What works to increase the use of evidence for policy decision-making: A systematic review

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Systematic reviews appraise and synthesise the available high-quality evidence to answer specific research questions in a rigorous, objective and stepwise process. These reviews follow scientifically recognised review methods, and they are peer-reviewed and quality-assured according to internationally accepted standards.

About this systematic review

This report presents the findings of a systematic review that brought together the empirical literature on interventions targeting the use of evidence in policy decision-making. We aimed to identify mechanisms, policies and programmes with promising evidence of effectiveness, and areas where further primary research would help consolidate the evidence base.

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Plain language summary

No one-size-fits-all solutions: A systematic review of what works, for whom, and why in promoting evidence use in policymaking

The review in brief

Most EIDM interventions positively influence decision-makers' likelihood of using evidence. Demand-led intervention design and implementation enhance EIDM effectiveness by prioritizing evidence users.

What is this review about?

Policies based on robust evidence achieve intended outcomes. Understanding EIDM mechanisms and impacts sustains evidence-informed policymaking. EIDM interventions work through six mechanisms: raising awareness, aligning policy questions, improving evidence communication, fostering researcher-decision-maker interactions, enhancing policymakers' skills, and influencing decision-making structures. This review assesses EIDM interventions' impact on evidence use, behavioural changes, and socio-economic outcomes.

What is the aim of this review?

This systematic review synthesizes rigorous evidence on interventions supporting EIDM among policymakers. It examines intervention effectiveness as well as design, context and implementation factors, particularly in low- and middle-income countries (LMICs), analysing 164 quantitative and qualitative empirical studies.

What are the main findings of this review?

What studies are included?

This review applies an effectiveness-plus approach, analysing what works, how, why, for whom, and in what context. It includes 18 counterfactual impact evaluations, 97 qualitative and mixed-method evaluations, 43 practitioner reflections, and 12 policy case studies. Impact evaluations cover multiple countries, with LMIC-focused empirical studies included for contextual analysis.

What are the impacts of EIDM interventions?

Capacity-building programs show promise for improving policymakers' EIDM skills. Studies on evidence accessibility suggest small positive effects but do not necessarily enhance policymakers' ability to interpret and apply the evidence. Most counterfactual studies fail to assess both intermediate outcomes and evidence use impacts, limiting quantitative analysis of whether targeting multiple behavioural constraints is more effective than addressing a single one. Due to heterogeneity in measurements, most findings rely on one or two studies.

What factors influence the design, implementation and impact of EIDM interventions?

Limited skills and training hinder evidence users' engagement with research. Similarly, evidence producers often lack the capacity to communicate findings effectively. External

challenges such as political instability, armed conflict, and health crises disrupt EIDM efforts, whereas political commitment fosters success.

Capacity-building initiatives work best when well-structured, blended, contextually adapted, led by skilled trainers, and held in accessible locations. Producing concise, visually engaging, and multilingual evidence enhances policymakers' engagement. Targeted messages have a greater impact in departments with established research cultures.

Organizational and individual factors significantly impact success. Barriers include limited resources, poor communication, resistance to change, and weak engagement networks. Conversely, strong leadership support, high-quality data, and monitoring mechanisms improve outcomes.

What do the findings of this review mean?

Researchers and policymakers play crucial role in bridging the evidence-action gap. Programs integrating multiple mechanisms, such as training and improved research access, achieve better results. Policymakers engage more with clear statistical data, cost-effectiveness insights, and comparative evidence. Strengthening capacity-building efforts is essential, incorporating diverse learning methods, high-quality materials, and adaptability to local contexts. Training specialists to translate research into actionable insights enhances evidence-policy links. Equipping policymakers with the right tools fosters a culture where evidence consistently informs decisions .

Effective communication and follow-ups are key to EIDM success. Meetings should be scheduled at convenient times for decision-makers. Research briefs alone rarely change beliefs; active stakeholder collaboration drives policy impact. Research outputs must align with policymakers' priorities and be presented in engaging, accessible formats.

For researchers, critical evidence gaps remain. Future studies should explore broader policy environments beyond health and assess how evidence quality affects decision-making. Rigorous methodologies combining impact evaluations with qualitative research are needed to understand intervention effectiveness. Standardizing measures of evidence use ensures consistency in evaluations. Increased impact evaluation research, especially in LMICs, is necessary to assess both short-term behavioural shifts and long-term structural changes in evidence use.

How up-to-date is this review?

This review is based on an updated search of an existing evidence gap map, conducted in January 2023. This Campbell Systematic Review was published in May2025.

Executive summary

Background

The utilisation of evidence-informed decision-making (EIDM) is essential for effective policy making. However, the impact of, and the factors influencing, the success and sustainability of EIDM interventions, particularly in low- and middle-income countries (LMICs), remain underexplored. A systematic review of the existing evaluation literature on EIDM initiatives in policymaking was therefore undertaken to identify mechanisms, policies and programmes with promising evidence of effectiveness, and areas where further primary research would help consolidate the evidence base.

Objectives

We collected, appraised, and synthesised all the available empirical evidence on what works to support EIDM by policymakers. We aimed to answer the following research questions:

1. What are the impacts of interventions to support evidence-informed decision-making by policymakers?
2. What are the factors which have influenced:
    a. the impact of these interventions in LMICs?
    b. their design and implementation in LMICs?

In answering these questions, our goal was to estimate the overall impact and relative effectiveness of different EIDM interventions, identify factors or configurations of factors that support or hinder the effectiveness of these interventions in LMICs and to identify gaps and areas for future primary research regarding the design, implementation, and evaluation of these interventions.

Methods

We conducted a mixed-methods systematic review, employing an 'effectiveness plus' approach with two parallel review modules to answer the two review research questions. An effectiveness plus approach combines answering questions of what works with an equal emphasis on why and how it works, for whom, in what context, etc. To identify studies for the review, we updated the search of an existing evidence gap map that fully overlapped with the review's scope (Nduku et al. 2024a), involving a scientific and exhaustive search. To address research question 1, we only included counterfactual impact evaluations. We largely relied on narrative synthesis to bring study findings together due to the limited number of studies and substantial heterogeneity. Where meta-analysis was possible, we used inverse-variance weighted random effects models. We appraised each impact evaluation included in the systematic review using an adapted version of the Cochrane risk of bias tool for randomised and non-randomised studies. To address research question 2, we undertook a thematic synthesis using inductive coding techniques to identify common descriptive themes that were configured into analytical themes. The thematic synthesis aimed to identify themes related to the interplay of intervention design, intervention implementation, target population and contextual variables with intervention outcomes and effects. Intervention design factors

related to the design and planning of the evaluated intervention, including intervention components and the sequence that they were implemented. Intervention implementation factors related to the implementation of the intervention in practice, normally emerging while the intervention was implemented and not known in advance. Contextual factors included external influences beyond the intervention's control including political context, societal factors such as norms, economic factors such as a recession, and cultural factors such as beliefs.

Study selection criteria

The study selection criteria for our review were guided by a conceptual framework developed by Langer and colleagues (Langer et al. 2016; Nduku et al. 2024a), which draws on Michie and colleagues (2011) behaviour change framework. We included studies of interventions targeting the use of evidence in policy decision-making that worked through one or more of six possible mechanisms of change: (1) building Awareness for EIDM, (2) building Agreement on policy-relevant questions and the evidence needed to answer them, (3) providing communication of, and Access to, evidence, (4) supporting Interaction between decision-makers and researchers, (5) supporting decision-makers to develop Skills in accessing and using evidence, and (6) influencing decision-making Structures and Processes. 'Intervention' could refer to a programme, strategy action or practice that actively intervened in the decision-making status quo. We included studies that explored the impact or influence of EIDM interventions on the use of evidence in policy design or implementation, on the intermediary components of behaviour change, that is capability, opportunity, and motivation (COM) to use evidence, or socio-economic impacts resulting from EIDM practice. These could be measured at the individual, team, organisational (e.g. government ministry) or institutional level (e.g. government-wide). We were interested specifically in EIDM involving policymakers at any level of government, including elected officials or civil servants. It also covered individuals working in multilateral organisations. We did not place restrictions around 'policy decision-making behaviours and processes', and these could include for example starting or amending a policy, stopping a programme or changing the process for making decisions. We were interested in studies from any policy area, including education, health, economic policy and environmental policy.

To address review question 1, we included Randomised Controlled Trials (RCTs) and Quasi-Experimental Designs (QEDs). These could take place in any country. To address review question 2, we included studies from LMICs that used any empirical evaluation design to assess an EIDM intervention, covering both quantitative and more qualitative designs. This included any qualitative or mixed-methods studies attached to the programmes evaluated in RCTs and QEDs identified to address review question 1. This ensured that our systematic review included a broad set of evidence on EIDM in LMICs. We included both academic and grey literature. We only included studies published in English.

Overview of the evidence base

We included a total of 164 empirical studies of EIDM interventions in the review, 18 of which were counterfactual impact evaluations.

Of the counterfactual impact evaluations we used to address research question 1, half had been published in the last five years. Most of these tested an intervention that worked through an access to evidence mechanism, but we did find a smaller number testing policymaker skills

focused interventions and multi-mechanism of change approaches. Most studies evaluated impact on one part of the EIDM intervention logic model, rather than testing both intermediate and evidence use outcomes, with only seven of the eighteen evaluating the impact on an indicator of evidence use by policymakers. Importantly, most of the impact evaluations took place entirely in a high-income country. Six of the studies were rated as being at a low risk of bias with the rest being rated as having some concerns or being at a high risk.

To address research question 2, we included 152 studies: 97 qualitative and mixed methods evaluations, 43 reports providing practitioner reflections and 12 policy case studies. A significant proportion of this literature comes from public health - almost 70 per cent of the studies included to address research question 2 - but there are emerging literatures working across multiple areas of government and from environmental policy. Several policy areas including economic growth, transport and education are underrepresented. Around 40 per cent of this evidence base is concentrated in five African countries, namely South Africa, Nigeria, Uganda, Kenya and Burkina Faso. As was the case for the impact evaluation literature, the least assessed mechanism was awareness of EIDM with the most frequently assessed mechanisms of change being policymaker interaction with researchers, access to evidence and building skills of policymakers.

Summary of findings

Research question 1: Impact of EIDM interventions

Overall, it was challenging to synthesise and draw generalisable conclusions on EIDM intervention effectiveness given the small number of counterfactual studies and differences in focus, intervention and control conditions, context and outcomes. Given this heterogeneity, most of our individual findings are drawn from just one or two of the 18 studies. That said, most of the EIDM interventions evaluated in the included studies had a positive effect on intermediate conditions and activities that enhance the likelihood of decision-makers using evidence compared to business as usual with a few notable exceptions. The largest consistent effect sizes on motivation and capability to use evidence we found in the review were in an evaluation of a programme providing quantitative research methods training to junior ministers in Pakistan, although this may be at least partially due to the use of outcome measures that were closely linked to the intervention.

There is very tentative causal evidence of promise for capacity building programmes targeting the EIDM skills of policymakers. Three studies found positive effects across indicators of evidence use in policymaking, capability and opportunity to use evidence. These studies targeted local and state public health policy teams in the USA and junior ministers in Pakistan. However, these three studies were rated as being at a high risk of bias or having some concerns.

The few studies that tested making evidence more accessible for policymaking generally found small, positive effects on measures of policymakers' capability to use evidence, although interventions in this category did not directly target building policymakers' knowledge and skills to use this evidence. However, a study from Canada found that the use of tailored, targeted evidence messages had a much greater effect on reported evidence use in public health departments that already had a strong culture of valuing research evidence relative to departments that did not have this culture. Several studies that varied the source of research

evidence and communication of results found that these factors can affect accessibility, beliefs and evidence use outcomes:

- Providing more statistical data on variation, presenting impact evaluation results side-by side with other results for comparison and providing cost effectiveness data may increase policymakers' updating of beliefs when presented with new evidence.
- Contextually framed narratives around systematic review evidence improved accessibility and clarity of the information for participants at a guidelines workshop in Kenya, although they did not improve correct understanding about intervention effectiveness.
- Global health actors in Francophone Africa were more likely to report using the findings of a policy brief when the author was reported as an African funder or international organisation compared to a European or North American organisation, but less likely if it was an African university compared to a European or North American University.
- Policy briefs on the topic of agriculture and nutrition that included an opinion from a sector expert or researcher improved the likelihood of participants informing someone about the messages of the brief, although receiving a brief largely did not translate into self-reported evidence use.

A rapid response model linking researchers with policymakers in the USA demonstrated particular promise for improving evidence use and researcher-policy engagement. Organisational and individual characteristics were found in other studies to have significant influences on the effectiveness of EIDM interventions. When tailored, targeted evidence messages were combined with a knowledge broker in public health departments in Canada, there was a positive effect on evidence use in those departments with a low organisational research culture but a negative effect in organisations that already placed a high value on research evidence. In another study, policy briefs on the topics of agriculture and nutrition created evidence-accurate beliefs among those with no prior views but had little effect when readers had strong prior views.

Most of the counterfactual studies evaluated impact on one part of the EIDM intervention logic model, rather than evaluating impact on both intermediate and evidence use outcomes. This prevented us from being able to quantitatively test a key hypothesis that interventions that work through targeting multiple behavioural constraints to EIDM - specifically capability, opportunity and motivation to use evidence - are more effective at shifting evidence use than those targeting a single pathway.

Research question 2: Factors influencing the design, implementation and impact of EIDM interventions

The qualitative synthesis identified key factors influencing the impact of EIDM interventions, organised into population characteristics, intervention design features, context and implementation factors. We identified a total of 49 descriptive themes configured into 11 analytical themes. An overview of the 11 analytical themes, organised by the four groups of factors above, is as follows:

Population characteristics

1. Evidence users' **lack of skills and experience** as well as **inadequate training** may affect the ability and opportunity to engage and use evidence while **evidence producer's limited skills and experience** may impact ability to engage with evidence users and provide relevant evidence.

Contextual factors

2. **Disease outbreaks, political instability, political cycles, and armed conflicts** can disrupt EIDM interventions while **political will and commitment** tend to promote the successful implementation of EIDM interventions

Intervention design factors

3. Designing **structured, blended, and contextualised EIDM capacity-building programs** facilitated by **skilled trainers in safe and convenient locations** can enhance the impact of these initiatives to promote the capability to use evidence by policymakers
4. Producing **relevant, succinct evidence** products that are **visually appealing** and **translated into numerous languages** can enhance **more in-depth engagement with evidence**, and thereby can promote the use of evidence by policymakers
5. **Diversity of stakeholders**, consistent and **effective communication** can promote fruitful collaborative engagements whereas **high cost of engagement** along with a lack of policymaker **incentives** may hinder the effective implementation of policy dialogue elements and stakeholder collaboration
6. **Timing** of interventions and engagements as well as **time constraints** and **scheduling challenges** can affect stakeholders' participation in EIDM interventions

Implementation factors

7. A **lack of resources**, **staff** and **capacities** affects utilisation of evidence
8. Poor **digital connectivity**, **communication**, and a poor **flow and accessibility** of information create an inadequate provision of and access to evidence
9. **Leadership support** and **organisational valuing of evidence** can drive EIDM, but **limited stakeholder engagement** in monitoring and evaluation may hinder evidence utilisation, potentially leading to divergent opinions and alignment challenges during decision-making
10. **Conflicting interests** and **resistance to change**, **high turnover** of policymakers and **workplace confidentiality** may affect the implementation of EIDM activities
11. **Delays in data provision**, poor **data quality** causing mistrust in administrative data, and data collection hurdles may affect the implementation of EIDM interventions and effective use of evidence in policymaking

Conclusions and implications

We believe this is the first systematic review to comprehensively identify and synthesise both the impact evaluation and broader empirical literature on applied EIDM interventions working through a range of mechanisms of change. We have brought together a diverse body of literature on interventions targeting EIDM in policymaking. We present a summary of the implications for practice and policy below.

We see a huge opportunity for the sector to increase the use of the full range of impact evaluation methods available to evaluate the impact or contribution of interventions targeting EIDM. The emerging counterfactual literature we identified is fragmented and lacks an agreed set of outcome measures of evidence-use, relying heavily on self-reported measures. There were also very few studies included for research question 2 that attempted to comprehensively assess contribution or impact of EIDM using a theory-based, qualitative approach, with a few notable exceptions. Although some of the types of interventions of relevance to this review are difficult to test using counterfactual impact evaluation methods, such as co-production approaches and awareness raising campaigns, recent RCTs such as Hjort and colleagues (2020) in Brazil and Mehmood and colleagues (2024) in Pakistan demonstrate that robust, counterfactual evaluations of EIDM interventions can successfully be done with promising results.

Few of the included impact evaluations combined a robust counterfactual approach with exploration of implementation, context and stakeholders' experience of participation in the relevant programmes. Where impacts on evidence use in policymaking were measured in impact studies, it was typically self-reported by those working in policy and with typically no discussion of what quality use of research evidence would look like. We encourage future studies to explore creative approaches and use triangulation wherever possible to capture changes to the use of evidence from different perspectives given the inherent complexity and challenges with measuring this process.

There are structural patterns in the evidence base in terms of what EIDM interventions are designed, implemented, and evaluated that hinder systems level change for evidence-use. We are missing evaluation evidence on programmes that work through building awareness of EIDM, getting agreement and changing structures and processes. We summarise these key gaps in terms of mechanisms and outcome areas for the included evaluations.

- **We identified few evaluations - and no impact evaluations - of programmes or policies that worked through the awareness mechanism** -specifically, building awareness for, and positive attitudes towards, EIDM, such as social marketing around the norm to use evidence and **awareness raising campaigns.**
- **We identified few evaluations - and no impact evaluations - of programmes or policies that worked through the agreement mechanism** – specifically building mutual understanding and agreement on policy-relevant questions and the kind of evidence needed to answer them, including co-production approaches and use of Delphi panels
- We also did not identify any impact evaluations that individually tested approaches involving policymaker – researcher interactions or changes to structure and processes.
- **None of the studies explored impacts on downstream, socio-economic outcomes** that might result from EIDM interventions.

However, there were several recurring themes emerging from the quantitative and qualitative synthesis that are worth highlighting. The benefits of demand-led intervention design and implementation components was a cross-cutting finding, and EIDM practice and research stands to improve if it centres evidence users more prominently. The significance of targeting programmes and exploring differences in impact depending on an organisation's existing

value and culture of research was also a finding that was reflected in both quantitative and qualitative synthesis.

The small number of impact evaluations evaluating the impact of capacity building programmes on the skills of policymakers provided tentative evidence on their potential to improve indicators of evidence use in policymaking, capability and opportunity to use evidence, although we were unable to explore quantitatively which design features were associated with greater impact. The qualitative synthesis found that structured, blended, and contextualised EIDM programs facilitated by skilled trainers in safe and convenient locations was suggested to enhance the effectiveness of these initiatives.

The qualitative synthesis suggested that capacity building initiatives should not only focus on building evidence users' capability to engage with the evidence but also promote evidence producers' ability to engage with users including understanding the policymaking environment. An impact evaluation of the Research-to-policy Collaboration model in the USA was one of the only impact studies to involve capacity building of researchers to build their knowledge of policy processes, increase their preparedness to work with government and on best practices for knowledge translation and demonstrated particularly promising results (Crowley et al. 2021a). While more impact research is needed to test such models in other contexts, it suggests such capacity building should be an important component of EIDM interventions that link researchers with policymakers.

Finally, the qualitative synthesis brought up several contextual challenges when delivering EIDM interventions with government actors in LMICs that clearly remain important barriers to successful intervention implementation and that should be considered at all stages of programme design and delivery. These include a lack of staff resources and capacities in government departments and among evidence brokers to support the production of evidence products, high-turnover of policymakers, poor internet and digital connectivity and limited accessibility to databases and journals. In addition, disease outbreaks, changes in the political climate and armed conflicts were some of the most common factors reported as disrupting EIDM interventions.

Considering all the above, we present a summary of implications for practice and for research below. We indicate where implications draw upon findings of just one or two impact evaluations and therefore generalisability may be limited.

Keywords

Evidence-informed decision-making, policymakers, interventions, low- and middle-income countries, systematic review, mixed methods, quantitative synthesis, qualitative synthesis.

Summary of implications for practice and research

Implications for practice	Implications for research
• To affect behaviour change, multi-mechanism and multi-component interventions may be required that target different elements of the evidence-to-policy journey (e.g., capacity-building paired with access). • When presenting impact evaluation results to policymakers, consider providing more statistical data on variation, presenting impact evaluation results side-by side with other results for comparison and providing cost effectiveness data to increase policymakers' responsiveness to the evidence (tested in two impact studies only). • Consider capacity building programmes to build the skills of policymakers to improve capabilities and use of research evidence. Design flexible, consistently structured EIDM capacity-building activities that are delivered with sufficient training materials, and blended learning techniques and tailored to the local context with facilitation by experienced and politically sensitive facilitators, to promote the successful implementation of these initiatives. Ensure that the duration and regularity of capacity-building workshops are sufficient for participants to achieve capacity development goals. It is also important to target evidence brokers with training to enhance their understanding of the policymaking process and best practice in knowledge translation.	• More impact evaluation evidence is needed, particularly in LMICs, including impact evaluations that evaluate both the intermediate outcomes of interest and evidence use. This will allow us to explore to what extent having an effect on multiple intermediate, behavioural factors - capability, opportunity, motivation - makes it more likely that evidence use during policy making will follow. It will also allow exploration of variation in effectiveness, including across different contexts. • Consider combining robust impact approaches with qualitative or mixed method exploration of implementation, context and stakeholders' experience of participation in the relevant programmes. Future studies would benefit from this design to understand if as well as how and why interventions are effective or not. • Further work needs to look at developing standardised, robust measures of evidence use in policy making, going beyond self-reported assessments. Future studies could also include multiple sources of information, including objective measures of evidence use, to triangulate against self-reported metrics.

Implications for practice	Implications for research
• Establish to what extent an organisation values research evidence and has an existing culture of evidence use when designing programmes. Consider attempting to measure it as a part of impact evaluations to explore variation in effects by these characteristics. • Choosing venues for meetings and workshops should balance convenience and safety for public officials and other stakeholders to encourage participation. Meetings and workshops to promote evidence use by policymakers need to be carried out at the convenience of relevant stakeholders (especially policymakers) to maximise attendance and participation. • Diverse stakeholders should be included in policy dialogues and advocacy efforts to improve the facilitation of mutual and collaborative engagement in implementing effective decision-making. • Establish effective communication and consistent follow-ups to improve the success of policy dialogues and capacity-building efforts. • Consider providing financial incentives to engage stakeholders in EIDM processes, particularly participation in meetings and workshops. • Ensure that evidence products such as policy briefs match policymakers' information needs and are structured in an easy-to-read and visually appealing way to promote engagement with and use of evidence. Consider that provision of policy briefs alone may	• There are structural patterns in the evidence base that need to be addressed through future funding of EIDM evaluation. New studies can meaningfully fill absolute evidence gaps in the awareness and agreement mechanisms. In addition, more evidence is needed in areas outside of health policy making. • Little is known about the effect of the quality of research evidence on evidence use from the evidence user's perspective. This is an important question for future studies to address. • Consider including studies published in languages other than English in future systematic reviews to facilitate learning from other evidence systems.

Implications for practice	Implications for research
not result in more evidence-accurate beliefs when readers have strong prior views (tested in one impact study only).	

1. Background

1.1 The problem, condition or issue

Effective and equitable public policies and programmes present a major pathway for socio-economic development. The systematic use of data and evidence during decision-making is a cornerstone in the design and implementation of such policies and programmes. Evidence can be used at various stages of the policy cycle. An idealised version of the policy cycle stages formed the basis of our coding framework is presented in Figure 1.

Figure 1: Illustrative policy cycle

Note: Policy cycle figure adapted from Jann and Wegrich (2017)

Evidence-informed decision-making (EIDM) can improve policies and programmes in at least three ways. First, from an economic perspective, the use of evidence allows decision-makers to zoom in on the most impactful and cost-effective policies maximising the gains of the investment of scarce public resources. Second, from a political perspective, using evidence and data transparently during decision-making can enhance accountability and citizens' trust in policymaking and proposed policies and programmes. Third, from an equity perspective, data and evidence can serve as a proxy for groups and viewpoints traditionally excluded from decision-making contexts. In order to advance policies and programmes to tackle inequities, data and evidence is required to substantiate the extent of the effects of these policies and how the public policy issues can best be addressed

However, data and evidence are not the only input for policy decision-making and other factors such as politics, contexts, ideologies, budget considerations, etc play a critical role. This has been acknowledged since the inception of the evidence movement in the health care sector, with the first models for evidence-based medicine explicitly defining evidence as one input for decision-making in a practice setting (with the other two being clinical expertise and patient values) (Sackett and Rosenberg 1995)). Decision-makers are usually supported by a range of policy and research professionals, both within government as well as in trusted organisations, who give advice, and prepare and collate information and evidence on their behalf. These actors also play crucial roles in the EIDM process.

1.2 The intervention

The systematic review was concerned with interventions able to enhance and support the use of evidence in policy decision-making. In the absence of an agreed-on overarching theory of how EIDM occurs, we applied and refined a conceptual framework developed by Langer and colleagues for the Art and Science of Using Evidence project (Langer et al. 2016; Nduku et al. 2024a). This framework covers interventions targeting evidence use in decision-making, categorised by six identified mechanisms of change, which are the processes through which EIDM can be achieved. The primary outcome of interest was the behaviour of using evidence, which can be further broken down into the intermediary components of capability, opportunity, and motivation (COM) to use evidence. We recognise that EIDM interventions can target

behaviour (B) change at different levels, such as individuals or organisations. These four elements—evidence use interventions, mechanisms of change, behavioural outcomes, and levels of intervention—served as the conceptual tools for examining the evidence base. Detailed descriptions of the framework and interventions are provided in the protocol (Nduku et al. 2024b).

We categorised evidence use interventions in the included studies based on the underlying mechanisms driving them. We identified six such mechanisms from previous studies (e.g., Gough et al. 2011; Nutley et al. 2007), barriers and facilitators research on decision-makers' use of evidence (e.g., Oliver et al. 2014), and existing empirical frameworks (e.g., Moore et al. 2011). Interventions were assumed to operate through individual mechanisms or a combination of mechanisms. Table 1 below outlines these six evidence-use mechanisms.

Table 1. Conceptual framework to structure EIDM interventions according to mechanisms of change (source: Langer et al. 2016)

Mechanism	Description	Example of linked activity
Awareness (M1)	Building awareness for, and positive attitudes towards, evidence-informed decision-making (EIDM). This mechanism emphasises the importance of decision-makers' valuing the concept of EIDM.	● Social marketing of the norm to use evidence (e.g., Sense About Science) ● Awareness raising campaigns (e.g., March for Science)
Agree (M2)	Building mutual understanding and agreement on policy-relevant questions and the kind of evidence needed to answer them. This mechanism emphasises the importance of building mutual understanding and agreement on policy questions and what constitutes fit-for-purpose evidence.	● Co-production approaches ● Delphi panels ● Inter-professional education
Access (M3)	Providing communication of, and access to, evidence. This mechanism emphasises the importance of decision-makers receiving effective communication of evidence and convenient access to evidence.	● Knowledge repositories ● Communication campaigns and strategies ● Policy briefs

Interact (M4)	Interaction between decision-makers and researchers[1]. This mechanism emphasises the importance of decision-makers interacting with researchers to build trusted relationships, collaborate, and gain exposure to a different type of social influence.	• Networks and communities of practice • Events and conferences (e.g., science cafés) • Knowledge brokers
Skills (M5)	Supporting decision-makers to develop skills in accessing and making sense of evidence. This mechanism emphasises the importance of decision-makers having the necessary skills to locate, appraise, synthesise evidence, and integrate it with other information and political needs etc.	• Capacity-building (e.g., workshops and formal training courses) • Mentoring programmes • Adult learning • Online learning
Structure & Process (M6)	Influencing decision-making structures and processes. This mechanism emphasises the importance of decision-makers' psychological, social, and environmental structures and processes (for example, mental models, professional norms, habits, organisational and institutional rules) in providing means and barriers to action.	• Secondments • Organisational supports (e.g., embedded knowledge brokers) • Rapid Response Services • Institutionalisation (e.g., National Evaluation Systems) • Evidence checklists

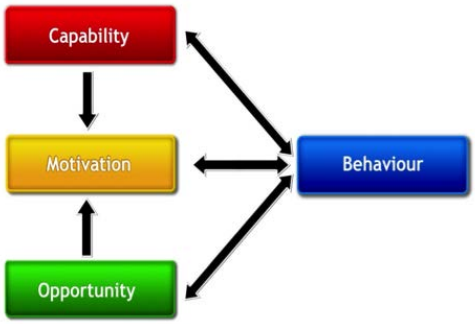
1.3 How the intervention might work

Increasing the use of evidence by decision-makers relies on behaviour change. Specifically, this involves decision-makers using evidence to influence policy debates, policy choices, and policy implementation. Michie and colleagues (2011) developed a method to characterise interventions and link them to an analysis of the targeted behaviour, the COM-B model. In this 'behaviour system', three essential conditions—capability, opportunity, and motivation (COM)—interact to generate behaviour (B), which in turn influences these components. These conditions influencing behaviour (B) change therefore constitute the intermediary outcomes in addition to the main outcome behaviour of evidence-informed decision-making. Any given intervention might alter one or more components in this 'behaviour system' (see Figure 2). Our

[1] Use of the term researcher denotes anyone conducting research and is not confined to appointed individuals in official research positions.

systematic review has adopted Michie's definitions of capability, motivation, and opportunity, which we define as the capability, motivation, and opportunity to use evidence[2]

.**Figure 2: Components of behaviour change (source: Michie et al. 2011))**



Behaviour change can occur at both the organisational and individual levels. For the purposes of this systematic review, behaviour was organised into four levels consisting of:

1. Individual behaviour
2. Team-level behaviour
3. Organisational behaviour (e.g., a government ministry, an individual NGO)
4. Institutional behaviour (e.g., government-wide, system-specific)

There is no theoretical consensus explaining how interventions can effectively influence decision-makers' use of evidence. Laurenz and colleagues (2016) therefore integrated the individual components of this conceptual framework to create a simple logic model that outlines how evidence use interventions are assumed to affect decision-makers' consideration of evidence (Figure 2). This model illustrates how interventions may influence evidence use through a single mechanism or a combination of multiple mechanisms. By applying these mechanisms, interventions can affect one or more components of behaviour change, namely capability, opportunity, and/or motivation to use evidence. These COMs then facilitate the final outcome of evidence use. A COM component can therefore be understood as an intermediate outcome on the causal pathway to the final outcome. COMs can work either in isolation or in combination.

Using this logic model allowed us to categorise interventions according to the applied intervention mechanisms (M1 – M6, outlined in Table 1). We could then unpack the impact of these interventions on evidence use through a COM configuration as intermediate outcomes.

[2] Capability is defined as the individual's psychological and physical capacity to engage in the activity concerned. It includes having the necessary knowledge and skills. Motivation is defined as all those brain processes that energise and direct behaviour, not just goals and conscious decision-making. It includes habitual processes, emotional responding, as well as analytical decision-making. Opportunity is defined as all the factors that lie outside the individual that make the behaviour possible or prompt it (Michie et al. 2011).

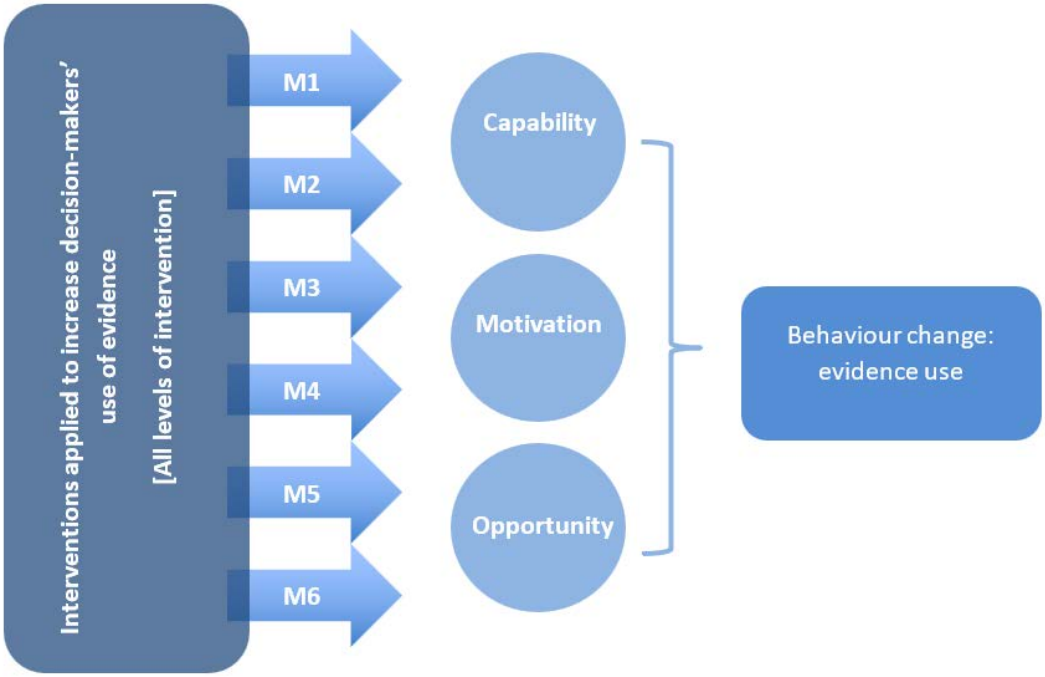


Figure 3: EIDM intervention logic model based on Science of Using Science conceptual framework (Langer et al. 2016)

1.4 Why it is important to do this review

Oliver and colleagues' (2022) systematic review of research-policy engagement activities, identified a significant expansion of initiatives to encourage greater use of evidence in

decision-making since 2010, finding 1,923 initiatives being undertaken by 513 organisations globally in 2020. This included initiatives to build decision-maker skills around evidence use, promoting engagement through incentives and rewards and building professional partnerships. However, they found that a significant proportion of this dynamic activity is going unevaluated. This review focused on systematically mapping research-policy engagement initiatives and existence of associated evaluations in the UK only, with a small sample of initiatives outside the UK. The authors also identify that a useful next step would be to more fully synthesise this evidence base for the different activities they identified in different contexts. Thus, a systematic review of the impact of research-policy engagement evaluations globally was deemed a valuable extension of this review.

In addition, and despite Oliver and colleagues' (2022) findings on the amount of activity going unevaluated, there are an increasing number of robust counterfactual evaluations that test the impact of strategies to encourage EIDM using experimental and quasi-experimental methods. For example, Hjort and colleagues (2020) conducted an experiment with 1,818 municipality mayors in Brazil, where half the mayors were invited to attend a research-information session on the effectiveness of taxpayer reminder letters, as demonstrated by consistent RCT evidence. Fifteen to twenty-four months later, they found that the simple approach of providing access to research evidence increased the probability that the tax policy was implemented by 10 percentage points. In the USA, Crowley and colleagues (2021) evaluated the impact of a formal outreach model between federal lawmakers working on child and family policy issues and researchers, to encourage congressional use of research evidence. They observed positive impacts on a range of evidence use related outcomes, including research use observed in legislation brought in by the treatment group of congressional offices as well as greater perceived value of research for understanding policy issues. There is also a valuable body of other types of primary research around initiatives to strengthen EIDM, including cross-country efforts such as Vogel and Punton (2018) and Lester and colleagues (2020), that explore questions of how, when and for whom these initiatives are effective.

Other recent studies have quantitatively explored the factors influencing the use of evidence in decision making. For example, Xu and colleagues (2024) investigated the preferences of United States (US) government civil servants for evidence with different characteristics. They found that state-level civil servants preferred programmatic evidence local to their state, indicating positive effects across various demographic groups and that was more recent. They also preferred research created by university teams or independent government teams. DellaVigna and colleagues (2024) explored how 30 US cities adopted nudge-focused RCT results into policy. They found low rates of adoption of RCT results into policy (27%). The key factor influencing adoption was whether the communications nudge tested in the RCT were implemented via preexisting communication processes compared to introducing a new communication. This was mainly attributed to organisational inertia as modifications to already established systems are incorporated into ongoing processes more easily.

To facilitate learning from this dynamic body of research, Nduku and colleagues' (2024a, in press) evidence gap map (EGM) collected, organised, and visualised the available empirical, global evidence on interventions to support evidence-informed policymaking across different policy sectors. The map indicates that despite a global evidence base of more than 600 studies, there is a lack of evidence in several areas, including mechanisms working through raising awareness of EIDM. Empirical studies in this area typically focus on measuring

intermediate outcomes of capability, motivation and opportunity to use evidence rather than attempting to measure actual change in evidence use. Additionally, they found synthesis gaps of the evaluation literature across the six mechanisms of change that they explored in the map. While the growth of EIDM and initiatives to encourage the use of evidence by policymakers is exciting, it is not clear which of these programmes and initiatives to support evidence use work best and why. This indicates there are several areas where research is needed, including to understand the contexts that can support evidence use in decision-making and how to improve practice in this area.

The FCDO has approved funding for research on this topic, to address some of these research gaps and to inform EIDM practice for themselves and their partners. Topics of interest include when, where and how evidence is used in policymaking, the barriers and facilitators to evidence use, and what works to address these barriers and drive the uptake of evidence by decision-makers. A systematic review of the existing evaluation literature on EIDM initiatives in policymaking was therefore agreed as a first step to identify mechanisms, policies and programmes with promising evidence of effectiveness, and areas where further primary research would help consolidate the evidence base.

2 Objectives

We aimed to collect, assess, and synthesise all the available empirical evidence on what works to support EIDM by policymakers. In doing so, we aimed to answer two research questions:

1. What are the impacts of interventions to support evidence-informed decision-making by policymakers?

2. What are the factors which have influenced:

    a. the impact of these interventions in low-and-middle income countries LMICs?

    b. their design and implementation in LMICs?

Specifically, we were interested in studies which set out to evaluate interventions aiming to increase policymakers' use of evidence, for example capacity-building programmes to enhance decision-makers' skills to access evidence or interventions aiming to connect decision-makers and researchers. We did not search for evaluations of interventions that focused only on enhancing the supply of research, such as financial incentives to produce better-quality or more research. While supply-side interventions can be an important tool to enhance EIDM, the focus of this systematic review was on the more direct use of evidence by policy decision-makers. Interventions such as research co-production, engagement and rapid response services were of relevance to this review, however, as they target decision-makers' demand for evidence.

By answering these research questions, we aimed to meet the following objectives:

- To estimate the overall impact and relative effectiveness of different evidence use interventions;

- To identify factors or configurations of factors that support or hinder the effectiveness of these interventions in LMICs;
- To identify gaps and areas for future primary research regarding the design, implementation, and evaluation of these interventions.

3 Methods

We conducted a systematic review of the existing empirical evidence (Gough et al. 2017) following guidelines for systematic reviews in social systems published by the Campbell Collaboration (2020). We used an 'effectiveness plus' (Snilstveit 2012) approach with two parallel review modules to answer the review questions on the extent to which interventions have been effective at supporting EIDM as well as what factors influence their impact. An effectiveness plus approach combines answering questions of what works with an equal emphasis on why and how it works, for whom, in what context, etc

To answer the first review question, we included primary studies that measured the effects of interventions and whose design could reliably attribute observed effects to the applied interventions, specifically Randomised Controlled Trials (RCTs) and Quasi-Experimental Designs (QEDs). We synthesised individual effects into overall estimates of treatment effects using statistical meta-analysis where possible. For the second review question, we included any form of empirical evaluation of an evidence use intervention that addressed research question 2 and applied qualitative evidence synthesis approaches to synthesise the results of these evaluation studies.

3.1 Criteria for considering studies for this review

We used detailed inclusion criteria to determine what studies to include in this systematic review. We adopted the PICOS (Population, Intervention, Comparator, Outcome and Study design) framework to develop our inclusion criteria. The inclusion criteria defined the precise characteristics of the studies that were included in the review. We excluded all studies not meeting these criteria from this review. As indicated above, we defined two sets of inclusion for research question (1) and (2) respectively. We provide an overview in Table 2, followed by a discussion of each individual criterion.

Table 2: Overview of inclusion criteria for the systematic review

	Review question 1 **What are the impacts of interventions to support evidence-informed decision-making by policymakers?**	**Review question 2** **What are the factors that have influenced the design, implementation, and impact of interventions to support evidence-informed decision-making by policymakers in LMICs?**

Population	Country: Studies in any country	Country: LMICs as defined by the World Bank classification of economies.
	Time: There is no limitation on the publication date of the study. People: Policymakers	
Intervention	Applied interventions to support the use of evidence in policymaking. Programmes, strategies, actions, practices, etc that actively intervene in the current decision-making status quo with the aim of making decision-making more receptive to evidence use.	
Comparator	Studies that identify a comparison/control group	N/A
Outcome	Evidence use outcomes as per conceptual framework.	
Study design	Experimental designs (RCTs) or quasi-experimental designs with non-random assignment that allow for causal inference.	Any form of empirical evaluation of an evidence use intervention where 'empirical' is defined as a study applying a structured approach to both data collection and data analysis.

3.1.1 Types of studies

For review question (1), we included studies that assessed the effects of interventions using experimental designs or quasi-experimental designs with non-random assignment that allow for causal inference, in line with Lwamba and colleagues (2021). Specifically, we included the following:

- Randomised controlled trials (RCTs), with assignment at individual, household, community, or other cluster level, and quasi-RCTs using prospective methods of assignment such as alternation.
- Non-randomised studies with selection on unobservables:

i. Regression discontinuity designs, where assignment is done on a threshold measured at pre-test, and the study uses prospective or retrospective approaches of analysis to control for unobservable confounding.

ii. Studies using design or methods to control for unobservable confounding, such as natural experiments with clearly defined intervention and comparison groups, which exploit natural randomness in implementation assignment by decision-makers (e.g., public lottery) or random errors in implementation, and instrumental variables estimation.

