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Methodological Briefs on Evidence Synthesis Brief 3: Developing and designing an evidence synthesis product

3

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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>.

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UNICEF OFFICE OF RESEARCH – INNOCENTI METHODOLOGICAL BRIEFS

UNICEF Office of Research – Innocenti Methodological Briefs are intended to share contemporary research practice, methods, designs and recommendations from renowned researchers and evaluators. The primary audience is UNICEF staff who conduct, commission or interpret research and evaluation findings to make decisions about programming, policy and advocacy.

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

Brief 2 described how evidence synthesis products all draw on a common systematic approach, which is transparent and explicit. This enables them to be replicable and updatable.

Whilst it is unlikely that most UNICEF staff will be directly involved in producing evidence synthesis products, it is essential for those who commission this research to understand the steps involved in developing an evidence synthesis product. Doing so will enable research commissioners to: (1) have a common understanding of what is or what is not an evidence synthesis product in alignment with globally recognized terminology and quality standards; and (2) ensure that they are able to recognize and apply such quality standards to external consultancies. This is important because evidence synthesis products produced or commissioned by UNICEF need to meet internationally recognized quality standards if they are to be acknowledged and included in global repositories and cited in the evidence synthesis products of others.

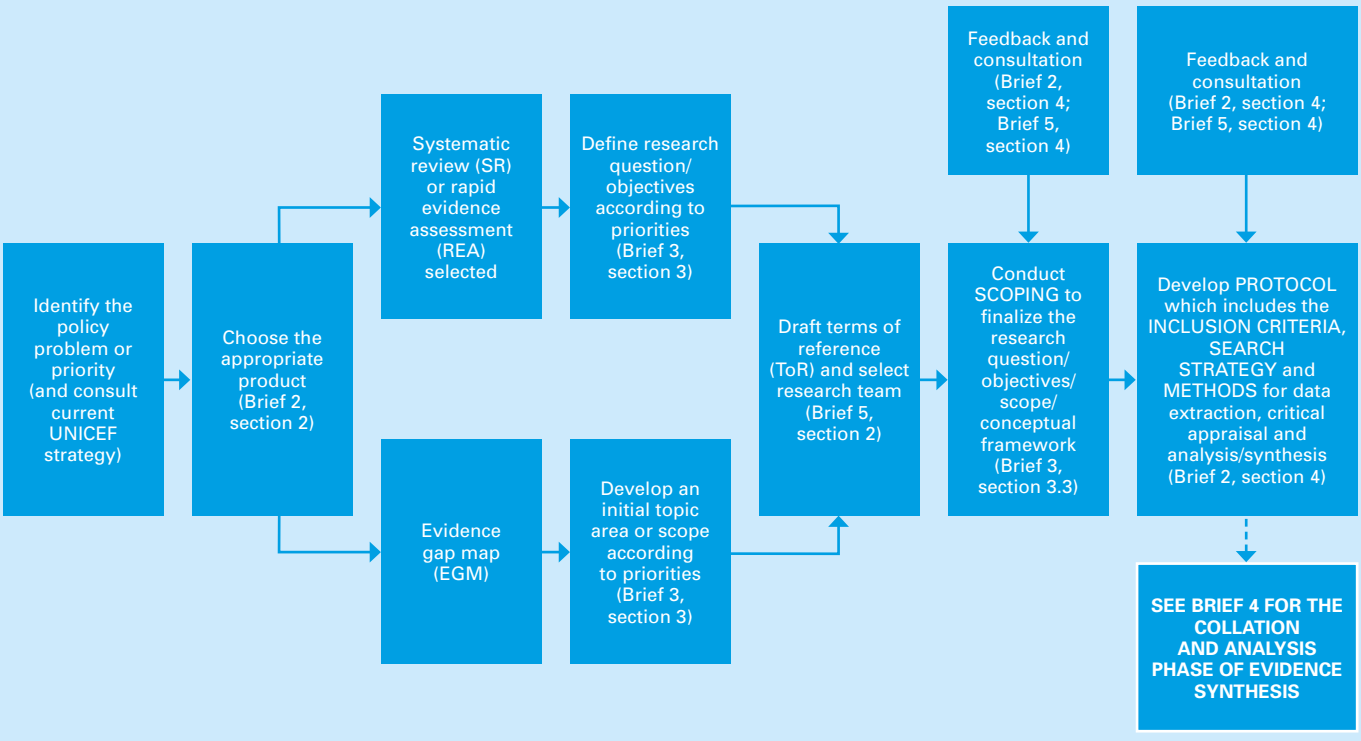
This brief covers the development and design stages of producing an evidence synthesis product (including the activities that contribute to drafting and refining the research question and scope), how externally contracted research teams are engaged in these stages, the type of consultation and feedback that should occur during these stages, and the development of inclusion criteria and a search strategy. All of these activities lead to the development and publication of a research protocol, which helps to ensure that all important decisions are made in advance and helps to avoid the introduction of bias. The protocol should be completed before work begins on collating, analysing and synthesizing studies (which is the focus of Brief 4). Box 1 lists the key questions considered in this brief.

Box 1. Key questions addressed in this brief

- What are the key considerations when deciding on a research question or scope?
- What does the scoping process involve and how can it help to refine and finalize the research questions and scope?
- How are the inclusion criteria and search strategies developed?
- What is a research protocol and what should it include?

Box 2 illustrates the various stages of developing and designing an evidence synthesis product.

