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3ie evidence gap maps
A starting point for strategic evidence production and use

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About 3ie

The International Initiative for Impact Evaluation (3ie) is an international grant-making non-government organisation promoting evidence-informed development policies and programmes. We are the global leader in funding and producing high-quality evidence of what works, how, why and at what cost. We believe that better and policy-relevant evidence will make development more effective and improve people's lives.

3ie working papers

These papers cover a range of content. They may focus on current issues, debates and enduring challenges facing development policymakers and practitioners and the impact evaluation and systematic review communities. Policy-relevant papers draw on relevant findings from impact evaluations and systematic reviews funded by 3ie, as well as other rigorous evidence to offer insights, new analyses, findings and recommendations. Papers focusing on methods and technical guides also draw on similar sources to help advance understanding, design and use of rigorous and appropriate evaluations and reviews. 3ie also uses this series to publish lessons learned from 3ie grant-making.

About this working paper

This paper, *3ie evidence gap maps: a starting point for strategic evidence production and use* provides a conceptual introduction to and demonstration of the evidence gap maps that 3ie produces and their various applications. It outlines the methods for conducting evidence gap maps, but does not go into detail. 3ie will also produce separate guidance about how to create an evidence gap map in 2017.

The content of this paper is the sole responsibility of the authors and does not represent the opinions of 3ie, its donors or its board of commissioners. Any errors and omissions are also the sole responsibility of the authors. Please direct any comments or queries to the corresponding author, Raag Bhatia at rbhatia@3ieimpact.org

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3ie evidence gap maps: a starting point for strategic evidence production and use

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Abbreviations and acronyms

3ie   International Initiative for Impact Evaluation

EGM   evidence gap map

L&MIC   low- and middle-income country

USAID   United States Agency for International Development

1. Why should we map evidence?

Every year, governments and NGOs spend billions of dollars on social programmes to improve the lives of people in low- and middle-income countries (L&MICs). But good intentions are not enough. Intervening in people's lives without considering the best available evidence of what works (and what does not) risks wasting opportunities and doing harm (Chalmers 2005).

The report, *When will we ever learn?*, brought attention to the lack of rigorous evidence[1] to inform programmes in L&MICs (Centre for Global Development 2006). Since then, there has been an exponential growth in evidence on programme effectiveness. As of early 2017, 3ie has identified more than 4,000 impact evaluations and 400 systematic reviews that assess the effects of international development interventions (3ie 2017).

But keeping up with this ever-expanding evidence base is not easy. Studies are often scattered across different databases and websites. Some are behind paywalls, making them difficult to find and access. Indeed, much existing research is rarely accessed and never used (Doemeland and Trevino 2014), representing a waste of scarce research funding.

Furthermore, the existing evidence base has major gaps. The funding of research assessing the effects of policies and programmes represents only a fraction of what is spent on their implementation. Moreover, the scope of policies and programmes relating to international development spans more than a dozen sectors and 6 billion people in approximately 140 countries.

The growth in impact evaluations and systematic reviews, and the limited funding available for new studies, present a twin challenge. How can we ensure that existing evidence is accessible to decision makers? And how can we ensure that research funding is used efficiently, and prioritises important evidence gaps? 3ie evidence gap maps (EGMs) provide a tool to help the users and producers of evidence to address these challenges.

The purpose of this paper is to provide a conceptual introduction to and demonstration of the EGMs that 3ie produces and their various applications. In doing so, we position 3ie EGMs within broader systematic approaches to evidence mapping and synthesis. We briefly outline the methods for conducting EGMs, but do not go into detail as this has been described elsewhere (Snilstveit *et al.* 2016a). 3ie will also produce separate guidance about how to create an EGM in 2017.

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[1] 3ie defines rigorous impact evaluations as studies that use counterfactual analysis to attribute a change in outcomes to a particular intervention. Such studies may use randomised or non-randomised evaluation designs.

1.1 What is a 3ie EGM?

3ie EGMs are collections of evidence on the effects of development policies and programmes in a particular sector or thematic area (Snilstveit *et al.* 2016a). They provide a graphical display of existing and ongoing systematic reviews and impact evaluations in a sector or sub-sector, structured around a framework of interventions and outcomes.

