This series of eight briefs, produced by the UNICEF Office of Research – Innocenti, is intended to provide guidance on how to undertake, commission and manage evidence synthesis products such as systematic reviews, rapid evidence assessments and evidence gap maps. Evidence synthesis can play an important role in UNICEF’s knowledge management and evidence translation efforts by collating knowledge from multiple studies on what interventions work, and why and how they work. It makes research more accessible and therefore can contribute to evidence-informed programming and policy decisions. The primary audience for these briefs is professionals, including UNICEF staff, who conduct, commission or interpret research and evaluation findings in development contexts to make decisions about policy, programming and advocacy. These briefs cover topics including:

- What is evidence synthesis? What kinds of questions can evidence synthesis products help to answer and how can they contribute to decision-making?
- How to design and undertake a systematic review, a rapid evidence assessment or an evidence gap map
- How to commission and manage an evidence synthesis product
- The future of evidence synthesis and key innovations for making the process faster and more efficient

These briefs have been written by Shivit Bakrania with input from some of the world’s leading evidence synthesis experts. The other briefs in this series can be accessed at <www.unicef-irc.org>.

UNICEF OFFICE OF RESEARCH – INNOCENTI

The Office of Research – Innocenti is UNICEF’s dedicated research centre. It undertakes research on emerging or current issues in order to inform the strategic direction, policies and programmes of UNICEF and its partners, shape global debates on child rights and development, and inform the global research and policy agenda for all children, and particularly for the most vulnerable.

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To consult and download the Methodological Briefs on Evidence Synthesis and a glossary of key terms, visit the website <www.unicef-irc.org>.


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FURTHER GUIDANCE ON EVIDENCE SYNTHESIS

This series of methodological briefs is part of broader efforts by UNICEF Innocenti to support UNICEF staff to appraise, commission, generate, communicate and use research to drive change for children.

For further guidance on evidence synthesis, or to ask about anything covered in these methodological briefs, please contact the author, Shivit Bakrania, or Kerry Albright, Chief of Research Facilitation and Knowledge Management, at <research@unicef.org>.

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1. INTRODUCTION

This brief will focus on emerging innovations and cutting-edge debates amongst the evidence synthesis community of practice. Unlike the other briefs, it will not give practical guidance, but will, instead, highlight some of the new and critical thinking and tools employed by UNICEF Innocenti and others that are likely to influence the research commissioning or knowledge brokering process in the future.

Box 1. Key questions addressed in this brief

- What are the key innovations in evidence synthesis?
- What are the emerging tools that can potentially make the evidence synthesis process faster and more efficient?
- What is knowledge brokering?
- How can the findings from evidence synthesis be presented and translated in a manner that is understandable, useful and accessible to decision makers?

2. KEY INNOVATIONS IN EVIDENCE SYNTHESIS

Evidence synthesis products are time-consuming and labour-intensive because of the need to screen a large quantity of studies for eligibility using predefined inclusion criteria. In many cases, this may require the screening of tens of thousands of studies. Current innovations in evidence synthesis centre on adapting the workflow and using technological advances to make the process more efficient and less time-consuming.

2.1 Microtasks and workflow management

Evidence synthesis products are normally undertaken by a small team working in a highly labour-intensive way. Newer models have been proposed whereby the workflow is undertaken by a wider community of individuals working on a series of parallel ‘microtasks’.

2.2 Crowdsourcing/citizen science

A recent development in the evidence synthesis field is the crowdsourcing of microtasks to enable a large pool of individuals to contribute to evidence synthesis products. In theory, all the stages of the systematic approach can be crowdsourced as individual microtasks, but in practice, thus far, this approach has mainly been used for the screening of studies. Evaluations have shown that the use of crowdsourcing techniques for the screening of studies can significantly reduce the workload, with total workload savings of over 70 per cent across the entire screening process. Evaluations also show that the quality of crowdsourced screening is high when compared with traditional approaches.

Cochrane Crowd is an online platform where members of the public can screen studies to assess whether they are randomized controlled trials (RCTs) or not. Here, the focus is on a very specific part of the process and involves participants making a specific and binary decision. Additional tasks are the systematic searches, the screening, the data extraction, the critical appraisal and the analysis or synthesis. This enables a larger pool of people to make smaller individual contributions that can add up to larger efforts.

