Systematic Reviews as a Tool in Evidence-Based Decision Making:

Improving Research and Informing Practice

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Systematic Reviews: Important Tool in U.S. Federal Funding and Policy Making Decisions

These are encouraging times for producers of and believers in evidence. In the past two years in United States (U.S.), The Office of Management and Budget (OMB) has promoted the use of evidence-based, or “tiered evidence” funding streams. (http://www.gpo.gov/fdsys/pkg/FR-2013-03-27/pdf/2013-07003.pdf, http://homvee.acf.hhs.gov/Default.aspx). A critical tool for documenting this evidence base is a systematic review. Systematic reviews have had an important place in synthesizing evidence on the effectiveness of medicine for decades. Cochrane reviews established the template for systematic reviews that followed in other areas. In education, the Campbell Collaboration and in the last decade, The U.S. Department of Education’s What Works Clearinghouse (WWC) have furthered the role of systematic reviews in education, providing researchers, policymakers and educators better information on what research tells us about what works, what doesn’t works and what needs further study in education.

In this paper I provide some thoughts on important considerations in the decision to fund or conduct a systematic review. These views have been formed through my involvement in the What Works Clearinghouse as well as several other systematic reviews Mathematica Policy Research conducts on behalf of other federal agencies.¹ It is important to define what we mean by a systematic review to distinguish it from simple summaries of research. Systematic reviews are designed to answer a question and prevent the information overload that decision makers at all levels may face. The challenge that many decision makers face is that research summaries or reviews can be presented as we see in the cartoon below. A mass of studies have findings that point in different directions. Why does that happen? Are there different types of studies? Are all research studies created equal? Do the findings really vary this much? How can I make sense of it all?

Systematic reviews: what is in a name

¹ The views expressed here are my own and do not reflect the views of the U.S. Department of Education, or Mathematica.

“Systematic reviews follow a defined set of rules for identifying and assessing individual studies and synthesizing a body of evidence. The expert opinions or judgments of the review team may factor into the initial definition of these rules. Once established, however, the rules—not the opinions or judgments of the review team—determine the outcomes of the review. “

The first step in undertaking a systematic review is to decide what question your review is designed to answer. Much of the recent focus on systematic reviews in the U.S. examines studies that test the effectiveness of programs or policies (Which math or reading programs improve students test scores? Which prevent teen pregnancies? How do we train effective teachers?), but systematic reviews can examine other types of questions (How do we best measure effective teaching? What is the cost of implementing a high quality home visiting program?). Systematic reviews are a critical tool for supporting evidence-based decision or policy making, but they can only serve this purpose if they are addressing the questions decision makers need answered.

Once you choose the question your review will address there are three main features that should be incorporated into a systematic review.

- **Consistent.** A review team should be trained to consistently apply review standards and processes. Reviewers should not use individual judgment or
opinions on any aspects of a review including how studies are identified for review, whether a study falls within the scope of a particular review, and how to assess and report on the study design and findings

- **Transparent.** Review processes should be fully documented and made accessible to others. If a review is well documented, an individual from outside your review team should be able to replicate your review and come to the same conclusions.

- **Comprehensive.** A systematic review should have processes in place to uncover all of the research relevant to the question you have identified. You should be able to demonstrate that your process for identifying the research was not subject to professional judgment or opinion. The review should follow the rules laid out before you began the review.

Establishing a systematic review with these features should ensure the results of your review are both valuable and credible.

**Designing a Systematic Review: Five Key Considerations**

There are five important considerations in designing your systematic review. You will need to make choices around each of these issues and as described above, there is a lot of judgment that may be applied to these choices. However, once they are made and codified, you should adhere to them for your review.

One of the main determinants of the choices you may make in your review will be resources available to conduct your review. This will be particularly important if you are conducting reviews in an area with a lot of research. If resources are constrained, your choices will also be constrained, but you can still generate a valuable systematic review within a resource constraint.

1. **Decide what you are conducting a systematic of.** Reviews of program effectiveness provide the answer to “what works”, but systematic review principles can be applied to studies of implementation, measurement, or costs of programs. This type of information could also be incorporated into systematic review of research on effectiveness, but you should apply the same standard to assessing and reporting on the information.

2. **Determine your criteria for identifying research.** This is one of main decision points most influenced by available resources. Keep in mind, the more comprehensive your process for identifying research, the more resource required. Decisions include but are not limited to; published and unpublished research? electronic searches or hand searches of journals? Should you restrict the time interval of research eligible for review to 10 or 20 years or include all research? review studies with positive effects only?
3. **Set standards for reviewing research.** Do you develop design standards for your review or use already established standards? Will your standards be absolute or relative? For example, will you only review and report on studies that have strong research designs that provide a credible test of program effectiveness (such as randomized control trials), regardless of the general standards for research in your field? Or, will you use design standards that address most of the research in your field but essentially grade the research designs relative to each other?

4. **Train reliable reviewers and decide on the rigor of your review process.** The more complex your review process, standards and reporting requirements, the more intensive the training should be. Also, good training should include a certification process that verifies that the training was not only delivered, but was received by reviewers. That is, the reviewer should be tested and successfully demonstrate they understand the review standards and their application. Training reviewers to consistently review and report on studies can be resource intense. These considerations extend to the review process itself. A rigorous review process includes two independent reviews of each study followed by a reconciliation with a third reviewer. You might do this if you have adequate resources and the stakes are high. However, you could reduce the number of reviews, saving resources but potentially making the review less reliable.

5. **Summarizing your findings.** First, you must develop decision rules for how to combine findings across multiple studies to avoid the information overload problem shown above. There are numerous meta analytic and study counting techniques that may or may not be appropriate for your reviews. The most important consideration in summarizing findings, however, is your audience, because review summaries serve many purposes. Ask yourself, who is your audience, what do they need to know, and how can I make this summary most accessible to them? Do they want to know; Which reading supplement to use in their classroom? Which pregnancy prevention approach or job training program should I bring to my community? Which programs show the most promise and should be funded? What research should we commission or conduct to move the field forward in an area? A teacher, community organizer, state, local, or federal policy maker, and a researcher all need research presented in a different way and one size is unlikely to fit all. However, the more dissemination and different types of dissemination, the more resources required.

**The Tools for Conducting a Systematic Review**

Finally, there are important tools that must be developed before you undertake a review. If these tools are used consistently and made available to others, they support the three features of a systematic review described above. Your review will be consistent, reliable and transparent.

1. **Protocols** document all the decisions made in determining the question your review will answer as well as the research eligible for review.

2. **Documentation of the review of each study** should show how the review rules where applied to that specific study.
3. **Templates for summarizing and reporting findings.** The template needs to account for reporting on individual studies and summarizing findings across studies. Even if you decide you need different types of dissemination for different audiences, you need to have a template to ensure consistency among reports with specific types of dissemination.

I have included examples of this type of documentation in the materials that accompany this overview. These include The What Works Clearinghouse Procedures and Standards Handbook, and a sample intervention report. These documents, a sample Study Review Guide (SRG) and accompany instructions, as well as hundreds of reviews are available on the What Works Clearinghouse website at www.whatworks.ed.gov.