig. 1).

It is critical to include individuals with expertise in ethical, social, and legal dilemmas on the Guideline Development Group, as well as expertise in issues related to equity, gender, and human rights. Although these issues may be considered by some to be peripheral to the urgent health problem being addressed (e.g., an outbreak of a disease), critical human rights issues often emerge in the context of a public health emergency, and they must be addressed in the initial stages of a response.

4.3. Scope the rapid advice guideline and define the key questions

Once the need for a rapid advice guideline has been established, the WHO Steering Group continues to redefine the scope of the guideline and develop key questions in population, interventions, comparators, outcomes (PICO) format. A rapid advice guideline will most likely provide recommendations on the benefits and harms of interventions. However, recommendations on diagnostic tests, prognosis, and risk factors may also be needed.

With the assistance of an experienced information specialist, a scoping exercise should be conducted quickly to provide a general sense of the depth of the relevant literature. This is not a systematic search of all potential sources, but rather a focused search for the best available, relevant literature, including high-quality systematic reviews and key primary studies. The resources most applicable to the topic should be examined briefly (e.g., MEDLINE, The Cochrane Library, Scopus, etc.) in addition to looking for any information or guidance published by WHO in the early stages of the public health emergency. This scoping exercise, including synthesis of the evidence retrieved, should take no longer than 1 or 2 days, and a brief summary of the results should be prepared.

4.4. Prepare and maintain the planning proposal

A detailed planning proposal akin to a review protocol should be prepared for all guidelines, including rapid advice guidelines. At WHO, all planning proposals are reviewed by the Guidelines Review Committee, and in the context of a rapid advice guideline, the primary issue for the Guidelines Review Committee is to determine if there is adequate justification for applying an accelerated and abbreviated process. The planning proposal for rapid advice

Table 1. Steps in the development of rapid advice guidelines—phase 1 (planning)

Primary contributor	Step	Key points for rapid advice guidelines
Phase 1. Planning		
Member State, WHO country office, or public/private entity	Request(s) for guidance on a topic.	The request is in the context of a public health emergency.
WHO technical unit	Determine if a guideline is needed; review existing WHO and external guidelines.	The technical unit must determine if a rapid advice guideline is needed or if a standard or interim guideline would be more appropriate.
	Discuss the process with GRC Secretariat and with other WHO staff with experience developing guidelines.	The planned guideline is discussed with the Secretariat when it first becomes a possibility.
	Form the Steering Group.	All relevant departments at WHO headquarters and in the regional offices must be involved.
	Identify sufficient resources. Determine the timeline.	
Steering Group	Draft the scope of the guideline. Begin preparing the planning proposal.	The literature is scoped through a brief review. The guideline's scope must be narrow and feasible.
	Identify potential members of the GDG and the chair.	Issue invitations early; involve the GDG in determining the scope and key questions.
	Obtain DOIs and manage any COIs among potential GDG members.	The process for rapid advice guidelines and standard guidelines is identical.
Steering Group and the Guideline Development Group (GDG)	Formulate key questions in PICO format. Prioritize outcomes.	Key questions (in PICO format) include only those of the highest priority and must be focused and narrow. Background questions are not addressed in a rapid advice guideline.
WHO Steering Group	Finalize the guideline planning proposal.	The process is the same as for a standard guideline.
Guidelines Review Committee (GRC)	Review and approve the planning proposal.	The GRC uses an accelerated process for review and disposition.

Abbreviations: COI, conflict of interest; DOI, declaration of interest; PICO, population, intervention, comparator and outcome; WHO, World Health Organization.

guidelines has the same content, level of detail, and format as for standard guidelines, describing the planned processes and procedures, the results of the scoping review, the methods for the rapid review, and the approach for translating the evidence into recommendations.

The planning proposal serves as a point of reference for all contributors, and therefore, it must be detailed and kept up to date, even when operating under a compressed timeline. This is particularly important as contributors to the guideline may change as WHO staff members are deployed to the field during the guideline development process. As described below, the rapid review process is often more fluid and iterative than that of a standard systematic review, and thus, the planning proposal is a living document, amended as needed, including the rationale for any changes. Complete and accurate documentation ensures transparency and greatly facilitates the drafting of the final guideline document.