These maps highlight the availability and characteristics of the existing evidence base in an accessible way. 3ie EGMs are presented using an interactive online platform, which allows users to explore the evidence base and findings of relevant studies (see an example in the figure in Box 1). They are sometimes also presented in a Microsoft Excel worksheet to allow users to work with an offline version.

A defining feature of 3ie EGMs is that they are structured around a framework (matrix) designed to reflect the relevant interventions and outcomes associated with a particular area. The framework is informed by a theory (or theories) of change, relevant academic literature and consultation with key stakeholders, including research funders, implementing agencies, experts and researchers.

The resulting framework then sets out the substantive parameters of the EGM. We map systematic reviews and impact evaluations onto this framework according to their characteristics. In doing this, EGMs identify 'absolute gaps' where few or no impact evaluations exist and 'synthesis gaps' where there is a concentration of impact evaluations but no recent high-quality systematic reviews.[2]

We use a systematic search and screening process to identify relevant impact evaluations and systematic reviews for inclusion in EGMs. Researchers then systematically extract data on the basic characteristics of included studies and reviews, such as interventions, outcome measures, geographical location, population and study design. We critically appraise systematic reviews using a standardised checklist, but do not appraise the quality of included impact evaluations.[3]

Finally, we upload the data to the 3ie EGM platform to create an interactive graphic, which allows users to explore the available evidence and access further information.

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[2] Systematic reviews need to be updated with new studies regularly, to remain a reliable source of evidence for decision making. If systematic reviews were conducted more than four years ago and/or the EGM indicates that new studies are available, the EGM will show relevant areas as synthesis gaps.

[3] This is primarily for practical reasons relating to resources and timescales. EGMs often include hundreds of impact evaluation studies. Detailed critical appraisal takes around 2–4 hours per study and requires advanced statistical skills. Most 3ie EGMs have relatively broad inclusion criteria in terms of study design, so include impact evaluation designs that may have a high risk of bias or be considered too limited on closer inspection, for example in a systematic review.

Box 1: EGMs on 3ie's interactive platform

The picture below provides a snapshot of an example EGM on 3ie's interactive platform. The rows in the framework represent key interventions in a particular sector. The columns cover the most relevant outcomes structured along the causal chain, from intermediate outcomes to final outcomes.

The bubbles at intersections between interventions and outcomes represent studies examining the relevant outcome and intervention. The size of the bubble indicates the size of the evidence base – the larger the bubble, the greater the volume of evidence in that cell. By hovering over a bubble, users get hyperlinks to study summaries on the 3ie evidence database.

Different colour bubbles indicate different types of evidence. Grey represents primary studies and colours represent systematic reviews.

The colour of the bubbles indicates the overall rating given to a systematic review based on a careful appraisal of the study's methods, using a standardised checklist (green = high confidence; orange = medium confidence; red = low confidence; blue = ongoing systematic review).

Users can choose to see only selected types of studies on the map. They can also filter evidence by region, country, population sub-group and study design (this last option is available for impact evaluations only).

1.2 Where is mapping in relation to evidence sythesis?

Systematic reviews are designed to address a number of well-known problems with academic research, which present challenges for informing policy and programming. They focus on these issues and are considered the best available approach to assess and interpret research evidence addressing a specific question.

Systematic reviews aim to overcome:
- the limitations inherent in generalising from single studies (Chalmers, Hedges and Cooper 2002; Ioannidis 2006)
- the biases of traditional literature reviews (Chalmers 2005; Cooper, Hedges and Valentine 2009)
- the challenges in keeping up with the volume of research output (Chalmers, Hedges and Cooper 2002; Chalmers 2005; Cooper, Hedges and Valentine 2009; Ioannidis 2006).

However, systematic reviews are not always the most appropriate approach to reviewing evidence. For example, decision makers or research funders may be interested in a broad topic but not have clearly defined research questions and/or priorities. Alternatively, evidence on a topic might be scattered, or funders' expectations of limited, relevant research may make them reluctant to invest in a systematic review only to be told more research is needed.

These issues are more prevalent in policy areas where research and programming are at early stages, or when topics are particularly complex. Finally, decision makers and other key actors often require information about available evidence more urgently than systematic reviews can provide it (Moher, Stewart and Shekelle 2015).