Box 2. The development and design stages of an evidence synthesis product



2. THE APPROPRIATE EVIDENCE SYNTHESIS PRODUCT

At the very beginning, it is useful to consider what kind of evidence synthesis product serves the purpose for which the product is to be commissioned. Brief 2 provides definitions and descriptions of systematic reviews (SRs), rapid evidence assessments (REAs) and evidence gap maps (EGMs). They each have specific uses, as well as strengths and weaknesses. See Brief 2, sections 2 and 3, for more details.

3. INITIAL STEPS TOWARDS DEFINING THE RESEARCH QUESTION, SCOPE AND CONCEPTUAL FRAMEWORK

The key decisions to be made at the beginning of the process relate to the research question and scope. For SRs and REAs, the research question and scope are critical. While an EGM will not have a specific research question, it is still necessary to define the overall thematic area or scope. When commissioning an evidence synthesis product, some initial thinking and research may be necessary, as part of a very initial scoping and before the process to select an external contractor begins, so that these details can be included in the terms of reference (ToRs).

Developing the research question and scope at the outset is vital because they have implications for the manageability of the process – i.e,. the amount of time and resources needed to complete the product. They also influence the conceptual framework of an evidence synthesis product, which in turn influences subsequent stages, such as the search strategy and the inclusion criteria.

3.1 Drafting the research question for a systematic review and a rapid evidence assessment

The principles for framing research questions for SRs and REAs are the same as those for conducting good research. The questions should be clear, realistic, investigable, focused and structured. It is important to keep in mind that what is feasible in terms of the scope differs between an SR and an REA. It is also important to consider the usefulness of the research question to UNICEF as an organization; the question should be framed keeping in mind UNICEF's current strategic plan or other important strategic documents that guide the organization's activities, policies and research priorities.

Investigable and meaningful questions
Firstly, it is important to identify a broader subject of interest that lends itself to investigation and to decide on a meaningful and useful research question that responds to a real policy problem or need. Part of this process may be exploring: (1) what research has already been done as part of an initial scoping before an external contractor is selected (to determine whether there is a unique area that lends itself to further investigation); or (2) whether there are existing SRs or REAs that are worth replicating, updating or adapting to different contexts.[1]

Therefore, at the outset, it is worth undertaking the following steps as part of an initial scoping:

- Think about your sector or topic of interest and consider whether there is a policy problem or need that would benefit from the findings of an SR or REA.
- Consult UNICEF's current strategic plan or other strategic documents to see how your topic or area of interest can be placed within UNICEF's broader strategic framework. It would be useful to UNICEF as an organization if your research question or objectives refer or respond to the priorities and goal areas highlighted within those strategic documents.
- Consult existing evidence synthesis products as part of a very initial scoping, particularly the Campbell-UNICEF Child Welfare Mega Map and the UNICEF Evidence Gap Map on Adolescent Well-being in Low- and Middle-income Countries. In the Mega Map, you will find existing EGMs and SRs that map onto the five goal areas of UNICEF's Strategic Plan 2018–2021. In the EGM on adolescent well-being, you will find existing SRs and primary studies that map onto well-being domains of interest to UNICEF, including protection, participation, and financial and material well-being. It is also useful to consult external SR or REA databases to see what kind of existing evidence synthesis is available (*for a list of key websites for accessing SRs, REAs and EGMs, see Brief 7*). From these SRs, REAs and EGMs, it can be determined whether there is: an evidence gap worth exploring; existing evidence synthesis that may benefit from being updated or replicated; or the potential to adapt or revise the focus of existing evidence synthesis to meet specific contextual or policy needs.

Focused questions
It is important to decide the focus of the question and the objectives of the evidence synthesis and to consider the types of evidence you want to draw on. Are you interested in a 'what works' type question?

1 Center for Innovation in Research and Teaching, 'Writing a Good Research Question', n.d., <https://cirt.gcu.edu/research/developmentresources/tutorials/question>, accessed 5 February 2020.

This will likely entail a synthesis of quantitative studies that focuses on the effects of interventions and can draw causal inference between an intervention and outcomes. Alternatively, you may be more interested in 'how' or 'why' an intervention works. This type of question could draw on qualitative or quantitative studies that describe or explain the experiences of stakeholders of an intervention or explore the barriers or facilitators that determine whether an intervention works (or does not work).

When framing the question, it is also important to consider how narrow or broad it should be and whether it is feasible to answer this question given the available time and resources. When considering this, keep in mind that for REAs the question will almost always be narrower and more specific than for SRs.

Table 1 provides a few examples of how to focus the scope of the research question.

If the question is too narrow, it may be that too few studies are identified, which affects the generalizability of the findings and thereby reduces the usefulness of the eventual synthesis. Indeed, some SRs find no relevant studies and it is important to consider whether this would be a useful outcome after dedicating valuable time and resources to the work.[2]

If the question is too broad, the scope may be too large and thereby entail the collation of many studies across different themes and topics. This will affect the manageability of the process and the findings may be too general to be applied to any specific population or context.[3]

Ultimately, prior knowledge of the extent of evidence available on a topic or theme, as well as the availability of resources, will determine how broad a research question is and whether an SR or a REA is the most suitable product.

