Use of research to inform public policymaking

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To improve health and reduce health inequalities, public policymakers need to find the best solutions to the most burdensome health problems, the best ways to fit these solutions into complex and often overstretched and underresourced health systems, and the best ways to bring about the desired changes in health systems. Systematic reviews can inform public policymaking by providing research-based answers to these questions. Public policymakers can encourage more informed policymaking by asking to see systematic reviews on priority issues, commissioning reviews when none exists, and placing more value on such work in their deliberations and in their interactions with stakeholders. Donors and international agencies can encourage more informed public policymaking by supporting national and regional efforts to undertake reviews and assess their local applicability, and by supporting regional or worldwide efforts to coordinate review and assessment processes.

Health ministers in low-income and middle-income countries who take their responsibility to improve health and reduce health inequalities seriously face both many challenges and little support. Quite legitimately in many cases, ministers can criticise the health-research community (especially funders), their political staff and civil servants, and others who seek to advise or influence them for not giving them what they need to be successful. Like clinicians, health ministers can benefit from high quality, locally applicable systematic reviews of research. Unlike clinicians, health ministers can turn to very few systematic reviews of the reports most relevant to them (ie, health systems research) and they cannot rely on advice about how to critically assess the local applicability of reviews.

In this report we describe the challenges that public policymakers (ie, health ministers, their political staff, and senior civil servants) face in answering three types of questions relevant to improving health and reducing health inequalities in their countries; outline an approach that public policymakers can use to critically assess the local applicability of systematic reviews of health systems research; and propose several steps that public policymakers, donors, and international agencies can take to ensure that in future public policymakers will stand a better chance of finding high quality, locally applicable reviews to inform their decisions. Although our observations are applicable across a range of potential health goals, we use the three millennium development goals most directly related to health systems—reducing child mortality, improving maternal health, and combating HIV/AIDS, malaria, and other diseases such as tuberculosis—to illustrate both the associated challenges and the opportunities on the horizon.[1,2]

Challenges faced by public policymakers

Improving health and reducing health inequalities, whether in general or in the specific domains implicated by the millennium development goals, constitutes a daunting task for public policymakers.[3,4] Three questions need to be answered: (1) what are the best solutions to the most burdensome health problems; (2) what are the best ways to fit these solutions into complex and often overstretched and underresourced health systems; and (3) what are the best ways to bring about the desired changes in health systems? We call these first-order, second-order, and third-order questions, respectively, because the complexity of both the issues and the investigations needed to address them become progressively more complicated from one level to the next. The iterative and time-pressured nature of the public policymaking process and the interrelations among the potential answers mean that the questions are often considered simultaneously.

Public policymakers are well served by researchers who help them find the best solution in terms of effectiveness and cost-effectiveness. Health ministers turn to their political staff and senior civil servants for input about other elements of what constitutes the best option. Feasibility is one such element, in view of the jurisdictional authority, administrative capacities, and financial discretion that government structures, public policies, and the financial situation have created for public policymakers and the broader government of which they are only a part.[5] Other elements include the probable acceptability of the available options to key health-system stakeholders (eg, civil society groups, patient groups, professional associations, non-governmental organisations, private businesses, donors, and international agencies), and its consistency with the governing party's political views.[5]

For public policymakers, systematic reviews offer two large advantages. First, such reviews reduce bias in the estimation of the effectiveness of an intervention by identifying all reported and unreported studies that address the research question, by selecting studies that meet explicit criteria, by appraising the quality of the studies using explicit criteria, and by synthesising the study results with a transparent process (not necessarily a quantitative process as is done with a meta-analysis). The likelihood that public policymakers will be misled by research is lower with systematic reviews than with individual studies.

Second, systematic reviews reduce the role that chance has in estimates of effectiveness by increasing the number of units for study, thereby providing more precise estimates of effect, and sometimes allowing the estimation of the effectiveness of an intervention in specific subgroups. Public policymakers can be more confident about what can be expected from an intervention when they use a systematic review.