EGMs are part of a family of systematic approaches to identifying and interpreting evidence that have emerged to address these decision-making needs, objectives and contexts (Moher, Stewart and Shekelle 2015). Table 1 summarises the key characteristics of some of the most commonly used systematic approaches to reviewing evidence, separated into two broad types: maps and syntheses.

The world of evidence production is dynamic. Researchers are constantly innovating and developing new methods, resulting in diverse terminology and methods applied by individual researchers and organisations. Apart from systematic reviews, most other synthesis and mapping methodologies listed in the table are not standardised.[4] Nevertheless, by categorising methodologies in this way we aim to show the main purposes and outputs that stakeholders can expect from each type.

The main distinguishing features between evidence maps and syntheses are their aims and the type of analysis they provide (Haddaway et al. 2016; Miake-Lye et al. 2016). Evidence maps are typically broad in scope and address questions related to the size and characteristics of the evidence base, with the purpose of identifying existing research and research gaps (Haddaway et al. 2016; Miake-Lye et al. 2016).
As indicated in Table 1, evidence maps and evidence syntheses both use systematic methods to identify and describe the evidence base. The crucial distinction between them

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[4] This was a key finding of two recent landscaping studies of evidence maps (Miake-Lye et al. 2016) and rapid review methods (Tricco et al. 2015). An exception to this is in the environmental sciences, where there is guidance on methods for systematic maps (James, Randall and Haddaway 2016).

is that evidence maps limit data extraction and analysis to study characteristics, without any formal synthesis of the studies' findings.

Some evidence maps, including 3ie EGMs, and those produced by the Global Evidence Mapping Initiative and Headspace, also aim to inform decision making by compiling existing research to make it more accessible to users. For example, they may link to summaries on databases (3ie impact evaluation repository and 3ie systematic reviews database; evidencemap.org; headspace.org.au).

Syntheses, on the other hand, typically focus more narrowly on addressing specific, substantive questions and combining studies' findings in a formal synthesis. For example, systematic reviews extract findings from primary studies, critically appraise the methods used to generate those findings and combine the results using statistical, qualitative or narrative methods. Rapid evidence assessments also follow similar methods to systematic reviews. However, because they are more limited in terms of time and resources, the literature searching, data extraction, appraisal and analysis are typically less comprehensive.

Evidence maps are one of many tools and information sources to support evidence production and use. There is no hierarchy of maps and syntheses, just different tools for different purposes. 3ie EGMs will continue to evolve to improve the maps' usefulness, but key characteristics, such as broad scope, using an intervention or outcome framework and a focus on mapping evidence on effects will remain.

2. How can we use EGMs?

EGMs are usually designed to address two main objectives. The first is to facilitate strategic use of research funding by identifying evidence gaps and indicating where new primary research, evaluation studies and systematic reviews can add most value. The second is to facilitate evidence-informed decision making by providing access to user-friendly summaries of existing research. The next section describes these different uses in turn.

2.1 EGMs can inform strategic research investment

EGMs map and describe the characteristics of the existing evidence base. By identifying areas of high policy relevance where evidence is lacking, they can inform a strategic approach to building the evidence base on a particular issue and ensure that scarce resources are used on studies that matter.

EGMs can highlight intervention and outcome areas that have few studies, where new primary studies can add value. Because of 3ie's mandate to focus on evidence relevant to development in L&MICs, assessing evidence by geographic context is also important. Evidence gaps may not be clear until such strategic filters are added to the mapping. For example, learner-centred teaching is an approach that is often implemented to promote transferable skills among youth (Rankin *et al.* 2015). However, a recent EGM on this topic revealed a complete evidence gap on the effects of such programmes in L&MICs.

Evidence gaps are not only areas or topics with no or very few impact evaluations. Several studies may exist for a group of interventions and outcomes, but they may not be sufficiently diverse in terms of contexts and populations. In such cases, carrying out a few

more studies can help to identify generalisable and context-specific findings in a future systematic review. An EGM assists users in making these decisions.

Using EGMs to inform 3ie research funding programmes shows how EGMs can help to guide the strategic production of new impact evaluations. 3ie's commissioning is increasingly managed in the form of 'thematic windows' (funding thematically similar studies at the same time). We use EGMs to inform the targeting of these windows to help ensure that new studies close important gaps in the evidence.