Table 1. Focused research questions

Type of question	Too narrow	Less narrow
'What works'	What is the effectiveness of non-formal education on educational outcomes for children living or working on the street in low- and middle-income countries? *This question is perhaps too narrow because it is very specific about the type of intervention (non-formal education), the type of outcomes (educational outcomes), the population (children living or working on the street), and the geographic scope (low- and middle-income countries). This is from a real SR and no eligible studies were found.*	What is the effectiveness of non-formal education on educational outcomes for children in low- and middle-income countries? *This question is broader because it increases the scope to all children. There are likely to be many studies suitable for synthesis.*
'How' or 'why' something works	What are the factors affecting the implementation of lay health worker programmes for maternal and child health in Nepal? *This question is too narrow because it focuses on a very specific intervention (lay health worker programmes) in a very specific context (Nepal). There are unlikely to be many studies for synthesis and an opportunity is lost for one country to learn from research done elsewhere.*	What are the factors affecting the implementation of lay health worker programmes for maternal and child health? *This question is less narrow and more suitable for synthesis because it has a global scope and, as such, there are likely to be more studies for synthesis. It may also be worth considering whether studies conducted in different contexts offer different findings.*

2 Wright, Rick W., et al., 'How to Write a Systematic Review', *Clinical Orthopaedics and related research*, vol. 455, 2007, pp. 23–29. Available at: <doi:10.1097/BLO.0b013e31802c9098>, accessed 5 February 2020.

3 Ibid.

This knowledge is gained through an initial scoping – as suggested in the above sections – which is conducted before formulating the ToRs and selecting an external contractor. The decision on the scope can also be revisited at a later scoping stage undertaken by the external contractors (*see section 3.3 below*). As detailed in Brief 5, section 6, it may be worth considering a clause allowing a 'no fault' break clause following the scoping and protocol development phase, whereby progression beyond this phase is dependent upon confirmation that there is sufficient evidence for the research question to be answered or for the objectives to be realized, and that the scope is manageable.

3.2 Defining the initial thematic scope for an Evidence Gap Map

As stated, EGMs do not examine a specific research question. Rather, the aim is to map the evidence on a certain topic, theme or domain of interest. Therefore, at the very beginning of the process, it is necessary to have an idea of the thematic scope that an EGM should cover. This scope should be defined in the ToR when commissioning an EGM.

A variation of the steps described above for SRs and REAs applies here:

- Think about your sector or topic of interest and consider whether there is a policy problem or thematic area of interest that would benefit from a mapping of the evidence. Another way of approaching this is to consider whether there is a justifiable need to know more about the evidence on certain interventions or certain groups of related interventions.

- Consult UNICEF's current strategic plan or other strategic documents to see how your topic or area of interest can be placed within UNICEF's broader strategic framework. It would be useful to UNICEF as an organization if the thematic scope or objectives of the EGM respond to or reflect the priorities and goal areas highlighted within those strategic documents.

- Consult existing evidence synthesis products as part of a very initial scoping, particularly the Campbell-UNICEF Child Welfare Mega Map and the UNICEF EGM on Adolescent Well-being in Low- and Middle-income Countries. In the Mega Map, you will find existing EGMs and SRs that map onto the five goal areas of UNICEF's Strategic Plan 2018–2021. In the EGM on adolescent well-being, you will find existing SRs and primary studies that map onto well-being domains of interest to UNICEF, including protection, participation, and financial and material well-being.

  It is also useful to consult external EGM databases to see what kind of existing evidence synthesis is available (*for a list of key websites for accessing EGMs, see Brief 7*). From these EGMs, you can determine whether there is an evidence gap worth exploring – to avoid duplication with existing EGMs.

3.3 Scoping: Finalizing the research question and scope of an Systematic Review, Rapid Evidence Assessment and Evidence Gap Map

Detail on the draft research question and thematic scope can be included in the ToRs for commissioning an evidence synthesis product. After the commissioning process is complete and the external contractor has been selected, she/he can be engaged in a scoping exercise to further develop and refine the research question and scope. This is likely to be a collaborative process with feedback loops built in to ensure that the final product meets the requirements and that there is final agreement on the objectives.

Scoping the scope
With the external contractor in place, a scoping exercise can be conducted, the aims of which are to:

- Further define and refine the research question and scope.

- Gain a better understanding of the evidence base by gauging the depth of the literature – including initial estimates of the quantity of evidence, an initial understanding of the evidence gaps and uncertainties, and a clarification of definitions of key concepts that will feed into the inclusion criteria and the search strategy.

Depending on the time and resources available, approaches to scoping exercises range from the ad hoc and informal to more formal scoping reviews, or somewhere in between:

- Ad hoc approaches entail a rapid background literature search in a limited number of databases. A sample of the literature can then be reviewed to reach some initial conclusions on the potential size of the evidence base, the coverage of existing studies, the key intervention and outcome types included in these studies, and ways in which these are defined.

- More formal scoping reviews draw on systematic approaches to searching and exploring the extent of the literature in a domain or theme without describing findings in detail. This can help to identify the parameters of an evidence synthesis product (i.e., by defining the targeted population, interventions

and outcomes) and the associated costs. These scoping reviews may be published as a research outcome and are appealing since they produce a broad map of the evidence that can be made widely available via publication.[4]

Using the PICOCS to further structure the question and scope

The scoping provides a basis for further refining and structuring the research question and scope. At the end of this process, the research question should clearly outline the problem to be addressed, specify the population to which the question applies, and identify the interventions and outcomes of interest.[5]

The PICOCS mnemonic is useful for structuring a research question and also provides a basis for formulating the inclusion criteria at a later stage. Making decisions on each component also helps define the scope and boundaries of the product. This is a core design activity that the externally contracted research team should complete. Box 3 provides an example of how PICOCS can help structure the research questions, objectives and scope.