For the less senior civil servants and other advisers who support public policymakers, drawing on the systematic reviews produced by others constitutes a more efficient use of their time. Instead of undertaking an informal review of reported data on their own, they can focus on assessing the local applicability of existing reviews and on gathering and interpreting the other types of information that public policymakers need to inform their decisions. Systematic reviews also offer advantages to research funders and researchers. Funders, whether inside or outside government, can use systematic reviews to identify gaps in existing knowledge and thereby adjust their priorities and make more efficient use of their resources. Researchers can cite systematic reviews in their applications for funding and for ethics review, both of which increasingly need reviews to support statements about the need for additional investigation.

The Cochrane Library provides an increasingly rich resource for public policymakers. It contains all systematic reviews that have been quality assessed, either through the standards of the Cochrane Collaboration's domain-specific review groups (for Cochrane reviews) or through the application of a set of quality criteria by two independent reviewers (for reviews from the Database of Reviews of Effects). These quality assessments should evolve as systematic reviews are done in complex domains such as health care financing in low-income countries, but the very emergence of a review in this domain is a triumph.[6] *The Cochrane Library* also contains all economic evaluations that have been quality assessed through the application of a set of criteria by two independent reviewers.

Neither systematic reviews in general nor *The Cochrane Library* specifically are a panacea. Many questions relevant to public policymakers have not yet been asked (ie, no protocols have been developed) or addressed (ie, a protocol exists but the review has not yet been completed). Moreover, a systematic review can fail to yield a research-based answer to a public policymaker's question because high-quality work has either not been done or is not locally applicable. A systematic review can yield an inconclusive research-based answer because high-quality work has generated as-yet-unexplained divergent results. Conversely, on occasion a single rigorously designed and conducted study in a relevant setting can by itself provide useful information for policymaking, such as when a public policymaker has commissioned research to assess the impact of a major policy initiative.

In a political context, the knowledge that there is no research-based answer or an inconclusive answer can be a powerful resource in dealing with stakeholders who purport to have identified the best solution and in building the case for further assessments of either the present situation or new innovations. Notably, systematic reviews are not inherently conservative in their implications. An absence of evidence of effect is not the same as evidence of no effect; the first suggests the need for more (or different types of) research whereas the second suggests the need for a different solution.

Finding solutions

Research-based answers to first-order health-system questions, specifically what are the most effective and cost-effective solutions to the most burdensome health problems, are among the easiest to find. A key word search in *The Cochrane Library* will yield all quality-assessed reviews on a specific topic. Thorough answers to these questions for the millennium development goal of reducing child mortality have been especially well documented. Investigators have calculated that 42 countries accounted for 90% of the 10·8 million child deaths in 2000.[7] They also calculated that making 15 preventive interventions and eight treatment interventions universally available in the 42 countries would reduce child mortality by 63% and thereby achieve the millennium development goal.[8]

Finding solutions is especially amenable to between country and worldwide collaborations. The 23 preventive and treatment interventions that were recommended to reduce child mortality, for example, were supported by (among other types of research) seven publications that had in their title the terms Cochrane review (four), systematic review (one), meta-analysis (one) or pooled analysis (one).[8] Only one of these reviews—the Cochrane review of insecticide-treated bednets and curtains for preventing malaria—drew on 22 trials done in 16 different countries.[9] Clinical and public health interventions such as this one against malaria are often readily accepted as transferable beyond the countries where the research was done.