The idea is that a larger team that includes subject matter and methodological experts, information specialists and a larger number of dedicated researchers can divide responsibilities and conduct these labour-intensive tasks in parallel to complete the product in less time. For example, studies that have been included at title and abstract screening can be moved on immediately to full-text screening, and then data extraction and critical appraisal can begin as soon as a decision has been made to include a study. Depending on the size and complexity of the product, different tasks related to the data extraction and quality appraisal can be split amongst the team. So, for example, if a systematic review (SR) is to include meta-analysis, the data extraction can be divided between a junior researcher who extracts descriptive information and a senior researcher who extracts the statistical information.

References:
being developed to enable the identification via crowdsourcing of other study information, such as information to determine the PICOCs (see Brief 2, section 3).  

There are several challenges involved when using crowdsourcing and these stem from the involvement of a large group of participants with diverse backgrounds. A certain level of formal training or research expertise is required for evidence synthesis, particularly knowledge of research designs and methods, and training may be required for those with less experience. It can also be difficult to attract and retain the right participants throughout the process – experience shows that participant dropout rates can be high.

2.3 Machine learning and artificial intelligence for screening studies

Artificial intelligence, machine learning and natural language processing are increasingly used as part of the screening process for evidence synthesis products. Several studies have shown that they have the potential to significantly reduce the workload in screening without affecting the quality of decisions made or the sensitivity of the process (the number of correctly identified relevant studies divided by the total number of relevant studies). Applications such as EPPI-Reviewer and DistillerSR incorporate machine learning and text mining tools, which semi-automate the process of screening by prioritizing studies according to relevance. They rely on the prior development of inclusion criteria and humans manually screening a portion of the documents to train the machine. After that, the software uses machine learning to text mine the remaining documents and to sort/prioritize these according to relevance. Researchers can then focus on screening the most relevant studies until a predetermined completion or stopping point is reached.

Machine learning and artificial intelligence can also be combined with other innovative approaches described here. For example, in the Cochrane Crowd example mentioned above (see section 2.2), crowdsourced decisions have, in turn, been used to train a machine learning model within the platform, which can predict how likely it is that a study is an RCT or not.

2.4 Software and tools for other evidence synthesis tasks

There is a burgeoning movement in the evidence synthesis field to develop software and tools to make evidence synthesis more efficient, timely, rigorous and accessible.

The Systematic Review Toolbox is an online catalogue of tools that support various tasks within the evidence synthesis process. This includes tools for protocol development, automated searches, study selection, quality appraisal, data extraction (and coding), analysis and report writing.

The Evidence Synthesis Hackathon series of workshops has been held annually since 2017. The workshops bring together researchers, practitioners and coders to produce open-source tools that help solve problems and support the evidence synthesis process. This includes tools such as EviAtlas for visualizing evidence synthesis data, and Paperweight, which uses natural language processing to create keywords and search terms from several publications that can later be used to develop search strings.

2.5 ‘Living’ systematic reviews and evidence gap maps

A ‘living’ systematic review (SR) or evidence gap map (EGM) is “continuously updated, incorporating relevant new evidence as it becomes available”. It is an approach to updating an SR or EGM and in practice entails the continual search for new evidence through ongoing or frequently scheduled searches and the inclusion of new information in a timely manner. Living SRs and EGMs are particularly appropriate where the findings of the SR are important for decision-making and where certainty in the existing evidence is low. Therefore, it can be useful to continually update SRs or EGMs where there is likely to be new research and where this new information is likely to change the findings of an SR or affect the

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4 Ibid.
5 Ibid.

distribution of evidence in an EGM. Most guidance on living SRs assumes that they will primarily incorporate quantitative evidence and meta-analysis. There is little guidance on living EGMs, but it should be noted that the Campbell-UNICEF Child Welfare Mega Map is an example of a living EGM that will be updated annually.

The core methods for a living SR or EGM are largely the same as for a normal SR/EGM, however, there are implications for the workflow. For example, there is a need to clearly plan and report the methods in the protocol, which includes stating the frequency with which searches will be undertaken.

