Policy-makers and health system managers routinely face difficult decisions around improving health and promoting equity. They must consider complex, core questions about particular programmes to implement and effective strategies for organizing the overall health system. For instance, does contracting out services to the private sector improve access to health care? How could the health system best retain trained health care providers in underserved areas? Do conditional cash transfers improve the uptake of health interventions?

These questions have a high relevance to many low- and middle-income countries (LMICs). But how can scientific evidence – often difficult to find, unclear, and seemingly shifting from one year to the next – inform the answers to these questions?

The challenge of reviewing scientific knowledge and synthesizing its (sometimes competing) findings has been a constant throughout the evolution of science; balancing and blending older findings with the new has been more art than science. In reflecting on his work on scurvy in the 18th century, the Scottish naval surgeon James Lind wrote:

As it is no easy matter to root out prejudices… it became requisite to exhibit a full and impartial view of what had hitherto been published on the scurvy, and that in a chronological order, by which the sources of these mistakes may be detected. Indeed, before the subject could be set in a clear and proper light, it was necessary to remove a great deal of rubbish.¹

Given the many advances in science over the past few decades, the need for a systematic approach to review and synthesize has only increased. Although a variety of terms have been used to describe the processes involved in review and synthesis – including research synthesis, literature review, and meta-analysis – the term systematic review became widespread during the late 1990s.² ³
Like the science they assess and summarize, systematic reviews must be reproducible, structured, and explicitly formulated; they must cast a wide net and catch all inputs (e.g. primary studies) relevant to the research question they seek to answer. They must be compact (allowing the reader to “one-stop shop”), objective, balanced, replicable, verifiable, dynamic, updateable, and ultimately readable. Unlike meta-analyses, they are not statistical analyses of the results from independent studies (though they may include meta-analyses), and unlike research syntheses they do not summarize research studies in order to explore and balance the competing evidence. They are standardized and consistent inquiries into a particular question, written by teams of reviewers who typically possess a command of the subject area.

Systematic Reviews and Health Policy and Systems Research

These perceived shortcomings, though, tend not to weaken the stature or utility of a systematic review. In the field of health policy and systems research (HPSR), systematic reviews can be enormously helpful in appraising complex findings from a wide array of disciplines and methods – particularly when individual pieces of HPSR research conclude with different or even conflicting policy options. A tool that appraises all relevant studies and collates their findings offers distinct advantages not only to researchers, but to policy-makers and health system managers as well.

Box 1

Systematic Review

With roots in Galileo’s time and ancient astronomy, systematic reviews are an ever-evolving tool used to compare and contrast scientific findings. First prominent in evidence-based medicine, their utility has spread into non-clinical spheres. Fairly and objectively – and as free from bias and error as possible – systematic reviews attempt to assess and appraise all relevant evidence on a particular topic. A systematic review is defined here as a formulated, replicable and current summary that collates, assesses and appraises all empirical evidence related to a specific research question.

Box 2 (continued)

treatment/intervention effect.

Research synthesis: the process through which two or more research studies are summarized in order to explore and balance the evidence relating to a particular question.

Literature review: a review that harvests and discusses published information (including empirical, peer-reviewed, theoretical) in a particular subject area, sometimes within a particular time period, for the primary purpose of bringing the reader up to date.

Systematic reviews do have their disadvantages. First, there are occasions when a systematic review has disagreed with the findings of another, or when a systematic review disagrees with a large clinical trial. Secondly, their methods are observational, where the review team itself defines and selects the key variables of its study population (e.g. the studies to include and exclude), thus shaping from the outset their eventual judgements of applicability or validity.

Box 2 (continued)

Other Syntheses

Meta-analysis: a statistical analysis of the results from independent studies, with the intention of producing a single estimate of the outcome of interest. For example, in a meta-analysis of effectiveness, the outcome is a measure of the
A systematic review in HPSR is typically designed for multiple audiences, including researchers, policymakers, health system managers, and other research-users, from practitioners to the media. With the focus on the health system itself, systematic reviews in HPSR address but often move beyond issues concerning the effectiveness of an intervention to a synthesis of how to implement the intervention, what different types/costs of interventions may be available, and how users might ultimately experience the intervention. The policy audience of these systematic reviews often requires different information and perspectives than researchers do, including cost-effectiveness analysis, modelling data, the political and social acceptability of the intervention, and any relevant equity implications.