5. Performing rapid reviews and developing summaries of the evidence

5.1. What are rapid reviews?

When rapid advice guidelines are deemed necessary, conducting a systematic review de novo may not be feasible. Rapid reviews have emerged as a streamlined approach to identifying and synthesizing evidence, typically for the purpose of assisting expeditious decision making by state and local governments or by healthcare providers. For the purposes of this guidance, we define "rapid review" as a type of evidence review that is produced using accelerated and/or modified systematic review methods [6].

5.2. How do rapid reviews compare with systematic reviews?

The core principles of evidence searching and retrieval for standard systematic reviews apply to rapid reviews, including thoughtful scoping and formulation of the review questions, transparency, reproducible methods, careful assessment of the quality of the information incorporated into the review, efforts to minimize bias at every stage, and the clear presentation of information focused on the intended users' needs. However, there are important differences: the rapid review may have a more limited scope and fewer outcomes of interest, more restricted search criteria, looks to existing high-quality systematic reviews as the first line of evidence, involves a more targeted and iterative procedure for screening

Table 2. Steps in the development of rapid advice guidelines—phase 2 (development) and phase 3 (publishing and updating)

Phase 2. Development		
Systematic review (SR) team	Perform SRs of the evidence for each key question with the potential of abbreviating the SR process (i.e., perform an RR).	The contractor needs to be identified from the outset and involved in the scoping and development of key questions: they can advise on what is feasible in the given time frame.
	Evaluate evidence quality for each important outcome, using GRADE as appropriate.	The process is the same as for a standard guideline.
Steering Group	Convene a meeting of the GDG.	Meeting place and participants need to be identified at the beginning of the development process. The meeting has a similar format and agenda as for the development of a standard guideline.
Guideline Development Group (GDG)	Formulate recommendations using the GRADE framework.	The general methods are the same as for a standard guideline. The evidence may be sparse, so other factors that inform the recommendations must be transparent and based on indirect evidence when possible, and on equity, human rights and gender considerations.
Steering Group	Draft the guideline document.	The document should be concise and tailored to the end user.
External review group	Conduct targeted external peer review.	External peer review is recommended for rapid advice guidelines but may not be feasible in some situations.
Phase 3. Publishing and updating		
Steering Group and editors	Finalize the guideline document. Perform copy editing and technical editing. Submit the final guideline to the GRC for review and approval.	This step will have to be performed in an accelerated manner. Editorial staff needs to be identified early in the process.
WHO Guidelines Review Committee (GRC)	Review and approve the final guideline.	The GRC uses an accelerated process for review and disposition.
Steering Group and editors	Finalize the layout. Proofread.	This step needs to be accelerated and perhaps abbreviated from the standard processes.
	Publish (online and in print, as appropriate).	
WHO technical unit and program manager	Disseminate, adapt, implement, evaluate.	
WHO technical unit	Update.	From the outset, the technical unit must consider the likely shelf life of the rapid advice guideline and whether a standard guideline will follow and when.

Abbreviations: GRADE, Grading of Recommendations Assessment, Development and Evaluation; RR, rapid review.

the literature and for data analysis and synthesis, places less emphasis on meta-analyses, and involves a concise and abbreviated report. In addition, in a rapid review, the search process is more iterative and hierarchical, depending on the findings at each step: the types of publication and study designs included and the bibliographic databases searched may change as the evidence is explored. Other efficiencies may be achieved by, for example, adding more resources so that reviewers can work in parallel.

Types of reviews that underpin rapid advice guidelines may be categorized into two basic types: a standard systematic review performed rapidly or a rapid review involving a variety of abbreviated methods, which may include only existing systematic reviews; primary studies and existing systematic reviews; or only primary studies (Table 3) [7].

5.3. Steps in the rapid review process

5.3.1. Select the types of evidence to be collected and identify the appropriate sources

Depending on the nature of the question being asked, the purpose of the rapid review, and the magnitude of the literature on the topic, various types of evidence may be targeted. In most cases, the emphasis will be placed on locating and summarizing evidence from relevant and high-quality "off-the-shelf" systematic reviews or guidelines. In the absence of such systematic reviews, high-quality and/or recent primary studies may be included. Landmark papers may be included for reference, and high-quality quasiexperimental or observational studies may be considered, depending on the key question and the volume of the available evidence.

Usually, no more than two to three of the most relevant databases are searched (e.g., MEDLINE, The Cochrane Library, EMBASE, Scopus). However, depending on the review topic and access to research databases, additional databases including topic specific and regional databases may be examined (e.g., PsychINFO, CINAHL, ERIC, African Index Medicus, International Clinical Trial Registry Platform, ClinicalTrials.gov). A WHO information speciality should be involved in the selection of the priority information sources, as regional databases and local sources may be the richest source of relevant information.