- Non-randomised studies with pre-intervention and post-intervention outcomes data in intervention and comparisons groups, where data are individual-level panel or pseudo-panels (repeated cross-sections), which use the following methods to control for confounding:

    i. Studies controlling for time-invariant unobservable confounding, including difference-in-differences, or fixed- or random-effects models with an interaction term between time and intervention for pre-intervention and post-intervention observations.

    ii. Studies assessing changes in trends in outcomes over a series of time points (interrupted time series, ITS), with or without contemporaneous comparison (controlled ITS), with sufficient observations to establish a trend and control for effects on outcomes due to factors other than the intervention (e.g., seasonality).

- Non-randomised studies with control for observable confounding, including non-parametric approaches (e.g., statistical matching, covariate matching, coarsened-exact matching, propensity score matching) and parametric approaches (e.g., propensity-weighted multiple regression analysis).

We excluded all studies from the first review question that did not fall under any of the criteria defined above. Examples of excluded study types are studies without a comparison group that used pre-intervention and post-intervention outcome data only, simulation studies that aimed to predict the effect of a certain intervention, observational studies with no control for selection bias, life-cycle analysis, process evaluations, and acceptability studies.

For review question (2), we included a broad range of different study designs covering all empirical evaluation designs where 'empirical' was defined as a study applying a structured approach to both data collection and data analysis. This covers both predominantly quantitative and predominantly qualitative evaluation designs. This approach ensured that our systematic review included a broad set of evidence on EIDM in LMICs in relation to our second review question. To be eligible for inclusion in our review question (2), studies must have explored the factors that influenced the design, implementation, and impact of an applied EIDM intervention.

We excluded the following types of evidence and study designs for either review question:

- Conceptual and theoretical studies, for example frameworks and models, not based on empirical data.

- Opinion pieces, commentaries, and op-eds.
- Studies merely reporting data, for example monitoring data and administrative data without a structured analysis.
- Studies reporting an analysis of data without a structured approach to collect and quality assure the available data, for example secondary analysis, big data.
- Studies reporting on both data collection and analysis, but where no EIDM intervention was assessed.
- We also excluded certain types of publications:
    - Newspaper articles, blogs, opinion pieces, other social media
    - Books and book chapters.
    - Honours thesis

1.1.1 Types of participants

We included studies that focused on the populations specified below:

Geography: For research question (1), we included studies in any country. For research question (2), we only included studies that assessed an EIDM intervention conducted in an LMIC as defined by the World Bank classification of economies[3]. Where studies took place in multiple countries or regions including HIC countries or regions, their empirical data needed to be disaggregated for LMICs or regions for the study to be included

Time: There was no limitation on the publication date of the study.

People: We included policy decision-making behaviours and processes at the following levels:

1. individual
2. team
3. organisational (e.g., a government ministry / agency)
4. institutional (e.g., government-wide, system-specific)

Policymakers for the purpose of our review could refer to any individual working in a government department at any level of government (i.e. national, and sub-national), including elected officials or civil servants that either could or should contribute to a policy process. It also covered individuals working in multilateral organisations, such as agencies and funds in the United Nations system, the World Bank and Inter-American Development Bank. We did not place restrictions around the concept of 'policy decision-making behaviours and processes' and this remained open to any form of decision-

[3] https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2022-2023

making behaviours and processes, e.g., starting or amending a policy, stopping a programme, changing the process for making decisions.

Language: We considered only English publications due to resource constraints, and so we may have missed relevant studies published in other languages. However, the evidence map that this systematic review used as a source of studies did include studies in the following languages: Arabic, Chinese, English, French, Portuguese, Russian, and Spanish. The map found a significant proportion of the included studies were published in English, with 25 in Chinese and two in Portuguese. Both academic and grey literature were eligible for inclusion in the review.

1.1.2 Types of intervention

We only included studies which set out to evaluate or assess the effects of interventions aiming to increase policymakers' use of evidence. Such interventions can take many forms, for example capacity-building programmes to enhance decision-makers' skills to access evidence or interventions aiming to connect decision-makers and researchers (e.g., science cafés). We included all types of such EIDM interventions, and we applied the mechanism structure introduced above to group interventions into categories for synthesis. We included either single or multi-component EIDM interventions, regardless of scale or intensity. This could include nudge type interventions if the nudge targeted EIDM. If an intervention of any scale targeted policymakers' decision-making more broadly it was not included in the review, for example, Banuri and colleagues (2019).

Interventions needed to focus on policymakers' use of evidence. We defined evidence in this context broadly as research-based evidence (where research was defined as a systematic investigative process employed to increase or revise current knowledge). For the purposes of this systematic review, we employed a broad conceptualisation of research that included not only scientifically based research but extended to administrative data and statistics collected in the course of service and benefit provision (such as school-level datasets). We excluded studies that focused on the use of information more generally, for example those that provided opinion surveys, citizen preference surveys and market research.

We excluded interventions that focused on the uptake or implementation of evidence-based practices or programmes (e.g., interventions to increase doctors' washing of hands). In the implementation science literature, there are many evaluations of interventions in which evidence use is understood as the adoption of an evidence-based practice. The targeted behaviour change in this case is practitioners' implementation of a new practice, which happens to be evidence-based. Gray and colleagues (2013) term this type of intervention as fostering the uptake of 'empirically supported interventions (ESI)', as opposed to interventions aiming to increase EIDM.

We also excluded supply-side interventions, such as financial incentives to produce more or better-quality research. While supply-side interventions are an important tool to enhance EIDM, for example, by increasing the policy-relevance of research, the focus of this systematic review was on the direct use of evidence by policy decision-makers (the art and science of using evidence). Supply-side interventions in this context were outside the scope of this review as they do not directly target decision-makers and rather aim to improve the research enterprise itself (such as through funding channels) or to change researchers' behaviour. It is

beyond the project's ability to assess the lengths of the causal chain from this change in research supply to decision-makers' use of evidence. Interventions such as co-production and engagement were, however, of relevance to this review in case they targeted decision-makers' demand for evidence and were not narrowly focused on enhancing the supply of research.

Finally, we excluded studies that used experimentation or other methods solely to attempt to reveal policymakers' beliefs and biases when interpreting data or research studies or to understand decision-making. However, if they also evaluated the effects of an intervention aiming to increase those policymakers' use of evidence or opportunity, motivation, or capability to do so, we included them in the review. An example study to illustrate this criterion is Vivalt and Colville (2023). They ran experiments with policy makers and researchers attending World Bank and IDB workshops to ascertain their prior beliefs about intervention effectiveness, before exposing them to new evidence, randomly varying whether the evidence presented was positive or negative or more or less certain. The goal was to explore the presence of behavioural biases, in this case asymmetric optimism and variance neglect, and therefore the results of this part of the experiment were out of scope of the review. However, they also tested a mechanism to overcome this bias, specifically providing more detailed statistical information, which is in scope and therefore included in this review.

3.1.2 Types of outcome measures

We included studies that reported data on either primary or intermediary evidence use outcomes. As indicated above, studies merely assessing the uptake of evidence-based interventions or practices (e.g., washing of hands) were excluded from our review. Essentially, this approach is synonymous with evaluating a common adoption of a new practice and its performance. If studies aimed to evaluate an intervention to increase evidence use, outcomes needed to be structured to capture changes in evidence use, that is the practice of EIDM (Thompson et al. 2007). In our systematic review, the targeted behaviour change was the use of evidence rather than the adoption of individual evidence-based practices. Unfortunately, this distinction is often not made explicit in the wider literature. For this systematic review, we analysed the reported outcome measures in the included studies in order to ensure that the outcomes met our definition of EIDM.

Primary outcomes: This refers to outcomes assessing whether decision-makers use of evidence has changed as a result of the applied EIDM intervention. Our systematic review focused on two primary outcomes of interest.

(1) Evidence Use

This refers to the practice of evidence-informed decision-making (EIDM). We defined EIDM as:

> *"a process whereby multiple sources of information, including the best available research evidence, are consulted before making a decision to plan, implement, and (where relevant) alter policies, programmes, and other services"* (Langer et al. 2016).

EIDM or evidence use as an outcome is therefore not the alignment of the policy content with the available evidence-base, but the extent to which the policy formulation process was

informed by evidence. Or, to put it differently, EIDM as an outcome implies that the decision-maker has engaged with the evidence and acted upon it in some way. Acting upon it may not necessarily mean that the evidence has been used to inform policy or practice developments. It could simply mean that the findings have been considered during policy discussions. This indicates that a policy decision in which evidence was considered but not fully integrated should still be considered as evidence informed.

Furthermore, there are different ways in which evidence can inform a decision. Based on Weiss' (1979) typology of evidence use, two types of evidence use apply to this study:

> *Instrumental evidence use* is a direct use of evidence, knowledge, and insights. It refers to the concrete application of evidence, such as in the taking of specific policy decisions or implementation of practice interventions.
>
> *Conceptual evidence use* highlights evidence's enlightenment function. This is when evidence influences how policymakers and practitioners think about issues, problems, or potential solutions. Evidence findings may change their opinion but not necessarily a particular action.

Relevant indicators for the primary outcomes of evidence use include but are not limited to: research evidence being referenced in policy documents, or utilised in programme or guideline development; EIDM indicators, e.g., Global EIDM index (Dobbins et al. 2009); evidence of decision-makers' behaviour change, e.g., accessing, appraising, considering evidence as part of a decision-maker's daily practice.

Lastly, evidence use for policy decision-making can occur at two stages: first, at the policy design stage and, second, at the policy implementation stage. For evidence use to influence socio-economic development, both policy design *and* implementation have to be effective and equitable. Where possible, we coded evidence use outcomes for the respective stage in the policy cycle. This information was used to answer the broader question on design and implementation of EIDM. For the meta-analysis, we grouped studies by whether they measured evidence use for policy design or evidence use for policy implementation.

(2) Socio-economic impact[4]

This refers to the impact of an increased use of evidence on development indicators. For example, a sustained practice of EIDM can be associated with better health outcomes such as reduced mortality rates. Likewise, evidence use can affect educational outcomes such as increased test scores and grade pass rates. Indicators of development impact are not prespecified and can be cross-sectoral covering all 17 SDGs.

Intermediary outcomes: This refers to outcomes assessing intermediate conditions and activities that enhance the likelihood of decision-makers using evidence. As above, we separated intermediate outcomes using Michie and colleagues' (2011) COM model of

[4] We did not expect many studies covering the pathway from evidence use to socio-economic impact. Arguably, this last step in the causal chain is beyond the control of the applied EIDM intervention and as a result the applied intervention should not be assessed against outcome.

behaviour change (Table 3). These could be measured through self-report by policymakers but could also be measured through researchers' perceptions.

Table 3. Intermediary outcomes

1. Capability to use evidence	This refers to decision-makers having the required psychological and physical capacity to engage in EIDM. It includes having the necessary knowledge and skills. Indicators of this intermediate outcome include test scores evaluating respondents' knowledge of EIDM concepts as well as critical appraisal skills.
2. Motivation to use evidence	This refers to the brain processes that energise and direct behaviour, not just goals and conscious decision-making. It includes habitual processes, emotional responding, as well as analytical decision-making. Indicators of this intermediate outcome include attitudes towards evidence or decision-makers' reported intention to use evidence.
3. Opportunity to use evidence	This refers to all the factors that lie outside the decision-makers' control that make the EIDM possible or prompt it. Indicators of this intermediate outcome include access to evidence databases or organisational processes for EIDM.

3.2 Search methods for identification of studies

For this review, we updated the search of an existing evidence gap map that fully overlapped with the review's scope and was conducted in January 2023 (Nduku et al. 2024a). The search strategy followed by Nduku and colleagues (2024a) designed a scientific and exhaustive search for evidence with the help of an information scientist. The search strategy was based on three pillars: (i) an exhaustive and replicable search of the indexed academic literature; (ii) an in-depth search of available grey literature sources; and (iii) a forward and backward search including key informants.

For this review, we first updated the searches for all academic evidence on EIDM in the eight academic databases including PubMed, Web of Science, Scopus, and EBSCO Host (ERIC, PsycINFO, Business Source Complete, Communication and Mass Media complete, and Political Science Complete). A combination of key terms was adopted and included **evidence use terms** (e.g., "evidence use" OR "evidence utilisation" "research use" OR "research utilisation" OR "knowledge use" OR "knowledge utilisation" OR "evaluation use" OR "evaluation utilisation"); **evidence into action terms** (e.g., "evidence broker*" OR "evidence champion*" OR "research broker*" OR "research champion*"); **evidence-informed decision-making terms** (e.g., "evidence-based" OR "evidence-informed"); and **policy- and decision-**

making terms (e.g., policy OR policies OR decision* OR “decision-making” OR “decision making” OR “policy-making” OR “policy making” OR policymaking).

Second, we also carried out search updates in grey literature sources such as websites of specialist organisations to find studies meeting our inclusion criteria that are outside of the indexed academic literature and that were published since the previous search was conducted, from January 2023 onwards. These searches utilised key words only given the websites’ limited search capabilities. Third, we conducted backward and forward citation-tracking of key authors and publications on Google Scholar for all newly identified studies. We did not conduct citation screening of included studies due to resource constraints given the size of the evidence in the map used as the foundation for this systematic review which constitute 672 studies. Appendix A presents the comprehensive search strings applied whilst Appendix B presents a full list of all the academic and grey literature search sources.

3.3 Data collection and analysis

3.3.1 Selection of studies

We used review management software (EPPI-Reviewer 4) to manage the entire review process. We imported all potentially relevant citations gathered from the academic sources above into EPPI-Reviewer 4. They were subjected to a detailed screening process to assess eligibility using the inclusion criteria highlighted above, and we recorded decisions made about each citation on the same platform. We recorded search results from organisational websites and the citation searches in MS Word and only transferred studies deemed to be relevant for the review to EPPI-Reviewer 4. We manually captured studies that were not already on EPPI-Reviewer on the software. Before proceeding with screening, we excluded all duplicates of titles from the review using the duplicate control function on EPPI Reviewer 4.

We tested reviewer bias (interrater reliability) at the start of each stage of the screening process using a Kappa analysis (CEE 2013). Two reviewers screened a common random sample of 10% of abstracts. We calculated the level of agreement between the number of articles rejected or accepted by the Kappa statistic on a scale that ranges from 1 (perfect agreement) and -1 (strong disagreement). The individual screening was only permissible once we achieved a Kappa statistic score of 0.85 or above. A third-party arbitrator resolved any disagreements at both stages of the screening process. We report the screening process using a PRISMA flow chart in the results section.

3.3.2 Data extraction and management

We used a predefined data extraction tool to extract data systematically and transparently from the included primary studies. We present the data extraction tool in the protocol. We migrated the tool into EPPI-Reviewer 4 to extract the information required for the evidence synthesis. We entered the data directly into the EPPI-Reviewer database. We extracted data from full-text reports on the following:

1. Descriptive data including authors, publication date and type, as well as other information to characterise the study including country, type of intervention, outcome, population, and context.

2. Information on intervention design, implementation fidelity, factors that influenced design, implementation and impact, and possible programme mechanisms.

We also mapped studies that were included to address research question one according to where in the policy cycle the interventions were seeking to drive evidence use. Appendix C.2 describes the tool for the descriptive extraction. We defined a policy process as a sequence of steps through which policies are developed, implemented, and assessed, usually understood and organised in a cycle (Jann and Wegrich, 2017). The steps in the policy cycle for the purposes of this review were:

- Agenda setting: Identifying issues that require policy attention
- Policy formulation: Developing potential solutions to address identified issues
- Decision-making: Choosing a course of action from available options
- Implementation: Putting the chosen policy into practice
- Evaluation: Assessing the outcomes and impacts of the implemented policy

To ensure consistency of coding quality, two reviewers piloted the data extraction tool, working independently on a random sample (10%) of eligible studies selected to test the tool on the complete range of the included impact evaluation designs and methods. We repeated the process until we achieved a very high level of consistency, defined by a minimum Kappa statistic score of 0.85, in the reviewers' application of codes and the tool was deemed final. Following the piloting stage, individual reviewers coded the remaining studies, with a subset of these coded by different combinations of two reviewers independently extracting information from each study and then comparing their decisions to minimize coder drift. We resolved any uncertainties or disagreements via discussion, with a third-party arbitrator resolving any outstanding disagreements.

3.3.3 Critical appraisal

For review question (1), we applied a critical appraisal tool to assess the impact of bias on the trustworthiness of primary impact evaluations included in the systematic review. Trustworthiness refers to the confidence of the review team that the findings reported in the included studies used for the synthesis were rigorous and credible. To assess the risk of bias of the primary studies, we used an adapted version of the Cochrane risk of bias tool (ROB 2) for randomised studies of interventions (Higgins et al. 2016) and the ROBINS-I tool for assessing risk of bias in non-randomized studies of interventions (Sterne et al. 2016). We have previously used this adapted version of the tool in international development reviews, including a Campbell Collaboration systematic review (Stewart et al. 2015; Ategeka et al. 2022). We provide the tool in the protocol (Nduku et al. 2024b) and Appendix C.3 also presents the critical appraisal tool.

Sterne and colleagues (2016) used a domain-based risk of bias tool covering the following six indications of trustworthiness: (i) selection bias; (ii) confounding bias; (iii) bias due to departures from applied interventions; (iv) bias due to missing data; (v) bias due to measurement of outcomes; and (vi) bias due to selection of the reported result. Each domain of bias received a low, moderate, high or critical risk of bias rating, allowing for a transparent calculation of the overall risk of bias score for each study. We included studies with a critical risk of bias in the review but excluded them from the synthesis. We piloted the risk of bias tool using a similar approach to that used for the piloting of the data extraction tool. Two reviewers

independently assessed each study and then came together to compare their decisions. Where these reviewers disagreed about the risk of bias rating for a particular study, a third reviewer was consulted.

We used the following decision rules:

> A single critical risk of bias judgement in any of the domains leads to a critical overall judgement.
> 2 or more high risk of bias judgements in any of the appraisal domains lead to an overall high risk of bias rating.

2 or more moderate risk of bias judgements in any of the appraisal domains lead to an overall moderate risk of bias.

For review question (2), we conducted critical appraisal assessments of the included studies based on the three distinct groups: qualitative/mixed methods evaluations, practitioner reflections and policy case studies. Appendix C4 provides the detailed tool used to evaluate the studies focusing on methodological rigor, design defensibility, context and reflexivity. The tool applies a set of methodological appraisal criteria, assessing whether the research design is clearly specified and justified. This includes evaluating whether the study provides a strong rationale for its design, clearly articulates its research question, and acknowledges potential limitations. The appraisal criterion considered aspects like the justification for study design, appropriateness of data collection methods, and the clarity of research objectives. Additionally, the tool incorporates a criterion for assessing the research sample, ensuring that studies include an appropriate and representative sample size while minimizing biases.

Two reviewers independently assessed the studies with a third reviewer randomly selecting studies for quality appraisal. We used similar decision rules as quantitative studies to categorize the studies into high, moderate, low or critical quality –

- 2 or more high critical appraisal judgements in any of the 6 appraisal domains lead to an overall high risk of bias / low quality rating.
- 2 or more moderate critical appraisal judgements in any of the 6 appraisal domains lead to an overall moderate risk of bias / moderate quality rating.
- For a study to be rated of low risk of bias / high quality at least 5 appraisal domains need be rated as of low critical appraisal.

3.3.4 Criteria for the determination of independent findings

Given the small number of included studies, it was not feasible to include dependent findings in any analysis (as we would lack sufficient power to detect effects). We dealt with dependent effect sizes through data processing and selection techniques, which utilise several criteria to select one effect estimate per study.

Complex data structures are a common occurrence in meta-analyses of impact evaluations. There are numerous scenarios through which these complex structures with dependent effect sizes might occur. For example, there could be several publications that stem from one study, or several studies based on the same data set. Some studies might have multiple treatment arms that are all compared to a single control group. Other studies may report outcome measurements from several time points or use multiple outcome measures to assess related

outcome constructs. All such cases yield a set of statistically dependent effect size estimates (Borenstein et al. 2009).

The research team assessed the extent to which relationships exist across the studies included in the review and avoided double counting of identical evidence by linking papers before data analysis. Where we had several publications reporting on the same effect, we used effect sizes from the most recent publication. We utilised information provided in studies to support these assessments, such as sample sizes, programme characteristics and key implementing and/or funding partners.

We extracted effects reported across different outcomes or subgroups within a study, and where information is collected on the same programme for different outcomes at the same or different periods, information on the full range of outcomes over time was extracted. Where studies reported effects from multiple model specifications, we adopted the author's preferred model specification. If this was not stated or was unclear, we extracted effect data from the most precise model (e.g., the model with the smallest standard error). Where studies reported multiple outcomes or evidence according to sub-groups of participants, we recorded and reported data on relevant sub-groups separately. Further information on criteria for determining independent effect sizes is presented below.

We dealt with dependent effect sizes through data processing and selection techniques, which utilised several criteria to select one effect estimate per study. For studies with outcome measures at different time points, we followed De La Rue and colleagues (2017) and synthesise outcomes measured immediately after the intervention (defined as 1-6 months) and at follow-up (longer than six months) separately. If multiple time points exist within these periods, we adopted the most recent measure. We anticipated that some of the interventions that we included in our review would be ongoing programmes and the follow-up would, therefore, reflect duration in a programme rather than time since the intervention. When such studies report outcome measures at different time points, we identified the most common follow-up period and included the follow-up measures that match this most closely in the meta-analysis. When studies include multiple outcome measures to assess related outcome constructs, we followed Macdonald and colleagues (2012) and selected the outcome that appeared to reflect the construct of interest most accurately without reference to the results.

If studies included multiple treatment arms with only one control group and the treatments represent separate treatment constructs, we calculated the effect size for treatment A versus control and treatment B versus control and include them in separate meta-analyses according to the treatment construct. Where different studies report on the same programme but use different samples (e.g., from different regions, or separately for men and women) we included both estimates, treating them as independent samples, provided effect sizes are measured relative to separate control or comparison groups.

3.3.5 Measures of treatment effect

We extracted quantitative data for outcome measures, including outcome descriptive information, sample size in each intervention group, outcomes means and standard deviations, and test statistics (e.g., t-test, F-test, p-values, 95% confidence intervals) using Excel (see the preliminary data extraction form in Appendix C.1). We stored effect size data and conducted any necessary cleaning in Excel. Following the screening and descriptive data

extraction process of ensuring consistency in coding quality, two reviewers piloted the effect size data extraction tool, working independently on a random sample (10%) of included studies to test the tool across a range of the included impact evaluation designs and methods. Once a minimum Kappa statistic score of 0.85 was achieved, following a round of repeating the process for the tool was considered to be finalised. After the piloting stage, individual reviewers coded the remaining studies and a third reviewer checked all data extracted.

An effect size expresses the magnitude (or strength) and direction of the relationship of interest (Valentine et al. 2015; Borenstein et al. 2009). We extracted data from each study to calculate standardised effect sizes for cross-study comparison wherever possible. For continuous outcomes comparing group means in a treatment and control group, we calculated the standardised mean difference (SMDs), or Cohen's d, its variance and standard error using formulae provided in Borenstein and colleagues (2009). An SMD is a difference in means between the treatment and control groups divided by the pooled standard deviation of the outcome measure. Cohen's d can be biased in cases where sample sizes are small.

Therefore, in all cases we adjusted using Hedges' method, adjusting Cohen's d to Hedges' g using the following formula (Ellis, 2010):

$$g \cong d\left(1 - \frac{3}{4(n_T + n_C) - 9}\right)$$

We chose an appropriate formula for effect size calculations in reference to, and dependent upon, the data provided in included studies. For example, for studies reporting means (X) and pooled standard deviation (SD) for treatment (T) and control or comparison (C) at follow up only:

$$d = \frac{x_{Tp+1} - x_{Cp+1}}{SD}$$

If the study does not report the pooled standard deviation, it is possible to calculate it using the following formula:

$$SD_{p+1} = \sqrt{\frac{(n_{Tp+1}-1)SD^2_{Tp+1} + (n_{Cp+1}-1)SD^2_{Cp+1}}{n_{Tp+1} + n_{Cp+1} - 2}}$$

Where the intervention is expected to change the standard deviation of the outcome variable, we used the standard deviation of the control group only.

For studies reporting means ($\underline{X}$) and standard deviations (SD) for treatment and control or comparison groups at baseline (p) and follow up (p+1):

$$d = \frac{\Delta\underline{X}_{p+1} - \Delta\underline{X}_p}{SD_{p+1}}$$

For studies reporting mean differences (Δ_X) between treatment and control and standard deviation (SD) at follow up (p+1):

$$d = \frac{\Delta \bar{X}_{p+1}}{SD_{p+1}} = \frac{\bar{X}_{Tp+1} - \bar{X}_{Cp+1}}{SD_{p+1}}$$

For studies reporting mean differences between treatment and control, standard error (SE) and sample size (n):

$$d = \frac{\Delta \bar{X}_{p+1}}{SE\sqrt{n}}$$

As primary studies have become increasingly complex, it has become commonplace for authors to extract partial effect sizes (e.g., a regression coefficient adjusted for covariates) in the context of meta-analysis. For studies reporting regression results, followed the approach suggested by Keef and Roberts (2004) using the regression coefficient and the pooled standard deviation of the outcome. Where the pooled standard deviation of the outcome is unavailable, we utilised regression coefficients and standard errors or t-statistics to do the following, where sample size information is available in each group: $d = t\sqrt{\frac{1}{n_T} + \frac{1}{n_C}}$

where n denotes the sample size of the treatment group and control. We used the following where only the total sample size information (N) is available, as suggested in Polanin and Snilstveit (2016):

$$d = \frac{2t}{\sqrt{N}} \qquad Var_d = \frac{4}{N} + \frac{d^2}{2N}$$

We calculated the t-statistic (t) by dividing the coefficient by the standard error. If the authors only report confidence intervals and no standard error, we calculated the standard error from the confidence intervals. If the study does not report the standard error but reports t, we extracted and use this as reported by the authors. In cases in which significance levels are reported rather than t or SE (b), then t was imputed as follows:

- Prob > 0.1: $t = 0.5$
- Prob ≤ 0.1 to Prob > 0.05: $t = 1.8$
- Prob ≤ 0.05 to Prob > 0.01: $t = 2.4$
- Prob ≤ 0.01 : $t = 2.8$.

Where outcomes are reported in proportions of individuals, we calculated the Cox-transformed log odds ratio effect size :

$$d = LogOddsRatiov\ x\ \frac{\sqrt{3}}{\pi}$$

where OR is the odds ratio calculated from the two-by-two frequency table.

Where outcomes were reported based on proportions of events or days, we used the standardised proportion difference effect size:

$$d = \frac{p_T - p_C}{SD(p)}$$

where p_t is the proportion in the treatment group and p_c the proportion in the comparison group, and the denominator is given by:

$$SD(p) = \sqrt{p\,(1-p)}$$

where p is the weighted average of p_c and p_t:

$$p = \frac{n_T\, p_T + n_C\, p_C}{n_T + n_C}$$

An independent reviewer evaluated a random selection of 10 percent of effect sizes to ensure that the correct formulae was employed in effect size calculations.

3.3.6 Unit of analysis issues

Unit of analysis errors can arise when the unit of allocation of a treatment is different from the unit of analysis of effect size estimate, and this is not accounted for in the analysis (e.g., by clustering standard errors at the level of allocation). We assessed studies for unit of analysis errors (The Campbell Collaboration 2019), and where they exist, we corrected for by adjusting the standard errors according to the following formula (Higgins et al. 2020; Waddington et al. 2012; Hedges 2009):

$$SE(d)' = SE(d) * \sqrt{1 + (m-1)c}$$

where m is the average number of observations per cluster and c is the intra-cluster correlation coefficient. Where included studies used robust Huber-White standard errors to correct for clustering, we calculated the standard error of d by dividing d by the t-statistic on the coefficient of interest.

3.3.7 Data synthesis

We applied two different synthesis approaches for the two distinct review modules. For review question (1), we applied statistical meta-analysis where data allowed.

We conducted statistical meta-analyses of studies that were assessed to be sufficiently similar and only combined studies using meta-analysis when we identified two or more effect sizes using a similar outcome construct and where the comparison group stated is judged to be similar across the two (the approach taken by Wilson and colleagues (2011)). Wecombined studies in the same analysis when they evaluated the same intervention type and the same outcome type (that is, evidence use, the three intermediate outcome categories or

socioeconomic impact). We used the *metafor* package in R to undertake meta-analysis (Viechtbauer 2010). Where there were too few studies or included studies were considered too heterogeneous in terms of interventions or outcomes, we discussed the individual effect sizes along the causal chain narratively. We anticipated heterogeneity across studies, and so we adopted inverse-variance weighted, random effects meta-analytic models (Julian P. T. Higgins and Thompson 2002) to account for this.

We conducted separate analyses for the major outcome categories for each mechanism where possible: that is, by evidence use, socio-economic impact and the three categories of intermediate outcomes (capability, motivation, opportunity to use evidence).

We anticipated that we would have a limited number of included impact evaluations, and therefore it would be unlikely to be able to undertake moderator analysis to try to explain variations in effect sizes. This was the case for this review.

3.3.8 Assessment of heterogeneity

To visibly examine variability in the effect size estimates, we used forest plots to display the estimated effect sizes from each study along with their 95% confidence intervals. Subsequently, and acknowledging the limitations of quantification of heterogeneity and the different strengths of statistical approaches, the following tests for heterogeneity were conducted: calculation of the Q- statistic as a statistical test of heterogeneity (Hedges and Olkin 2014); and calculation of the i2 and Tau2 statistic to provide estimates of the magnitude of the variability across study findings caused by heterogeneity (Higgins and Thompson 2002; Higgins 2003; Borenstein et al. 2009).

3.3.9 Sensitivity analysis

The main objective of the sensitivity analysis is to serve as a visual tool that allows informal comparisons to determine whether the results of our meta-analyses are sensitive to the methodological decisions of the review team. To test the robustness of the results of the meta-analysis, we planned to conduct sensitivity analyses. related to (i) the methods of the primary studies and (ii) the methods of the review. It involves examining whether the results were sensitive to study design, the risk of bias associated with the study, the degree of missing/incomplete data, and the way outcomes are measured and the timing at which they are measured. However, due to a limited number of studies in each meta-analysis, we were unable to conduct sensitivity analysis for this review.

3.3.10 Treatment of qualitative research

We applied thematic synthesis as our preferred approach to the qualitative evidence synthesis. Thematic synthesis depends on the availability of sufficient in-depth qualitative studies and empirical primary data reported across the identified evidence-base and linked to groups of interventions and outcomes along the review's logic model. The objective of this synthesis approach was to identify analytical themes on factors that have influenced the design, implementation and impact of the interventions of interest.

Following Thomas and Harden's (2008) thematic synthesis approach, we applied inductive coding techniques to first identify common descriptive themes based on the reported findings of the primary studies. We used EPPI-Reviewer's in-built qualitative synthesis coding software

to illustrate the link between the inductive codes in the primary studies and the identified descriptive themes. In a second step, following the identification of descriptive themes, we configured them into higher level analytical themes, which present the results of the thematic synthesis. Again, this configuration from descriptive to analytical themes is conducted in EPPI-Reviewer and we produced an overview table of both types of themes and their linkages for transparency in this final synthesis step. The process of configuring descriptive and analytical themes from the inductive coding applied the same consistency checks as the general data extraction process outlined above. That is, two reviewers piloted the data extraction tool, working independently on a random sample (10%) of eligible studies selected to test the tool on the complete range of types of studies. The process was repeated until there was a very high level of consistency, defined by a minimum Kappa statistic score of 0.85.

The process of generating inductive codes, descriptive themes, and final analytical themes was configured around the analytical lenses derived from the research question 2 of this review, detailed below. We synthesised the extracted qualitative evidence regarding the interplay of four groups of factors with the intervention effect, outcome, or impact.

I. *Intervention design*: any factor that is related to the design and planning of the applied intervention. Design and planning of an intervention refers to the blueprint or schedule of the intervention and will typically outline what components the intervention consists of and in what sequence they will be applied.

II. *Intervention implementation*: any factor that is related to the implementation of the intervention in practice. This refers to variables that emerge while the intervention is applied and are usually not known in advance. For example, there may be contextual factors that have influenced a lack of attendance or uptake.

III. *Context*: any factors related to external influences beyond the programme's control that affect intervention design, implementation or impact. This can refer to political factors such as types of governance, societal factors such as norms, economic factors such as a recession, and cultural factors such as beliefs.

4 Results

This section reports on the main findings of the systematic review. We begin with an overview of the search and screening results, followed by a description of the characteristics of the included studies for both research questions, and the trends observed in the evidence base. Finally, we discuss the results from the quantitative and qualitative synthesis respectively.

4.1 Description of studies

4.1.1 Results of the search

The PRISMA flowchart presented in Figure 4 indicates the process of searching for evidence for inclusion in the systematic review.

We began the review by updating the search of an existing evidence gap map that fully overlaps with the review's scope (Nduku et al. 2024a). As described above, the search for this evidence map was conducted in January 2023, and the search results for the map are reported

in full in Nduku and colleagues (2024a). The updated search, conducted across January and February 2024, identified 9,820 academic and 27 grey literature search hits respectively. We deduplicated the results using EPPI-Reviewer. After the removal of duplicates, we were left with 8,298 papers to screen at title and abstract level. A total of 8,038 studies were excluded at the title and abstract screening stage, with the main reason being that they were not on the topic of EIDM. We then screened the remaining 260 studies at full-text for inclusion. As a result, we excluded a further 204 studies largely due to the studies being "diagnostic evidence[5]". The full list of reasons for exclusion are provided in Figure 3. The list of studies excluded at full text for both the evidence map search conducted in January 2023 and the update in January - February 2024 are available on request. This left us with 56 newly included papers in the evidence gap map to make a total of 673 papers, including the 617 papers that were already included in the 2023 evidence map.

4.2 Included studies

We then used a two-stage process to identify relevant studies for the systematic review. Stage one entailed screening all 673 studies included in the updated evidence map to identify studies that focused on policymakers[6]. We identified a total of 365 studies that fit this criterion. The studies excluded at this stage because they did not focus on policymakers as the population of interest are listed in the reference list. In the second stage, we screened this sub-set of studies to identify studies to address our two research questions:

- For the first review question on the impacts of interventions to support EIDM by policymakers, we looked for evaluations from any country that used an experimental design (RCTs) or a quasi-experimental design with non-random assignment that allows for causal inference (described in the methods). We identified 18 impact evaluations reported in 21 papers to answer review question 1.
- For the second review question on the influence of population, context, design, and implementation factors on the impact of interventions to support EIDM by policymakers in LMICs, we looked for any empirical evaluation that took place in an LMIC. We identified 152 papers that took place in an LMIC to answer review question 2.

There were six papers that we included in the analysis for both review questions one and two[7]. We therefore included a total of 164 studies reported in 167[8] papers in the systematic review.

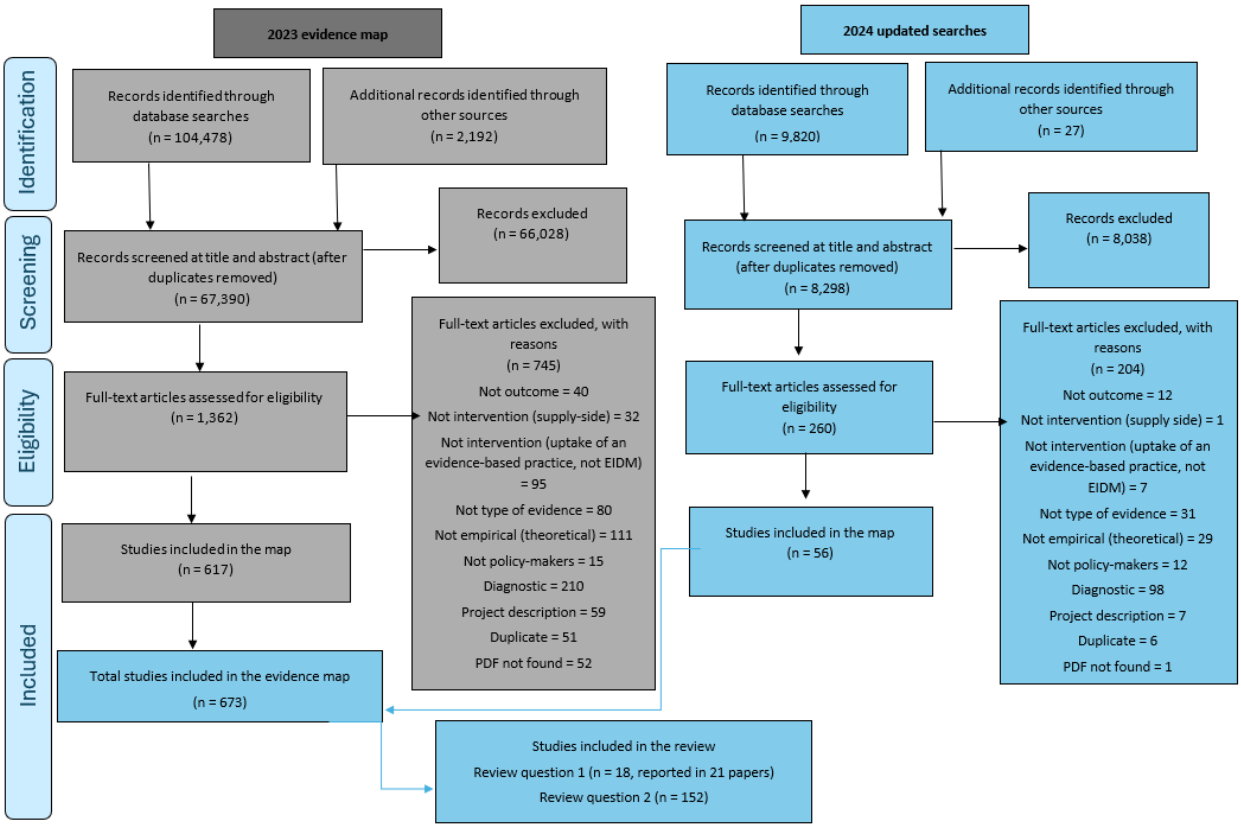
[5] Studies featuring empirical data but no EIDM intervention.

[6] Nduku et al's (2024a) evidence map also included studies targeting evidence use by practitioners such as doctors, teachers, nurses etc. which were not in scope for this review.

[7] As a result, the total does not tally to 170 studies but 164.

[8] We identified 3 linked papers.

Figure 4. Overview of the search and screening process



4.2.1 Geography

Most of the impact evaluations addressing review question 1 took place entirely in high-income countries (11 out of 18), specifically, the USA (n = 8), Canada (n = 1), the UK (n = 1), and Australia (n = 1). Three studies took place across multiple countries. Vivalt and Colville (2023) conducted their experiment at World Bank and Inter-American Development Bank (IDB) policy workshops in the USA, Mexico, Senegal, Nigeria and Portugal. Two studies that tested the impact of policy briefs in different forms circulated the briefs to participants in various countries (Masset et al. 2013, also reported in Beynon et al. 2012; Fillol et al. 2022). Fillol and colleagues (2022) targeted Francophone African countries (Benin, Burkina Faso, Chad, Guinea, Mali, Mauritania, Niger, Senegal and Togo) and the main development funding nations in the region (Belgium, Canada, France and Switzerland). Masset and colleagues (2013), also reported in Beynon and colleagues (2012), targeted people on contact lists held by the IDS Knowledge Services department and 3ie which spanned those based in high, middle and low-income countries. We identified one study each respectively from Ethiopia, Brazil, Kenya and Pakistan (Rogger and Somani 2023; Hjort et al. 2020; Opiyo et al. 2013; Mehmood et al. 2024).

Country	Number of studies
USA	8
Canada	1

UK	1
Francophone African countries (Benin, Burkina Faso, Chad, Guinea, Mali, Mauritania, Niger, Senegal and Togo) and the main development funding nations in the region (Belgium, Canada, France and Switzerland)	1
Brazil	1
Pakistan	1
Kenya	1
Ethiopia	1
Multi-country studies in high-, middle- and low-income countries	2
USA, Mexico, Senegal, Nigeria and Portugal	1

The 152 studies included to address the review question 2, which we limited to studies from LMICs only, were conducted across 63[9] countries. Since there were studies reporting interventions in multiple countries, this yields a greater number of intervention "contexts", and we use the number of these intervention "points" for analysis to ensure a more accurate reporting of geographical coverage. We identified 363 different contexts. A large cluster of the empirical evidence, approximately 40% (142/363) is concentrated in five African countries namely South Africa (n = 41), Nigeria (n = 32), Uganda (n = 32), Kenya (n = 20) and Burkina Faso (n = 17). This is highlighted in Figure 5B below. In terms of the socioeconomic setting of the LMICs, a majority of the 212 economic contexts were in lower-middle-income countries (n = 98, 46%), followed by low-income countries (n = 62, 29%). We identified the least amount of evidence in upper-middle income countries (n = 51, 24%).

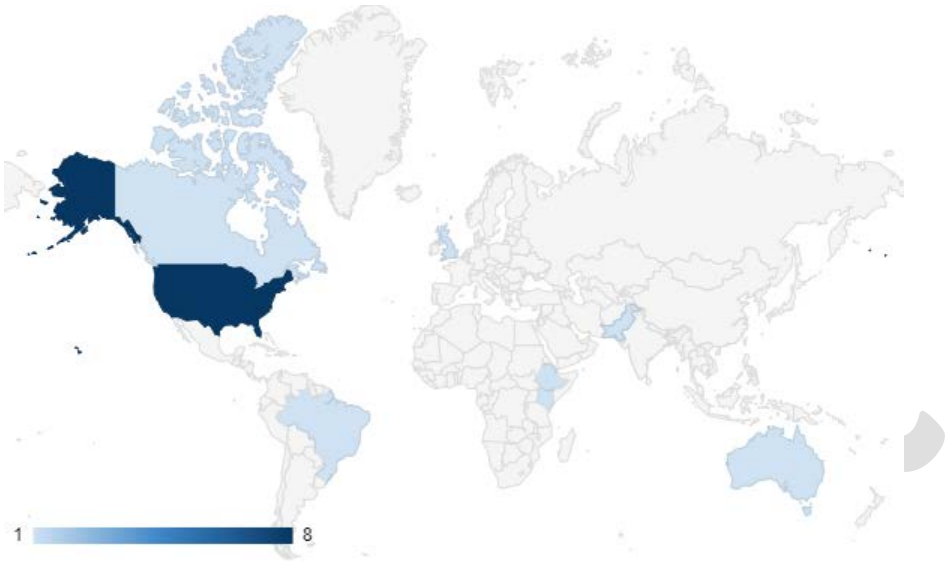
The majority of the impact evaluations included to address research question 1 took place in the region of the Americas, while the largest group of studies to address research question 2 were from Africa. Considering WHO regions, we found a total of 23 regional intervention contexts from the 18 impact evaluation studies and a total of 185 regional intervention "contexts" from the 152 studies included to address research question 2. For the former, most of the regional focus was on the Americas (n = 13, 54%), followed by the European and the African region (n = 4, 7% for both). Conversely, for the qualitative evidence base, the largest group is in the African region (n = 137, 74%), followed by the South-East Asian region, which has 9% (n = 17). The region with the fewest regional intervention contexts is the region of the Americas (n = 5, 3%). These results are depicted in Figure 6 below.

