



A Guide for Evidence-Informed Decision-Making, Including in Health Emergencies

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A Guide for Evidence-Informed
Decision-Making,

Including in Health Emergencies

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Abbreviations and Acronyms

EBP

Evidence Brief for Policy

EIDM

Evidence-informed Decision-making

EVIPNet

Evidence-informed Policy Network

GRADE

Grading of Recommendations Assessment, Development
and Evaluation

HTA

Health Technology Assessment

LMICs

Low- and Middle-Income Countries

PAHO

Pan American Health Organization

PICO

Population, Intervention, Comparator/Control, Outcome

PRISMA

Preferred Reporting Items for Systematic reviews and Meta-Analyses

RCT

Randomized Controlled Trial

WHO

World Health Organization

Methodology

This guide was developed based on key World Health Organization (WHO) and Pan American Health Organization (PAHO) documents, a review of the literature related to evidence-informed decision-making (EIDM) for clinical practice, public health, and health systems decisions, and on the experience and expertise of the authors and reviewers.

The guide was reviewed by various expert reviewers from ministries of health and other institutions responsible for EIDM, as well as from within PAHO. The contributions and comments of each reviewer were used to make improvements to the content of the guide.

This guide builds on, and contextualizes, the related EIDM guide for WHO staff that presents the “evidence ecosystem for impact” framework, including the evidence creation funnel (Figure 1) and the “policy/action cycle” (Figure 2). These two figures are reproduced from the WHO guide.¹

¹ World Health Organization. Evidence, policy, impact. WHO guide for evidence-informed decision-making. Geneva: WHO; 2021

■ Summary

Evidence-informed decision-making (EIDM) emphasizes that decisions should be informed by the best available evidence from research, considering factors such as context, public opinion, effectiveness, safety, impact on equity, feasibility of implementation, affordability, sustainability, and acceptability to stakeholders. The evidence-informed approach to decision-making is, at its core, about better decisions for better health, avoiding harm, and making more effective use of scarce resources. EIDM can also improve transparency and accountability. EIDM includes decisions about clinical practice, public health, and health systems.

To better understand EIDM, an evidence funnel and the “policy/action cycle” help to describe the process and show the links and overlap that can exist between the two. Key evidence products produced as part of the EIDM process include guidelines, health technology assessment reports, and evidence briefs for policy. Systematic reviews play an important role in EIDM as they are the core element of all the evidence products mentioned previously. When choosing between the different types of research evidence for EIDM, it is important to consider the research question that needs answering and the quality of the study in addition to study design.

The key steps in the EIDM process for which research evidence is essential include identifying a high-priority issue, selecting interventions/options, appraising implementation considerations, monitoring implementation, and evaluating impact. The steps that are less dependent on research evidence include communicating and engaging with decisionmakers, implementing the intervention, and sustaining change.

The use of evidence to inform decisions can be improved through understanding the context, considering health equity, involving stakeholders early in the process, managing conflicts of interest, co-producing research with stakeholders, and using rapid methods when needed for production of evidence syntheses and evidence products. Throughout the process it is important to ensure sufficient quality of evidence syntheses and evidence products, and to encourage uptake by decisionmakers through user-friendly formats. Impacting on policy can be more challenging. Institutionalization of EIDM is important for ongoing success, and embedding EIDM in low- and middle-income countries may need additional efforts.

EIDM for health emergencies should follow similar principles and processes as for decisions in other contexts, but needs to be done at greater speed. As has been seen during the COVID-19 pandemic, any existing problems with the EIDM infrastructure will be amplified, although the COVID-19 pandemic has also offered many gains for EIDM. It has given unprecedented visibility to research evidence and its use in health decision-making, and greater attention to scientific advisors and advisory bodies. It has also been witness to some extraordinary efforts of cooperation and collaboration between research groups, the World Health Organization, and governments, and these provide a platform to build on. However, stronger institutionalization of EIDM is required and EIDM needs to be considered in the planning process for future health emergencies. The main text of the publication offers some potential solutions to the challenges encountered during the COVID-19 pandemic so that the world can be better prepared for the next health emergency.

1. What Is Evidence-informed Decision-making and Why Is It Important?

Definition of EIDM

Evidence-informed decision-making (EIDM) emphasizes that decisions should be informed by the best available evidence from research, considering factors such as context, public opinion, effectiveness, safety, impact on equity, feasibility of implementation, affordability, sustainability, ethics, and acceptability to stakeholders (1–3). EIDM is a systematic and transparent approach that can be applied across the decision-making process, including to: (i) identify a high-priority issue; (ii) select interventions/options; (iii) appraise implementation considerations; and (iv) monitor implementation and evaluate impact (2–4).

The evidence-informed approach to decision-making is, at its core, about better decisions for better health, avoiding harm, and making more effective use of scarce resources (1, 4–6). EIDM includes decisions about clinical practice (programs, services, and products that target individuals), public health (programs and services that target groups and populations), and health systems (governance, financial and delivery arrangements, and implementation strategies) (2, 3).

Why is EIDM Important

EIDM is important because it helps to: (i) ensure that an intervention is effective in achieving the intended outcomes; (ii) ensure that no harm will come from the implementation of an intervention; (iii) maximize use of resources and ensure the highest return on investment; and (iv) help minimize health inequities (1, 5–7). EIDM can also increase transparency and accountability (4, 8).

The COVID-19 pandemic has provided several examples of the importance of EIDM in a health emergency. An example of harm when EIDM is not practiced was the use and promotion of hydroxychloroquine or chloroquine to treat COVID-19 in many countries despite lack of evidence; a treatment that has now been shown to increase mortality and have no effect on other outcomes (9). An example of success is the use of corticosteroids to treat critically ill COVID-19 patients. This intervention was not recommended at the beginning of the pandemic, but as moderate quality evidence of its effectiveness became available (9), the number of countries recommending corticosteroid use has increased.

Origins of EIDM

EIDM has its origins in the evidence-based medicine movement, which was first formally described by Guyatt et al. in 1992 (10)¹ as a more scientific and systematic approach to the practice of medicine (11). Evidence-based medicine has been defined as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients” (12), and within this, the integration of clinical expertise is said to be key. “Evidence-based public health” expands this concept to encompass a population focus as well as the integration of community preferences (1, 11). Other variations of the term include evidence-based practice, evidence-based health care, evidence-based nursing, and evidence-based policy, depending on the specific area of practice.

¹Although first formally described by Guyatt et al. in 1992, the evidence-based medicine movement first started in 1981 when a group of clinical epidemiologists at McMaster University (Hamilton, Canada), led by David Sackett, published the first of a series of articles in the Canadian Medical Association Journal advising physicians how to appraise the medical literature.

The current emphasis on evidence-informed rather than evidence-based decision-making acknowledges the many factors, beyond simply evidence of effectiveness and safety, that influence decision-making (1, 5, 13). Depending on the type of decision (clinical practice, public health, policy) these factors can include context, public opinion, institutional constraints, equity impacts, feasibility of implementation, affordability, sustainability, and acceptability to stakeholders, among others (1, 2, 14). These factors can be explicitly incorporated into the decision-making process in a transparent and structured way, and can be supported by research evidence (15–21).

Purpose of this Guide

Various guides have been produced over the years on topics related to EIDM, including on evidence-based medicine, evidence-based public health, evidence-informed policy, and on the use of knowledge translation to link research to action (22–26). However, the field is constantly evolving and EIDM practitioners are continually learning, and the COVID-19 pandemic has highlighted deficiencies in the EIDM infrastructure and in its practice that need to be addressed so as to be better prepared for the next health emergency. Similarities in practice across EIDM for clinical practice, public health, and health systems have also become apparent. Moreover, there was no single guide that brought together the most important aspects of EIDM, as applied to clinical practice, public health, and health systems, and for all relevant audiences.

This guide aims to bring together the most recent thinking in the EIDM field and to present this in a format that is accessible to a wide audience of EIDM practitioners. It builds on, and contextualizes, the related World Health Organization (WHO) guide Evidence, Policy, Impact. WHO Guide for Evidence-Informed Decision-Making (3). The WHO guide presents the “evidence ecosystem for impact” framework, including the evidence creation funnel and the “policy/action cycle” that are reproduced in this publication (3).

Scope of this Guide

This guide applies to clinical practice, public health, and health systems decisions. In particular, the focus is on interventions or options, including products (e.g., prescription medicines, health technologies), services (e.g., surgery, diagnostic test, health check, counseling), programs (e.g., screening, vaccination, education, prevention, health promotion), policies, and health system arrangements (governance, financing, delivery) (2). The word “intervention” is used throughout this guide in a broad sense to include all of the above concepts. While the type of intervention and decision can vary, the principles and processes are the same – although these will be affected by the different decision-making contexts. This process of EIDM involves the use of research evidence to identify a high-priority issue; select interventions/options; appraise implementation considerations; and monitor implementation and evaluate impact.

The guide considers the development of guidelines, health technology assessments (HTAs) and its reports, and evidence briefs for policy (EBPs), and shows similarities between them in the EIDM process. It also shows the links between the different types of evidence used in EIDM, including data analytics, modeling, behavioral/implementation research, evaluation, and systematic reviews (evidence synthesis).

Audience for this Guide

The audience for this guide includes researchers, decisionmakers (including policymakers, managers, healthcare professionals), and any other professionals or stakeholders involved in developing, commissioning, or using evidence products to inform decision-making.

2. Evidence-informed Decision-making in Practice

To better understand EIDM and how to do it, it is helpful to introduce the evidence funnel (Figure 1) and the “policy/action cycle” (Figure 2), and to show the links and overlap that can exist between the evidence funnel and the “policy/action cycle” (3, 27). A more in-depth description of the funnel and cycle can be found in the WHO guide for EIDM (3).

The Evidence Funnel

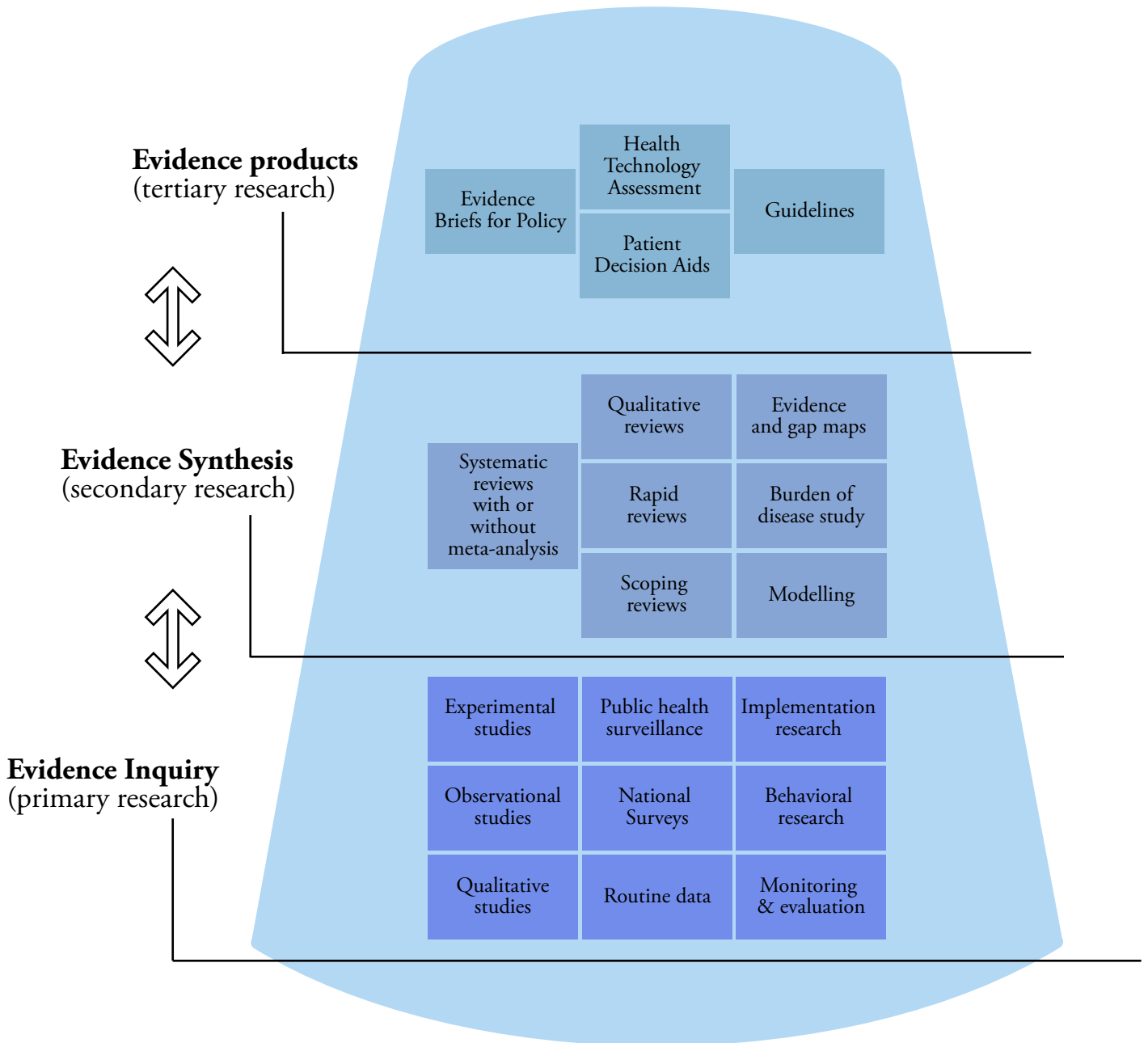
The evidence funnel shows some of the different types of evidence that can be created through research (Figure 1) and that are used to inform decision-making (3, 27). The research can be conducted by researchers, in conjunction with decisionmakers, and can also involve other stakeholders in its development and use. The funnel includes three levels, going from (i) evidence inquiry (primary research) at the base of the funnel, which feeds into (ii) evidence synthesis (secondary research), which in turn feeds into the creation of (iii) evidence products (tertiary research). A description of each level follows.

Evidence inquiry (primary research) requires collection of data or information directly from individuals in the population. The unit of analysis is generally the individual. Examples of primary research include qualitative research (e.g., research that collects data using focus groups or interviews and analyses these using qualitative approaches), case reports, case series, surveys or other types of cross-sectional studies, surveillance data, case-control studies, cohort studies, randomized controlled trials (RCTs), quasi-experimental studies, controlled trials, and evaluations (including of process, outcome, and impact).

Evidence synthesis (secondary research) uses data or research that have already been collected through primary research. The unit of analysis is generally primary studies. Evidence syntheses or systematic reviews can address a wide range of questions (such as the effectiveness of health interventions or people’s views on the acceptability of these interventions), may have different purposes and use different methods (including quantitative and qualitative approaches), and may be done more or less rapidly. The core elements of an evidence synthesis, however, is that it is done systematically and transparently to limit bias. Meta-analysis can generally be conducted as part of the systematic review when the studies included are sufficiently similar and use the same (quantitative) outcome measures.

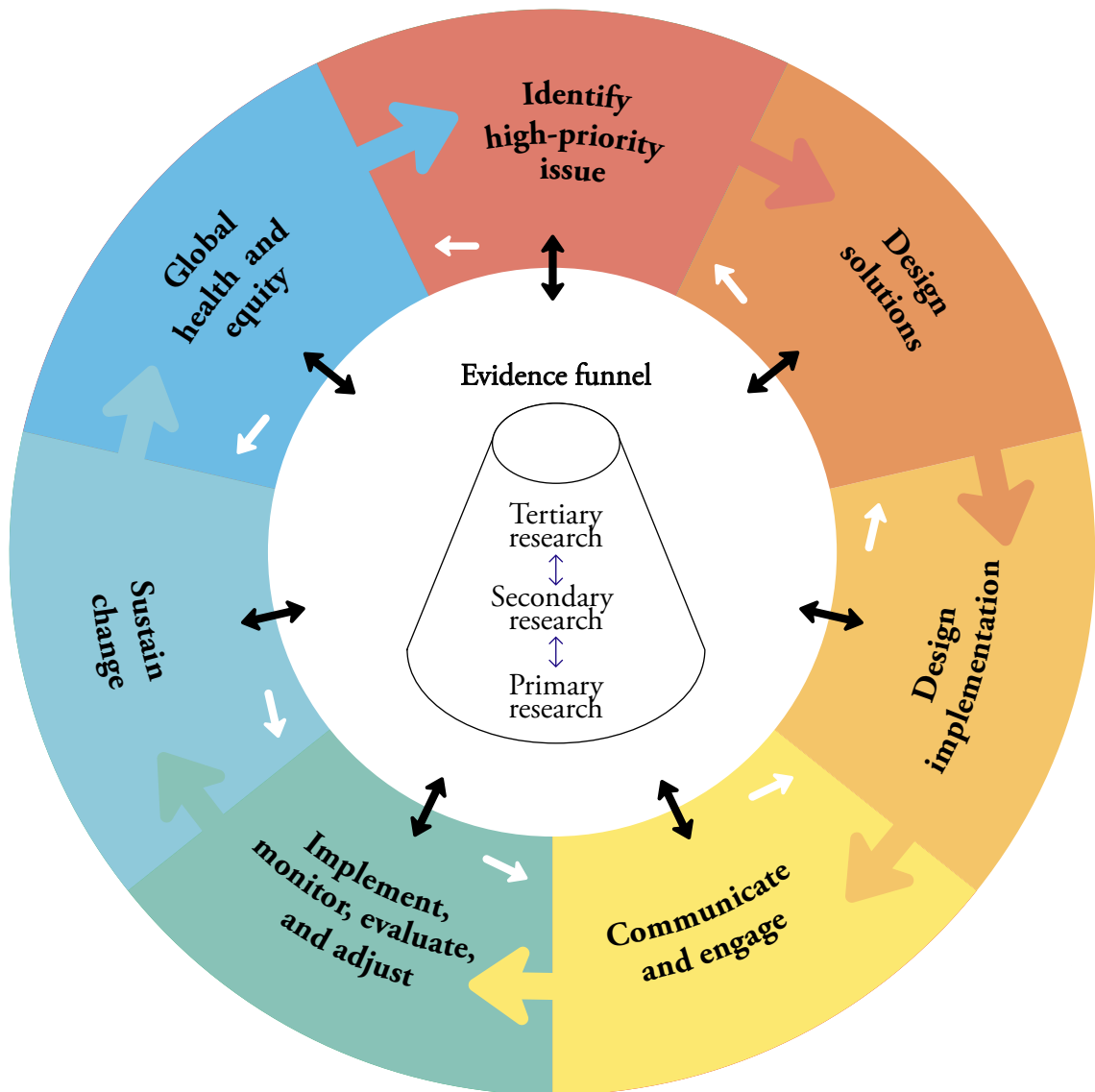
Evidence products (tertiary research) summarize or synthesize the results of secondary research and can also include primary research where needed. Evidence products can also be thought of as knowledge translation tools or as tools/processes to link research to action. Examples of evidence products include clinical practice guidelines, public health or health system guidelines, HTA reports, and EBPs. They are designed to facilitate decision-making by using systematic and transparent approaches to access, synthesize, and interpret research evidence; and to integrate that evidence with the other information, values, and judgments to inform decisions about practice or policy (4, 28). They usually involve stakeholders in their development, such as consumers, health professionals that work within the relevant area, researchers, and managers or policymakers (29–31). Depending on the purpose and audience, they may or may not include the formulation of recommendations (4, 28, 32).

Figure 1. The evidence funnel



Source: Adapted from (3, 33).

■ **Figure 2.** The “policy/action cycle”



Source: Adapted from WHO 2021 (3).

The “Policy/Action Cycle”

The “policy/action cycle” shows how the application (or use) of research evidence within the policy or practice decision-making process can be enhanced to achieve improvements in population health and equity (Figure 2). It is based on the idea of both the knowledge-to-action cycle (as proposed by Graham and colleagues [27]) and the policy cycle (34, 35), which exist in various forms. While the cycle shows how the process can work, it is important to remember that the policymaking process is rarely linear, sequential, or cyclical, as implied by the cycle figure (34, 35). Moreover, one can start at any step of the cycle and work backward to fill gaps.

By looking at the policy process in terms of these steps, it can help one to understand how the process does (or should) work (35) and to be prepared with the evidence when policy windows open (36, 37). Moreover, it can help to foresee (and create) emergent windows, respond quickly to opening windows, frame research in line with appropriate windows, and persevere in closed windows (37) – see also Chapter 4. It can also help to understand how research evidence may be used or generated at each step in order to enhance the possibility of influencing the decision-making to achieve the desired impact on health outcomes.

Linking the Evidence Funnel with the “Policy/Action Cycle”

In both the WHO “**evidence ecosystem for impact**” framework (3) and Graham’s knowledge-to-action cycle (27), the evidence funnel sits inside the “policy/action cycle” to show the interaction or linkages between the cycle and the funnel. While the cycle represents the ideal process for EIDM, the funnel represents the research evidence that should be used along the way, or produced as part of the process. For further guidance on the different sources of research evidence that can be used for different questions in the “policy/action cycle” refer to Table 3.1 in Evidence, Policy, Impact: WHO Guide for Evidence-informed Decision-making (3). In general, the more refined the research, the greater the chance that it will be useful for, and used by, decisionmakers (38); and that the evidence will be translated into action. Co-production of the research by researchers and decisionmakers may also help to improve the likelihood that it will be used (39, 40), as can the involvement of key stakeholders (41) – see Chapter 4 for more details.

Evidence Products

Evidence products, such as guidelines, EBPs, and HTA reports, along with the process used to develop them, can help to close the gap between evidence creation and application to policy and practice. Each are described in turn and a comparison of their key characteristics, according to the EIDM process, is shown in Table 1.

Guidelines: According to WHO, guidelines are a set of recommendations that “help the user of the guideline to make informed decisions on whether to undertake specific interventions, clinical tests or public health measures, and on where and when to do so. Recommendations also help the user to select and prioritize across a range of potential interventions” (31). WHO uses the GRADE approach to develop guidelines (42).

Guidelines can apply to clinical, public health, or health system interventions. Examples of guideline development programs include the [WHO guideline program](#) at the global level and clinical practice guideline programs at the national level, for example, Chile ([guidelines; manual](#)); Colombia ([guideline](#)); Mexico ([guidelines](#)). Global-level guidelines may need adapting to the specific country context (43).

Information on developing guidelines using the GRADE approach can be found in the WHO guideline handbook (31):

<https://www.who.int/publications/i/item/9789241548960>,

and the GRADE handbook (44):

<https://gdt.gradeapro.org/app/handbook/handbook.html>

The PAHO Strengthening National Evidence-informed Guideline Programs Tool can help with the establishment of national guideline programs, and with the adaptation and implementation of evidence-informed guidelines at the national level (43):

<https://iris.paho.org/handle/10665.2/49145?locale-attribute=en>.

This map for adaptation also provides links to helpful tools:

<https://guidelines-map.epistemonikos.org/#/>

The Guideline International Network (GIN)-McMaster Guideline Development Checklist can be used to support the development, implementation, and evaluation of guidelines (45), and includes links to training materials and resources (45):

<https://cebgrade.mcmaster.ca/guidelinechecklistonline.html>

The AGREE Reporting Checklist will help to improve the comprehensiveness, completeness, and transparency of reporting in guidelines (46):

<https://www.agreetrust.org/resource-centre/agree-reporting-checklist/>. It can be used by guideline developers, users, funders, peer-reviewers, and journal editors.

Health technology assessment: The current, internationally accepted definition of HTA, along with accompanying notes is:

“HTA is a multidisciplinary process that uses explicit methods to determine the value of a health technology at different points in its lifecycle. The purpose is to inform decision-making in order to promote an equitable, efficient, and high-quality health system” (47).

Note 1: A health technology is an intervention developed to prevent, diagnose or treat medical conditions; promote health; provide rehabilitation; or organize healthcare delivery. The intervention can be a test, device, medicine, vaccine, procedure, program or system. ([Definition from the HTA Glossary](#))

Note 2: The process is formal, systematic and transparent, and uses state-of-the-art methods to consider the best available evidence.

Note 3: The dimensions of value for a health technology may be assessed by examining the intended and unintended consequences of using a health technology compared to existing alternatives. These dimensions often include clinical effectiveness, safety, costs and economic implications, ethical, social, cultural and legal issues, organizational and environmental aspects, as well as wider implications for the patient, relatives, caregivers, and the population. The overall value may vary depending on the perspective taken, the stakeholders involved, and the decision context.

Note 4: HTA can be applied at different points in the lifecycle of a health technology, i.e., pre-market, during market approval, post-market, through to the disinvestment of a health technology.

