REUSE, RECYCLE: RETHINK RESEARCH

QUESTIONS TO ASK IN REVIEWING RESEARCH EVIDENCE

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SUMMARY

Looking at findings from past studies can be a fast, less expensive way to get the evidence that funders need. This can let you avoid wasting time and money re-testing things that other studies have already demonstrated. This paper introduces approaches and resources that you can use to review the evidence in a cost-effective and reliable way, including:

- * How to focus a review on what is most relevant to your situation
- *How to find and select relevant materials that can provide the evidence you need
- * How to effectively interpret and communicate review findings to effectively spread your message to target audiences

A "review" simply means to look again at evidence from existing related research and synthesize the findings as they relate to your topic. This may sound familiar from research assignments you remember from college.

In health care and social services, several trends have made this task more challenging:

- New models of services are working as part of complete systems where people can choose the services that work best for them. Assessing the evidence can be complicated when you use multiple strategies and respond to multiple needs.
- The sheer volume of potentially relevant evidence has grown.
- Organizations are facing more questions about the scientific reliability of the evidence for what they do.

Since the early 2000s, a growing number of research reviews in health care and a wide range of other topics have emphasized being "systematic." These reviews follow clearly described plans and report details of their methods for finding, reviewing, and synthesizing studies. A growing number of tools and techniques may usefully assist with any of the steps, depending on the questions and available data (Rodgers, 2009). Reviewers can use any tools and methods that they consider appropriate and still be systematic, as long as they clearly document and justify their decisions. As in any research, the questions, the type of intervention, and audience needs should form the basis of the review strategy.

This paper introduces some different approaches that you can use to review the evidence in a reliable way, based on your questions, information needs, and available data.

A. CLARIFYING YOUR QUESTIONS

You need to define where you want to go before you define how to get there.

Identifying the right questions is key to ensuring that a review is useful in responding to demands for evidence (3ie, 2012). This involves looking at the overarching question and breaking it down into specific sub-areas to explore (Leedy, 1993). This process is often iterative. A preliminary review may suggest new questions or changes to the initial questions.

Often, different stakeholder groups have different ideas about what topics are the most important to address. Involving individuals with experience and expertise in the topic (e.g., providers, participants, partners, and experts) throughout the review process can help ensure that important perspectives are considered.

A few considerations can help ensure that the review questions will lead to useful findings:

- Why are we asking these questions?
- What are the planned uses for the findings?
- What are the possible implications for future policy and action?

In addition, thinking about the questions below may help in clarifying your review focus.

IS IT ALL ABOUT EFFECTIVENESS?

Several recent papers have noted that **one of the common mistaken beliefs about reviews is that they can only address questions about effectiveness** or "what works" (Moat et al., 2013; EPPI-Centre, 2010, p.3; Gough et al., 2102, p. 12). Many reviews use methods from medical research, which is often concerned with a single question of "was it effective?" and a single outcome measure (e.g., 5-year survival rates) (Rahman & Applebaum, 2010).

However, many reviews have examined the evidence for a broad range of questions and outcomes. This reflects the broad range of questions and outcomes of interest to policy and practice, in addition to questions of effectiveness. For example, medical centers that emphasize patient-centered care might want to know more than, is an aspirin an effective treatment for a headache (Patton, 2013). They might tend to ask questions like, what is the best treatment for a headache for this individual (given their health history, medications they are taking, and other pertinent individual characteristics) (Patton, 2013).

Organizations that are working to make a social impact often need answers to several questions and respond to several desired outcomes (and competing agendas). For example, below are some of the myriad of outcomes that can be important in services for people with chronic illnesses and disabilities:

- > Helping people remain at home and live independently
- Improving functioning
- Keeping people as healthy as possible
- Reducing hospitalizations/re-hospitalizations
- Controlling health care spending (for multiple funding streams)
- > Meeting unmet needs
- Improving coordination and continuity of care
- Supporting community participation and enjoyment of life