[9] One study does not specify the country of investigation.

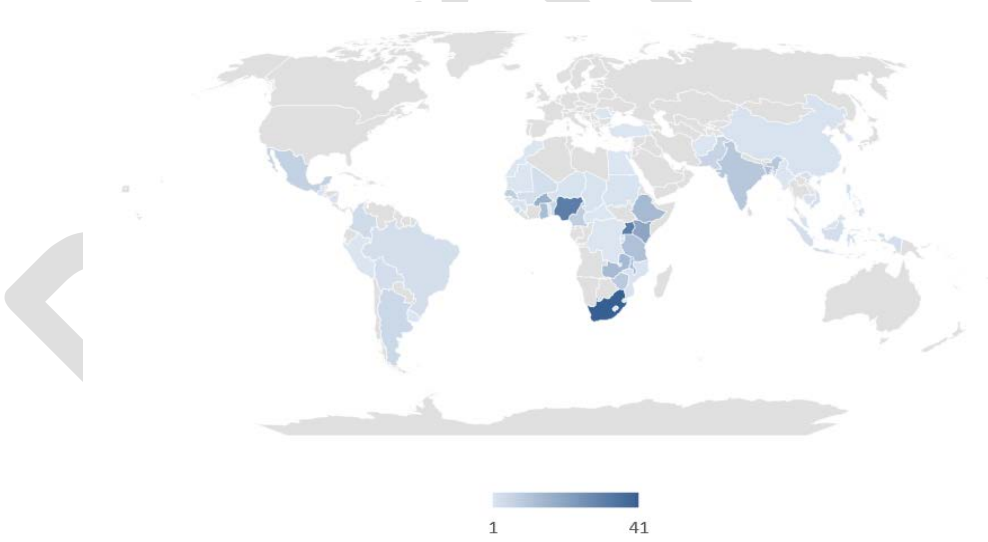
Figure 5. Distribution of studies by country

Panel A - Quantitative studies; Panel B - Qualitative studies

Panel A

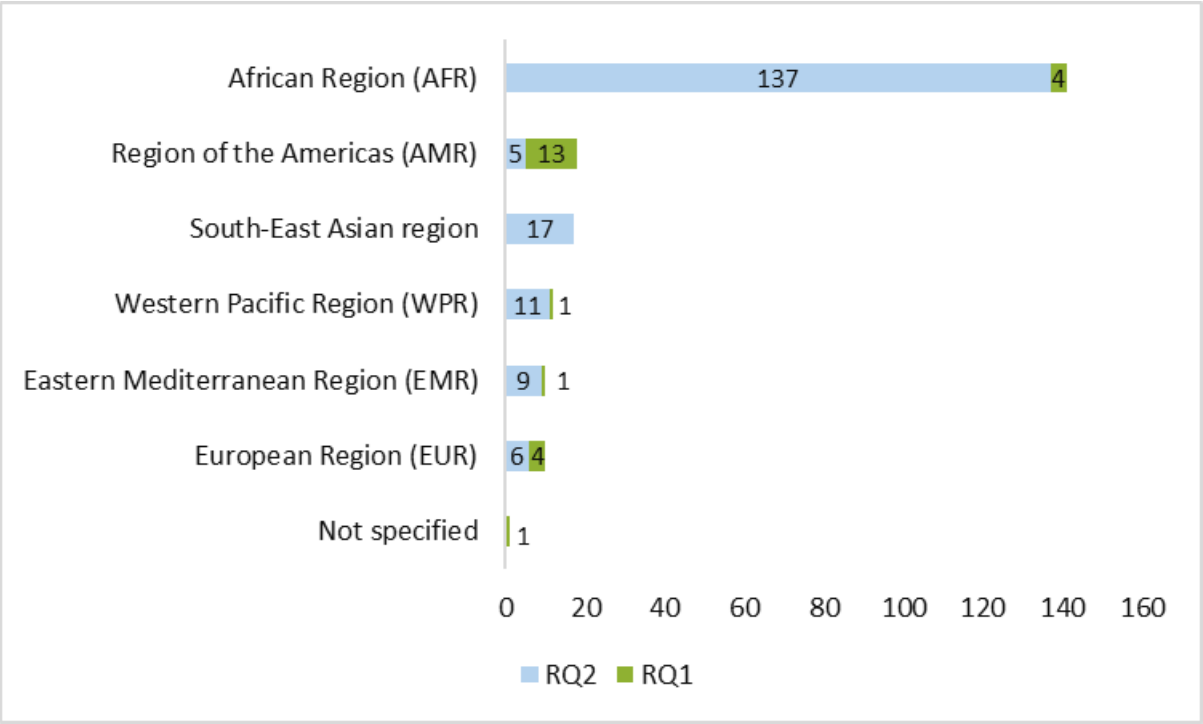


Panel B



Note: The map does not include multi-country studies that do not report effects separately for each country.

Figure 6. Distribution of studies by region



4.2.2 Interventions

We organised the interventions evaluated in the included studies according to six possible mechanisms of change, that is, the processes by which EIDM might be achieved.. It was common for studies across the whole review to evaluate interventions that combined multiple mechanisms of change. In addition, one study included multiple treatment arms testing different mechanisms of change. Therefore, the number of mechanisms identified is higher than the number of included studies.

In the 18 included impact evaluations, the most frequently used mechanisms of change were access to evidence (n = 15) followed by building the skills of policymakers (n = 7) and interaction of decision-makers and researchers (n = 3). Eleven of the included studies tested an intervention that worked solely through the access to evidence mechanism, that is, providing effective communication of, and access to, evidence. Most of the included studies in this category (n = 8) tested design elements of effective communication and dissemination of evidence rather than making it more generally convenient to access. We identified three studies that tested an intervention which worked solely through building the skills of policymakers to access and / or make sense of evidence. We did not find any impact evaluation evidence that assessed the effects of interventions working through awareness of EIDM or agreement mechanisms. They were not tested on their own or in combination with other mechanisms of change in the framework.

We identified five studies that combined multiple mechanisms of change. Three evaluations, reported in five papers, tested an intervention that combined access to evidence activities plus interaction with decision-makers, building skills and structure and process mechanisms (Dobbins et al. 2009; Crowley et al. 2021a; 2021b; Wilson et al. 2017a; 2017b) In addition, Scott and colleagues (2023) evaluated the SciComm Optimizer for Policy Engagement (SCOPE) model, which combined activities working through the access and interaction mechanisms, while Hjort and colleagues (2020) evaluated an intervention that worked through access and skills mechanisms.

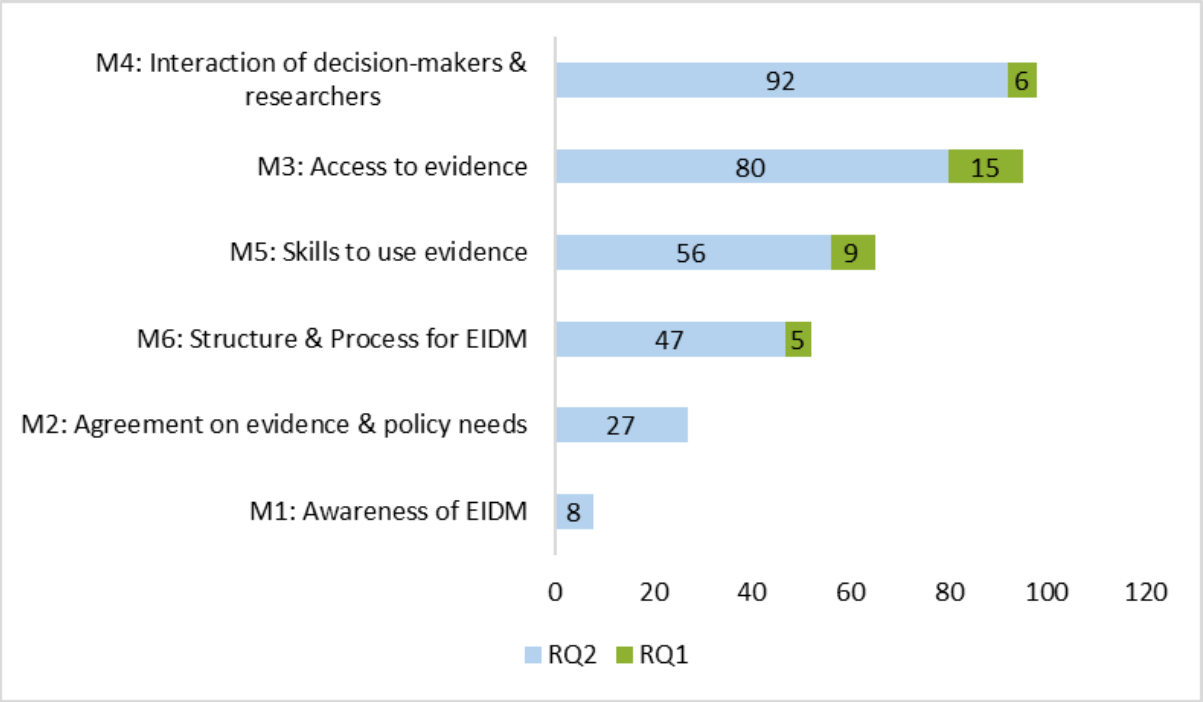
Three studies did not clearly focus on any specific step on the project cycle. In terms of individual steps of the cycle, seven studies reported in nine papers targeted evidence use during agenda setting, seven studies in nine papers targeted policy formulation, 13 studies reported in 15 papers targeted use during decision-making and seven studies reported in eight papers had interventions focused on implementation. Three studies reported in four papers targeted the evaluation stage of the policy cycle.

Most of the evaluated interventions targeted evidence use at multiple stages of the policy cycle. The highest concentration of included counterfactual studies targeted evidence use across the agenda setting, policy formulation, and decision-making stages (Wilson et al. 2017a; 2017b; Dobbins et al. 2009; Toma and Bell 2022; Mehmood et al. 2024; Hjort et al. 2020). Two studies (Vivalt and Covile 2023; Rogger and Somani 2023) specifically referenced evidence at the decision-making step within the policy cycle. Several interventions appeared to centre on evidence use during decision-making and implementation (Beynon et al. 2012; Noia et al. 2003; Nellies et al. 2019). Some interventions in the included studies adopted a broader scope, targeting all stages of the policy cycle, from agenda-setting, decision-making, decision implementation, policy formulation to evaluation (Scott et al. 2023; Crowley et al. 2021a; 2021 b). Brownson and colleagues (2017) focused on decision-making, implementation and evaluation. Similarly, Dobbins and colleagues (2009) targeted policy formulation, decision-making, and implementation steps within the cycle. Finally, three studies did not clearly target any specific stage of the policy cycle (Brownson et al. 2011; Opiyo et al. 2013; Makkar et al. 2016). There were some similarities in the spread of intervention mechanisms being evaluated in the studies included for research question 2. In the 152 included studies, the least assessed mechanism was the awareness of EIDM mechanism, with 8 studies, indicating a lack of both impact evaluation and qualitative evaluation evidence for this mechanism of change. A total of 47 studies assessed the structures and process mechanism, while 27 studies considered the agreement on evidence and policy needs mechanism. The most frequently assessed mechanisms of change were interaction with decision-makers (n = 92), access to evidence (n = 80), and building skills of policymakers (n = 56). Of these, a small number of studies assess interventions working through a single mechanism of change. There are 17 studies (e.g., Bashir et al. 2016; Amadou et al. 2020; Mehmood, 2024) that evaluate interventions applying the skills mechanism as a sole mechanism of change, 11 applying the structures and process mechanism (Phillips et al. 2014; Tirivanhu et al. 2017; Goldman et al. 2018) and nine applying the access mechanism (e.g., Munyoro (2019; McKay et al. 2022; Robson et al. 2023). Six studies evaluate interventions working through the interaction mechanism as a sole mechanism of change (e.g., Norton et al. 2016; Oronje, 2017; Sakala et al. 2023). One study evaluated interventions working through

each of the awareness (Carrasco et al. 2023) and agreement (Doughman et al. 2017) mechanisms as the sole mechanism of change, respectively.

A majority of the studies assess interventions applying mechanisms of change that are paired with other intervention mechanisms. The most frequent pairing of intervention mechanisms are the access and interaction mechanisms (n = 55), skills and interaction (n = 30), agreement and interaction (n = 21), structure and process and interaction (n = 21), access and skills (n = 20) and access and structures and processes (n = 19). The least frequent pairings are the awareness and structures and processes (n = 4), access and awareness (n = 4), skills and agreement (n = 3), awareness and agreement (n = 2), as well as awareness and skills (n = 2) mechanisms.

Figure 7. EIDM mechanisms in included studies



4.2.3 Outcomes

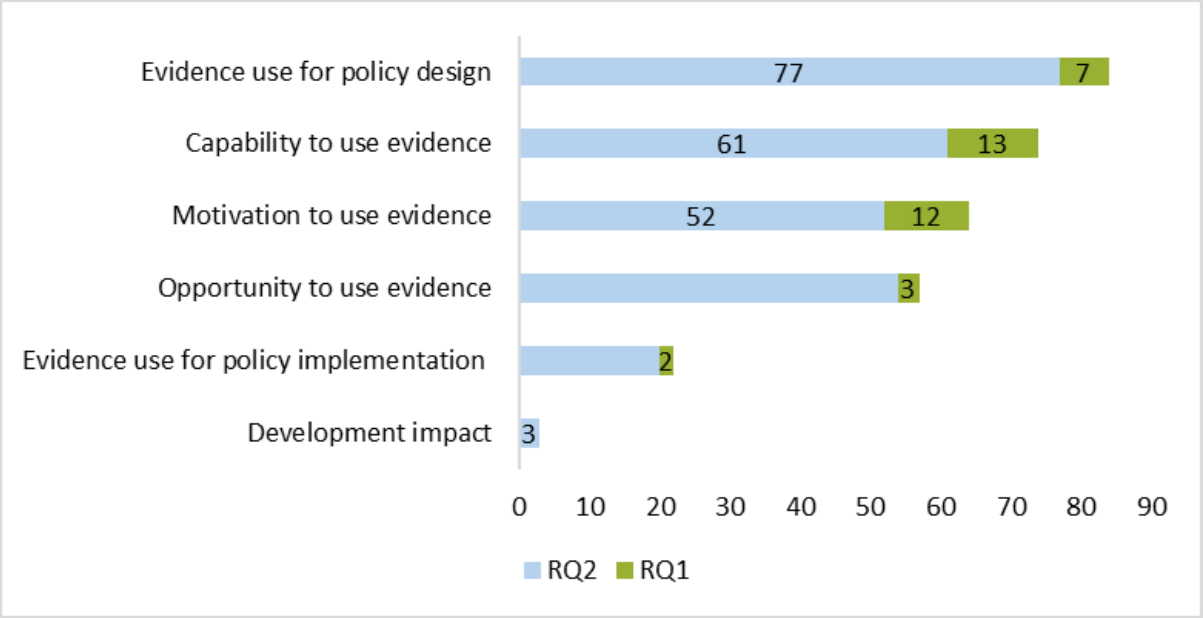
The studies included to address both research questions 1 and 2 broadly looked at similar outcome areas. None of the impact evaluations addressing research question 1 measured a socio-economic outcome, and only three of the studies included to address research question 2 explored influence on a socio-economic outcome (development impact).

For the impact evaluations included for research question 1, seven of the included studies attempted to measure the impact of the intervention on evidence use by policymakers, either at the individual, team, or institutional level. All seven measured an indicator of evidence use for policy design, while two of the seven also included an indicator of evidence use for policy implementation. Appendix Table 3 in Appendix E presents an overview of how these seven studies attempted to measure evidence use. Seventeen of the eighteen included studies measured an intermediate outcome, either capability to use evidence, motivation to use evidence, or opportunity to use evidence. Thirteen studies measured an indicator of capability

to use evidence, twelve studies measured an indicator of motivation to use evidence, and three studies measured an indicator of opportunity to use evidence (Figure 8).

For the studies included for research question 2, the largest explored outcome was evidence use for policy design (n = 77). In contrast, evidence use for policy implementation was not assessed frequently (n = 20). In terms of intermediate outcomes influencing evidence use, studies reported on capability to use evidence (n = 61), opportunity to use evidence (n = 54), and motivation to use evidence (n = 52).

Figure 8. Outcomes evaluated in included studies



Note: The number of studies in the figure add up to more than the total number of studies as some studies looked at multiple outcomes

4.2.4 Study design

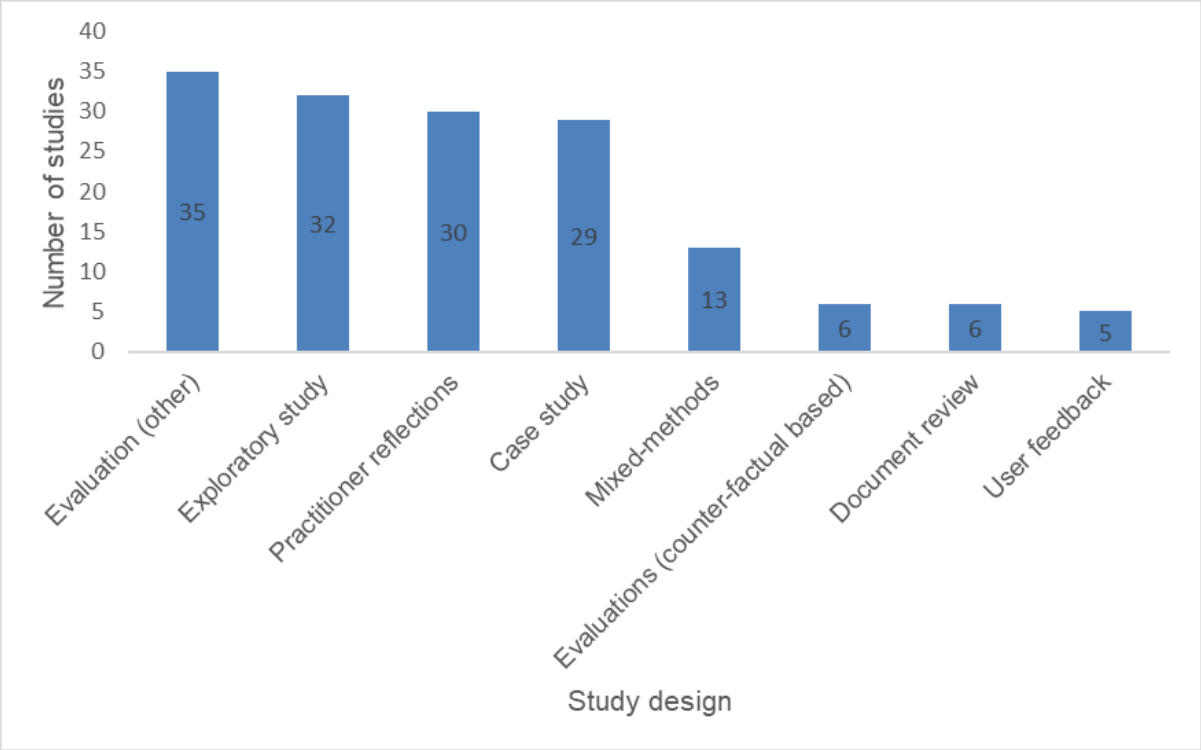
We used different study design inclusion criteria for research questions 1 and 2. To address research question 1, we included counterfactual impact evaluations, specifically RCTs and quasi-experimental designs. For research question 2, we included any empirical evaluation from an LMIC that explored the factors that have influenced the design, implementation, and impact of EIDM interventions. We used broader inclusion criteria for this question to ensure that our systematic review included the broader and diverse evidence base on EIDM in LMICs. We defined 'empirical' as a study applying a structured approach to both data collection and data analysis.

Most of the included impact evaluation studies were randomised controlled trials (n = 15). The remaining studies either used a quasi-experimental, controlled before-and-after design (n = 2), specifically Wilson and colleagues (2017a; 2017b) and Jacobs and colleagues (2014), or an interrupted time series design in the case of Makkar and colleagues (2016) (n = 1).

An examination of the studies included to address research question 2 revealed that most were programme or policy evaluations without a counterfactual impact component (n = 35), followed by exploratory studies (n = 32), practitioner reflections (n = 30) and case studies (n

= 29), as shown in Figure 9. The least common designs were document reviews (6), counterfactual based evaluations (n = 6)[10] and user-feedback designs (n = 5).

Figure 9. Study designs in included studies



4.2.5 Population

This section describes the impact evaluation evidence base for the first research question. Due to the size of the evidence base, we did not code the policymaker population in detail for research question 2, but we report on the policy areas of each included study.

The 18 included impact evaluations targeted a diverse set of policymakers in terms of policy area, level of government and role. Hjort and colleagues (2020) targeted municipality mayors in Brazil, who oversee local public services such as education, health, sanitation, and transportation as well as local taxation. Crowley and colleagues (2021a, 2021b) targeted US congressional offices working on child and family policy. Rogger and Somani (2023) targeted their evidence briefing at civil servants working at the federal, regional and district levels of the Ethiopian government, specifically those working on agriculture, education, health, revenue, and trade policy. Mehmood and colleagues (2024) studied the effect of quantitative research methods training on junior ministers entering service in Pakistan. Toma and Bell (2022) targeted staff at several US federal government agencies involved in developing, interpreting, or making decisions using evidence. Scott and colleagues (2023) targeted US state legislators and their staffers who sat on committees related to health.

[10] This refers to six impact evaluations included in review question 1.

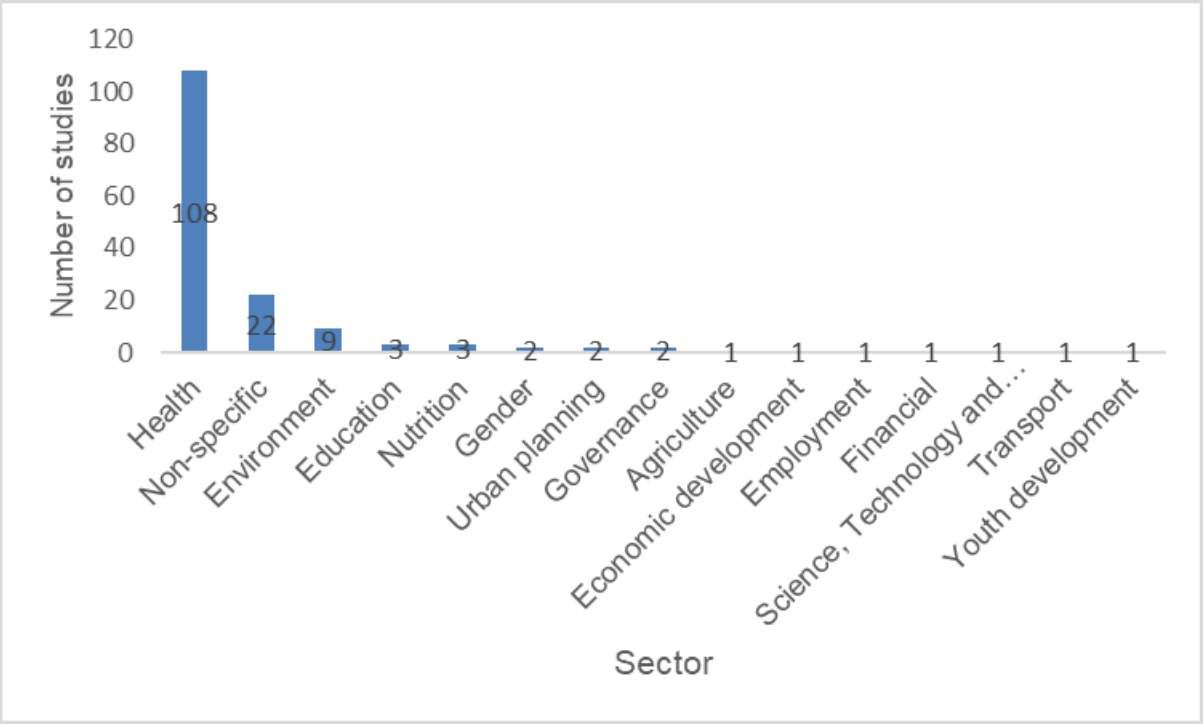
Several studies specifically targeted health policymakers. Brownson and colleagues (2011) targeted their policy briefs at state-level health policy makers, specifically legislative staff, state legislators, and executive branch administrators. Brownson and colleagues (2017) targeted their EIDM training at chronic disease control staff working in state and local health departments in government or community-based coalitions, while Jacobs and colleagues (2014) targeted their EIDM training to four local health departments in the USA. Dobbins and colleagues (2009) targeted their knowledge broker and messaging programme at Canadian regional and local public health departments. Wilson and colleagues (2017a; 2017b) targeted regional health policymakers (Clinical Commissioning Groups (CCGs)) in England. Makkar and colleagues (2016) targeted employees from state and federal-level health agencies in Australia.

A small number of studies explored impact on a mixed population that included policymakers but also practitioners and researchers. Masset and colleagues (2013), also reported in Beynon and colleagues (2012) targeted their policy briefs at people on contact lists held by the IDS Knowledge Services department and 3ie, which included government actors, academics, NGOs and international aid organisations, with the large majority of respondents involved in nutrition and agriculture. Fillol and colleagues (2022) targeted global health actors in French speaking African countries, including those from national governments, international organisations, development banks, civil society and academic institutions. Vivalt and Coville (2023) studied policymakers, policy practitioners and researchers attending World Bank or Inter-American Development Bank workshops. Nellis and colleagues (2019) studied mid-level and senior policymakers and practitioners working in Washington DC in the USA. Opiyo and colleagues (2013) studied the impact of varying the format of systematic review findings for health professionals on a guideline development panel, which included both policy and clinical health professionals. Finally, Di Noia and colleagues (2003) worked with a mixed population of policymaking organizations, community agencies and schools involved in drug abuse prevention programming.

The 152 studies included to address research question 2 involved policymakers working primarily in the health sector (n = 108, 68%), significantly more than any other sector as shown in Figure 10 below[11]. Fourteen percent (n = 22) of the studies were not sector-specific whilst 6% (n = 9) took place with policymakers from the environmental sector. The policy areas targeted by the fewest studies are agriculture; economic development; employment; financial; science, technology and innovation; transport and youth development with one study from each of the sectors.

[11] A total of 158 policy intervention "points" were generated from the 152 studies included to address review question 2, since some studies covered more than one policy area.

Figure 10. Sectorial coverage of empirical evaluations from LMICs



4.3 Risk of bias in included studies

We present the summaries of the risk of bias assessment for the included RCTs and QEDs in Figures 11a and 11b respectively, with the full assessment included in Appendix G. We assessed almost half of the included impact evaluations (n = 7) as having some concerns about the risk of bias.

We included 15 RCTs in the review, reported in 16 papers. We rated one of these papers as having a high risk of bias overall, seven studies as having some concerns overall and seven studies reported in seven papers as having a low risk of bias overall. Three studies were rated as being at risk of bias due to attrition at follow-up (Brownson et al. 2011; Brownson et al. 2017; Masset et al. 2013; Beynon et al. 2012). Brownson and colleagues (2017) were rated as being at a risk of bias due to confounding from differences in observable characteristics between treatment and control group participants. Six of the included RCTs did not clearly describe a process and method for randomisation, although we did not rate them down on this criterion if there appeared to be no other issues with randomisation and the studies demonstrated balance between intervention and control groups. Eight of the RCTs were rated as being of low risk of bias due to departures from intended interventions. The remaining seven were rated as being at risk of bias due to possible contamination of the control group or implementation challenges that may have threatened the validity of the estimated effect of the intervention. All the RCTs were rated as having a low risk of bias from the selection of results reported.

We included three quasi-experimental studies in the review, reported in four papers. The two controlled-before and after studies were both rated as having a high risk of bias (Wilson et al.

2017a; 2017b; Jacobs et al. 2014). The key reasons that we rated Wilson and colleagues' (2017a; 2017b) study as having a high risk of bias were due to the selection process for receiving treatment, where some of the very small number of participants requested to be in either control or intervention, and the high attrition at follow-up. The key reason that we rated Jacobs et al.'s (2014) study as having a high risk of bias were due to the differences between the intervention and control group participants in observable characteristics, some differential attrition at follow-up, and the risk of social desirability bias in the outcome measure. The interrupted time series study, Makkar and colleagues (2016) was appraised using a separate tool explicitly for interrupted time series studies.

Figure 11a. Summary of risk of bias assessment of included RCTs

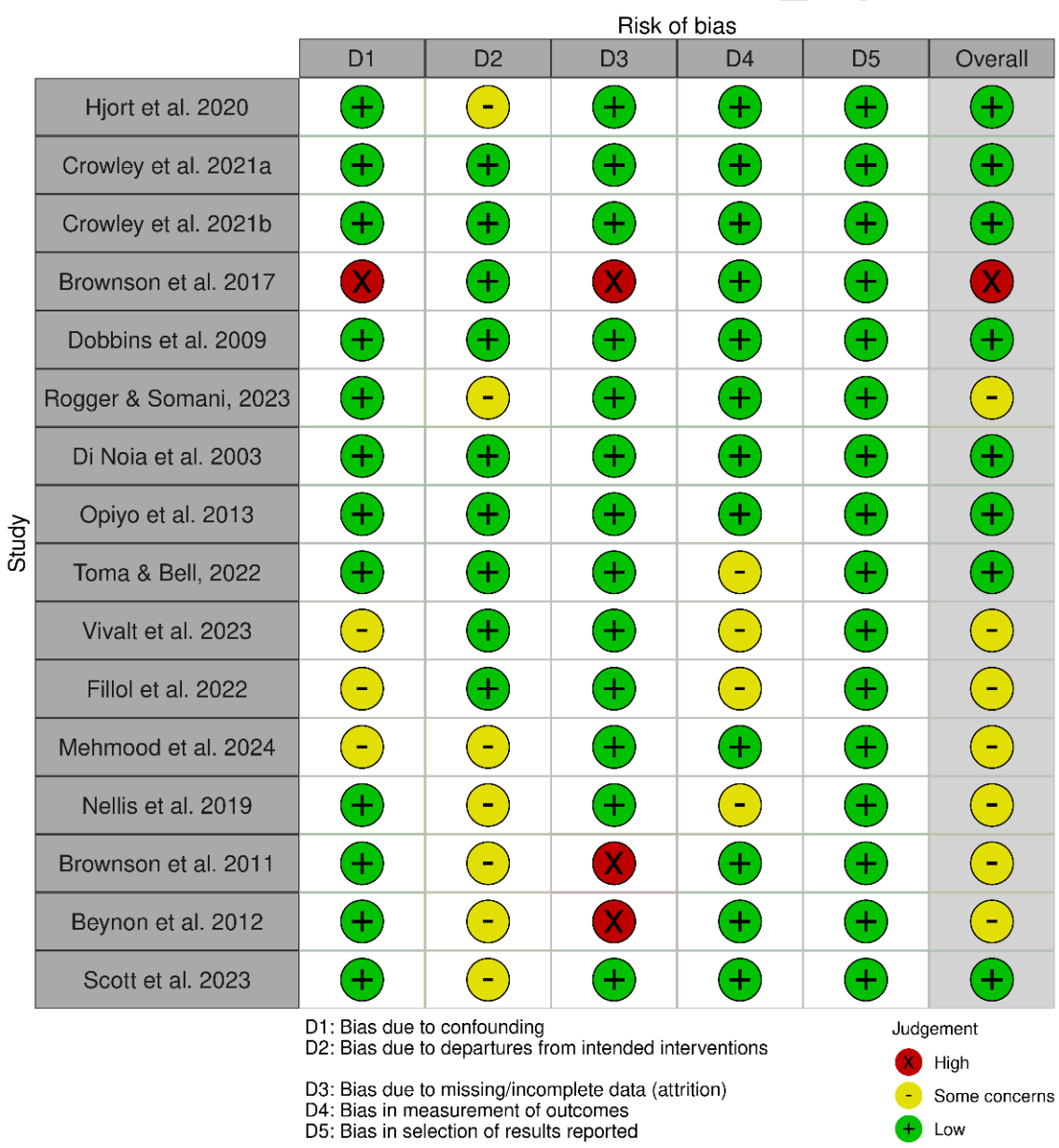
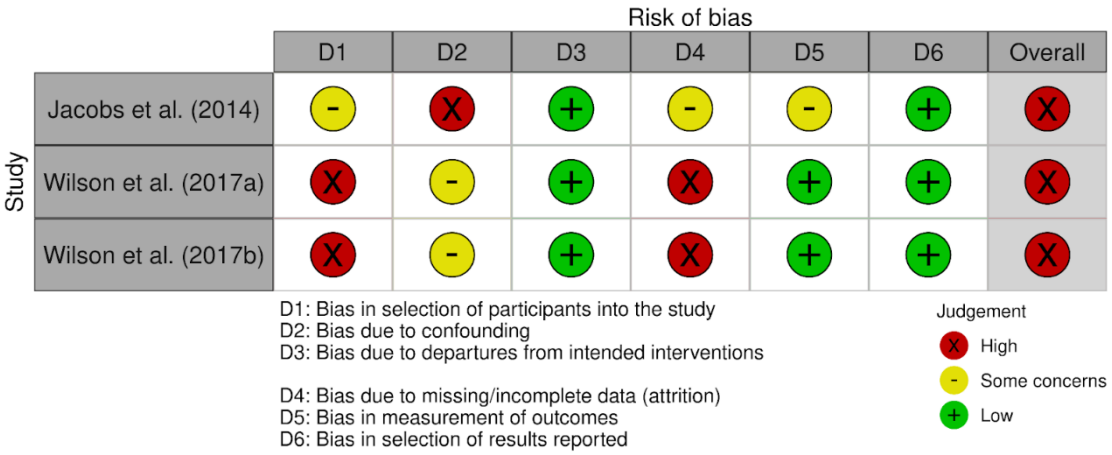
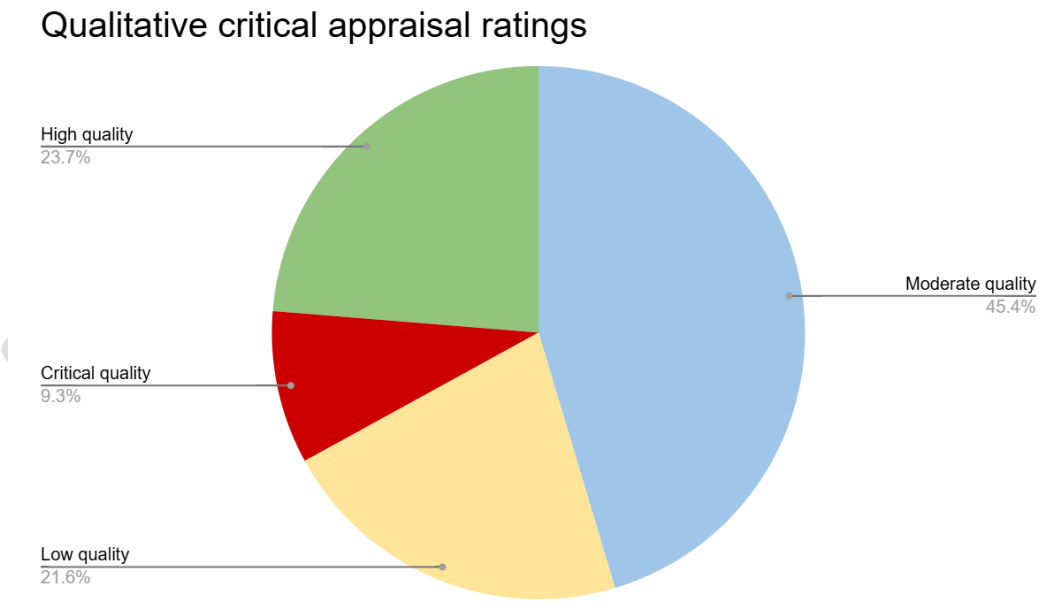


Figure 11b. Summary of risk of bias assessment of included QEDs



4.4 Quality Appraisal of Qualitative studies

Figure 12. Summary of critical appraisals



We present the summaries of the critical appraisal for the included qualitative studies in Figure 12, with the full assessment tool detailed in Appendix C4 . Based on the qualitative critical appraisal sheet, the overall quality of studies varied significantly across different appraisal categories.

Overall, the quality of studies assessed ranged from high to critical. Of the 97 unique qualitative studies assessed, 23 percent (23 studies) were high quality studies, 45 percent (44 studies) were moderate, 21.6 percent (21 studies) of the papers were low and 9 percent (9 studies) were critical. High-quality studies demonstrated methodological rigor, well-justified

research designs, and transparency in linking data to findings. Moderate-quality studies exhibited some gaps, such as insufficient explanations of sampling choices or limited discussions on research limitations. Low-quality studies, however, often lacked critical details on research design, data analysis, or contextual factors, making their findings less reliable.

Most studies (n = 96) clearly articulated their research questions and provided a rationale for their study design, ensuring that their methodologies were well-justified. However, a subset of studies (n = 25) lacked detailed explanations for their methodological choices, which raised concerns about the robustness and reliability of their findings.

Regarding participant selection and sampling, studies that employed purposive or reasoned sampling approaches were generally rated higher. These studies ensured that selected participants were relevant to the research objectives with appropriate samples (n = 40). Conversely, some studies failed to explain why certain locations (n = 46) or participant groups were chosen (n = 23), limiting the generalizability and applicability of their findings. Inadequate justification of sampling decisions was noted as a recurring issue in studies that were rated lower in quality.

Data collection and analytical rigor also varied among the studies. Many demonstrated strong methodological rigor, employing systematic data collection strategies that ensured depth, detail, and transparency (n = 60). These studies explained how analytical categories were generated, making their findings more credible. However, a few studies lacked sufficient detail on their analytical frameworks, making it unclear how findings were derived from the collected data. This limitation raised concerns about the potential for biases in interpretation.

In terms of credibility of claims and interpretation of data, higher-quality studies effectively distinguished between raw data, analytical frameworks, and interpretation (n = 55). These studies provided a clear link between evidence and conclusions, making their claims more defensible. On the other hand, some studies failed to establish this connection clearly, leading to arguable or doubtful findings (n = 32).

Most studies (n = 90) included context; however, the degree varied from mention (n = 27) or consideration (n = 38) to a central role (n = 25) in the analysis. However, several studies lacked reflexivity (n = 89), failing to discuss the role of researchers in the interpretation of findings. Studies that did not adequately consider the impact of ideological perspectives and researcher biases were deemed less transparent, reducing confidence in their conclusions.

4.5 Synthesis of results

In this section, we report the results of the synthesis of impact evaluations that **answer the first research question**: What are the effects of interventions to support evidence-informed decision-making by policymakers? We identified 20 papers corresponding to 18 unique impact evaluation studies that met our inclusion criteria.

Given the broad scope of this review in terms of intervention mechanism and outcomes, this is a very limited evidence base upon which to draw conclusions about intervention effectiveness, and there are several absolute gaps in terms of mechanism-outcome areas. We begin by presenting a disaggregated description of the characteristics of the evidence

base for each intervention by the associated outcomes, before presenting the results of the quantitative synthesis, organised by mechanism and outcome.

4.5.1 Mechanisms, activities and outcomes

Table 3 provides an overview of the distribution of studies across the mechanisms and outcomes they evaluate. In the table, we first present a mapping of the six individual mechanisms and five outcomes, followed by the cases where multiple mechanisms were combined together within a single study. These add up to more than the total number of included studies as Dobbins and colleagues (2009) was a multi-arm trial that tested two interventions that fell into different mechanism categories, and studies typically measured multiple outcomes that fell into different categories.

Table 3. Overview of distribution of studies by intervention and outcome

	Intermediate outcomes			Final outcomes		
	Capability to use evidence	Motivation to use evidence	Opportunity to use evidence	Evidence use	Socioeconomic outcomes	**Total outcomes**
Awareness	0	0	0	0	0	0
Agreement	0	0	0	0	0	0
Access	7	6	1	3	0	17
Interaction	0	0	0	0	0	0
Skills	3	3	1	2	0	9
Structure & Process	0	0	0	0	0	0
Interventions as combinations of mechanisms						
Access & Skills	1	0	0	1	0	2
Access, Interaction	0	1	0	0	0	1

Access, Interaction, Skills, Structure & Process	1	2	1	2	0	6
Total studies	12	12	3	8	0	**35**

Note: These add up to more than the total number of included studies as Dobbins and colleagues (2009) was a multi-arm trial that tested two interventions that fell into different mechanism categories, and studies typically measured multiple outcomes that fell into multiple different categories. Each individual cell in the table indicate number of studies for each intervention-outcome combination. The total studies for each intervention and outcomes are cumulated from this spread, indicated by the following spectrum -

Eleven of the included studies tested an intervention that worked through the access mechanism. This mechanism emphasises the importance of decision-makers (1) receiving effective communication of evidence and (2) having convenient access to evidence. Most of the included studies in this category test design elements of communication and dissemination rather than making evidence more generally convenient to access. A key characteristic of this body of evidence is that most of the identified studies have an active control group (i.e., a control group that received evidence in some form). This contrasts with, for example, a study testing the provision of knowledge repository access compared to business as usual. We characterise these studies in Appendix D.

We did not identify any impact evaluations of programmes or policies that worked through the awareness mechanism, which captures awareness for, and positive attitudes towards, EIDM. Nor did we identify any evaluation of – or an agreement mechanism, which – specifically builds building mutual understanding and agreement on policy-relevant questions and the kind of evidence needed to answer them. They were not tested on their own nor in combination with other mechanisms in the framework. Examples of activities that fall into these two categories include social marketing around the norm to use evidence and awareness raising campaigns (Awareness), and co-production approaches and use of Delphi panels (Agreement). **The impact of interventions working through the awareness and agreement mechanisms are therefore absolute gaps in the impact evaluation literature.** We also did not identify any impact evaluations that tested interventions working through policymaker–researcher interactions or changes to structure and processes individually.