Systematic reviews can also be used to inform decisions about different approaches to standard treatment, such as oral rehydration solutions. In children admitted to hospital with diarrhoea, reduced osmolarity oral rehydration solution, when compared with WHO standard oral rehydration solution, is associated with fewer unscheduled intravenous fluid infusions, lower stool volume, and reduced vomiting with no additional risk of developing hyponatraemia.[10] Also, rice-based oral rehydration solution seems to be

effective in reducing stool output in people with cholera, however, this effect was not apparent in infants and children with non-cholera diarrhoea.[11]

Fitting solutions into health systems

It is in trying to answer the second-order health system questions—the types of questions asked by public policymakers when they face the challenge of how best to fit interventions, often advocated in the form of a vertical programme, into a health system—that the dearth of systematic reviews of health systems research first becomes apparent.[12] Such questions include: (1) what governance arrangements for a programme are most conducive to achieving a particular health goal while also accomplishing other societal goals such as community involvement; (2) what financial arrangements for a programme (ie, mechanisms to raise revenue, fund organisations, and remunerate health workers) are most conducive to achieving a particular health goal while also accomplishing other societal goals such as equity in the burden of paying for and using all types of effective health care; and (3) what delivery arrangements (ie, by whom, where, and how a programme is delivered) are most conducive to achieving a particular health goal while also accomplishing other societal goals such as achieving universal and sustained coverage of a range of high quality, cost-effective interventions? Most systematic reviews that address such questions have been completed under the auspices of Cochrane's Effective Practice and Organization of Care group.[13] Few of the reviews focus on low-income and middle-income countries. Other articles in this series discuss the use of research to inform governance arrangements (eg, mechanisms to empower poor clients to hold service providers accountable),[14] financial arrangements (eg, health-care financing mechanisms),[6] and delivery arrangements (eg, scaling up interventions to the level of entire health systems).[15]

Not enough high-quality work has been done on many key questions related to health systems, and investigators have suggested that public policymakers should incorporate rigorously designed assessments into any future changes to governance, financial, or delivery arrangements. For example, few high-quality studies have been done to assess the effects of strategies for integrating primary health care services in low-income and middle-income countries despite concerns that the fragmentation of primary care service delivery that often accompanies vertical programmes (such as those often advocated to achieve the millennium development goals) might result in worse patient outcomes and higher costs.[16] If many of the public policymakers who are now making choices about the degree of integration needed in the delivery arrangements to achieve the millennium development goals were to support assessments of the effectiveness of the arrangements they choose, the next systematic review on this topic might yield a research-based answer to the more challenging question of under which conditions one strategy is more effective than another. Delivery arrangements could move incrementally along the vertical-to-horizontal continuum and along the selective-to-integrated continuum as health systems gain capacity in service delivery,[15] for example, but this could be the focus for future studies and a review based on these studies.

Bringing about change in health systems

Systematic reviews of health systems research are also often unavailable to help answer third-order questions, which are the types of questions asked by public policymakers when they face the challenge of implementing their decisions about how to fit particular solutions into the health system (ie, what are the best ways to bring about the desired changes in health systems?). Some governments possess the authority to make changes happen in health systems by decree. Most governments, however, rely on some combination of educational and other change interventions targeted at individuals (eg, mass media campaigns for the general public and clinical practice guideline implementation strategies for clinicians), financial and other incentives targeted at either individuals or organisations (eg, performance-based incentives for health-system managers or performance-based funding for health care organisations), and regulations targeted at organisations and coupled with varying degrees of monitoring and enforcement.

Not all the options for bringing about change in health systems are equally effective or effective in all situations. To bring about changes in health systems through changing clinical practice, an overview of 54 systematic reviews generated the following conclusions:[17,18] (1) well-designed interventions typically have some effect, averaging about a 10% improvement across studies; (2) there is more evidence on clinician-oriented interventions (eg, education, feedback on performance, and reminders) than on patient-focused or organisation-focused interventions; and (3) the cost-effectiveness of interventions is rarely assessed (although this is beginning to change).[19] Unfortunately very few of the studies included in the reviews were done in low-income and middle-income countries.[20] We do not yet have the advantage of a systematic review that examines the effectiveness of options for bringing about change in organisations such as community health centres and hospitals. Reviews of these methodologically diverse reports have identified several models (ranging from single instruments to comprehensive methodologies) for understanding, managing, and dealing with change but the reviews have not explicitly examined the relative effectiveness of the models.[21–23]

***Panel:* Assessing the local applicability of systematic reviews of health systems research**

Could it work?