In September 2012, the Pan American Health Organization (PAHO) adopted the first resolution on HTA and the incorporation of health technologies into health systems (CSP28. R9); an innovative policy paper that proposes linking HTA with the decision-making processes involved in incorporating these technologies into health systems (48).

HTA programs can be national initiatives, such as the National Committee for Technology Incorporation to the Brazilian National Health System: <http://conitec.gov.br/>; provincial initiatives, such as the National Institute of Excellence in Health and Social Services in Quebec, Canada: <http://www.inesss.qc.ca/>; part of health insurance institutions, such as the Institute for Health Technology Assessment and Research – EsSalud in Peru: <https://ietsi.essalud.gob.pe/>; or at academic institutions, such as the Institute for Clinical Effectiveness and Health Policy, in Argentina: <https://www.iecs.org.ar/>

HTA institutions usually organize within networks, such as the Health Technology Assessment Network of the Americas (RedETSA), formed by 40 organizations from 17 countries of the Region of the Americas, with PAHO as its Secretariat: <https://redetsa.bvsalud.org/>; and the International Network of Agencies for Health Technology Assessment (INAHTA): <https://www.inahta.org/>

Information on developing and implementing HTA mechanisms can be found in the PAHO/EASP Health Technology Assessment Toolbox for Emerging Settings (32): <http://www.easp.es/hta-toolbox/web/>, and the WHO Institutionalizing Health Technology Assessment Mechanisms: a How to Guide (49): <https://apps.who.int/iris/handle/10665/340722>

The International Network of Agencies for Health Technology Assessment checklist can be used to improve transparency and consistency in HTA reports (50).

Evidence briefs for policy: EBPs bring together global research evidence (from systematic reviews) and local evidence to inform deliberations about health policies and programs. An EBP begins with a description of a policy problem, then summarizes the best available evidence to clarify the size and nature of the problem, describes the likely impacts of key options for addressing the problem, and informs considerations about potential barriers to implementing the options and strategies for addressing these barriers (51, 52). EBPs include the involvement of content experts, policymakers, and stakeholders (30).

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Examples of EBP programs include WHO's Evidence-informed Policy Network that operates at the national, regional, and global levels. EBPs are generally produced at a national level (30, 53), such as the evidence briefs for policy and rapid reviews produced by the Evidence-Informed Health Policies Unit of the Ministry of Health in Chile:

<https://etesa-sbe.minsal.cl/index.php/evipnet-chile/lieas-de-trabajo/resumenes-de-evidencia-para-politicas/> ;

<https://etesa-sbe.minsal.cl/index.php/evipnet-chile/lieas-de-trabajo/servicio-de-respuesta-rapida/>

Information on developing evidence briefs for policy can be found in the EVIPNet Europe EBP guiding manual (30):

<https://apps.who.int/iris/bistream/handle/10665/337950/WHO-ERO-2020-1740-41491-56588-eng.pdf>, SURE guides (51):

https://epoc.cochrane.org/sites/epoc.cochrane.org/files/public/uploads/SURE-Guides-v2.1/Collectedfiles/sure_guides.html

and SUPPORT tools (54):

<https://health-policy-systems.biomedcentral.com/articles/10.1186/1478-4505-7-S1-I1>

Table 1.
Characteristics of three types of evidence products according to the EIDM process

Steps in the evidence-informed decision-making (EIDM) process (policy/action cycle)	Evidence briefs for policy (EBPs)	Guidelines	Health technology assessments (HTAs)
Guiding manuals	EVIPNet Europe EBP guiding manual (30), SURE guides ^a (51), SUPPORT tools (54)	WHO guideline handbook (31), GRADE handbook and articles (42, 44), PAHO Strengthening national evidence-informed guideline programs tool (43)	EASP/PAHO/LSE Health technology assessment Toolbox for emerging settings (32), WHO Institutionalizing health technology assessment mechanisms: a how to guide (49)
Identify high priority issue	✓	✓	✓
• Identify problem and causes	✓	✓	✓
• Involvement of stakeholders in process	✓	✓	Varies
• Process for declaration and management of conflicts of interest	✓	✓	✓
Select interventions/ options	✓	✓	✓
• PICO question(s)	✓	✓	✓
• Factors considered	Benefits and harms, cost-effectiveness	Benefits and harms, cost-effectiveness	Benefits and harms, cost-effectiveness
• Systematic reviews as source of evidence	✓	✓	✓
• Include an assessment of the quality of the included evidence	✓	✓	✓
• Use of GRADE to assess the certainty of evidence	✓	✓	Depends on specific country HTA program
• Includes different options to choose between	✓	✗	✗
Appraise implementation considerations	✓	✓	✓
• Other factors considered	Values, costs, availability of resources, stakeholder views	Values and preferences, feasibility, equity, acceptability, resource use	Equity, values and preferences, acceptability, resource use, precedents
• Barriers to implementation	✓	✓	Depends on specific country HTA program
• Includes recommendations	✗	✓	Depends on specific country HTA program
Communicate and engage (adoption)	If the EBP is combined with a policy dialogue	✓	✗
Implementation	✗	✓	✓
Monitor implementation and evaluate impact	✗	✓	✓
Sustain change	✗	✗	✗

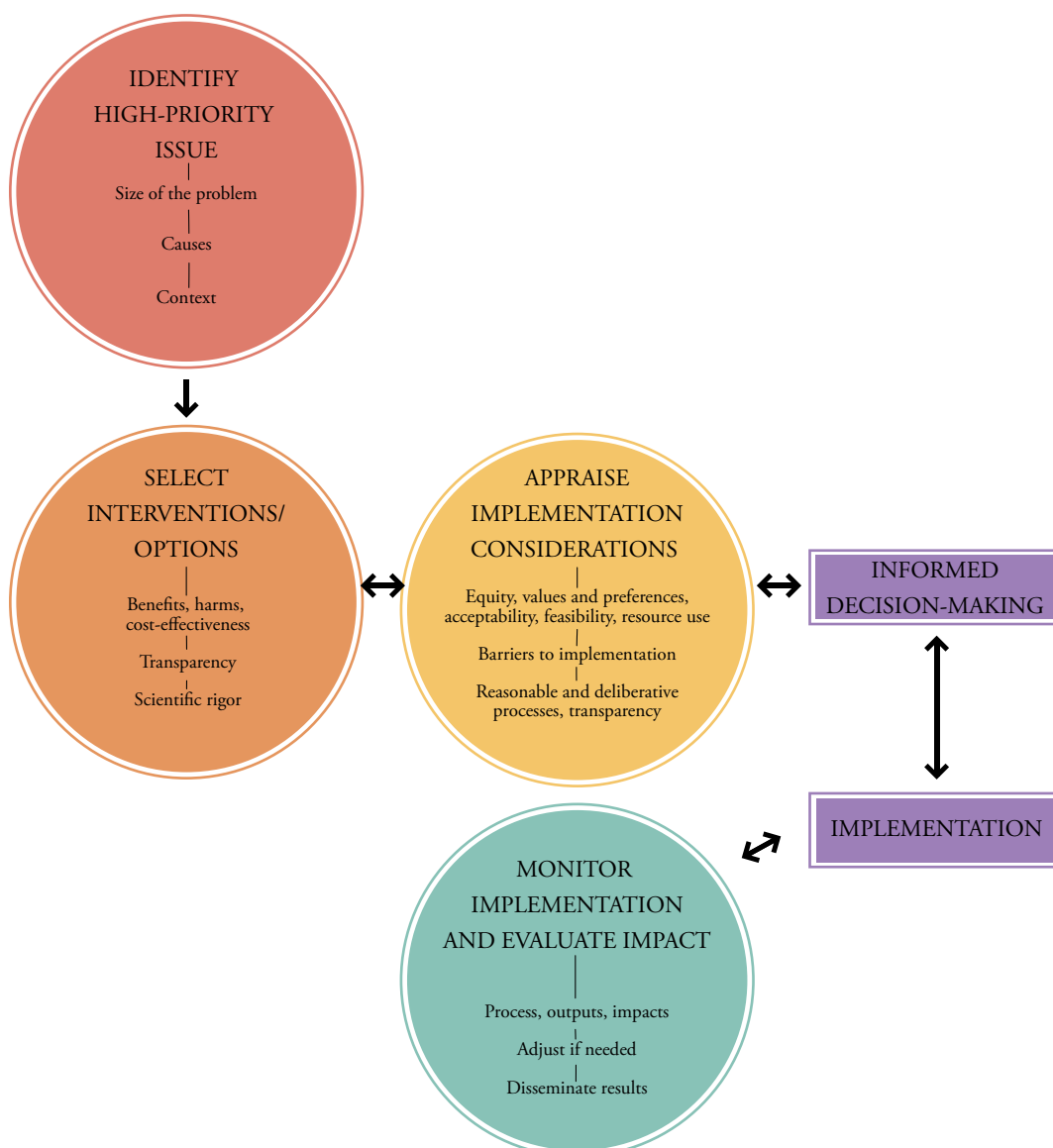
^aThe SURE guides use the GRADE approach for assessing certainty of the evidence – see SURE Guide 4.

Note: GRADE – Grading of Recommendations Assessment, Development and Evaluation. ✓ – yes; ✗ – no. Analysis based on guiding manuals and best available literature (i.e. WHO or international).

As can be seen from Table 1, although produced within different decision-making contexts, the three different types of evidence products presented (EBPs, guidelines, HTAs) have some similar features, including the identification of a high-priority issue, involvement of stakeholders, selection of interventions based on evidence from systematic reviews and primary research, and appraisal of factors that can affect implementation. While not all products include recommendations (e.g., EBPs), they all aim to facilitate decision-making by including a consideration of all factors that might be needed to inform a decision (Figure 3).

Thus, it would be expected that the evidence product increases the chance of a decision informed by evidence. However, to have an impact on health outcomes, the decision would still need to be made (i.e. the intervention adopted), implemented at sufficient scale, evaluated, and adjustments made if needed.

Figure 3.
Role of evidence in the evidence-informed decision-making process



Source: Adapted from Teutsch et al. 2005 (55) and SUPPORT Tool 1 (4).

Note: Processes described in rounded shapes should be informed by research evidence.

Different Types of Research Evidence

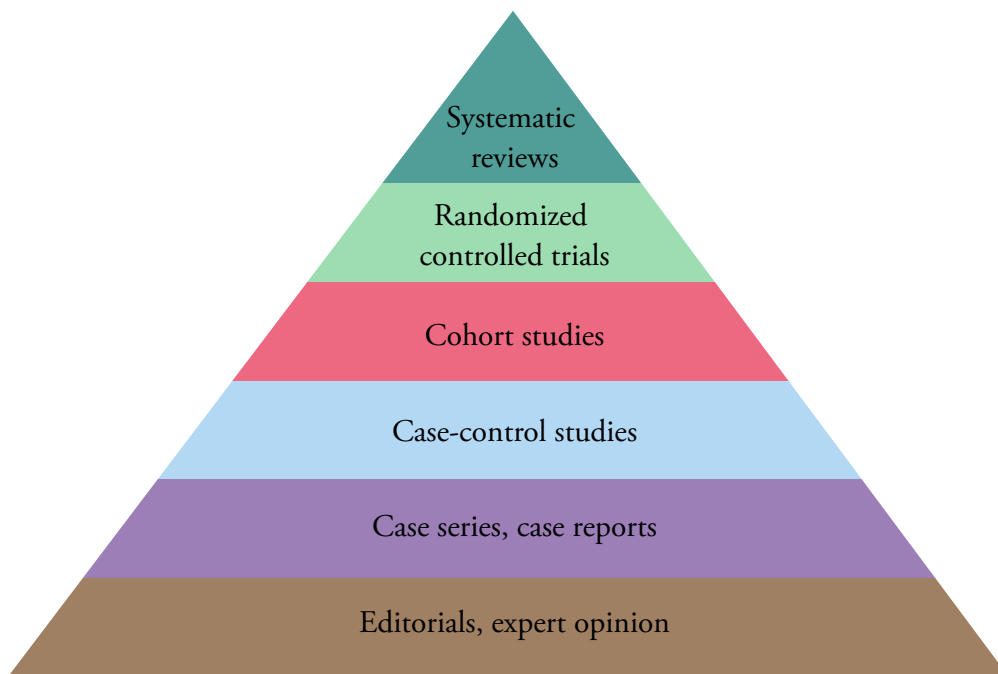
Different questions that may need to be addressed as part of the EIDM process require different types of evidence.

Study Design

The traditional way of thinking about research evidence was based on study design, with the different designs arranged in order of decreasing internal validity in a hierarchy or pyramid. Figure 4 shows an example of a hierarchy of evidence for questions related to effectiveness

Figure 4.

Traditional evidence pyramid of study designs for questions related to effectiveness



Research Question

There is now greater understanding that the best study design also varies depending on the question that needs answering – as shown in Table 2. For example, questions of effectiveness or “does this option work better than that option?” are best answered by systematic reviews of experimental designs. For questions related to understanding “how an intervention works or fails to work”, a mix of qualitative and quantitative designs are needed. However, when considering what is the best evidence for a particular question, it is not sufficient to judge a study by its design (56). The methodological quality (or risk of bias) of the study needs to be taken into account and, for evidence syntheses, it is necessary to assess how much confidence can be placed in the body of evidence.

Table 2.

A matrix of evidence for some key questions related to the “policy/action cycle”

Research question	Qualitative research	Survey ^a	Case-control study	Cohort study	Randomized controlled trial	Quasi-experimental ^b study	Systematic review ^c
Questions related to the issue/problem							
Size of the problem What is the prevalence, incidence, morbidity or mortality rate from the disease or condition?		++		++			+++
Cause of the problem Why is it a problem?	+		+	+	++		+++
Questions related to selecting interventions							
Effectiveness Does it work better than other options?				+	++	+	+++
Process How does it work?	++	+					+++
Value/importance Does it matter?	++	++					+++
Safety Does the option cause any undue harms?	+		+	+	++	+	+++
Resource use How much does it cost?				+	++	+	+++
Cost-effectiveness^d Are the benefits worth the extra costs?					++		+++
Equity What impact does it have on health equity?	++			+	++	+	+++
Acceptability Is it acceptable to key stakeholders, e.g., users, healthcare providers?	++	+					+++
Feasibility Is it feasible to implement?	++	++					++
Appropriateness Is it the right intervention for these people?	++	++					++

^a These are also known as cross-sectional studies.

^b Quasi-experimental studies are those where the investigator lacks full control over the allocation and/or timing of intervention but nonetheless conducts the study as if it were an experiment, allocating subjects to groups (61). Examples include controlled before-after studies and interrupted time-series studies (62).

^c Depending on the review question, systematic reviews can include any of the designs mentioned in the table, including qualitative and quantitative designs.

^d Economic evaluations and systematic reviews of economic evaluations are the best evidence types to determine the cost-effectiveness of an intervention, including cost-utility, cost-benefit, and cost-effectiveness analysis.

Notes: This table has a particular focus on identifying high-priority issues and selecting interventions (the first three steps of Figures 2 and 3). The greater the number of + symbols for a particular research question, the more appropriate the study design.

Source: Adapted from Table 1 in Petticrew and Roberts 2003 (57) and Box 4 in Nutley et al. 2013 (58), with additional questions added based on those included in GRADE Evidence to Decision frameworks (15, 59, 60).

Quality of Studies

The methodological quality (or risk of bias) of a research study also needs to be taken into account as it can affect the degree of confidence in its results (57, 58, 63). Research studies risk producing misleading results if they are flawed in their design or conduct – also known as internal validity or risk of bias (64). This can be rated using a range of risk of bias or quality assessment tools that are available. To arrive at a rating, reviewers consider features in controlled trials such as randomization, allocation concealment, blinding, and use of intention to treat analysis (65). In observational studies, reviewers consider appropriate measurement of exposure and outcome as well as appropriate control of confounding. In both controlled trials and observational studies, they consider loss to follow-up and may consider other aspects of design, conduct, and analysis that influence the risk of bias (65).

Well-conducted systematic reviews have the advantage that they will include an assessment of risk of bias of the included studies as part of the process (65). This assessment should be used in the interpretation of the evidence included. For example, the research user can have more confidence in a systematic review of effectiveness that includes RCTs with low risk of bias than in one that includes RCTs with a high risk of bias. The systematic review itself can also be assessed for its methodological quality. Tools for assessing the quality of the different types of evidence are listed in Table 3.

Table 3.
Quality (risk of bias) assessment tools

Study design	Quality assessment tools	Comments
Evidence Products		
Evidence briefs for policy (EBPs)	None available	No tool currently exists for assessing the quality of EBPs. However, SUPPORT Tool 13 (52) suggests six questions that can be used to guide those preparing and using policy briefs to support evidence-informed policymaking
Guidelines	AGREE II (Appraisal of Guidelines, Research and Evaluation) (66)	Revised version of the original AGREE tool to develop, report and evaluate guidelines. This version comprises 23 items and a user's manual: https://www.agreetrust.org/ https://www.cmajca/cotent/182/18/E839.long
	AGREE-REX (Appraisal of Guidelines Research and Evaluation–Recommendations Excellence) (67)	A tool designed to evaluate the quality of clinical practice guideline recommendations: https://www.agreetrust.org/resource-centre/agree-rex-recommendation-excellence/ The AGREE-REX tool is a complement rather than an alternative to the AGREE II tool
	AGREE-HS (Appraisal of Guidelines Research and Evaluation –Health Systems) (68)	Designed to evaluate the quality of health systems guidance documents, and provides a blueprint for health systems guidance documents development and reporting: https://www.agreetrust.org/resource-centre/agree-hs/

Study design	Quality assessment tools	Comments
Health technology assessments	INAHTA checklist for health technology assessment (HTA) reports (50)	<p>The tool is designed to be an aid to furthering a consistent and transparent approach to HTA. Version 3.2 is available from: https://www.inahta.org/hta-tools-resources/briefs/, https://www.inahta.org/wp-content/uploads/2014/04/INAHTA_HTA_Checklist_English.pdf</p>
	Tool 6, AdHopHTA checklist for good-quality HB-HTA reports (69)	<p>The tool was developed for hospital-based HTA reports but may also be useful for other types of HTA: http://www.adhophta.eu/toolkit/assets/tools/AdHopHTA_toolkit_tool6_document.pdf</p>
Evidence syntheses		
Systematic reviews	AMSTAR 2 (70)	<p>Revised version of AMSTAR that includes both randomized and nonrandomized trials –applies to reviews of interventions. The revised tool consists of 16 items in total, includes a more comprehensive user guide, and has an overall rating based on weaknesses in critical domains. It is not intended to produce an overall score. Reviews may receive a rating of high, moderate, low, or critically low confidence in the results: https://amstar.ca/Amstar-2.php https://www.bmj.com/content/358/bmj-j4008.long</p>
	AMSTAR (71, 72)	<p>Updated by AMSTAR 2 (above). Designed for reviews of randomized trials but also useful for other kinds of reviews, including reviews of qualitative studies if some criteria are removed from both the numerator and denominator.</p> <p>The tool consists of 11 items for which the possible responses are Yes/No/Can't answer/Not applicable. Only questions with a “yes” response receive a point: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0001350</p>
	ROBIS (73)	<p>ROBIS is a sophisticated three-phase instrument that focuses specifically on the risk of bias introduced by the conduct of the review. It covers most types of research question, including diagnosis, prognosis, and etiology. Reviews may receive a rating of low, high, or unclear risk of bias: http://www.bristol.ac.uk/population-health-sciences/projects/robis/ https://www.jclinepi.com/article/S0895-4356(15)00308-X/fulltext</p>

Study design	Quality assessment tools	Comments
Economic evaluations (of interventions)	Choice of instrument depends on the study design for the health outcomes (59)	When using the GRADE approach, it is recommended “that the confidence in effect estimates for each important or critical economic outcome should be appraised explicitly using the same criteria as for health outcomes” (59). This recommendation is consistent with that of the Cochrane handbook (74) – see Chapter 20
	Drummond checklist for assessing economic evaluations (75)	The tool includes 10 questions, which are also explained in detail in Chapter 3 of Drummond et al. (75)
	Consensus on Health Economic Criteria (CHEC) criteria list (76)	The tool includes 19 items that were agreed through a consensus process (76). See also: https://www.maastrichtuniversity.nl/research/caphri/our-research/creating-value-based-health-care/-chec-list-consensus-health-economic
Studies of interventions		
Randomized controlled trials	ROB 2.0 (74, 77)	Revised Cochrane tool for assessing risk of bias in randomized trials. See also: https://www.riskofbias.info/welcome/rob-2-0-tool The first version of the tool is described in the Cochrane handbook (78, 79)
Nonrandomized studies of interventions	ROBINS-I (80)	A tool for assessing risk of bias in nonrandomized studies of interventions. See also: https://www.riskofbias.info/welcome/home/current-version-of-robins-i
For both controlled and uncontrolled studies of interventions	Cochrane Effective Practice and Organisation of Care (EPOC) risk of bias criteria for EPOC reviews (62, 81)	Recommended by EPOC when uncontrolled studies included, e.g., interrupted time series: https://epoc.cochrane.org/resources/epoc-resources-review-authors (see resources under “Risk of bias”)
Studies of exposures		
Cohort studies	Newcastle-Ottawa Quality Assessment Scale: cohort studies (82)	http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp
Case-control studies	Newcastle-Ottawa scale: case-control studies (82)	http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp
Cross-sectional studies	RTI Item bank (83, 84)	For use in analytical cross-sectional studies for assessment of causes – see Appendix C of Viswanathan et al. 2013 (84): https://www.ncbi.nlm.nih.gov/books/NBK154461/
Observational studies of interventions or exposures	RTI Item Bank instruments, Agency for Healthcare Research and Quality (AHRQ) (83, 84)	https://www.ncbi.nlm.nih.gov/books/NBK154461/

Study design	Quality assessment tools	Comments
Diagnostic test accuracy	QUADAS-2 (Quality Assessment of Diagnostic Accuracy Studies) (85)	https://www.bristol.ac.uk/population-health-sciences/projects/quadas/quadas-2/
Qualitative research	Making sense of evidence: 10 questions to help make sense of qualitative research checklist (86)	Developed by the Critical Appraisal Skills Programme: https://casp-uk.net/casp-tools-checklists/ There are a large number of tools available to assess the quality of qualitative research, and there is currently no consensus in the field on which tools are more useful. An overview of the available tools is provided in Munthe-Kaas et al. 2019 (87): https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/s12874-019-0728-6
Various – JBI tools		
For a range of study designs, including systematic reviews, randomized trials, nonrandomized trials, cohort studies, case-control studies, analytical cross-sectional, prevalence, diagnostic test accuracy, economic evaluations, and qualitative research	JBI critical appraisal tools, JBI Manual for Evidence Syntheses (88)	See the following appendixes in the JBI Manual for Evidence Synthesis for the respective tool for each study design: https://jbi-global-wiki.refined.site/ <ul style="list-style-type: none"> • Systematic reviews – Appendix 10.1 • Randomized trials – Appendix 3.1 • Nonrandomized trials – Appendix 3.3 • Cohort studies – Appendix 7.1 • Case-control studies – Appendix 7.2 • Analytical cross-sectional studies – Appendix 7.5 • Prevalence – Appendix 5.1 • Diagnostic test accuracy – Appendix 9.1 • Economic evaluations – Appendix 6.1 • Qualitative research – Appendix 2.1

Notes: AdHopHTA – a toolkit for hospital-based Health Technology Assessment; AGREE – Appraisal of Guidelines, Research and Evaluation; AMSTAR – A Measurement Tool to Assess systematic Reviews; INAHTA – International Network of Agencies for Health Technology Assessment; QUADAS – Quality Assessment of Diagnostic Accuracy Studies; ROB – Risk of Bias; ROBINS-I – Risk of Bias In Non-randomised Studies of Interventions; ROBIS – Risk Of Bias In Systematic reviews.

Quality of a Body of Evidence (GRADE Approach)

The quality of a body of evidence for each outcome can be assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach, and is usually based on systematic reviews (31, 65). A body of evidence refers to all of the studies gathered and summarized for a specific question and outcome, which are often combined statistically using meta-analysis. The GRADE approach is often used for the development of guidelines and EBPs, and is sometimes used in HTAs (30, 31). It is also standard in Cochrane systematic reviews (74).

The GRADE approach rates the quality of the evidence (also known as certainty of the evidence) based on a number of factors and not solely on study design or risk of bias of individual studies (31, 63, 65). The assessment begins with the study design (RCTs or observational studies) and then addresses five reasons to possibly rate down the quality of evidence (risk of bias, inconsistency, imprecision, indirectness, and publication bias) and three reasons to possibly rate up the quality (a large magnitude of effect, a dose-response gradient, and a situation in which plausible biases, if present, would serve to increase confidence in the effect estimate) (89). The terms used in the quality assessments refer to the level of confidence in the estimate of effect (and not to the scientific quality of the investigations reviewed). The ratings can be high, moderate, low, or very low (Table 4).