Each time the searches are run and screened, relevant new evidence may or may not be identified. If new evidence is identified, it needs to be integrated into the SR or EGM.

The updated review then requires editorial and peer review before it is published.

The development of living SRs has gone hand in hand with the development of tools for semi-automating the systematic approach. This includes tools for running automated searches, whereby multiple databases are searched simultaneously and alerts can be set up for potentially relevant research to be ‘pushed’ to researchers.

2.6 Evidence pipelines

Another Cochrane project under development is the Evidence Pipeline that envisages a centralized workflow for finding studies for inclusion in SRs in a timely and reliable way. The intention is to curate studies and classify them in such a way that they are ready for synthesis – thereby negating the need for research teams to search for and screen studies themselves – in order to address the backlog of studies that needs to be screened. The Evidence Pipeline separates the different activities for searching and screening studies into a series of linked stages, aided by technology. First, automated searches are undertaken for studies, which are screened for their study design, including through the Cochrane Crowd platform. The studies are then automatically assigned to thematic review groups and the PICO characteristics are determined through data extraction. The coded studies are stored in a database and the studies are then ready for verification, classification and use by research teams working on SRs, or can be included in living SRs.

2.7 The complexities of applying these innovations in the international development arena

Most of the innovations and technologies described above focus on a few steps of the evidence synthesis process, mainly covering the search process and less so the data extraction and analysis/synthesis stages. In addition, several of these tools do not ‘talk’ to each other and there are often challenges in transferring data across platforms. Furthermore, many of these tools currently require licences or subscriptions, and costs need to be considered.

By and large, these innovations are still relatively untested for evidence synthesis in the international development arena and have been developed for evidence synthesis in the health, clinical and biomedical sciences.

There are several issues that may complicate the process for the international development sector. For machine learning, there is the issue of the scope and complexity of policy problems in the international development arena. Whilst papers in the clinical sciences are often clearly structured in a standard way for the straightforward application of machine learning (with clear titles and abstracts, and information on the research design, methods, interventions and outcomes reported in a standardized way), those in the social sciences have greater heterogeneity in the use of terminology, research design and reporting style.

To date, the crowdsourcing of SR tasks has been limited to the health sector and there is a need to test the feasibility and accuracy of this approach in sectors like international development. A challenge is that for the social sciences literature, decisions on whether studies are eligible or relevant are more complex. For example, it is likely that inclusion decisions may require consideration of whether a study is relevant both in terms of its thematic focus and its research design.

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9 Ibid.


Decisions would likely go beyond simply determining whether a study is an RCT or not.13

3. KNOWLEDGE BROKERING, UPTAKE AND EVIDENCE-INFORMED POLICYMAKING

The movement towards and increased emphasis on evidence-informed policymaking in the international development sphere can be characterized by four waves, as described in Box 2.

Knowledge brokering is not an innovation per se, but has become more prominently recognized in the evidence synthesis arena because the generation, publication and even synthesis of evidence itself is not enough to ensure the use of that evidence to inform decision-making. Knowledge brokers are individuals or organizations that “develop relationships and networks with, among and between the producers and users of knowledge to facilitate the exchange of knowledge throughout this network and build capacity for evidence [informed] decision-making”.14 Human relationships are key and knowledge brokering consists of the following elements:15

- Creating and conceptualizing research: this entails assisting decision makers to commission research through identifying issues and translating these into clear research questions.
- Knowledge management: This focuses on the active dissemination and translation of research for decision makers by synthesizing or summarizing bodies of evidence, producing plain language summaries or briefs, and holding one-to-one or group meetings with key stakeholders.
- Linkage and exchange: This involves developing positive and constructive relationships between researchers and decision makers. This is predicated on the fact that involving decision makers in the entire research process increases the chances of evidence being used. Brokers can act as intermediaries or linking agents, using their personal contacts to facilitate exchange.
- Capacity building: This aims to foster self-reliance in researchers and decision makers, developing the transfer and communication skills of the former and the analytical and interpretive skills of the latter.