As an input to the research process, systematic reviews - by assessing the evidence base and appraising studies - help to drive consensus around the appropriate types of study design for different types of questions. Additionally, researchers can constructively contest systematic reviews, with debates focusing on appraisal and synthesis, rather than on the more prosaic reasons around why one study might have been identified and selected over others.

As an input into the policy process, systematic reviews are indispensable as they have already identified, selected, appraised and synthesized the relevant research literature in a methodical and transparent way. When systematic reviews analyse the effects of competing policy options, they work to reduce bias in the estimation of an intervention’s effectiveness by identifying all studies that address a specific question. Policy-makers and health system managers are less likely to be misled by results of a systematic review than a single investigation and can thus be more confident about the consequences a decision might produce. Additionally, systematic reviews reduce the role that chance has to play in estimating the effectiveness or cost-effectiveness of different options by increasing the number of units for study, providing greater precision. They also allow for a much more efficient use of time, enabling policy-makers to draw upon the research literature without having to comb through it themselves.

Policy-makers and health system managers may turn to systematic reviews to answer questions concerning the comparative effectiveness of any given policy, strategy, program, service or technology. Currently they are relatively well served by existing databases such as Medline and the Cochrane Library but only if they restrict their questions to the effectiveness of clinical programmes, services and/or technologies. When questions and concerns move beyond comparative effectiveness to the governance, financial and delivery arrangements within which clinical programs and services and technologies are provided, available reviews are relatively thin (although their numbers have increased in recent years).

While in principle systematic reviews have much to offer different audiences, in practice there are many misunderstandings about what systematic reviews are and how they can make a difference. Their future development and application within the field of HPSR raises a number of important and unresolved points. To that end, this Briefing Note presents and analyses:

(i) the typical methodology of a systematic review;
(ii) the types of evidence used in a systematic review in HPSR;
(iii) the challenges in conducting systematic reviews in HPSR in LMICs;
(iv) the challenges in using systematic reviews in HPSR in LMICs;
(v) HPSR and the policy process; and
(vi) key steps for moving the field forward.
(i) Methodology

The conduct of a systematic review involves a number of stages, as described in a range of specialized textbooks and guides. These stages include:

- **Reviewing the literature.** Before any systematic review is undertaken, reviewers must be confident that their question has not already been answered in a previous systematic review.

- **Formulating review questions.** All systematic reviews seek to answer a single review or research question. Questions must be well-structured and specific to the issue under investigation. Pai et al (2004) suggest using the PICO acronym: every question must address the Population group, the Intervention, the Comparison intervention, and the Outcome. A research question that incorporates all of these PICO elements might be: In low-income countries (population), does the introduction of social health insurance (intervention) compared with maintaining current financial arrangements (comparison) lead to better patient outcomes (outcome)?

- **Identifying relevant literature.** A literature search identifies all potentially relevant studies that might shed light on the review question – systematically and thoroughly. Although the sources ultimately used will depend on the review question itself, current guidelines suggest the use of several prominent electronic databases (such as Medline, Embase and the Cochrane Library), reference lists of included studies, and direct contact with authors or experts in the specific field.

- **Including/excluding studies.** The criteria upon which studies will be included or excluded in the review must be decided upon. In most systematic reviews, at least two reviewers will apply these criteria. Although some reviews may focus on the evidence available locally or cover only the languages the reviewers know, they should be generally global in reach and utility.

- **Assessing quality of the included studies.** The authors must assess quality on various levels in the design, conduct and analysis of the included studies. This includes attention to bias, to the methodological quality of the included studies, and to the overall strength of the body of evidence (outlining perceived gaps and overlaps).

- **Summarizing the evidence.** Different approaches (including statistical meta-analysis) should be used to summarize the findings of the studies in the review. Some of these approaches are described in more detail below.