Table 4.

The four classes of quality (or certainty) of evidence used in GRADE

Quality of evidence	Interpretation
High	Very confident that the true effect lies close to that of the estimate of the effect
Moderate	Moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low	Confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect
Very low	Very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect

For systematic reviews of qualitative evidence the GRADE-CERQual (Confidence in the Evidence from Reviews of Qualitative Research) approach can be used (90). The approach provides a transparent method for assessing the confidence of evidence from reviews of qualitative research, and indicating this confidence to end-users, such as guideline panels or decisionmakers. GRADE-CERQual uses a similar approach conceptually to other GRADE tools (90).

For further information on applying the GRADE approach to assess the certainty of evidence see Chapter 5 of the GRADE handbook (44):

<https://gdt.grade.pro.org/app/handbook/handbook.html>, and these articles on GRADE guidelines for supplementary reading (42, 59, 64, 65, 89, 91-97).

For information on using GRADE-CERQual for assessing confidence in the evidence from systematic reviews of qualitative evidence see this dedicated website:

<https://www.cerqual.org/>, and this series of seven articles for applying the approach (90):

<https://implementationscience.biomedcentral.com/articles/supplements/volume-13-supplement-1>

A guide for decisionmakers on using and interpreting GRADE-CERQual assessments is available from (98):

<https://drive.google.com/open?id=1tF0rhDmihpzd3B6BDFHcD8msDu1rqYjR>

The Role of Systematic Reviews

High-quality systematic reviews are core to the EIDM process because they help to synthesize the results of all relevant studies on a specific question and consider the risk of bias (or methodological limitations) of the included studies. As can be seen from Table 2, they can also help to answer a range of research questions. Variations of systematic reviews include reviews of qualitative studies, rapid reviews, scoping reviews, and overviews of systematic reviews. For research users, systematic reviews offer five advantages over single studies (99-101) – see Box 1.

Box 1.

Advantages of systematic reviews over single studies

1. Systematic reviews of all studies relevant to a question reduce the likelihood of being misled by single studies.
2. Compared to single studies, systematic reviews with meta-analysis will enhance the precision of estimates of effects, thus increasing users' confidence in the results.
3. Using systematic reviews is a more efficient use of time because the relevant research has already been found, selected, appraised, and synthesized in a systematic and transparent way.
4. Systematic reviews allow for a more objective appraisal and discussion of the evidence.
5. Systematic reviews can identify areas where further studies are needed.

Source: Adapted from (99-101).

A systematic review is a review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyze data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used to analyze and summarize the results of the studies included (4, 74, 102). Systematic reviews can be done on a variety of research questions, including for reviews of intervention effectiveness, for evaluating diagnosis, prognosis, etiology, and prevalence, and for questions that require qualitative evidence, such as the acceptability of interventions. The main steps involved in a systematic review include: defining the question and eligibility criteria; finding and assessing all relevant research evidence; extracting data; assessing the quality (risk of bias) of the included studies; and synthesizing the information. The key steps for conducting a systematic review are shown in Figure 5.

Detailed methods for conducting systematic reviews of:

- Clinical and public health interventions can be found in the Cochrane handbook (74): <https://training.cochrane.org/handbook/current>
- Health policy and system interventions in Langlois et al. (103): <https://www.who.int/alliance-hpsr/resources/publications/hsr-synthesis/en/>
- Qualitative research in Chapter 2 of the JBI manual for evidence synthesis (104): <https://wiki.jbi.global/display/MANUAL/Chapter+2%3A+Systematic+reviews+of+qualitative+evidence> and in the series of papers published by the Cochrane Qualitative and Implementation Methods Group in 2017: <https://methods.cochrane.org/qi/supplemental-handbook-guidance>

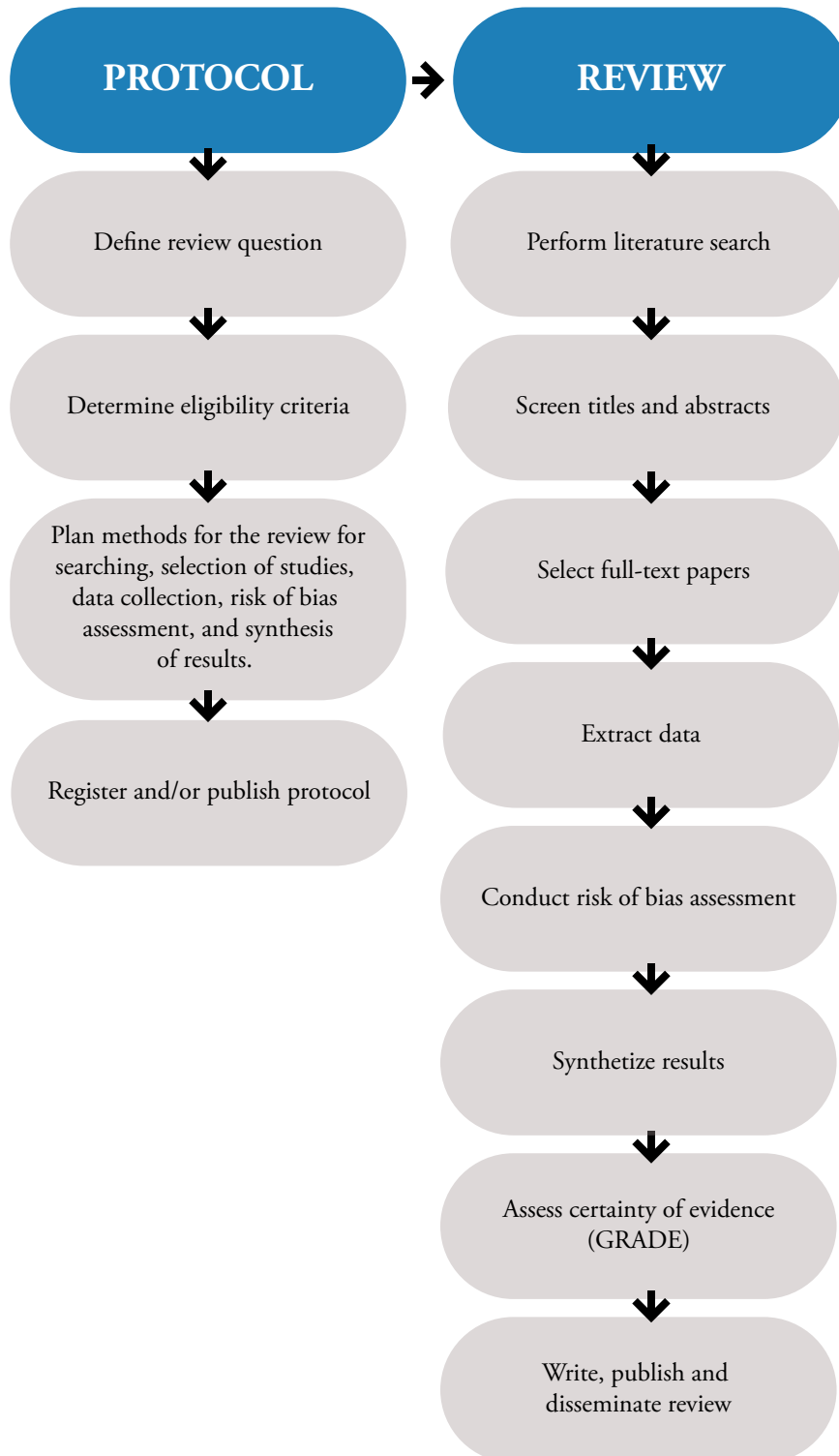
The JBI manual for evidence synthesis also includes methods for a large range of review questions: <https://jbi-global-wiki.refined.site/space/MANUAL>

The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement (105, 106) can be used to ensure transparent reporting of the systematic review: <http://www.prisma-statement.org/>

Tools for assessing the quality of a systematic review can be found in Table 3.

Systematic reviews are considered the best (“gold standard”) way to synthesize the findings of studies addressing the same question (102). Systematic reviews are considered to provide “global evidence” because they usually include the best evidence available from around the world (4). That evidence can then be combined with information from the local context to inform judgments about interventions (4).

Figure 5.
Key steps in the systematic review process



Source: Modified from the Cochrane handbook, Cochrane training slides and Boland et al. 2017 (74, 102, 107)

The Role of Data Analytics, Modeling, Implementation Research, and Evaluation in EIDM

Evidence can help at various steps in a decision-making process, including: (i) understanding a problem and its causes; (ii) selecting an option for addressing the problem; (iii) identifying implementation considerations; or (iv) monitoring implementation and evaluating impacts (108, exhibit 4.2). The different forms of evidence that can contribute to EIDM include those already covered above – systematic reviews (evidence synthesis), guidelines, HTAs, and EBPs. Other forms of research evidence often used as inputs to EIDM include data analytics, modeling, implementation research, and evaluation (Table 5). These sources can also be used to strengthen some of the phases in the development and application of evidence products to policy or practice, and in their evaluation (Table 1).

Table 5.
Some forms of evidence used as inputs to evidence-informed decision-making

Form of evidence	Working definitions and applications
Data analytics	<ul style="list-style-type: none"> • Systematic analysis of raw data in order to make conclusions about that information • Adds greatest value in identifying a high-priority issue, and monitoring and evaluation
Modeling	<ul style="list-style-type: none"> • Use of mathematical equations and existing data and research to simulate real-world scenarios (i.e., what is likely to happen if there is no intervention) and options (i.e., what happens if there is an intervention) in a virtual environment • Adds greatest value in identifying a high-priority issue, and option selection
Behavioral / implementation research	<ul style="list-style-type: none"> • Study of methods to promote the systematic uptake of effective approaches into routine practices at the personal, professional, organizational, and government levels (implementation research) • Systematic examination of what people (citizens and professionals) do, what drives them to do it, and what can sustain or change what they do (behavioral research) • Adds greatest value in determining implementation considerations
Evaluation	<ul style="list-style-type: none"> • Systematic assessment of the implementation (monitoring) and impacts (evaluation) of an initiative for the purposes of learning or decision-making • Adds greatest value in monitoring and evaluation

Source: Adapted from the Global Commission on Evidence to Address Societal Challenges exhibit 4.2 (108), with minor modifications.

3. Evidence-informed Decision-making - How to Do It?

Overview of the Steps in EIDM

As stated in Chapter 1, EIDM is a systematic and transparent approach that can be applied across the decision-making process, including to (i) prioritizing problems and understanding their causes; (ii) selecting interventions/options; (iii) appraising implementation considerations; and (iv) monitoring implementation and evaluating impact (2–4). EIDM can include decisions about clinical practice, public health, and health systems, and the process will be influenced by the decision-making context. EIDM applies to the process of producing and implementing EBPs, guidelines, and HTAs – with some small variations for each product/process, as shown in Table 1. To achieve impact on health outcomes, there are some additional elements that are part of the “policy/action cycle” that are required but are less dependent on research evidence, and rest more with the decisionmakers. These include the decision itself (selection of preferred intervention), communication and engagement, implementation of the intervention, and sustaining change (Figure 2).

In this chapter, each of the following steps is to be taken in turn: identify high-priority issue, select interventions, appraise implementation considerations, monitor implementation, and evaluate impact. Then, the steps that rest more with the decisionmakers are presented, along with consideration of how research evidence can also help.

Identify High-priority Issue

This step is also known as problem identification. The important elements are to define the problem, understand its causes, and the context for the decision (109). The **problem** may be, for example, that there is a high prevalence in the population of a condition, such as leptospirosis following a hurricane, or of a risk factor, such as high alcohol consumption. It is important to consider who is most affected by the problem, and whether there is a need to focus on a particular target group, such as children, adolescents, or marginalized populations. The type of research evidence that can help to clarify the size of the problem includes surveys (prevalence studies), surveillance and monitoring data, and routine health information (such as hospital admissions records and cause-of-death data). Where possible, disaggregated data should be sought to identify health inequities (see Chapter 4 – Considering Health Equity). National-level information from the Global Burden of Disease study is also useful for defining the problem because it combines both mortality and disability information into one metric (the disability-adjusted life year) that allows comparisons between different diseases, injuries, and risk factors (homepage: <http://www.healthdata.org/gbd/2019>; country profiles: <http://www.healthdata.org/results/country-profiles>).

To help identify potential solutions, it is important to understand the **causes** or determinants of the problem. For example, high levels of malnutrition following a disaster may be due to food shortages; or the high rate of dental caries may be due to high consumption of sugar-sweetened beverages.

At this early stage of the process, a good understanding of the decision-making **context** helps to ensure that the interventions or options proposed can fit within the current policy frameworks and health system arrangements, and that there will be support for the option (109). Involvement of the key **stakeholders** can help to ensure that the problem and decision-making context is well understood.

Select Interventions/Options

This step is also known as designing solutions. Depending on the process and product, the assessment may be limited to one option or intervention, or several alternative options may be assessed for a particular health issue. For example, EBPs usually include three or more alternative interventions, while HTAs may be limited to one new medication or technology. Regardless of the purpose, however, the essential steps are the same and include defining the question(s) and eligibility criteria (using PICO), finding and assessing all relevant research evidence, assessing its quality (risk of bias), and synthesizing the information.

PICO is an acronym for population, intervention, comparator (control), and outcome – four elements that should be considered in any question governing a systematic search of the evidence. Here, intervention is defined very broadly. It can mean anything from a new drug, a diagnostic test or other technology, to complex public health measures, to measures aimed at modifying aspects of the healthcare system, to give a few examples (31). The PICO format also provides a useful structure for defining the inclusion and exclusion criteria for the body of evidence. Two examples of a PICO question are shown in Box 2.

Box 2.

Examples of well-constructed PICO questions

- In a rural population in a low-income country (P), does paying higher salaries to health workers (I), compared with paying standard salaries (C), increase the number of health workers in rural areas (O) within a 5-year period?
- In babies born to HIV-positive women (P), does screening with a new rapid diagnostic test (I), compared with standard diagnostic methods (C), accurately detect disease (O) by 12 months of age?

Notes: P – population; I – intervention; C – comparator; O – outcome.

Source: WHO guideline handbook (31).

For further information on developing PICO questions for various types of questions, see Chapter 7 of the WHO guideline handbook (31):

<https://www.who.int/publications/i/item/9789241548960>.

The outcomes that are considered at this stage include those related to benefits, harms, and cost-effectiveness. Other factors that may also need to be considered when making a decision about interventions include values and preferences, feasibility, impact on equity, acceptability to key stakeholders, and resource use. These factors are included as part of the GRADE and WHO-INTEGRATE Evidence to Decision frameworks used for guideline development (15, 18, 20, 110), and are applied in a modified way for other types of evidence products.

Thus, it is important to be aware of, and collect information on, these factors as part of the search for global evidence of benefits and harms. However, they are also likely to need local² evidence, which is evidence that is available from the specific setting(s) in which a decision or action will be implemented (111). Thus, these factors will also be considered as part of the next step on implementation considerations.

Searching for all relevant research evidence should start first with preexisting evidence products (e.g., guidelines) whose recommendations can be **adapted** to the specific context or problem of interest. If adaptation of the evidence product is not appropriate, it still may be possible to use the same systematic reviews as a source of evidence for the development of a new evidence product provided that they are up to date.

There are a number of tools available to help with the adaptation of recommendations from evidence products to the local context. For example, if an international guideline needs to be adapted to the local context to ensure uptake and sustained use, consider the Pan American Health Organization (PAHO) tool for adapting and implementing guidelines, ADAPTE or ADOLOPMENT tools (43, 112, 113):

<https://iris.paho.org/handle/10665.2/49145>;

<https://g-i-n.net/wp-content/uploads/2021/05/ADAPTE-Resource-toolkit-V2.1-March-2010-updated-disclaimer.pdf>

A tool also exists for the adaptation of HTAs (114):

<https://www.journalslibrary.nihr.ac.uk/hta/hta13590/#/abstract>

If nothing is found, the **search** proceeds to systematic reviews, and finally to primary research if a new evidence synthesis is needed or an existing review needs updating. The evidence is accessed and then appraised to ensure that it meets the eligibility criteria, and its **quality** should be evaluated. The evidence is then **synthesized**, which can include both narrative syntheses as well as meta-analysis where appropriate.

For further information on searching and synthesis methods in relation to interventions, both the Cochrane handbook for systematic reviews of interventions (74):

<https://training.cochrane.org/handbook/current>

and the JBI reviewer's manual (88):

<https://jbi-global-wiki.refined.site/space/MANUAL> are both freely available online.

The Alliance for Health Policy and Systems research / WHO evidence synthesis manual provides extra guidance that is specific for health policy and systems (103):

<https://www.who.int/alliance-hpsr/resources/publications/hsr-synthesis/en/>

²The word "local" can refer to municipality, state, or national levels, depending on the intervention or policy issue being considered.

Sources of evidence products and systematic reviews can be found in Table 6. The sources included have been chosen due to their comprehensiveness and for the quality of product included in terms of the methods used in their development. Most of the sources include a summary and a link to the full text of the evidence product or systematic review – although the full text may not always be freely available.

Table 6.

Sources of evidence briefs for policy, guidelines, and health technology assessments, and of systematic reviews

Type of product	Sources	Comments
Evidence briefs for policy (EBPs)	Health systems evidence: https://www.healthsystemsevidence.org/?lang=en	EBPs can be found by selecting document type “evidence brief for policy” and then using the other filters available. A free text search using EVIPNet will find the EBPs produced by EVIPNet
	Evidence-informed policies: ^a https://sites.bvsalud.org/pie/en/biblio	EBPs can be found by selecting collection “policy briefs”
Guidelines	Guidelines International Networkb (GIN): ^b https://guidelines.ebmportal.com/	The open-access GIN library contains links to over 3,000 guidelines, published or endorsed by GIN members, as well as health guidelines from nonmember organizations
	International database of GRADE guidelines: ^a https://sites.bvsalud.org/bigg/en/biblio/	Only includes GRADE guidelines. Can be searched in English, French, Portuguese, and Spanish
	WHO Guidelines approved by the Guideline Review Committee: https://apps.who.int/iris/	Click Search to activate the Advanced filters. Then use the filter Subject – WHO guideline. The collection can then be searched using free text words and other filters
	ECRI Guidelines Trust repository: https://guidelines.ecri.org/	Includes clinical practice guidelines that meet four inclusion criteria, including being based on a verifiable systematic review of the evidence

31. A guide for evidence-informed decision-making, including in health emergencies

Type of product	Sources	Comments
Health technology assessments (HTAs)	International Network of Agencies for HTA database: https://www.inahta.org/hta-database/	This database provides free access to bibliographic information about ongoing and published health technology assessments commissioned or undertaken by HTA organizations internationally. This includes INAHTA members and non-INAHTA members. The database was previously maintained by the Centre for Reviews and Dissemination, University of York, United Kingdom (until March 2018)
	Regional Database of Health Technology Reports of the Americas: ^a https://sites.bvsalud.org/redetsa/en/brisa/	This database provides free access to HTA reports produced by members of the HTA Network of the Americas (RedETSA). The database includes reports in English, French, Portuguese, and Spanish
Systematic reviews of interventions	Cochrane Database of Systematic Reviews: https://www.cochranelibrary.com/cdsr/reviews	Includes clinical and public health interventions. Only high-quality systematic reviews are included
	ACCESSSS: https://www.accessss.org/	Useful for clinical decisions, programs, services, and drugs
	Health systems evidence: https://www.healthsystemsevidence.org/	Includes systematic reviews of interventions to address health system issues. Includes a quality assessment of the systematic review. Select document type “Systematic reviews of effects”, “Systematic reviews addressing other questions”, or “Overviews of systematic reviews”
	Health evidence: https://www.healthevidence.org/	Includes systematic reviews of public health interventions. Includes a quality assessment of the systematic review

Type of product	Sources	Comments
	Social systems evidence: https://www.socialsystemsevidence.org/	Includes systematic reviews of social interventions. Includes a quality assessment of the systematic review. Select document type “Systematic reviews of effects”, “Systematic reviews addressing other questions”, or “Overviews of systematic reviews”
	Epistemonikos: https://www.epistemonikos.org/en/	Includes systematic reviews concerning clinical and health policy questions. It does not include a quality assessment of the systematic review
Systematic reviews of economic evaluations	Health systems evidence: https://www.healthsystemsevidence.org/	Includes systematic reviews of interventions to address health system issues. Includes a quality assessment of the systematic review
	Health evidence: https://www.healthevidence.org/	Includes systematic reviews of public health interventions. Includes a quality assessment of the systematic review

^a Produced by PAHO/WHO and BIREME (Latin American and Caribbean Center on Health Science Information)

^b The Guidelines International Network is a global network supporting evidence-based guideline development and implementation – it currently has 113 Organisational Members and 172 Individual Members from 59 countries (<https://g-i-n.net/>).

Notes: EBP: evidence brief for policy; EVIPNet: Evidence-informed Policy Network; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HTA: health technology assessment; RedETSA: Health Technology Assessment Network of the Americas (Red de Evaluación de Tecnología en Salud de las Américas).

Appraise Implementation Considerations

This step is also known as designing implementation. The implementation considerations are used for selecting interventions/options and for developing the implementation plan once a decision to adopt an intervention has been made. To inform the implementation plan the barriers and facilitators to implementation will also need to be identified and research evidence for strategies to overcome the barriers needs to be found and evaluated (see below).

When making decisions about interventions, decisionmakers also need to consider other factors such as values and preferences, feasibility, impact on equity and human rights, acceptability to key stakeholders, and resource use. In the past, these issues were often not considered by evidence producers (researchers) as essential to the decision-making process, with the exception of some priority-setting exercises where these factors were explicitly included and discussed with the decisionmakers as part of the process (17). Then, as part of the DECIDE project (115), the GRADE Working Group developed Evidence to Decision frameworks to support the process of moving from evidence to decisions (15, 45). The additional factors included in the framework include priority of the problem, values and preferences, resource implications, equity and human rights, acceptability, and feasibility (15, 31).

The main purpose of the Evidence to Decision frameworks is to help groups of people (panels) use evidence in a structured and transparent way to inform their recommendations (15). By making the process and judgments systematic and transparent, the Evidence to Decision frameworks help to ensure that all important criteria are considered and that the best available research evidence informs the criteria (15). For processes where a recommendation is not generally made, such as EBPs and HTAs, research evidence related to these factors can still be presented as part of the evidence product to inform future decision-making (30, 53, 111). In that way, it is expected that it will be more likely that the final decision is informed by evidence (8). An alternative, but similar, method to the Evidence to Decision frameworks is the use of multiple criteria decision analysis (116–118). This process requires selection and weighting of criteria and can be used in deliberative processes with or without the aggregation of information on each criterion into a single score (116).

For further information on using the GRADE Evidence to Decision framework, see Chapter 10 of the WHO guideline handbook (31):

<https://www.who.int/publications/i/item/9789241548960>

Chapter 6 of the GRADE handbook (44):

<https://gdt.gradepro.org/app/handbook/handbook.html>, and articles on GRADE guidelines for supplementary reading (119–121).

As indicated in the previous section, research evidence on these factors may be found as part of the search for global evidence of benefits and harms. However, they are also likely to need local³ evidence, which is evidence that is available from the specific setting(s) in which a decision or action will be implemented (111).

³The word “local” can refer to municipality, state, or national levels, depending on the intervention or policy issue being considered.

Thus, further searching for primary studies and qualitative evidence may be needed. The factors that are considered here will depend on the particular decision-making process (see, for example, Table 1) and could include values and preferences, feasibility, impact on equity, acceptability to key stakeholders, resource use (affordability), and sustainability. Sources of research evidence to inform judgments about these factors are shown in Table 7.

See [Considering Health Equity in Chapter 4](#) for further information and tools for assessing the impact on equity.

For further information on finding and using information on resource use and costs, see SUPPORT Tool 12 (122):

<https://health-policy-systems.biomedcentral.com/articles/10.1186/1478-4505-7-S1-S12>, and this article on GRADE guidelines (59):

[https://www.jclinepi.com/article/S0895-4356\(12\)00134-5/fulltext](https://www.jclinepi.com/article/S0895-4356(12)00134-5/fulltext)

The GRADE Working Group recommends that the confidence in effect estimates for resource use should be appraised explicitly using the same criteria as for health outcomes (59).

Barriers and Facilitators to Implementation

Deliberations about the factors that can affect implementation, including barriers and facilitators to implementation, will also help to inform the implementation plan. This process can often require participatory and iterative approaches. Identifying strategies to overcome the barriers will be important. The three main sources of evidence for developing implementation considerations include: (i) systematic reviews of the effects of implementation strategies; (ii) systematic reviews of qualitative studies; and (iii) local evidence, including organizational or real-world data and experiential or tacit knowledge (123).