4.5.2 Quantitative synthesis

We synthesised the results of the included studies using a combination of narrative discussion of standardised effect sizes and statistical meta-analysis wherever possible, organised by mechanism and outcome. We highlight in text if results come from a study rated as having a high risk of bias, and forest plots also indicate explicitly which studies were rated as having a low risk of bias or as having some concerns.

1. Access to evidence interventions

Summary of key findings

- Eleven studies tested an intervention that worked through the access mechanism alone (Table 4). Three of these took place with policymakers in an LMIC, specifically Kenya, Ethiopia and Francophone Africa. Eight of these tested how different approaches to evidence communication and presentation influenced uptake, rather than impact of making evidence more accessible to policymakers generally. Most of the studies compared to an active control group receiving evidence rather than business as usual. Although a number of studies measured an indicator of capability to use evidence, interventions in this category did not directly target building policymakers' knowledge and skills to use this evidence.

- It was difficult to synthesise and draw generalisable conclusions given the differences in focus, intervention and control conditions, and outcomes across studies. Therefore, most of our findings come from just one or two studies. Most studies evaluated impact on one part of the EIDM intervention logic model, rather than testing both intermediate and evidence use outcomes.

- The few studies that tested making evidence more accessible found small, positive effects on outcomes.

- Source of the evidence and design can be important:

    - Global health actors in Francophone Africa were more likely to report using the findings of a policy brief when the author was reported as an African funder or international organisation compared to a European or North American organisation, but less likely it was an African university compared to a European or North American University (Fillol et al. 2022). Policy briefs on the topic of agriculture and nutrition that included an opinion from an expert or researcher improved the likelihood of participants informing someone about the messages of the brief although receiving a brief largely did not translate into evidence use (Beynon et al. 2012).

    - Providing more statistical data on variance and presenting impact evaluation results side-by side with other results for comparison may increase policymakers' updating of beliefs when presented with new evidence (Vivalt and Colville 2023; Toma and Bell 2022).

    - Contextually framed narratives around systematic review evidence improved accessibility and clarity of the information for participants at a guidelines workshop in Kenya, although they did not improve correct understanding about intervention effectiveness (Opiyo et al. 2013).

- Individual and organisational characteristics can be important:

    - Policy briefs created evidence-accurate beliefs among those with no prior views but had little effect when readers had strong prior views (Masset et al. 2013).

- Tailored, targeted evidence messages had a much greater effect on evidence use in organisations that already valued research evidence (Dobbins et al. 2009).

The effects of access interventions on evidence use

We included three studies that evaluated the impact of a programme working through an access mechanism on evidence use (Figure 13). This mechanism emphasises the importance of decision-makers receiving effective communication of evidence and convenient access to evidence. We were not able to combine these in a statistical meta-analysis due to the diversity in comparison conditions.

Fillol and colleagues (2022) measured the impact of being sent a policy brief on self-reported instrumental use of the reported evidence. Those who received a policy brief from an African organisation were slightly less likely to report using the evidence compared to those that received a policy brief from a North American or European organisation, although this was not statistically significant (-0.13 SMD, 95% CI: -0.58 to 0.33). However, this varied by type of organisation. Participants who received a policy brief from an African university were significantly less likely to report using the brief findings than those from a European / North American university (-0.52 SMD, 95% CI: -0.98 to -0.06). In contrast, participants who received a brief from an African international organisation or donor were more likely to report using the brief than the European or North American equivalent, although these results were not statistically significant (respectively: 0.46 SMD, [95% CI: -0.06 to 0.98], and 0.39 SMD, [95% CI: -0.11 to 0.87]). Compared to participants who received briefs that said they were from donor organisations, participants that received a policy brief signed by a university said they were less likely to use the evidence (-0.11 SMD, 95% CI: -0.45 to 0.22), while those that received a brief from an international organisation said they were more likely to use the evidence (0.15 SMD, 95% CI: -0.21 to 0.50), but again, these differences were not statistically significant.

Looking at similar messenger effects on evidence use, Beynon and colleagues (2012) varied whether the contents of a policy brief on agriculture and nutrition was presented alone, presented with the view of a well-known sector expert or with the view of an unnamed researcher on a number of different self-reported evidence use actions three months later, such as whether the recipient of the brief had changed current policies/ practice or reviewed current policies / practice. The authors did not find a clear pattern of effects on reported evidence use actions by type of policy brief, as shown by the effect sizes presented in Figure 13.

Dobbins and colleagues (2009) evaluated the impact of sending tailored, targeted messages with summarised systematic review evidence to public health departments in government in Canada, combined with access to a repository of systematic review evidence. They evaluated impact on two evidence use measures: a general measure asking participants to report on the extent to which research evidence was considered in a recent planning decision and the number of well evidenced programmes and policies being implemented in their department. They found that intervention public health departments were less likely to report using research evidence in a recent program decision - although they note that both groups improved over time to some extent. These effects were not statistically significant (-0.32 SMD, 95% CI: -0.83 to 0.19). However, the authors found a significant, large positive effect on the

number of programmes with good effectiveness evidence underlying them being implemented in a department (0.66 SMD, 95% CI: 0.14 to 1.17). The moderator analysis, which we were not able to calculate standardised effect sizes for, found that organisational research culture was related to the strength of this effect. For departments with an organisational research culture rated as low, there was a smaller positive effect on the number of evidence-based programmes whereas there was a larger positive effect for departments with a stronger organisational research culture. Organisation research culture was self-reported and defined as the extent to which the participant reported that their organisation valued the use of research evidence in decision-making. The authors suggest that their generic evidence use measure, where they found a negative although statistically insignificant effect, may be too vague to obtain reliable and valid responses from participants, in comparison to their more concrete measure of implementation of specific evidence-based programmes.

Table 4. Studies evaluating the effects of access *to evidence* interventions

Study	Intervention description	Population Country	Total sample size(s)	Evidence Use (3 studies) SMD [95% CI]	Capability to use (7 studies) SMD [95% CI]	Opportunity to use evidence (1 study) SMD [95% CI]	Motivation to use evidence (5 studies) SMD [95% CI]
Masset et al. (2013) Beynon et al. (2012)	Varied whether the contents of a policy brief were presented alone, with the view of a well-known sector expert or with the view of an unnamed researcher.	IDS and 3ie mailing lists, as well as a wider set of 7 communities of practice. Made up of researchers, policymakers, practitioners and others. Multi-country study	807 participants (201, 201 and 203 in the three intervention groups respectively, 202 control)	-0.43 [- 0.80; - 0.07] to 0.20 [-0.15; 0.56]	0.11 [-0.16; 0.38]		-0.01, [-0.38; 0.35] to 0.49 [0.12; 0.86]
Dobbins et al. (2009)	Sent tailored, targeted messages with summarised systematic review evidence , combined with access to its repository	Public health departments Canada	108 health departments (36 departments in each of the 3 intervention groups)	-0.32 [-0.83; 0.19] to 0.66 [0.14; 1.17] [a]			

Study	Intervention description	Population Country	Total sample size(s)	Evidence Use (3 studies) SMD [95% CI]	Capability to use (7 studies) SMD [95% CI]	Opportunity to use evidence (1 study) SMD [95% CI]	Motivation to use evidence (5 studies) SMD [95% CI]
Fillol et al. (2022)	Sent seven different versions of a policy brief with the same core content to global health actors, varying the types of authors presented in terms of type of organisation or location. All trial arms received a version of the policy brief.	Global health actors Francophone African countries	233 participants	-0.52 [-0.98; -0.06] to 0.46 [-0.06; 0.98] [a]			-0.80 [-1.27; -0.34] to 0.56 [0.07 to 1.06][a]
Rogger and Somani (2023)	Sent evidence briefings with summarised administrative data on the population they were serving on errors made by officials about their population.	Civil servants in federal, regional, district level government Ethiopia	1455 public officials (1001 intervention, 454 control)		0.10 [0.00;0.21]		

Study	Intervention description	Population Country	Total sample size(s)	Evidence Use (3 studies) SMD [95% CI]	Capability to use (7 studies) SMD [95% CI]	Opportunity to use evidence (1 study) SMD [95% CI]	Motivation to use evidence (5 studies) SMD [95% CI]
Brownson et al. (2011)	Tested different versions of the same policy brief on the topic of screening to reduce breast cancer mortality , varying a more narrative (story) presentation of evidence compared to a data driven presentation, and whether local or state level data is presented. All trial arms received a version of the policy brief.	State-level policy makers—legislative staff, legislators, and executive branch administrators USA	291 state level policymakers (66 received policy brief -1, 66 policy brief -2, 78 policy brief - 3, 68 policy brief – 4)		-0.09 [-0.42 to 0.23] to 0.00 [-0.31 to 0.31] [a]		0.00 [-0.32 ; 0.32] to 0.12 [-0.19 ; 0.43][a]
Opiyo et al. (2013)	Packaged systematic review results in three different formats in the context of a guidelines	Health professionals on a guideline development panel -	77 participants (Each of the 77particpants in each of the 3 intervention				-0.06 [-0.40; 0.28] to 0.40 [0.05; 0.74] [a]

Study	Intervention description	Population Country	Total sample size(s)	Evidence Use (3 studies) SMD [95% CI]	Capability to use (7 studies) SMD [95% CI]	Opportunity to use evidence (1 study) SMD [95% CI]	Motivation to use evidence (5 studies) SMD [95% CI]
	development workshop. Specifically, systematic review reports alone, systematic reviews with summary-of-findings tables, and 'graded-entry' formats (a 'front-end' summary and a contextually framed narrative report plus the systematic review reports)	policy and clinical professionals Kenya	groups received each format)				
De Noia et al. (2003)	Varied whether summarised information about adolescent substance abuse and research evidence about effective programmes was	Mixed population - Policy-making organization, community agencies, schools USA	188 professionals (55 received pamphlets, 64 received CDs, 69 received information over the internet)		-0.20 [-0.56; 0.15] to 0.58 [0.23; 0.93] [a]	0.38 [0.02 to 0.74] to 0.52 [0.17; 0.88][a]	

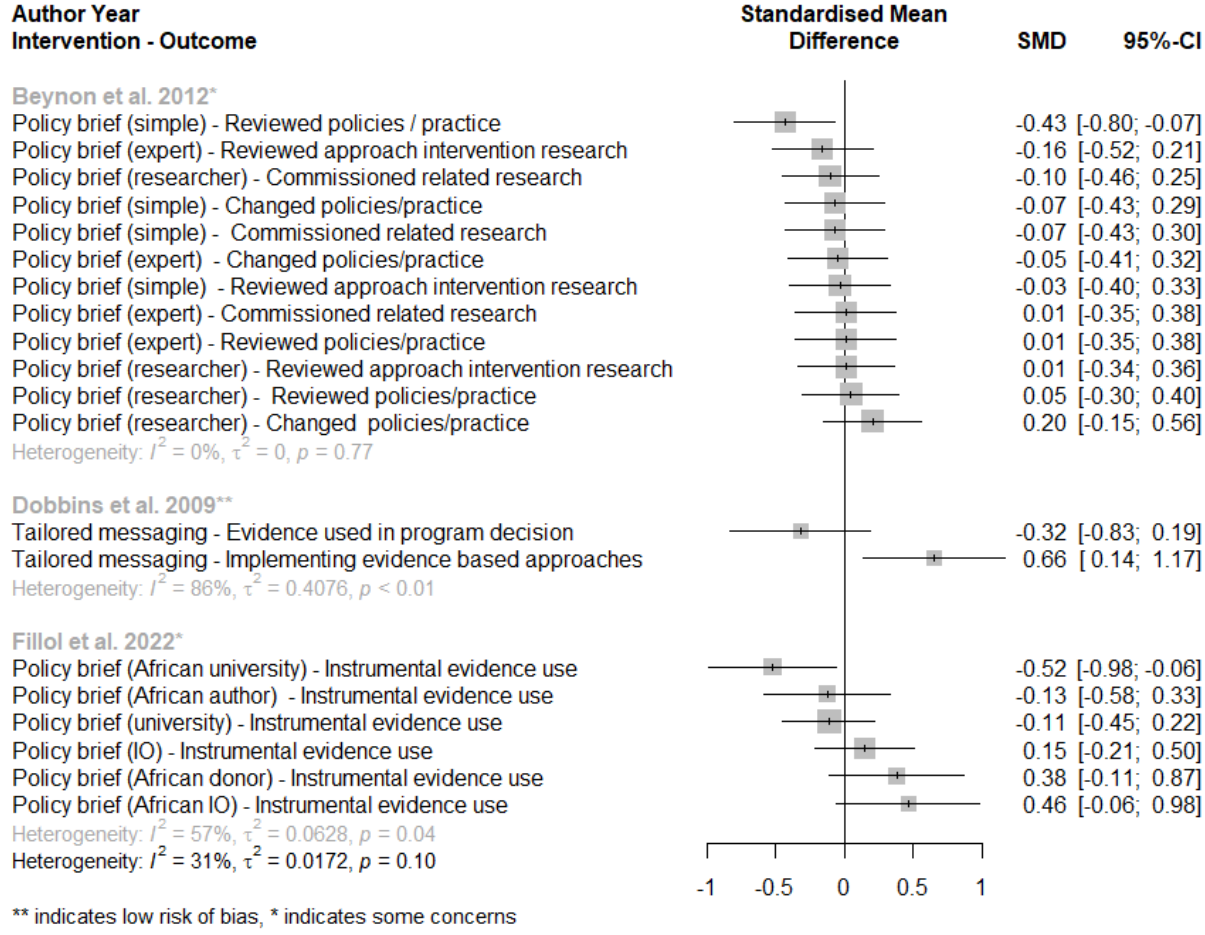
Study	Intervention description	Population Country	Total sample size(s)	Evidence Use (3 studies) SMD [95% CI]	Capability to use (7 studies) SMD [95% CI]	Opportunity to use evidence (1 study) SMD [95% CI]	Motivation to use evidence (5 studies) SMD [95% CI]
	shared through different modes, specifically through the internet, CDs or printed pamphlets.						
Vivalt and Colville (2023)	Varied how much quantitative information on point estimates and their variance was provided to participants in the context of World Bank and IDB policy workshops.	Policy professionals and researchers attending World Bank or IDB workshops Multi-country study	314 participants		0.23 [0.01; 0.45] to 0.30 [0.08; 0.52] [a]		
Toma and Bell (2022)	Undertook a lab in the field experiment where the impacts and total costs were presented to participants.	Staff in 22 federal government agencies whose role involves developing, interpreting, making	191 employees		0.14 [0.02; 0.25] to 0.20 [0.08; 0.32] [a]		

Study	Intervention description	Population Country	Total sample size(s)	Evidence Use (3 studies) SMD [95% CI]	Capability to use (7 studies) SMD [95% CI]	Opportunity to use evidence (1 study) SMD [95% CI]	Motivation to use evidence (5 studies) SMD [95% CI]
	Programmes and their impact were either presented side-by-side on one page rather than in isolation or presented with an impact calculator - the annual cost per person impacted.	decisions using research evidence USA					
Nellis and colleagues (2019)	Undertook an experiment , varying whether professionals saw single study impact evaluation results, meta-analytic results or a “placebo” presentation on upcoming research.	Mid-level and senior policymakers and practitioners active in Washington DC USA	55 participants (Each of 55 particpants in each intervention group and placebo received each type of information)		Unable to calculate standardised effect size – see narrative summary		

Study	Intervention description	Population Country	Total sample size(s)	Evidence Use (3 studies) SMD [95% CI]	Capability to use (7 studies) SMD [95% CI]	Opportunity to use evidence (1 study) SMD [95% CI]	Motivation to use evidence (5 studies) SMD [95% CI]
Makkar et al. (2016)	Sent tailored articles and blogs, drawing on evidence from the Web CIPHER online tool designed to help policymakers better engage with research.	Employees from state and federal-level health agencies Australia	392 policymakers				Unable to calculate standardised effect size – see narrative summary

[a]*These studies included an active control group and therefore a negative coefficient is a reduction in the outcome compared to another treatment, rather than business as usual.*

Figure 13. Effect of access interventions on evidence use outcomes



Summary

- ***Source may affect evidence use**. Differences in self-reported use were observed depending on the geographical location of the policy brief author presented to global health actors in Francophone Africa (Fillol et al. 2022). However, a study testing the effects of whether a policy brief was presented alone, with the view of a well-known sector expert or an unnamed researcher did not overall find a clear pattern of effects on reported evidence use and largely did not have statistically significant, positive results (Beynon et al. 2012).*

- *Targeted and tailored messaging summarising systematic review evidence with access to an online registry of research evidence was effective in increasing the implementation of evidence-based programmes in one evaluation in Canada (Dobbins et al. 2009). The **extent to which an organisation already valued research evidence positively influenced impact** on self-reported evidence use.*

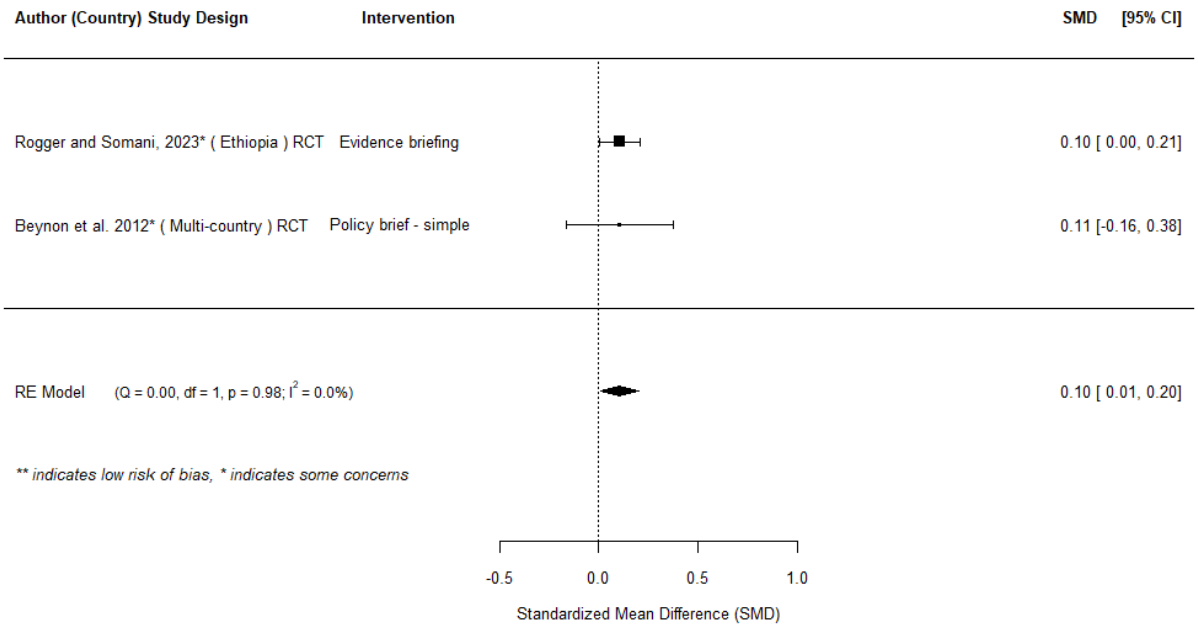
The effect of access interventions on capability to use evidence

We included seven studies that evaluated the impact of a programme working through an access mechanism on an indicator of capability to use evidence. We were able to include two of these studies in a meta-analysis. Rogger and Somani (2023) evaluated the impact of evidence briefings to public officials with summarised administrative data on the population

they were serving on errors made by officials about their population. Beynon and colleagues (2012), also reported in Masset and colleagues (2013), evaluated the impact of sending a simple version of a policy brief on the topic of biofortification and home garden effectiveness on evidence-accurate beliefs about effectiveness for both topics. We created a synthetic, or average, standardised effect size for the two similar outcomes from this study. The remaining studies are discussed narratively and presented in forest plots.

Access interventions **had a small positive and statistically significant effect on *capability to use evidence*.** The overall weighted average effect from two included estimates is 0.10 standard deviations (95% CI: 0.01 to 0.20; p = .03) (Figure 14). There is no heterogeneity across included estimates (Q(1) = 0.001, p = .98, $\hat{\tau}^2 = 0.00, I^2 =$ 0.0.%). Given the small number of included studies, this result should be interpreted with caution.

Figure 14. Forest plot showing observed outcomes and estimates of the random-effects model for the effect of access interventions on capability to use evidence.



Note. *A synthetic effect size was created for Beynon et al. (2012)*

We now discuss the results of the studies that evaluate the impact of access to evidence on capability to use evidence, but that we were unable to combine in a statistical meta-analysis due to the heterogeneity in control condition (Figure 15).

We were unable to calculate standardised effect sizes from Nellis and colleagues (2019) due to insufficient information presented in the paper, therefore we present the narrative results from their experiment with policymakers and practitioners that varied presentation of results from their Metaketa initiative of coordinated RCTs. In this experiment, each participant was presented at varying points with results from a meta-analysis of Metaketa results, a single Metaketa study, results from an external single study not conducted by them and a placebo presentation. The participants were asked to make predictions about the results of an unseen study after each of these presentations. They found that participants responded most to meta-analytic results compared with the placebo or the external study, in terms of improvement in

prediction about results of an unseen study and changing beliefs about the effects of intervention. However, these are not significantly stronger than the inferences from the single study in most cases. They did not find that the participants placed more weight on positive results, or more weight on the results they saw at the beginning of the experiment or the end of the experiment (consistency or recency bias).

Beynon and colleagues (2012) also evaluated whether the simple version of a policy brief increased the chance of the participants having an opinion about the effectiveness of the interventions in the policy brief (specifically home gardens and biofortification), compared to placebo. We did not include this outcome measure in the meta-analysis because of the dependence of effect sizes. They found that the policy brief did result in a moderate increase in the proportion of participants that had a view on biofortification (0.27 SMD, 95% CI: 0.003 to 0.54). While there was also a small increase in the proportion of participants that had a view on home gardens, this increase was not statistically different from the control group (0.15 SMD, 95% CI: -0.12 to 0.42). The authors also varied whether the contents of a policy brief were presented alone (results included in the meta-analysis above), presented with the view of a well-known sector expert or with the view of an unnamed researcher. They assessed impact on the beliefs about the effectiveness of the interventions presented (evidence-accurate beliefs) and whether they had an opinion about the intervention effectiveness. There was not a strong pattern of differences in terms of change in beliefs depending on the type of policy brief. Specifically, for those receiving the sector expert framed briefs, there was a very small but non-significant increase in evidence-accurate beliefs about home garden effectiveness (0.06, 95% CI: -0.21 to 0.34) and no change for biofortification (0.01 SMD, 95% CI: -0.26 to 0.29). For those receiving the researcher-framed briefs, there was a similarly very small non-significant increase in evidence accurate beliefs about home garden effectiveness (0.05 SMD, 95% CI: -0.23 to 0.32) and a moderate but still non-significant increase in evidence-accurate beliefs about biofortification (0.22 SMD, 95% CI: -0.05 to 0.49).

There were similar results for the different types of policy briefs in terms of whether they increased the proportion of people with an opinion about biofortification effectiveness. There was a moderate increase in opinions for the policy brief with a sector authority view compared not receiving the policy brief (0.27 SMD [95% CI: -0.006 to 0.54]), and a large increase in opinions for the policy brief with a researcher view compared to not receiving the policy brief (0.42 SMD [95% CI: 0.14 to 0.69]). However, the effects for opinions on home gardens were not significant (sector authority view compared to not receiving the policy brief: 0.02 SMD [95% CI: -0.25 to 0.30], researcher view compared to not receiving the policy brief: 0.05 SMD [95%: -0.22 to 0.32]). When looking at sub-groups however, they did find that the policy brief had little effect on changing the beliefs of participants who held strong prior beliefs at the beginning of the study but had a greater effect on creating evidence-accurate beliefs among those that did not have prior beliefs.

Brownson and colleagues (2011) varied whether the contents of a policy brief on cancer prevention were presented alongside state level data or data that was local to the participant, as well as whether it included a story or focused on data only. In terms of brief understandability, all treatment groups found the briefs to be understandable. There were very small non-significant differences in views on understandability between a policy brief that was data-focused at the local-level compared to a data focused at the state level brief (-0.09 SMD, 95% CI: -0.42 to 0.23), between a policy brief that was story focused with state level data

compared to the state level data brief (0.00 SMD, 95% CI: -0.31 to 0.31) and between a brief that was story focused with local data compared to the state level data brief (-0.09 SMD, 95% CI: -0.41 to 0.23).

Toma and Bell (2022) varied whether presenting impact evaluation results and total cost of a hypothetical programme individually to US federal policymakers or presenting two sets side by side resulted in greater sensitivity to the results of the impact evidence. They found that presenting impact and cost results side by side instead of one by one individually led to a moderate increase in the sensitivity to the evidence of 0.20 standard deviation units (95% CI: 0.08 to 0.32). The authors measured sensitivity to impact using the relationship between a percent-change in program impact and a percent-change in assessments of program value by policymakers.

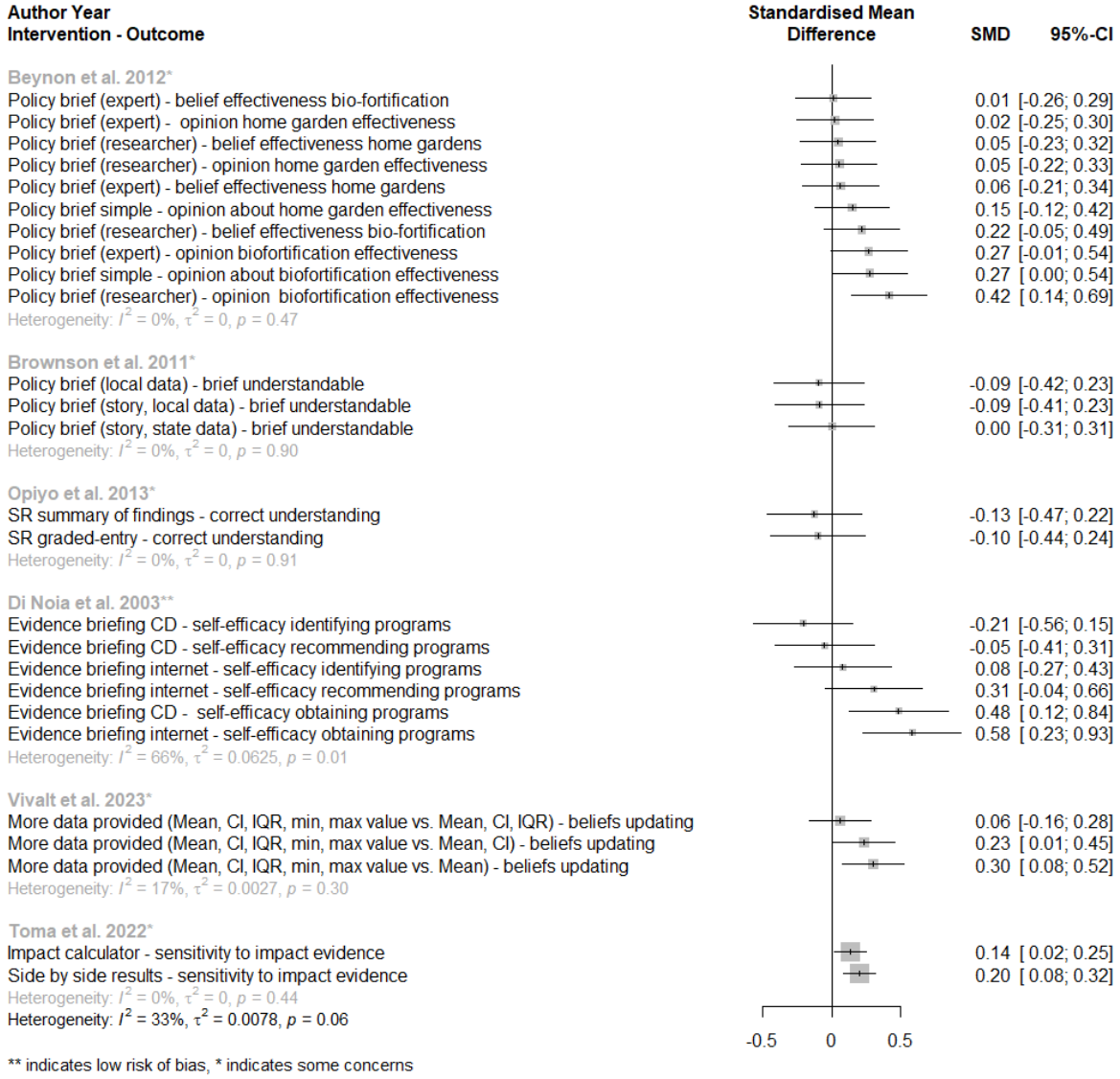
Two studies varied the quantitative information provided alongside quantitative evidence (Vivalt and Coville 2023; Toma and Bell 2022). Toma and Bell (2022) found that by providing the annual cost per additional person impacted alongside impact evaluation results and total cost of a hypothetical programme, US federal policymakers' sensitivity to the impact evidence increased by 0.14 standard deviation units (95% CI: 0.02 to 0.25), compared to those policymakers that just saw the hypothetical impact results and total cost. The theory behind this approach was that providing policymakers with the annual cost per person impacted, although calculable from the other information provided, would reduce the cognitive burden of assessing impact and make those policymakers more sensitive to assessing the value of the programmes. Vivalt and Coville (2023) tested whether providing additional statistical information to policymakers, policy practitioners, and researchers alongside point estimates leads to greater updating of beliefs when presented with new evidence. They found that compared to just providing the point estimate, providing confidence intervals, interquartile ranges (IQR), and min and max value of the data increased belief updating by 0.30 standard deviation units (95% CI: 0.08 to 0.52). Compared to just providing the point estimate and confidence intervals, providing confidence intervals, IQR, and min and max value of the data increased belief updating by 0.23 standard deviation units (95% CI: 0.01 to 0.45).

We identified one study that tested the provision of evidence via different formats. Opiyo and colleagues (2013) varied the presentation of systematic review findings in the context of a clinical guideline development process in Kenya. Healthcare policymakers and other professionals received either full systematic review reports alone, systematic reviews with summary-of-findings tables, or graded-entry reports, which included a 'front-end' summary, a contextually framed narrative report plus the full report. They found that the summary of findings table and graded entry versions had slightly negative, although statistically non-significant, effects on correct understanding about relevant intervention effectiveness (respectively to -0.13 SMD, [95% CI: -0.47 to 0.21] and -0.10 SMD, [95% CI: -0.44 to 0.24]).

One study tested provision of evidence via different dissemination channels (Di Noia et al. 2003), providing an evidence pamphlet on the problem of drug abuse and evidence-based programmes for prevention via the internet, a print copy in the mail and CD. They found the largest results for dissemination via the internet compared to print copies in terms of perceived self-efficacy for obtaining programmes (0.58 SMD, 95% CI: 0.23 to 0.93) and self-efficacy for recommending programmes (0.31 SMD, 95% CI: -0.04 to 0.66), with a very small, non-statistically significant effect on perceived self-efficacy for identifying programmes (0.08 SMD,

95% CI: -0.27 to 0.43). They found a large positive effect for provision via CD compared to print copies for perceived self-efficacy for obtaining programmes (0.48 SMD, 95% CI: 0.12 to 0.84), but a very small negative, statistically non-significant effect for self-efficacy for recommending programmes (-0.05 SMD, 95% CI: -0.40 to 0.30) and a moderate but not significant reduction in self-efficacy for identifying programmes (-0.20 SMD, 95% CI: -0.56 to 0.15).

Figure 15: Effect of access interventions on capability to use evidence outcomes



** indicates low risk of bias, * indicates some concerns

Summary

- *The small number of* ***studies testing different approaches to evidence presentation and dissemination do not find clear patterns of difference on capability to use evidence depending on how evidence was presented.*** *The impact of a policy brief on evidence accurate beliefs did not vary in terms of the brief form, specifically whether it was presented with the view of a sector expert, an unnamed researcher or without an expert view (Masset et al 2013.; Beynon et al. 2012). A study in the USA did not find differences on brief understandability depending on whether the brief presents data that is more local*

to the participant vs regional data, or includes a story compared to data only (Brownson et al. 2011).

- *However, policy briefs had little effect on changing the beliefs of participants who held strong prior beliefs but had a greater effect on creating evidence-accurate beliefs among those who did not (Masset et al 2013; Beynon et al. 2012).*
- *Providing additional, supporting statistical information to policymakers led to greater updating of beliefs when presented with new evidence (Vivalt and Colville 2023). Presenting impact evaluation results side by side compared to presenting results individually or providing the annual cost per additional person impacted can improve sensitivity to programme impact data (Toma and Bell 2022)*[12]*.*
- *Summary of findings or contextually framed narratives around systematic review evidence did not improve correct understanding about intervention effectiveness in a guidelines development workshop in Kenya (Opiyo et al. 2013).*
- *While there was some evidence that dissemination via the internet was more effective than provision via print or CDs, this study is over 20 years old and modes of communication have changed drastically.*

The effect of access interventions on opportunity to use evidence

We included one study that tested access to evidence on opportunity to use evidence (Di Noia et al. 2003), specifically on self-reported accessibility of information. They found a large positive, statistically significant effect of providing an evidence summary via the internet compared to a printed pamphlet (0.52 SMD, 95% CI: 0.17 to 0.88), and a smaller positive effect by CD compared to a printed pamphlet (0.38 SMD, 95% CI: 0.02 to 0.74).

Summary

- *Providing evidence summaries via the Internet had a greater effect on increasing accessibility and the opportunity to use the evidence than CDs and printed pamphlets. However, as discussed above, this study is over 20 years old, and modes of communication have changed drastically.*

The effect of access interventions on motivation to use evidence

We identified five impact evaluations of programmes that worked through an access mechanism that measured an indicator of motivation to use evidence. We present below the results of four of these studies in Appendix Figure 1. These were too diverse in terms of control condition to combine in a statistical meta-analysis. These studies largely evaluated different approaches to effective communication and dissemination of research evidence. We were unable to calculate reasonable effect sizes for Makkar and colleagues (2016), so we present results narratively instead.

[12] Toma and Bell (2022) measure sensitivity to impact using the relationship between a percent-change in program impact and a percent-change in assessments of program value by policymakers.

Opiyo and colleagues (2013) varied the presentation of systematic review findings in the context of a clinical guideline development process in Kenya. They found that the graded entry versions of systematic reviews with a contextually framed narrative improved reported accessibility and clarity of the information (0.40 SMD, 95% CI: 0.05 to 0.74). They found a very small negative, but not statistically significant effect, of being provided with the summary of findings table compared to the full systematic report only (-0.06 SMD, 95% CI: -0.40 to 0.28).

We were unable to calculate reasonable effect sizes from Makkar and colleagues' (2016) evaluation using the information presented in the paper, therefore we present the narrative results from their interrupted time series study. In this study, the authors sent Australian policymakers tailored articles and blogs, drawing on evidence from the Web CIPHER online tool designed to help policymakers better engage with research. Web CIPHER used the web and emails to provide access and delivery of health research, and the authors evaluated the impact on usage of the online tool. They found that publication of tailored articles that were relevant to particular policy organisations' goals resulted in increased, and sustained usage of the tool by some organisations targeted but not all. In general, page views of articles were higher for the targeted policy organisations. Publication of blogs were not associated with increases in usage of the online tool.

Fillol and colleagues (2022) evaluated the impact of sending seven different versions of a policy brief with the same core content to global health actors in French speaking African countries, varying the types of authors presented in terms of type of organisation or location. As well as the instrumental evidence use reported above, they measured impact on perceived quality of knowledge in the briefs. Like the impacts on instrumental use, participants that received a policy brief from an African university were significantly less likely to report that they thought the knowledge in the brief was of high quality than participants that received the same policy brief from a European / North American university (-0.80 SMD, 95% CI: -1.27 to -0.34). Overall, those that received a policy brief from an African organisation were slightly less likely to report that the knowledge was of high quality compared to those that received a policy brief from a North American or European organisation, although this was very small and not statistically significant (-0.08 SMD, 95% CI: -0.54 to 0.38). Participants that received a brief from an African international organisation or donor were more likely to report the knowledge in the brief as being high quality compared to the European or North American equivalent (respectively: 0.47 SMD, 95% CI: -0.06 to 0.98 and 0.56 SMD, 95% CI: 0.07 to 1.06).

Brownson and colleagues (2011) varied whether the contents of a policy brief on cancer prevention were presented alongside state level data or data that was local to the participant, as well as whether it included a story or focused on data only. They measured whether the briefs were found to be credible and whether they were likely to be shared and likely to be used. The authors report that all treatment groups found their versions of the briefs to be credible, and so there were no patterns of difference between a policy brief that was story-focused at the local-level compared to a data focused at the state level brief (0.00 SMD, 95% CI: -0.32 to 0.32) or a policy brief that included local level data compared to a state level data brief (0.00 SMD 95% CI: -0.32 to 0.32). A story-focused brief with state level data had a small positive effect on brief credibility, although this finding was not statistically significant (0.12 SD, 95% CI: -0.19 to 0.43). There were no strong patterns of difference on the outcomes of policy brief likely to be used or likely to be shared between different versions of the brief, as can be

seen in Appendix Figure 1. Their exploratory analysis indicated that there was a difference in the likelihood of use, however, from different groups of policymakers. Legislative staff members who collate evidence and help produce legislative proposals were found to be the most likely to use the story focused, state data brief (0.29 SMD, 95% CI: -0.02 to 0.61), although this difference was not statistically significant, in comparison to legislators and executive staff members. Legislators themselves reported they would be more likely to use the data focused state level brief compared to the story focused state brief (0.31 SMD, 95% CI: -0.0009 to 0.62).

Beynon and colleagues (2012) reported on the impact of different versions of a policy brief on a number of indicators capturing motivation to use evidence, as can be seen in the forest plot in Appendix Figure 1 in Appendix F. This included whether participants would inform someone about the messages of the brief, whether they would read the full report of the studies in the brief, re-read the brief and whether they reported they would change policies or practice. While there was no difference between the various versions of the brief and the control group for a number of motivation related outcomes, they did find a moderate positive effect for the expert framed version compared to the control group (0.33 SMD, [95% CI: 0.05 to 0.60)] and a small but non-significant positive effect for the researcher versions of the brief compared to the control group (0.13 SMD, [95% CI: -0.13 to 0.40]) on whether they said they would inform someone about the messages.

They found moderate but non-significant positive effects on whether they did inform someone about the messages of the brief (respectively for experts: 0.34 SMD, [95% CI: -0.03 to 0.70], and researchers: 0.21 SMD, [95% CI: -0.15 to 0.56]). This is in comparison to the effect on informing someone after the brief messages for participants who received the simple version of the brief (0.07 SMD, 95% CI: -0.30 to 0.43). They also found a large positive effect on whether the participants went on to write a blog or article about the contexts of the brief for those that received the expert framed brief (0.49 SMD, 95% CI: 0.12 to 0.86) and a moderate positive but non-significant effect for those that received the researcher framed brief (0.25 SMD, 95% CI: -0.11 to 0.60). This is in comparison to the simple version of the brief that had no effect on whether a participant went on to write a blog or article compared to the control group (-0.01 SD, 95% -0.38 to 0.35).

Summary

- *The presentation and source of evidence affected motivations to use it in some cases. Contextually framed narratives around systematic review evidence improved the accessibility and clarity of the information (Opiyo et al. 2013). Moreover, evidence-communication from different types of institutions affected motivations. Compared to European and North American counterparts, knowledge in a policy brief was more likely to be labelled high quality by participants in French-speaking African countries when it came from African international or donor organisations but less likely to be labelled high quality when from African universities compared to European and North American universities (Fillol et al. 2022).*

- *There were no clear patterns in terms of impact on the motivation to use evidence depending on whether a policy brief presented data that was more local to the participant vs regional data, or whether it included a story compared to data only (Brownson et al. 2011). Policy briefs that included an opinion from an expert or researcher did improve the*

likelihood of participants informing someone about the messages of the brief (Beynon et al. 2012).

2. Skills to use evidence interventions

Case study: Masset and colleagues (2013) and Beynon and colleagues (2012): An RCT testing the impact of a policy brief

Masset and colleagues (2013), also reported in Beynon and colleagues (2012), was one of the only impact evaluations included in the review that evaluated outcomes at multiple stages of the EIDM intervention logic model. They used an RCT to test the impact of various versions of a policy brief on biofortification and home garden interventions on self-reported evidence use as well as measures of capability to use evidence and motivation to use evidence. Some participants received a simple version of the brief, whereas some received a brief including a sector expert's view or the view of an unnamed researcher to test authority effects. The evidence included in each brief was the same. They found the following results:

- Capability to use evidence: The impact of the brief on recipients' evidence-accurate beliefs appeared to be independent of the specific version of the brief. However, they found that the policy briefs had little effect on changing the beliefs of participants who held strong prior beliefs about an intervention but had a greater effect on creating evidence-accurate beliefs among those who did not.
- Motivation to use evidence: policy briefs that included an opinion from an expert or researcher did improve the likelihood of participants stating they had written a blog about the brief, that they intended to inform someone about the messages of the brief and then whether they went on to do this. However, there were no clear patterns of impact on other measures of motivation to use evidence such as seeking further information.
- Evidence use: the evaluation did not overall find a clear pattern of effects on reported evidence use by version of the brief and largely the brief did not result in respondents stating they would review or change their policy or practice on biofortification or home gardens.

The authors ultimately concluded that overall, the policy briefs had a limited impact in their study and that more experiments are needed to assess the impact of different research dissemination methods.

Summary of key findings

- Three studies tested an intervention that worked solely through training and skills building of policymakers in EIDM and quantitative research (Table 5). One of these used a quasi-experimental design to evaluate the programme and two were rated as having a high risk of bias (Jacobs et al. 2014; Brownson et al. 2017). One of the included took place in an LMIC, in Pakistan (Mehmood et al. 2024).

- Effects were largely positive across outcomes, including evidence use, capability, and opportunity to use evidence.