Recent examples include the areas of agricultural risk (Barooah, Kaushish and Prui forthcoming), humanitarian assistance (Clarke *et al*. 2014), immunisation (Sabarwal *et al*. 2014) and water, sanitation and hygiene (Waddington *et al*. 2014). Box 2 expands on how EGMs have informed 3ie research commissioning.

Box 2: Critical evidence gaps identified in 3ie EGMs

As shown below, EGMs identify key 'gaps', where there is little or no evidence from impact evaluations or systematic reviews. Recent EGMs have informed 3ie's funding by highlighting gaps in the following areas:
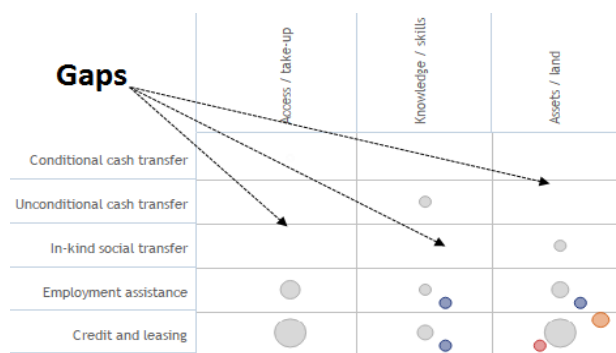
- Natural resources in Africa, if well governed, have the potential to generate more than US$330 billion annually (ONE 2012). The evidence on examining programmes to improve the transparency and accountability of natural resource governance is scarce. The few impact evaluations that exist focus mostly on the process and degree of compliance with natural resource transparency and accountability initiatives, rather than the impact of these initiatives on development outcomes (Darby 2010; Acosta 2010).
- A 3ie EGM on agricultural risk revealed a lack of evidence on interventions promoting the demand for, and uptake of, agriculture insurance (Barooah, Kaushish and Puri forthcoming). With funding from UK Aid, 3ie has funded 14 studies to close this gap and generate policy-relevant evidence on how best to create effective demand for agricultural insurance products.
- A 3ie EGM showed that existing evaluations in the land use, forestry and agriculture sector typically assess effects on *either* environmental or human welfare outcomes. But decision makers need evidence from studies measuring both types of outcomes to assess potential trade-offs (Snilstveit *et al*. 2016b). The EGM also highlighted where sufficient evidence exists, but no synthesis has been done. That finding will inform the commissioning of new systematic reviews.

An EGM can be used at various stages of impact evaluation investment, including generating support for future impact evaluation evidence. For example, the William and Flora Hewlett Foundation wanted to identify and address important evidence gaps around the effects of adolescent sexual and reproductive health programming. As part of scoping work, it funded 3ie to produce an EGM of existing impact evaluations and systematic reviews focused on L&MICs. This EGM is now helping to generate funding for impact evaluations to close the evidence gaps in this area.

EGMs highlight methodological trends in existing evidence, assisting the design of new research. They describe the methodological characteristics in a body of literature, such as study designs and outcome measures. For example, EGMs can help to identify when existing studies fail to assess policy-relevant outcomes, exclude important populations or rely on weak evaluation designs.

Moreover, variation in outcome measures used in primary studies creates a fragmented evidence base and is often a barrier to evidence synthesis. As EGMs include a survey of outcome measures, they can make it easier for researchers to select outcome measures commonly found in the literature. By highlighting such trends, EGMs can help identify how future studies can add most value.

Hyperlinks to 3ie's databases in EGMS also allow researchers to access summaries of individual studies, and link to full texts. Making completed studies available in this way can help researchers to design new evaluation studies. This may be especially helpful when working on a particularly challenging research question or context that requires creative approaches to establishing a counterfactual or evaluation design.

EGMs identify synthesis gaps and can inform the targeting of new systematic reviews. A lack of primary studies in a given area may limit the usefulness of findings provided by systematic reviews. Using EGMs to inform decisions about whether to undertake a systematic review will reduce the number of reviews with the main finding that further research is needed, saving time and money.

EGMs can help to reduce this by identifying areas with substantial unsynthesised primary evidence, as well as existing systematic reviews that are out of date or suffer from methodological shortcomings. They can also guide decisions on whether conducting a different type of review makes more strategic sense.