Table 7.
Sources of research evidence to inform implementation considerations

Type of evidence	Sources of research evidence	Comments
Systematic reviews	Systematic reviews of the effects of implementation strategies	See systematic review sources in Table 6 of this publication
	Cochrane Effective Practice and Organisation of Care (EPOC) reviews: https://epoc.cochrane.org/our-reviews	Includes high-quality systematic reviews of educational, behavioral, financial, regulatory, and organizational interventions designed to improve health professional practice and the organization of healthcare services. The reviews can also be sourced directly from the Cochrane Database of Systematic Reviews: https://www.cochranelibrary.com/cdsr/reviews
	Systematic reviews of qualitative studies (123, 124)	See systematic review sources in Table 6 of this publication

Type of evidence	Sources of research evidence	Comments
	Rx for change: https://www.cadth.ca/rx-change	Contains summaries of evidence from systematic reviews of intervention strategies used to alter behaviors of health technology prescribing, practice, and use. Includes a quality assessment of the systematic reviews
	Systematic reviews assessing the effects of interventions may describe implementation factors related to the interventions being tested	See systematic review sources in Table 6 of this publication
Primary studies in local context	EVID@Easy: https://bvsalud.org/evideasy/en/	The EVID@Easy tool (https://bvsalud.org/evideasy/en/) helps users locate the scientific evidence available in the Virtual Health Library of the Pan American Health Organization according to the stage of the decision-making process: (i) understanding the health problem; (ii) identifying and selecting options to face the problem; (iii) analyzing aspects and considerations for implementing options; and (iv) monitoring and evaluating the impact of the (decision) implementation. However, studies will still need to be evaluated for quality
	PubMed: https://pubmed.ncbi.nlm.nih.gov/	A search for local evidence will be needed and the included studies should be evaluated for quality. For more efficient searching, use the specialized searches function, available from: https://www.nlm.nih.gov/nichsr/hedges/search.html
	National surveys, routine health information, and national censuses	

Methods for assessing barriers and facilitators to implementation and effective strategies to overcome the barriers can be found in Chapter 3 of the PAHO tool for adapting and implementing guidelines (43): <https://iris.paho.org/handle/10665.2/49145>

SUPPORT Tool 6 is useful for assessing barriers and facilitators to implementation for policy (125): <https://health-policy-systems.biomedcentral.com/articles/10.1186/1478-4505-7-S1-S6>

At this stage of the EIDM process, a decision to adopt (or not) the intervention or policy option is made, and planning for implementation commences (see section below on implementation for guidance).

Monitor Implementation and Evaluate Impact

In most policy cycles diagrams, the evaluation step is placed after implementation. In practice, however, the monitoring and evaluation plan should always be developed and put into action before the intervention or policy option is implemented to ensure that baseline measures are collected. The monitoring and evaluation plan should consider the supporting evidence that was used at the selecting interventions step; and the potential effects that were identified should inform what should be monitored and whether an impact evaluation will be necessary.

The term **monitoring** refers to the process of systematically collecting data to inform the key stakeholders whether the intervention or policy option is being implemented in accordance with their expectations (126). Monitoring can answer questions such as: Is the program rollout progressing as planned? Are the objectives being achieved, and are the allocated funds being spent appropriately? (126).

An **evaluation** is an assessment, as systematic and impartial as possible, that aims to assess the relevance, impact, effectiveness, efficiency, and sustainability of an intervention or policy option (61, 126, 127). The term impact evaluation implies that there is a specific attempt to try to determine whether the observed changes in outcomes can be attributed to a particular policy or program (126). This requires inclusion of a comparison group and, ideally, randomization to groups.

For more information about monitoring and evaluation, see SUPPORT Tool 18 (126): <https://health-policy-systems.biomedcentral.com/articles/10.1186/1478-4505-7-S1-S18>, and the WHO evaluation practice handbook (127): <https://apps.who.int/iris/handle/10665/96311>

See Table 2 for guidance on the best study designs for the different research questions that may be addressed as part of an evaluation. For example, process evaluations ask questions such as “How does it work?”, which often requires conducting qualitative research or surveys; and impact evaluations ask questions such as “Did it work?” (effectiveness), in which case the best evidence will come from an RCT design. The main difference with evaluations is that systematic reviews will not be relevant as new data need to be collected to answer the relevant questions. Moreover, do not forget that it is important that these evaluations be conducted rigorously, using appropriate methods, to ensure low risk of bias.

The RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance) can help to guide the evaluation, given that it considers the different stages of implementation (reach, adoption, implementation, maintenance) and also includes multilevel (individual, setting) indicators (3, 128–130).

Further information about the RE-AIM framework for planning and evaluation can be found in the paper by Glasgow and colleagues 2019 (128) and on the free-use website: <https://www.re-aim.org/>

Indicators are frequently used as part of the monitoring and evaluation process. An indicator can be a quantitative or qualitative factor or variable that provides a simple and reliable means to assess the performance of the intervention (126). An example of an indicator is the number of vaccinations conducted within a set period of time in proportion to the target population (126). By using indicators that are in standard use, such as part of the assessment of the Sustainable Development Goals, the evaluation work will have a wider use (131, 132). Monitoring and evaluation allow problems to be identified early and facilitate **adjustments** to the intervention to improve performance. The results of the evaluation should also be disseminated/published to contribute to the evidence base and help others designing and implementing similar solutions.

What Else Needs to Be Considered to Achieve Impact?

As indicated in Figure 3 and described in the four previous steps in the EIDM process, research evidence plays an important role in informing the identification of a high-priority issue, selecting interventions/options, designing implementation, and in monitoring and evaluation. To achieve impact, however, there are some additional elements that are part of the “policy/action cycle” that are required but rest more with the decisionmakers. These include communication and engagement, implementation of the intervention (including the implementation plan), and sustaining change. However, research producers and brokers may be able to help with some of these steps.

Communication and Engagement

A decision to adopt an intervention may be encouraged by a sustained communication and engagement strategy to bring the solution to the attention of decisionmakers and to achieve their buy-in and ownership to implement the solution. Where a decision has not already been made, it may be helpful to bring stakeholders together to deliberate the suggested way forward once the research evidence is available (133). The conduct of a policy dialogue or citizen panel (134, 135) are good examples of ways to bring stakeholders together.

Guidance for producing and communicating evidence-based information about the effects of interventions is available in this reference (136), which also includes a checklist:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7375421/>

Guidance for conducting a policy dialogue can be found in the SURE guides (51):

https://epoc.cochrane.org/sites/epoc.cochrane.org/files/public/uploads/SURE-Guides-v2.1/Collectedfiles/sure_guides.html, and SUPPORT Tool 14 (134):

<https://health-policy-systems.biomedcentral.com/articles/10.1186/1478-4505-7-S1-S14>

EVIPNet Europe has also developed a useful tool for facilitating a policy dialogue (137):

https://www.euro.who.int/__data/assets/pdf_file/0017/323153/EVIPNET-PD-preparation-facilitation-checklist.pdf

Implementation

While the implementation plan is usually developed by the decisionmaker, guidance from research evidence and from researchers – both in the process of developing the implementation plan and also at the implementation considerations stage – can help to ensure that it is based on the best available evidence and is successful. By identifying the “essential components” of the intervention that should be maintained for maximum effectiveness (also known as “critical success factors”) researchers can highlight these factors when publishing the results of their research and when communicating the results of research to decisionmakers. Any potential barriers to implementation identified as part of the implementation considerations step should be considered in developing the implementation plan. Research evidence can also inform strategies to address the barriers (125).

Two useful tools for developing an implementation plan are the RE-AIM framework (25) and the WHO/ExpandNet nine steps for developing a scaling up strategy guide (94):

<https://expandnet.net/tools/>

In low- and middle-income countries, the most effective strategies for the implementation of interventions can be found in the Cochrane systematic review by Pantoja and colleagues (138):

<https://pubmed.ncbi.nlm.nih.gov/28895659/>

Sustain Change

Sustainability “describes to what extent an evidence-based intervention can deliver its intended benefits over an extended period of time after external support from the donor agency is terminated” (129). Indicators of the sustainability of an intervention or program include maintenance of the program’s initial health benefits, institutionalization of the program within the culture of the setting or community in which it is implemented, and capacity-building in the recipient setting or community to ensure continued delivery of the intervention (3, 129, 139).

Planning for sustainability ideally begins at the same time as the implementation plan is being developed (3, 140). Sustainability is also one of the implementation considerations (see section Appraise Implementation Considerations above). The monitoring and evaluation plan should also incorporate consideration of longer-term monitoring to ensure sustainability and to support the process of ongoing adaptation of the intervention if it is needed to achieve optimal fit and effectiveness (141). The results of the evaluation of the adjustment process should be disseminated to further contribute to the evidence base for achieving sustainability of interventions.

Further information on sustainability of interventions can be found in the WHO/ExpandNet nine steps for developing a scaling up strategy guide (94) and practical guidance for scaling up health service innovations (142):

<https://expandnet.net/tools/>. See in particular steps 5 and 6.

4. Ensuring Success

The chance of success in EIDM will be improved through incorporation of the following approaches.

Understanding the Context

“The context of an idea or event is the general situation that relates to it, and which helps it to be understood” (Collins Dictionary, <https://www.collinsdictionary.com/dictionary/english/-context>). Context can also be understood as “the circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood” (Oxford Dictionary, <https://www.lexico.com/definition/context>). In the case of EIDM, context needs to be considered throughout the process. At the stage of identification of the priority issue, it is important to consider: (i) whether there are any relevant policy frameworks that may help to frame or define the issue; (ii) the level of decision-making (e.g., global, national, multisectoral, health system level); (iii) the scope of interventions needed (e.g., a range of interventions to improve population diet vs. fiscal policy interventions only); (iv) the health outcomes that are most important; (v) the reason for the decision-making process (e.g., future planning, current crisis, need to address a policy commitment, availability of new evidence for an intervention or health outcome); and (vi) what is likely to be funded or is likely to have political interest (143). The context will also affect decisions about implementation (e.g., the availability of suitably qualified health professionals, infrastructure, legal frameworks, budget) and whether the intervention is successful in achieving the expected impacts.

Considering Health Equity

Achieving an impact on global health and equity is the ultimate aim of better use of research evidence in health decision-making. Health equity is defined as the absence of unfair and avoidable differences in health (144). Achieving equity is incorporated into both the United Nations Sustainable Development Goals (145) and WHO’s Thirteenth General Programme of Work, 2019–2023 (146, 147). To achieve health equity, it, and the social determinants of health (148), need to be considered throughout the EIDM process, including when determining priorities for action, selecting interventions, and in monitoring implementation and evaluating impact. Moreover, health equity needs to be considered when conducting research evidence to inform EIDM to ensure that the results of the research can be reported with stratification by key equity characteristics. One way to identify groups warranting particular attention is to use PROGRESS-Plus (Box 3) (149, 150).

Box 3.

Considering health equity using PROGRESS-Plus

PROGRESS-Plus is an acronym used to identify characteristics that stratify health opportunities and outcomes.

PROGRESS refers to:

- Place of residence
Race/ethnicity/culture/language
- Occupation
Gender/sex
- Religion
- Education
- Socioeconomic status
Social capital

Plus, it refers to:

- 1) personal characteristics associated with discrimination (e.g., age, disability);
- 2) features of relationships (e.g., smoking parents, excluded from school);
- 3) time-dependent relationships (e.g., leaving the hospital, respite care, other instances where a person may be temporarily at a disadvantage).

Sources: Cochrane Methods Equity (<https://methods.cochrane.org/equity/projects/evidence-equity/progress-plus>); O'Neill et al. (149).

A variety of tools are available to ensure that equity is considered during the conduct, reporting, or assessment of research results. These include tools for:

- the conduct of RCTs and systematic reviews (149, 151, 152);
- the reporting of RCTs (CONSORT-Equity) (153) and systematic reviews (PRISMA-Equity) (154);
- assessing the results of systematic reviews (150, 155).

Guidance for taking equity into account when developing evidence products is also available, including for:

- guidelines (156): <https://pubmed.ncbi.nlm.nih.gov/28802675/>
- HTAs (157, 158): http://www.cgh.uottawa.ca/whocc/projects/eo_toolkit/index.htm
- EBPs (155): <https://health-policy-systems.biomedcentral.com/articles/10.1186/1478-4505-7-S1-S10>

Early/Timely Involvement of Stakeholders

The involvement of stakeholders early in the process can help to ensure success. Depending on the decision-making context and evidence product being produced, the relevant stakeholders may include technical experts (often researchers), decisionmakers (e.g., policymakers), end-users that will implement the decision (e.g., program managers, health professionals), representatives of groups that will be most affected by the decision (e.g., the public, patients, disadvantaged groups), and experts in assessing evidence for EIDM.

The way in which important stakeholders can be involved will depend, in part, on the type of decision-making process being applied. For example, when developing guidelines, stakeholders are included within the different groups, including in the steering group, guideline development group, and external review group (31). When developing EBPs, stakeholders can be involved in prioritizing topics and also be invited to participate in the policy dialogue to shape the way forward (30). Depending on the product and the stage, the stakeholders involved might be required to provide a declaration of conflicts of interest.

The EVIPNet guiding manual for EBPs includes a useful section on stakeholder mapping (section 2.1.5), which is informed by a previous mapping of the policy and political contexts (section 2.1.4) (30).

In the case of systematic reviews, the TRANSFER approach supports authors of the review in collaborating with decisionmakers throughout the process to ensure an informed consideration of the transferability of the review findings to the review context (159):

<https://pubmed.ncbi.nlm.nih.gov/31952495/>

Management of Conflicts of Interest

Any EIDM process must include a clear process for the declaration and management of financial and nonfinancial conflicts of interest. This is essential to the development of unbiased and credible evidence syntheses, guidelines, HTAs, and EBPs (30, 31, 49, 103).

“A conflict of interest is a set of circumstances that creates a risk that professional judgment or actions regarding a primary interest will be unduly influenced by a secondary interest” (160). Conflicts of interest are of two basic types: financial and nonfinancial; both are relevant (31). Financial interests can be directly measured in monetary units, such as for stocks or patents owned, money received for commissioned work, or an honorarium for a speaking engagement. However, nonfinancial interests are less tangible and thus more difficult to identify, measure, and manage. They include any interest that could be reasonably perceived to affect an individual’s objectivity and independence, such as a desire for professional advancement or prestige, a drive to obtain research funding, or to improve one’s personal standing in the scientific community (31, 161). Conflicts of interest can apply to any participants (paid or not) in the EIDM process, including healthcare professionals, patients, decisionmakers, experts, researchers, and other professionals (31, 161).

Co-production of Research

Co-production is a collaborative model for research production that includes research users in the research process (162). It can allow a sharing of power between researchers and stakeholders, while they work together to develop the agenda, undertake, interpret, disseminate, and implement the findings (8, 39).

Despite there being few evaluations of the impact of co-production on research, practice, policy, or population outcomes (162, 163), it is expected to facilitate research use, implementation, and impact (39, 162, 164). Co-production does require work, time, and commitment for both research producers and users and it is not without risks (39, 162, 165). However, if it is undertaken in a way that ensures that conflicts of interest are managed, respect and trust are developed, and where the partnership is sufficiently supported by funding and time (39, 162, 166), it holds the potential to be mutually beneficial and improve population health outcomes.

Timely Production of Research through Rapid Methods

Timely access to good-quality and relevant research evidence is a key facilitator of research use (167). One way of promoting timeliness is the use of rapid methods such as rapid reviews (168-171) to ensure that evidence is available for decision-making when needed. However, care needs to be taken to ensure that minimum quality standards are maintained (172). Living reviews are another methodology that can help improve timeliness and quality as they use systematic review quality methods but are frequently updated to ensure that they are also current (173, 174). There are also methods available for rapid production of evidence products, such as in times of health emergencies (Table 8). When producing or commissioning a rapid review or rapid evidence product, it is important to consider the preparation of a full systematic review or evidence product as part of a plan for update (175).

Table 8.
Tools for rapid production of evidence syntheses and evidence products

Type of evidence synthesis or product	Guiding manuals	Reporting checklist / minimum standards
Rapid review	<ul style="list-style-type: none"> AHPSR/WHO guide for rapid reviews (169) Cochrane rapid review guidance (170) NCCMT guidebook (176) 	<ul style="list-style-type: none"> The Cochrane rapid review guidance includes recommendations for minimum standards (170) AMSTAR 2 (70) A reporting checklist based on PRISMA is in development (177)
Evidence brief for policy	Various models and product types exist, which also vary by country (172, 178-181)	None available
Guideline	<p>Guidance varies depending on the time frame for response:</p> <ul style="list-style-type: none"> For emergency response (hours to days): WHO guideline handbook, Chapter 11 (31) For urgent response (1-2 weeks): Akl et al. (175) For rapid advice (1-3 months): Garrity et al. (182) 	<ul style="list-style-type: none"> GIN-McMaster Guideline Development Checklist extension for rapid recommendations (183) AGREE II (66) Supplementary reading on country practices and standards can be found in (184), and on the use of the GRADE approach in situations of emergency and urgency can be found in (21)
Health technology assessment^a	Rapid health technology assessments are also described as rapid reviews – refer rapid review guidance. Guidance also varies by country (32, 185)	None available

^aNote that rapid health technology assessments (HTAs) are often described as rapid reviews (32, 185-187) and use similar methods to rapid reviews. Other terms used to describe rapid HTAs include mini-HTA and focused HTAs (186, 188). Some authors also refer to HTAs as cost-effectiveness analyses (108).

Two examples of rapid review programs include those of the Evidence-Informed Health Policies Unit of the Ministry of Health in Chile:

<https://etesa-sbe.minsal.cl/index.php/evipnet-chile/lineas-de-trabajo/servicio-de-respuesta-rapida/>,
and of Fiocruz in Brazil:

<https://brasilia.fiocruz.br/aagts/respostas-rapidas-rapid/rapid-productos/>

Dealing with Insufficient Research Evidence

At times, decisions need to be made even when there is insufficient evidence available on possible impacts. First, however, it is important to verify through searching that there are no existing systematic reviews. If no systematic review about the impact of an intervention is available, primary studies should be sought and a rapid review of the evidence (168, 169, 189) could be considered, ensuring that an assessment of the quality of the primary studies is undertaken. If a rapid review is conducted, a full systematic review should be considered at a later date.

If primary studies are not available, it may be appropriate to draw on other types of evidence, such as indirect evidence⁴ and expert opinion (although this should be a last resort) (3, 190). A deliberation (ideally, involving stakeholders) should be conducted to transparently assess the risks and benefits of the possible courses of action and thus identify the decision that is most justified (29, 191, 192), but it is important to publicly acknowledge the uncertainty in the decision (193, 194). A well-designed evaluation (of process, outcomes, and impacts) should be conducted whenever decisions are made based on insufficient evidence (119, 189). A pilot study is also a good option before fully rolling out the intervention (189).

Quality/Minimum Standards for Systematic Reviews, Rapid Reviews, and Evidence Products

When producing systematic reviews, rapid reviews, guidelines, HTAs, EBPs, and other types of evidence products, it is important to consider their quality. For example, anyone can put the label of systematic review on an evidence synthesis but that does not guarantee that it is a well-conducted systematic review or that it even includes the essential elements of a systematic review. For example, four overviews of systematic reviews included in a review of interventions for sustainable development and health included a total of 47 systematic reviews. However, 32% (n=15) were classified as low quality using the AMSTAR tool (71, 72) with scores of 0–3 out of 11, and 38% (n=18) as medium quality with scores of 4–7 (195, Table 1). Only 30% (n=14) were classified as high quality with scores of 8–11.

Thus, care needs to be taken to ensure that minimum quality standards are maintained, even when conducted rapidly (172). Moreover, a systematic review may have been well conducted but the report did not include sufficient details of methods to enable a quality assessment – thus it will be assessed as being of poor quality by current methods (72).

⁴Indirect evidence is obtained from other related or similar situations (for example, information on severe acute respiratory syndrome [SARS] and Middle East respiratory syndrome [MERS] was used to inform guidance in the COVID-19 pandemic).

Therefore, it is also important to ensure that all methods that may affect a quality rating be reported transparently. The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement (105, 106) can be used to ensure transparent reporting of systematic reviews.

The same applies to the production of guidelines, which have also been shown to vary widely in quality – both before (196, 197) and during the COVID-19 pandemic (198, 199) – when assessed using the AGREE II tool (66). In the case of guidelines, the AGREE II tool can be used to assess quality (66), and the AGREE Reporting Checklist can be used to ensure transparent reporting (46).

Tools exist to assess the quality of systematic reviews and evidence products (Table 3). The use of minimum quality standards that are based on these tools by commissioning organizations, such as WHO, and academic journals could help to ensure high quality. Many academic journals do require the completion of reporting checklists prior to publication, but the assessment of quality is currently dependent on the knowledge of peer-reviewers.

The use of minimum quality standards by commissioning organizations and academic journals could help to ensure high-quality evidence syntheses and products. These standards could be based on existing quality assessment tools (Table 3) with a consensus process for defining the minimum methodological requirements – see, for example, Silva et al. 2018 (185).

Journals and commissioners of reviews could consider requiring a quality assessment of all systematic reviews and rapid reviews prior to publication in addition to completion of the appropriate reporting checklist PRISMA (or PRISMA-RR) reporting checklist (105, 106, 177). AMSTAR (71, 72) or AMSTAR II (70) could be used and applied by the journal editor, peer-reviewers, and/or the authors of the review. The same applies to the quality assessment of guidelines, EBPs, and HTAs by commissioners and publishers before publication. Quality assessment tools for these purposes can be found in Tables 3 and 8.

User-friendly Formats for Decisionmakers

A known barrier to the use of research evidence by decisionmakers is the lack of time, while the inclusion of a policy-relevant summary has been reported as a facilitator of research use (167, 200–202). Various formats have been tested and suggested as being more user-friendly for decisionmakers (203–207). One of the earliest suggested formats that is still relevant today is the 1:3:25 format of the (then) Canadian Health Services Research Foundation (208).

The 1:3:25 approach starts with one page of main messages; followed by a three-page executive summary; and then presents the full report in up to 25 pages, in language someone who is not necessarily research-trained will understand (208):

<https://www.cfhi-fcass.ca/innovations-tools-resources/item-detail/2021/04/15/reader-friendly-writing-1-3-25>

For the one page of main messages, bullet points are recommended (208). These points should include the lessons decisionmakers can take from the research and not just summarize the main findings. They are what can be inferred from the research – “you have to go one step further and tell your audience what you think the findings mean for them, what implications your work has for theirs” (208). It is also important to tell the decisionmaker how the information could be interpreted and how any methodological flaws in the research may affect the interpretation of the results.

While some evidence products explicitly include recommendations (e.g., guidelines), policymakers sometimes prefer that summaries of research do not include explicit recommendations. Instead, it is more helpful for them if these are labeled using language such as “critical success factors”, “implementation considerations”, or “implications for policy”, rather than as recommendations. Moreover, it is not helpful to state that more research is needed without being more specific. For this it is helpful to try to answer the questions: What type of research?, In what population?, With what study design and methodological quality?, and With what purpose? Other tips for writing summaries that are user-friendly for decisionmakers are those suggested by BiodivERsA (209) (Box 4).

Box 4.

Tips for writing an effective policy brief

1. **Identify the audience** – so that the policy brief can be targeted appropriately; ensure that it is understood easily and quickly by non-specialists.
2. **Set a target length** – 6–12 pages long for a specialist policy audience and 1–2 pages maximum for more generalist policy audiences.
3. **Identify key messages** – think about what the key messages of the research are from the perspective of policymakers.
4. **Be specific and practical** – try to formulate specific actions that could arise from the research findings.
5. **Think beyond the facts** – put them in context and interpret them for readers.
6. **Headline key information** – make it easy to see what the key messages and recommendations are at a quick glance.
7. **Be precise**
8. **Do not overstretch the findings** – there should be a clear link between the content and the research findings.
9. **Get help with the language** – try to avoid technical jargon wherever possible.
10. **Do not put in too much** – cut it back to only the most important points
11. **Obtain feedback** – from colleagues and contacts in the policy community.
12. **Ensure the timing is right** – find out if there are key policy processes, decisions, events, or debates coming up that the policy brief could be linked to, or launched at.
13. **Provide links** – make sure those who read the policy brief can contact the researchers, and can easily access the evidence that underpins the arguments.