- Are there important differences in the structural elements of health systems (or health system subsectors such as pharmaceuticals or home care) that mean an intervention could not work in the same way as in the countries where the research was done—eg, 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 that mean an intervention will not be accepted and taken up in the same way—eg, power dynamics involving professional associations and donors.
- Does the health system face other challenges that substantially alter the potential benefits and harms (or risks) of the intervention—eg, 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)?
- Can power dynamics and on-the-ground realities and constraints be changed in the short-term to medium-term and what are the prospects for making this happen?

Is it worth it?

- Is the balance of benefits and harms (or risks) classifiable as net benefits, trade-offs, uncertain trade-offs, or no net benefits, and are the incremental health benefits from incorporating the intervention among the mix of interventions provided worth the incremental costs?

Recognising differences in health systems

Public policymakers are likely to ask two questions when faced with the results of a systematic review of health systems research (ie, investigations addressing a second-order or third-order question), especially when no research from their country was included in the review: (1) what can be expected if the same thing is done in our country, and (2) what can be expected if things are done differently? An appreciation of the importance of context often leads investigators to answer that they do not know whether the same intervention will work in a different setting or whether a modified intervention will work in any setting. We cannot be certain that reviews of health systems research are transferable beyond the countries (or even beyond the areas within countries) where the research was undertaken. We also cannot deduce with any certainty how modifications to an intervention will alter its effectiveness unless this question was asked explicitly as part of the review.

Assessing local applicability

A structured approach to critically assessing the local applicability of systematic reviews of health systems research would help public policymakers navigate between the extremes of assuming no transferability when no research from their country was included in a systematic review, and assuming full transferability. The parallels between the issues faced by clinicians trying to assess the applicability of clinical research to their patients and public policymakers trying to assess the applicability of reviews of health systems research to their health systems lead us to propose an approach for public policymakers that follows the same general structure as the users' guides for clinicians.[24] The three questions that we propose to assist public policymakers in critically assessing the local applicability of systematic reviews of health systems research (panel) correspond to the issues of efficacy (does an intervention do more good than harm under ideal circumstances?), effectiveness (does an intervention do more good than harm under usual circumstances in the field?), and efficiency (does the resulting mix of interventions provided and their distribution among members of society accord with the value of the interventions to individuals in society?).[25]

Answering the "could it work?" question necessitates a focus on institutional attributes at the level of the health system implicated by a systematic review. The transferability of a review that addresses an overarching feature of the health system, such as governance arrangements for purchasing authorities in health systems that separate purchasers' and providers' roles, might vary according to whether the country being compared with those included in the review had similar degrees of integration (or fragmentation) in primary care service delivery. On the other hand, the transferability of a review that addresses a health system subsector, such as bulk-purchasing arrangements for prescription drugs, might not vary according to any overarching feature of the health system, but it might vary according to the concentration in ownership of pharmacies because fewer price reductions may be passed onto patients in subsectors with concentrated ownership. These structural elements of health systems are hard to alter, particularly when the significant change is being advocated primarily because it means a single intervention is more likely to work in the same way as in other countries.

Answering the "will it work?" question necessitates an even more refined understanding of a health system because it taps into power dynamics (ie, are those groups with the political resources to influence public policymaking likely to support a change?) and on-the-ground realities and constraints (ie, are the necessary infrastructure and resources in place and are the starting points for change comparable?). For example, the immediate transferability of a review that addresses a new delivery arrangement for the front-line care of

people living with HIV/AIDS, and specifically one that means the substitution of one type of health worker for another, might vary according to the perspectives and influence of the two types of health workers, as well as their supply, distribution, and performance. If associations of physicians or nurse practitioners are listened to by key government officials, or are given the option of circumventing a decision by exiting the public system or even emigrating, the likelihood is low that a review that included studies from countries in which these conditions were not present would be considered locally applicable. Answering the "will it work?" question also neccessitates a comparison of the countries' starting points in terms of the magnitude of the health problem being faced or the existing pattern of use of the intervention or both. The benefits achieved for a specific expenditure on a new treatment for HIV/AIDS may not be the same in countries with different prevalence rates or with different uptake rates of existing therapies in particular target populations.