5.3.2. Develop search strategies

In a standard systematic review, the aim is to maximize both recall, which is the ability to identify all relevant articles (sensitivity) and precision, which is the ability to

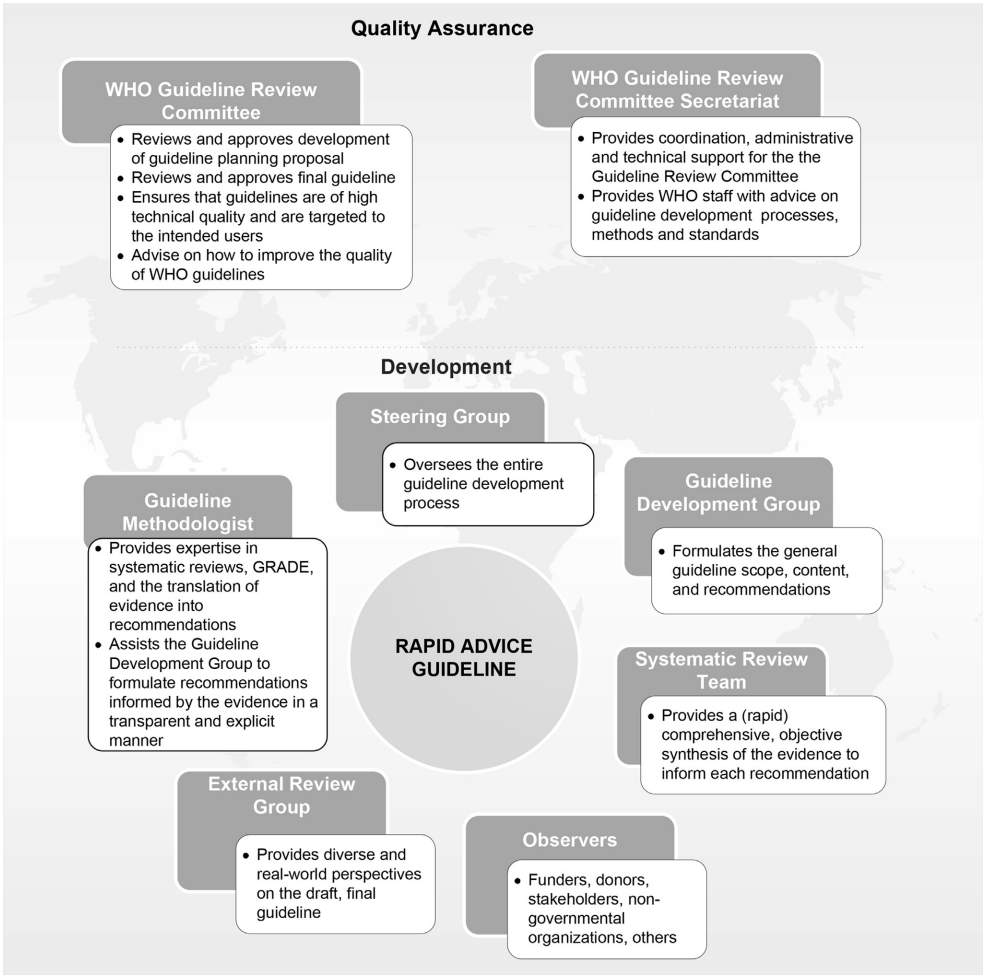

Fig. 1. Contributors to the development of rapid advice guidelines issued by WHO. GRADE, Grading of Recommendations, Assessment, Development and Evaluation; WHO, World Health Organization.

exclude nonrelevant articles (specificity). However, for a rapid review, the aim may be to maximize precision rather than recall. Several common eligibility restrictions should be considered to optimally balance recall and precision (Box 3) [1]. Potential restrictions should be discussed among WHO Steering Group members and with the review team information specialist.

Search strategies for a rapid review will generally have language restrictions because translation is time consuming. The languages of inclusion should be carefully selected based on the guideline topic. For example, a rapid review on personal protective equipment for health workers in Ebola treatment centers [4], engendered by the Ebola virus disease outbreak that became widespread across parts of West Africa in 2014, included only literature in English and French owing to the geographic distribution of the outbreak and the opinion of experts that most of the relevant literature was in those two languages. Citations in nonselected languages are generally included during the citation screening phase but may be excluded from further analyses if the full text is difficult to access or insufficient time or resources are available for translation.