Source: Adapted from BiodivERsA 2015 (209)

Institutionalization of EIDM – Creating a Climate for EIDM

Institutionalization refers to the action of establishing EIDM as a convention or norm in an organization or culture. Institutionalization can be achieved with the use of mandates, standards or norms, education, incentives, disincentives, funding mechanisms, human resources, and leadership, among other mechanisms; many of which are interrelated (49). The institutionalization of EIDM will help to create a general climate for EIDM (and vice versa).

The general climate is the first element in the framework put forward by Lavis and colleagues to assess country-level efforts to link research to action (99), and arguably one of the most important. The types of conditions proposed for this element to link research to action include: (i) that funders of research have a mandate to support such efforts; (ii) that universities and other research institutions promote such efforts in their tenure and promotion processes and work to remove disincentives; (iii) that researchers place value on promoting the use of research but also understand that other types of information will also inform policy decisions (e.g., institutional constraints, public opinion); and (iv) that intermediary groups (e.g., the media, civil society groups) and research users place value on the use of research (99).

While there are few evaluations of these types of actions in improving the use of research in decision-making, some policy options can be suggested based on learnings from scoping reviews, systematic reviews of barriers and facilitators, mixed methods papers, and discussion papers (167, 202, 210–216) (Box 5). However, given the lack of evidence to support the impact of these options, consideration should be given to conducting a pilot program with a strong evaluation prior to widespread implementation of the option. When implemented at a larger scale, monitoring and evaluation should also be conducted, and the results disseminated to add to the evidence base.

Box 5.

Policy options to promote the institutionalization of EIDM at country level

For research producers/academics

1. Revise the criteria for academic performance evaluation process in universities to encourage the involvement of academics in evidence-informed decision-making (EIDM). Currently, academic performance evaluation is based heavily on the publication of academic articles in peer-reviewed journals. The criteria could include aspects such as:
 - dissemination of research results to non-academic audiences;
 - involvement in World Health Organization, government, and health sector committees involved in EIDM processes;
 - conduct of research (including systematic reviews) to inform EIDM processes;
 - involvement in the production of evidence products (guidelines, health technology assessments, evidence briefs for policy).
2. Define criteria to evaluate the impact of research on policy and practice decision-making, the health system, or health outcomes. Use these criteria to evaluate the research activities of academic and research institutions, and scientific journals.
3. Require the inclusion of a knowledge translation plan when submitting a research proposal for funding, as a mandatory condition.

For research funders

4. Revise existing research funding mechanisms to support the conduct of research (including systematic reviews) that is relevant for policy and practice decision-making. The inclusion of decisionmakers as reviewers of research proposals could also be helpful.
5. Revise existing research funding mechanisms to support the conduct of research by collaborative partnerships of academics and decisionmakers.

For research users

6. Define criteria to evaluate the use of research evidence and EIDM processes by decisionmakers and health professionals. Use these criteria to evaluate the performance of managers and staff in government departments, health services, and other health system institutions.
7. Introduce legislation and/or policies that require the publication of the evidence base for policy decisions.
8. Introduce legislation and/or policies that require the evaluation of the impact on health of all new programs above a certain funding threshold, and of all new programs that have a low certainty of evidence (or no evidence) when introduced.

To encourage linkage and exchange between research producers and users

9. Encourage and support mechanisms to increase interactions between decisionmakers and researchers such as holding policy dialogues, and holding and participating in EIDM courses, among others.
10. Encourage employment and/or secondment of policymakers and practitioners within academic institutions. For employment opportunities for policymakers, selection criteria will need to place value on policy and practice skill and experience.
11. Encourage employment and/or secondment of academics within ministries of health, health services, and other health system institutions. For employment opportunities for academics, selection criteria will need to place value on research skill and experience.

Note: Criteria 1-4, 6, and 9 are adapted from Sajadi and colleagues (213), who combined a scoping review of the international literature, case studies, and two policy dialogues to identify policy options to motivate health researchers and policymakers to support evidence-informed health policymaking in Iran (Islamic Republic of). Criteria 10 and 11 are partly based on Uneke and colleagues (215) and Schroff and colleagues (214).

Source: Adapted from various sources, including (213–215).

For detailed guidance on how to institutionalize health technology mechanisms in a country, see the recently published WHO guide: Institutionalizing Health Technology Assessment Mechanisms: a How to Guide (49):

<https://www.who.int/publications/i/item/9789240020665>

Platforms to Support EIDM

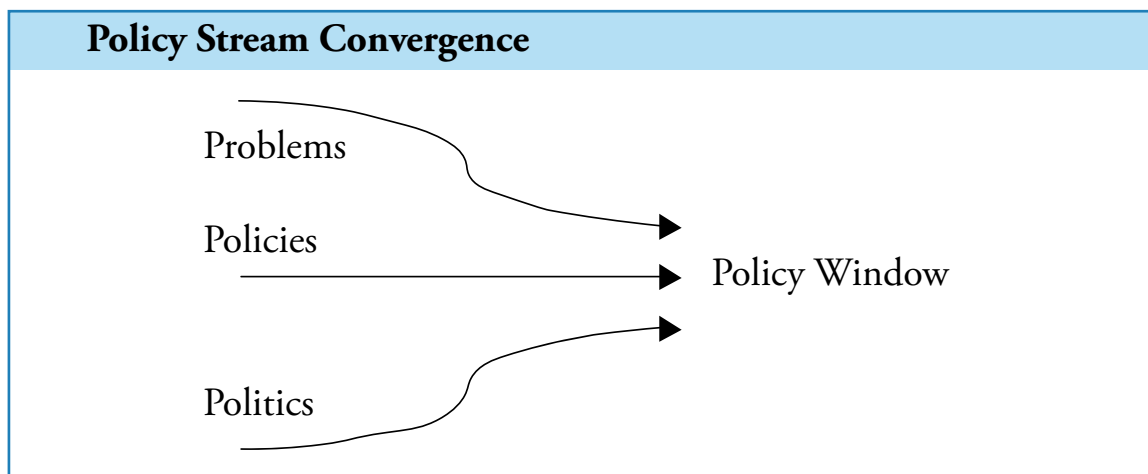
Consider the creation of platforms to support EIDM, such as those supported by the Evidence-informed Policy Network (EVIPNet), to help bridge the gap between the communities of research producers (generally, academic institutions) and research users (policymakers and other health decisionmakers) (2, 53). Also known as **knowledge translation platforms**, these platforms bring together researchers, policymakers, and other stakeholders in a formalized manner to achieve policy influence. This includes the joint creation, synthesis, dissemination, and promotion of the use of research evidence to shape policy and research agendas.

The Special Case of Policymaking

As mentioned in Chapter 2, with the introduction of the “policy/action cycle”, there are similarities in the decision-making process between both practice and policy. However, it is important to note that the policymaking process is less likely to be linear, sequential, or cyclical, as implied by Figure 2 (34, 35). Instead, decision-making processes in the policy environment are typically “messy”. While “ideal” processes may exist, in reality policy decisions are more likely to be driven by opportunities and conditions that present themselves as opposed to any kind of logical, explicit process (1, 217).

A useful framework for understanding how research may come to impact on the policy process is the idea of policy windows, theorized by the American political scientist John W. Kingdon (Figure 6) (218). Kingdon describes how windows of opportunity for policy change can create situations for the sudden uptake of research evidence, even when it has been previously ignored (37, 218, 219). Policy windows can open when three streams converge: problems, proposals, and politics. The **problem stream** refers to policy problems in society that potentially require attention; the **policy stream** pertains to the many potential policy solutions that can be put forward by policymakers, researchers, and lobby groups; and the **politics stream** refers to factors such as changes in government, and in public opinion (37).

Figure 6.
Kingdon’s streams model of policymaking



Source: Adapted from Kingdon 1984 (218).

To influence policy decisions, researcher producers need to be prepared when policy windows open (36, 37). Research producers can also work to create windows by promoting the problem and accompanying proposals (solutions) for the problem, and ensure that both are framed for (aligned with) the politics of the day. Researchers can increase the likelihood of research uptake by: (i) working to foresee (and create) emergent windows; (ii) responding quickly with support for the problem and a policy solution when a window opens; (iii) framing their research in line with likely windows; and (iv) persevering when the windows are closed (37). For those researchers who would like to play a stronger role in influencing policymaking, Oliver and Cairney (166) make eight recommendations, based on a systematic review of “how to” advice literature (Box 6).

Box 6.

The dos and don'ts of influencing policy – advice for researchers

1. Do high-quality research.
2. Communicate well: make your research relevant and readable.
3. Understand policy processes, policymaking context, and key actors.
4. Be accessible to policymakers: engage routinely, flexibly, and humbly.
5. Decide if you want to be an “issue advocate” or “honest broker”.
6. Build relationships (and ground rules) with policymakers.
7. Be “entrepreneurial” or find someone who is.
8. Reflect continuously: Should you engage, do you want to, and is it working?

Source: Oliver and Cairney 2019 (166).

The Special Case of Low- and Middle-income Countries

Low- and middle-income countries (LMICs) have extra challenges in applying EIDM processes in comparison to high-income countries. Moreover, the level of this challenge can vary depending on the income level of the country (e.g., low- vs. middle-income), the population size, level of development of the academic system, and whether the country is affected by protracted or acute emergencies (216). Limitations can include reduced financial resources, academic capacity, access to bibliographic databases and journals, low-quality health data (e.g., cause-of-death reports), language difficulties, high costs of publication in open-access journals, lack of policy support for EIDM, and presence of conflicts of interest in decision-making (220). Thus, a flexible approach to building national capacity is needed that can be supported by WHO, national governments, and other networks and nonprofit institutions involved in supporting EIDM globally, such as Cochrane and the Global Evidence Synthesis Initiative (216, 221, 222).

Some actions are suggested for LMICs to build national capacity for EIDM (Box 7). These efforts can be supported by high-income countries offering opportunities for funding, collaboration, and capacity-building in LMICs. The suggested actions are based on the WHO Eastern Mediterranean Region framework for action to improve national institutional capacity for the use of evidence health policymaking (216), the WHO European Region action plan to strengthen the use of evidence, information and research for policymaking (221), the academic literature (2, 99, 214, 220, 222, 223), and other sources (224, 225). They should be considered in conjunction with the policy options to promote the institutionalization of EIDM at country level suggested above (Box 5).

Box 7.

Actions for low- and middle-income countries to build national capacity for EIDM

Minimum requirements/set of actions (216)

- Establish mechanisms to regulate and manage conflicts of interest in decision-making.
- Enhance the capacity of the ministry of health for critical appraisal of evidence syntheses (e.g., systematic reviews, rapid reviews) and evidence products (e.g., guidelines, health technology assessments).
- Ensure access of the ministry of health to sources of research evidence for health (e.g., through the WHO Hinari Access to Research for Health Programme).^a
- Improve cause-of-death reports and national observatory for national health indicators, including surveillance reports.
- Ensure a minimum capacity (epidemiology and cost analysis) for development of policy reports.
- Establish mid-long-term projects to increase capacity in research methods, epidemiology, and economic analyses.
- Include resource funds for evidence-informed decision-making (EIDM) activities in donor requests to enhance national capacity.

Where academic capacity/resources are limited

- Focus efforts on, and build capacity in, adaptation of high-quality evidence products to the national context.
- Build capacity in implementation and evaluation of the adapted evidence products at the local level.
- Build academic capacity in the conduct of systematic reviews, with a focus on the conduct of reviews to address national priorities. This may require the support of international systematic review organizations.
- Build capacity of health professionals in EIDM during their university training and in the workplace.
- Make use of systematic reviews and burden of disease studies in the setting of national research priorities.
- Involve research users in setting priorities for research.
- Ensure that funders and academic institutions place value on systematic reviews as a legitimate research activity. The relatively low cost of conducting a systematic review in comparison to some other research activities could be promoted as an advantage to funders.
- Ensure that research funding bodies direct a part of their funding to national priorities.

^aThe Hinari Access to Research for Health Programme (<https://www.who.int/hinari/en/>) provides free or very-low-cost online access to the major journals in biomedical and related social sciences to local, nonprofit institutions in many low- and middle-income countries.

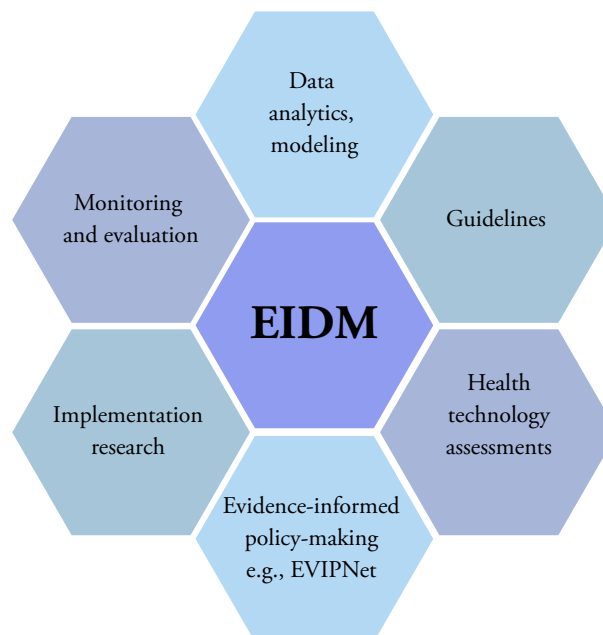
Costs of Publishing in Open-access Journals

At a global level, a conversation is needed regarding the high cost of publishing in open-access journals. While the existence of open-access journals enhances access of LMICs to the academic literature, which is welcome, it often results in a disproportionately high cost to researchers and their institutions in LMICs (226, 227). While some journals offer a full fee waiver to some countries, many LMICs only receive a reduced rate, or no reduction at all (e.g., Brazil, Colombia, Mexico). Where there is no national or institutional program to cover the cost (which is common in LMICs due to competing priorities for the health research budget), the fee falls on the researcher – and this fee can sometimes be equivalent to more than an average month's salary (227). Moreover, these are the same researchers that are often involved in peer-reviewing articles at no cost to the journal.

Integration of the Different EIDM Groups to Create Synergies

A range of groups are involved in producing research evidence for EIDM (Figure 7). Strong relationships between the different groups can help to promote exchange of innovations, experiences, and resources for the overall advancement of the field and create efficiencies in resource use. Some of these groups conduct similar types of activities (e.g., conducting or commissioning systematic reviews) and require similar technical knowledge (e.g., guidelines, EBPs, HTAs). Other groups support EIDM through the analysis or modeling of existing data and research, implementation and behavioral research to inform implementation, or through monitoring and evaluation of policies and programs. Synergies in resource use and capacity could be created between the groups through integration, especially where resources are limited or new programs being set up (216). Integration could be achieved in different ways, including the creation of a single “EIDM” unit or agency, separate but co-located units, or a model of close collaboration promoted through formal or informal arrangements. For existing programs, there is value in building bridges between groups and promoting close collaboration and exchange.

Figure 7. Integration of the different evidence-informed decision-making groups



Notes: The data analytics group may be responsible for and/or use as inputs national surveys, routine data, and public health surveillance data. The evidence-informed policymaking group (also known as EVIPNet) may produce evidence briefs for policy, among other products.

Sources: Adapted from Figure 2 in (216), and (108, 224, 228).

5. Evidence-Informed Decision-Making in Health Emergencies

Health emergencies can include outbreaks or disasters caused by infectious disease outbreaks, conflicts, and natural, technological, and other hazards (229). Recent examples of health emergencies include the COVID-19 pandemic, the Zika virus infection public health emergency in 2016 (Box 8), and the earthquakes in Haiti (in 2021 and 2010, respectively). In health emergencies, EIDM should follow similar principles and processes as for nonemergency times (see Chapters 2–4). However, EIDM needs to be done faster, with faster learning, and the lessons learned need to be put into action to improve preparedness for, and mitigation of, future health emergencies. This requires stronger institutionalization of EIDM prior to a health emergency, and the consideration of EIDM in the planning process for future health emergencies.

What is Different in Health Emergencies?

When there is a health emergency, decision-making needs to be conducted at a greater speed, with some “shortcuts” taken along the way to allow timely decision-making. It must also be conducted with less waste due to the strain on resources that health emergencies often imply. At times, decisions need to be made when there is little or no research evidence available – but these decisions need to be taken carefully and updated regularly as new evidence is created. However, when decisions are made to use unproven therapeutics, they should only be offered within research protocols, and specifically within RCTs capable of assessing safety and efficacy (230, 231). If conducting research is not possible, then the use of unproven interventions could be justified in exceptional circumstances under the Monitored Emergency Use of Unregistered and Investigational Interventions (MEURI) framework, until an RCT can be initiated (230, 231).

During health emergencies, decisionmakers must also consider the scientific evidence together with other political and social imperatives, such as the need to maintain the national economy, security, education, and the need of individuals to work to meet their daily needs (232, 233). While these may appear to be competing priorities, research has shown that they are intertwined and that decisions in one area can have impacts in others – as reflected in the social determinants of health (234–236) and the Sustainable Development Goals (145, 195, 237).

Box 8.

The 2016 Zika virus infection public health emergency

In early 2015, an increase in cases of the mosquito-borne Zika virus was detected in Brazil (238). On 7 May 2015, the Pan American Health Organization (PAHO) issued an Epidemiological Alert, describing the infection and giving Member States recommendations for leveraging existing surveillance systems to detect possible cases of Zika virus infection. Later that year an increase in prevalence of congenital anomalies, including microcephaly, and Guillain-Barré syndrome was noted, and these seemed to be associated with the Zika virus outbreak. By 17 January 2016, 18 countries and territories in the Americas had confirmed autochthonous circulation of Zika virus (239).

On 1 February 2016, the Director-General of the World Health Organization (WHO) declared a Public Health Emergency of International Concern due to the increase in cases of Zika virus infection and its potential association with the recent cluster of microcephaly cases and other neurological disorders reported in Brazil, which followed a similar cluster in French Polynesia in 2014 (240).

What measures were taken to ensure that the response was informed by research evidence?

As a result of the increase in cases, PAHO and WHO recommended that countries apply and intensify the surveillance and vector control measures developed for dengue and chikungunya, as these three viruses are transmitted by the same mosquito, *Aedes aegypti* (241). Efforts to improve the evidence base for decision-making included the development of guidelines for Zika virus surveillance (242, 243), case definitions (244), and six standardized research protocols to ensure that the epidemiological research studies conducted in response to the emergency were comprehensive, reliable, and minimized bias at different stages of the study (245, 246). To make better use of the research evidence and to try to prevent duplication, a register for Zika virus study protocols and published studies was developed and continually updated (247). PAHO and WHO also funded systematic reviews to answer key questions, such as whether there was a causal relation between Zika virus and congenital brain abnormalities and Guillain-Barré syndrome (248), and to determine the prevalence of asymptomatic Zika virus infection (249).

Issues Amplified by the COVID-19 Pandemic

As stated by Helen Pearson in her article for Nature, How COVID Broke the Evidence Pipeline: “the pandemic stress-tested the way the world produces evidence – and revealed all the flaws” (250). These included research waste due to multiple COVID-19 trials with small samples, too many trials on some treatments (e.g., hydroxychloroquine) even after convincing evidence of no effect or possible harm, poor-quality trials, poor-quality systematic reviews, too many reviews of low quality, duplication of effort, insufficient speed, proliferation of misinformation, recommendations for treatments with no evidence of effectiveness by experts and nonexperts alike (250-254). Other issues included scientific uncertainties, scarcity of relevant research, poor access to actionable evidence, time constraints, and weak collaboration among relevant stakeholders (253). Moreover, there was a lack of a comprehensive and collaborative mechanism of rapid response for providing evidence to Member States to guide their response to the pandemic. Some of these issues are presented in more detail below.

While science has been used in policy documents throughout the pandemic, the use of science has been mostly concentrated within intergovernmental organizations, such as WHO, and much less so in national governments (255). In addition, some countries have been actively antagonistic to intergovernmental organizations and scientific advice (256–258).

Use of Unproven Interventions outside of Research

The use of unproven therapeutics for the prevention and treatment of COVID-19 was very frequent in 2020. For example, both chloroquine and hydroxychloroquine were endorsed by some doctors and high-profile figures early on in the pandemic for use in the prevention and treatment of COVID-19, but without evidence of effectiveness (230, 259, 260). Both drugs have since been shown to increase mortality and have no significant effect on other health outcomes (9). Another treatment that was widely recommended for prevention and early treatment of COVID-19 in some countries was ivermectin, with no clear evidence of benefit (9), which also led to cases of poisoning due to inappropriate use, such as the use of veterinary formulations (261).

Duplication of Effort

As cases of COVID-19 climbed in February 2020, the need for guidance from research evidence on treatment, prevention, and control was evident (250, 262). There was also a rush by researchers to contribute to the field, even when the topic was not within their area of expertise. As a result, there was an explosion in COVID-19 research (263). There was also a tendency by journals to abbreviate the peer-review process, and authors to release results before peer-review through press release or publication of preprints, sometimes leading to dissemination of unproven treatments and later retraction of papers (264, 265). There was also waste due to the conduct and publication of small, repetitive, nonrigorous studies, with nonrelevant outcomes that duplicated efforts and drained limited resources without producing meaningful conclusions on the safety and efficacy of the interventions being tested (250, 252). While some level of replication is needed, it is important to focus on the conduct of high-quality studies and the coordination of efforts to ensure maximum usefulness.

There was also a rush to conduct systematic reviews to guide the response. During the first five months of the COVID-19 pandemic (up to 15 June 2020), 280 reviews (232 systematic reviews, 46 rapid reviews, and 2 overviews) addressing any research question related to COVID-19 were published (251). Many of the systematic reviews identified addressed the same or similar research question (251). For example, nine reviews investigated hydroxychloroquine for treatment of inpatients with COVID-19 and were all published within 8 weeks of one another. One review suggested hydroxychloroquine could be beneficial, one reported increased mortality, and the other seven concluded that there was insufficient or conflicting evidence (251).

Not only does this example of systematic reviews show duplication of effort, but it also highlights the confusion that can be caused by conflicting results (251). Other studies showed similar findings in which, in less than 6 months, the literature was flooded with more systematic reviews than primary studies trying to answer the question of “what is the spectrum and frequency of imaging findings in children with COVID-19” with 25 systematic reviews found that included a total of 17 primary studies between them (254).

Low Quality of Primary Studies, Systematic Reviews, Rapid Reviews, and Guidelines

The conduct and publication of small, repetitive, nonrigorous primary studies, as mentioned above, limited the ability of those trying to interpret the results to make meaningful conclusions on the safety and efficacy of the interventions being tested (250, 252).

The same occurred for the multiple systematic reviews and rapid reviews published. Most of the reviews published in the first five months of the pandemic were of low quality and fewer than half reported undertaking a quality assessment of the included studies. What is more concerning is that sometimes the lowest-quality reviews were the ones that received the most attention and citations (251). Flaws in the conduct of systematic reviews will limit their validity and generalizability, and can damage public trust in systematic reviews and researchers. A similar variation in quality was also seen in the production of guidelines for the treatment of COVID-19 (198, 199) – when assessed using the AGREE II tool (66).

Journal Publication Process Too Slow to Be Useful

The time taken to publish a study in a peer-reviewed journal can be lengthy and took an average of 80–100 days before COVID-19 (average from 11 medical journals) (263). While journals worked hard to speed up publication of COVID-19 papers during the pandemic, it came at the cost of a slower publication time for non-COVID-19 papers (263). Moreover, the rush to publish sometimes resulted in later retraction (264, 265) or publication of lower-quality studies (see previous section).

Sociopolitical and Time Pressures

During health emergencies, decisionmakers look for scientific input from experts who understand public health risks and can frame evidence within the appropriate context (232). At times, however, the experts (researcher producers) are not able to provide advice quickly, are not skilled in EIDM, are not able to communicate complex scientific evidence to decisionmakers, or are drowned out by competing information supplied through social networks and from the media (232, 250, 266) – see also next section.

Proliferation of Misinformation and the Role of the Media, Social Networks, and “Experts”

During any health emergency, it is expected that there will be an effect on social communication, especially mainstream media and through social networks (267). This communication can be helpful in promoting useful recommendations, but it can also promote sensationalism and the spreading of false or contradictory information, as seen with the COVID-19 pandemic (267). This is a problem given that many users of the media and social networks are unable to critically assess the credibility of scientific reports. Often, the media does not discriminate between the credibility of “experts” and is willing to interview and publish comments from any expert that offers advice (266). Moreover some researchers’ desire for publicity encourages them to offer opinions to the media about topics in which they are not fully qualified. This can lead to contradictory messages and even greater confusion in the general public (266).