Box 2. The four waves of the evidence revolution

- The first wave relates to the results agenda in the 1990s, whereby development agencies shifted their focus from monitoring inputs (the amount of money spent) towards actual results and higher-level outcomes.
- The second wave relates to the rigorous impact evaluation of development interventions, which occurred in the early 2000s. Until then, there had been few rigorous impact evaluations of development interventions, however, development agencies such as the World Bank and the UK Department for International Development began investing in and institutionalizing the use of RCTs for evaluating the impact of various interventions.
- In response to the limitations and risks of relying on single studies (see Brief 1, section 3), the third wave saw the emergence of SRs in the international development sphere in the late 2000s. Organizations such as the International Initiative for Impact Evaluation (3ie) played a key role in popularizing the use of evidence synthesis.
- The fourth, and current, wave concerns the rise of knowledge brokering, which is the focus of this section. Knowledge brokering is important because evidence synthesis products still require interpretation of the findings by decision makers for evidence to be translated into policy. Therefore, this fourth wave can be seen as the step beyond evidence synthesis, involving various ways and means to interpret and translate findings and present these to policymakers and practitioners in accessible forms.1


13 Snilstveit et al., Timely, Efficient, and Living Systematic Reviews.
3.1 Knowledge brokers’ role in producing and interpreting evidence synthesis

Knowledge broker teams or individuals can work with decision makers in an iterative fashion to produce or interpret evidence synthesis by:

- Helping decision makers draft proposals and/or helping with the drafting of research questions for evidence synthesis that meet policy needs but are also manageable and feasible from a research perspective.\(^\text{16}\) This is particularly useful when a policy team requires urgent evidence but where key concepts are unclear or have not been agreed upon in advance.\(^\text{17}\)

- Facilitating the production of evidence synthesis products that are contextually relevant for policy and practice.\(^\text{18}\)

- Working with decision makers to interpret the findings of evidence synthesis products and presenting these in an accessible and understandable way.

Boxes 3 and 4 provide examples of how knowledge brokers have worked with decision makers to conceptualize and translate the findings of evidence synthesis.

**Box 3. The Sax Institute Evidence Check service**

Evidence Check was developed to support organizations to gather the best and most relevant research evidence to inform policymaking and programming on health. Policymakers complete a structured questionnaire to clarify their information needs. This is used as a basis for Evidence Check’s knowledge brokers to work with policymakers to help them clarify the policy issue, research questions, review scope and methods, and to determine timelines, budgets and reporting format for an REA. This is done through structured discussions with policy teams, after which a brokering proposal is given to a research team to produce a policy-relevant REA.\(^\text{19}\)

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**Box 4. Uganda’s rapid response mechanism for health systems and technology**

The rapid response mechanism was set up by the Ugandan country node of the Regional East African Community Health policy initiative, which is a partner in the World Health Organization’s Evidence-Informed Policy Network and the Supporting the Use of Research Evidence (SURE) for policy in African health systems project. The mechanism responds to the inability of health systems in Uganda to effectively use evidence to inform their decisions and interventions. Help-desk staff receive questions from policymakers via telephone or email or in person. The policymaker is then taken through a process of question clarification to ensure that the research question is clear and answerable and that it falls within the thematic scope handled by the service. The researchers then search for research evidence relevant to the query and appraise, contextualize and summarize this. A four-page brief is produced and peer reviewed within 28 days and includes clear messages for the policymaker.\(^\text{20}\)

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**3.2 Evidence portals**

Evidence portals are websites that present the findings from evidence synthesis in an accessible and easy to understand form for policymakers and practitioners. They are usually easy to navigate and present the best available evidence on the most effective approaches to achieving outcomes in different thematic areas. They are different to databases because they translate evidence to make it more accessible, often using visualizations rather than just providing links to studies.\(^\text{19}\) The UK’s What Works Network and the US’s What Works Clearinghouse incorporate evidence portals on a range of social policy-related topics. Box 5 provides an example of an evidence portal, the Education Endowment Foundation’s Teaching and Learning Toolkit, which is part of the United Kingdom’s What Works Network.

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18 Ibid.

Box 5. The Education Endowment Foundation’s Teaching and Learning Toolkit

The Teaching and Learning Toolkit is an evidence portal providing accessible summaries of educational research. It provides guidance for teachers and schools on how to use their resources to improve the attainment of disadvantaged pupils. The Toolkit provides a visual summary of the evidence from SRs on 35 different types of intervention, each summarized visually in terms of the average impact on attainment, the strength of the supporting evidence and the cost. The Toolkit is a live resource that is updated on a regular basis as findings from EEF-funded projects and other high-quality research become available.