The related "what would it take to make it work?" question needs an assessment of the extent to which power dynamics and on-the-ground realities and constraints can be changed in the short-term to medium-term and the prospects for making this happen. Power dynamics, such as when one influential group can effectively block change if it threatens their position, can be very difficult, but not impossible, to alter. Realities and constraints in the field may be more amenable to change over time.[15] Distribution networks for drugs can be improved. Difficulties with the supply, distribution, and performance of health workers can be addressed.[26] Doing so needs a sustained commitment.

Answering the "is it worth it?" question can be made easier by classifying the balance of benefits and harms (or risks) as net benefits, trade-offs between different types of benefits, uncertain trade-offs, or no net benefits, and then assessing whether the incremental health benefits from incorporating the intervention among the mix of interventions provided are worth the incremental costs.[27] Systematic reviews and economic evaluations can help to get the numbers right. But the answer to the question is a political choice and values play a central role in choosing between options. Nevertheless, the availability of systematic reviews and economic evaluations can make more transparent the application of values in a decision and compel both public policymakers and stakeholders to justify their decisions or positions more clearly. This reasoning is analogous to that used in clinical decision-making when the answer to the question is an inherently personal one for the patient (although governments may have an important role in determining, for example, the costs to the patient).

As with any new proposal, this approach to critically assessing the local applicability of systematic reviews of health systems should be tested. To test its perceived usefulness, a sample of systematic reviews of health systems research could be identified and the reviews assessed for their applicability to a range of different countries, and these assessments could then be rated for their usefulness by public policymakers in these countries. To examine the effect of the approach, multicountry case studies could be undertaken to examine whether, how, and under what conditions systematic reviews with and without applicability assessments are used to inform public policymaking. Testing the approach will also help to identify the more detailed questions that need to be asked in these applicability assessments.

Doing things differently

For various reasons, public policymakers might believe that they cannot adopt an intervention that a systematic review suggests would be the most effective or cost-effective. Policymakers might think they cannot mobilise the necessary political or financial and human resources to make an intervention work. For example, policymakers might already have secured a concession from a professional association and might not believe they can ask again, or they may face shortages in key health human resources and therefore be unable to support an intervention that needs highly skilled professionals. Alternatively, public policymakers may have political concerns about adopting an intervention, such as fear of a public backlash. Many public policymakers would then ask: (1) if only one component of an intervention can be undertaken, which component should be selected, and (2) if there is a commitment to undertaking all components of an intervention in the long run but only one component can be undertaken now, how should the components be sequenced?

In some cases, public policymakers can draw on systematic reviews of studies that have examined the components of an intervention or alternative approaches to sequencing the components of an intervention. For example, directly observed therapy is a component of the internationally recommended control strategy for tuberculosis.[28] A systematic review reported in November, 2002, compared directly observed therapy with self-administered treatment at home in people needing treatment for clinically active tuberculosis or needing medication for the prevention of active disease.[29] The review showed that the effects of direct observation on cure or treatment completion were similar to those of self-administered treatment,[29] which suggests that this component of the intervention might not be critical to its effectiveness. More often, public policymakers can draw on process assessments, which are typically qualitative in nature, and seek to understand how and why an intervention might work. These types of studies can also be systematically reviewed albeit using different approaches for selecting, appraising, and synthesising studies. The reviews can

inform decisions about implementing or sequencing components of an intervention.