Improving the Use of Research Evidence during Health Emergencies

Despite the pressure to do otherwise, the principles of EIDM remain the same during a health emergency. Research producers and users must collectively do all that they can to ensure that the response to a health emergency is based on the same principles that apply during nonemergency times (250, 262, 264, 268). Moreover, it is also necessary to continue to invest in country capacity to bridge science, policy, and action (262) to ensure that all preparations are made.

Previous work conducted to ensure success (see Chapter 4), including institutionalization of EIDM and workforce development, including in LMICs, will contribute to success during health emergencies. For example, knowledge translation platforms that support EIDM can play an important role in providing relevant and timely evidence to inform pandemic responses and bridge the gap between science, policy, and practice, as could be seen by the example of the Knowledge to Policy (K2P) Center in Lebanon (also a WHO Collaborating Centre for Evidence-Informed Policymaking and Practice) (253).

The COVID-19 pandemic has also offered many gains for EIDM, despite the apparent flaws. It has given unprecedented visibility to research evidence and its use in health decision-making, and greater attention and responsibility to scientific advisors and advisory bodies (262). It has also been witness to some extraordinary efforts of cooperation and collaboration between research groups, WHO, PAHO, and governments to produce rapid reviews, living reviews, repositories of COVID-19 evidence, living guidelines, repositories of recommendations, and to coordinate international RCTs or treatment options, and a road map for research, among others (9, 250, 269–275). This is potentially a very solid foundation on which to build for future health emergencies and for EIDM in general (108).

Some Potential Solutions

It is necessary to build on the gains that have been achieved to date by strengthening national capacities for EIDM, enhancing public trust in science, sharing knowledge for more collaborative research, ensuring universal access to solutions, and acting with greater urgency on global scientific assessments (233, 262, 276). There is also a need to ensure that efficient processes for the creation and use of research evidence are included in the planning process for future health emergencies (229, 277). Some potential solutions are proposed in Table 9.

Table 9.

Potential solutions to problems seen in EIDM in the COVID-19 pandemic

Potential solution	Examples/comments
Creating a climate for evidence-informed decision-making (EIDM)	
Institutionalization of EIDM	A range of complementary policy options to promote the institutionalization of EIDM within countries are presented in Box 5 of this publication. These options include the introduction of legislation and/or policies that require the publication of the evidence base for policy decisions, and that require the evaluation of the impact on health of all new programs.
Build capacity for EIDM in low- and middle-income countries (LMICs) – in both research producers and research users (decisionmakers)	Training of researchers, health professionals, and decisionmakers in EIDM is required, including in adaptation of high-quality evidence products to the national context, in implementation and evaluation of adapted evidence products at the local level, and in the conduct of systematic reviews (220). See also Box 7 of this publication.

Potential solution	Examples/comments
Leading organizations (e.g., WHO, PAHO, nongovernmental organizations) and high-income countries to support LMICs	The above actions need to be supported by leading organizations and high-income countries offering opportunities for funding, collaboration, and capacity-building in LMICs.
Linkage and exchange	
Greater collaboration	The co-production of research between researchers and research users, as part of multinational research collaborations, has the potential to improve the quality of the products produced, be beneficial to the participants involved, and improve population health outcomes. See also “Co-production of research” in Chapter 4 of this publication. This activity could be supported by leading organizations (e.g., WHO, PAHO) to rapidly identify the different evidence initiatives and evidence needs across the countries and make links or connections among teams to encourage collaboration.
Use of knowledge translation platforms to support EIDM	These country-level platforms bring together researchers, policymakers, and other stakeholders in a formalized manner to bridge the gap between the communities of research producers and research users to achieve policy influence. Activities include the joint creation, synthesis, dissemination, and promotion of the use of research evidence to shape policy and research agendas.
Production of research evidence	
Build academic capacity in EIDM in LMICs	Skills training in EIDM and systematic reviews should be included as part of the university degrees of health professionals. International organizations and researchers from high-income countries can help by providing opportunities for learning through collaboration with more experienced researchers and teams.
Rapid reviews to allow for a rapid response for key questions	Examples: <ul style="list-style-type: none"> • Cochrane and WHO rapid review program https://covidreviews.cochrane.org/search/site • National Collaborating Centre for Methods and Tools rapid review service (272)
Living reviews to ensure that systematic reviews are kept up to date	Examples: <ul style="list-style-type: none"> • Ongoing Living Update of COVID-19 Therapeutic Options by PAHO (9) • Drug Treatments for Covid-19: Living Systematic Review and Network Meta-analysis (278)
Living guidelines to ensure frequent update of guidelines for decisionmakers	Examples: <ul style="list-style-type: none"> • Therapeutics and COVID-19: Living Guideline by WHO and partners (275) https://app.magicapp.org/#/guidelines • National COVID-19 Clinical Evidence Taskforce (Australia): https://covid19evidence.net.au/
Ensure that equity is considered as part of data collection, research production and reporting	This should be part of business as usual and continue during any health emergency.
Ensure that research delivered during a pandemic is of the highest possible quality	There is a need to “raise the bar of science, not to lower it” (264).

Potential solution	Examples/comments
<p>Minimum quality standards for primary studies</p>	<ul style="list-style-type: none"> • Journals could consider requiring a quality assessment of all primary studies prior to publication in addition to completion of the appropriate reporting checklist, e.g., CONSORT for randomized trials (http://www.equator-network.org) • Quality assessment tools (Table 3 of this publication) could be used and applied by the journal editor, peer-reviewers, and/or the authors of studies prior to publication
<p>Minimum quality standards for systematic reviews, rapid reviews, and evidence products</p>	<ul style="list-style-type: none"> • Tools exist to assess the quality of systematic reviews, rapid reviews, and evidence products (see Table 3 of this publication) • The use of agreed minimum quality standards that are based on these tools by commissioning organizations, such as WHO, and academic journals could help to ensure high quality
<p>Improve quality of reports of primary studies and evidence syntheses</p>	<ul style="list-style-type: none"> • Increase author and journal awareness of and training in reporting guidelines (279) • Supplement peer-review of primary studies and evidence syntheses with review by methodologists (279)
<p>Require registration of the protocol for all new trials and systematic reviews, and introduce a process to check for duplication and quality</p>	<p>Examples of existing registries:</p> <ul style="list-style-type: none"> • International Prospective Register of Systematic Reviews (PROSPERO): https://www.crd.york.ac.uk/prospéro/ • International Clinical Trials Registry Platform (ICTRP): https://www.who.int/clinical-trials-registry-platform • U.S. National Library of Medicine ClinicalTrials.gov: https://clinicaltrials.gov/ <p>In times of emergency there may be a need to register the title as a first step and provide extra funding to the register to allow quality assessment and quicker registration time. The scope of registers may also need expanding, or new registers may need to be set up. For example, PROSPERO is limited to health reviews and does not include all review types, e.g., scoping reviews.</p>
<p>Require registration of all new guidelines and include a process to check for duplication and quality</p>	<p>Prospective registration of guidelines can help to reduce duplication, improve collaboration, and increase transparency and credibility (280)</p> <p>Examples of existing registries:</p> <ul style="list-style-type: none"> • International Practice Guideline Registry Platform: http://www.guidelines-registry.org/ • Clinical Practice Guidelines in Development Register (for Australian guidelines): https://www.clinicalguidelines.gov.au/register
<p>Use/application of research evidence</p>	
<p>Decisionmakers and the media should be encouraged not to use preprints as they are not yet peer-reviewed</p>	<ul style="list-style-type: none"> • Advisors to decisionmakers and the media should be made aware of the dangers of using preprints based on experience of the possible negative impacts of promoting research that is later proved to be faulty
<p>Skills training to help decisionmakers search for trustworthy sources of evidence</p>	<p>Support from leading organizations and high-income countries to develop, fund, and implement training courses in LMICs would be helpful.</p>
<p>Skills training to help decisionmakers interpret and use scientific evidence</p>	<p>Support from leading organizations and high-income countries to develop, fund, and implement training courses in LMICs would be helpful.</p>

Potential solution	Examples/comments
Facilitation of research use	
Creation of evidence networks to coordinate EIDM efforts, encourage collaboration, and reduce duplication	COVID-19 Evidence Network to support Decision-making (COVID-END) (271) https://www.mcmasterforum.org/networks/covid-end
Identification of credible scientific spokespersons from leading organizations to ensure consistent and accurate messages to the public and media	This needs to be done at international level (e.g., WHO), and by national governments, research institutions, and knowledge translation platforms (281).
Coordination of international high-quality randomized controlled trials by WHO and other leading institutions with participation open to all countries, including LMICs	Examples: <ul style="list-style-type: none"> • RECOVERY trial coordinated by the Nuffield Department of Population Health at University of Oxford (Oxford, United Kingdom) and funded by the National Institute for Health Research Clinical Research Network (282) https://www.recoverytrial.net/ • WHO COVID-19 Solidarity trial (283, 284) https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov/solidarity-clinical-trial-for-covid-19-treatments
Repositories of the best available evidence – for trials, systematic reviews, and guidelines	Examples: <ul style="list-style-type: none"> • L.OVE platform (273) https://iloveevidence.com/ • COVID-NMA initiative: A living mapping and living systematic review of Covid-19 trials (269, 285) https://covid-nma.com/ • Getting trustworthy guidelines into the hands of decisionmakers – COVID-19 recommendations map (270) https://covid19.recmap.org/ • COVID-END inventory of best evidence syntheses (271) https://www.mcmasterforum.org/networks/covid-end/resources-to-support-decision-makers/Inventory-of-best-evidence-syntheses

The Way Forward

The COVID-19 pandemic has brought about many challenges, but has also offered many gains for EIDM. It has shown what is possible with collaborative and coordinated work between EIDM practitioners, including researchers, WHO, governments, health professionals, and other stakeholders. While some things have worked well and provide a platform to build on, there is clearly much more work to be done to strengthen national capacities for EIDM. Stronger institutionalization of EIDM is required, and EIDM needs to be considered in the planning process for future health emergencies. All those with a role to play in EIDM, no matter how small, should start on this work now.

References

1. Clark R, Haby M. Chapter 7. Evidence-based policy: why and how. In: Carey G, Landvogt K, Barraket J, editors. *Creating and implementing public policy: cross-sectoral debates*. Abingdon, UK: Routledge, Taylor and Francis Group; 2015. p. 98-112.
2. Partridge ACR, Mansilla C, Randhawa H, Lavis JN, El-Jardali F, Sewankambo NK. Lessons learned from descriptions and evaluations of knowledge translation platforms supporting evidence-informed policy-making in low- and middle-income countries: a systematic review. *Health Res Policy Syst* 2020;18:127.
3. World Health Organization. *Evidence, policy, impact. WHO guide for evidence-informed decision-making*. Geneva: WHO; 2021
4. Oxman AD, Lavis JN, Lewin S, Fretheim A. SUPPORT tools for evidence-informed health policymaking (STP) 1: what is evidence-informed policymaking? *Health Res Policy Syst* 2009;7 Suppl 1:S1.
5. Chalmers I. If evidence-informed policy works in practice, does it matter if it doesn't work in theory? *Evidence & Policy* 2005;1:227-42.
6. Stewart R, Dayal H, Langer L, van Rooyen C. The evidence ecosystem in South Africa: growing resilience and institutionalisation of evidence use. *Palgrave Commun* 2019;5:90.
7. Brownson RC, Fielding JE, Maylahn CM. Evidence-based public health: a fundamental concept for public health practice. *Annu Rev Public Health* 2009;30:175-201.
8. Oliver K, Pearce W. Three lessons from evidence-based medicine and policy: increase transparency, balance inputs and understand power. *Palgrave Commun* 2017;3:43.
9. Pan American Health Organization. *Ongoing living update of COVID-19 therapeutic options: summary of evidence*. Rapid Review. 24th Ed. 6 August 2021. Washington, DC: PAHO; 2021 [cited 13 August 2021]. Available from: <https://iris.paho.org/handle/10665.2/52719>
10. Guyatt G, Cairns J, Churchill D, Cook D, Haynes B, Hirsh J, et al. Evidence-based medicine: a new approach to teaching the practice of medicine. *JAMA* 1992;268:2420-5.
11. Kohatsu ND, Robinson JG, Torner JC. Evidence-based public health: an evolving concept. *Am J Prev Med* 2004;27:417-21.
12. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312:71-2.
13. Ciliska D, Thomas S, Buffet C. *An Introduction to Evidence-Informed Public Health and A Compendium of Critical Appraisal Tools for Public Health Practice*. Canada: National Collaborating Centre for Methods and Tools; 2008.
14. Davies P. *Is Evidence-Based Government Possible? Jerry Lee Lecture to the 4th Annual Campbell Collaboration Colloquium; 19 February*. Washington, DC: Policy Hub, UK Cabinet Office; 2004.
15. Alonso-Coello P, Schunemann HJ, Moberg J, Brignardello-Petersen R, Akl EA, Davoli M, et al. GRADE Evidence to Decision (EtD) frameworks: a systematic and transparent approach to making well informed healthcare choices. 1: Introduction. *BMJ* 2016;353:i2016.
16. Burford BJ, Rehfuess E, Schunemann HJ, Akl EA, Waters E, Armstrong R, et al. Assessing evidence in public health: the added value of GRADE. *Journal of Public Health* 2012;34:631-5
17. Carter R, Vos T, Moodie M, Haby M, Magnus A, Mihalopoulos C. Priority setting in health: origins, description and application of the Australian Assessing Cost-Effectiveness initiative. *Expert Rev Pharmacoecon Outcomes Res* 2008;8:593-617.
18. Moberg J, Oxman AD, Rosenbaum S, Schunemann HJ, Guyatt G, Flottorp S, et al. The GRADE Evidence to Decision (EtD) framework for health system and public health decisions. *Health Res Policy Syst* 2018;16:45.

19. Oxman AD, Lavis JN, Fretheim A, Lewin S. SUPPORT tools for evidence-informed health policymaking (STP) 16: using research evidence in balancing the pros and cons of policies. *Health Res Policy Syst* 2009;7:S16.
20. Rehfuss EA, Stratil JM, Scheel IB, Portela A, Norris SL, Baltussen R. The WHO-INTEGRATE evidence to decision framework version 1.0: integrating WHO norms and values and a complexity perspective. *BMJ Glob Health* 2019;4:e000844.
21. Schünemann HJ, Santesso N, Vist GE, Cuello C, Lotfi T, Flottorp S, et al. Using GRADE in situations of emergencies and urgencies: certainty in evidence and recommendations matters during the COVID-19 pandemic, now more than ever and no matter what. *J Clin Epidemiol* 2020;127:202-7.
22. Brownson RC, Baker EA, Deshpande AD, Gillespie KN. Evidence-based public health. Oxford: Oxford University Press; 2018.
23. Cuello García C, Pérez-Gaxiola G. Medicina basada en la evidencia: Fundamentos y su enseñanza en el contexto clínico. Mexico City: Editorial Médica Panamericana; 2019. 288 pp.
24. Killoran A, Kelly MP. Evidence-based public health: effectiveness and efficiency. Oxford University Press; 2009.
25. Nutley S. Bridging the policy/research divide. Reflections and lessons from the UK. Keynote paper presented at "Facing the future: Engaging stakeholders and citizens in developing public policy". National Institute of Governance Conference, Canberra, Australia 23/24 April 2003. <http://www.treasury.govt.nz/publications/media-speeches/guestlectures/nutley-apr03>
26. Campbell S, Schryer-Roy A-M, Jessani N, Bennett G, IDRC. Knowledge translation: a "research matters" toolkit. Ottawa: International Development Research Centre and the Swiss Agency for Development and Cooperation; 2008 [cited 8 November 2021]. Available from: <https://idl-bnc-idrc.dspacedirect.org/handle/10625/41030>
27. Graham ID, Logan J, Harrison MB, Straus SE, Tetroe J, Caswell W, et al. Lost in knowledge translation: time for a map? *J Contin Educ Health Prof* 2006;26:13-24.
28. Oxman AD, Fretheim A, Schunemann HJ, Sure. Improving the use of research evidence in guideline development: introduction. *Health Res Policy Syst* 2006;4:12.
29. Fretheim A, Schunemann HJ, Oxman AD. Improving the use of research evidence in guideline development: 3. Group composition and consultation process. *Health Res Policy Syst* 2006;4:15.
30. EVIPNet Europe. Evidence briefs for policy. Using the integrated knowledge translation approach: a guiding manual. Copenhagen: World Health Organization Regional Office for Europe; 2020.
31. World Health Organization. WHO handbook for guideline development, second edition. Geneva: WHO; 2014.
32. Escuela Andaluza de Salud Pública / Pan American Health Organization / London School of Economics EASP/PAHO/LSE. Health technology assessment toolbox for emerging settings. Best practices and recommendations. Granada: EASP/PAHO/LSE; 2015 [cited 17 June 2021]. Available from: <http://www.easp.es/hta-toolbox/web/>
33. Reveiz L. Monitoreo de las metas del ODS-3 y sus desigualdades: evidencia para la acción del ODS-3. Washington, DC: PAHO; 2020.
34. Young E, Quinn L. Writing effective public policy papers. A guide for policy advisers in Central and Eastern Europe. Budapest: Local Government and Public Service Reform Initiative, Open Society Institute Budapest; 2002.

35. Giorgi S. How to improve the evaluation of complex systems to better inform policymaking – Learning from evaluating Defra’s Reward & Recognition Fund. Fellowship Report, July 2017. 2017 [cited 12 July 2021]. Available from: <https://www.cecan.ac.uk/wp-content/uploads/2020/09/Guidance-Report-RRF-Fellowship-Final.pdf>
36. Kingdon J. *Agendas, alternatives and public policies*. Second ed. Harlow: Longman Classics, 2010.
37. Rose DC, Mukherjee N, Simmons BI, Tew ER, Robertson RJ, Vadrot ABM, et al. Policy windows for the environment: Tips for improving the uptake of scientific knowledge. *Environ Sci Policy* 2020;113:47-54.
38. Lavis J, Davies H, Oxman A, Denis JL, Golden-Biddle K, Ferlie E. Towards systematic reviews that inform health care management and policy-making. *J Health Serv Res Policy* 2005;10 Suppl 1:35-48.
39. Redman S, Greenhalgh T, Adedokun L, Staniszevska S, Denegri S. Co-production of knowledge: the future. *BMJ* 2021;372:n434.
40. El-Jardali F, Lavis JN, Ataya N, Jamal D. Use of health systems and policy research evidence in the health policymaking in eastern Mediterranean countries: views and practices of researchers. *Implement Sci* 2012;11:2.
41. Clar C, Campbell S, Davidson L, Graham W. What are the effects of interventions to improve the uptake of evidence from health research into policy in low and middle-income countries? Systematic Review. Aberdeen, UK: Department for International Development; 2011.
42. Guyatt G, Oxman AD, Akl EA, Kunz R, Vist G, Brozek J, et al. GRADE guidelines: 1. Introduction-GRADE evidence profiles and summary of findings tables. *J Clin Epidemiol* 2011;64:383-94.
43. Pan American Health Organization. *Strengthening national evidence-informed guideline programs. A tool for adapting and implementing guidelines in the Americas*. Washington, DC: PAHO; 2018.
44. Schünemann H, Brozek J, Guyatt G, Oxman A, editors. *Handbook for grading the quality of evidence and the strength of recommendations using the GRADE approach*. Updated October 2013. GRADE Working Group; 2013. Available from: <https://gdt.grade.pro.org/app/handbook/handbook.html>
45. Schunemann HJ, Wiercioch W, Exteandria I, Falavigna M, Santesso N, Mustafa R, et al. Guidelines 2.0: systematic development of a comprehensive checklist for a successful guideline enterprise. *CMAJ* 2014;186:E123-42.
46. Brouwers MC, Kerkvliet K, Spithoff K, Consortium ANS. The AGREE Reporting Checklist: a tool to improve reporting of clinical practice guidelines. *BMJ* 2016;352:i1152.
47. O’Rourke B, Oortwijn W, Schuller T. The new definition of health technology assessment: a milestone in international collaboration. *Int J Technol Assess Health Care* 2020;36:187-90.
48. Pan American Health Organization. CSP28.R9 - Health technology assessment and incorporation into health systems. 64th Session of the Regional Committee. 28th Pan American Sanitary Conference. Washington, DC: PAHO; 2012.
49. Bertram M, Dhaene G, Tan-Torres Edejer T, editors. *Institutionalizing health technology assessment mechanisms: a how to guide*. Geneva: World Health Organization, 2021.
50. Hailey D. Toward transparency in health technology assessment: a checklist for HTA reports. *Int J Technol Assess Health Care* 2003;19:1-7.
51. The SURE Collaboration. *SURE Guides for Preparing and Using Evidence-Based Policy Briefs*. Version 2.1 [updated November 2011]; The SURE Collaboration; 2011. Available from: https://epoc.cochrane.org/sites/epoc.cochrane.org/files/public/uploads/SURE-Guides-v2.1/Collectedfiles/sure_guides.html
52. Lavis JN, Permand G, Oxman AD, Lewin S, Fretheim A. SUPPORT tools for evidence-informed health policymaking (STP) 13: preparing and using policy briefs to support evidence-informed policymaking. *Health Res Policy Syst* 2009;7 Suppl 1:S13.

53. EVIPNet Europe. Conceptual background and case studies – introduction to EVIPNet Europe. Copenhagen: WHO Regional Office for Europe; 2017.
54. Lavis JN, Oxman AD, Lewin S, Fretheim A. SUPPORT tools for evidence-informed health policymaking (STP). *Health Res Policy Syst* 2009;7 Suppl 1:I1.
55. Teutsch SM, Berger ML. Evidence synthesis and evidence-based decision making: related but distinct processes. *Med Decis Making* 2005;25:487-9.
56. Rychetnik L, Frommer M, Hawe P, Shiell A. Criteria for evaluating evidence on public health interventions. *J Epidemiol Community Health* 2002;56:119-27.
57. Petticrew M, Roberts H. Evidence, hierarchies, and typologies: horses for courses. *J Epidemiol Community Health* 2003;57:527-9.
58. Nutley S, Powell A, Davies H. What counts as good evidence? Provocation paper for the Alliance for Useful Evidence. London: Alliance for Useful Evidence; 2013.
59. Brunetti M, Shemilt I, Pregno S, Vale L, Oxman AD, Lord J, et al. GRADE guidelines: 10. Considering resource use and rating the quality of economic evidence. *J Clin Epidemiol* 2013;66:140-50.
60. Welch VA, Akl EA, Pottie K, Ansari MT, Briel M, Christensen R, et al. GRADE equity guidelines 3: considering health equity in GRADE guideline development: rating the certainty of synthesized evidence. *J Clin Epidemiol* 2017;90:76-83.
61. Porta M, Greenland S, Hernán M, Silva IdS, Last JM, for the International Epidemiological Association, editors. *A dictionary of epidemiology*. Sixth ed. New York: Oxford University Press; 2014.
62. Cochrane Effective Practice and Organisation of Care (EPOC). What study designs can be considered for inclusion in an EPOC review and what should they be called? 2021. Available from: <https://doi.org/10.5281/zenodo.5106085>
63. Murad MH, Asi N, Alsawas M, Alahdab F. New evidence pyramid. *Evid Based Med* 2016;21:125-7.
64. Guyatt GH, Oxman AD, Vist G, Kunz R, Brozek J, Alonso-Coello P, et al. GRADE guidelines: 4. Rating the quality of evidence--study limitations (risk of bias). *J Clin Epidemiol* 2011;64:407-15.
65. Balshem H, Helfand M, Schunemann HJ, Oxman AD, Kunz R, Brozek J, et al. GRADE guidelines: 3. Rating the quality of evidence. *J Clin Epidemiol* 2011;64:401-6.
66. Brouwers MC, Kho ME, Browman GP, Burgers JS, Cluzeau F, Feder G, et al. AGREE II: advancing guideline development, reporting and evaluation in health care. *CMAJ* 2010;182:E839-42.
67. Brouwers MC, Spithoff K, Kerkvliet K, Alonso-Coello P, Burgers J, Cluzeau F, et al. Development and validation of a tool to assess the quality of clinical practice guideline recommendations. *JAMA Network Open* 2020;3:e205535-e.
68. AGREE-HS Research Team. The Appraisal of Guidelines Research & Evaluation—Health Systems (AGREE-HS). Electronic version 2018. [cited 27 October 2021]. Available from: <https://www.agreetrust.org/>
69. AdHopHTA partners. Tool 6 - AdHopHTA checklist for good-quality HB-HTA reports. 2015. In: The AdHopHTA toolkit: a toolkit for hospital-based Health Technology Assessment (HB-HTA); Public deliverable, The AdHopHTA Project (FP7/2007-13 grant agreement nr 305018) [Internet]. Available from: http://www.adhophta.eu/toolkit/assets/tools/AdHopHTA_toolkit_tool6_document.pdf.
70. Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ* 2017;358:j4008.