Organizations need answers to a broad range of questions to develop and sustain effective solutions to achieve desired outcomes. In a recent survey, when asked to rank three choices of evaluation focus, non-profits ranked "what difference did it make?" as the top choice (Innovation Network, Inc.). The question of "how well did we do?" was the second choice. The third choice was "how much did we do?" This was the same ordering as in the first survey of the project, in 2010. Below are some examples of additional questions that are often important in designing, implementing, and assessing effective solutions to problems:

- ➤ Is a proposed new way of doing things practical, viable, and desirable to people who need services, providers, and the public?
- What is the nature and extent of the problem?
- What do people receiving services consider a successful outcome?
- What processes or conditions explain different results among similar interventions?
- What are the lessons learned from past efforts' positive and negative experiences?
- What have been the expected and unexpected, short-term and long-term, individual-level and systems-level outcomes?
- > What are the effects for different groups, including those with the greatest need?

A review of available related research could explore any of these questions. This can help avoid wasting money and participant time by re-testing things that others have already demonstrated (Smyth & Schorr, 2009; Gough et al., 2012).

In addition, a well-conducted review can help make future research more costeffective, such as (Leedy, 1993; GAO, 1992; Liberati et al., 2009)...

- > Topics for which the review found little data or where evidence was weak that may be relevant for future research (e.g., specific interventions or strategies, groups of participants, or outcomes)
- > Potential data sources
- Promising research strategies
- Data elements and relationships that are likely to be important
- > Researchers who have done significant work on the topic
- > How your research compares with earlier attempts to solve the problem

IS IT ABOUT THE PROGRAM OR THE PROCESS?

Services for people with disabilities frequently rely on multiple strategies. For example, to help people stay at home, a home care program might need to provide several components, like respectful relationships with participants and families, appropriate assessments, well designed and followed service plans, adequate follow-up, coordination of services, and partnerships with organizations in the community (Rahman & Applebaum, 2010, p. 7). A review could examine the evidence for any or all of these, depending on information needs.

Many reviews focus on one or more of three areas (Pawson & Bellamy, 2006):

- ➤ Whole programs or service models—These reviews examine the evidence for whether or not to replicate whole interventions. Many of these reviews use methods derived from medical research, which often focuses on isolated interventions (e.g., comparisons of the effects of two medications) (Rahman & Applebaum, 2010).
- Whole programs, along with factors that affect odds of success—These reviews can combine numerical results with deeper understanding about how programs work to affect people's lives. This can increase the usefulness of the findings for policy and practice. For example, one study examined related research for a campaign in the United Kingdom to encourage children to eat more fruits and vegetables (Thomas et al., 2004, cited in Harden, 2010). The researchers first reviewed studies testing the effects of experimental programs. Next, they reviewed studies on children's perspectives and experiences with fruits and vegetables to come up with recommendations that reflected children's views (e.g., brand fruits and vegetables as tasty rather than healthy). They then examined how well the tested interventions matched these recommendations.
- Mechanisms or conditions that affect odds of success (Greenhalgh et al., 2004; Pawson & Bellamy, 2006)—These reviews seek to build stronger explanations for

mechanisms or conditions affecting the results for multi-component interventions. For example, a review about what works in peer support for people with chronic illness might examine research on peer support across fields, to identify critical conditions associated with success of these programs, i.e., the best use of appropriate means to an end (Pawson & Bellamy, 2006). This type of evidence is often important for guiding future action to build new solutions and tweak existing solutions.

B. FINDING AND SFI FCTING RFI FVANT MATERIALS

After clarifying your questions, the next step is to find studies and materials that can provide evidence to address them. Below are some questions that may be useful to consider in this stage.

WHAT IS THE SEARCH AND SELECTION PLAN?

Some traditional steps to find and collect information about studies in a systematic way are to look at your questions, identify key words and sources to find related studies, and create index cards to take with you to the library to collect information about each study (Leedy, 1993). A more modern approach might focus on constructing search terms for searches of the internet and various electronic literature databases and making a plan to use software to manage the literature search results.