- **Interpreting the findings.** Inferences for policy and practice are typically generated by interpreting and exploring the relevance or applicability of the findings.

(ii) Evidence and the Systematic Review in HPSR

In the field of HPSR, relatively little evidence is generated through randomized controlled trials (RCTs). As such, systematic reviews in HPSR must rely more heavily on non-experimental (e.g. secondary) analyses and qualitative research, controlled before/after studies and interrupted time-series studies, and other study designs. Although methods are available for synthesising findings from such studies, they are less well known and less well developed than those for synthesizing findings from randomized studies. Additionally, some might locate the findings produced by these methods lower on a “hierarchy of evidence” scale – a ranking of evidence from the most rigorous (double-blind RCTs) to the least (personal experience).

Notably, however, the intended audiences of an HPSR systematic review – from researchers to policy-makers – are interested not only in what the effectiveness of a particular intervention is, but also in knowing how to implement the intervention, what different types/costs of interventions may be available to them, and how users might experience the intervention. These types of questions typically do not lend themselves to...
quasi-experimental designs but may be better addressed through policy analysis or qualitative research. As a result, synthesizing evidence across disciplines, methods and quality levels is the subject of much ongoing discussion among HPSR researchers and systematic reviewers.

Included among these emerging synthesis methods are narrative synthesis, meta-ethnography, realist synthesis, meta-synthesis, meta-narrative review, and thematic synthesis. While understanding and managing this diversity of approaches can be a challenge, the opportunities multiple methodological viewpoints afford is significant, bridging researchers working from very different traditions, and integrating the various components of their work into one comprehensive perspective.

**BOX 5**

**AMSTAR: A Measurement Tool to Assess Reviews**

Developed in 2007, AMSTAR is a tool that allows the user to compare and assess systematic reviews, which can be helpful in cases where reviews do not agree with each other, or in determining a review’s local applicability. AMSTAR assesses the methodological quality of reviews by highlighting 37 critical quality variables and then channeling these into 11 questions a panel of experts can use to assess the quality of any given review.  

(iii) LMIC challenges in conducting Systematic Reviews in HPSR

As with many elements in health research, teams of reviewers in LMICs face specific and steep challenges in conducting systematic reviews, which may partly explain the limited number of systematic reviews relevant to health systems currently produced in LMICs. While access to articles has increased in recent years (through open-access journals and initiatives like HINARI), accessing the search databases (e.g., Cochrane Library, Embase, Medline) has remained difficult. Other challenges to conducting HPSR systematic reviews in LMICs include:

(i) Surveying grey- and/or non-English literature. Although search strategies have been extensively evaluated in the context of systematic reviews of randomized trials, reviews in HPSR rely heavily on evidence from non-randomized or non-experimental studies that are not as well indexed as randomized trials. Search sources must go beyond databases such as Medline or Embase; furthermore, they must include evidence generated by and relevant to LMICs that tend to be published in local journals and indexed in regional databases (that may not be easily searchable). However, the lack of established or regularly maintained databases (of both published and grey literature) further compounds search limitations.

(ii) Limited skill sets to create viable teams of reviewers with complementary abilities. This has been somewhat addressed in recent years through several training opportunities, notably those offered through the South African Cochrane Centre (and its Nigeria Branch), the South Asia Cochrane Centre, and the Iberoamerican Cochrane Centre. These workshops focus on various different topics relevant to systematic reviews, including developing review protocols (including designing a review question, determining the intervention, deciding on study criteria, and choosing the outcome of interest), an introduction to methodological issues and concepts of statistics used in systematic reviews, and fine-tuning in-progress reviews (detailing the final touches needed to complete a systematic review). The Joanna Briggs Institute also offers routine training in systematic reviews, with each course certifying participants as a systematic reviewer.