Increasingly, 3ie commissions systematic reviews in a two-stage process: an EGM on a broad topic, followed by a systematic review targeting questions where the EGM identified sufficient unsynthesised impact evaluations. For example, an EGM on land use, forestry and agriculture is informing the scope of a new systematic review to be commissioned with funding from the Children's Investment Fund Foundation.

Systematic reviews can be produced more efficiently after an EGM. This is achieved in two main ways. Firstly, researchers using an EGM can begin to conceptualise definitions, prevailing theories of change and potential research questions relevant to a particular area to develop a systematic review protocol more quickly.

Secondly, researchers using an EGM start the systematic review process with a set of relevant primary studies. While the systematic review will require additional – and more targeted – searches, reviewers already have a set of studies that they can feed into the review production process.

2.2 EGMs can inform decision making

What do decision makers want from researchers? Some evidence suggests that decision makers see researchers as brokers of important knowledge, and often value their narrative more than the quality of the evidence they present (Avey and Desch 2014; Head *et al.* 2014). Most of all, decision makers need *timely* information. This makes EGMs well suited as a tool for informing decision making.

EGMs provide a tool for rapid capture of the best available evidence. Policy-making processes often move quickly, and decisions are based on a host of factors and information. Policymakers often do not have the time or inclination to wait for new impact evaluations and systematic reviews to be completed. EGMs identifying relevant systematic review evidence can be produced relatively quickly, making them useful tools for policymakers.

While 3ie EGMs do not provide substantive policy findings or recommendations, they provide user-friendly summaries and critical appraisals of systematic reviews. The confidence rating of systematic reviews can help users to make informed judgements about how far they can rely on the findings of existing systematic reviews.

EGMs provide a simple and accessible visual summary of available evidence on a given topic. Users can further explore the characteristics of existing evidence using interactive platforms, to meet their specific needs. A key feature of 3ie EGMs is their visual representation of the distribution of evidence. Users can filter studies to reflect evidence by country, study design, sub-populations and/or region. This allows the user to view less visible but important nuances and gaps in the evidence base.

For example, there are more than 150 studies in the adolescent sexual and reproductive health EGM. Filtering the EGM by important sub-populations (such as girls, boys or very young adolescents) highlights large gaps that are not visible when viewing the adolescent target population as a whole. EGM users can also filter out studies of low quality in systematic reviews.

EGMs can serve as a tool to compare programming with the evidence base and to organise other evidence. Organisations and individuals can overlay programmes onto an EGM to compare current investments against the availability of evidence. This allows a user to identify relevant impact evaluations and systematic reviews more easily and to begin to prioritise the gaps in evidence. Users can also use the framework of an EGM to organise monitoring data, programme evaluations and other information. For example, USAID is using the framework developed by 3ie for an EGM on science, technology, innovation and partnerships to map out USAID-funded programme evaluations.

EGMs provide a common point of reference for researchers and decision makers to engage in discussions about prioritising investments and new research. Research suggests that interaction between researchers and decision makers that builds understanding and trust is key to improving evidence uptake (Langer, Tripney and Gough 2016). 3ie EGM frameworks are designed in consultation with relevant experts to represent a comprehensive set of interventions and outcomes within a particular development sub-sector.

EGMs are just one of many tools that can be used to inform decision making; they should not be used in isolation. While EGMs describe research and make it more available and accessible, they do not provide any formal synthesis or explicit recommendations.

3. Conclusion: the main value of EGMs

In an age of increasing aid accountability and rationed research money, improving the targeting of funding and research to help ensure effective development policies and programming is more important than ever.

EGMs provide a rapid, efficient and user-friendly tool to highlight what evidence exists for specific interventions and outcomes. For researchers, decision makers, development practitioners and funders alike, they are a strategic starting point for looking at investments in the production and use of evidence.

By highlighting where there is a lack of impact evaluations, or where there is a need for systematic reviews or studies of better quality, EGMs help funders target their resources to fill important evidence gaps more quickly, cost-effectively and in a more strategic and impactful way. They also facilitate evidence-informed decision making by making the best research more accessible to end users.

However, EGMs are not a cheap alternative to new impact evaluations and systematic reviews. Rather, they provide a new tool to support the production, analysis and use of evidence for decision making.