71. Shea BJ, Grimshaw JM, Wells GA, Boers M, Andersson N, Hamel C, et al. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC Med Res Methodol* 2007;7:10.
72. Shea BJ, Hamel C, Wells GA, Bouter LM, Kristjansson E, Grimshaw J, et al. AMSTAR is a reliable and valid measurement tool to assess the methodological quality of systematic reviews. *J Clin Epidemiol* 2009;62:1013-20.
73. Whiting P, Savovic J, Higgins JP, Caldwell DM, Reeves BC, Shea B, et al. ROBIS: A new tool to assess risk of bias in systematic reviews was developed. *J Clin Epidemiol* 2016;69:225-34.
74. Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, et al., editors. *Cochrane handbook for systematic reviews of interventions*, version 6.2 (updated February 2021). Cochrane, 2021. Available from: <https://training.cochrane.org/handbook/current>
75. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance GW. *Methods for economic evaluation of health care programmes*. Fourth ed. New York: Oxford University Press; 2015.
76. Evers S, Goossens M, de Vet H, van Tulder M, Ament A. Criteria list for assessment of methodological quality of economic evaluations: Consensus on Health Economic Criteria. *Int J Technol Assess Health Care* 2005;21:240-5.
77. Sterne JAC, Savovic J, Page MJ, Elbers RG, Blencowe NS, Boutron I, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. *BMJ* 2019;366:l4898.
78. Higgins JP, Altman DG, Gotsche PC, Juni P, Moher D, Oxman AD, et al. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ* 2011;343:d5928.
79. Higgins JPT, Green S, editors. *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0* [updated March 2011]. The Cochrane Collaboration; 2011.
80. Sterne JA, Hernan MA, Reeves BC, Savovic J, Berkman ND, Viswanathan M, et al. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *BMJ* 2016;355:i4919.
81. Cochrane Effective Practice and Organisation of Care (EPOC). Suggested risk of bias criteria for EPOC reviews. EPOC Resources for review authors 2017. Available from: <https://epoc.cochrane.org/resources/epoc-resources-review-authors>
82. Wells GA, Shea B, O'Connell D, Peterson J, Welch V, Losos M, et al. The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses. Ottawa, Ottawa Hospital Research Institute; 2019 [updated 2019; cited 7 March 2021]. Available from: http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp
83. Viswanathan M, Berkman ND. Development of the RTI item bank on risk of bias and precision of observational studies. *J Clin Epidemiol* 2012;65:163-78.
84. Viswanathan M, Berkman ND, Dryden DM, Hartling L. Assessing risk of bias and confounding in observational studies of interventions or exposures: further development of the RTI item bank. Methods research report. (Prepared by RTI-UNC Evidence-based Practice Center under Contract No. 290-2007-10056-I). AHRQ Publication No. 13-EHC106-EF. Rockville, USA: Agency for Healthcare Research and Quality; 2013. Available from: <https://effectivehealthcare.ahrq.gov/products/rti-item-bank/research>
85. Whiting PF, Rutjes AW, Westwood ME, Mallett S, Deeks JJ, Reitsma JB, et al. QUADAS-2: a revised tool for the quality assessment of diagnostic accuracy studies. *Ann Intern Med* 2011;155:529-36.
86. Critical Appraisal Skills Programme. CASP Checklist: 10 questions to help you make sense of a qualitative research [online]. UK: Public Health Resource Unit; 2018 [cited 15 November 2021]. Available from: <https://casp-uk.net/casp-tools-checklists/>

87. Munthe-Kaas HM, Glenton C, Booth A, Noyes J, Lewin S. Systematic mapping of existing tools to appraise methodological strengths and limitations of qualitative research: first stage in the development of the CAMELOT tool. *BMC Med Res Methodol* 2019;19:113.
88. Aromataris E, Munn Z, editors. *JBI manual for evidence synthesis*. Adelaide, Australia: JBI; 2020 [cited 19 July 2021]. Available from: <https://synthesismanual.jbi.global>
89. Guyatt G, Oxman AD, Sultan S, Brozek J, Glasziou P, Alonso-Coello P, et al. GRADE guidelines: 11. Making an overall rating of confidence in effect estimates for a single outcome and for all outcomes. *J Clin Epidemiol* 2013;66:151-7.
90. Lewin S, Booth A, Glenton C, Munthe-Kaas H, Rashidian A, Wainwright M, et al. Applying GRADE-CERQual to qualitative evidence synthesis findings: introduction to the series. *Implement Sci* 2018;13:2.
91. Guyatt GH, Oxman AD, Kunz R, Atkins D, Brozek J, Vist G, et al. GRADE guidelines: 2. Framing the question and deciding on important outcomes. *J Clin Epidemiol* 2011;64:395-400.
92. Guyatt GH, Oxman AD, Montori V, Vist G, Kunz R, Brozek J, et al. GRADE guidelines: 5. Rating the quality of evidence--publication bias. *J Clin Epidemiol* 2011;64:1277-82.
93. Guyatt GH, Oxman AD, Kunz R, Woodcock J, Brozek J, Helfand M, et al. GRADE guidelines: 7. Rating the quality of evidence--inconsistency. *J Clin Epidemiol* 2011;64:1294-302.
94. Guyatt GH, Oxman AD, Kunz R, Woodcock J, Brozek J, Helfand M, et al. GRADE guidelines: 8. Rating the quality of evidence--indirectness. *J Clin Epidemiol* 2011;64:1303-10.
95. Guyatt GH, Oxman AD, Sultan S, Glasziou P, Akl EA, Alonso-Coello P, et al. GRADE guidelines: 9. Rating up the quality of evidence. *J Clin Epidemiol* 2011;64:1311-6.
96. Guyatt GH, Oxman AD, Santesso N, Helfand M, Vist G, Kunz R, et al. GRADE guidelines: 12. Preparing summary of findings tables-binary outcomes. *J Clin Epidemiol* 2013;66:158-72.
97. Guyatt GH, Thorlund K, Oxman AD, Walter SD, Patrick D, Furukawa TA, et al. GRADE guidelines: 13. Preparing summary of findings tables and evidence profiles-continuous outcomes. *J Clin Epidemiol* 2013;66:173-83.
98. The GRADE-CERQual Project Group. How to use and interpret findings from qualitative evidence syntheses assessed using the CERQual approach. A practical guide for decision makers in health and social care and other users 2018. [cited 15 November 2021]. Available from: <https://drive.google.com/file/d/1tF0rhDmihpzd3B6BDFHcD8msDu1rqYjR/view>; <https://www.cerqual.org/>
99. Lavis JN, Lomas J, Hamid M, Sewankambo NK. Assessing country-level efforts to link research to action. *Bull World Health Organ* 2006;84:620-8.
100. Egger M, Smith GD. Meta-Analysis. Potentials and promise. *BMJ* 1997;315:1371-4.
101. Egger M, Smith GD, O'Rourke K. Rationale, potentials, and promise of systematic reviews. In: Egger M, Smith GD, Altman DG, editors. *Systematic reviews in health care: meta-analysis in context*. London: BMJ Publishing Group; 2001.
102. Boland A, Cherry MG, Dickson R, editors. *Doing a systematic review: a student's guide*. 2nd ed. London: SAGE; 2017.
103. Langlois ÉV, Daniels K, Akl EA, editors. *Evidence synthesis for health policy and systems: a methods guide*. Geneva: WHO; 2018.
104. Lockwood C, Porrit K, Munn Z, Rittenmeyer L, Salmond S, Bjerrum M, et al. Systematic reviews of qualitative evidence. In: *JBI Manual for Evidence Synthesis* [Internet]. Adelaide: JBI; 2021, [cited 28 August 2021]. Available from: <https://jbi-global-wiki.refined.site/space/MANUAL/3283910681/Chapter+2%3A+Systematic+reviews+of+qualitative+evidence>

105. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Systematic Reviews* 2021;10:89.
106. Page MJ, Moher D, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *BMJ* 2021;372:n160.
107. Cumpston M. Cochrane Training slides. Compiled by Miranda Cumpston based on materials by Cochrane Australia and Cochrane Canada. Melbourne: Cochrane; 2017.
108. McMaster Health Forum. Global Commission on Evidence to address Societal Challenges. Hamilton, Canada: McMaster University; 2021 [cited 13 August 2021]. Available from: <https://www.mcmasterforum.org/networks/evidence-commission>
109. Lavis JN, Wilson MG, Oxman AD, Lewin S, Fretheim A. SUPPORT tools for evidence-informed health policymaking (STP) 4: using research evidence to clarify a problem. *Health Res Policy Syst* 2009;7:S4.
110. Alonso-Coello P, Schünemann HJ, Moberg J, Brignardello-Petersen R, Akl EA, Davoli M, et al. Marcos GRADE de la evidencia a la decisión (EtD): un enfoque sistemático y transparente para tomar decisiones sanitarias bien informadas. 1: Introducción. *Gac Sanit* 2018;32:166.e1-e10.
111. Lewin S, Oxman AD, Lavis JN, Fretheim A, Marti SG, Munabi-Babigumira S. SUPPORT tools for evidence-informed policymaking in health 11: finding and using evidence about local conditions. *Health Res Policy Syst* 2009;7:S11.
112. Schünemann HJ, Wiercioch W, Brozek J, Etzeandia-Ikobaltzeta I, Mustafa RA, Manja V, et al. GRADE Evidence to Decision (EtD) frameworks for adoption, adaptation, and de novo development of trustworthy recommendations: GRADE-ADOLOPMENT. *J Clin Epidemiol* 2017;81:101-10.
113. ADAPTE collaboration. The ADAPTE process: resource toolkit for guideline adaptation. Version 2.0: Guideline International Network; 2009. Available from: <https://g-i-n.net/wp-content/uploads/2021/05/ADAPTE-Resource-toolkit-V2.1-March-2010-updated-disclaimer.pdf>
114. Chase D, Rosten C, Turner S, Hicks N, Milne R. Development of a toolkit and glossary to aid in the adaptation of health technology assessment (HTA) reports for use in different contexts. *Health Technol Assess* 2009;13:1-142, iii.
115. Treweek S, Oxman AD, Alderson P, Bossuyt PM, Brandt L, Brozek J, et al. Developing and Evaluating Communication Strategies to Support Informed Decisions and Practice Based on Evidence (DECIDE): protocol and preliminary results. *Implement Sci* 2013;8:6.
116. Thokala P, Devlin N, Marsh K, Baltussen R, Boysen M, Kalo Z, et al. Multiple criteria decision analysis for health care decision making—an introduction: report 1 of the ISPOR MCDA Emerging Good Practices Task Force. *Value Health* 2016;19:1-13.
117. Marsh K, Ijzerman M, Thokala P, Baltussen R, Boysen M, Kalo Z, et al. Multiple criteria decision analysis for health care decision making—emerging good practices: report 2 of the ISPOR MCDA Emerging Good Practices Task Force. *Value Health* 2016;19:125-37.
118. Drake JI, de Hart JCT, Monleon C, Toro W, Valentim J. Utilization of multiple-criteria decision analysis (MCDA) to support healthcare decision-making FIFARMA, 2016. *J Mark Access Health Policy* 2017;5:1360545.
119. Andrews J, Guyatt G, Oxman AD, Alderson P, Dahm P, Falck-Ytter Y, et al. GRADE guidelines: 14. Going from evidence to recommendations: the significance and presentation of recommendations. *J Clin Epidemiol* 2013;66:719-25.
120. Andrews JC, Schunemann HJ, Oxman AD, Pottie K, Meerpohl JJ, Coello PA, et al. GRADE guidelines: 15. Going from evidence to recommendation—determinants of a recommendation's direction and strength. *J Clin Epidemiol* 2013;66:726-35.

121. Schunemann HJ, Mustafa R, Brozek J, Santesso N, Alonso-Coello P, Guyatt G, et al. GRADE Guidelines: 16. GRADE evidence to decision frameworks for tests in clinical practice and public health. *J Clin Epidemiol* 2016;76:89-98.
122. Oxman AD, Fretheim A, Lavis JN, Lewin S. SUPPORT tools for evidence-informed health policymaking (STP) 12: finding and using research evidence about resource use and costs. *Health Res Policy Syst* 2009;7:S12.
123. Glenton C, Lewin S, Lawrie TA, Barreix M, Downe S, Finlayson KW, et al. Qualitative Evidence Synthesis (QES) for Guidelines: Paper 3 - Using qualitative evidence syntheses to develop implementation considerations and inform implementation processes. *Health Res Policy Syst* 2019;17:74.
124. Lewin S, Glenton C, Lawrie TA, Downe S, Finlayson KW, Rosenbaum S, et al. Qualitative Evidence Synthesis (QES) for Guidelines: Paper 2 – Using qualitative evidence synthesis findings to inform evidence-to-decision frameworks and recommendations. *Health Res Policy Syst* 2019;17:75.
125. Fretheim A, Munabi-Babigumira S, Oxman AD, Lavis JN, Lewin S. SUPPORT tools for evidence-informed policymaking in health 6: using research evidence to address how an option will be implemented. *Health Res Policy Syst* 2009;7:S6.
126. Fretheim A, Oxman AD, Lavis JN, Lewin S. SUPPORT tools for evidence-informed policymaking in health 18: planning monitoring and evaluation of policies. *Health Res Policy Syst* 2009;7:S18.
127. World Health Organization. WHO evaluation practice handbook. Geneva: WHO; 2013.
128. Glasgow RE, Harden SM, Gaglio B, Rabin B, Smith ML, Porter GC, et al. RE-AIM Planning and Evaluation Framework: adapting to new science and practice with a 20-year review. *Frontiers in Public Health* 2019;7.
129. Rabin BA, Brownson RC, Haire-Joshu D, Kreuter MW, Weaver NL. A glossary for dissemination and implementation research in health. *J Public Health Manag Pract* 2008;14:117-23.
130. Dzawaltowski DA, Glasgow RE, Klesges LM, Estabrooks PA, Brock E. RE-AIM: evidence-based standards and a Web resource to improve translation of research into practice. *Ann Behav Med* 2004;28:75-80.
131. Global Health Observatory [online database] [Internet]. WHO; 2019 [cited 2 August 2021]. Available from: <http://www.who.int/gho/en/>
132. United Nations Global SDG Indicators Database [online database] [Internet]. United Nations; 2019 [cited 2 August 2021]. Available from: <https://unstats.un.org/sdgs/indicators/database/>
133. Oliver S, Roche C, Stewart R, Bangpan M, Dickson K, Pells K, et al. Stakeholder engagement for development impact evaluation and evidence synthesis. CEDIL Inception Paper 3. London: The Centre of Excellence for Development Impact and Learning (CEDIL); 2018.
134. Lavis JN, Boyko JA, Oxman AD, Lewin S, Fretheim A. SUPPORT tools for evidence-informed health policymaking (STP) 14: organising and using policy dialogues to support evidence-informed policymaking. *Health Res Policy Syst* 2009;7 Suppl 1:S14.
135. Oxman AD, Lewin S, Lavis JN, Fretheim A. SUPPORT tools for evidence-informed health policymaking (STP) 15: engaging the public in evidence-informed policymaking. *Health Res Policy Syst* 2009;7:S15.
136. Oxman AD, Glenton C, Flottorp S, Lewin S, Rosenbaum S, Fretheim A. Development of a checklist for people communicating evidence-based information about the effects of healthcare interventions: a mixed methods study. *BMJ open* 2020;10:e036348-e.
137. EVIPNet Europe. Policy dialogue preparation and facilitation checklist. Copenhagen: WHO Regional Office for Europe; 2016.

138. Pantoja T, Opiyo N, Lewin S, Paulsen E, Ciapponi A, Wiysonge CS, et al. Implementation strategies for health systems in low-income countries: an overview of systematic reviews. *Cochrane Database Syst Rev* 2017;9:CD011086.
139. Shediak-Rizkallah MC, Bone LR. Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy. *Health Educ Res* 1998;13:87-108.
140. Simmons R, Ghiron L, Fajans P. Nine steps for developing a scaling-up strategy. Geneva: WHO, ExpandNet; 2010.
141. Chambers DA, Glasgow RE, Stange KC. The dynamic sustainability framework: addressing the paradox of sustainment amid ongoing change. *Implement Sci* 2013;8:117.
142. World Health Organization, ExpandNet. Practical guidance for scaling up health service innovations. Geneva: WHO, ExpandNet; 2009. Available from: <https://expandnet.net/tools/>
143. Haby M, Bowen S. Making decisions about interventions. A guide for evidence-informed policy and practice. Melbourne: Prevention and Population Health Branch, Victorian Government Department of Health; 2010 [cited 8 August 2021]. Available from: <https://www.health.vic.gov.au/population-health-systems/guidelines-on-research-evidence-and-evaluation>
144. Whitehead M. The concepts and principles of equity and health. *Int J Health Serv* 1992;22:429-45.
145. UN. Transforming our world: the 2030 agenda for sustainable development. A/RES/70/1. Geneva: United Nations; 2015.
146. World Health Organization. Resolution WHA71.1 WHO's Thirteenth General Programme of Work (GPW13). Approved by the Seventy-first World Health Assembly, 21-26 May 2018. WHO/PRP/18.1. Geneva: WHO; 2019.
147. World Health Organization. Thirteenth General Programme of Work (GPW13): methods for impact measurement. Licence: CC BY-NC-SA 3.0 IGO. Geneva: WHO; 2020.
148. Commission on Social Determinants of Health. Closing the gap in a generation: health equity through action on the social determinants of health. Final report of the Commission on Social Determinants of Health. Geneva: WHO; 2008. Available from: <https://apps.who.int/iris/handle/10665/43943>
149. O'Neill J, Tabish H, Welch V, Petticrew M, Pottie K, Clarke M, et al. Applying an equity lens to interventions: using PROGRESS ensures consideration of socially stratifying factors to illuminate inequities in health. *J Clin Epidemiol* 2014;67:56-64.
150. Tugwell P, Petticrew M, Kristjansson E, Welch V, Ueffing E, Waters E, et al. Assessing equity in systematic reviews: realising the recommendations of the Commission on Social Determinants of Health. *BMJ* 2010;341:c4739
151. Mbuagbaw L, Aves T, Shea B, Jull J, Welch V, Taljaard M, et al. Considerations and guidance in designing equity-relevant clinical trials. *International Journal for Equity in Health* 2017;16:93.
152. Welch VA, Petticrew M, O'Neill J, Waters E, Armstrong R, Bhutta ZA, et al. Health equity: evidence synthesis and knowledge translation methods. *Syst Rev* 2013;2:43.
153. Welch VA, Norheim OF, Jull J, Cookson R, Sommerfelt H, Tugwell P. CONSORT-Equity 2017 extension and elaboration for better reporting of health equity in randomised trials. *BMJ* 2017;359:j5085.
154. Welch V, Petticrew M, Tugwell P, Moher D, O'Neill J, Waters E, et al. PRISMA-Equity 2012 extension: reporting guidelines for systematic reviews with a focus on health equity. *PLoS Med* 2012;9:e1001333.
155. Oxman AD, Lavis JN, Lewin S, Fretheim A. SUPPORT tools for evidence-informed health policymaking (STP) 10: taking equity into consideration when assessing the findings of a systematic review. *Health Res Policy Syst* 2009;7:S10.

156. Pottie K, Welch V, Morton R, Akl EA, Eslava-Schmalbach JH, Katikireddi V, et al. GRADE equity guidelines 4: considering health equity in GRADE guideline development: evidence to decision process. *J Clin Epidemiol* 2017;90:84-91.
157. WHO Collaborating Center for Knowledge Translation and Health Technology Assessment in Health Equity. Equity-Oriented Toolkit for Health Technology Assessment. 2007. Available from: http://www.cgh.uottawa.ca/whocc/projects/eo_toolkit/index.htm
158. Ueffing E, Tugwell P, Hatcher Roberts J, Walker P, Hamel N, Welch V. Equity-oriented toolkit for health technology assessment and knowledge translation: application to scaling up of training and education for health workers. *Hum Resour Health* 2009;7:67.
159. Munthe-Kaas H, Nokleby H, Lewin S, Glenton C. The TRANSFER Approach for assessing the transferability of systematic review findings. *BMC Med Res Methodol* 2020;20:11.
160. Institute of Medicine. Conflict of interest in medical research, education, and practice. 2009. Washington, DC: National Academies Press. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK22942/>.
161. Schunemann HJ, Al-Ansary LA, Forland F, Kersten S, Komulainen J, Kopp IB, et al. Guidelines International Network: principles for disclosure of interests and management of conflicts in guidelines. *Ann Intern Med* 2015;163:548-53.
162. Oliver K, Kothari A, Mays N. The dark side of coproduction: do the costs outweigh the benefits for health research? *Health Res Policy Syst* 2019;17:33.
163. Gagliardi AR, Kothari A, Graham ID. Research agenda for integrated knowledge translation (IKT) in healthcare: what we know and do not yet know. *J Epidemiol Community Health* 2017;71:105-6.
164. Rycroft-Malone J, Burton CR, Bucknall T, Graham ID, Hutchinson AM, Stacey D. Collaboration and co-production of knowledge in healthcare: opportunities and challenges. *Int J Health Policy Manag* 2016;5:221-3.
165. Flinders M, Wood M, Cunningham M. The politics of co-production: risks, limits and pollution. *Evidence & Policy: A Journal of Research, Debate & Practice* 2016;12:261-79.
166. Oliver K, Cairney P. The dos and don'ts of influencing policy: a systematic review of advice to academics. *Palgrave Commun* 2019;5:21.
167. Oliver K, Innvar S, Lorenc T, Woodman J, Thomas J. A systematic review of barriers to and facilitators of the use of evidence by policymakers. *BMC Health Serv Res* 2014;14:2.
168. Haby MM, Chapman E, Clark R, Barreto J, Reveiz L, Lavis JN. What are the best methodologies for rapid reviews of the research evidence for evidence-informed decision making in health policy and practice: a rapid review. *Health Res Policy Syst* 2016;14:83.
169. Tricco AC, Langlois EV, Straus SE, editors. Rapid reviews to strengthen health policy and systems: a practical guide. Geneva: WHO; 2017. Licence: CC BY-NC-SA 3.0 IGO.
170. Garrity C, Gartlehner G, Nussbaumer-Streit B, King VJ, Hamel C, Kamel C, et al. Cochrane Rapid Reviews Methods Group offers evidence-informed guidance to conduct rapid reviews. *J Clin Epidemiol* 2021;130:13-22.
171. Polisen J, Garrity C, Kamel C, Stevens A, Abou-Setta AM. Rapid review programs to support health care and policy decision making: a descriptive analysis of processes and methods. *Systematic Reviews* 2015;4:26.
172. Haby MM, Chapman E, Clark R, Barreto J, Reveiz L, Lavis JN. Designing a rapid response program to support evidence-informed decision-making in the Americas region: using the best available evidence and case studies. *Implement Sci* 2016;11:117.
173. Akl EA, Haddaway NR, Rada G, Lotfi T. Future of Evidence Ecosystem Series: evidence synthesis 2.0: when systematic, scoping, rapid, living, and overviews of reviews come together. *J Clin Epidemiol* 2020;123:162-5.