P – Population: Which groups are you interested in? There may be certain vulnerable groups that you want to focus on – for example, specific ethnic, age and gender groups – or you may want to maintain a broad scope to cover entire populations of children and adolescents.

I – Intervention: You may be interested in a specific discrete intervention (e.g., conditional cash transfers) or a group of interventions with multiple and complex components (e.g., financial and material well-being interventions as an entire group).

C – Comparison: For 'what works' type questions, SRs and REAs include studies that evaluate the impact of interventions. They do this by comparing a group that receives an intervention to a control or comparison group that receives no intervention, or a different type of intervention. It is important to define what kind of comparison group will be considered in the review.

O – Outcomes: Which outcomes are you interested in? Outcomes are the measure used to assess the effectiveness of interventions. Again, this could be a specific set of outcomes or a broader and more complex set of outcomes that range from immediate to mid-term to longer-term outcomes. Both primary (more immediate) and secondary (other likely or possible) outcomes could be considered.

C – Context: What is the context being covered by the SR, REA or EGM? For example, you could consider a global scope or just focus on low- and middle-income countries. For an SR or REA, other specific contexts could be considered, such as rural/urban areas, certain deprived areas, humanitarian and emergency contexts, and fragile and conflict-affected contexts. For an EGM, the context is likely to be global or there may be a focus on low- and middle-income countries, though other specific contexts could be included as filters within the EGM.

S – Study design: What kinds of study design are being considered to answer the research question? For a 'what works' type question, this is likely to be designs that claim causal inference, such as experimental or quasi-experimental designs. For 'how' or 'why' type questions, a range of study designs and types could be included, such as qualitative studies, descriptive quantitative studies, process evaluations and project documents.

4 Armstrong, Rebecca,, et al. '"Scoping the Scope" of a Cochrane Review', *Journal of Public Health,* vol. 33, no. 1, 2011, pp. 147–150. Available at: <https://doi.org/10.1093/pubmed/fdr015>, accessed 5 February 2020.

5 Pollock, Alex, and Eivind Berge, 'How to Do a Systematic Review', *International Journal of Stroke,* vol. 13, no. 2, 2018, pp. 138–156. Available at: <https://doi.org/10.1177/1747493017743796>, accessed 5 February 2020.

Box 3. How a research question and objectives for an Systematic Review are structured using the PICOCS

Key concepts from the PICOCS mnemonic can be translated into a structured research question. One of the examples highlighted in Brief 2 is a systematic review of interventions for improving learning outcomes and access to education in low- and middle-income countries.[i] Below is an illustration of how the PICOCS is translated into the research question and objectives for this SR.

PICOCS

Population	■ Children of primary and secondary school age in mainstream education in low- and middle-income countries (as defined by the World Bank)
Intervention	■ Interventions with a primary focus on educational outcomes ■ These include a range of specified interventions at the child, household, school, teacher and education system levels ■ The excluded interventions were also specified (e.g., early childhood development, girls' sexual and reproductive health, distance education).
Comparison	■ Studies that used any type of comparison group (e.g., those receiving no intervention or a different education intervention)
Outcomes	■ Primary outcomes: enrolment, attendance, dropout, completion, learning outcomes ■ Secondary outcomes: teacher attendance and teacher performance
Context	■ Low- and middle-income countries (as defined by the World Bank)
Study design	■ Experimental and quasi-experimental study designs that allow for causal inference ■ Focus of study: studies evaluating the effectiveness of a real-world intervention ■ Time frame: studies published from 1990 onwards

Corresponding research question and objectives

- To identify, assess and synthesize evidence on the effects of education interventions on children's access to education and learning in low- and middle-income countries. *This objective is related to the intervention and outcome components.*
- What are the effects of different education interventions on enrolment, attendance, dropout rates, completion and learning outcomes for primary and secondary school children in low- and middle-income countries? *This objective is related to the outcome, population and context components.*
- Do the effects differ between subgroups of participants (according to gender, age, urban or rural location, or socio-economic status)? *This objective is related to the population component and further identified sub-populations of interest.*

i Snilstveit, Birte, et al., *Interventions for Improving Learning Outcomes and Access to Education in Low- and Middle-income Countries: A systematic review,* Systematic Review 24, International Initiative for Impact Evaluation, London, 2015. Available at: <https://doi.org/10.23846/SRS007>, accessed 5 February 2020.

Consultation and feedback on the scope
After the scoping, there is a consultation stage. During this stage, the research team will share its initial findings from the scoping with UNICEF staff and external experts to further refine and finalize the research question and scope. At this point, research commissioners at UNICEF can offer feedback and discuss the question and scope with the externally contracted research team to reach agreement.

The scope of an SR or REA will largely be determined by the research question and the PICOCS, whilst the scope of an EGM will be determined by the PICOCS. There may be further considerations, which mean that the research question or elements of the PICOCS should be broadened or narrowed to make the evidence synthesis product manageable given the available time and resources.[6] This may mean going back over the PICOCS with the research team and reviewing it.

Some key decisions to take on the scope may be:

- Is the product manageable given the available time and resources? For example, are the number and diversity of interventions and outcomes stated in the PICOCS too great or too small for the kind of product you are developing or commissioning? It is particularly important to consider the differences in scope and manageability between an SR and REA.