Table 1: Family of systematic approaches to evidence mapping and synthesis

Product	Aim	Scope	Average production time	Search	Inclusion criteria	Data extraction and critical appraisal	Analysis	Presentation
Evidence maps								
Evidence inventories[5]	Rapid overview of available evidence to assess need for further research	Typically narrow	5–10 days	1–4 databases (relevant repositories of impact evaluations and/or systematic reviews), typically restricted by time and language of publication	Impact evaluations and/or systematic reviews	List of studies categorised in line with stakeholder needs. No critical appraisal	May include limited descriptive summary	Categorised list, with references and brief notes
Systematic maps[6]	Overview of research on a topic. Identify evidence clusters and gaps. Make existing research available	Depends on stakeholder interest, often broad but can also address more narrow questions	3–6 months	All relevant databases and websites. Reference snowballing. Hand searching. Expert consultation	Depends on question, but not limited to counterfactual studies	Descriptive characteristics of evidence base. May include some critical appraisal	Descriptive analysis of study characteristics, highlighting evidence clusters and gaps	Report describing characteristics of evidence, list or database of all studies
Evidence gap maps[7]	Inform research commissioning and facilitate the use of evidence to inform decision making	Broad theme or sector	3–6 months	Key evidence repositories, select academic databases, reference snowballing	Impact evaluations, systematic reviews	Descriptive characteristics of studies, appraisal of systematic reviews	Descriptive analysis of evidence and gaps, summary of lessons from high-quality systematic reviews	Report and visual and interactive map website or matrix. Links to summaries of included studies

[5] Hartling *et al.* (2015)

[6] Bates, Clapton and Coren (2007); Oakley *et al.* (2005); Haddaway *et al.* (2016)

[7] Snilstveit *et al.* (2016a)

Evidence synthesis

Systematic reviews of intervention effects[8]	Comprehensive, unbiased assessment of evidence on intervention effects	Specific question(s)	12–18 months	All relevant databases and websites. Reference snowballing. Hand searching. Expert consultation	Impact evaluations	Descriptive characteristics of studies, empirical findings. Detailed critical appraisal	Quantitative and qualitative *synthesis* as appropriate	Full technical report, often user-friendly summary report and brief
Systematic reviews of implementation	Comprehensive, unbiased assessment and synthesis of evidence on intervention implementation	Specific question(s)	12–18 months	As above, and government documentation	Qualitative studies, process evaluations, correlational studies as appropriate	Descriptive characteristics of studies, empirical findings. Detailed critical appraisal	Quantitative and qualitative *synthesis* as appropriate	Full technical report, often user-friendly summary report and brief
Systematic reviews – full causal chain analysis[9]	Comprehensive, unbiased assessment and synthesis to address whether an intervention works, and for whom, and identify potential barriers to, and facilitators of, effectiveness	Specific question(s)	12–24 months	As above, and government documentation	Impact evaluations *and* associated qualitative studies, process evaluations and project documents	Descriptive characteristics of studies, empirical findings. Detailed critical appraisal	Quantitative and qualitative *synthesis* as appropriate	Full technical report, often user-friendly summary report and brief

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[8] Cooper, Hedges and Valentine (2009); Petticrew and Roberts (2006); Waddington *et al.* (2012)

[9] Waddington *et al.* (2012)

Rapid evidence assessments [10]	Quick review and synthesis of available evidence under time and/or resource constraints	Specific question(s)	3–6 months	Time-bound search of relevant subject databases. Reference snowballing	Depends on question	Similar to systematic reviews, but more limited	May be similar to systematic reviews, but often more limited narrative, descriptive or tabular analysis	Full technical report, often user-friendly summary report and brief
Meta-synthesis								
Reviews of reviews [11]	An accessible overview of systematic reviews available in a particular area	Specific question(s), covering more than one intervention or outcome	6–9 months	All relevant databases and websites. Reference snowballing. Hand searching. Expert consultation	Systematic reviews	Critical appraisal of systematic reviews. Data from included systematic reviews, in some cases additional data from included studies	Quantitative and qualitative synthesis as appropriate, including meta-analysis where possible	Full technical report, often user-friendly summary report and brief

[10] Ganann, Ciliska and Thomas (2010); Khangura *et al.* (2012); Government Social Research Service (2013)

[11] Becker and Oxman (2011)

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