Search terms should include both medical subject headings (MeSH) and text words. Validated search filters may

Table 3. Types of rapid reviews used to inform recommendations in rapid advice guidelines

Types of rapid reviews [7]	Traditional systematic review (conducted rapidly)	Rapid review of systematic reviews	Rapid review of systematic reviews plus primary studies	Rapid review of primary studies only
Time frame	Up to 16 weeks	Up to 12 weeks	Up to 12 weeks	Up to 12 weeks
Methods				
Question types	Clinical effectiveness, clinical efficacy; safety/harms; diagnostic or screening test accuracy; cost-effectiveness; health systems, education, public health, policy/programs, or prevention interventions			
Number of questions	Multiple (targeted and narrow in scope)	1 primary question (targeted)		
Literature search	No restrictions	Restrictions (e.g., date, study design, language, setting)		
Number of databases searched	No restrictions (comprehensive)	2–3 databases		
Use of systematic reviews	Systematic reviews and primary studies	Systematic reviews only	Systematic reviews plus primary studies	Primary studies only
Gray literature	Yes, as appropriate	Limited (e.g., key web sites)		
Screening	2 reviewers	2 reviewers: second reviewer may only review excluded studies at title/abstract phase of screening		
Types of study designs included	RCTs and observational studies as appropriate	Systematic reviews and guidelines only (highest quality)	Systematic reviews and guidelines plus RCTs or observational studies (highest quality)	RCTs or observational studies only (highest quality)
Data extraction	Complete verification	Selected verification		
Outcomes	Restricted to four critical outcomes or fewer	2–4 critical outcomes only: more if data are available		
Assessment of risk of bias at the individual study level	Yes (using validated instruments when available)			
Assessment of the quality of the body of evidence	GRADE for critical outcomes as appropriate	Reliance on GRADE as reported in the included systematic review(s); or perform de novo for each systematic review		GRADE for critical outcomes as appropriate

Abbreviations: GRADE, Grading of Recommendations Assessment, Development and Evaluation; RCTs, randomized controlled trials.
Types of rapid reviews and characteristics from Garritty (2013).

be useful (see Chapter 8, WHO Handbook [1]), such as those related to study type and design (e.g., randomized controlled trial, systematic review, or meta-analysis). The draft search strategy must be reviewed by at least one other member of the rapid review team, one or more content experts, and a WHO information specialist. A limited search for gray literature should be considered (e.g., relevant data may be quickly identified and retrieved from the web sites of relevant organizations).

The search approach and restrictions used, and their rationale and potential limitations should be reported in the planning proposal, the review report, and the guideline document. A list of potentially relevant citations identified during the search but excluded from the analysis due to language restrictions or other reasons should be included as an appendix in the rapid review report.

5.3.3. Consider other strategies for identifying relevant literature

In the context of a new situation or event, the best (and perhaps only) data might come from the analysis of emerging information in real time. In the Ebola virus disease outbreak in West Africa in 2014, essentially, no relevant data were obtained through a rapid review of the published literature comparing various types of personal protective equipment in the context of Ebola or related viruses [4]. Therefore, a survey of repatriated healthcare workers was rapidly implemented to gather information on experiences with various types of personal protective equipment [10]. If time permits, the reference lists of all included studies should be scanned for additional relevant studies to ensure that key publications have not been overlooked.

5.3.4. Screen and select studies

Standard systematic review methods apply to the process of screening the records retrieved via the searches. Records should be imported into reference management software to facilitate record management and citation screening.

Study selection involves a two-step process. First, either two people independently screen titles and abstracts of all potentially relevant records or one person reviews all titles and abstracts, whereas the second reviewer examines only the citations excluded by the first. Second, two reviewers examine the full-text publications to determine their eligibility. As for a standard systematic review, consensus on the included studies should be achieved, with involvement of a third reviewer if necessary.

To keep the scope of a rapid review within the bounds dictated by timelines and resources, initially, the evidence is often limited to that found in systematic reviews. A

Box 3 Common search restrictions for rapid reviews

Sources

- Usually, search no more than two or three key bibliographic databases.
- If time and resources permit, additional resources may be added.