- If the scope seems too broad, can the number of interventions and outcomes covered be narrowed down? If there are multiple research questions or objectives, can the focus be narrowed down to just some of these? Furthermore, if there are other evidence synthesis products on the same or a related topic or theme, it may be possible to reduce the scope by removing those topics (or sub-topics) where there is likely to be a duplication of coverage and effort.

- Conversely, if the scope seems too narrow, can the number of interventions and outcomes covered be increased by including other related interventions or outcomes within your topic or domain of interest? If there is a single research question or objective, can this be usefully expanded upon?

- If a clause allowing a 'no fault' break clause has been built in (*see Brief 5, section 6*), it may be worth considering whether the scoping has indicated that there is sufficient evidence to answer the research question or objective. If not, a decision can be made to stop the work at this stage.

3.4 The scope and framework for an Evidence Gap Map

Most EGMs are based on a framework of interventions (the rows) and outcomes (the columns). The framework defines the intervention and outcome categories (and subcategories) and, in doing so, also helps define the scope of an EGM. An initial conceptual framework for an EGM can be suggested in the ToR. This is useful if you want the research team to build the EGM around an existing framework that has strategic value to UNICEF. Alternatively, the research team may be tasked with developing a framework through the initial scoping exercise.

There are different ways of developing the scope of an EGM:

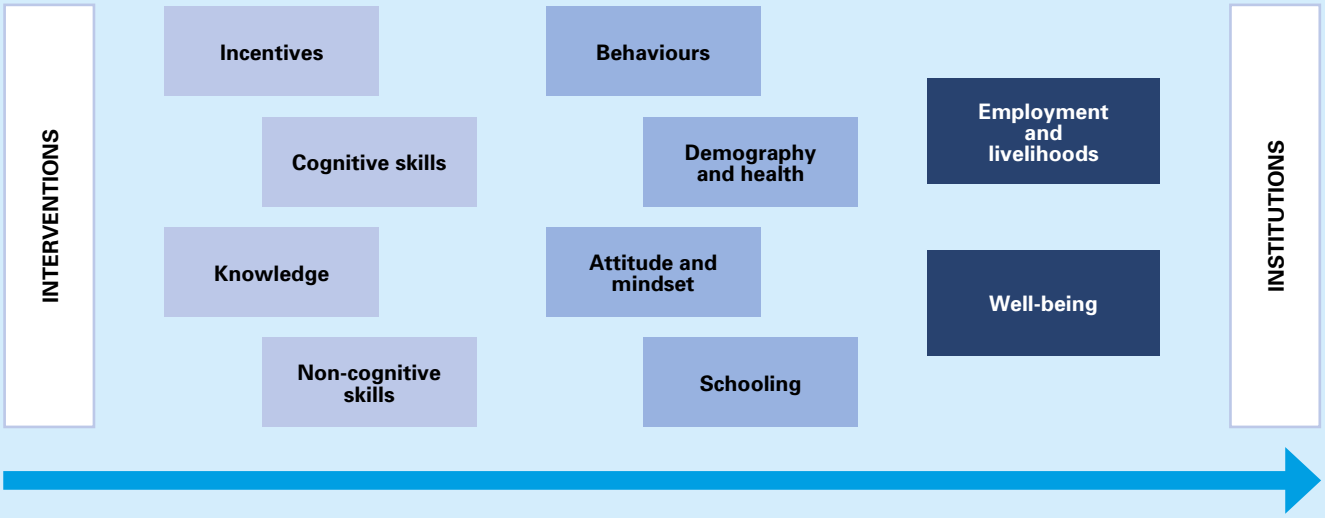
- **A causal chain framework based on a theory of change:** An initial scoping of key documents (*as described in section 3.3 above*) may reveal key intervention and outcome types and common theories of change for an intervention. The outcomes can then be placed in a causal chain, ordered from short-term, to intermediate, to longer-term outcomes (*see Box 4*).

- **Drawing from an existing conceptual framework:** Alternatively, a framework for an EGM may be placed on an existing conceptual framework, which may provide an initial basis to categorize and order interventions and outcomes (*see Box 5*).

6 Pollock, and Berge, 'How to Do a Systematic Review'.

Box 4. Developing an Evidence Gap Map framework using a causal chain framework

For an EGM on youth and transferable skills, the authors undertook an initial scoping exercise and reviewed the theories of change presented in studies. They combined the theories of change into a simplified version. Here there output and outcomes are ordered along a causal chain, meaning that they are ordered according to how they would typically appear.[ii]