(iii) Developing and documenting methods (and innovative, LMIC-centred methodologies) to be used in HPSR systematic reviews.
(iv) LMIC challenges in using Systematic Reviews in HPSR

One overarching issue that emerges repeatedly in the literature is the involvement of policy-makers in the review process to increase the prospects for research use in policy-making and to hold researchers more accountable. This involvement would stretch beyond the use and uptake of systematic reviews to their actual involvement in the creation of a review, helping to identify issues of policy relevance to be explored in a systematic review. If policy-makers can become a routine part of the process behind systematic reviews, this could bring about profound changes in the methodological approaches currently in use. Related challenges in using systematic reviews include:

(i) Synthesizing evidence from many different studies. In the field of HPSR, relatively limited evidence is generated through RCTs, leaving systematic reviews to rely heavily on non-experimental studies. Moreover, key HPSR audiences – including policy-makers and funders – frequently require different types of information and evidence, including cost-effectiveness analysis, modelling data, the political and social acceptability of the intervention, and equity implications. How to optimally combine these different types of evidence is a genuine challenge for any systematic review, and although certain methods and tools may assist this process, they are not as developed as those for synthesizing findings from randomized trials.

(ii) Operationalizing evidence. As research questions are not typically framed in a “what works?” fashion (which would appeal, for instance, to policy-makers and health system managers), there is a pressing need to move beyond questions concerning effectiveness to those around actual implementation and operationalization. However, methodologies for tackling such highly relevant and broad questions have not been explored extensively in the health policy field and could potentially conflict with the “focused-question” approach proposed by the Cochrane-type of systematic review.

(iii) Dealing with limited policy-relevant evidence. For many questions in the HPSR field, there is relatively limited evidence concerning the effects of policy options for various policy decisions. The challenge for reviewers lies in how to incorporate and balance the existing non-experimental evidence with the lack of experimental studies. “Empty” reviews may serve a useful purpose in highlighting areas where research is required, though more thought is required when a policy request leads to a systematic review that turns up little of interest (or only one or two studies).

(iv) Developing and testing approaches to writing plain-language summaries of systematic reviews in HPSR. This could also involve creating a “graded entry” for a systematic review in 1:3:25 format (one page of take-home messages; a three-page executive summary; then the full systematic review).

(v) Developing and testing a set of generic questions that help people to assess the applicability of a particular review to their own context;

(vi) Developing systematic approaches for moving from systematic reviews to policy advice.

BOX 6

McMaster University and HPSR Systematic Reviews

A team at McMaster University in Canada has recently developed and refined a taxonomy of governance, financial and delivery arrangements within health systems, and created a database of systematic reviews that address questions about such arrangements. They have identified more than 900 systematic reviews that typically address delivery arrangements (including, for instance, the site of service delivery).

(v) HPSR and the Policy Process

Even if reviewers were to tailor the future production of systematic reviews for policy-makers – e.g. by focusing on “what works” – there remain a host of other ways
reviewers will need to enhance and improve the ultimate utility of their reviews.\textsuperscript{32} First, policy-makers have supported the idea of reviews providing information about two prominent types of decision-relevant information – harms (or risks) and costs (not just benefits).\textsuperscript{6} This would require a greater emphasis on examining the evidence within primary studies regarding these particular outcomes, with one useful approach for doing so developed by the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) working group.\textsuperscript{33} Providing information about the actual costs of interventions also requires a broader consideration of economic issues in systematic reviews, a topic currently under examination by the Campbell & Cochrane Economics Methods Group.\textsuperscript{34} Second, highlighting the contextual factors that may affect a review’s applicability is imperative in deciding upon the relative local value of a review. Differences in health systems mean that an intervention that works in one jurisdiction may not necessarily work the same way in another. One approach to assist policy-makers in this regard is to highlight features of the intervention and the context in which it was employed that would influence assessments of the review’s local applicability. Another approach is to equip policy-makers with a tool to conduct this assessment of local applicability through the use of questions such as those described recently by Lavis et al (2004) (see Box 8) and by Gruen et al (2005).\textsuperscript{35}