Language

- Language restrictions are frequently applied, as translation is time consuming and resource intensive.
- Limitations by language of publication need to be assessed for each topic, with consideration given to the distribution of the disease or condition being addressed and the likely languages of the relevant publications.

Accessible studies

- Publication status is limited to full text only (abstracts are not usually included).
- To maximize efficiency, articles should be electronically available through e-journal subscriptions available to the rapid review team.
- Articles should be purchased directly from a journal only under special circumstances, namely when the paper is deemed essential and is not available through other means.

Gray literature

- The utility of the gray literature is assessed for each topic.
- Web sites of relevant organizations may be examined, depending on the subject under review.

Year (search dates)

- Publication dates are limited (e.g., only the most recent decade is searched).
- When applying a year limit, a rationale for the time frame must be provided.

Region

- Restrictions may be placed on the geographical locations of the included studies.
- A rationale should be provided to explain why citations from certain regions, rather than from the global literature, are targeted.

decision to include primary studies must be justified in the planning proposal and reflected in the timelines and budget. Further restrictions (e.g., by outcomes or study quality) may be considered to accommodate the inclusion of primary studies.

Records that are not available electronically are generally excluded because the timeline of a rapid advice guideline is not compatible with the delays involved in interlibrary loans. Even if the full text cannot be obtained or translated, the abstract may provide valuable information, particularly when evidence is sparse.

5.3.5. Extract data and synthesize evidence

Once the included studies are finalized for each critical outcome, outcome data can then be extracted, including key study demographics, effect estimates (e.g., odds ratios, mean differences, or summary effect [i.e., a meta-analysis]), and their corresponding confidence intervals. A standard extraction form should be developed and pilot tested to facilitate accurate data collection. Usually, one reviewer extracts data, and a second verifies all extracted data. If this is not feasible, a random sample of at least 10% of the included studies should be independently checked to provide some measure of quality assurance.

The rapid review team will finalize the data analysis plan in consultation with the WHO Steering Group. Quantitative syntheses of primary studies (i.e., meta-analyses) may not be feasible for rapid reviews unless time and resources permit; however, the results of previously published meta-analyses should be reported. Fig. 2 provides details of the various steps and decisions involved in selecting the type of evidence and the approach to data synthesis (see Chapter 11, WHO Handbook [1]).

5.3.6. Assess the quality of the body of evidence

The risk of bias should be assessed for each included study to facilitate appropriate interpretation of the review findings. For rapid reviews particularly, the assessment of the risk of bias may be used to select the studies included in the review, once initial criteria based on study design have been applied.

The quality of the body of evidence for each outcome that is critical for decision making should generally be assessed using the Grading of Recommendations Assessment,

Development and Evaluation (GRADE) framework [11]. The focus is on health outcomes and not on intermediate, surrogate, or other types of outcomes. However, exceptions may be made when data are sparse, and decisions may need to be based on indirect evidence, including intermediate outcomes.

Rapid reviews often necessitate the inclusion of existing systematic reviews over primary studies. However, when using an existing systematic review that did not use the GRADE framework to assess the quality of the body of evidence (or which does not supply all of the necessary information for this assessment), it may not be feasible to examine the individual studies included in the review to assess their risk of bias and to develop GRADE profiles de novo. In this case, ROBIS [12], a tool for assessing the risk of bias in systematic reviews (rather than in primary studies) and where appropriate the relevance of a review to the research question at hand, could be applied. Further, to determine a review's quality, A Measurement Tool to Assess systematic Reviews [13] could also be used. Although limited in the ability to assess quality in terms of certainty of the effect estimates, this will help to identify areas of potential concern to help judge overall risk of bias and the quality of conduct across included reviews. If only primary studies are identified, then it will be important to assess risk of bias at the individual study level (See Box 4) applying the GRADE framework.

5.3.7. Develop the rapid review report

The rapid review report should transparently and succinctly summarize the methods used and the results of the review. Suggested components of the rapid review report are listed in Box 4. The rapid review methods should be reported at a level of detail that will allow them to be replicated by interested organizations and readers. A PRISMA flow diagram [14] gives the reader an overview of the rapid review process and a snapshot of the evidence identified. All rapid reviews should include a narrative summary of the evidence, generally organized around the PICO framework. A brief section on the gaps in the evidence and future research needs may be very useful, particularly when data are sparse. A written disclosure should be provided that the rapid review is not intended to be a gold standard systematic review and that its results should be interpreted with caution and viewed within a specific context.