Several issues may be important to consider in shaping the plan to find and select studies:

- ➤ What is the scope of the review? A review of the evidence can range in scope anywhere from a quick summary of readily available findings from leading sources to a comprehensive attempt to describe all research that exists on a topic. An initial review of available materials can help determine whether a more comprehensive review might be appropriate. A comprehensive review might not make sense, for example, if a previous review has adequately covered your topic, if consensus on the issue exists, if few studies have looked at the issue, or if you need answers quickly.
- What criteria will determine which studies to include and which to exclude? Relevant criteria often include the studies' research questions, populations and geographic locations included, types of interventions involved, date of publication, and publication language. Reviews may use a wide range of different criteria to select studies, depending on the focus and scope of the review.
- What are the information sources? Depending on the scope of the review, reviewers can find studies in many possible ways. Some frequently used methods include...

- Examining related resources that organizations and researchers may have already collected, like conference presentations, news articles, and research reports
- Searching the internet
- o Searching various literature and information databases
- Checking the sources cited in included studies
- Browsing tables of contents of key journals
- Checking the websites of leading organizations and government agencies involved in the issue
- Communicating with study authors
- Asking stakeholders, researchers, and experts for their suggestions about available materials, studies currently underway, and future planned research

DO YOU NEED TO EXCLUDE STUDIES BY THEIR TYPE OF DESIGN?

Another common misconception about systematic reviews is that they only look at studies that used randomized controlled trial designs (Moat et al., 2013) or that "randomized controlled trials are the only type of research evidence that is accepted" (EPPI-Centre, 2010, p. 3).

In reality, although randomized controlled trials are sometimes possible and worthwhile, they are not the usual or standard source of evidence for many types of interventions to assist people with disabilities (Johnston et al., 2009). When reviews are restricted to randomized controlled trials and similar designs, researchers may miss valuable insights about interventions and questions that those methods do not easily address (Dijkers, 2009; Rahman & Applebaum, 2010; Smyth & Schorr, 2009).

Interventions that involve multiple processes and outcomes interacting together need studies using multiple methods to assess their effects (European Evaluation Society, 2007). Hence, in reviewing the evidence from past evaluation studies, "whenever possible the evaluator should seek studies that use a variety of methods" (GAO, 1992, p. 28).

For many questions of interest to planning and action, related evidence could potentially come from studies using a wide variety of designs, such as:

- Prior literature reviews on the issue
- Past related evaluations, which may use a mix of several methods and approaches, like focus groups, analyses of program data and reports, costbenefit analyses, case studies, comparison group studies, key informant and expert interviews, time series analyses, and many others
- Statistical modeling studies that examine relationships across various data or predict future impact
- Overview papers and background papers describing the issue

DO YOU NEED TO EXCLUDE STUDIES BECAUSE OF THEIR "QUALITY"?

Another myth about reviews is that "A systematic review can only be of high quality if the primary evidence is of high quality" (Moat et al., 2013). If that level of evidence is lacking, then reviews may recommend "more research" and make no practical recommendations (Dijkers, 2009).

In actuality, a well-conducted and reported review can include past studies of all levels of quality and still provide strong evidence from the review. In general, "systematic reviewers should consider all available research and not disregard investigations of a quality level below an artificially drawn line" (Dijkers, 2009). As one set of guidelines for reviews in health care (Centre for Reviews and Dissemination, 2009, p. 10), noted, "Although quality assessment can sometimes be used to exclude studies that do not meet certain criteria, this is not standard practice." Reviewers can take into account any variations that they find in the quality or relevance of previous research when they examine the results and draw conclusions (Gough et al., 2012).

ARE ITERATIONS MADE AS NEEDED?

Developing a review strategy "is often an iterative process..." (CRD, 2009, p. 6). As one set of guidelines for reviews in health care cautioned (Centre for Reviews and Dissemination (CRD), 2009, p. 15), "Sticking rigidly to a protocol when it becomes apparent that a change of direction is required can result in a review that is not useful to end users."

Reviewers can make modifications to the methods as a review progresses, as long as they clearly document the changes and the reasons for making them (EPPI-Centre, 2010; CRD, 2009). Of course, reviewers should not make changes as an attempt to make the results support a particular conclusion.

As an example of how iterations can be useful, a review of research on diffusion of innovations in health care (Greenhalgh et al., 2004) at first set stringent criteria for types of studies to include. As the review unfolded, the authors realized that little evidence was available that met all of the criteria and that looking at more literature could add critical insights. They then extended the review to add overview articles and "landmark" studies from outside the health sector that had important lessons for their research question.