Improving the outlook

Public policymakers, donors, and international agencies can take several steps to raise the likelihood that high quality, locally applicable systematic reviews will inform public policymaking and decisions about funding for more (or different types of) research. Public policymakers can encourage more informed policymaking by asking to see systematic reviews on priority issues, ensuring that these reviews are commissioned when none exist, and placing more value on them in their deliberations and in their interactions with stakeholders. Creating demand for systematic reviews will, at least in part, encourage their supply. Public policymakers can also encourage funders to become more involved in supporting systematic reviews of health systems research, and encourage and support researchers to do more systematic reviews. However, the usefulness of the reviews hinges on the availability of high-quality health-systems investigations, so funding for primary studies cannot be neglected in a transition toward more funding for systematic reviews.

Some trends suggest that efforts to encourage and support researchers to do more systematic reviews are paying off. The proportion of Cochrane reviewers from low-income and middle-income countries has risen from 5·6% in 2000 to 7·1% in 2002 and 8·2% in 2003.[30] In 2000, there were 5436 Cochrane reviewers in 64 countries; by 2003 there were 9281 reviewers in 83 countries.[30] Open-access initiatives, such as the Health Internetwork Access to Research Initiative, facilitate the participation of investigators from low-income and middle-income countries in initiatives like the Cochrane Collaboration. These initiatives do not address the challenge of accessing the large volume of studies that are done in low-income and middle-income countries and that either are not reported or are reported in journals that are not indexed in bibliographic databases. This omission remains a stubborn challenge, although one that an international registry of randomised controlled trials will address in part.

Donors and international agencies can encourage more informed public policymaking by supporting national and regional efforts to undertake reviews and assess their local applicability and by supporting regional or worldwide efforts to coordinate review and assessment processes. Shared problems and resource constraints in many countries, coupled with the potential for economies of scale (ie, reductions in the average cost as output increases), suggest the need for some cooperation in the priority-setting and commissioning processes for systematic reviews of health systems research. There may even be economies of scale in adapting the presentation of the systematic reviews so that benefits, harms, and costs, and the elements that could change assessments of local applicability, are clearly emphasised. The same may hold true for identifying persuasive case studies of effective interventions to give life to the presentations.

The regional and worldwide efforts could be integrated into a new or existing support function for public policymakers, ideally one that is governed in large part by public policymakers or their representatives. The European Observatory on Health Systems and Policies provides a model for such a support function,[31] which could be adapted for low-income and middle-income countries. The secretariat for the support function could, among other roles, take responsibility for setting priorities for systematic reviews in collaboration with public policymakers and key stakeholders in countries and with technical experts in regions, developing links with groups like the Cochrane Collaboration, identifying or commissioning systematic reviews or both, identifying optimal presentation formats for different types of public policymakers and stakeholders, developing actionable messages (ie, clear statements about the most effective solutions to particular health problems, how to fit solutions into health systems, and how to bring about change in health systems, which are appropriate to both the target audience and their local context), providing national or regional workshops or both and other types of face-to-face interactions for public policymakers and stakeholders to discuss how to take action on the messages, and developing a searchable database of actionable messages with links to the systematic reviews on which the messages are based and to intelligence gathered about how best to facilitate action based on the messages.[32] The WHO Reproductive Health Library provides a model for a searchable database of high-quality reviews.[33]

Conclusion

Politics will always have a role in public policymaking but improving health and reducing health inequalities in low-income and middle-income countries (and indeed in high-income countries) will be made a bit easier if high quality, locally applicable reviews are considered in the policymaking process. If anything, we have underestimated the potential for systematic reviews of health systems research. We have focused on instrumental uses of such work made possible by reviews that answer questions about effectiveness. What have been called conceptual uses of research, whereby investigations change the way that problems, solutions, and their interrelations are framed and understood, among other benefits, also warrant exploration.[5] We have focused on public policymakers, but health-system managers working in community health centres, hospitals, and health districts and stakeholders such as civil society groups can also benefit from systematic reviews of health systems research. Public policymakers, donors, and international agencies have important roles

to play in realising the formidable potential of systematic reviews to shape the future of health systems and thereby help to achieve both national health goals and, where relevant, the millennium development goals.

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