174. Elliott JH, Turner T, Clavisi O, Thomas J, Higgins JP, Mavergames C, et al. Living systematic reviews: an emerging opportunity to narrow the evidence-practice gap. *PLoS Med* 2014;11:e1001603.
175. Akl EA, Morgan RL, Rooney AA, Beverly B, Katikireddi SV, Agarwal A, et al. Developing trustworthy recommendations as part of an urgent response (1–2 weeks): a GRADE concept paper. *J Clin Epidemiol* 2021;129:1-11.
176. Dobbins M. *Rapid Review Guidebook*. Hamilton, Canada: National Collaborating Centre for Methods and Tools; 2017 [cited 8 August 2021]. Available from: <https://www.nccmt.ca/tools/rapid-review-guidebook>
177. Stevens A, Garritty C, Hersi M, Moher D. Developing PRISMA-RR, a reporting guideline for rapid reviews of primary studies (Protocol)2018. Available from: <https://www.equator-network.org/wp-content/uploads/2018/02/PRISMA-RR-protocol.pdf>
178. Mijumbi-Deve R, Rosenbaum SE, Oxman AD, Lavis JN, Sewankambo NK. Policymaker experiences with rapid response briefs to address health-system and technology questions in Uganda. *Health Res Policy Syst* 2017;15:37-.
179. Zida A, Lavis JN, Sewankambo NK, Kouyate B, Ouedraogo S. Evaluating the Process and Extent of Institutionalization: A Case Study of a Rapid Response Unit for Health Policy in Burkina Faso. *International journal of health policy and management* 2018;7:15-26.
180. Wilson MG. *Rapid Response program: summary of service timelines*. Hamilton, Canada: McMaster Health Forum; 2018 [cited 8 August 2021]. Available from: https://www.mcmasterforum.org/docs/default-source/resources/14_rr_timelines.pdf?sfvrsn=e58552d5_9; <https://www.mcmasterforum.org/find-evidence/rapid-response>
181. Wilson MG, Lavis JN, Gauvin FP. Developing a rapid-response program for health system decision-makers in Canada: findings from an issue brief and stakeholder dialogue. *Systematic Reviews* 2015;4:25.
182. Garritty CM, Norris SL, Moher D. Developing WHO rapid advice guidelines in the setting of a public health emergency. *J Clin Epidemiol* 2017;82:47-60.
183. Morgan RL, Florez I, Falavigna M, Kowalski S, Akl EA, Thayer KA, et al. Development of rapid guidelines: 3. GIN-McMaster Guideline Development Checklist extension for rapid recommendations. *Health Res Policy Syst* 2018;16:63.
184. Kowalski SC, Morgan RL, Falavigna M, Florez ID, Etxeandia-Ikobaltzeta I, Wiercioch W, et al. Development of rapid guidelines: 1. Systematic survey of current practices and methods. *Health Res Policy Syst* 2018;16:61.
185. Silva M, Silva E, Barreto JO. Rapid response in health technology assessment: a Delphi study for a Brazilian guideline. *BMC Med Res Methodol* 2018;18.
186. INAHTA. *INAHTA Product Type (IPT) Classifications & Marks*. International Network of Agencies for Health Technology Assessment. [cited 8 August 2021]. Available from: <http://www.inahta.org/hta-tools-resources/ipt-marks/#Full>
187. Watt A, Cameron A, Sturm L, Lathlean T, Babidge W, Blamey S, et al. Rapid reviews versus full systematic reviews: an inventory of current methods and practice in health technology assessment. *Int J Technol Assess Health Care* 2008;24:133-9.
188. Kristensen FB, Sigmund H, editors. *Health technology assessment handbook, second edition*. Copenhagen: Danish Centre for Health Technology Assessment, National Board of Health; 2007.
189. Oxman AD, Lavis JN, Fretheim A, Lewin S. SUPPORT tools for evidence-informed health policymaking (STP) 17: dealing with insufficient research evidence. *Health Res Policy Syst* 2009;7:S17.
190. Sharma T, Choudhury M, Kaur B, Naidoo B, Garner S, Littlejohns P, et al. Evidence informed decision making: the use of "colloquial evidence" at NICE. *Int J Technol Assess Health Care* 2015;31:138-46.

191. Fretheim A, Schunemann HJ, Oxman AD. Improving the use of research evidence in guideline development: 5. Group processes. *Health Res Policy Syst* 2006;4:17.
192. Boyd EA, Bero LA. Improving the use of research evidence in guideline development: 4. Managing conflicts of interests. *Health Res Policy Syst* 2006;4:16.
193. Oxman AD, Schunemann HJ, Fretheim A. Improving the use of research evidence in guideline development: 7. Deciding what evidence to include. *Health Res Policy Syst* 2006;4:19.
194. Lomas J, Culyer T, McCutcheon C, McAuley L, Law S. Conceptualizing and combining evidence for health system guidance. Ottawa: Canadian Health Services Research Foundation; 2005.
195. Galvao LA, Haby MM, Chapman E, Clark R, Camara VM, Luiz RR, et al. The new United Nations approach to sustainable development post-2015: Findings from four overviews of systematic reviews on interventions for sustainable development and health. *Rev Panam Salud Publica* 2016;39:157-65.
196. Coronado Daza J, Vernooij RWM, Salas K, Osorio D, Urrútia Cuchí G. Quality assessment of clinical practice guidelines for chronic kidney disease: a systematic review. *BMC Nephrol* 2019;20:192.
197. Acuña-Izcaray A, Sánchez-Angarita E, Plaza V, Rodrigo G, de Oca MM, Gich I, et al. Quality assessment of asthma clinical practice guidelines: a systematic appraisal. *Chest* 2013;144:390-7.
198. Stamm TA, Andrews MR, Mosor E, Ritschl V, Li LC, Ma JK, et al. The methodological quality is insufficient in clinical practice guidelines in the context of COVID-19: systematic review. *J Clin Epidemiol* 2021;135:125-35.
199. Luo X, Liu Y, Ren M, Zhang X, Janne E, Lv M, et al. Consistency of recommendations and methodological quality of guidelines for the diagnosis and treatment of COVID-19. *J Evid Based Med* 2021;14:40-55.
200. Innvaer S, Vist G, Trommald M, Oxman A. Health policy-makers' perceptions of their use of evidence: a systematic review. *J Health Serv Res Policy* 2002;7:239-44.
201. Moore G, Todd A, Redman S. Strategies to increase the use of evidence from research in population health policy and programs: Evidence Check rapid reviews brokered by the Sax Institute (<http://www.saxinstitute.org.au>) for the Primary Health and Community Partnerships Unit, NSW Department of Health. 2009.
202. Tricco AC, Cardoso R, Thomas SM, Motiwala S, Sullivan S, Kealey MR, et al. Barriers and facilitators to uptake of systematic reviews by policy makers and health care managers: a scoping review. *Implement Sci* 2016;11:4.
203. Carrasco-Labra A, Brignardello-Petersen R, Santesso N, Neumann I, Mustafa RA, Mbuagbaw L, et al. Improving GRADE evidence tables part 1: a randomized trial shows improved understanding of content in summary of findings tables with a new format. *J Clin Epidemiol* 2016;74:7-18.
204. Eklund Karlsson L, Takahashi R. A resource for developing an evidence synthesis report for policy-making. Health Evidence Network (HEN) synthesis report 50. Copenhagen: WHO Regional Office for Europe; 2017.
205. Kristiansen A, Brandt L, Alonso-Coello P, Agoritsas T, Akl EA, Conboy T, et al. Development of a novel, multilayered presentation format for clinical practice guidelines. *Chest* 2015;147:754-63.
206. Marquez C, Johnson AM, Jassemi S, Park J, Moore JE, Blaine C, et al. Enhancing the uptake of systematic reviews of effects: what is the best format for health care managers and policy-makers? A mixed-methods study. *Implement Sci* 2018;13:84.
207. Speckemeier C, Krabbe L, Schwenke S, Wasem J, Buchberger B, Neusser S. Discrete choice experiment to determine preferences of decision-makers in healthcare for different formats of rapid reviews. *Syst Rev* 2021;10:121.

208. Canadian Foundation for Healthcare Improvement. Reader-friendly writing - 1:3:25. 2001 [cited 15 August 2021]. Available from: <https://www.cfhi-fcass.ca/innovations-tools-resources/item-detail/2021/04/15/reader-friendly-writing-1-3-25>
209. Durham E, Baker H, Smith M, E. M, Morgan V. Annex 1. Practical method notes: 4. How to write a policy brief. In: The BiodivERsA stakeholder engagement handbook [Internet]. Paris: BiodivERsA; 2015. Available from: <https://www.biodiversa.org/702>
210. Choi BC, Pang T, Lin V, Puska P, Sherman G, Goddard M, et al. Can scientists and policy makers work together? *J Epidemiol Community Health* 2005;59:632-7.
211. Dowdy DW, Pai M. Bridging the gap between knowledge and health: the epidemiologist as Accountable Health Advocate (“AHA!”). *Epidemiology* 2012;23:914-8.
212. OECD. Building capacity for evidence-informed policy-making: lessons from country experiences. Paris: OECD Publishing; 2020.
213. Sajadi HS, Majdzadeh R, Ehsani-Chimeh E, Yazdizadeh B, Nikooee S, Pourabbasi A, et al. Policy options to increase motivation for improving evidence-informed health policy-making in Iran. *Health Res Policy Syst* 2021;19:91.
214. Shroff ZC, Javadi D, Gilson L, Kang R, Ghaffar A. Institutional capacity to generate and use evidence in LMICs: current state and opportunities for HPSR. *Health Res Policy Syst* 2017;15:94.
215. Uneke CJ, Ezeoha AE, Uro-Chukwu HC, Ezeonu CT, Igboji J. Promoting researchers and policy-makers collaboration in evidence-informed policy-making in Nigeria: outcome of a two-way secondment model between university and health ministry. *Int J Health Policy Manag* 2018;7:522-31.
216. WHO Regional Office for the Eastern Mediterranean. Developing national institutional capacity for evidence-informed policy-making for health [EM/RC66/R.5]. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019.
217. Colebatch HK. *Policy*. 2nd ed. Buckingham, UK: Open University Press; 2002.
218. Kingdon JW. *Agendas, alternatives and public policies*. Boston, USA: Little, Brown; 1984.
219. Howlett M, McConnell A, Perl A. Streams and stages: Reconciling Kingdon and policy process theory. *Eur J Polit Res* 2015;54:419-34.
220. Murunga VI, Oronje RN, Bates I, Tagoe N, Pulford J. Review of published evidence on knowledge translation capacity, practice and support among researchers and research institutions in low- and middle-income countries. *Health Res Policy Syst* 2020;18:16.
221. WHO Regional Office for Europe. Action plan to strengthen the use of evidence, information and research for policy-making in the WHO European Region [EUR/RC66/12]. Copenhagen: WHO Regional Office for Europe; 2016.
222. Oliver S, Bangpan M, Stansfield C, Stewart R. Capacity for conducting systematic reviews in low- and middle-income countries: a rapid appraisal. *Health Res Policy Syst* 2015;13:23.
223. Oliver S, Dickson K. Policy-relevant systematic reviews to strengthen health systems: models and mechanisms to support their production. *Evidence & Policy* 2016;12:235-59.
224. El-Jardali F, Fadlallah R, Lavis J. A 2-day meeting to advance the field of and innovation in knowledge translation to achieve impact. Evidence-informed Policy Network (EVIPNet), 2018.

225. World Health Organization. Report on International Forum on Evidence Informed Health Policy in Low-and Middle-Income Countries. Addis Ababa, Ethiopia, 27–31 August 2012. Geneva: WHO; 2013. Available from: <https://www.who.int/evidence/Addisreport2012.pdf>
226. Else H. Nature journals reveal terms of landmark open-access option. *Nature* 2020;588:19-20.
227. Mekonnen A, Downs C, Effiom EO, Razafindratsima O, Stenseth NC, Chapman CA. What costs half a year's pay for African scholars? Open access. *Nature* 2021;596:189.
228. Lavis JN, Gauvin FP, Mattison CA, Moat KA, Waddell K, Wilson MG, et al. Rapid synthesis: creating rapid-learning health systems in Canada. 10 December 2018. Hamilton, Canada: McMaster Health Forum; 2018.
229. World Health Organization. Health emergency and disaster risk management framework. Geneva: WHO; 2019. Available from: <https://apps.who.int/iris/handle/10665/326106>
230. Pan American Health Organization. Emergency use of unproven interventions outside of research. Ethics guidance for the COVID-19 pandemic. Washington, DC: PAHO; 2020 [cited 6 November 2021]. Available from: <https://iris.paho.org/handle/10665.2/52429>
231. World Health Organization. Guidance for managing ethical issues in infectious disease outbreaks. Geneva: WHO; 2016 [cited 6 November 2021]. Available from: <https://apps.who.int/iris/handle/10665/250580>
232. European Centre for Disease Prevention and Control. The use of evidence in decision-making during public health emergencies. Stockholm: ECDC; 2019. Available from: https://www.ecdc.europa.eu/sites/default/files/documents/use-of-evidence-in-decision-making-during-public-health-emergencies_0.pdf
233. EVIPNet Europe. Rapid response: knowledge translation mechanisms to translate evidence into public health policy in emergencies. Copenhagen: WHO Regional Office for Europe; 2021.
234. Abrams EM, Szeffler SJ. COVID-19 and the impact of social determinants of health. *The Lancet Respiratory Medicine* 2020;8:659-61.
235. Bambra C, Gibson M, Sowden A, Wright K, Whitehead M, Petticrew M. Tackling the wider social determinants of health and health inequalities: evidence from systematic reviews. *J Epidemiol Community Health* 2010;64:284-91.
236. Solar O, Irwin A. A conceptual framework for action on the social determinants of health. Social determinants of health discussion paper 2 (policy and practice). Geneva: WHO; 2010 [cited 13 August 2021]. Available from: <https://apps.who.int/iris/handle/10665/44489>
237. Kuruvilla S, Hinton R, Boerma T, Bunney R, Casamitjana N, Cortez R, et al. Business not as usual: how multisectoral collaboration can promote transformative change for health and sustainable development. *BMJ* 2018;363:k4771.
238. Pan American Health Organization / World Health Organization. Timeline of the emergence of Zika virus in the Americas. Washington, DC: PAHO/WHO; 2016 [updated December 2016]. Available from: https://www3.paho.org/hq/index.php?option=com_content&view=article&cid=11959:timeline-of-emergence-of-zika-virus-in-the-americas&Itemid=41711&lang=en
239. Pan American Health Organization / World Health Organization. Epidemiological alert. Neurological syndrome, congenital malformations, and Zika virus infection. 17 January 2016. Washington, DC: PAHO/WHO; 2016 [cited 2 October 2021]. Available from: <https://www.paho.org/hq/dmdocuments/2016/2016-jan-17-cha-epi-update-zika-virus.pdf>

240. World Health Organization. WHO Director-General summarizes the outcome of the Emergency Committee regarding clusters of microcephaly and Guillain Barré syndrome. 1 February 2016. Geneva: WHO; 2016 [cited 2 October 2021]. Available from: <https://www.who.int/news/item/01-02-2016-who-director-general-summarizes-the-outcome-of-the-emergency-committee-regarding-clusters-of-microcephaly-and-guillain-barr%C3%A9-syndrome>
241. Pan American Health Organization / World Health Organization. Epidemiological alert. Zika virus infection. 7 May 2015. Washington, DC: PAHO/WHO; 2015 [cited 2 October 2021]. Available from: <https://www.paho.org/hq/dmdocuments/2015/2015-may-7-cha-zika-virus-epi-alert.pdf>
242. Pan American Health Organization. Guidelines for surveillance of Zika virus disease and its complications. 2016 edition. Washington, DC: PAHO; 2016. Available from: <https://iris.paho.org/handle/10665.2/28405>
243. Pan American Health Organization. Guidelines for surveillance of Zika virus disease and its complications. 2018 edition. Washington, DC: PAHO; 2018. Available from: <http://iris.paho.org/xmlui/handle/10665.2/49518>
244. Pan American Health Organization / World Health Organization. Zika resources: case definitions. Washington, DC: PAHO/WHO; 2016 [updated 1 April 2016; cited 2 October 2021]. Available from: https://www3.paho.org/hq/index.php?option=com_content&view=article&cid=11117:zika-resources-case-definitions&Itemid=41532&lang=en
245. Van Kerkhove MD, Reveiz L, Souza JP, Jaenisch T, Carson G, Broutet N. Harmonisation of Zika virus research protocols to address key public health concerns. *The Lancet Global Health* 2016;4:e911-e2.
246. Reveiz L, Haby MM, Martinez-Vega R, Pinzon-Flores CE, Elias V, Smith E, et al. Risk of bias and confounding of observational studies of Zika virus infection: A scoping review of research protocols. *PLoS One* 2017;12:e0180220.
247. Pan American Health Organization / World Health Organization. Zika research. Washington, DC: PAHO/WHO [cited 2 October 2021]. Available from: <https://www3.paho.org/zika-research/index.php>
248. Krauer F, Riesen M, Reveiz L, Oladapo OT, Martinez-Vega R, Porgo TV, et al. Zika Virus infection as a cause of congenital brain abnormalities and Guillain-Barre syndrome: systematic review. *PLoS Med* 2017;14:e1002203.
249. Haby MM, Pinart M, Elias V, Reveiz L. Prevalence of asymptomatic Zika virus infection: a systematic review. *Bull World Health Organ* 2018;96:402-13D.
250. Pearson H. How COVID broke the evidence pipeline. *Nature* 2021;593:182-5.
251. Abbott R, Bethel A, Rogers M, Whear R, Orr N, Shaw L, et al. Characteristics, quality and volume of the first 5 months of the COVID-19 evidence synthesis infodemic: a meta-research study. *BMJ Evidence-Based Medicine* 2021;bmjebm-2021-111710.
252. Carracedo S, Palmero A, Neil M, Hasan-Granier A, Saenz C, Reveiz L. The landscape of COVID-19 clinical trials in Latin America and the Caribbean: assessment and challenges. *Rev Panam Salud Publica* 2020;44:e177.
253. El-Jardali F, Bou-Karroum L, Fadlallah R. Amplifying the role of knowledge translation platforms in the COVID-19 pandemic response. *Health Res Policy Syst* 2020;18:58.
254. Pérez-Gaxiola G, Verdugo-Paiva F, Rada G, Flórez ID. Assessment of duplicate evidence in systematic reviews of imaging findings of children with COVID-19. *JAMA Network Open* 2021;4:e2032690-e.
255. Yin Y, Gao J, Jones BF, Wang D. Coevolution of policy and science during the pandemic. *Science* 2021;371:128-30.

256. Tollefson J. How Trump damaged science - and why it could take decades to recover. *Nature* 2020;586:190-4.
257. Thorp HH. Why WHO? *Science* 2020;368:341.
258. McKee M, Gugushvili A, Koltai J, Stuckler D. Are populist leaders creating the conditions for the spread of COVID-19? Comment on "A scoping review of populist radical right parties' influence on welfare policy and its implications for population health in Europe". *Int J Health Policy Manag* 2021;10:511-5.
259. Furlan L, Caramelli B. The regrettable story of the "Covid Kit" and the "Early Treatment of Covid-19" in Brazil. *The Lancet Regional Health – Americas*.
260. DeJong C, Wachter RM. The risks of prescribing hydroxychloroquine for treatment of COVID-19 — first, do no harm. *JAMA Intern Med* 2020;180:1118-9.
261. Temple C, Hoang R, Hendrickson RG. Toxic effects from ivermectin use associated with prevention and treatment of Covid-19. *New England Journal of Medicine* 2021.
262. Kuchenmüller T, Reeder JC, Reveiz L, Tomson G, El-Jardali F, Lavis JN, et al. COVID-19: investing in country capacity to bridge science, policy and action. *BMJ Global Health* 2021;6:e005012.
263. Else H. How a torrent of COVID science changed research publishing - in seven charts. *Nature* 2020;588:553.
264. Carley S, Horner D, Body R, Mackway-Jones K. Evidence-based medicine and COVID-19: what to believe and when to change. *Emerg Med J* 2020;37:572-5.
265. Mehra MR, Desai SS, Ruschitzka F, Patel AN. RETRACTED: Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis. *Lancet* 2020.
266. Antonelli G, Capobianchi MR, Riva E. The SARS-CoV-2 epidemic: how the Italian public is being informed. *Clinical Microbiology and Infection* 2020;26:791-2.
267. Focosi D, Navarro D, Maggi F, Roilides E, Antonelli G. COVID-19 infodemics: the role of mainstream and social media. *Clinical Microbiology and Infection* 2021; <https://doi.org/10.1016/j.cmi.2021.08.003>.
268. Zagury-Orly I, Schwartzstein RM. Covid-19 - A Reminder to Reason. *N Engl J Med* 2020;383:e12.
269. Boutron I, Chaimani A, Devane D, Meerpohl JJ, Rada G, Hróbjartsson A, et al. Interventions for the prevention and treatment of COVID-19: a living mapping of research and living network meta-analysis. *Cochrane Database of Systematic Reviews* 2020.
270. Lotfi T, Stevens A, Akl EA, Falavigna M, Kredo T, Mathew JL, et al. Getting trustworthy guidelines into the hands of decision-makers and supporting their consideration of contextual factors for implementation globally: recommendation mapping of COVID-19 guidelines. *J Clin Epidemiol* 2021;135:182-6.
271. McMaster Health Forum. COVID-END: COVID-19 Evidence Network to support Decision-making. Hamilton, Canada: McMaster Health Forum; 2021 [cited 13 August 2021]. Available from: <https://www.mcmasterforum.org/networks/covid-end>
272. Neil-Sztramko SE, Belita E, Traynor RL, Clark E, Hagerman L, Dobbins M. Methods to support evidence-informed decision-making in the midst of COVID-19: Creation and evolution of a rapid review service from the National Collaborating Centre for Methods and Tools [Preprint]. *Research Square*; 2021.
273. Rada G, Verdugo-Paiva F, Avila C, Morel-Marambio M, Bravo-Jeria R, Pesce F, et al. Evidence synthesis relevant to COVID-19: a protocol for multiple systematic reviews and overviews of systematic reviews. *Medwave* 2020;20:e7868.

274. World Health Organization. A coordinated global research roadmap: 2019 novel coronavirus. Geneva: WHO; 2020. Available from: <https://www.who.int/publications/m/item/a-coordinated-global-research-roadmap>
275. World Health Organization. Therapeutics and COVID-19: living guideline. 6 July 2021. Geneva: WHO; 2021 [cited 13 August 2021]. Available from: <https://app.magicapp.org/#/guidelines>
276. Roehrl RA, Liu W, Mukherjee S. 3UN/DESA Policy Brief #62: The COVID-19 pandemic: a wake-up call for better cooperation at the science–policy–society interface. United Nations, Department of Economic and Social Affairs; 2020 [cited 13 August 2021]. Available from: <https://www.un-ilibrary.org/content/papers/27081990/5>
277. World Health Organization. A strategic framework for emergency preparedness. Geneva: WHO; 2016 [cited 7 November 2021]. Available from: <https://www.who.int/publications/i/item/a-strategic-framework-for-emergency-preparedness>
278. Siemieniuk RA, Bartoszko JJ, Ge L, Zeraatkar D, Izcovich A, Kum E, et al. Drug treatments for covid-19: living systematic review and network meta-analysis. *BMJ* 2020;370:m2980.
279. Chalmers I, Glasziou P. Avoidable waste in the production and reporting of research evidence. *Lancet* 2009;374:86-9.
280. Chen Y, Guyatt GH, Munn Z, Florez ID, Marušić A, Norris SL, et al. Clinical practice guidelines registry: toward reducing duplication, improving collaboration, and increasing transparency. *Ann Intern Med* 2021;174:705-7.
281. Zarocostas J. How to fight an infodemic. *Lancet* 2020;395:676.
282. Recovery Collaborative Group. Tocilizumab in patients admitted to hospital with COVID-19 (RECOVERY): a randomised, controlled, open-label, platform trial. *Lancet* 2021;397:1637-45.
283. Roussi A, Maxmen A. African nations missing from coronavirus trials. *Nature* 2020.
284. Repurposed Antiviral Drugs for Covid-19 — Interim WHO Solidarity Trial Results. *New England Journal of Medicine* 2020;384:497-511.
285. Boutron I, Chaimani A, Devane D, Meerpohl JJ, Rada G, Hróbjartsson A, et al. Interventions for the treatment of COVID-19: a living network meta-analysis. *Cochrane Database of Systematic Reviews* 2020.

Evidence-informed decision-making (EIDM) emphasizes that decisions should be informed by the best available evidence from research, considering factors such as context, public opinion, effectiveness, safety, impact on equity, feasibility of implementation, affordability, sustainability, ethics, and acceptability to stakeholders. The evidence-informed approach to decision-making is, at its core, about better decisions for better health, avoiding harm, and making more effective use of scarce resources. EIDM can also improve transparency and accountability. The process of EIDM involves the use of research evidence to identify a high-priority issue; select interventions/options; appraise implementation considerations; and monitor implementation and evaluate impact.

Various guides have been produced over the years on topics related to EIDM, including on evidence-based medicine, and on the use of knowledge translation to link research to action. However, the field is constantly evolving and EIDM practitioners are continually learning, and the COVID-19 pandemic has highlighted deficiencies in the EIDM infrastructure and in its practice that need to be addressed so as to be better prepared for the next health emergency. This guide aims to bring together the most recent thinking in the EIDM field and to present this in a format that is accessible to a wide audience of EIDM practitioners in the areas of clinical practice, public health, and health systems.

The audience for this guide includes researchers, decisionmakers (including policymakers, managers, healthcare professionals), and any other professionals or stakeholders involved in developing, commissioning, or using evidence products to inform decision-making. The guide considers the development of guidelines, health technology assessments, and evidence briefs for policy. It also shows the links between the different types of evidence used in EIDM, including data analytics, modeling, behavioral/implementation research, evaluation, and systematic reviews (evidence synthesis). In addition, it offers some potential solutions to the challenges that have emerged during the COVID-19 pandemic.