C. ANALYZING, REPORTING, AND SHARING RESULTS

Below are some questions to consider in analyzing, reporting, and sharing review results.

DOES THE ANALYSIS OF STUDY DATA FIT THE QUESTIONS?

A basic approach to being systematic in discussing review findings is to start with an outline (Leedy, 1993). This can help ensure that a review is a focused discussion of what is most relevant to your topic, rather than a haphazard collection of irrelevant studies. A basic structure is to begin by talking about the early studies that paved the way for later research, for broader perspective, then studies that gradually focus more on your specific topic.

A simple way to organize relevant data from the studies is to start by making an annotated bibliography that summarizes results for each study as they relate to your questions. Spreadsheets or other software can often be useful for making the analysis go more quickly. However, mechanical processes cannot replace the need for reviewers to understand and interpret the studies. As Paw put it, the analysis of study data is "is a sense-making exercise and not a mechanical one" (Paw, 2002, p. 176).

Various frameworks provide ways to analyze study findings in a systematic way, based on the type of studies and review questions. For example, in a review of the research on the effectiveness of interventions to promote smoke alarms, Rodgers et al. (2009) developed a four-part general framework to synthesize study narratives in a systematic and transparent way. The steps may occur in combination and not necessarily in this order:

- 1) Develop a theory of how the intervention works, why, and for whom
- 2) Develop a preliminary synthesis
- 3) Explore relationships within and between studies
- 4) Assess robustness of the synthesis product

In their review of the research on spreading and sustaining innovations in health services, Greenhalgh et al. (2004, 2005) used a general 6-stage framework for a systematic review of the "storyline" of research from a diffuse set of literature, with six phases:

- 1. Planning (convene team, outline initial questions, define outputs)
- 2. Search phase (find diverse approaches, seminal concept papers, empirical papers)
- 3. Mapping (map key elements, actors, language for each research tradition)
- 4. Appraisal (evaluate each study for validity and relevance, collate key results)
- 5. Synthesis (describe findings for key dimensions that research has addressed)
- 6. Recommendations (summarize messages from the literature along with other relevant evidence and recommendations for practice, policy, and further research)

An analytical technique that many reviews include is to pool and re-analyze similar data from multiple studies (Liberati et al., 2009). A systematic review of existing research can examine any question; however, mathematically synthesizing study results is not always possible or desirable (Liberati et al., 2009). A frequent use of this technique has

been to combine statistical results from multiple tests of the effectiveness of an intervention, such as clinical trials of a medication. The approach may produce misleading results when the treatments vary across studies (Berk, 2011). Berk cautioned, "A conventional literature review will often do better."

HOW IS THE WEIGHT OF EVIDENCE ASSESSED?

As in any research, no review can establish absolute and final proof or thoroughly examine all aspects of an issue. Rather, the idea is to provide the best possible explanations based on the best available evidence.

Reviews that include diverse types of studies need inclusive criteria for assessing the credibility of each study and the strength of the overall evidence. Several inclusive frameworks for assessing research quality have suggested issues to consider that can apply to any type of study design:

- A recent report suggested an inclusive approach to assuring quality of impact evaluations that addressed three questions (Stern et al., 2012):
 - o Does the evaluation use appropriate designs and methods?
 - Does it properly apply the designs and methods used?
 - o Do the data support the conclusions?
- ➤ Lewis et al. (2006) described a framework for assessing research quality based on the principles that research should meet four criteria:
 - Contributory in advancing wider knowledge or understanding
 - Defensible in design by providing a research strategy that can address the questions asked
 - Rigorous in using a transparent system for collecting, analyzing, and interpreting data
 - Credible in claim, offering good arguments about the importance of the evidence presented
- ➤ EPPI-Centre's guidelines for conducting systematic reviews (2010) suggested that reviewers judge the overall "weight of the evidence" based on their assessments for one or more of three criteria, depending on the type of studies:
 - Methodological quality: the trustworthiness of the study based on accepted norms for the research strategy used in the study
 - Methodological relevance: the appropriateness of the study design for addressing the review's questions
 - Topic relevance: the appropriateness of focus of the research for answering the review questions

ARE THE REVIEW METHODS CLEARLY AND ACCURATELY DESCRIBED?