- A study of a programme providing quantitative research methods training to junior ministers in Pakistan finds particularly large and consistent effects, including on their willingness to use funds for and run RCTs, while potentially reducing willingness to use funds for data which cannot provide causal attributions (Mehmood et al. 2024).

Table 5. Studies evaluating the effects of skills to use evidence interventions on evidence use

	Intervention description	**Country** **Population**	**Total sample size(s)**	**Evidence Use (2 studies)** **SMD [95% CI}**	**Capability to use (3 studies)** **SMD [95% CI}**	**Opportunity to use evidence (1 study)** **SMD [95% CI}**	**Motivation to use evidence (3 studies)** **SMD [95% CI}**
Mehmood et al. (2024)	Training in quantitative research methods	Pakistan Junior ministers	190 ministers (70 intervention, 120 control)	0.52 [0.23; 0.80]	0.34 [0.05; 0.62]		1.25 [0.95,1.55]
Brownson et al. (2017)	Impact of a multi-day training in EIDM plus follow-up technical assistance	USA State health policy professionals	12 states (6 intervention, 6 control)	0.10 [-0.07; 0.26]	0.33 [0.17; 0.50]	0.26 [0.10; 0.43]	-0.02 [-0.18; 0.14]
Jacobs et al. (2014)	Delivery of 9-module training curriculum on EIDM	USA Local health department staff	396 staff (82 intervention, 214 comparison)		0.34 [0.11; 0.56]		-0.13 [-0.35,0.10]

The effects of policymakers skills to use evidence interventions on evidence use

Policymaker skills interventions had a moderate positive but not statistically significant effect on evidence use. The overall weighted average effect from the two included estimates is 0.29 standard deviations (95% CI: -0.12 to 0.70; p = .17). We included two studies in a statistical meta-analysis on the impact of programmes that worked primarily through building the skills of policymakers in EIDM on their use of evidence. Mehmood and colleagues (2024) tested the impact of a training in quantitative research methods for junior ministers in Pakistan on whether they sent a letter recommending a policy for which there is RCT evidence – specifically deworming in schools – or a letter recommending a budget allocation for deworming to the federal government. Brownson and colleagues (2017) evaluated the impact of a multi-day training on evidence-based decision making for US health policymakers on their self-reported use of research evidence and their department's use of programme evaluation in decision-making. The training was followed up with additional training and support, including for building an organisation culture of EIDM and building evaluation capacity. This study was

rated as having a high risk of bias. Further details of the meta-analysis, including the forest plot, can be found in Appendix F (Appendix Figure 2).

Mehmood and colleagues (2024) also measure the impact on other proxies related to evidence use, specifically whether the junior ministers also sent more letters recommending orphanage renovation policies or increased funds and school renovation policies or increased funds. These were policies for which no RCT evidence was provided but which were under spending review in the relevant budget cycle and thus served as placebo policies. We did not include this outcome measure in the meta-analysis because of the dependence of effect sizes and because the outcome was qualitatively different from those in the meta-analysis. For these placebo outcomes, they found no change or limited change in requests. There was no difference in letters sent about orphanage renovation policies (0.03 SMD, 95% CI: -0.26 to 0.31) and a small negative, non-statistically significant effect on letters sent about school renovation policies (-0.10 SMD, 95% CI, -0.38 to 0.19).

Summary

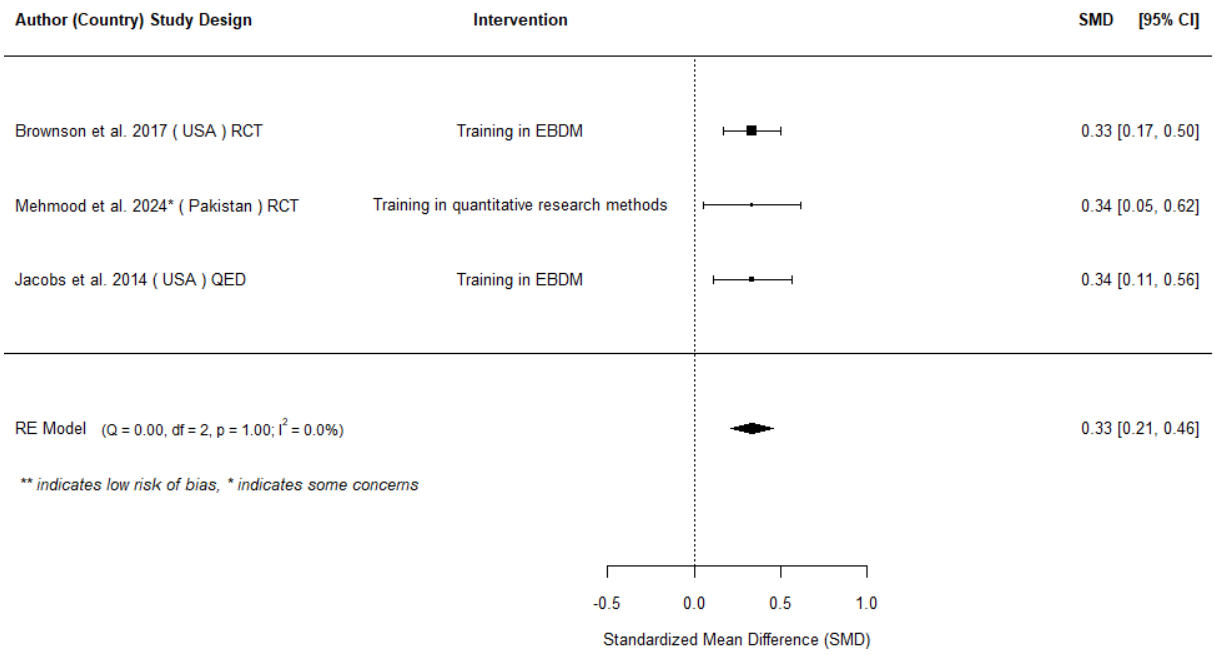
- *Training programmes for policymakers in evidence-based decision-making and quantitative research methods had a moderate positive effect on the use of evidence.*

The effects of policymakers skills to use evidence interventions on capability to use evidence

***Skills interventions* had a moderate positive and statistically significant effect on *capability to use evidence*.** The overall weighted average effect from the three included estimates is 0.33 standard deviations (95% CI: 0.21 to 0.46; p< .001) (Figure 16). We included three studies in a statistical meta-analysis on the impact of programmes that worked primarily through building the skills of policy makers in EIDM on their capability to use evidence. These were Mehmood and colleagues (2024) and Brownson and colleagues (2017) described above, as well as Jacobs and colleagues (2014). Jacobs and colleagues (2014) evaluated the delivery of a nine module Evidence-Based Public Health (EBPH) training curriculum to local health department staff in the USA. Both Jacobs and colleagues (2014) and Brownson and colleagues (2017) report effects on a measure of the EIDM skills gap. These two studies were rated as having a high risk of bias. Mehmood and colleagues (2024) evaluate capability to use evidence through scores from regular policy assessments conducted as part of their routine ministerial training, for example on research methods, as well as the correct answer when ministers were asked about the reasons to run an RCT. We combined these measures into a synthetic effect size to include in the meta-analysis.

As Figure 16 shows, there is no heterogeneity across included estimates (Q(2) = 0.0002, p = .99, $\hat{\tau}^2 = 0.00$, $I^2 =$ 0.0.%). Given the small number of included studies, this result should be interpreted with caution.

Figure 16. Forest plot showing observed outcomes and estimates of the random-effects model for the effect of skills interventions on capability to use evidence.



Note. A synthetic effect size was created for Mehmood and colleagues (2024)

Jacobs and colleagues (2014) also report on an additional outcome measure related to capability, that is, the self-reported availability of EIDM competencies for study participants, either in their own skillset or among others in their department. We did not include this outcome measure in the meta-analysis because of the dependence of effect sizes. Similar in magnitude to the studies in the meta-analysis, they find a moderate positive, statistically significant effect on this measure of 0.29 standard deviation units (95% CI: 0.06 to 0.51).

Summary

- *Training programmes for policymakers in evidence-based decision-making and quantitative research methods had moderate statistically significant positive effects on capabilities to use evidence.*

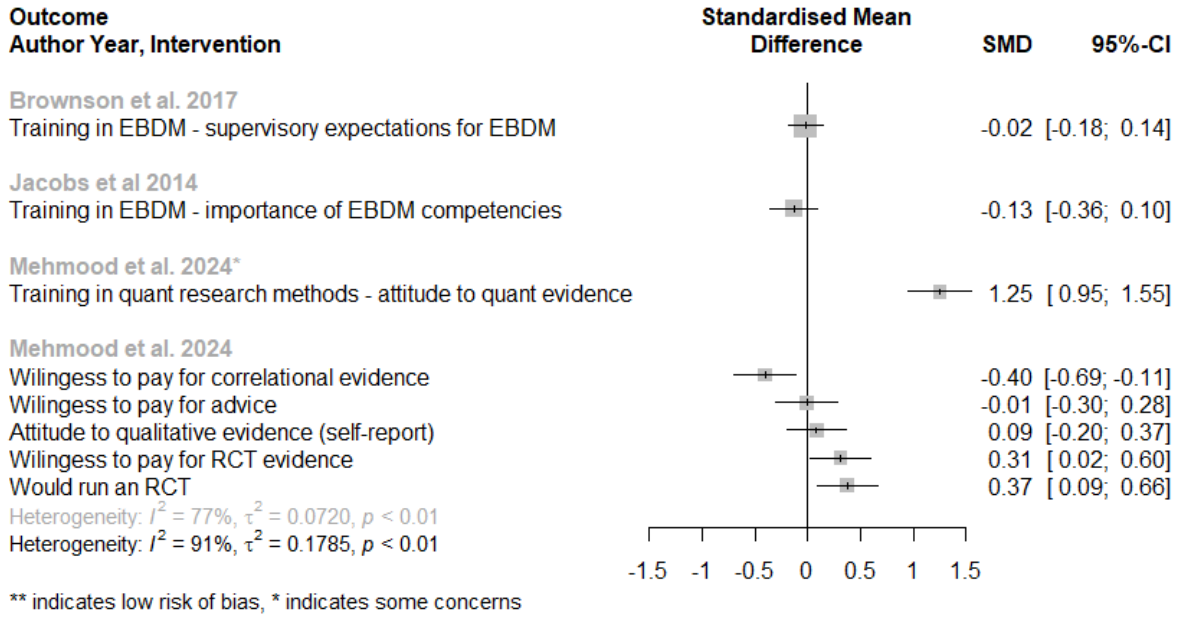
The effects of policymakers skills to use evidence interventions on motivation to use evidence

We included three studies (three effect sizes) that measured the impact of programmes that worked primarily through building the skills of policymakers in EIDM on their motivation to use evidence. Mehmood and colleagues (2024) measured attitudes towards quantitative evidence. Jacobs and colleagues (2014) measured the perceived importance of EIDM competencies. Finally, Brownson and colleagues (2017) measured perceived supervisory expectations for EIDM in their department, for example, whether their direct supervisor expected them to use EIDM. Two of the studies were rated as having a high risk of bias – Jacobs and colleagues (2014) and Brownson and colleagues (2017).

As Figure 17 shows, both Brownson and colleagues (2017) and Jacobs and colleagues (2014) did not find that EIDM training resulted in improvements in motivation to use evidence

(respectively, -0.02 SMD, 95% CI: -0.18 to 0.14 for Brownson et al. 2017, and -0.13 SMD, 95% CI: -0.36 to 0.10, Jacobs et al. 2014).

Figure 17. Forest plot showing observed outcomes and estimates of the effect of skills interventions on motivation to use evidence.



In contrast, Mehmood and colleagues (2024) measured the impact on several indicators of motivation to use evidence and found substantial effects of quantitative methods training. They found a very large positive effect on attitudes towards quantitative evidence in policymaking four months after training (1.25 SMD, 95% CI: 0.95 to 1.55). They found a small but non-statistically significant effect on attitude towards qualitative evidence (not included in their training) of 0.09 standard deviation units (95% CI: -0.20 to 0.37). They found a larger positive effect on whether the minister suggested they would run an RCT (0.38 SMD, 95% CI: 0.09 to 0.66) and their willingness to pay for evidence from public funds for results from a RCT on the impact of deworming (0.31 SMD, 95% CI: 0.02 to 0.60). They found a large and statistically significant reduction in the ministers' willingness to pay for evidence from public funds for correlational data on incomes of schools with and without deworming programme of -0.40 standard deviation units (95% CI: -0.70, -0.11) and no change on willingness to pay for evidence from public funds for advice from senior public officials on the impact of deworming policy (-0.01 SMD, 95% CI: -0.30 to 0.28).

Summary

- *While evidence from the studies with a high risk of bias indicates no effect on motivation to use evidence, the results from the one included high-quality study suggest that skills interventions may increase willingness to use funds for and run RCTs, while potentially reducing willingness to use funds for data which cannot provide causal attributions.*

The effects of skills to use evidence interventions on opportunity to use evidence

Brownson and colleagues (2017) were the only included study to measure the impact of a skills intervention on an indicator of opportunity to use evidence, specifically self-reported access to evidence and skilled staff in their department. They found a moderate positive, statistically significant effect on this outcome of 0.26 standard deviation units (95% CI: 0.10 to 0.43). This study was rated as having a high risk of bias.

3. Multi-mechanism interventions

Summary of key findings

- Five studies tested an intervention that worked through two or more mechanisms of change (Table 8). Only one of these took place in a LMIC, in Brazil.
- The Research to Policy Collaboration rapid response model linking researchers with policymakers in the USA shows promise for improving evidence use and researcher-policy engagement, in this case with congressional offices (Crowley et al. 2021a; Crowley et al. 2021b). This was one of the only studies included in the review that used an objective rather than self-reported measure of evidence use, specifically use of research evidence language in legislation. The model involved training of researchers in the policy process and best practice for knowledge translation as well as facilitating interactions between them and congressional offices
- Tailored, targeted evidence messages combined with a knowledge broker had a positive effect on evidence use in public health organisations in the USA with a low organisational research culture but had a negative effect in organisations that placed a high value on research evidence (Dobbins et al. 2009).
- A study of an information session for municipality mayors in Brazil that presented on the value of impact evaluation and the research evidence around increasing tax compliance demonstrated that in some contexts, targeted provision of evidence to senior policymakers can lead to policy implementation (Hjort et al. 2020).

Table 8. Studies evaluating the effects of interventions combining multiple mechanisms of change

	Intervention description	Country Population	Total sample size(s)	Mechanisms of change	Evidence Use (3 studies)	Capability to use (2 study)	Opportunity to use evidence (1 study)	Motivation to use evidence (3 studies)
Crowley et al. (2021a and 2021b)	A rapid response programme targeting both researchers and congressional offices (Research-to-Policy Collaboration (RPC)	USA Researchers and US congressional offices working on child and family related policy	96 congressional offices (48 intervention, 48 control) 226 researchers (151 intervention, 75 control)	Access, Policymaker-researcher interaction, Skills development, Structure and process	0.25 [-0.15; 0.65]			0.06 [-0.34; 0.46]
Dobbins et al. (2009)	Impact of access to an online knowledge repository, tailored messaging on content from the repository, plus access to a full-time knowledge broker.	Canada Public health departments	108 health departments (36 departments in each of the 3 intervention groups)	Access, Policymaker-researcher interaction, Skills development, Structure and process	-0.06 [-0.57; 0.46][a]			
Wilson et al. (2017a)	Access to demand-led evidence briefing services	United Kingdom	9 Clinical Commissioning Groups	Access, Policymaker-researcher interaction, Skills development,		-0.10 [-0.54; 0.34] to 0.01 [-0.40 to 0.42]	-0.17 [-0.61; 0.27] to -0.09 [-0.49; 0.32]	-0.27 [-0.72,0.17]

and (2017b)	Intervention A involved the briefing service plus a push of tailored evidence, intervention B involved the briefing service plus a push of untailored evidence	Clinical Commissioning Groups of regional public health services	(2 in intervention A, 2 in intervention B, 4 in control)	Structure and process				
Hjort et al. (2020)	Research information session on the value of impact evaluation, on the RCT evidence base around tax compliance nudges, combined with provision of policy briefs	Brazil Municipality mayors / municipality-level government	1,818 municipalities (881 intervention, 937 control)	Access, Skills development	0.10 [0.00; 0.20]	0.14 [0.04; 0.24]		
Scott et al. (2023)	An intervention that connected legislative staff iwith researchers by email, within the context of the COVID-19 pandemic	USA Researchers and state-level legislators working on health committees and their staff	4,050 state level legislators (3,034 intervention, 1,016 control)	Access, Policymaker-researcher interaction				0.03 [-0.03; 0.10]

[a]These studies included an active control group and therefore a negative coefficient is a reduction in the outcome compared to another treatment, rather than business as usual.

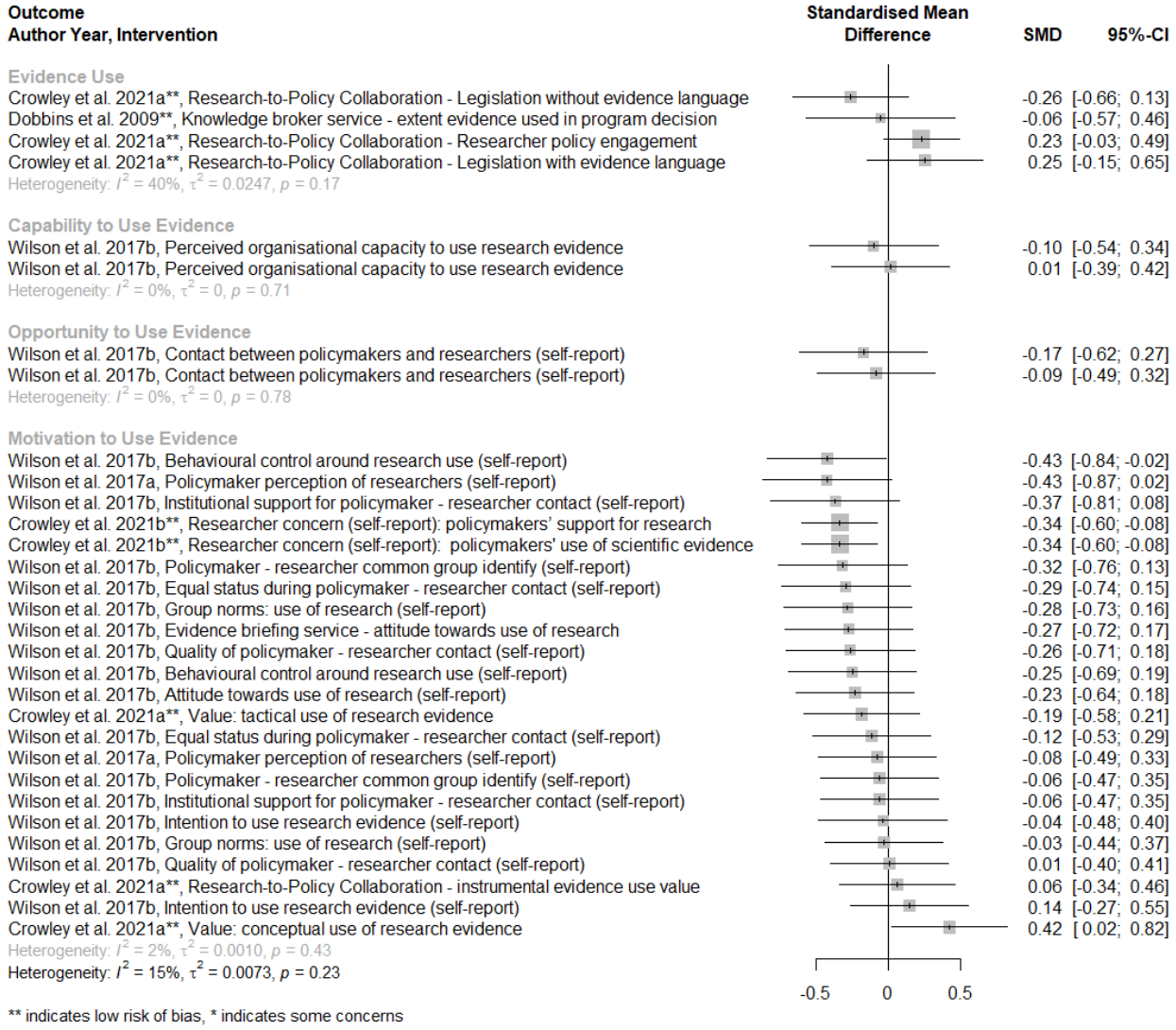
Evidence use

We included three multi-mechanism studies that measured indicators of evidence use in policymaking, presented in Figure 18**.** Crowley and colleagues (2021a) evaluated the impact of a rapid response programme targeting both researchers and congressional offices in the USA, described as an outreach model for supporting legislative use of research evidence regarding child and family policy issues (Research-to-Policy Collaboration (RPC)). The programme combined activities working through access to evidence, policymaker-researcher interaction, skills and structure and processes mechanisms of change. The model involved training of researchers in the policy process and best practice for knowledge translation as well as facilitating interactions between them and congressional offices. They found that the programme moderately improved the instances of congressional offices introducing new legislation on child and family topics that contained research evidence language by 0.25 standard deviation units (95% CI: -0.15 to 0.65), and moderately reduced the instances of new legislation that did not contain research evidence language by (-0.26 SMD, 95% CI: -0.66 to 0.13). They also found a moderate positive effect on the level of researcher policy engagement (0.23 SMD, 95% CI: -0.57 to 0.46).

Dobbins and colleagues (2009) evaluated the impact of access to an online knowledge repository, tailored messaging on content from the repository, plus access to a full-time knowledge broker for public health departments in Canada. The knowledge broker made sure that the decision-makers received accessible, relevant research when needed, helped them to develop their skills and capacity for EIDM, and translated evidence into the local context. The programme combined activities working through access to evidence, policymaker-researcher interaction, skills and structure, and processes and mechanisms of change. In contrast to Crowley and colleagues (2021a), they found a small negative although statistically insignificant effect on the outcomes of interest, specifically, the extent to which evidence was used in a recent program decision in the last 12 months (-0.06 SMD, 95% CI: -0.57 to 0.46) or the sum of 12 different evidence-based policies and programmes being implemented by the department (-0.08 SMD, 95% CI: -0.59 to 0.43). However, their moderator analysis, which we were not able to calculate standardised effect sizes for, found that organisational research culture was related to the effect. For departments with an organisational research culture rated as low, there was a positive effect on the number of evidence-based programmes whereas there was a negative effect for departments with a stronger organisational research culture. Organisation research culture was self-reported and defined as the extent to which the participant reported that their organisation valued the use of research evidence in decision-making. The authors suggest one explanation for this may be that knowledge brokers spent more time on developing department capacity, which may have slowed down decision-making in these departments.

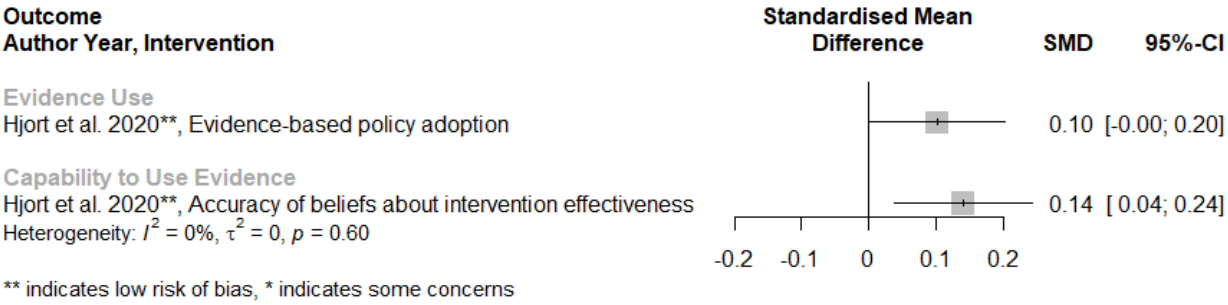
Figure 18. Effect of multiple mechanisms

Interaction, skills, structure/process, and access mechanism combinations



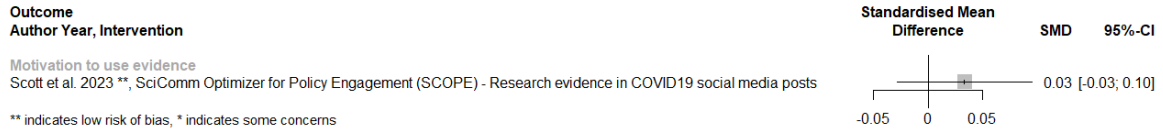
** indicates low risk of bias, * indicates some concerns

Access and skills mechanism combinations



** indicates low risk of bias, * indicates some concerns

Access and interaction mechanism combination



Hjort and colleagues (2020) evaluated an intervention that worked through the combination of **providing access to evidence and supporting development of policymaker skills.** This evaluation tested a research information session for Brazilian municipality mayors at a national conference that introduced the idea of impact evaluation and presented findings from impact studies testing reminder letters on tax compliance. Mayors were also provided with a policy brief summarising these findings. They found a small positive, statistically significant effect on evidence use through the adoption of tax reminder letters in municipalities 15 to 24 months after the intervention of 0.10 standard deviation units (95% CI: 0.00 to 0.20). The authors undertook exploratory analysis to assess whether effects varied by the characteristics of the mayors and the municipalities that they represented, suggesting they could not identify clear evidence of heterogeneity likely due to small sample sizes.

Capability to use evidence

We included two studies (reported in three papers) that measured an indicator of capability to use evidence. Wilson and colleagues (2017a; 2017b) evaluated access to two different demand-led evidence briefing services for clinical health commissioning groups in England. They found that both versions of the evidence briefing service they tested did not have a positive effect on perceived organisational capacity to use research; specifically, -0.10 SMD (95% CI: -0.54 to 0.34) for the tailored evidence version of the briefing service and 0.01 SMD (95% CI: -0.40 to 0.42) for the untailored evidence version. This study was rated as high risk of bias.

Hjort and colleagues' (2020) evaluation that tested a research information session for Brazilian municipality mayors found *a small positive effect on their capability to use evidence,* specifically a significant increase in the accuracy of beliefs about effectiveness of reminder letters in municipalities 15 to 24 months after the intervention of 0.14 standard deviation units (95% CI: 0.04 to 0.24).

Motivation to use evidence

We included three studies that measured an indicator of motivation to use evidence, shown in Figure 18. Wilson and colleagues (2017b) measured a range of indicators of motivation to use evidence, including the reported value of the instrumental use of research evidence, while Crowley and colleagues (2021a) measured the policy makers' value of the use of evidence in policy making and researcher concerns around policy makers use of research. Wilson and colleagues' (2017b) evaluation was rated as having a high risk of bias. Both were evaluations of a programme that combined supporting **researcher - policymaker interaction, skills, structure/process and access mechanisms** on indicators of motivation to use evidence.

Crowley and colleagues (2021a) found a statistically significant, positive effect on policy makers' value of the conceptual use of research evidence in policy making (0.42 SMD, 95% CI: 0.02 to 0.82). They found a very small, positive but non-statistically significant effect on the value for the instrumental use of research evidence in policy (0.06 SMD, 95% CI: -0.34, 0,46). At the same time, the programme reduced researcher's concerns about policy makers support for research (-0.34 SMD, 95% CI: -0.60 to -0.08) and use of scientific evidence in decision-making (-0.34 SMD, 95% CI: -0.60 to -0.08).

In contrast, Wilson and colleagues (2021a) found a range of largely negative although statistically insignificant effects on motivation to use evidence related indicators. These ranged from a -0.43 standard deviation unit (95% CI: -0.87 to 0.02) effect on policy maker perceptions of researchers to 0.14 standard deviation units (95% CI: -0.27 to 0.55) on self-reported intentions to use research evidence in decision-making. However, as noted above this study was rated as being at a high risk of bias.

Scott and colleagues (2023) were the only study in the review to test an intervention that worked through the mechanism combination **of providing access to evidence and supporting interaction of policymakers and researchers.** They evaluated the SciComm Optimizer for Policy Engagement (SCOPE) model, which connected legislative staff in the USA with researchers by email, within the context of the COVID-19 pandemic. They found a very small positive effect, although statistically insignificant and close to zero, on the count of social media posts of targeted policymakers that used research evidence language to talk about the COVID-19 pandemic (0.03 SMD, 95% CI: -0.03 to 0.10). Their secondary analysis indicated that targeted legislators produced 67% more COVID-related social media posts including research evidence language in the categories of data and analytics and 28% more posts on conceptual use of research evidence but saw control group legislators posting 69% more about knowledge generation

Opportunity to use evidence

We included one study (reported in two papers) that measured an indicator of opportunity to use evidence (Wilson et al. 2017a; 2017b), specifically self-reported contact between policymakers and researchers. They evaluated access to two different demand-led evidence briefing services for clinical health commissioning groups in England. They found a small negative effect of both versions of the service, although these were not statistically significant (tailored service: -0.17 SMD, [95% CI: -0.61 to 0.27], untailored version: -0.09 SMD, [95% CI: -0.49 to 0.32]). This study was rated as having a high risk of bias.

4.6 Qualitative synthesis

Having reported the findings of the synthesis to understand the impacts of interventions to support EIDM by policymakers, in this section, we report the results of the qualitative synthesis for the second review question on the factors that have influenced the design, implementation, and impact of these interventions in LMICs.

We identified 152 studies that met our inclusion criteria, including 6 impact evaluations included in the first review question. We included three broad types of studies to address research question 2: (i) qualitative and mixed methods evaluations of EIDM interventions, (ii) reports providing practitioner reflections on delivery of EIDM interventions and (iii) policy case

studies that reported on EIDM interventions in the context of a particular policymaking case. We identified 97 qualitative and mixed methods evaluations, 43 reports providing practitioner reflections and 12 policy case studies.

As indicated above, this thematic synthesis aimed to identify themes related to the interplay of intervention design, intervention implementation, target population and contextual variables with intervention outcomes and effects. In total, we identify 49 descriptive themes configured into 11 analytical themes, which we discuss in more detail below. Table 9 provides an overview of the 11 analytical themes, including a short summary of each, as well as the descriptive themes on which the analytical themes are configured.

Table 9. High-level findings of the qualitative evidence synthesis focussed on identifying the factors that have influenced the design, implementation, and impact of EIDM interventions in LMICs

Descriptive themes based on the inductive coding of primary studies' findings	Number and type of studies per theme	Analytical themes derived from the configuration of descriptive themes
• Limited skills and experience • Lack of training and capacity development • Conceptual understanding of evidence	Total: 25 studies Qualitative/mixed methods evaluations (n = 14) Practitioner reflections (n=9) Policy case studies (n = 2)	**5.4.1 Analytical theme 1: Evidence users' lack of skills and experience as well as inadequate training may affect the ability and opportunity to engage and use evidence while evidence producers' limited skills and experience may impact ability to engage with evidence users and provide relevant evidence.** **(Population)** Policymakers' limited capacity to access and assess scientific publications, engage with researchers, and use evidence products such as evaluation reports may lead to challenges in the utilization of evidence. Insufficient research skills and training of policymakers may impede their ability to assess the quality of evidence and discern pertinent information to develop informed decisions. Respectively, limited training of researchers in evidence brokering and a lack of understanding of the policymaking process may affect the efficient production and dissemination of evidence as well as interactions (e.g. conducting policy dialogues effectively) with policymakers to promote evidence use.
• Disease outbreaks (e.g. COVID-19) and natural disasters • Armed conflicts • Political will and commitment	Total: 30 studies Qualitative / mixed-methods evaluations (n = 20) Practitioner reflections (n = 7)	**5.4.2 Analytical theme 2: Disease outbreaks, political instability, political cycles, and armed conflicts can disrupt EIDM interventions, while political will and commitment tend to promote their successful implementation.** **(Context)** Disease outbreaks such as COVID-19 and Ebola can disrupt EIDM activities such as policy dialogues, face-to-face meetings, capacity-building, and mentorships, as well as straining

Descriptive themes based on the inductive coding of primary studies' findings	Number and type of studies per theme	Analytical themes derived from the configuration of descriptive themes
• Political and personal interests • Political cycles and instability • Bureaucracies	Policy case studies (n = 3)	resources meant for these activities. Armed conflicts that affect the implementation of programs and data collection activities impede EIDM processes. Political and personal interests may affect the uptake of evidence-informed recommendations for decision-making. They can derail evidence-informed proposals that relate to policy issues and reforms. Weak political systems may present operational challenges to EIDM organisations and repressive political environments stifle freedom of expression, public voices, and civil society – which fosters open dialogue required for EIDM. Changes in the political climate (e.g., shifts in government structure) and instability (e.g., disputed elections) affect knowledge translation and evidence-generation-related activities such as science-based dialogues. Bureaucracies can constrain the implementation of knowledge translation activities, affecting the evidence provision's timeliness and decision-makers' ability to access evidence. Political will, commitment and support can promote the successful implementation of program activities including evidence generation and mobilisation as well as enhancing communication among relevant stakeholders.
• Blended learning • Contextualised training • Duration of capacity-building initiatives • Skilled facilitators • Location for meetings and training	Total: 21 studies Qualitative / mixed-methods evaluations (n = 14) Practitioner reflections (n = 6) Policy case studies	**5.4.3 Analytical theme 3: Designing structured, blended, and contextualised EIDM capacity-building programs facilitated by skilled trainers in safe and convenient locations can enhance the impact of these initiatives to promote the capability to use evidence by policymakers.** **(Design)** Designing flexible, consistently structured EIDM capacity-building activities that are delivered with sufficient training materials, blended learning techniques, and tailoring to the local context, and facilitated by experienced and politically sensitive facilitators can promote the successful implementation of these initiatives. The duration and regularity of capacity-building workshops are an important consideration to ensure that participants achieve capacity development goals,

Descriptive themes based on the inductive coding of primary studies' findings	Number and type of studies per theme	Analytical themes derived from the configuration of descriptive themes
• Coordination of workshops and dialogues	(n = 1)	thereby enhancing capabilities to use evidence. Choosing venues for meetings that balance convenience and safety for public officials and other stakeholders can foster participation. In planning capacity-building workshops and policy dialogues, logistics and pre-meeting organisations must be well coordinated with clearly stated objectives to avoid delays and confusion among participants.
• Relevance of content in evidence products • Visual design of evidence products • Translation of evidence • Adaptation to time constraints	Total: 8 studies Qualitative/mixed methods evaluations (n = 7) Practitioner reflections (n = 0) Policy case studies (n = 1)	**5.4.4 Analytical theme 4: Producing relevant, succinct evidence products that are visually appealing and translated into numerous languages can enhance more in-depth engagement with evidence and thereby can promote the use of evidence by policymakers.** **(Design)** Providing evidence products (e.g. policy briefs) to policymakers that match their information needs in an easy-to-read and visually appealing format is an important design factor that can enhance the use of evidence by policymakers. It is also important to ensure that evidence products contain explicit most up-to-date information translated into numerous languages to sustain relevance and attain wider reach. The use of jargon and unfamiliar vocabulary may hinder comprehension and subsequent use of evidence. Policymakers often face time constraints and large volumes of evidence can affect complete engagement; hence, it is imperative to provide succinct evidence pieces to policymakers. It is important to note that developing a common language and adapting a format for presenting evidence to the right stakeholders at the right time may be challenging in some contexts.
• Diversity of stakeholders	Total: 44 studies	**5.4.5 Analytical theme 5: Diversity of stakeholders, consistent and effective communication can promote fruitful collaborative engagements whereas the high cost of**

Descriptive themes based on the inductive coding of primary studies' findings	Number and type of studies per theme	Analytical themes derived from the configuration of descriptive themes
• Incentives • High cost of engagement • Policy dialogue elements • Stakeholder collaboration	Qualitative / mixed-methods evaluations (n = 26) Practitioner reflections (n = 13) Policy case studies (n = 5)	**engagement along with a lack of policymaker incentives may hinder the effective implementation of policy dialogue elements and stakeholder collaboration.** **(Design)** Establishing an enabling environment for productive policy dialogues is crucial for mutual and collaborative engagement. Professional incentives can drive the realisation of knowledge translation activities by encouraging attendance and participation in policy dialogues. However, post-project and limited incentives may pose challenges to effective participation, while relevant and tailored learning opportunities can contribute to increased participation. Negotiating stakeholder participation can present challenges due to its multi-sectoral nature and the growing number of involved parties, potentially resulting in high engagement costs stemming from expensive consultations and time-intensive processes. Implementers' adaptability may play a key role in securing partner buy-in for evidence promotion and trust-building between researchers and policymakers, which are essential for effective dialogues. Sharing regional experiences may cultivate collaboration and evidence use, along with regular dialogue facilitated by close relationships and effective communication. Including government officials as facilitators can further enhance collaboration and engagement.
• Time constraints • Timing of interventions and engagements • Scheduling challenge	Total: 33 studies Qualitative/mixed methods evaluations (n = 24) Practitioner reflections (n = 7)	**5.4.6 Analytical theme 6: Timing of interventions and engagements as well as time constraints and scheduling challenges can affect stakeholders' participation in EIDM interventions.** **(Design)** If interventions and engagements are not carried out at the convenience of relevant stakeholders, participation and attendance may be negatively affected thus limiting the benefits of EIDM-related activities. Misalignment of schedules can negatively affect stakeholder engagement in EIDM discussions. Time constraints and logistical issues, limiting follow-up

Descriptive themes based on the inductive coding of primary studies' findings	Number and type of studies per theme	Analytical themes derived from the configuration of descriptive themes
	Policy case studies (n = 2)	discussions and longer-term assessments affect decision-making processes and engagements for policymakers. Busy schedules among high-ranking officials, policymakers, researchers, and other stakeholders may hinder effective engagement with evidence, leading to limited collaboration, inadequate skill development, and challenges in accessing and utilising research data for decision-making.
• Lack of staff • Limited funding • Limited resources and capacities	Total: 42 studies Qualitative / mixed-methods evaluations (n = 27) Practitioner reflections (n = 13) Policy case studies (n = 2)	**5.4.7 Analytical theme 7: A lack of resources, staff and capacities affects utilisation of evidence** **(Implementation)** A lack of funding affects the implementation of EIDM activities such as workshops and dialogues. Limited resources and capacities hinder government personnel and other stakeholders' ability to conduct and support the utilisation of evidence. This is particularly the case where government departments and evidence brokers do not have sufficient staff dedicated to supporting the translation and uptake of evidence. A sufficient number of skilled staff within government departments may be imperative to enhance coordination and collaboration to promote effective evidence utilization.
• Stakeholder discord • Digital connectivity challenges • Information accessibility issues	Total: 39 studies Qualitative / mixed-methods evaluations (n = 27) Practitioner reflections (n = 11)	**5.4.8 Analytical theme 8: Poor digital connectivity, communication, and a poor flow and accessibility of information create an inadequate provision of and access to evidence.** **(Implementation)** Limited internet connectivity, stakeholder discord, and communication challenges may impede evidence utilisation. These obstruct the effective dissemination and comprehension of evidence for policymakers. In reverse, clear communication and improved access facilitate evidence uptake and integration into policy processes. This necessitates enhancing collaboration and

Descriptive themes based on the inductive coding of primary studies' findings	Number and type of studies per theme	Analytical themes derived from the configuration of descriptive themes
• Lack of clarity and clear communication	Policy case studies (n = 1)	strategic communication efforts to overcome obstacles and maximise evidence utilisation for informed decision-making.
• Active leadership and organizational valuation of evidence • Lack of leadership engagement • Limited use and appreciation of monitoring and evaluation (M&E) • Sharp differences of opinion • Lack of shared vision and alignment	Total: 29 studies Qualitative / mixed-methods evaluations (n = 21) Practitioner reflections (n = 8) Policy case studies (n = 0)	**5.4.9 Analytical theme 9: Leadership support and organizational valuing of evidence can drive EIDM, but limited stakeholder engagement in monitoring and evaluation may hinder evidence utilization, potentially leading to divergent opinions and alignment challenges during decision-making.** **(Implementation)** Strong senior leadership involvement can be crucial for enhancing research to policy relations and role delineation within the leadership hierarchy further facilitates effective collaboration and decision-making. A lack of an established culture for verifying evidence, weak ownership at less-senior levels of decision-making, and limited decision-making authority among implementers may hinder evidence use. Aligning goals between the research team and the research users can foster greater stakeholder engagement and emphasize collaboration and a shared vision, highlighting the importance of advocacy and leadership in promoting evidence use. A lack of coordination within and between government agencies may inhibit collaboration, while decentralization can empower less senior-level officials to make evidence-informed decisions, emphasising the importance of autonomy in policy implementation.
• Lack of interest by policymakers	Total: 21studies	**5.4.10 Analytical theme 10: Conflicting interests and resistance to change, high-turnover of policymakers and workplace confidentiality may affect the implementation of EIDM activities.**

Descriptive themes based on the inductive coding of primary studies' findings	Number and type of studies per theme	Analytical themes derived from the configuration of descriptive themes
• Organisational restructure • Resistance to change • Workplace confidentiality	Qualitative / mixed-methods evaluations (n = 12) Practitioner reflections (n = 7) Policy case studies (n = 2)	**(Implementation)** Conflicting interests, limited awareness, high turnover in governmental positions, and political and legal constraints are commonly reported challenges that disrupt the implementation of EIDM interventions. These barriers could impede consistent participation and disrupt continuity in policymaking efforts. Additionally, workplace confidentiality poses a complex challenge, impeding the acquisition of accurate data and restricting access to crucial insights from researchers. This reluctance to share information may undermine the credibility of findings and impede the ability to draw comprehensive conclusions necessary for effective policymaking.
• Mistrust in administrative data • Difficulty in collecting and using data	Total: 11 studies Qualitative / mixed-methods evaluation (n = 7) Practitioner reflections (n = 3) Policy case studies (n = 1)	**5.4.1 Analytical theme 11: Delays in data provision, poor data quality causing mistrust in administrative data, and data collection hurdles may affect the implementation of EIDM interventions and effective use of evidence in policymaking** **(Implementation)** Mistrust in government data further complicates evidence use, while participant confusion and data collection hurdles lead to decreased engagement and potential duplication of efforts. Inconsistent administrative data quality and accessibility issues impede efficient planning and decision-making processes.

We next discuss each of the 11 analytical themes in more detail below.