**BOX 7**

**GRADE: Grading of Recommendations, Assessment, Development and Evaluation**

With particular relevance for clinical practice guidelines, GRADE has developed a system for assessing the quality of evidence and the strength of recommendations across a wide range of interventions and contexts. “Judgments about the strength of a recommendation require consideration of the balance between benefits and harms, the quality of the evidence, translation of the evidence into specific circumstances, and the certainty of the baseline risk. It is also important to consider costs (resource utilisation) before making a recommendation. Inconsistencies among systems for grading the quality of evidence and the strength of recommendations reduce their potential to facilitate critical appraisal and improve communication of these judgments. Our system for guiding these complex judgments balances the need for simplicity with the need for full and transparent consideration of all important issues.”\textsuperscript{35}

**BOX 8**

**Assessing the local applicability of systematic reviews of health system research**

**Could it work?**

- Are there important differences in the structural elements of health systems (or health system sub-sectors such as pharmaceuticals or home care) that mean an intervention might not work in the same way as in the countries where the research was done? This could include important institutional attributes such as the degree of integration in service delivery.

**Will it work? (or what would it take to make it work?)**

- Are there important differences in the perspectives and influence of those health system stakeholders who have the political resources to influence decisions around a particular intervention? This could include power dynamics involving professional associations, funders, and government ministries.

- Does the health system face other challenges that substantially alter the potential benefits and harms (or risks) of the intervention? This might include on-the-ground realities and constraints, such as the availability of financial resources and the supply, distribution, and performance of health human resources (including managers).
A third way to enhance the utility of reviews is through the development of user-friendly “front ends,” allowing rapid scanning for relevance. One example is the 1:3:25 graded-entry format championed by the Canadian Health Service Research Foundation, which includes one page of take-home messages, a three-page executive summary, and a full 25-page report. Interviews with healthcare managers and policy-makers suggest that presenting reviews in a format similar to 1:3:25 is preferred over traditional approaches. However, an analysis of websites suggests that reviews using this type of graded-entry format are rare. In a similar vein, the SUPPORT Collaboration has developed structured summaries of systematic reviews to present current knowledge concerning factors affecting use of reviews for policy-makers and of developments in summarizing evidence of reviews. Both of these “front-ends” represent a new and innovative approach for communicating key, user-friendly and decision-relevant review messages to a policy audience (particularly in LMICs).

Finally, a number of so-called “pull” strategies emphasizes the role that actual users of reviews can play in improving the utility and relevance of reviews. For instance, if all policy briefs and proposals (proposing changes in specific policies on specific issues) were required to have an underpinning of research evidence – and specifically evidence from systematic reviews – reviews could become a valuable input into the policy process. Likewise, regularly evaluating the capacity of policy-makers to acquire, assess, adapt and apply findings from systematic reviews could identify important gaps or weaknesses in skills and knowledge, and may well lead to the increased participation of policy-makers in capacity-strengthening programmes aimed to improve their skills for using reviews in policy-making.
(vi) Key Steps for Moving the Field Forward

Systematic reviews offer tremendous - if still poorly studied - opportunities to make research a key input into the policy process, and in answering the needs of critical stakeholders in the process. Indeed, there is a great deal of momentum behind those advocating for an increased focus on systematic reviews as a way to enhance the use of research in health policy and health systems in LMICs. Advocates agree that the reviews should: address a variety of questions relevant to policy-makers, going in many cases beyond effectiveness to answer their direct knowledge needs; move beyond effectiveness studies to those that address system-wide concerns, building a deeper stock of reviews relevant to HPSR; and include methods that are transparent, evaluable, and appropriate to the questions asked. However, there are a number of pressing issues that must be addressed:

- **Increasing funding.** Research funders need to recognize the critical contribution that systematic reviews can have, and support their future conduct through funding calls, applications and grants (for instance, a funder might consider financing a systematic review before funding a new evaluation study of a specific intervention). In this regard, much can be learned from the Alliance for Health Policy and Systems Research grants funding the Centres for Systematic Reviews in HPSR in LMICs (see Box 10).

- **Methodological development.** The continued methodological development of systematic reviews in HPSR is necessary in order to ensure their ultimate use and relevance. Priority areas where this should be done include developing methods for mapping the existing literature, searching LMICs health literature databases, and synthesizing different types of evidence.