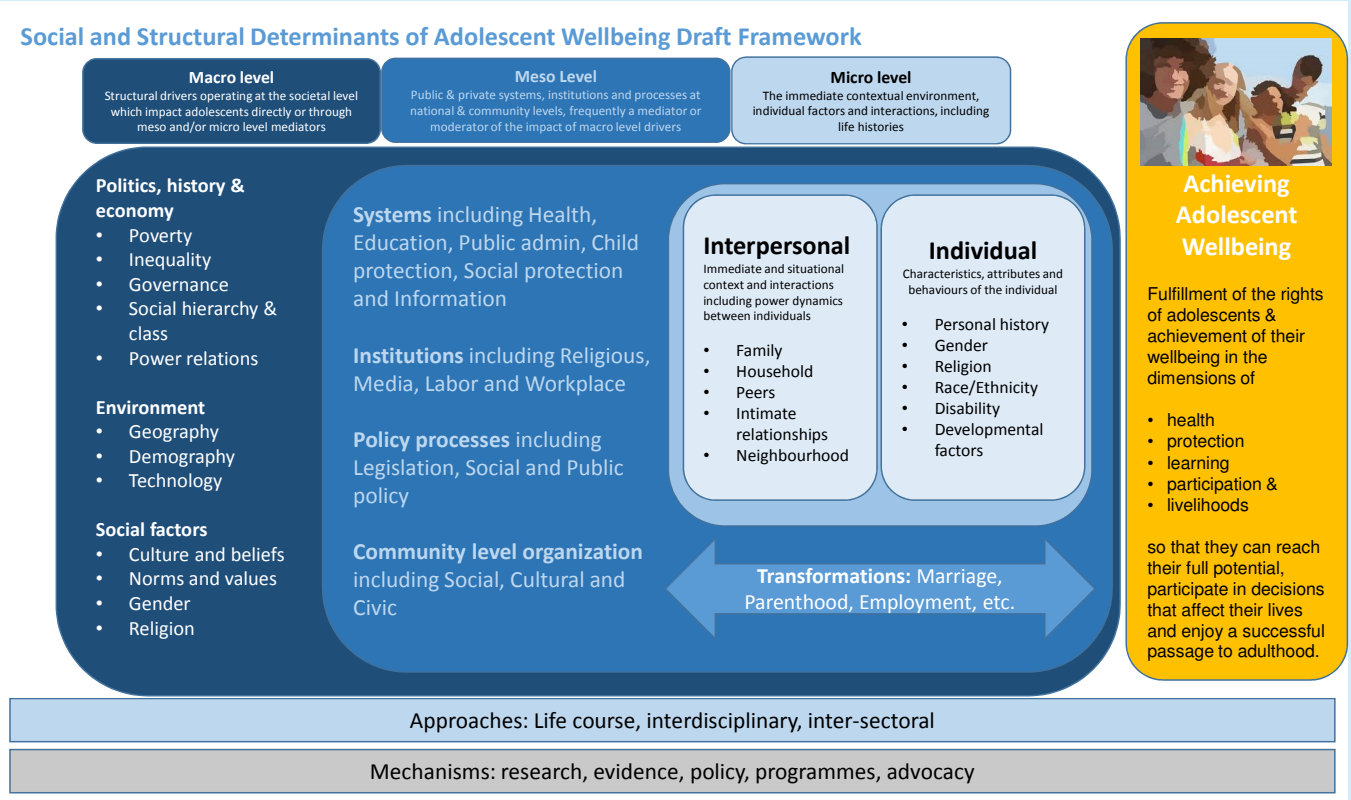


ii Rankin, Kristen, et al., *Youth and Transferable Skills: An evidence gap map*, 3ie Evidence Gap Report 2, International Initiative for Impact Evaluation (3ie), New Delhi, 2015. Available at: <http://3ieimpact.org/evidence-hub/publications/evidence-gap-maps/youth-and-transferable-skills-evidence-gap-map>, accessed 5 February 2020.

Box 5. Using existing conceptual frameworks to develop an Evidence Gap Map framework