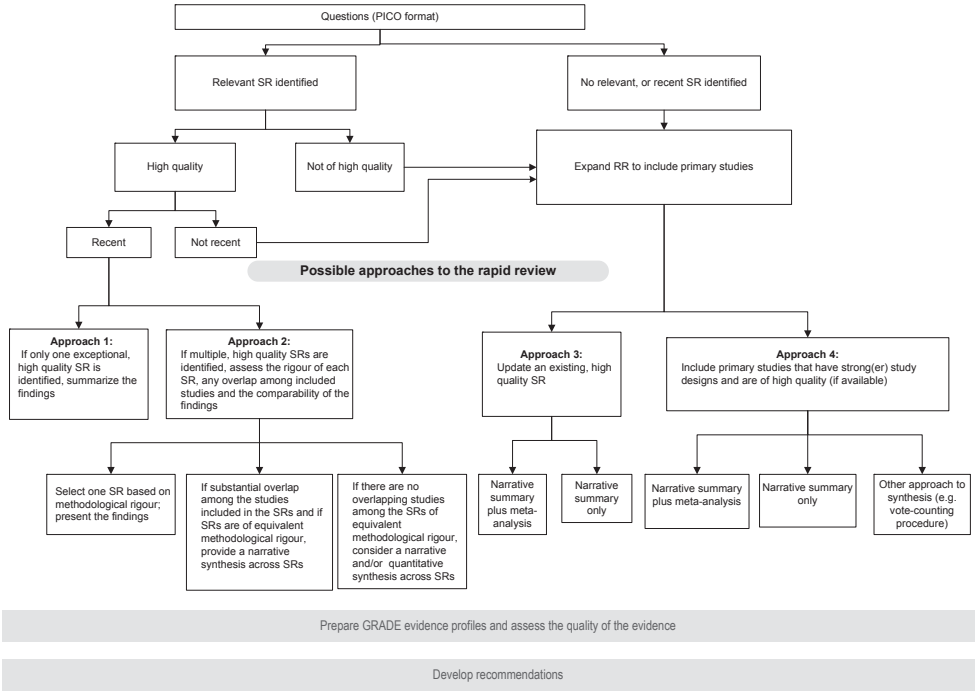

Fig. 2. Approaches to a rapid review of the evidence. GRADE, Grading of Recommendations Assessment, Development and Evaluation; PICO, population, intervention, comparator and outcome; RR, rapid review; SR, systematic review.

6. Formulate recommendations and draft the guideline

The Steering Group needs to plan early for the Guideline Development Group meeting where recommendations will be formulated. Recommendations can be developed via a virtual meeting, although in-person meetings are preferred, even in the context of a rapid advice guideline.

The GRADE approach for formulating recommendations should be followed when developing rapid advice guidelines (see Chapter 10—WHO Handbook [1]). It will seldom be feasible to collect primary data or to perform a review of the resource implications of the intervention or of the values and preferences surrounding the outcomes of interest. However, data that can be readily obtained should be collected (e.g., the cost of gloves in the 2014 guideline on personal protective equipment in the context of Ebola virus disease) [3].

Implementation and the importance of context should also be considered when developing a rapid advice guideline as most research evidence was likely generated in settings and populations that differ from that of the public health emergency at hand. Thus, the degree to which such evidence can be directly applied to the current context may be limited. It is important to consider how contextual factors can modify the benefits and harms of an intervention and how various barriers and facilitators can affect implementation and impact. For a rapid review that relies heavily on evidence from systematic reviews, the synthesis should be tailored to the local context for the emergency throughout all stages of the guideline development process.

The process and resources needed to draft the final rapid advice guideline document are the same as for standard guidelines, and a writer should be identified early and involved throughout the development process. It is particularly important to describe how the rapid advice guideline differs from a standard guideline, and the potential biases that may have been introduced. In addition, the shelf life of the document should be clearly indicated; for example, if the rapid advice guideline constitutes interim guidance because new information is anticipated in the foreseeable future, this should be clearly indicated to the user.

7. External peer review and publication

A draft of the rapid advice guideline draft should be peer reviewed by key individuals, both internal and external to WHO. Three to six potential peer reviewers should be identified early and their interest, availability, and commitment to a quick turn-around time (e.g., 48–72 hours) discussed. Governmental or nongovernmental organizations that are involved in the public health emergency should also be asked to review the draft document to promote engagement and buy-in during dissemination and implementation and to raise issues and concerns before publication. At an absolute minimum, all relevant departments at WHO and in the regional offices must be given the opportunity to provide substantive input into the final document.