5.4.1 Analytical theme 1*: Evidence users' lack of skills and experience as well as inadequate training may affect the ability and opportunity to engage and use evidence while evidence producer's limited skills and experience may impact ability to engage with evidence users and provide relevant evidence* (Population)

Included studies consistently indicated that the *limited capacity of policymakers to access and assess scientific publications, engage with researchers, and use evidence products may lead to challenges during the implementation of EIDM interventions*. For instance, according to Phillips and colleagues (2014) the South African government lacked evaluation capacity leading to departments struggling with compiling evidence into reports that could be used to inform policies. In Goldman and colleagues' (2018) assessment of the emergence of national, government-wide evaluation systems in Africa, specifically in Benin, Uganda, and South Africa, identified capacity issues across the three countries. The study notes that in South Africa, policymakers have limited capacity to use evaluation reports. Consequently, as part of an advocacy campaign to promote the use of Monitoring and Evaluation (M&E), a 3-day course for the three levels of public services was conducted and trained 250 officials. In addition, the existence of few evaluation organisations and limited resources to compile evidence negatively affected evidence utilisation in South Africa (Goldman et al. 2018). In an evaluation of a multisite knowledge transfer strategy by Dagenais and colleagues (2013) implemented in Mexico, Nicaragua, South Africa and Cameroon, very few participants were noted to have the skills required to read and understand scientific publications, and several mentioned that generally reading research documents is not a norm. In the INASP (2016a) study on approaches to developing capacity for the use of evidence in policymaking, there was a reported knowledge and skills gap among civil servants and parliamentary staff in a myriad of areas including how to access research, how to effectively search databases, and how to assess the quality and credibility of the research and other types of evidence. The need for skills and knowledge by policymakers was highlighted in Mijumbi-Deve and colleagues' (2022) study. Respondents consented to the fact that a particular set of skills such as reading and understanding research or synthesising evidence are important for rapid review findings to be used effectively and efficiently.

Furthermore, included studies identified capacity gaps in the production of strong policy briefs, reports, infographics as well as oral presentations. Several Parliament officers involved in Munyoro's (2019) assessment of the Parliament of Zimbabwe's informatics database for providing evidence-based information for decision-making were not sufficiently skilled in information management and technology which affected the sustainability of the project, thereby impeding their ability to access and engage with the evidence. In a structured reflection of lessons learned from evidence-to-policy initiatives, El-Jardali and colleagues' (2014) participants acknowledged that developing evidence briefs was burdensome and lengthy due to a lack of skilled human resources. This structured reflection drew on a number of sources and data from Knowledge Translation Platforms in Argentina, Nigeria, Bangladesh, Burkina Faso, Cameroon, Central African Republic, Ethiopia, Uganda, Sudan and Zambia.

Limited experience of researchers in evidence brokering and a lack of understanding of the policy environment may affect adequate interactions with evidence users, efficient

production and dissemination of evidence. A World Health Organisation (2021) study reported that modest experience in conducting policy dialogues coupled with poor cooperation between researcher and policy-makers was a major factor that posed systemic challenges during the development of an evidence brief in the Republic of Moldova. Even with established dialogue and stakeholder engagement, it can be challenging for researchers to bridge the gap between science and practice and understand all aspects of the policymaking process such that whilst there is a need to foster the use of evidence by decision-makers, it is also crucial to educate scientists in the policy-making field (Brites et al. 2021). Mijumbi-Deve and colleagues' (2022) study highlights the importance of researcher capacity beyond the traditional technical capacities including the capability to engage with and negotiate review questions. As described by a policymaker from Ethiopia who reiterates that *"And I think the other important thing is to understand the decision makers' world because if you are a researcher, you don't always understand what is on pressure and the issues on the policymakers' side" p.6.,* thereby emphasising the need for researcher understanding of the policy environment. This was also attributed to the fact that centres supporting EIDM were generally established within academic institutions, hence the limited experience in carrying out structured activities in relation to engagement and adequately responding to policy needs. The Building Capacity to Use Research Evidence (BCURE)[13] program emphasised how important it is for evidence advocates to think and work politically by assessing the context and potential for change through a political economy lens. BCURE was more successful in driving key mechanisms when partners identified entry points within sectors or government institutions that had already shown interest in evidence, had clear incentives for reform and a mandate to promote the use of evidence. The program also capitalised on windows of opportunity for partnership and reform, often leveraging existing institutional credibility and relationships to gain initial access. In addition, BCURE fostered relationships with individual champions who fulfilled the role of "gatekeepers and advocated for the program which helped facilitate its progress (Vogel and Punton 2018).

5.4.2 Analytical theme 2: *Disease outbreaks, political instability, political cycles, and armed conflicts can disrupt EIDM interventions while political will and commitment tend to promote the successful implementation of EIDM interventions.* (Context)

Disease outbreaks such as COVID-19 and Ebola as well as armed conflicts can disrupt EIDM activities such as policy dialogues, face-to-face meetings, capacity-building, and mentorships, as well as straining resources meant for these activities. The global COVID-19 pandemic impacted the integrated knowledge translation in non-communicable diseases project in South Africa across five sites that included face-to-face meetings, a key mode of engagement as their stakeholder engagement strategy (Mpando et al. 2021). This resulted in a shift from physical to virtual meetings and caused delays in some of the planned meetings. Primary research in South Africa was placed on hold due to restricted access to clinics (Mpando et al. 2021). The implementation of the capacity-building and mentorship (CBMP) program in

[13] The BCURE programme was launched by the UK Department for International Development (DFID) to strengthen capacity of policy in low-and-middle income countries to make evidence-based decisions. The programme was implemented in Afghanistan, Bangladesh, Ghana, Kenya, Malawi, Sierra Leone, Liberia, South Sudan, Pakistan, Zimbabwe, South Africa.

Ethiopia was negatively affected by the COVID-19 pandemic (Tilahun et al. 2021), while the Ebola virus affected the implementation of the Building Capacity to Use Research Evidence (BCURE) program activities in West Africa as it caused severe delays and withdrawal of an international adviser in Liberia. As a result, there was limited support for the revision of a cabinet manual (Vogel and Punton 2016). In Cameroon, the outbreak of poliomyelitis and subsequent response put a strain on resources and time available to policymakers to engage in the Policy BUDDIES initiative (Langlois et al. 2016). Armed conflicts can affect the implementation of programs and data collection activities, thereby impeding EIDM processes. For instance, in South Sudan, the outbreak of the civil war negatively impacted the Africa Cabinet Decision-Making (ACD) program, as some activities had to be stopped for a period (Vogel and Punton 2016). In the BCURE program, it was also difficult to conduct interviews with participants in Pakistan due to security concerns (Vogel and Punton 2018).

Changes in the political climate and political and personal interests may affect the uptake of EIDM activities and recommendations for decision-making. As an example, in Brites and colleagues' (2021) study on science-based stakeholder dialogues for environmental policy implementation, even though dialogues resumed successfully, political changes, and institutional instability impaired the reach of the dialogues in Brazil. The BCURE program faced challenges related to government setting dynamics across all contexts including regular changes in personnel which required the rebuilding of relationships. As a result, there was significant investment in staff resources to maintain and rebuild new relationships with program sponsors as well as managing expectations of program participants. Additionally, the evaluation of the BCURE program also highlights the political nature of decision making as one of the most prevalent barriers to EIDM. Political and personal priorities were often seen to overshadow the evidence. Evidence use is limited by existing norms and standards whilst, individual policy maker potential financial gains priorities and preferences affect the use of evidence. The study showed that political cycle pressures tend to block the use of evidence with governments and politicians been more keen to deliver their political agendas, creating the need for fast reactive decision making leaving little room to consider the evidence. Furthermore, in some cases evidence was used politically, particularly at higher levels of decision-making structures. (Vogel and Punton 2016). Jessani and colleagues' (2017) study on enhancing evidence-informed decision-making in Kenya was conducted just before the May 2013 elections and this may have affected the number of policymakers who were willing and able to partake in the study. The potential change in government structure and governance brought concerns with political upheaval and time constraints due to engagement with the potential transition (Jessani et al. 2017).

Bureaucracies can constrain the implementation of knowledge translation activities, affecting the timeliness of evidence provision and decision-makers' ability to access evidence. For example, the implementation of knowledge translation and evidence generation to increase the impact of vector control in Malawi were delayed due to stakeholder consultations, bureaucratic procedures, and political uncertainty emanating from the disputed election of May 2019 (Mwendera et al. 2022). Porter and Goldman (2013) report that bureaucratic procedures involving multiple reporting channels wasted time and effort while reporting on the evidence was seen as a redundant process which caused delays in using the information.

Political will, commitment, and support can promote the successful implementation of EIDM program activities. One example emerges in Nigeria where political support was a key enabler

of the successful implementation of activities in a capacity-building initiative for the Health Policy Research Group (HPSR) in endemic disease control that enjoyed the audience and support of the Commissioner of Health, enabling a series of meetings and regular communication via platforms such as WhatsApp (Onwujekwe et al. 2020). In contrast, a program manager in Enugu state highlighted a lack of political support from key decision-makers in the Health Ministry as a major stumbling block to the proposed reactivation of a research unit. In Vogel and Paton's (2016) evaluation of the BCURE programme, political will was noted as a key barrier to EIDM. Respondents indicated that numerous top-level directors are deployed politically, and political priorities are advanced over insights from the evidence. Kawooya and colleagues (2020b) study in Uganda provides a similar example of the importance of political support, where a respondent noted that: *"Then also you can [also] think about the political support was also key, because Mukono has most of the time been working with our political leaders and they have helped us a lot especially in mobilization, supporting some of the things that are supposed to be approved by the local council" p.13.* Regime changes can enable EIDM to effectively drive evidence use. For instance, the change in a mandate of the Kenyan Ministry of Health meant that all departments attained the responsibility for policy which promoted the growth in demand for evidence (Vogel and Punton, 2016).

5.4.3 Analytical theme 3: *Designing structured, blended, and contextualised EIDM capacity-building programs facilitated by skilled trainers in safe and convenient locations can enhance the impact of these initiatives to promote the capability to use evidence by policymakers.* (Design)

In designing EIDM capacity-building activities, *consistent structure, providing sufficient training materials, using blended learning techniques, tailoring content to local context, and facilitation by experienced trainers can promote the successful implementation of EIDM initiatives.* For example, in a practical reflection on combining workshops and mentorships to build capacity in demand and use of evidence in government organizations, Stewart and colleagues (2017) highlighted that they were flexible with meeting dates and times for structured EIDM workshops in South Africa and Malawi in order to retain attendees and were also adaptable with workshop content depending on the needs of participants. Results of an evaluation of the Evidence-Informed Decision-Making in Nutrition & Health (EVIDENT) in Africa project involving participating organisations from Ethiopia, Ghana, Morocco, South Africa, Tanzania and Uganda showed that the blended learning techniques adopted to include both theory and practicals were effective in promoting EIDM in nutrition and health (Motani et al. 2019). Participants in the policy dialogue to support maternal, newborn and child health evidence use in policymaking project in Nigeria (Johnson, 2020) stressed the need for practical capacity acquisition sessions to ensure a minimum understanding of topics to be discussed in policy dialogues as well as workshops that allowed for group activities and interactive discussions among stakeholders. The knowledge brokering program to promote research use in Burkina Faso saw training sessions that were developed in Quebec being adapted to the realities of Burkina Faso which enhanced the relevance of the course content (Dagenais et al. 2015). However, some participants indicated that there were not enough teaching materials which potentially affected the impact of this program. Similar challenges also emerged in Zambia where consistency issues such as a lack of curriculum and discrepant trainer performance was problematic (Kasonde and Campbell 2012). In Yehia and El Jardali (2015), participants

found the utilization of a skilled facilitator to be one of the most helpful aspects of the policy dialogues.

The *duration and regularity of capacity-building workshops are important to ensure that participants develop the necessary skills to use evidence*. The results from Uneke and colleagues' (2015a) study focusing on enhancing health policymakers' skills in infectious disease control reveals that the two-day information literacy workshop was insufficient to adequately enhance the knowledge and skills of policymakers. In an evaluation of a capacity development program that focused on health economics among producers and users of evidence in Nigeria, some aspects that were highlighted to be considered for future improvement were training duration, regularity of training, and choice of peer educators to achieve capacity development goals (Ezenduka and Onwujekwe 2022). It is important that the duration of capacity building initiatives allow for sensible measurement of the impact of these initiatives. For example, Vogel and Punton (2018) report that relative to the aims and objectives of the program to attain a systemic change in government settings, the BCURE program was too short which limited adequate identification and measurement of longer-term effects.

The co-production experimentation by Culwick and colleagues (2019) reflects the *importance of hosting meetings in safe and convenient spaces.* The study indicates that the choice of venues required a balance between the convenience of public officials and other stakeholders to foster participation. However, this also proved to be challenging as one participant was unwilling to freely speak on a university campus. A flexible approach and reflection concerning safe and neutral space for different participants had to be adopted.

5.4.4 Analytical theme 4: ***Producing relevant, succinct evidence products that are visually appealing and translated into numerous languages can enhance more in-depth engagement with evidence, and thereby can promote the use of evidence by policymakers.*** **(Design)**

The *provision of evidence products such as policy briefs that match policymakers' information needs in an easy-to-read and visually appealing format* was reported as an important design factor that can enhance the use of evidence. For example, Jones and Walsh (2008) purport that policy briefs as communication tools need to be conceptually engaging and visually appealing to make an impact on an audience. Given that policymakers have constrained time to read, briefs need to draw the users' attention and the information should be presented in a manner that is easily remembered (Jones and Walsh 2008). In the Supporting Policy-relevant Reviews and Trials (SUPPORT) project that supported policymakers in Argentina, China, Colombia, South Africa and Uganda several participants indicated a mismatch between the content provided in evidence summaries and their information needs. In Ogbonnaya and colleagues (2021) assessment of the usefulness (and areas of improvement) of policy briefs and policy dialogues as knowledge translation tools, 88.9% suggested no changes to the short policy brief provided, while only 5.6% of the respondents indicated that the policy briefs provided could be made shorter for easier reading as well as the incorporation of local literature in the synthesis. Policymakers often face time constraints (Jones and Walsh 2008) and large volumes of evidence can affect complete engagement; hence, it is imperative to provide succinct evidence pieces to policymakers.

Included studies comprising this theme indicated that it is i*mportant to ensure that evidence products are easy to read and contain explicit and the most up-to-date information to sustain relevance and attain wider reach.* For example, to promote the use of evidence in tobacco control in West Africa, results were presented in an easy-to-read format including policy notes that focused on policy recommendations, available in both English and French (Mane et al. 2020). In Rosenbaum and colleagues' (2011) study the use of jargon and unfamiliar vocabulary in evidence summaries hindered comprehension and inclusivity, thereby curtailing the use of evidence presented. Some participants in the study proposed shorter and clearer presentation of the evidence. When policymakers find it difficult to navigate through extensive and complex documents, it can act as a barrier to the effective use of evidence. As a further reflection of the need to have relevant up-to-date research in evidence products, an evaluation of user experiences of a clearing house for health policy and systems revealed that the house's website did not have all up-to-date information, possibly hindering evidence use (Mutatina et al. 2019). Developing a common language and adapting a format for presenting evidence to the right stakeholders at the right time may be challenging in some contexts. The project evaluation of EVIDENT in Africa by Motani and colleagues (2019) highlights the need to be adaptive and consider quicker alternatives such as rapid reviews given time constraints. Among other, the study found the production of systematic reviews laborious and time-consuming such that many planned evidence synthesis outputs were not produced.

5.4.5 Analytical theme 5: *Diversity of stakeholders, consistent and effective communication can promote fruitful collaborative engagements whereas high cost of engagement along with a lack of policymaker incentives may hinder the effective implementation of policy dialogue elements and stakeholder collaboration. (Design)*

The *inclusion of diverse stakeholders in policy dialogues and advocacy efforts was highlighted in several studies as an important feature which may improve the facilitation of mutual and collaborative engagement* in implementing effective decision-making. Engaging a broad range of stakeholders, from affected communities to government officials, may foster ownership, sustained interest, and effective implementation of policies. For instance, Gichane and colleagues (2019) emphasised that involving diverse stakeholders from the earliest stages in the adaptation of Zambia's National Family Planning Guidelines helped build sustained government interest and ownership. Similarly, the World Health Organisation (2021) found that comprehensive stakeholder consultations positively influenced the use of evidence in policymaking by increasing opportunities and champions for evidence use in Lebanon. However, negotiating stakeholder participation can present challenges due to its multi-sectoral nature and the growing number of involved parties, potentially resulting in high engagement costs arising from expensive consultations and time-intensive processes, as noted in the Lawson (2016) study in the Ghana context. Additionally, structural issues, such as slow decision-making processes and poorly structured forums, can hinder dialogue. Dovlo and colleagues (2016) found that slow decision-making in Chad's Ministry of Health affected the dialogue process, while in Cabo Verde poorly structured forums hindered discussion and debate.

Effective communication and consistent follow-up also emerged as key components of successful policy dialogues and capacity-building efforts. Early recognition of convening

power, regular meetings, and proactive communication can help sustain engagement and interest among stakeholders. For example, the INASP (2016b) study highlighted the importance of consistent communication in the success of training and capacity-building projects in Nigeria. This consistent communication can foster ongoing discussions and the continued use of evidence in policymaking processes, as seen in Gichane and colleagues (2019) where regular meetings sustained government involvement and interest in Zambia. Yehia and El Jardali (2015) demonstrated that an integrated Knowledge Translation (KT) model, "*which aligns the research efforts of researchers with the needs of policymakers and infuses public dialogue with an understanding of research evidence*" *p.2*, was essential for strengthening relationships and ensuring ongoing engagement among stakeholders in Lebanon. In addition to effective communication as a successful policy dialogue enabler, building trust could also play a key role. As elaborated by Miszczak and Patel (2018), trust fostered through established relationships was crucial for effective communication and co-production of knowledge in the context of South Africa, while in the Stewart and colleagues (2017) study in Malawi and South Africa trust developed with facilitators helping participants overcome initial doubts about mentorship programs.

Motivation and incentives, both financial and non-financial, can play a significant role in engaging stakeholders in EIDM processes. Keita and colleagues (2017) noted that positive perceptions of the research topic and design, as well as non-financial motivations, could facilitate the volunteer participation of potential steering committee members in Burkina Faso, Nigeria, Senegal and Sierra Leone. This was exemplified in Hjort and colleagues (2020), whereby participants in Brazil took part in the study "based on their interest in the participation incentive (lottery tickets) p.10." However, the decision to not pay incentives affected participation, as seen in Vogel and Punton (2017) in the VakaYiko project in Zimbabwe and the UJ-BCURE project in Malawi contexts, where participation issues arose due to expectations of monetary incentives. Furthermore, policymakers might be more inclined to use evidence if there are personal incentives such as recognition of their positive contributions as seen in Uganda (Kawooya et al 2020b).

Kasonde and Campbell (2012) also highlighted how databasing core issues within the research community in Zambia revealed a lack of incentives for collaboration among researchers, hindering the sharing of information and effective evidence utilization within the research community. The interest of individuals in participating in policy development and research, as well as the adaptability of projects to partner requirements, can be crucial for success. Miszczak and Patel (2018) emphasized the importance of individual interest in policy areas for engagement success in South Africa while Motani and colleagues (2019) reported on how the flexibility of the EVIDENT project in adapting to partners' requirements ensured buy-in and successful implementation in Africa. Understanding the intricate dynamics of motivation and incentives within policy processes is essential for fostering active stakeholder engagement and promoting evidence-informed decision-making.

5.4.6 Analytical theme 6: *Timing of interventions and engagements as well as time constraints and scheduling challenges can affect stakeholders' participation in EIDM interventions.* (Design)

Interventions to support and promote evidence use by policymakers need to be carried out at the convenience of relevant stakeholders for maximum participation and attendance. If policymakers are unable to attend and participate, the potential impact of the interventions and engagements could be limited. In Burkina Faso, the issue of timing was evident as respondents highlighted the absence of policymakers during a workshop that was conducted a week before the presidential elections. Respondents stressed the importance of having decision-makers present to not limit the impact of the workshop, further emphasising that the timing was not ideal (McSween-Cadieux & colleagues 2018). Approximately 9 % of the potential participants in Kenya in the study by Opiyo and colleagues (2013) attributed non-attendance to the timing of the meeting.

Scheduling conflicts also emerged as barriers to stakeholder participation in the study by Mbonye and Magnussen (2013) in Uganda, which noted that policymakers had busy schedules that hindered their full participation in the workshop for translating evidence into policy. In consensus, Ogbonnaya and colleagues (2021) noted stakeholders' busy schedules as an obstacle to attendance in Nigeria—policymakers were often occupied with other political engagements and therefore it was difficult for them to take part in knowledge transfer activities. In addition, scheduling meetings or interviews with government officials with the aim of capacity building was difficult especially in Bangladesh and Pakistan owing to excessive workloads (Vogel & Punton 2018). Stewart and colleagues (2017) as well as Waqa and colleagues (2013) underline the issue of non-attendance among participants due to scheduling challenges. In Fiji, only 45% of invitees participated in one workshop; and, further, did not complete the intervention which was 12-18 months long. The truncated government calendar which was used to address state affairs posed a challenge for scheduling events with the relevant officials to foster capacity building (Waqa et al. 2013).

In Burkina Faso, the busy schedules of high-ranking officials hindered opportunities for engagement (Robson et al. 2023; Dagenais, Queuille, & Ridde 2013). In a study by Young and colleagues (2018) in South Africa, participation was also a challenge. For example, policymakers were not able to collaborate with researchers as they often had to reschedule meetings on short notice due to competing priorities which negatively affected dialogues for evidence use. In other instances, knowledge brokers did not set time to engage with high-level ranking officials to promote knowledge sharing. This issue was also evident in a study conducted in Africa based on experiences of participants from Ethiopia, Ghana, Morocco, South Africa, Tanzania and Uganda in the EVIDENT program by Motani and colleagues (2019) where time was a barrier to participation and implementation of activities to promote EIDM. In addition, Young and colleagues (2018) noted that policymakers and researchers found it difficult to schedule meetings as some of the intervention activities were time-consuming. Similar sentiments were highlighted in Lebanon where the response rate to policy dialogues was low and this was attributed to participants' busy schedules as well as limited time to complete the survey and engage fully in the dialogues (Yehia and El Jardali 2015).

5.4.7 Analytical Theme 7: A lack of resources, staff and capacities affects utilisation of evidence. (Implementation)

A recurring theme in included studies was that *a lack of financial resources and adequate staffing can undermine the implementation of EIDM activities* and utilisation of evidence for

informed decision-making, respectively. The critical role of adequate funding in facilitating effective decision-making processes and sustaining knowledge transfer initiatives is evident across various contexts. Due to limited financial resources, fewer activities were implemented in a knowledge brokering program in Burkina Faso, which included the provision of research-based evidence, facilitating knowledge transfer and application of the evidence, conducting evidence dissemination workshops and developing partnerships between knowledge producers and decision-makers. Other planned activities in the program included the development of policy briefs and follow-up discussions with decision-makers (Mc Sween-Cadieux et al. 2019). Deliberative dialogues to enhance decision-making between a health faculty and policymakers in Kenya were hindered by financial, time, and spatial resource constraints which affected engagement (Jessani et al. 2016). Financial constraints were further highlighted in Malawi during the development of a knowledge translation platform. Inadequate funding in the initial stages of development resulted in activities being paused continuously, affecting the sustainability of knowledge transfers (Berman et al. 2015). In Bangladesh and Uganda, funding for policy analysis institutes came from donors; however, when the finances were depleted, it was difficult to sustain the efforts of the think tanks (Bennett et al. 2012). A respondent in a Nigerian study by Uzochukwu and colleagues (2016) stated "*…from the local point of view, governments of states are not always interested in research. In most cases, little or no budgets are made for research. Even where there are fiscal releases they are hardly used for research p.11."* This further supports the studies above that noted limited funding as a barrier to evidence utilisation. Oronje and Zulu (2018) also noted challenges with capacity building among members of African parliaments such as being limited to small-scale training workshops due to limited financial resources. Conducting the workshops at a larger scale would have been more beneficial as a larger audience could have been reached and developed skills for evidence use.

The importance of having sufficient resources (financial and nonfinancial) was noted in Bangladesh, Ethiopia, and Vietnam. Hajeebhoy and colleagues (2013) reported that sufficient human, financial and technical resources were a facilitator for the successful development of evidence-based advocacy. In addition, in the VakaYiko program in Ghana, South Africa and Zimbabwe (2016a), an international consortium facilitated knowledge transfer as well as skills development for national organisations to developing capacity for evidence use in policymaking (INASP 2016a). The availability of resources enhanced active dissemination and promotion of evidence thus providing pertinent information to policymakers and encouraging the adoption of EIDM practices.

Insufficient staffing, especially in government departments, poses a significant barrier to effective evidence use in policymaking. For example, a lack of staff affected the range of government policy and programme evaluations that could be conducted thus impeding evidence use in South Africa (Goldman et al. 2018; Griessel et al. 2019). In Malawi, Technical Working Groups (TWGs) required more staff to ensure functionality to enable EIDM through coordination and collaboration (Sakala et al. 2022). The lack of staff and resources to develop the capacity for the use of evidence in policymaking was further reiterated in the INASP (2016a) VakaYiko program. The study highlighted common issues that are faced by a majority of research and information departments in government including understaffing, unreliable internet or other challenges with IT services, and minimal budget allocation for research which all impede engaging with evidence. Furthermore, the lack of staff affected the impact of another knowledge brokering program in Burkina Faso as only one junior broker was available

full-time to facilitate the activities (Mc Sween-Cadieux et al. 2019; Dagenais et al. 2016). In Burkina Faso, Zida and colleagues (2017) found that data generation for use by policymakers was challenging as there was an absence of support staff who were skilled in data management. Insufficient resource allocation towards data generation resulted in gaps or inadequate evidence, showcasing the pivotal role of resources.

5.4.8 *Analytical theme 8: Poor digital connectivity, communication, and a poor flow and accessibility of information creates an inadequate provision of and access to evidence.* (Implementation)

Poor digital connectivity affects various aspects of EIDM in multiple LMICs. Mbonye and Magnussen (2013) noted that in Uganda poor internet connectivity affected the organisation and running of research evidence workshop discussions, limiting the sharing of vital research materials between researchers and policymakers. Unreliable internet connectivity and restricted access to research databases impeded the accessibility of research evidence needed for urgent policy making decisions in Uganda. In a study by Onwujekwe and colleagues (2020), poor Information and communication technologies (ICT) accessibility and availability, compounded by the need for individuals to fund their own ICT costs, hindered effective communication and access to evidence in Nigeria. According to Norton (2019), health professionals in LMICs faced restricted access to scientific publications and publishing opportunities due to unreliable internet connectivity. In Uganda, Mbonye and Magnussen (2013) also found that inadequate internet connectivity hindered effective communication between researchers and policymakers, thus impeding the dissemination and utilization of vital research materials. Inadequate internet connectivity and poor ICT accessibility exacerbate communication challenges, particularly in resource-constrained settings. However, in some cases as noted in Uganda, the availability of resources such as computers and reliable Internet enables policymakers to access evidence thus promoting its use (Kawooya et al. 2020b). According to Uneke and colleagues (2019) in Nigeria, low email usage reduced the response rate to email surveys limiting access to contextualized knowledge for health policymaking. Issues such as spam filters, outdated contact information, and low response rates further affected effective engagement with stakeholders.

Poor communication affected several aspects of EIDM implementation and activities including negatively impacting data access, implementation flexibility, team relations, dissemination of findings, skill matching, and result clarification. As reported by Mijumbi-Deve and colleagues (2022) in Lebanon, Ethiopia and South Africa, decision-makers preferred emails due to their busy schedules but often did not respond, making it difficult for researchers to effectively communicate and follow up. This hindered the provision and subsequent use of evidence in decision-making processes. In Burkina Faso, Dagenais and colleagues (2013) stated that the difficulties in reaching targeted groups posed a challenge for information dissemination. In a study by Paing and colleagues (2021) in Myanmar, a lack of structured communication processes between policymakers and researchers prevented access to existing relevant data and obstructed the planning of appropriate research to fill data gaps. This communication issue was a key barrier to creating effective policies. Dagenais and colleagues (2016) in Burkina Faso noted poor team communication and difficulties in accessing decision-makers hindered the effective transfer and utilization of research evidence. Additionally, communication challenges within the team were significant obstacles. According to Struyk and Haddaway (2012), in countries such as Kenya, Argentina, Bangladesh, Guatemala, Indonesia,

India, Mexico, Nigeria, Philippines, Tanzania, and Uganda, weak communication of early findings affected the effective dissemination and utilization of research evidence which was a critical barrier to the implementation of program findings.

When access to research was limited, key stakeholders such as policymakers and practitioners found it challenging to obtain the necessary evidence to inform their decisions. For example, Sakala and colleagues (2023) reported that user fees for online journal databases were a significant barrier to accessing research evidence within Malawi's Ministry of Health. Moranker and Mirkuzie (2016) also noted that limitations in accessing relevant databases due to paid subscriptions restricted evidence availability for Ethiopia's health planners and policymakers. If data is stored in inaccessible formats or behind paywalls, only a select few benefit from the insights, leaving many decision-makers without critical information that shapes effective policies. In South Africa, Cockburn and colleagues (2016) highlighted that the data and knowledge generated did not directly translate into practice or policy due to issues related to the format, accessibility, and usability of information. The impediments to effective communication, connectivity, accessibility, and information flow presented significant barriers to evidence utilization in decision-making processes and policy implementation. Challenges such as difficulties in reaching diverse target groups and uncertainties regarding the dissemination of information to higher authorities hindered the seamless transmission of evidence. Clear communication and better access to information helped policymakers use and integrate evidence into their decisions.

5.4.9 Analytical theme 9: ***Leadership support and organisational valuing of evidence can drive EIDM, but limited stakeholder engagement in monitoring and evaluation may hinder evidence utilisation, potentially leading to divergent opinions and alignment challenges during decision-making.*** **(Implementation)**

Integrating evidence into decision-making processes may be challenging due to barriers such as *the lack of established norms for verifying the best available evidence when formulating policies and weak ownership at lower level*s. In some contexts, evidence is not prioritised due to its lack of perceived value, as one respondent cited in Vogel and Punton (2016) stated that *"the underlying barrier for Evidence-Informed Policy Making (EIPM) seems to be that evidence is not valued as an input or as a norm, and so is not prioritised" p.32.* However, valuing evidence at an organisational level can act as a facilitator of EIPM, as seen, for instance, in South Africa and India, where establishing data management systems led to the integration of data and research into organisational processes, thereby stimulating demand for information and analytical services (Vogel and Punton 2016). In the Ranchod (2017) study on building the Research-Policy Nexus in South Africa, enhanced relations between researchers and policymakers were attributed to the strong senior leadership involved in steering research use. This led to a clear delineation of roles and functions within the leadership hierarchy. Additionally, the EVIDENT-focused study by Motani and colleagues (2019) that included participants from Ethiopia, Ghana, Morocco, South Africa, Tanzania and Uganda highlighted the necessity of leadership skills for stakeholder engagement, conflict resolution, and teamwork in diverse contexts to facilitate effective collaboration. Furthermore, Kawooya and colleagues (2020) exemplified how decentralisation in Uganda could empower lower-level officials to address policy concerns by granting them autonomy in decision-making, enabling impactful evidence-informed decisions.

Another emerging theme identified was the *importance of aligning goals within the research team and with users to improve stakeholder engagement.* As demonstrated in the study by Miszczak and Patel (2018), the success of Knowledge Translation Platforms in South Africa, was facilitated by a mutual interest in areas such as energy and space economy shared by both institutions. Policymakers also highlighted that internal priorities could aid in translating evidence into practice, as demonstrated by Uzochukwu and colleagues (2016) in Nigeria. However, donors' agendas, which may not align with the host country's priorities, could hamper the implementation of evidence-informed approaches. The lack of coordination within and between government agencies in countries in the Vaka Yiko program (INASP 2016a) and in Uganda (Kawooya et al. 2020b), also posed significant challenges. Collaboration could also be affected by a lack of shared vision among key agencies and institutional divisions within ministries. Cockburn and colleagues (2016) reflected on how, within a year into the KwaZulu-Natal Sandstone Sourveld (KZNSS) Research Programme in South Africa, a lack of shared understanding of research requirements disrupted the collaboration process. Additionally, White and colleagues (2018) reported that an agenda overly influenced by key partners in South Africa potentially hindered open and transparent engagement with external experts and leadership, limiting their participation in the collaborative engagement process. Moreover, the fragmentation of Monitoring and Evaluation (M&E) functions among government departments and a lack of shared vision across central agencies hindered stakeholder engagement and evidence use in Africa (Stephen & Goldman 2013). This inconsistency may lead to ineffective data collection and analysis, making cohesive evidence-informed policymaking challenging and causing stakeholders to struggle with engagement due to unclear roles and objectives, leading to fragmented and inefficient use of evidence.

5.4.10 *Analytical theme 10: Conflicting interests and resistance to change, high turnover of policymakers and workplace confidentiality may affect the implementation of EIDM activities.* (Implementation)

A lack of interest and engagement from policymakers in EIDM can stem from a combination of issues, including *competing interests, resistance to change, high turnover in governmental positions, political and legal constraints, lack of awareness, and operational challenges.* Addressing these barriers can require targeted strategies to align personal and professional incentives in order to improve awareness and advocacy efforts that create supportive operational environments. In Uganda, Mijumbi and colleagues (2014) pointed out that a lack of awareness and competing interests among top-level decision-makers hindered their engagement with evidence-based initiatives. Onwujekwe and colleagues (2020) posit that personal interests, such as career advancement, are significant enablers of successful implementation activities in Nigeria. Policymakers who see potential personal or professional benefits were seen to be more likely to engage with EIDM. This keen interest promoted dedication and commitment among individuals, driving the effective execution of tasks.

Resistance to change and reluctance to engage with new initiatives can hinder evidence integration into policymaking. According to Uzochukwu and colleagues (2016), in Nigeria, resistance to change among policymakers and stakeholders significantly obstructed the integration of evidence into policymaking. This resistance challenged efforts to bridge the gap between research and policy, limiting the effectiveness of EIDM initiatives. According to Goldman and colleagues (2013), in South Africa, managerial reticence due to limited public disclosure caused by restrictive access to information reduced transparency and hindered

effective decision-making mainly because of incomplete or outdated evidence. The INASP (2016b) study noted that initial reluctance among senior policymakers to engage with new projects, such as the Improving Information Literacy for Urban Service Planning and Delivery (INFO-LIT) project aimed at improving information literacy for urban service planning.

Organisational restructuring and political instability in African Ministries of Health can hinder effective evidence-informed decision-making, underscoring the need for flexible strategies and robust communication. According to Sakala and colleagues (2022), the organisational restructure and changes within the Ministry of Health in Malawi, Burkina Faso, Sierra Leone, and Kenya had a mixed impact on EIDM. While reducing the number of technical working groups aimed to enhance efficiency, challenges in coordination and continuity due to frequent personnel changes and political shifts persisted. According to Mwendera and colleagues (2022), high staff turnover was also experienced in the Malawian Ministry of Health, with three different ministers during the life of the Partnership for Increasing the Impact of Vector Control (PIIVeC) project. The instability hindered continuity and the effective implementation of evidence-based policies and practices. Effective EIDM implementation required flexible, well-coordinated strategies and robust communication mechanisms to navigate these challenges and ensure the integration of evidence into policy and practice.

Workplace confidentiality also impacted the implementation of EIDM activities. This impact manifested in various ways, through access to perspectives and insights from individuals within organizations. For example, in Uganda, Mijumbi-Deve and colleagues (2022) noted that fourteen individuals did not respond to interview invitations or declined to participate, citing reasons such as a lack of knowledge about the review centres or not being permitted to speak on behalf of their workplaces. This restriction on communication limited the researchers' ability to gather comprehensive data, thereby affecting the quality and breadth of insights necessary for informed decision-making in health policy and systems in Uganda. Doughman and colleagues (2017) in Burkina Faso, Ethiopia, Senegal and Zambia highlighted that leadership requesting analysis was not aware that their country representatives are often hesitant or refused to communicate with the Bureau, even confidentially. Confidentiality concerns, therefore, limited the quantity and quality of information collected from key informant interviews, which was crucial to gaining insights for driving EIDM to ensure effective policymaking. The same was observed by Oronje and colleagues (2019) in the study of the Strengthening Capacity to Use Research Evidence (SCURE) in health sector policy-making project in Kenya and Malawi. The study reported that policymakers and stakeholders with informal or confidential political roles are often inaccessible, making it difficult to involve them in the knowledge translation process.

5.4.11 Analytical theme 11*: Delays in data provision, poor data quality causing mistrust in administrative data, and data collection hurdles may affect the implementation of EIDM interventions and effective use of evidence in policymaking.* (Implementation)

Effective decision-making in public health can be hampered by delays in data provision, unreliable data quality, and technical challenges in data collection, as evidenced by multiple studies across various countries. For example, in Zida and colleagues' (2017) study in Burkina Faso, when health information feedback, statistics, and indicators were not available promptly, it became challenging to support decision-making processes. This delay in data provision hindered the ability of policymakers and health officials' to make informed decisions crucial for

the effectiveness of health information systems. In Ethiopia, Moranker and Mirkuzie (2016) indicated that evidence was not used effectively as health planners and policymakers did not have adequate time to access all relevant data which undermined evidence-based decision-making by increasing the likelihood of decisions being based on intuition, or outdated practices rather than on current, reliable research.

The effectiveness of EIDM efforts was influenced by the quality and reliability of data, the technical tools used for data collection, stakeholder biases, and the understanding and use of data by policymakers and implementers. Kawooya and colleagues (2020a) in Uganda, stated that unreliable or incomplete government data led to mistrust among policymakers, impacting the effective use of evidence in policymaking. This mistrust hindered informed decision-making and the development of effective policies. Phillips and colleagues (2014) highlighted that the quality of administrative data was a major challenge in South Africa, with data often being patchy and inconsistent across sectors. This lack of quality and common data standards hindered decision-making and affected the implementation of policies and programs due to incomplete or unreliable data systems. Participant errors and confusion regarding study communications had a detrimental effect on the EIDM processes by reducing the number of valid responses and complicating the data collection process.

The challenges encountered in data collection, reliability, and utilization across various studies in Cambodia, Uganda, and multiple African countries underscore significant barriers to effective policymaking and decision-making processes. Bossba (2023) in Cambodia noted that during the COVID-19 pandemic, technical problems with data collection tools led to disruptions and delays in the data collection process. The absence of physical assistance to resolve these technical issues exacerbated the problem, affecting the timeliness and reliability of the collected data. A study by Courtenay-Quirk and colleagues (2016) in South Africa, Swaziland and Tanzania emphasized the laborious process of inputting and updating data, which was further complicated by the absence of de-duplicated data and the lack of detailed disaggregation at lower sub-national levels. These issues hindered efficient planning and the effective use of evidence in decision-making.

5 Discussion

5.1 Summary of findings

5.1.1 Overview of the evidence base

In this review, we synthesised the findings from a total of 164 empirical studies of EIDM interventions, 18 of which were counterfactual impact evaluations and 152 were empirical evaluations of EIDM interventions that took place in an LMIC. As expected, a significant proportion of this literature comes from public health but there are emerging literatures working across multiple sectors of government and from environmental policy.

5.1.2 Research question 1: Impact of EIDM interventions

The quantitative synthesis focused on the effects of interventions aimed at supporting evidence-informed decision-making by policymakers from any country and at any level of

government. Due to the limited number of studies and substantial heterogeneity, we largely relied on narrative synthesis to bring findings together. Where meta-analysis was possible, we used inverse-variance weighted random effects models to account for anticipated heterogeneity. However, it was challenging to synthesise and draw generalisable conclusions on EIDM programme effectiveness given the differences in focus, intervention and control conditions, and outcomes across studies. Therefore, most of our findings come from just one or two studies. While more rigorous evidence is needed increase the strength of our conclusions, we present some tentative findings from the impact evaluations evidence below:

1. **Most of the EIDM interventions evaluated in the included studies had a positive effect on intermediate conditions and activities that enhance the likelihood of decision-makers using evidence compared to business as usual with a few notable exceptions.** The largest consistent effect sizes on motivation and capability to use in evidence we found in the review were in a study a programme providing quantitative research methods training to junior ministers in Pakistan (Mehmood et al. 2024), discussed more below.

2. **There is very tentative evidence of promise for capacity building programmes targeting the EIDM skills of policymakers:** Three studies found positive effects across indicators of evidence use in policymaking, capability and opportunity to use evidence. These studies targeted local and state public health policy teams in the USA and junior ministers in Pakistan. The studies from the US targeted both individual and organisation level EIDM processes, although we rated both as being at high risk of bias. The study of the programme providing quantitative research methods training to individual junior ministers in Pakistan found particularly large and consistent effects, including on their willingness to use funds for and run RCTs, while potentially reducing willingness to use funds for data which cannot provide causal attributions (Mehmood et al. 2024). The reason for the large observed effect sizes may be at least partially due to the use of outcome measures that were closely linked to the intervention. In addition, the evaluation did not assess actual policy decisions. This study was rated in the critical appraisal as having some concerns.

3. **Source of the evidence and communication of results can affect accessibility, beliefs and evidence use outcomes:**

Providing more statistical data, presenting impact evaluation results side-by side with other results for comparison and providing cost effectiveness data may increase policymakers' updating of beliefs when presented with new evidence (Vivalt and Colville 2023; Toma and Bell 2022). Contextually framed narratives around systematic review evidence improved accessibility and clarity of the information for participants at a guidelines workshop in Kenya, although they did not improve correct understanding about intervention effectiveness (Opiyo et al. 2013).

Global health actors in Francophone Africa were more likely to report using the findings of a policy brief when the author was reported as an African funder or international organisation compared to a European or North American organisation, but less likely if it was an African university compared to a European or North American University (Fillol et al. 2022). Policy briefs on the topic of agriculture and nutrition that included an opinion from an expert or

researcher improved the likelihood of participants informing someone about the messages of the brief although this did not translate into increased use of evidence (Beynon et al. 2012).