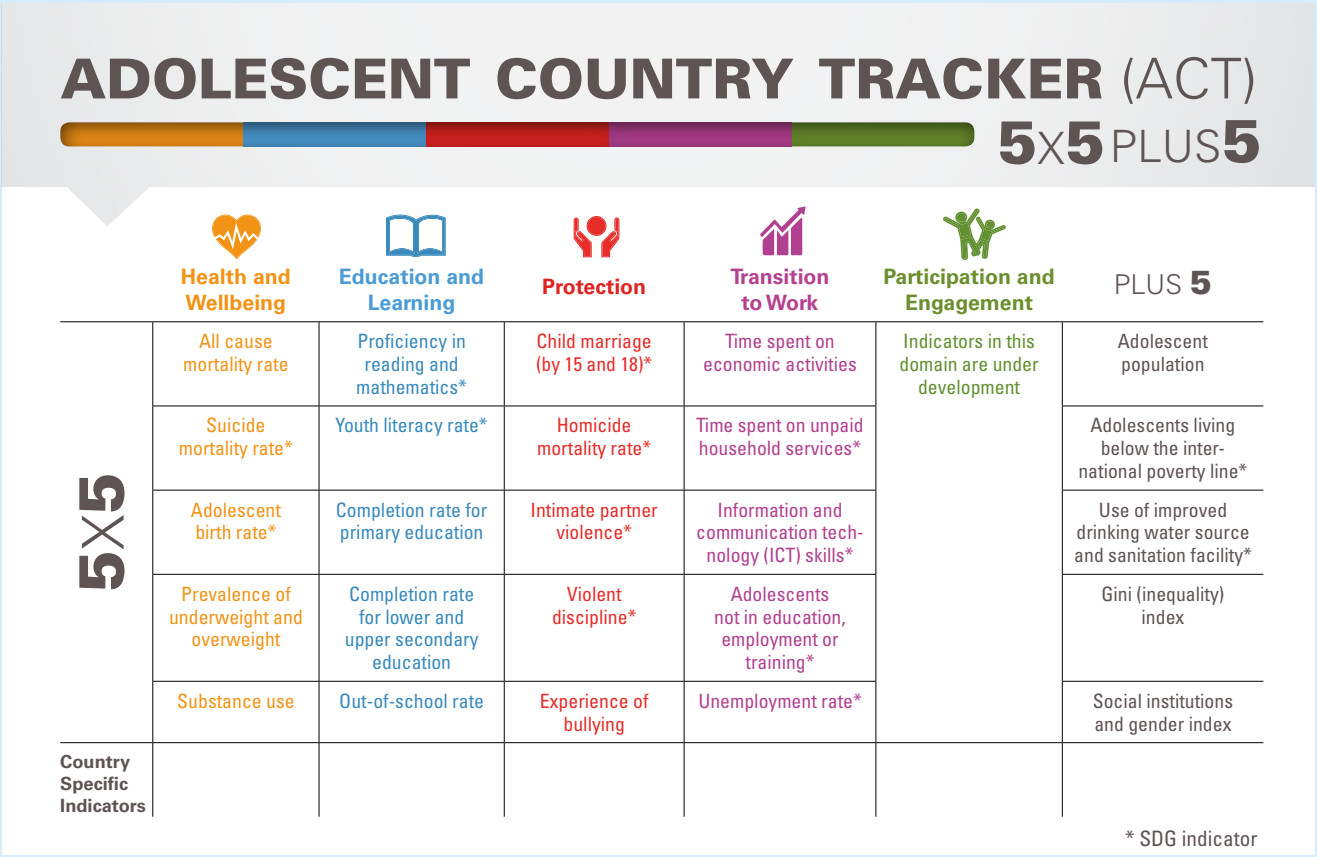
The framework for UNICEF EGM on Adolescent Well-being in Low- and Middle-income Countries was based on a combination of two existing conceptual frameworks: (1) UNICEF's theoretical framework on the social and structural determinants of adolescent well-being; and (2) the UNICEF Adolescent Country Tracker. The dimensions of well-being presented in both frameworks eventually translated into the thematic domains covered by the EGM (protection, participation, and financial and material well-being). Some dimensions of well-being included in these frameworks (e.g., health, education and transferable skills) were deliberately excluded because they were covered in existing EGMs developed by other organizations. A scoping exercise was undertaken whereby a sample of studies in these three domains were reviewed to identify the key intervention and outcome types. The outcomes were then grouped according to the overall domain. The interventions were structured in a hierarchy, from 'individual and interpersonal', to 'group and community', to 'policy and institutional'. This hierarchy was influenced by the ecological system presented in UNICEF's theoretical framework on the social and structural determinants of adolescent well-being and mirrors the micro/meso/macro levels presented in that framework.

UNICEF's Social and Structural Determinants of Adolescent Well-being Framework



UNICEF. (undated). Social and Structural Determinants of Adolescent Wellbeing Draft Framework. Florence: UNICEF Office of Research-Innocenti

UNICEF's Adolescent Country Tracker



	Health and Wellbeing	Education and Learning	Protection	Transition to Work	Participation and Engagement	PLUS 5
5X5	All cause mortality rate	Proficiency in reading and mathematics*	Child marriage (by 15 and 18)*	Time spent on economic activities	Indicators in this domain are under development	Adolescent population
	Suicide mortality rate*	Youth literacy rate*	Homicide mortality rate*	Time spent on unpaid household services*		Adolescents living below the inter-national poverty line*
	Adolescent birth rate*	Completion rate for primary education	Intimate partner violence*	Information and communication tech-nology (ICT) skills*		Use of improved drinking water source and sanitation facility*
	Prevalence of underweight and overweight	Completion rate for lower and upper secondary education	Violent discipline*	Adolescents not in education, employment or training*		Gini (inequality) index
	Substance use	Out-of-school rate	Experience of bullying	Unemployment rate*		Social institutions and gender index
Country Specific Indicators						

* SDG indicator

UNICEF. (2018). UNICEF Programme Guidance for the Second Decade: Programming With and for Adolescents. New York: UNICEF. https://www.unicef.org/media/57336/file

4. THE RESEARCH PROTOCOL

The research protocol is a vital part of the development and review process for an evidence synthesis product and should be completed by the research team prior to beginning the collation stage. It ensures that all the important decisions about methodology and approach have been made in advance, and it should include sufficient information to enable the independent replication of the methods by another research team. Box 6 provides some examples of research protocols.

In most cases, the protocol will be published prior to beginning the collation process, as this helps to ensure transparency and that other research teams are aware of the work to avoid duplication of efforts. The protocol will likely be published on a UNICEF thematic or country office website and publication on an external evidence synthesis repository should also be considered (*for more details on where evidence synthesis outputs can be published, see Brief 5, sections 2.3 and* 5). Importantly, this is another key stage at which feedback and consultation can occur, as the protocol should be shared with the research commissioner and experts (as part of an advisory group) for peer review (*for details on advisory group functions, see Brief 5, section 4*).

The research protocol includes the following information developed during the design stage:

- A brief background to the product, explaining the justification and rationale.
- The research question, aims and objectives.
- The scope, including the inclusion criteria and key definitions, drawing from the PICOCS, including on the interventions, outcomes, population and types of studies to be included.
- The key thematic areas or interventions that are to be excluded can also be explicitly stated.

- The methods, including the search strategy; the databases or sources to be searched; the process for screening documents; the process for extracting data, including the types of data to be extracted; the process for critically appraising studies; and the methods to be used for analysing or synthesizing studies.