Clearly and transparently reporting a review's methods lets readers assess the relevance and strength of the evidence and replicate or update the research (Liberati et al., 2009). Examples include listing all key words and search databases employed,

describing the process for scanning abstracts and full papers, and explaining the criteria used to determine which articles to include and which to exclude.

The PRISMA (Preferred Reporting Items for Systematic reviews and Meta-analyses) Statement provides a 27-item checklist of items deemed essential for transparent reporting a systematic review (Liberati, et al., 2009). Although the Statement focuses on reporting of systematic reviews to assess the benefits and harms of a health care intervention, many of the items may also apply to other types of reviews. Authors of reviews examining other topics may need to modify the items or incorporate other items (Liberati et al., 2009).

A 2012 study by Hannes and Macaitis on systematic reviews of the evidence in health care shows the importance of clearly describing details of how a review actually proceeds. The study found that "for most cases it was unclear what exactly reviewers did in synthesizing the studies" (Hannes & Macaitis, 2012, p. 433). The studies reported using numerous techniques for synthesizing and presenting study findings (e.g., "narrative synthesis," "thematic analysis," "meta-ethnography"), but this did not always match what the reviewers did. Examples included reviews that reported using the meta-ethnographic approach but failed to comply with that approaches' methods or that misrepresented their methods (e.g., a content analysis presented as a narrative analysis).

ARE FINDINGS PRESENTED IN USEFUL WAYS FOR TARGET AUDIENCES?

Many organizations, like the majority of foundations, may view their internal audiences as the main users of their learning results (Grantmakers for Effective Organizations, 2012). However, sharing findings with others involved in your work, like participants, partners, and members can be important for working together. Moreover, spreading the word about your results can be a way to raise awareness and benefit others who are working on your issue. Stakeholders can provide ideas about the best ways to present findings.

"Layering" information, or making information available in multiple formats at different times, can increase the impact of your message (Hutchison, 2011). A typical example of layering results of a systematic review is to provide 1) a one-page summary of key messages, 2) a three-page summary, and 3) a 25-page detailed report (CRD, 2009). Another example is to present results through 1) a one-page summary, 2) a short report, 3) a 100-page technical report with all details about methods, and 4) web-based access to more information about the reviewed studies (EPPI-Centre, 2010).

Several new data visualization technologies and creative approaches may be useful in communicating research findings, in addition to or as alternatives to a final report (Hutchison, 2011). For example, some groups may prefer to receive findings via a series of newsletter articles, on a website, and/or on a poster (Lewis & Sullins, 2012). The important point is to give your audience the information that they need in a way that they can use.

APPENDIX: RESOURCES FOR MORE INFORMATION

This Appendix lists some recommended resources to read for more information. Many of these resources are available online.

A. GENERAL INFORMATION

- Gough, D., Oliver, S., & Thomas, J. (2012). Introducing systematic reviews. In D. Gough, S. Oliver & J. Thomas (Eds.), An Introduction to Systematic Reviews (pp. 1-16). Available from: http://www.uk.sagepub.com/upm-data/46999 Gough Chapter 1.pdf
- Leedy, P. D. *Practical Research: Planning and Design* (Fifth Edition). Englewood Cliffs, NJ: Macmillan Publishing Company, 1993. Chapter 4, "The Review of the Related Literature."
- U.S. General Accounting Office (GAO), Program Evaluation and Methodology Division. *The Evaluation Synthesis*. GAO/PEMD-10.1.2 Revised March 1992. Available from: http://www.gao.gov/special.pubs/pemd1012.pdf

B. EXAMPLE GUIDANCE

- Centre for Reviews and Dissemination (CRD), University of York, 2009. Systematic Reviews: CRD's guidance for undertaking reviews in health care. University of York. Available from: http://www.york.ac.uk/inst/crd/index guidance.htm
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C. METHODOLOGICAL ISSUES AND TECHNIQUES

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