Publication of the final rapid advice guideline involves the same steps as for a standard guideline. Electronic means will usually be used for initial dissemination, followed by print circulation as required in the local context.

8. Conclusion

WHO must produce high-quality, evidence-informed guidelines in the context of public health emergencies when there are no existing guidelines for Member States to implement. We have outlined the processes and methods by which WHO can produce rapid advice guidelines in this context.

The development of a rapid advice guideline differs in important ways from that of a WHO standard guideline. A rapid advice guideline has a very narrow scope to make development feasible within the given time frame. Moreover, WHO staff and external experts need to be identified and engaged early in the guideline development process, and the Guidelines Review Committee Secretariat should be contacted to put in place the required expedited processes and to provide technical support.

Rapid review methods may differ from those of a traditional systematic review, including constraints in searching bibliographic databases and other sources of information; the need for a more fluid and iterative approach to establishing study inclusion/exclusion criteria, data extraction, and evidence synthesis; and the abbreviated nature of the review report. These differences, in turn, may affect the credibility of the review and the validity of the review's conclusions. Given that interest in rapid reviews has increased and there is great variability in the approaches and level of reporting [15–19], future research needs to address how rapid reviews compare with standard systematic reviews in terms of bias and credibility, with further guidance developed on when and how to conduct a rapid review. Rapid reviews have become an area of new methodological development for several health research organizations. The US Agency for Healthcare Research and Quality has established a rapid reviews workgroup [20]. Cochrane, the world's largest producer of high-quality systematic reviews of effectiveness, recently established the Cochrane Methods Rapid Reviews Group [21]. Further, due to the increased interest of public authorities and clinicians, the Guidelines-International-Network established a working group dedicated to the methods for developing guidelines in an accelerated time frame [22].

Few data exist on the ways in which rapid advice guidelines are developed and implemented, how they differ from standard guideline development methods, and the impact of rapid advice guidelines on health outcomes. Nevertheless, the core principles and standards for WHO guidelines apply: minimize bias; apply transparent processes and

Box 4 Suggested components of the rapid review report

Introduction

- Brief description of the rationale for the rapid review and of the context for the guideline.
- Duration of the rapid review process (with accompanying dates).
- Indication that this is a rapid review and should be interpreted in that light.

Methods

- Final key questions in PICO format.
- How critical and important outcomes were selected.
- Study inclusion and exclusion criteria.
- Search strategies and databases searched.
- Approach to screening citations and identifying the final set of included studies.
- Data extraction process.
- Assessment of the risk of bias at the individual study level.
- Use of GRADE or other approach to assess the quality of the body of evidence for each critical outcome.
- Description of the data synthesis process.

Results

- Complete documentation of the search results, including a PRISMA flow diagram [14].
- A summary table of results for each key question.
- GRADE evidence profiles (or modified versions thereof) for each key question.

Discussion

- The strengths and limitations of the review process, focusing particularly on how the methods differed from those of a standard systematic review and the potential risk of bias introduced by the rapid review process.
- Future research needs.

Information page

- Acknowledgments.
- List of authors and collaborators.
- How the rapid review should be cited.
- Declaration of interests of the report authors.
- Sources of funding of the rapid review.
- Disclosure statement regarding the limitations of the rapid review process.

Reference list

Appendices (as appropriate)

- List of studies fulfilling inclusion criteria, with citations.
- List of publications excluded at the full-text screening stage, with citations.
- List of non-English language or selected foreign language studies that may fulfill inclusion criteria.
- Data extraction tables.
- Risk of bias summary tables.
- GRADE evidence profiles.

Abbreviations: GRADE, Grading of Recommendations Assessment, Development and Evaluation; PICO, population, intervention, comparator and outcome; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

explicit, reproducible methods; acknowledge potential limitations; and attend to the target audience's needs and to the interests of the individuals and populations affected by the recommendations. Applying these principles and meeting these standards in the face of an emergency involves trade-offs, as well as expertise in both guideline development methods and the guideline topic. Further, guideline developers at WHO need to commit to updating these guidelines in a timely manner when new data become available. When warranted, rapid advice guidelines need to be converted to standard ones so that WHO recommendations are robust and the organization is prepared for continuing public health emergencies or for recurrent events.

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