- **Networking.** While there are already some good training programmes for present and future reviewers, there is still a strong need to boost the skills of LMIC reviewers, not only in systematic reviews in general but in reviews relevant to and drawing upon HPSR. Health system researchers in LMICs need to engage with leading organizations in the field of systematic reviews - such as the Cochrane and Campbell Collaborations - to build a greater sensitivity and responsiveness to HPSR. This engagement could start to address the insufficient stock of reviews in the field of HPSR and relevant methodological challenges (e.g. reviews involving non-experimental analyses and qualitative research). Through a compelling case to adapt, revise and even shift the focus of systematic reviews, HPSR will benefit greatly through the considerable experience and expertise of these organizations in the production of systematic reviews.

- **Training end-users.** Policy-makers need critical support and training to acquire, assess, adapt and apply systematic reviews. Capacity-strengthening programmes suited to their systematic-review needs should be created and implemented in LMICs. Likewise, policy-making organizations should promote the use of self-assessment tools among their staff to identify specific knowledge gaps and training needs.

- **Promoting knowledge translation networks.** The utility of systematic reviews will only increase the more responsive they become to the needs of policy-makers and other research-users. Knowledge translation platforms and networks - such as EVIPNet or REACH-Policy - that promote the use of well-packaged systematic reviews (e.g. via graded-entry or in the form of structured summaries) and that provide opportunities for interactions between reviewers, policy-makers and other research-users must be better supported.
The Alliance for Health Policy and Systems Research and Systematic Reviews

The Alliance is providing ongoing support to four systematic review centres in LMICs:

- the Centre for Systematic Reviews on the Non-State Sector in Health. Based at the Health Systems and Infectious Disease Division, International Centre for Diarrhoeal Disease Research (ICDDR,B), Bangladesh;
- the Centre for Systematic Reviews on Health Financing. Based at the Centre for Health Management and Policy, Shandong University, China;
- the Centre for Systematic Reviews on the Health Workforce. Based at the Institute of Public Health, Makerere University, Uganda.
- the Methodology Centre for Systematic Reviews of Health Policy and Systems Research. Based at the Escuela de Medicina, Pontificia Universidad Católica de Chile, Chile.

Technical support has been provided largely by three collaborating partners — the Oslo Satellite of the Cochrane Effective Practice and Organization of Care (EPOC) Group, the EPPI Centre, Institute of Education, London, and the Effective Health Care Research Programme Consortium, Liverpool School of Tropical Medicine, Liverpool.

For the range of actors working in the field of health policy and systems research, systematic reviews offer tremendous opportunities to connect the research and policy processes. As an input to the research process, systematic reviews in HPSR can drive consensus, synthesize evidence across disciplines, and prompt focused debates; as an input to the policy process, systematic reviews in HPSR can push discussions past methodology and hard science to vital considerations of cost-effectiveness, political and social acceptability, and equity. As a bridge linking these two processes, systematic reviews can incorporate and contextualize the voice and needs of relevant audiences, blend and balance the dictates of science with the priorities of policy, and ultimately contribute to better policies designed to strengthen health systems.

References


27 For more on Cochrane Centre training, see Piehl JH, Green S, Silagy C. Training practitioners in preparing systematic reviews: a cross-sectional survey of participants in the Australasian Cochrane Centre training program. *BMC Health Services Research*. 2002; 2: 11.


39 For a discussion of involving the media in systematic reviews, see Fox D. Evidence of Evidence-Based Health Policy: The Politics of Systematic Reviews in Coverage Decisions. *Health Affairs*. 2005, 24:1.


The Alliance for Health Policy and Systems Research ("the Alliance") is an international collaboration based within WHO Geneva. Its primary goal is to promote the generation and use of health policy and systems research as a means to improve health and health systems in developing countries.

Specifically, the Alliance aims to:

- Stimulate the generation and synthesis of policy-relevant health systems knowledge, encompassing evidence, tools and methods;
- Promote the dissemination and use of health policy and systems knowledge to improve the performance of health systems;
- Facilitate the development of capacity for the generation, dissemination and use of health policy and systems research knowledge among researchers, policy-makers and other stakeholders.

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