4. **The few studies that tested making evidence more accessible for policymaking generally found small, positive effects on capability to use evidence.** For example, Rogger and Somani (2023) evaluated sending evidence briefings to public officials working on agriculture, education, health, revenue, and trade policy in Ethiopia with summarised administrative data on the population they were serving, finding that it reduced errors in beliefs about their population. However, they did not go on to assess whether this resulted in changes in public officials' behaviour.

5. **A rapid response model in the USA linking researchers with policymakers demonstrated promise for improving evidence use and researcher-policy engagement, in this case with congressional offices (Crowley et al. 2021a; Crowley et al. 2021b).** This was one of the only studies included in the review that used an objective measure of evidence use rather than a self-reported measure, specifically use of research evidence language in legislation.

6. **Organisational and individual characteristics can have significant influences on the effectiveness of EIDM interventions:**

In an RCT in the USA, the use of tailored, targeted evidence messages had a much greater effect on reported evidence use in public health departments that already had a strong culture of valuing research evidence. In contrast, when evidence messages were combined with a knowledge broker, there was a positive effect on evidence use in those departments with a low organisational research culture but a negative effect in organisations that already placed a high value on research evidence (Dobbins et al. 2009). Policy briefs on the topics of agriculture and nutrition created evidence-accurate beliefs among those with no prior views but had little effect when readers had strong prior views (Masset et al. 2013; Beynon et al. 2012).

5.1.3 Research question 2: Factors influencing the design, implementation and impact of EIDM interventions

The qualitative synthesis aimed to identify factors influencing the design, implementation, and impact of interventions in LMICs. It involved a thematic synthesis of 152 studies, applying inductive coding techniques to identify common descriptive and analytical themes. The thematic synthesis aims to identify themes related to the interplay of intervention design, intervention implementation, population and contextual variable with intervention effects and outcomes of EIDM interventions. We identified a total of 49 descriptive themes configured into 11 analytical themes related to population characteristics, contextual factors, design features and implementation factors. A summary of the qualitative evidence synthesis focusing on the interplay of these factors with the effects of EIDM interventions is presented below

Population factors

Analytical theme 1: Evidence users' **lack of skills and experience** as well as **inadequate training** may affect the ability and opportunity to engage and use evidence while **evidence producer's limited skills and experience** may impact ability to engage with evidence users

and provide relevant evidence. For example, a multisite evaluation of knowledge transfer strategy implemented in Mexico, Nicaragua, South Africa and Cameroon indicated that few participants had the skills required to read and understand scientific publications, with several mentioning that reading research documents is not a norm (Dagenais et al. 2013).

1. Contextual factors

Analytical theme 2: **Disease outbreaks, political instability, political cycles, and armed conflicts** can disrupt EIDM interventions while **political will and commitment** tend to promote the successful implementation of EIDM interventions. The global COVID-19 pandemic impacted the integrated knowledge translation in non-communicable diseases project in South Africa (Mpando et al. 2021) across five sites that included face-to-face meetings, a key mode of engagement as their stakeholder engagement strategy. This resulted in a shift from physical to virtual meetings and caused delays in some of the planned meetings. Primary research in South Africa was placed on hold due to restricted access to clinics (Mpando et al. 2021).

2. Design factors

Analytical theme 3: Designing **structured, blended, and contextualised EIDM capacity-building programs** facilitated by **skilled trainers in safe and convenient locations** can enhance the impact of these initiatives to promote the capability to use evidence by policymakers. For example, in a practical reflection on combining workshops and mentorships to build capacity in demand and use of evidence in government organizations, Stewart and colleagues (2017) highlighted that they were flexible with meeting dates and times for structured EIDM workshops in South Africa and Malawi in order to retain attendees and were also adaptable with workshop content depending on the needs of participants.

Analytical theme 4: Producing **relevant, succinct evidence** products that are **visually appealing** and **translated into numerous languages** can enhance **more in-depth engagement with evidence**, and thereby can promote the use of evidence by policymakers. To promote the use of evidence in tobacco control in West Africa, results were presented in an easy-to-read format including policy notes that focused on policy recommendations, available in both English and French (Mane et al. 2020).

Analytical theme 5: **Diversity of stakeholders**, consistent and **effective communication** can promote fruitful collaborative engagements whereas **high cost of engagement** along with a lack of policymaker **incentives** may hinder the effective implementation of policy dialogue elements and stakeholder collaboration. The World Health Organisation (2021) found that comprehensive stakeholder consultations positively influenced the use of evidence in policy making by increasing opportunities and champions for evidence use in Lebanon.

Analytical theme 6: **Timing** of interventions and engagements as well as **time constraints** and **scheduling challenges** can affect stakeholders' participation in EIDM interventions. In Burkina Faso, the issue of timing an intervention was evident as respondents highlighted the absence of policymakers during a workshop that was conducted a week before the presidential elections. Respondents stressed the importance of having decision-makers present to not limit the impact of the workshop, further reiterating emphasising that the timing was not ideal (McSween-Cadieux and & colleagues (2018).

3. Implementation factors

Analytical Theme 7: A **lack of resources**, **staff** and **capacities** affects utilisation of evidence. Due to limited financial resources, fewer activities were implemented in a knowledge brokering program in Burkina Faso, which included the provision of research-based evidence, facilitating knowledge transfer and application of the evidence, conducting evidence dissemination workshops and developing partnerships between knowledge producers and decision-makers. Other planned activities in the program included the development of policy briefs and follow-up discussions with decision-makers (Mc Sween-Cadieux et al. 2019).

Analytical theme 8: Poor **digital connectivity**, **communication**, and a poor **flow and accessibility** of information create an inadequate provision of and access to evidence. Mbonye and Magnussen (2013) found that in Uganda, poor internet connectivity affected the organisation and running of research evidence workshop discussions, limiting the sharing of vital research materials between researchers and policymakers. Unreliable internet connectivity and restricted access to research databases also impeded the accessibility of research evidence needed for urgent policy making decision.

Analytical theme 9: **Leadership support** and **organisational valuing of evidence** can drive EIDM, but **limited stakeholder engagement** in monitoring and evaluation may hinder evidence utilisation, potentially leading to divergent opinions and alignment challenges during decision-making. In the Ranchod (2017) study on building the Research-Policy Nexus in South Africa, enhanced relations between researchers and policymakers were attributed to the strong senior leadership involved in steering research use.

Analytical theme 10: **Conflicting interests** and **resistance to change**, **high turnover** of policymakers and **workplace confidentiality** may affect the implementation of EIDM activities. For instance, In Uganda, Mijumbi and colleagues (2014) pointed out that a lack of awareness and competing interests among top-level decision-makers hindered their engagement with evidence-based initiatives, making it difficult to involve them in the knowledge translation process.

Analytical theme 11: **Delays in data provision**, poor **data quality** causing mistrust in administrative data, and data collection hurdles may affect the implementation of EIDM interventions and effective use of evidence in policymaking. As highlighted by Zida and colleagues' (2017) study in Burkina Faso, when health information feedback, statistics, and indicators were not available promptly, it became challenging to support decision-making processes. This delay in data provision hindered the ability of policymakers and health officials' ability to make informed decisions crucial for the effectiveness of health information systems.

A recurring theme from the qualitative synthesis concerns the value of demand-led intervention design and implementation components present. Evidence users' skills are an important element to promote evidence use. Capacity building initiatives should not only focus on building evidence users' capability to engage with the evidence but also promote evidence advocates' ability to engage with these users, including understanding the policymaking environment. The design of evidence products should consider the users to provide relevant content that addresses their needs, allowing more in-depth engagement with evidence. In addition, designing engagement activities such as policy dialogues at the convenience of policymakers given their time constraints, coupled with effective communication and provision

of incentives, are key considerations to promote fruitful collaborative engagements. In terms of implementation, we see that leadership support and organisational valuing of evidence can drive EIDM, stressing the importance of institutionalisation of evidence use in government bodies to create sustainable appetite for evidence use. However, there are implementation factors affecting the utilisation of evidence by decision-makers that need acknowledgement. To navigate through these, it may require more concerted efforts to promote policymakers' access to evidence and eventual evidence use. These relate to lack of resources, staff and capacities, poor digital connectivity, delays in data provision, and poor data quality. Hence, EIDM practice and research stands to improve if it centres evidence users more prominently.

5.1.4 Overall completeness and applicability of evidence

We included a total of 164 empirical studies of EIDM interventions, 18 of which were counterfactual impact evaluations and 152 which were empirical evaluations of EIDM interventions that took place in an LMIC. As expected, a significant proportion of this literature comes from public health, but there are emerging literatures working across multiple sectors of government and from environmental policy. Several policy areas including economic growth, transport and education are underrepresented in the empirical literature. Most of the impact evaluations addressing review question 1 took place entirely in high-income countries (11 out of 18). The 152 studies included to address the review question 2, which we limited to studies from LMICs only, were conducted across 63 countries. Since there were studies reporting interventions in multiple countries, this yields a greater number of intervention contexts (n =363). A significant minority of this evidence is concentrated in five African countries namely South Africa, Nigeria, Uganda, Kenya and Burkina Faso.

We mapped the 18 included counterfactual impact evaluations according to six individual mechanisms of change and five outcomes, revealing a limited evidence base with absolute gaps in certain mechanism-outcome areas. The size and heterogeneity limited the extent to which these included studies were able to address the first research question of the review. The interventions were diverse, targeting various policy areas and government levels, including local public services, health policy, and federal agencies, and mainly focused on interventions working through access to evidence and policymaker skills mechanisms of change. Most of the studies tested an intervention that worked through an access to evidence mechanism, but we did find a smaller number testing policymaker skills focused interventions and multi-mechanism of change approaches. Most studies evaluated impact on one part of the EIDM intervention logic model, rather than testing both intermediate and evidence use outcomes. Most of the included impact evaluations (17 of 18 studies) measured an intermediate outcome, either capability to use evidence, motivation to use evidence, or opportunity to use evidence,13 studies measured an indicator of capability to use evidence, 12 studies measured an indicator of motivation to use evidence, and three studies measured an indicator of opportunity to use evidence. Only seven of the included studies attempted to measure the impact of the intervention on actual evidence use by policymakers. All seven measured an indicator of evidence use for policy design, while two of the seven also included an indicator of evidence use for policy implementation.

Absolute gaps included impact evaluations of programmes or policies that worked through the awareness mechanism, impact evaluations of programmes or policies that worked through the agreement mechanism and impact evaluations that individually tested approaches

involving policymaker – researcher interactions or changes to structure and processes. None of the studies explored impacts on downstream, socio-economic outcomes that might result from EIDM interventions.

There were similarities in the spread of intervention mechanisms being evaluated in the studies included for research question 2. In the 152 included studies, the least assessed mechanism was the awareness of EIDM mechanism. The most frequently assessed mechanisms of change were interaction with decision-makers, access to evidence and building skills of policymakers.

5.1.5 Quality of the evidence

Both syntheses indicated methodological challenges, including size of the evidence base and heterogeneity across studies in terms of intervention and control condition, type of policymaker and policymaking context. Although the heterogeneity in the impact evaluation evidence base included to address research question one and the limited number of studies resulted in significant challenges for drawing conclusions, we identified several well conducted RCTs that we appraised as having a low risk of bias. This included studies such as Hjort and colleagues (2020) in Brazil and Crowley and colleagues (2021) in the USA. Only one of the included RCTs was appraised as having a high risk of bias (Brownson et al. 2017), largely due to presenting significant differences between intervention and control group participants in their observable characteristics.

One of the major challenges in the impact evaluation literature is the non-uniform nature of outcomes and the reliance on short-term, self-reported measures. If the impacts on evidence use in policymaking were measured in studies, it was typically self-reported by those working in policy, and there was generally no discussion of what would constitute the quality use of research evidence. In addition, few of the included impact evaluations combined a robust counterfactual approach with exploration of the influence of implementation, context and stakeholders' experience of participation in the relevant programmes. Institutional context is likely to be particularly influential for the types of interventions included in this review, and therefore this is a significant gap in the evidence base.

5.1.6 Agreement and disagreements with other studies or reviews

We believe this is the first systematic review to comprehensively bring together the EIDM intervention impact evaluation and qualitative evaluation literature across different policy areas and geographical regions. However, several existing systematic reviews have summarised different parts of the evidence base.

Langer and colleagues' (2016) systematic review of reviews is the most comprehensive in terms of intervention, policy area and geographical scope, synthesising the evidence from 36 reviews on the efficacy of interventions targeting use of research evidence in decision-making (Langer et al., 2016). Although conducted almost ten years ago, they found similar research gaps to this review, including an absence of evidence of interventions building awareness of, and positive attitudes towards, EIDM and interventions building agreement on policy-relevant questions and what constitutes fit-for-purpose evidence. They also found that most reviews focused on intermediate outcomes, with only eight reviews considering evidence use.

Oliver and colleagues' (2014) review of barriers and facilitators to use of evidence by policymakers picked up similar factors as our analysis exploring the factors that have influenced the design, implementation, and impact of EIDM interventions. Barriers included poor access to relevant research, lack of time or opportunity to use research evidence, and policymakers and other users not having knowledge of research methods. They found that collaboration and relationships between policymakers and researchers were an important factor. In addition, most of the research they identified focused on policy actors' perceptions about factors affecting the use of research evidence through short interviews or surveys, with a considerable number surveying only researchers.

We also identified several systematic reviews focusing on the effectiveness of individual EIDM interventions or individual policy areas. In health, for example, Petkovic and colleagues' (2018) Campbell Collaboration systematic review searched for evaluations of approaches that summarised systematic review evidence for health policymakers, including policy briefs (Petkovic et al., 2018). While the six impact evaluations they identified indicated that summary of findings and graded entry summaries are easier to understand than complete reports, insufficient evidence was available to establish that they lead to increased use of systematic review evidence in policymaking. Like the findings of this review, they concluded that there is little impact evaluation evidence to inform the design of evidence summaries, and that future research should consider measuring the uptake of systematic review evidence and incorporate qualitative methods to assess credibility, desirability, and usefulness of evidence. By incorporating qualitative evaluations in our review, we extended their review to offer additional findings, for example, around producing relevant, succinct evidence products that are visually appealing and translated into numerous languages to enhance more in-depth engagement with evidence.

Verboom and Baumann (2020) mapped the global qualitative literature on the use of research evidence in health policymaking, touching upon the qualitative intervention literature on improving evidence use. Unlike our review, the authors focused only on the descriptive characteristics of the 319 studies they identified and included qualitative literature from high-income countries. They found that while most studies are still from North America, Western Europe and Australia, there is a growing proportion of studies from low- and middle-income countries, particularly in sub-Saharan Africa. A finding of the review that was not picked up explicitly in our analysis is that the literature focuses overwhelmingly on the use of research in the policy activities of technical rather than political decision-makers. They suggest this may be partly due to the higher degree of availability of civil servants for research participation, but that future research on political decision-making would help to produce a more complete view of the relationship between research and policy processes. In addition, like our review and other systematic reviews, they find that few studies involved direct observation of policymaking processes and decisions and that most rely on collecting retrospective information on perceptions.

5.1.7 Potential biases in the review process

This section presents the main limitations of our review approach that have affected our findings. Our inclusion criteria for the review focused on studies of applied interventions to support the use of evidence in policymaking, that is, programmes, strategies, and actions that actively intervened in the current decision-making status quo. It is possible that we might have

missed diagnostic studies or other types of institutional evaluations that explored existing structures and processes that have previously been intended to enhance evidence use.

Although we searched a long list of organisational databases and sources of grey literature, a significant number of these were primarily sources of health literature. Combined with the focus on applied interventions, this may have led to a bias towards identifying the evidence base in public health.

There were challenges in drawing complementary insights through sensible integration of the two review modules since the quantitative and qualitative analyses were based on different sets of included studies with different geographical foci. Future research could consider the qualitative synthesis only of studies linked to the impact evaluations.

Due to resource constraints, we only included studies published in English in our review, which means we may have missed relevant studies published in other languages. However, the evidence map that this systematic review used as a source of studies did include studies in the following languages: Arabic, Chinese, English, French, Portuguese, Russian, and Spanish. The map found a significant proportion of the included studies were published in English, with 25 in Chinese and two in Portuguese. An initial screen of these studies indicated that very few of these focused on policymakers and therefore would not be included in this review.

We were also unable to complete the critical appraisals of qualitative studies independently in duplicate. Only 5% of the studies of the full sample of studies (97) were appraised by third reviewer. We were also not able to integrate the qualitative critical appraisal findings into the analysis itself, so we can only comment on the overall quality of the evidence, without reference to specific findings or interventions.

Finally, we identified very few impact evaluations to address the first research question in our review and therefore some of our conclusions and implications stem from a very small body of evidence.

6 Author's Conclusions

6.1 Nature of the evidence base

This review brings together a diverse body of literature on interventions targeting evidence-informed decision-making in policymaking. We believe it is the first systematic review to comprehensively identify and synthesise both the impact evaluation and broader empirical literature on EIDM interventions working through a range of mechanisms of change.

The evidence base remains dominated by studies from health, with almost 70 per cent of the studies from LMICs (review question 2) emanating from EIDM interventions targeting health policy makers. There are a small number of evaluations of programmes working across multiple government policy areas and from the environmental sector but several policy areas, including economic growth, transport and education are underrepresented in the LMIC empirical literature. While we believe there are generalisable lessons to be learned about EIDM interventions from across different policy areas, there are also area specific challenges, for example around the production and use of research evidence for economic policy making, that mean that new research is desperately needed in these areas.

We find a small and emerging body of counterfactual impact evaluations of EIDM interventions, with half of these being published in the last five years. This emerging literature is fragmented and lacks an agreed set of key indicators and outcome measures of evidence-use, relying heavily on self-reported measures. Although some of the types of interventions of relevance to this review are difficult to test using counterfactual impact evaluation methods, such as co-production approaches and awareness raising campaigns, recent RCTs such as Hjort and colleagues (2020) in Brazil, Crowley and colleagues (2021) in the USA and Mehmood and colleagues (2024) in Pakistan demonstrate that robust, counterfactual evaluations of EIDM interventions can successfully be done with useful and promising results. Although we did not include studies using theory-based, qualitative approaches to assess the contribution or impact of EIDM interventions for research question 1, we did note when studies included for research question 2 did this. There were very few studies included for research question 2 that attempted to comprehensively assess contribution or impact using such an approach, with a few notable exceptions such as Vogel and Punton's (2018) realist evaluation of the Building Capacity to Use Research Evidence (BCURE) programme and Asiimwe and Engel's (2020) tracer study of Parliamentary Capacity Strengthening Initiatives implemented by CLEAR-AA and Twende Mbele, aimed at improving evidence use in African parliaments. We therefore see a huge opportunity for the sector to increase the use of the full range of impact evaluation methods available to evaluate the impact or contribution of interventions targeting EIDM. This chimes with the findings of other recent evidence reviews, including Oliver and colleagues (2022). There are a growing number of methodological resources to support such work, including The Use of Research Evidence Methods Repository and PACE's overview of measures to assess EIDM initiatives[14]. Equally, it is important that funding is made available for evaluation alongside programming targeting evidence use by policy makers to make sure lessons can be learned from the dynamic work going on in this sector.

6.2 Impact of EIDM interventions

Overall, it was difficult to synthesise and draw generalisable conclusions on intervention effectiveness given the differences in focus, intervention and control conditions, and outcomes across studies. This inhibits cross-learning and diffusion of innovations. Therefore, most of our findings on effectiveness come from just one or two studies, and we rely primarily on narrative reporting of individual studies rather than meta-analysis. In addition, most studies evaluated effects on one part of the EIDM intervention logic model, rather than testing both intermediate and evidence use outcomes. This prevented us from being able to quantitatively test a key hypothesis that interventions that work through targeting multiple behavioural constraints to EIDM - specifically capability, opportunity, and motivation to use evidence - are more effective at shifting evidence use. Few of the included impact evaluations combined a robust counterfactual approach with exploration of implementation, context, and stakeholders' experience of participation in the relevant programmes. Where impacts on evidence use in policymaking were measured in impact studies, it was typically self-reported by those working in policy, and there was typically no discussion of what quality use of research evidence would look like. However, recent impact evaluations have developed innovative approaches to measuring aspects of evidence use in policymaking that rely on existing data, including reviewing research evidence language used in new legislation (Crowley et al. 2021a) and

[14] https://uremethods.org/about-us/ and https://prezi.com/view/ybFXNH4XZHtPcK1mb7R8/

reviewing letters from junior ministers regarding the recommendation of well-informed policies or programmes in letters to more senior policymakers (Mehmood et al. 2024). This is a promising development, and we encourage future studies to explore creative approaches such as these and use triangulation wherever possible to capture changes to the use of evidence from different perspectives, given the inherent complexity and challenges with measuring this process.

There are structural patterns in the evidence base in terms of what EIPM interventions are designed, implemented, and evaluated that hinder systems-level change for evidence-use. We are missing evaluation evidence on programmes that work through building awareness of EIDM, getting agreement and changing structures and processes. We summarise these key gaps in terms of mechanisms and outcome areas for the included impact evaluations.

- **We did not identify any impact evaluations of programmes or policies that worked through the awareness mechanism** -specifically, building awareness for, and positive attitudes towards, EIDM, such as social marketing around the norm to use evidence and **awareness raising campaigns.**

- **We did not identify any impact evaluations of programmes or policies that worked through the agreement mechanism** – specifically building mutual understanding and agreement on policy-relevant questions and the kind of evidence needed to answer them, including co-production approaches and use of Delphi panels

- We also did not identify any impact evaluations that individually tested approaches involving policymaker – researcher interactions or changes to structure and processes.

- **None of the studies explored impacts on downstream, socio-economic outcomes** that might result from EIDM interventions.

There were several recurring themes emerging in the quantitative and qualitative synthesis that are worth highlighting. The benefits of demand-led intervention design and implementation components present a recurring theme, and EIDM practice and research stands to improve if it centres evidence users more prominently. The importance of targeting programmes and exploring differences in impact depending on an organisation's value of research was also a finding that emerged from both quantitative and qualitative synthesis. The qualitative synthesis identified organisational value of research evidence as a key driver of impact. Dobbins and colleagues' (2009) RCT in the USA was the only included impact evaluation that explored variation in effectiveness of EIDM strategies by differences in an organisation's culture of research evidence, which was self-reported and defined as the extent to which the participant reported that their organisation valued the use of research evidence in decision-making. However, they found substantial differences in results, finding that the use of tailored, targeted evidence messages had a much greater effect on reported evidence use in public health departments that already had a strong culture of valuing research evidence. In contrast, when evidence messages were combined with a knowledge broker, there was a positive effect on evidence use in those departments with a low organisational research culture but a negative effect in organisations that already placed a high value on research evidence. It may therefore also be valuable to attempt to routinely measure organisational research use culture as part of evaluations.

There is tentative, observational evidence from across the review that single-mechanism interventions may only improve intermediate outcomes, although we lack counterfactual impact evaluation evidence that directly compares single vs multi-mechanism and behaviour change component approaches. The few studies that look at evidence use do either combine mechanisms or combine targeted CMOs. The qualitative synthesis identified barriers and facilitators to EIDM impact that can only be addressed in programme designs that target multiple mechanisms. As noted above, of the 152 studies included in the qualitative synthesis, a majority of the studies assess interventions applying mechanisms of change that are paired with other intervention mechanisms. Overall, single mechanism interventions are in the minority of programmes being evaluated, suggesting that practitioners are typically designing and evaluating interventions targeting multiple mechanisms

The qualitative synthesis identified population factors influencing the success and sustainability of EIDM interventions in LMICs. Evidence users' lack of skills and experience, as well as inadequate training, was consistently reported as affecting their ability and opportunity to engage with and use research evidence. However, the small number of impact evaluations testing capacity building programmes targeting the EIDM skills of policymakers provided very tentative evidence of promise for improving indicators of evidence use in policymaking, capability, and opportunity to use evidence. Unfortunately, due to the limited number of impact evaluations exploring this mechanism, we were unable to quantitatively explore which intervention design features were associated with greater impact. However, the qualitative synthesis identified some consistently reported key features for consideration when designing capacity-building activities. Designing structured, blended, and contextualised EIPM capacity-building programmes facilitated by skilled trainers in safe and convenient locations was suggested to enhance the impact of these initiatives. In addition, it is important that capacity building initiatives are of adequate length to allow participants to achieve development goals whilst also allowing sufficient time to measure programme impact, a priority consideration for donors and funders, and other key stakeholders.

The qualitative synthesis also identified evidence producers' limited skills and experience in the policy making process as impacting their ability to engage with evidence users and provide relevant or contextualised evidence. With this in mind, we found that one of the impact evaluations with the most promising results was of the Research-to-policy Collaboration model in the USA (Crowley et al. 2021a; 2021b), one of the only to involve capacity building of researchers to build their knowledge of policy processes, increase their preparedness to work with offices in Congress and on best practices for knowledge translation. Not only did this model increase the amount of legislation that included research evidence language, it also improved researcher knowledge of policy processes, such as lobbying, as well as broader motivation to engage with policy makers. Although more impact research is needed to test such models in other contexts, it suggests that such capacity building should be an important component of EIDM interventions, linking researchers with policymakers.

6.3 Factors influencing the design, implementation and impact of EIDM interventions

Finally, our qualitative synthesis brought up a number of contextual and implementation challenges when delivering EIDM interventions with government actors in LMICs. Disease outbreaks, changes in the political climate, armed conflicts, and bureaucracies have disrupted

EIDM interventions while political will and commitment tend to promote the successful implementation of EIDM interventions. In addition, a lack of staff resources and capacities in government departments and among evidence brokers to support the production of evidence products were consistently noted as implementation challenges. Conflicting interests, high turn-over of policymakers, and workplace confidentiality were common issues affecting the implementation. Poor internet and digital connectivity, and limited accessibility to databases and journals remain key barriers to the flow of research evidence to policy. While we are far from the first to point out these challenges (e.g., Oliver et al. 2014), they clearly remain important barriers to successful EIDM intervention implementation that should be considered and built into all stages of programme design and delivery.

Considering all the above, we present some implications for practice and for research below. We indicate where implications draw upon findings of just one or two impact evaluations and therefore, generalisability may be limited.

6.4 Implications for policy and practice

- To affect behaviour change, multi-mechanism and multi-component interventions may be required that target different elements of the evidence-to-policy journey (e.g., capacity-building paired with access).

- When presenting impact evaluation results to policymakers, consider providing more statistical data on variation, presenting impact evaluation results side-by-side with other results for comparison, and providing cost-effectiveness data to increase policymakers' responsiveness to the evidence (tested in two impact studies only).

- Consider capacity building programmes to build the skills of policy makers to improve capabilities and use of research evidence. Design flexible, consistently structured EIDM capacity-building activities that are delivered with sufficient training materials, and blended learning techniques and are tailored to the local context with facilitation by experienced and politically sensitive facilitators, to promote the successful implementation of these initiatives. Ensure that the duration and regularity of capacity-building workshops are sufficient for participants to achieve capacity development goals, which is a key consideration for donors and funders among other relevant stakeholders. It is also important to target evidence brokers with training to enhance their understanding of the policymaking process and best practice in knowledge translation.

- Establish the extent to which an organisation values research evidence and has an existing culture of evidence use when designing programmes, and consider attempting to measure as a part of impact evaluations to explore variation in effects by these characteristics.

- Choosing venues for meetings and workshops should balance convenience and safety for public officials and other stakeholders to encourage participation. Meetings and workshops to promote evidence use by policymakers need to be carried out at the convenience of relevant stakeholders (especially policymakers) to maximise attendance and participation.

- Diverse stakeholders should be included in policy dialogues and advocacy efforts to improve the facilitation of mutual and collaborative engagement in implementing effective decision-making.
- Establish effective communication and consistent follow-ups to improve the success of policy dialogues and capacity-building efforts.
- Consider providing financial incentives to engage stakeholders in EIDM processes, particularly participation in meetings and workshops.
- Ensure that evidence products such as policy briefs match policy makers' information needs and are structured in an easy-to-read and visually appealing way to promote engagement with and use of evidence. Consider that provision of policy briefs alone may not result in more evidence-accurate beliefs when readers have strong prior views (tested in one impact study only).

6.5 Implications for research

- More impact evaluation evidence is needed, particularly in LMICs, including impact evaluations that evaluate both the intermediate outcomes of interest and evidence use. This will allow us to explore to what extent having an effect on multiple intermediate, behavioural factors - capability, opportunity, motivation - makes it more likely that evidence use during policy making will follow. It will also allow exploration of variation in effectiveness, including across different contexts.
- Consider combining robust impact approaches with qualitative or mixed method exploration of implementation, context, and stakeholders' experience of participation in the relevant programmes. Future studies would benefit from this design to understand if as well as how and why interventions are effective or not.
- Further work needs to look at developing standardised, robust measures of evidence use in policy making, going beyond self-reported assessments. Future studies could also include multiple sources of information, including objective measures of evidence use, to triangulate against self-reported metrics.
- Future studies should consider integrating aspects of qualitative appraisals fully into research design and analysis.
- There are structural patterns in the evidence base that need to be addressed through future funding of EIDM evaluation. New studies can meaningfully fill absolute evidence gaps in the awareness and agreement mechanisms. In addition, more evidence is needed in areas outside of health policy making.
- Explore the effect of the quality of research evidence on evidence use from the evidence user's perspective.
- Consider including studies published in languages other than English in future systematic reviews to facilitate learning from other evidence systems.

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The review is being led by a team at the Pan-Africa Collective for Evidence (PACE): Laurenz Mahlanza-Langer, Promise Nduku, John Ategeka, Tafadzwa Mutanha, Tanya Mdlalose, Ruvimbo Nhandara.

The review is being supported by a team at 3ie: Jennifer Stevenson, Shannon Shisler, Suvarna Pande.

Declarations of interest

There are no reported conflicts of interest on this review. Several of the review authors are involved with the International Development Coordination Group of the Campbell Collaboration. However, the IDCG editor for this review is not involved in the review.

Differences between protocol and review

The large number of qualitative studies coupled with limited resources precluded us from including the quality of the included evidence for research question 2 in the synthesis work. Future synthesis efforts should consider the quality of the qualitative evidence in drawing conclusions

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Plans for updating the review

The authors do not have plans to update the review at this time.

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8 Appendices

8.1 Appendix A: Search Strategy

8.1.1 Appendix A.1 Overall Search Terms

(#1 OR #2 OR #3) AND #4

#1 Comprehensive evidence use terms

“evidence use” OR “evidence utilisation” OR “evidence utilization” OR “evidence dissemination” OR “evidence diffusion” OR “evidence uptake” OR “evidence mobilisation” OR “evidence mobilization” OR “evidence application” OR “evidence translation” OR “evidence transfer” OR “evidence adoption” OR “evidence sharing” OR “evidence implementation” OR “evidence exchange”

OR

“research use” OR “research utilisation” OR “research utilization” OR “research dissemination” OR “research diffusion” OR “research uptake” OR “research mobilisation” OR “research mobilization” OR “research application” OR “research translation” OR “research transfer” OR “research adoption” OR “research sharing” OR “research implementation” OR “research exchange”

OR

“knowledge use” OR “knowledge utilisation” OR “knowledge utilization” OR “knowledge dissemination” OR “knowledge diffusion” OR “knowledge uptake” OR “knowledge mobilisation” OR “knowledge mobilization” OR “knowledge application” OR “knowledge translation” OR “knowledge transfer” OR “knowledge adoption” OR “knowledge sharing” OR “knowledge implementation” OR “knowledge exchange”

OR

“evaluation use” OR “evaluation utilisation” OR “evaluation utilization” OR “evaluation dissemination” OR “evaluation diffusion” OR “evaluation uptake” OR “evaluation mobilisation” OR “evaluation mobilization” OR “evaluation application” OR “evaluation translation” OR “evaluation transfer” OR “evaluation adoption” OR “evaluation sharing” OR “evaluation implementation” OR “evaluation exchange”

#2 Evidence into Action terms (supplement)

“evidence broker*” OR “evidence champion*” OR “evidence into action” OR “evidence into practice” OR “evidence into policy” OR “evidence to action” OR “evidence to practice” OR “evidence to policy”

“research broker*” OR “research champion*” OR “research into action” OR “research into practice” OR “research into policy” OR “research to action” OR “research to practice” OR “research to policy”

“knowledge broker*” OR “knowledge champion*” OR “knowledge into action” OR “knowledge into practice” OR “knowledge into policy” OR “knowledge to action” OR “knowledge to practice” OR “knowledge to policy”

“evaluation broker*” OR “evaluation champion*” OR “evaluation into action” OR “evaluation into practice” OR “evaluation into policy” OR “evaluation to action” OR “evaluation to practice” OR “evaluation to policy”

#3 Evidence-informed decision-making terms

(“evidence-based” OR “evidence-informed”) AND (policy OR policies OR decision* OR “decision-making” OR “decision making” OR “policy-making” OR “policy making” OR policymaking)

OR

“data use” OR “research impact” OR “evidence ecosystem” OR “evidence system” OR “knowledge system” OR “evidence movement” OR “evidence agenda”

OR

(“use of evidence” OR “use of research” OR “use of knowledge” OR “use of evaluation” OR “uptake of research” OR “uptake of evidence” OR “uptake of knowledge” OR “uptake of evaluation”)

#4 Country terms

Andorra OR “Antigua and Barbuda” OR Aruba OR Australia OR Austria OR Bahamas OR Bahrain OR Barbados OR Belgium OR Bermuda OR “British Virgin Islands” OR “Brunei Darussalam” OR Canada OR “Cayman Islands” OR “Channel Islands” OR Chile OR Croatia OR Curacao OR Cyprus OR Czechia OR Denmark OR Estonia OR “Faroe islands” OR Finland OR France OR “French Polynesia” OR Germany OR Gibraltar OR Greece OR Greenland OR Guam OR “Hong Kong” OR Hungary OR Iceland OR Ireland OR “Isle of Man” OR Israel OR Italy OR Japan OR “South Korea” OR Kuwait OR Latvia OR Liechtenstein OR Lithuania OR Luxembourg OR Macao OR Malta OR Monaco OR Nauru OR Netherlands OR “New Caledonia” OR “New Zealand” OR “Northern Mariana Islands” OR “Norway” OR Oman OR Panama OR “Poland” OR “Portugal” OR “Puerto Rico” OR Qatar OR Romania OR “San Marino” OR “Saudi Arabia” OR “Seychelles” OR Singapore OR “Sint Maarten” OR “Slovak Republic” OR “Slovenia” OR Spain OR “St Kitts and Nevis” OR “St Martin” OR Sweden OR “Switzerland” OR Taiwan OR “Trinidad and Tobago” OR “Turks and Caicos Islands” OR “United Arab Emirates” OR UAE OR “United Kingdom” OR UK OR Britain OR “United States” OR USA OR Uruguay OR “developed countr*” OR “developed nation*” OR “developed world” OR “high-developed countr*” OR “high-developed world” OR “high income countr*” OR “high-income countr*” OR HIC OR “high income nation*” OR “high-income nation*” OR “wealthy countr*” OR “wealthy nation*” OR “developed econom*” OR “high income econom*” OR “high-income econom*” OR "first world countr*" OR "industrialized countr*" OR "industrialised countr*" OR "Global North"

OR

Africa OR Asia OR Caribbean OR “West Indies” OR “South America” OR “Latin America” OR “Central America” OR Afghanistan OR Albania OR Algeria OR Angola OR Antigua OR Barbuda OR Argentina OR Armenia OR Azerbaijan OR Bahamas OR Bahrain OR Bangladesh OR Barbados OR Benin OR Belize OR Bhutan OR Bolivia OR Bosnia OR Herzegovina OR Hercegovina OR Botswana OR Brasil OR Brazil OR Darussalam OR “Burkina Faso” OR “Burkina Fasso” OR “Upper Volta” OR Burundi OR Urundi OR Cambodia OR “Khmer Republic” OR Kampuchea OR Cameroon OR Cameroons OR Cameron OR Camerons OR “Cabo Verde” OR “Cape Verde” OR “Central African Republic” OR CAR OR Chad OR Chile OR China OR Colombia OR Comoros OR “Comoro Islands” OR Comores OR “Cook Islands” OR Congo OR Zaire OR “Costa Rica” OR “Cote d’Ivoire” OR “Ivory Coast” OR Croatia OR Cuba OR Cyprus OR Czechoslovakia OR “Czech Republic” OR Slovakia OR “Slovak Republic” OR Djibouti OR “French Somaliland” OR Dominica OR “Dominican Republic” OR “East Timor” OR “East Timur” OR “Timor Leste” OR Eswatini OR Ecuador OR Egypt OR “United Arab Republic” OR “El

Salvador" OR Eritrea OR Estonia OR Ethiopia OR Fiji OR Gabon OR "Gabonese Republic" OR Gambia OR Georgia OR Ghana OR "Gold Coast" OR Greece OR Grenada OR Guatemala OR Guinea OR Haiti OR Honduras OR India OR Maldives OR Indonesia OR Iran OR Iraq OR Israel OR Jamaica OR Jordan OR Kazakhstan OR Kazakh OR Kenya OR Kiribati OR Korea OR Kosovo OR Kyrgyzstan OR Kirghizia OR "Kyrgyz Republic" OR Kirghiz OR Kirgizstan OR "Lao PDR" OR Laos OR Latvia OR Lebanon OR Lesotho OR Basutoland OR Liberia OR Libya OR Macedonia OR Madagascar OR "Malagasy Republic" OR Malaysia OR Malaya OR Malay OR Maldives OR Malawi OR Nyasaland OR Mali OR Mauritania OR Mauritius OR Mexico OR Micronesia OR "Middle East" OR Moldova OR Moldovia OR Mongolia OR Montenegro OR Morocco OR Mozambique OR Mocambique OR Myanmar OR Myanma OR Burma OR Namibia OR Nauru OR Nepal Nicaragua OR Niger OR Nigeria OR "Northern Mariana Islands" OR Niue OR Oman OR Pakistan OR Palau OR Palestine OR Panama OR Paraguay OR Peru OR Philippines OR Philipines OR Phillipines OR Phillippines OR "Puerto Rico" OR Romania OR Rumania OR Roumania OR Rwanda OR Ruanda OR "Saint Kitts" OR "St Kitts" OR Nevis OR "Saint Lucia" OR "St Lucia" OR "Saint Vincent" OR "St Vincent" OR Grenadines OR Samoa OR "Samoan Islands" OR "Sao Tome" OR Principe OR "Saudi Arabia" OR Senegal OR Serbia OR Montenegro OR Seychelles OR "Sierra Leone" OR Slovenia OR "Sri Lanka" OR Singapore OR "Solomon Islands" OR Somalia OR Sudan OR Suriname OR Surinam OR Swaziland OR Syria* OR Tajikistan OR Tadzhikistan OR Tadjikistan OR Tadzhik OR Tanzania OR Thailand OR Togo OR "Togolese Republic" OR Tonga OR Trinidad OR Tobago OR Tunisia OR Turkey OR Turkmenistan OR Turkmen OR Tuvalu OR Uganda OR Ukraine OR "United Arab Emirates" OR UAE OR Uruguay OR Uzbekistan OR Uzbek OR Vanuatu OR "New Hebrides" OR Venezuela OR Vietnam OR "Viet Nam" OR "West Bank" OR Yemen OR Zambia OR Zimbabwe OR "developing country" OR "developing countries" OR "developing nation" OR "developing nations" OR "developing world" OR "less-developed countr*" OR "less developed countr*" OR "less-developed world" OR "less-developed world" OR "lesser-developed countr*" OR "lesser developed countr*" OR "lesser-developed nation" OR "lesser developed nation*" OR "lesser developed world" OR "lesser-developed world" OR "under-developed countr*" OR "under developed countr*" OR "under-developed nation*" OR "under developed nation*" OR "under-developed world" OR "underdeveloped world" OR "under developed world" OR "underdeveloped countr*" OR "under-developed countr*" OR "Under developed countr*" OR "under developed nation*" OR "under-developed nation*" OR "underdeveloped nation*" OR "lower middle income countr*" OR "lower middle-income countr*" OR "lower middle income nation*" OR "lower middle-income nation*" OR "upper middle-income countr*" OR "upper middle income countr*" OR "upper middle-income nation*" OR "upper middle income nation*" OR "low-income countr*" OR "low income countr*" OR "low-income nation*" OR "low income nation*" OR "lower income countr*" OR "lower-income countr*" OR "lower income nation*" OR "lower-income nation*" OR "Low- and Middle- Income countr*" OR "Low and Middle Income Countr*" OR "underserved country" OR "underserved countries" OR "underserved nation" OR "underserved nations" OR "underserved world" OR "under served country" OR "under served countries" OR "under served nation" OR "under served nations" OR "under served world" OR "deprived country" OR "deprived countries" OR "deprived nation" OR "deprived nations" OR "deprived world" OR "poor country" OR "poor countries" OR "poor nation" OR "poor nations" OR "poor world" OR "poorer country" OR "poorer countries" OR "poorer nation"

OR “poorer nations” OR “poorer world” OR “developing economy” OR “developing economies” OR “less developed economy” OR “less developed economies” OR “lesser developed economy” OR “lesser developed economies” OR “under developed economy” OR “under developed economies” OR “underdeveloped economy” OR “underdeveloped economies” OR “middle income economy” OR “middle income economies” OR “low income economy” OR “low income economies” OR “lower income economy” OR “lower income economies” OR lmic OR lmics OR “third world” OR “lami country” OR “lami countries” OR “transitional country” OR “transitional countries” LMIC OR LMICs OR LIC OR LICs OR UMICs OR UMIC OR (“khmer” AND “republic”) OR (“cape” AND “verde”) OR (“central” AND “african” AND “republic”)

8.2 Appendix B: Search Sources

8.2.1 Appendix B.1 Electronic academic databases

Appendix Table 1: Search results from electronic academic sources

Database	Search results
Healthcare:	
1. Medline/PubMed	
Broad Social Sciences:	
2. Web of Science (Science Citation Index Expanded, Social Science Citation Index, Emerging Sources Citation Index)	
3. Scopus	
All searched via EbscoHost	
Education:	
4. ERIC	

Psychology/Behavioural Sciences:	
5. PsycINFO	
Organisational:	
6. Business Source Ultimate	
Communication:	
7. Communication and Mass Media complete	
Political Science:	
8. Political Science Complete	