- Appendices may include items such as a screening checklist (*see Brief 4, section 3*), a list of the types of data to be extracted (*see Brief 4, section 6*), and the critical appraisal criteria (*see Brief 4, section 5*).

Box 6. Example research protocols

The protocol for UNICEF's EGM on Adolescent Well-being in Low- and Middle-income Countries can be found here.

The Campbell Systematic Reviews library includes protocols for all its SRs.

4.1 Developing the inclusion criteria

Inclusion criteria define which studies are eligible to be included in the evidence synthesis product and which are not. Therefore, the criteria should be clear on what is to be excluded as well as what is to be included. During the collation stage of an evidence synthesis product, decisions to include or exclude documents are based on the inclusion criteria. In practical terms, the PICOCS forms the basis of the inclusion criteria, though this can be expanded upon to further define and clarify the interventions and outcomes that are of interest. One way of doing this is to ask the research team to develop clear definitions of the different interventions and outcomes that are to be included. This should be done in collaboration with the commissioning team to ensure relevance and a similar understanding of scope. The scoping exercise can contribute to this process and the resulting definitions can be included in the research protocol.

4.2 Developing the search strategy

The next step for the research team is to develop a search strategy. This is the method used to systematically search for studies. SRs and EGMs (and REAs to a lesser extent) are all based on a comprehensive search strategy, whereby the goal is to identify all relevant studies on a topic (for REAs, the goal is to identify a good cross-section of studies on a topic). A search strategy consists of four elements: (1) the actual search terms you will use to conduct electronic searches for studies (combined into search strings); (2) a list of databases where the electronic searches will be conducted, including academic journal article databases, grey literature databases, and the websites of key organizations that have document libraries; (3) a list of experts to be consulted, including members of the advisory group, for study recommendations; and (4) other search elements, such as snowballing. Box 7 lists the key issues to consider for a search strategy.

An electronic search strategy is developed by translating the key concepts from the PICOCS and/or the conceptual framework into a series of search strings. Search strings combine key search terms using Boolean search terms (AND, OR, NOT) and search syntax, which is a form of language used by databases to help specify searches. Box 8 shows an example of a search string. An information specialist (most often a person with a digital librarian background) usually develops these search strings by taking key concepts from the PICOCS and drawing on her/his knowledge of database functionality. See Brief 5, section 3, for further details on how information specialists can be deployed as part of the research team.

Box 7. Key issues to consider when developing a search strategy:

- The balance between comprehensiveness and relevance: Increasing the comprehensiveness (also known as the sensitivity) of a search will reduce its precision and retrieve more irrelevant articles. Therefore, the goal is to maximize the generation of relevant results (also known as specificity) while keeping the number of search results manageable.
- Consider publication bias: Academic journals may be more likely to publish studies that present positive results in specific thematic areas on which the journal focuses. Therefore, it is important to use a broad range of academic and grey literature databases in your search strategy that are likely to have studies relevant to the topic being studied. The mix of databases should include academic journal databases, donor and development agency databases, and institutional or non-governmental organization databases.
- Language bias: Ideally, searches should not only be conducted in English. However, expanding the range of languages covered has implications for the manageability and scope of the process. For example, does the research team have the necessary resources and language skills to search for and review non-English studies?
- Reference snowballing: Reference snowballing is normally part of a comprehensive search strategy. Backwards snowballing involves reviewing and including references from eligible studies identified and selected for inclusion. Forwards snowballing involves reviewing references in which the included study has been cited (e.g., using the Google Scholar 'cited by' function).
- Contact key experts: As another arm of the search strategy, it is advisable to contact subject experts to ask them to recommend studies to include.

Box 8. Example search string

Below is an example of a search string taken from the search strategy for UNICEF EGM on Adolescent Well-being in Low- and Middle-income Countries. Note that just a portion of the search strategy is shown; the full search strategy can be found in the EGM research protocol.

1. TI, AB, SU: ((financial OR material OR "in-kind") N3 (grant OR support OR loan)) OR ((saving) N3 (scheme OR group OR support OR training OR club)) OR "financial literacy" or "cash transfer" OR stipend
2. TI, AB, SU: interpersonal OR psychosocial OR "psycho-social" OR "socio-emotional" OR counselling OR therapy OR cognitive OR "non-cognitive" OR "noncognitive" OR "life-skill" OR "second chance education" OR "peer support" OR "non-formal education" OR "non formal education" OR mentoring OR tutoring
3. TI, AB, SU: (norm N3 (change OR attitude OR behaviour OR sensiti?ation)) OR empowerment OR outreach OR advocacy OR engagement OR campaign OR "support groups" OR "safe spaces" OR "information centres"
4. TI, AB, SU: polic* OR institution* OR agenc* OR mainstreaming OR "capacity building" OR service OR "service delivery" OR prevent* OR response OR "legal reform" OR "justice reform" OR "judicial reform" OR "human rights"
5. **1 OR 2 OR 3 OR 4**

Key for search syntax:

TI = Title (for searching in the title field)
AB = Abstract (for searching in the abstract field)
SU = Subject (for searching in the subject keyword field)
N3 = Within three words of (a type of proximity indicator)
* = Truncation, e.g., prevent* finds all variations of the root 'prevent', including prevents, prevention, preventative.
? = Wild-card letter, for alternative spellings of the same word, e.g., sensitization and sensitisation

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For every child, answers