Box 6. Examples of policy briefs and summaries

3ie produced a policy brief of its systematic review on interventions for improving learning outcomes and access to education in low- and middle-income countries (see Brief 2, section 3 for more details on this SR). The 2-page brief summarizes the findings from a 900-page SR, clearly stating the main findings, useful evidence for policy and programming and evidence to inform future research priorities.

Policy briefs have also been produced from the Campbell-UNICEF Child Welfare Mega Map. The briefs provide descriptive analysis on the state of evidence for each of the five goals in UNICEF’s Strategic Plan 2018–2021 and clearly state the policy implications of the findings.

Supporting the Use of Research Evidence (SURE) has produced a series of policy briefs for health systems and policies in Africa.

SUPPORT structured summaries have been developed by a range of partners. They aim to summarize the best and most relevant evidence from SRs of health system interventions in low- and middle-income countries. The information is presented in a user-friendly manner for decision makers to quickly review and decide whether an intervention is likely to be effective in their own context.

Cochrane plain language summaries are another way Cochrane is using non-technical language to summarize SRs to communicate with a wider audience.

3.3 Guidelines, briefs and checklists

Guidelines are prominent in the health sector and aim to institutionalize the use of evidence from synthesis in national-level health policy in different countries around the world. The World Health Organization produces guidelines that present recommendations based on evidence synthesis. They tell decision makers what can be done in specific situations to achieve health outcomes. The recommendations enable decision makers to make informed decisions on whether to undertake or prioritize specific interventions.

Policy briefs are yet another way of presenting or summarizing the findings from evidence synthesis products in an accessible way for policy audiences. The use of non-technical plain language is often emphasized in these briefs and summaries. Box 6 provides some examples of policy briefs and structured summaries of evidence synthesis.

Checklists are an even further distillation of synthesized evidence and provide a list of simple instructions for policymakers and practitioners to follow. These are prominent in the health sector where they provide simple evidence-based guidelines for complex procedures and activities.

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White, ‘The Twenty-First Century Experimenting Society.'
3.4 Policy dialogues and stakeholder engagement for context-specific evidence synthesis

Evidence synthesis products often collate evidence at a global level, whether this is collating evidence on a topic from all countries or with certain limitations applied, such as restricting the scope to low- and middle-income countries. However, one criticism often aimed at evidence synthesis products is that they are often not context-specific and it can be difficult to know how to interpret the findings and apply these to specific contexts. Another issue, as with all research, concerns the uptake of findings from evidence synthesis. There has been an increasing movement towards ensuring that stakeholders are engaged throughout the process of design, development and the communication and implementation of findings. Brief 2, section 4, explores how evidence synthesis can contribute to evidence-informed decision-making through stakeholder involvement and engagement.

To a certain extent, stakeholder engagement is built into the systematic approach of evidence synthesis products because steering or advisory groups are often required to provide feedback on key steps such as the development of the study protocol and the final report. Beyond this, stakeholder and policy engagement are becoming increasingly institutionalized. Organizations such as 3ie and the Campbell Collaboration have instituted policy advisory groups for all evidence synthesis products, and research teams working on 3ie or Campbell Collaboration products are required to develop stakeholder engagement and communication plans.

Context-specific policy dialogues are also becoming more prominent. These can occur pre- or post-development of evidence synthesis products. In the pre-development phase, stakeholder engagement can be conducted at a country level, with key stakeholders working in a particular sector or domain feeding into the development of a context-specific product. The deliberations can feed into a scoping exercise for an evidence synthesis product and ensure that the research questions or framework reflect national policy priorities. Deliberations can also help identify the important interventions and outcomes that need to be included. The products can look at a range of context-specific questions, such as identifying the mechanisms (barriers and facilitators) related to the implementation of interventions in a specific sector. Post-development, national-level stakeholders can lead a deliberative process to look at how findings from evidence synthesis can be implemented in the specific context. This process can include the further interpretation of findings to produce guidelines and checklists to facilitate the implementation of findings.