8.2.2 Appendix B.2. Grey literature sources

Appendix Table 2: List of grey literature sources

Website	URL
1. Africa Centre for Evidence	https://africacentreforevidence.org/
2. Africa Evidence Network	https://www.africaevidencenetwork.org/en/
3. BCURE	https://bcureglobal.wordpress.com

4. African Institute for Development Policy (AFIDEP)	https://www.afidep.org/
5. African Academy of Sciences	https://www.aasciences.africa/
6. Africa Centre for Systematic Reviews and Knowledge Translation (ACSRKT)	https://chs.mak.ac.ug/afcen/
7. Zimbabwe Evidence Informed Policy Making Network (ZEIPNET)	https://www.zeipnet.co.zw/
8. PACKS-Africa	https://www.packs-africa.org/
9. Africa Cabinet Network	http://www.cabinetgovernment.net/
10. The Overseas Development Institute (ODI)	https://odi.org/en/
11. International Network for the Availability of Scientific Publications (INASP)	https://www.inasp.info/
12. 3ie	https://www.3ieimpact.org/evidence-hub

13. WACIE	https://www.3ieimpact.org/our-work/west-africa-capacity-building-and-impact-evaluation
14. International Network for Government Science Advice (INGSA)	https://www.ingsa.org/
15. South African Department of Planning, Monitoring and Evaluation (DPME)	https://www.dpme.gov.za/Pages/default.aspx
16. Twende Mbele	https://twendembele.org/
17. Human Sciences Research Council (HSRC)	http://www.hsrc.ac.za/en
18. Council for Scientific and Industrial Research (CSIR)	https://www.csir.co.za/
19. University of Cape Town (UCT)	https://www.uct.ac.za/
20. Makerere University	https://www.mak.ac.ug/
21. SDG Hub	https://sdg.iisd.org/
22. eBase Africa	https://www.ebaseafrica.org/

23. Centre for the Development of Best Practices in Health (Cameroon)	http://www.cdbph.org/index.php/en/
24. Ethiopian Public Health Institute (Ethiopia)	http://www.ephi.gov.et/
25. Ebonyi State University (Nigeria)	https://www.ebsu.edu.ng/#
26. Ministry of Health (Burkina Faso)	https://www.sante.gov.bf/accueil
27. School of Medicine, Faculty of Medicine, University of Antioquia (Colombia)	https://bit.ly/2hHkosq
28. Veredas Institute (Brazil)	https://www.veredasinstitute.com/
29. Foundation for Scientific and Technological Development in Health (FIOTEC)	https://www.fiotec.fiocruz.br/en/access-to-information
30. Ministry of Health (Chile)	https://www.minsal.cl/
31. Centre of Studies and Research,	https://mohcsr.gov.om/

Ministry of Health (Oman)	
32. Lanzhou University	https://en.lzu.edu.cn/
33. Knowledge to Policy Center, American University of Beirut (Lebanon)	https://www.aub.edu.lb/k2p/Pages/default.aspx
34. EPPI Centre, UCL Institute of Education, University College London (United Kingdom)	https://eppi.ioe.ac.uk/cms/
35. Results for All	https://results4america.org
36. Jimma University Ethiopia	https://www.ju.edu.et/
37. Partnership for African Social and Governance Research (PASGR)	https://www.pasgr.org/
38. CEE Joburg	https://ceejoburg.com/
39. African Union	https://au.int/
40. Alliance for Health Policy and Systems Research	http://www.who.int/alliance-hpsr/en/

41. EVIPNet	https://www.who.int/evidence/en/
42. McMaster KT+ Database	http://plus.mcmaster.ca/kt/
43. UNICEF	https://www.unicef-irc.org/publications
44. Human Development research foundation	https://hdrfoundation.org/evidence-synthesis-analysis-team/
45. USAID	https://www.usaid.gov/
46. FCDO	https://www.gov.uk/government/organisations/foreign-commonwealth-development-office
47. Oxfam	https://www.oxfam.org/en
48. IDC	https://idc.co.za/
49. IDRC	https://www.idrc.ca/en?gclid=Cj0KCQiA1sucBhDgARIsAFoytUuJYXCUfJGIPfRVAaw9g_CrlDY1Z-MqJWb5g0RFWhHNoX9bFvhqVnQaApwLEALw_wcB https://www.idrc-crdi.ca/en
50. GIZ	https://www.giz.de/en/html/index.html
51. Deval	https://www.deval.org/en/
52. IRC	https://www.rescue.org/

53. World Bank Evaluation office	https://ieg.worldbankgroup.org/
54. FAO	https://www.fao.org/home/en
55. OECD	https://www.oecd.org/southafrica/
56. WHO	https://www.who.int/
57. UNDP	https://www.undp.org/
58. US Data coalition	https://www.datacoalition.org/
59. US coalition for evidence-based policy	http://coalition4evidence.org/
60. Results 4 America	https://results4america.org/
61. Results for development	https://r4d.org/
62. Behavioural insights team	https://www.bi.team/
63. Alliance for Useful Evidence_NESTA	https://www.nesta.org.uk/project/alliance-useful-evidence/
64. Agora	https://agora.unicef.org/
65. Centre for Science and Policy	https://www.csap.cam.ac.uk/

66. APO	https://apo-opa.com/
67. Community NI	https://www.communityni.org/
68. Epistemonikos (Chile)	https://www.epistemonikos.org/#
69. Hewlett foundation	https://hewlett.org/
70. William T Grant Foundation	https://wtgrantfoundation.org/
71. Monash University in Australia	https://www.monash.edu/
72. On Think Tanks	https://onthinktanks.org/
73. Asian Development Bank	https://www.adb.org/
74. Bill & Melinda Gates Foundation	https://www.gatesfoundation.org/
75. Center for Effective Global Action Research Publications	https://vcresearch.berkeley.edu/research-unit/center-effective-global-action
76. Innovations for Poverty Action Publications	https://www.poverty-action.org/publications

77. Inter-American Development Bank	https://www.iadb.org/en/topics-effectiveness-improving-lives/impact-evaluations-repository
78. Millennium Challenge Corporation	https://www.mcc.gov/
79. National Bureau of Economic Research, USA	https://www.nber.org
80. USAID Evaluations Clearinghouse	http://dec.usaid.gov/
81. Thünen-Institute, GER	www.thuenen.de/
82. Observatory for Public Sector Innovation	https://oecd-opsi.org/bi-projects/
83. Campbell Collaboration	https://campbellcollaboration.org/
84. Data Coalition	https://www.datacoalition.org
85. Bosch Stiftung	https://www.bosch-stiftung.de/de/story/es-kann-nicht-genuegend-stiftungen-geben
86. Mastercard Foundation	https://mastercardfdn.org
87. Evidence Commission	https://www.mcmasterforum.org/networks/evidence-commission

88. COVID-END	https://www.mcmasterforum.org/networks/covid-end
89. Centre for Evidence and Implementation	https://www.ceiglobal.org
90. Centre for Global Development	https://www.cgdev.org
91. IDInsights	https://www.idinsight.org

8.3 Appendix C: Data extraction and critical appraisal

8.3.1 Appendix C.1 Descriptive data extraction tool (all included studies)

Variable	Description
Publication year	Year of study publication
Publication type	Publication type of study(e.g., journal articles)
Project name	State name of the project
Region (socio-economic)	World Bank country classifications by income level
Region (geographical)	World bank classification.

Country	Country(s) of intervention
Sector	Intervention sector ● Health ● Agriculture, fishing and forestry ● Social protection ● Education ● Industry, trade and services ● Public administration ● Energy and extractives ● Financial sector ● Water, sanitation and waste management ● Transportation ● Information and communications technologies
Nature of the evidence	Denote if the intervention focuses on the art or science of using evidence
Evidence Use Mechanism	EIDM interventions according to mechanisms of change namely: ● M1 Awareness: Awareness for, and positive attitudes towards EIDM ● M2 Agree: Mutual understanding & agreement on evidence needs & policy-relevant evidence

	● M3 Access: Providing communication of, and access to, evidence ● M4 Interact: Interaction between decision-makers and researchers ● M5 Skills: Supporting decision-makers skills in accessing and making sense of evidence ● M6 Structure & Process: Influencing decision-making structures and processes
Intervention description	Provide detailed description of the intervention and its different components. Include details of sections of the manuscript and page numbers where authors describe details of the intervention.
Intervention theory of change / logic model	Does the study mention a theory of change or logic model? If yes, provide page number and provide a short description of the theory of change and the pathway discussed by the authors which explain the reported effects.
Intervention implementation	Does the study describe the process of implementing the intervention or programme? If yes, please provide page number and provide a short description of the information reported in the study.
Stage of the policy cycle	Policy Design; Policy Implementation

Single vs multicomponent interventions	
Year of the intervention	The earliest date (year) observations are exposed to the intervention.
Length of follow up	How many months have elapsed between the start of the intervention (earliest date observations are exposed to the intervention) and the date of the final outcome measurement.
Exposure to intervention	For how long are the observations exposed to the intervention (in months)?
Type of policymaker	Does the study describe the policymaking population targeted by the intervention or programme? If yes, please provide page number and provide a short description of the information reported in the study.
Level of policymaking	Global, Regional, National, subnational,
Seniority of policymaker	- junior -mid-level -senior
Gender of policymaker	Where reported, please comment on the gender composition of the policymakers targeted by the intervention or programme.

Resource / information setting	Where reported, please comment on the setting in which the policymakers targeted by the intervention or programme operate; in particular, do they have access to information (eg internet, libraries) and access to resources (eg academic databases, knowledge management systems, KT staff)

8.3.2 Appendix C.2 Descriptive extraction tool for mapping project cycle

Variable	Description
Publication year	Year of study publication
Study Name	Complete study title
Author(s)	Fill in full author names
Project cycle step of the study	Fill in the stated project cycle step measured in the study - Agenda setting, Policy formulation, Decision-making, Implementation, Evaluation. If no particular step specified, please report as unclear
Project cycle step of the study - supporting text and page numbers	Please specify text that supports the stage of project cycle that the authors aimed to cover with page numbers.

8.3.3 Appendix C.3 Critical appraisal tool

Methodological appraisal criteria	Response		
	Yes	No	Comment

IF RANDOMISED CONTROL TRIAL, START AFTER CONFOUNDING BIAS. FOR ALL OTHER STUDY DESIGNS, START HERE. I. Bias in selection of participants into the study *Are participants selected in a way that minimizes selection bias?* Appraisal indicators Consider whether:			
i. there is an adequate description of how and why sample was chosen (i.e., identified/selected/recruited)			
ii. there is adequate sample size to allow for representative and/or statistically significant conclusions			
iii. participants in the control group were sampled from the same population as that of the treatment			
iv. group allocation process minimised potential risk of bias (e.g., using computer algorithms)			
v. the selection of participants into the study (or into the analysis) is based on participant characteristics observed after the start of the intervention			

Low risk of bias	Moderate Risk of bias	High risk of bias	Critical risk of bias	*Worth to continue: Y/N?*

I. Bias due to confounding *Is confounding potentially controllable in the context of this study?* Appraisal indicators: Consider whether:			
i. there is potential for confounding of the effect of the intervention in this study. If yes, provide example of confounding domain in comment box.			
ii. where matching was applied, it featured sufficient criteria			
iii. where relevant, the authors conducted an appropriate analysis that controlled for all potential/remaining critical confounding domains after matching had been applied			
iv. the authors avoided adjusting for variables identified after the intervention has been administered			
v. the treatment and control group are comparable after matching/controls have been done. Select one of the following: i. ☐No statistically significant differences ii. ☐Statistically significance differences			

iii. ☐Negligible descriptive differences *iv.* ☐Significant descriptive differences						
Low risk of bias	Moderate Risk of bias	High risk of bias	Critical risk of bias	*Worth to continue: Y/N?*		
IF RANDOMISED CONTROL TRIAL, SKIP I + II (ABOVE) AND START HERE! <u>Bias due to confounding (because of ineffective randomisation)</u> *Is allocation of treatment status truly random?* <u>Appraisal indicators</u> Consider whether:						
i. *eligibility criteria for study entry are specified*						
ii. *there is a clear description of the randomisation process and methods are robust*						
iii. *the unit of randomisation and number of participants is clearly stated (pay special attention to treatment and control locations/ balance)*						
iv. *characteristics of both baseline and endline sample are provided and at endline the treatment and control group are comparable. Select one of the following:* i. ☐No statistically significant differences ii. ☐Statistically significance differences iii. ☐Negligible descriptive differences iv. ☐Significant descriptive differences						
Low risk of bias	Moderate Risk of bias	High risk of bias	Critical risk of bias	*If critical risk of bias, treat as non-random study*		
I. <u>Bias due to departures from intended interventions</u> *Was the intervention implemented as laid out in the study protocol?* <u>Appraisal indicators</u> Consider whether:						
i. *the critical co-interventions were balanced across intervention and control groups*						
i. *treatment switches were low enough to not threaten the validity of the estimated effect of the intervention*						

i.	*implementation failure was minor and unlikely to threaten the validity of the estimated effect of the intervention*					
v.	*it is possible that the intervention was taken by the controls (contamination and possible crossing-over)*					
v.	*it is possible that knowledge of group allocation affects how the two study groups are treated during delivery and evaluation of the intervention*					
Low risk of bias	Moderate Risk of bias	High risk of bias	Critical risk of bias	*Worth to continue: Y/N?*		
V.	Bias due to missing/incomplete data (attrition) *Are the intervention and control groups free of critical differences in participants with missing/incomplete data?* Appraisal indicators Consider whether:					
	i. outcome data are reasonably complete (80% or above)					
i.	*If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?*					
i.	*If level of attrition (or other forms of missing/incomplete data) is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/incomplete data and reasons for missing/incomplete data similar across groups?*					
v.	*If level of attrition (or other forms of missing/incomplete data) is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)*					
v.	*If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?*					
Low risk of bias	Moderate Risk of bias	High risk of bias	Critical risk of bias	*Worth to continue: Y/N?*		
V.	Bias in measurement of outcomes *Are measurements appropriate, e.g., clear origin, or validity known?* Appraisal indicators Consider whether:					
	i. there was an adequate period for follow up					

ii.	*the outcome measure (e.g., employment status, income) was clearly defined and objective*					
iii.	*outcomes were assessed using standardised instruments and indicators*					
iv.	*outcome measurements reflect what the experiment set out to measure*					
v.	*the methods of outcome assessment were comparable across groups*					
vi.	*were outcome assessors aware of the intervention received by study participants?*					
Low risk of bias	Moderate Risk of bias	High risk of bias	Critical risk of bias	*Worth to continue: Y/N?*		
I.	Bias in selection of results reported *Are the reported outcomes consistent with the proposed outcomes at the protocol stage?* Appraisal indicators Consider whether:					
i.	*it is unlikely that the reported effect estimate has been selected for publication due to it being a particularly notable finding among numerous exploratory analyses*					
ii.	*it is unlikely that the reported effect estimate is prone to selective reporting from among multiple outcome measurements within the outcome domain*					
iii.	*it is unlikely that the reported effect estimate is prone to selective reporting from among multiple analyses of the outcome measurements, including sub-group analysis*					
iv.	*if sub-group/ancillary/adjusted analyses are presented, are these pre-specified or exploratory?*					
v.	*the analysis includes an intention to treat analysis. (If so, was this appropriate and were appropriate methods used to account for missing data?)*					
vi.	*do the authors report on all variables they aimed to study (as specified in their protocol or study aims/research questions)?*					
Low risk of bias	Moderate Risk of bias	High risk of bias	Critical risk of bias			
OVERALL RISK OF BIAS:						

OVERAL RISK OF BIAS: Decision rule:	• A single critical risk of bias judgement in any of the 6 RoB domains leads to a critical overall judgement. • 2 or more high risk of bias judgements in any of the 6 appraisal domains lead to an overall high risk of bias rating. • 2 or more moderate risk of bias judgements in any of the 6 appraisal domains lead to an overall moderate risk of bias. This means that for a study to be rated of low risk of bias least 5 RoB domains need be rated as of low RoB.
LOW RISK OF BIAS	The experimental results reported are of high probability to reflect the impact of the intervention accurately and are not significantly influenced by the study design or implementation.
MODERATE RISK OF BIAS	The experimental results reported are of fair probability to reflect the impact of the intervention accurately but are somewhat influenced by the study design or implementation. This influence, however, only has a moderate effect on the overall impact reported and is unlikely to alter the impact reported significantly.
HIGH RISK OF BIAS	The experimental results reported are of low probability to reflect the impact of the intervention accurately and are significantly influenced by the study design or implementation. This influence carries the risk that the overall impact reported is mistaken.
CRITICAL RISK OF BIAS EXCLUDE FROM SYNTHESIS	The experimental results reported are of high probability to reflect the influence of the study design or implementation rather than the impact of the intervention.
Sources used in this section (in weighted order): Cochrane (2014); Stewart et al (2014); Stewart et al (2012); Higgins et al (2011); Greenhalgh & Brown (2014); Pluye et al (2011); Gough et al (2007)	

8.3.4 Appendix C.4 Critical appraisal tool for qualitative studies

	Methodological appraisal criteria	**Response**

Study type					Yes	No	Comment / Confidence judgment
1. Qualitative and descriptive quantitative, and process evaluations	**I. RESEARCH IS DEFENSIBLE IN DESIGN** (providing a research strategy that addresses the question) Appraisal indicators: ✓ *Is the research design clearly specified and appropriate for aims and objectives of the research?* Consider whether						
	i. there is a discussion of the rationale for the study design						
	ii. the research question is clear, and suited to the inquiry						
	iii. there are convincing arguments for different features of the study design						
	iv. limitations of the research design and implications for the research evidence are discussed						
	Defensible	**Arguable**	**Critical**	**Not defensible**	*Worth to continue:*		
	II. RESEARCH FEATURES AN APPROPRIATE SAMPLE (following an adequate strategy for selection of participants) Appraisal indicators: Consider whether						
	i. there is a description of study location and how/why it was chosen						
	ii. the researcher has explained how the participants were selected						
	iii. the selected participants were appropriate to collect rich and relevant data						
	iv. reasons are given why potential participants chose not take part in study						
	Appropriate sample	**Functional sample**	**Critical sample**	**Flawed sample**	*Worth to continue:*		
	III. RESEARCH IS RIGOROUS IN CONDUCT (providing a systematic and transparent account of the research process) Appraisal indicators:						

	Consider whether					
	i. researchers provide a clear account/description of the process by which data was collected (e.g. for interview method, is there an indication of how interviews were conducted?/procedures for collection or recording of data?)					
	ii. researchers demonstrate that data collection targeted depth, detail and richness of information (e.g. interview/observation schedule)					
	iii. there is evidence of how descriptive analytical categories, classes, labels, etc. have been generated and used					
	iv. presentation of data distinguishes clearly between the data, the analytical frame used, and the interpretation					
	v. methods were modified during the study; and if so, has the researcher explained how and why?					
	Rigorous conduct	**Considerate conduct**	**Critical conduct**	**Flawed conduct**	*Worth to continue:*	
	IV. RESEARCH FINDINGS ARE CREDIBLE IN CLAIM/BASED ON DATA					
	(providing well-founded and plausible arguments based on the evidence generated)					
	Appraisal indicators:					
	Consider whether					
	i. there is a clear description of the form of the original data					
	ii. sufficient amount of data are presented to support interpretations and findings/conclusions					
	iii. the researchers explain how the data presented were selected from the original sample to feed into the analysis process (i.e. commentary and cited data relate; there is an analytical context to cited data, not simply repeated description; is there an account of frequency of presented data?)					
	iv. there is a clear and transparent link between data, interpretation, and findings/conclusion					
	v. there is evidence (of attempts) to give attention to negative cases/outliers etc.					
	Credible claims	**Arguable claims**	**Doubtful claims**	**Not credible**	*If findings not credible, can data still be used?*	
	V. REASEARCH ATTENDS TO CONTEXTS					
	(describing the contexts and particulars of the study)					

	Appraisal indicators: Consider whether					
	i. there is an adequate description of the contexts of data sources and how they are retained and portrayed?					
	ii. participants' perspectives/observations are placed in personal contexts					
	iii. appropriate consideration is given to how findings relate to the contexts (how findings are influenced by or influence the context)					
	iv. the study makes any claims (implicit or explicit) that infer generalisation (if yes, comment on appropriateness)					
	Context central	**Context considered**	**Context mentioned**	**No context attention**		
	VI. RESEARCH IS REFLECTIVE (assessing what factors might have shaped the form and output of research) Appraisal indicators: Consider whether					
	i. appropriate consideration is given to how findings relate to researchers' influence/own role during analysis and selection of data for presentation					
	ii. researchers have attempted to validate the credibility of findings (e.g. triangulation, respondent validation, more than one analyst)					
	iii. researchers explain their reaction to critical events that occurred during the study					
	iv. researchers discuss ideological perspectives/values/philosophies and their impact on the methodological or other substantive content of the research (implicit/explicit)					
	Reflection	**Consideration**	**Acknowledgement**	**Unreflective research**	*NB: Can override previous exclusion!*	

OVERALL CRITICAL APPRAISAL DECISION

Decision rule:

- 2 or more high critical appraisal judgements in any of the 6 appraisal domains lead to an overall high risk of bias / low quality rating.
- 2 or more moderate critical appraisal judgements in any of the 6 appraisal domains lead to an overall moderate risk of bias / moderate quality rating.
- which means that for a study to be rated of low risk of bias / high quality at least 5 appraisal domains need be rated as of low critical appraisal.

HIGH QUALITY	MODERATE QUALITY	LOW QUALITY	CRITICAL QUALITY
EMPIRICAL RESEARCH	**EMPIRICAL RESEARCH**	**EMPIRICAL RESEARCH**	**EMPIRICAL RESEARCH**
(study generates new evidence relevant to the review question and complies with all methodological criteria to ensure reliability and empirical grounding of the evidence).	(study generates new evidence relevant to the review question and complies with reasonable methodological criteria to ensure reliability and empirical grounding of the evidence).	(study generates new evidence relevant to the review question and complies with minimum methodological criteria to ensure reliability and empirical grounding of the evidence).	(the evidence generated by the study does not comply with minimum methodological criteria to ensure reliability and empirical grounding of the evidence).

Sources used in this section (in alphabetical order); Campbell et al (2003); CASP (2006); CRD (2009); Dixon-Woods et al (2004); Dixon-Woods et al (2006) ; Greenhalgh & Brown (2014); Harden et al (2004); Harden et al (2009); Harden & Gough (2012); Mays & Pope (1995); Pluye et al (2011); Spencer et al 2006; Thomas et al (2003); SCIE (2010).

Study type	**Methodological appraisal criteria**	**Response**		
		Yes	No	Comment /confidence judgment
2. Mixed-methods2	**I. RESEARCH INTEGRATION/SYNTHESIS OF METHODS**			
	(assessing the value-added of the mixed-methods approach)			
Sequential explanatory design				
The quantitative component is followed by the qualitative. The purpose is to explain quantitative results using qualitative findings. E.g., the quantitative results guide the selection of qualitative data sources and data collection, and the qualitative findings contribute to the	Applied mixed-methods design:			

interpretation of quantitative results.				
Sequential exploratory design The qualitative component is followed by the quantitative. The purpose is to explore, develop and test an instrument (or taxonomy), or a conceptual framework (or theoretical model). E.g., the qualitative findings inform the quantitative data collection, and the quantitative results allow a generalization of the qualitative findings.				
Triangulation designs The qualitative and quantitative components are concomitant. The purpose is to examine the same phenomenon by interpreting qualitative and quantitative results (bringing data analysis together at the interpretation stage), or by integrating qualitative and quantitative datasets (e.g., data on same cases), or by transforming data (e.g., quantization of qualitative data).	Sequential explanatory design			
Embedded/convergent design The qualitative and quantitative components are concomitant. The purpose is to support a qualitative study with a quantitative sub-study (measures), or to better understand a specific issue of a quantitative study using a qualitative sub-study, e.g., the efficacy or the implementation of an intervention based on the views of participants.	Sequential explorative design			
	Triangulation design			
	Embedded design			

	Appraisal indicators:			
	Consider whether			
	i. the rationale for integrating qualitative and quantitative methods to answer the research question is explained			
	[DEFENSIBLE]			
	ii. the mixed-methods research design is relevant to address the qualitative and quantitative research questions, or the qualitative and quantitative aspects of the mixed methods research question			
	[DEFENSIBLE]			
	iii. there is evidence that data gathered by both research methods was brought together to inform new findings to answer the mixed-methods research question (e.g. form a complete picture, synthesise findings, configuration)			
	[CREDIBLE]			
	iv. the approach to data integration is transparent and rigorous in considering all findings from both the qualitative and quantitative module (danger of cherry-picking)			
	[RIGOROUS]			
	v. appropriate consideration is given to the limitations associated with this integration, e.g., the divergence of qualitative and quantitative data (or results)?			
	[REFLEXIVE]			

For mixed-methods research studies, each component undergoes its individual critical appraisal first. Since qualitative studies are either included or excluded, no combined risk of bias assessment is facilitated, and the assigned risk of bias from the quantitative component similarly holds for the mixed-methods research.

The above appraisal indicators only refer to the applied mixed-methods design. If this design is not found to comply with each of the four mixed-methods appraisal criteria below, then the quantitative/qualitative components will individually be included in the review:

Mixed-methods critical appraisal:	Qualitative critical appraisal:	Quantitative critical appraisal:
1. Research is defensible in design	Include / Exclude	1. Low risk of bias
2. Research is rigorous in conduct		2. Risk of bias
3. Research is credible in claim		3. High risk of bias

4. Research is reflective		4. Critical risk of bias
Combined appraisal:		
Include / Exclude mixed-methods findings judged with _____ risk of bias		
Section based on Pluye et al (2011). Further sources consulted (in alphabetical order): Creswell & Clark (2007); Crow (2013); Long (2005); O'Cathain et al (2008); O'Cathain (2010); Pluye & Hong (2014); Sirriyeh et al (2011).		

8.4 Appendix D: Characteristics of studies

8.4.1 Appendix D.1 Characteristics of included impact evaluations

Here, we characterise each of the included impact evaluations in terms of their intervention and control group condition. Studies may appear under multiple categories as a number of them included multiple treatment arms.

Access to new evidence (3 studies)

- Rogger and Somani (2023) provided evidence briefings to public officials with summarised administrative data on the population they were serving. The control group received no evidence briefing.
- Masset and colleagues (2013), also reported in Beynon and colleagues (2012), conducted a multi-arm trial that tested sending a simple version of a policy brief on the topic of biofortification and home garden effectiveness to various mailing lists. They also tested different versions of the policy brief, containing the same content but varying whether the views of a sector expert or an unnamed researcher were presented in the brief. The control group were sent another publication on a different topic but not a policy brief.
- Nellis and colleagues (2019) undertook an experiment at an event in Washington DC with mid-level and senior policymakers and practitioners, varying whether professionals saw single study impact evaluation results, meta-analytic results or a "placebo" presentation on upcoming research.

Access: communication and dissemination of evidence (8 studies)

- Fillol and colleagues (2022) evaluated seven different versions of the same policy brief, varying the author location and organisations. All trial arms received a version of the policy brief.
- Brownson and colleagues (2011) evaluated different versions of the same policy brief on the topic of screening to reduce breast cancer mortality, varying a more narrative (story) presentation of evidence compared to a data driven presentation, and whether local or state level data is presented. All trial arms received a version of the policy brief.

- Toma and Bell (2022) undertook a lab in the field experiment with US federal policymakers, varying how hypothetical programmes, the impacts and total costs of those programmes were presented to participants. In one treatment arm, the programmes and their impact were presented side-by-side on one page rather than in isolation. In the other treatment arm, participants were presented with an impact calculator - the annual cost per person impacted.

- Dobbins and colleagues (2009) was a multiple-arm trial that tested sending of tailored, targeted messages with systematic review evidence plus access to health-evidence.ca. The control group had access to health-evidence.ca. The other arm of the trial is discussed below.

- Makkar and colleagues (2016) sent Australian policymakers tailored articles and blogs, drawing on evidence from the Web CIPHER online tool designed to help policymakers better engage with research.

- Opiyo and colleagues (2013) evaluated the impact of evidence packaged in three different formats in the context of a guidelines development workshop: specifically, systematic review reports alone, systematic reviews with summary-of-findings tables, and 'graded-entry' formats (a 'front-end' summary and a contextually framed narrative report plus the systematic review reports). All trial arms received a version of the systematic reviews.

- Vivalt and Coville (2023) varied how much quantitative information on point estimates and their variance was provided to participants in the context of a policy workshop.

- Di Noia and colleagues (2003) evaluated the impact of sharing summarised information about the problem of adolescent substance abuse and research evidence about effective programmes through different dissemination channels, specifically through the internet, CD, or printed pamphlet.

We identified three studies that tested an intervention worked through building the skills of policymakers to access and / or make sense of evidence. These three studies are described briefly below.

- Brownson and colleagues (2017) evaluated a multiday training on evidence-based decision making in the USA, with a set of supplemental capacity-building activities, compared to a control that received no training but received a list of EIDM resources, web links, and state-specific baseline and post-intervention findings.

- Jacobs and colleagues (2014) evaluated the delivery of an Evidence-Based Public Health (EBPH) training curriculum in the USA compared to a control group that received business-as-usual.

- Mehmood and colleagues (2024) evaluated a quantitative research methods training centered around a mastering metrics book for junior ministers in Pakistan, compared to a control group that received a placebo condition, specifically training on a self-help book.

We identified three studies, reported in five papers, that tested an intervention that combined activities working through access, interaction, skills and structure and process mechanisms. The interaction mechanism emphasises the importance of decision-makers interacting with

researchers to build trusted relationships, collaborate, and gain exposure to a different type of social influence, while the structure and process mechanism emphasises the importance of decision-makers' psychological, social, and environmental structures and processes as a means or barrier to action. These three studies are described below.

- Crowley and colleagues (2021a; 2021b) report on an evaluation of a rapid response programme targeting both researchers and congressional offices in the USA, described as an outreach model for supporting legislative use of research evidence regarding child and family policy issues (Research-to-Policy Collaboration (RPC). The programme begins with a needs assessment of policymaker priorities, objectives and need for evidence, before matching them with researchers from a rapid response network with relevant expertise. The network of researchers participates in training on engagement with congressional offices and research translation. Meetings with the relevant offices and researchers are facilitated, with the goal of developing long-term collaborations. The control group of congressional offices had the offer of provision of publicly available, research-based resources.

- Wilson and colleagues (2017a; 2017b) report on an evaluation of two different evidence briefing services for health service commissioners, both providing EIDM training, access to evidence and interaction with researchers compared to a comparison receiving business-as-usual service provision.

- Dobbins and colleagues (2009) evaluated the impact of access to a knowledge repository, tailored messaging on content from the repository, plus access to one full time knowledge broker. The knowledge broker made sure that the decision makers received accessible, relevant research when needed, helped them to develop their skills and capacity for EIDM and translated evidence into the local context. The control group had access to the repository, health-evidence.ca.

Scott and colleagues (2023) evaluated the SciComm Optimizer for Policy Engagement (SCOPE) model, which combined activities working through the access and interaction mechanisms. This model connected legislative staff in the USA with researchers by email during the COVID-19 pandemic. Researchers developed accessible summaries of research evidence on topics relevant to social issues occurring during the pandemic, which were shared with legislative staff (both state legislators and their staff) by email on a weekly basis over a year period, who could respond with further questions and requests, including for meetings or to present research at hearings.

Finally, Hjort and colleagues (2020) report on an evaluation of a research information session for Brazilian municipality mayors at a national conference that introduced the idea of impact evaluation and presented findings from impact studies testing reminder letters on tax compliance. Mayors were also provided with a policy brief. This study evaluated an intervention that worked through access and skills mechanisms.

8.4.2 Appendix D.2 Included studies (research question 2)

Authors	Study title	EIDM Intervention mechanism	Country

Abd El Razik & Salem (2019)	From public health and demographic research to decision making: An intervention study in Giza Governorate-Egypt.	M6: Structure & Process for EIDM	Egypt
Agweyu, Opiyo & English (2012)	Experience developing national evidence-based clinical guidelines for childhood pneumonia in a low-income setting - making the GRADE?	M3: Access to evidence M6: Structure & Process for EIDM	Kenya
Ali & Osman (2016)	Capacity building for decision makers to use evidence in policy making in Sudan	M5: Skills to use evidence	Sudan
Amadou et al (2020)	Qualitative evaluation of a knowledge transfer training programme in maternal and child health in Burkina Faso, West Africa	M5: Skills to use evidence	Burkina Faso
Amisi, Buthelezi & Magangoe (2020)	Use of evidence in a complex social programme Case of an evaluation of the state's response to violence against women and children in South Africa	M2: Agreement on evidence & policy needs M3: Access to evidence M4: Interaction of decision-makers & researchers	South Africa
Aryeetey et al (2017)	Evidence-informed decision making for nutrition: African experiences and way forward	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Benin, Ghana, South Africa
Ashford et al (2006)	Creating windows of opportunity for policy change: Incorporating evidence into decentralized planning in Kenya.	M3: Access to evidence M4: Interaction of decision-makers & researchers	Kenya
Asiimwe & Engel (2020)	Effects of the Parliamentary Capacity	M3: Access to evidence M4: Interaction of decision-	Benin, Ghana, Kenya, Malawi,

	Strengthening Initiatives – Tracer Study Report	makers & researchers M5: Skills to use evidence	Nigeria, Rwanda, South Africa, Tanzania, Uganda, Zambia
Awang et al (2023)	Development of the National Policy for Quality in Healthcare for Malaysia.	M2: Agreement on evidence & policy needs M3: Access to evidence M4: Interaction of decision-makers & researchers	Malaysia
Ayuso-Mateos et al (2019)	Effective methods for knowledge transfer to strengthen mental health systems in low- and middle-income countries	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Ethiopia, India, Nigeria, South Africa, Uganda
Ba-Nguz et al (2019)	Supporting national immunization technical advisory groups (NITAGs) in resource-constrained settings. New strategies and lessons learned from the Task Force for Global Health's Partnership for influenza vaccine introduction	M5: Skills to use evidence	Cote d'Ivoire, Vietnam
Bennett et al (2012)	Influencing policy change: the experience of health think tanks in low- and middle-income countries	M3: Access to evidence M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Bangladesh, Ghana, India, South Africa, Uganda, Vietnam
Bennett et al (2013)	The impact of Fogarty International Center research training programs on public health policy and program development in Kenya and Uganda	M3: Access to evidence M4: Interaction of decision-makers & researchers	Kenya, Uganda
Berman et al (2015)	Building a knowledge translation platform in Malawi to support evidence-informed health policy	M3: Access to evidence M5: Skills to use evidence M6: Structure & Process for EIDM	Malawi

Bossba (2023)	Lessons Learned from Mobilising Research for Impact During the Covid-19 Pandemic	M4: Interaction of decision-makers & researchers	Cambodia
Braa, Heywood & Sahay (2012)	Improving quality and use of data through data-use workshops:. Zanzibar, United Republic of Tanzania	M5: Skills to use evidence	Tanzania
Brites et al (2021)	Science-based Stakeholder Dialogue for Environmental Policy Implementation	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers	Brazil
Carrasco et al (2023)	Assessing Use, Usefulness, and Application of the High Impact Practices in Family Planning Briefs and Strategic Planning Guides.	M1: Awareness of EIDM	Burkina Faso, Colombia, Ethiopia, India, Mali, Mexico, Nigeria, Pakistan, Senegal
Cash-Gibson, Guerra & Salgado-de-Snyder (2015)	SDH-NET: a South-NorthSouth collaboration to build sustainable research capacities on social determinants of health in low- and middle-income countries.	M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Colombia, Kenya, Mexico, South Africa, Tanzania
Club (2020)	"Not Just a Journal Club - It's Where the Magic Happens": Knowledge Mobilization through Co-Production for Health System Development in the Western Cape Province, South Africa.	M2: Agreement on evidence & policy needs M3: Access to evidence M4: Interaction of decision-makers & researchers	South Africa
Cockburn et al (2016)	Evaluating the outcomes and processes of a research-action	M2: Agreement on evidence & policy needs M3: Access to evidence	South Africa

	partnership: The need for continuous reflective evaluation	M4: Interaction of decision-makers & researchers	
COHRED (2000)	Lessons in Research to Action and Policy: Case studies from seven countries, The Council on Health Research for Development	M6: Structure & Process for EIDM	Brazil, Burkina Faso, Indonesia, Lithuania, Pakistan, South Africa, Uruguay
Courtenay-Quirk et al (2016)	Building capacity for data-driven decision making in African HIV testing programs: Field perspectives on data use workshops	M5: Skills to use evidence	South Africa, Swaziland, Tanzania, Zambia, Zimbabwe
Cruz & Walt (2013)	Brokering the boundary between science and advocacy: the case of intermittent preventive treatment among infants	M4: Interaction of decision-makers & researchers	Tanzania
Culwick et al (2019)	CityLab reflections and evolutions: nurturing knowledge and learning for urban sustainability through co-production experimentation	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers	South Africa, Tanzania
D'Ambruoso et al (2019)	Rethinking collaboration: developing a learning platform to address under-five mortality in Mpumalanga province, South Africa.	M3: Access to evidence M4: Interaction of decision-makers & researchers	South Africa
Dagenais, Queuille & Ridde (2013)	Evaluation of a knowledge transfer strategy from a user fee exemption program for vulnerable populations in Burkina Faso	M3: Access to evidence M4: Interaction of decision-makers & researchers	Burkina Faso

Dagenais et al (2015)	Collaborative development and implementation of a knowledge brokering program to promote research use in Burkina Faso, West Africa	M3: Access to evidence M4: Interaction of decision-makers & researchers	Burkina Faso
Dagenais et al (2016)	A Knowledge Brokering Program in Burkina Faso (West Africa): Reflections from Our Experience.	M3: Access to evidence M4: Interaction of decision-makers & researchers	Burkina Faso
Datta (2017)	Improving effectiveness of evidence use to support Zimbabwe's youth	M5: Skills to use evidence M6: Structure & Process for EIDM	Zimbabwe
Datta et al (2016)	Enhancing the use of evidence in South Africa's Department of Environmental Affairs	M5: Skills to use evidence M6: Structure & Process for EIDM	South Africa
Doughman, Kantengwa & Hakizinka (2017)	Using knowledge brokerage to strengthen African voices in global decision-making on HIV and AIDS	M2: Agreement on evidence & policy needs M6: Structure & Process for EIDM	Burkina Faso, Ethiopia, Senegal, Zambia
Dovlo et al (2016)	Policy dialogues-the "bolts and joints" of policy-making: Experiences from Cabo Verde, Chad and Mali	M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Cabo Verde, Chad, Mali
Drimie & Quinlan (2011)	Playing the role of a 'boundary organisation': getting smarter with networking	M4: Interaction of decision-makers & researchers	Kenya, Malawi, South Africa, Uganda, Zambia
El-Jardali et al (2014)	Capturing lessons learned from evidence-to-policy initiatives through structured reflection	M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Argentina, Bangladesh, Burkina Faso, Cameroon, Central African Republic, Ethiopia, Nigeria, Sudan, Uganda, Zambia

Ezenduka & Onwujekwe (2022)	Evaluating a capacity development intervention in health economics among producers and users of evidence in Nigeria: a case study in Getting Research Into Policy and Practice (GRIPP) in Anambra State	M5: Skills to use evidence	Nigeria
Fillol et al (2022)	When the messenger is more important than the message: an experimental study of evidence use in francophone Africa	M3: Access to evidence	Benin, Belgium, Burkina Faso, Canada, Chad, France, Guinea, Mali, Mauritania, Niger, Senegal, Switzerland, Togo
Gichane, Mutesa & Chowa (2019)	Translating Evidence into Policy Change: Advocacy for Community-Based Distribution of Injectable Contraceptives in Zambia	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Zambia
Gilson et al (2021)	Collective sensemaking for action: researchers and decision makers working collaboratively to strengthen health systems	M2: Agreement on evidence & policy needs M3: Access to evidence M4: Interaction of decision-makers & researchers	Kenya
Goldman, Ntakumba & Jacob (2013)	Reflections on the South African experience with evaluation and the use of evaluative evidence to orient public policy formulation	M6: Structure & Process for EIDM	South Africa
Goldman et al (2018)	The emergence of government evaluation systems in Africa : the case of Benin, Uganda and South Africa - original research	M6: Structure & Process for EIDM	Benin, Uganda, South Africa

Griessel et al (2019)	Evaluating the national evaluation system in South Africa: What has been achieved in the first 5 years?	M3: Access to evidence M5: Skills to use evidence M6: Structure & Process for EIDM	South Africa
Hajeebhoy et al (2013)	Developing evidence-based advocacy and policy change strategies to protect, promote, and support infant and young child feeding	M1: Awareness of EIDM M2: Agreement on evidence & policy needs M3: Access to evidence M4: Interaction of decision-makers & researchers	Bangladesh, Ethiopia, Vietnam
Harvey et al (2021)	Mobilizing Climate Information for Decision-Making in Africa: Contrasting User-Centered and Knowledge-Centered Approaches	M3: Access to evidence M4: Interaction of decision-makers & researchers	Burkina Faso, Ghana, Kenya, Malawi, Senegal, South Africa, Tanzania
Hawkes et al (2016)	Strengthening capacity to apply health research evidence in policy making: experience from four countries.	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence M6: Structure & Process for EIDM	Bangladesh, Gambia, India, Nigeria
Henriksson et al (2019)	Decision-making in district health planning in Uganda: does use of district-specific evidence matter?	M2: Agreement on evidence & policy needs M3: Access to evidence M6: Structure & Process for EIDM	Uganda
Hjort et al (2020)	How Research Affects Policy: Experimental Evidence from 2,150 Brazilian Municipalities	M3: Access to evidence M5: Skills to use evidence	Brazil
INASP (2016a)	Approaches for developing capacity for the use of evidence in policy making	M5: Skills to use evidence	Ghana, Nigeria, Philippines, South Africa, Uganda, Zimbabwe
INASP (2016b)	Improving information literacy for urban service planning and delivery at local	M5: Skills to use evidence	Nigeria

	government level in Nigeria		
INASP (2017)	Building capacity for the use of research evidence in Ghana's Ministry of Employment	M5: Skills to use evidence	Ghana
Jessani, Kennedy & Bennett (2017)	Enhancing evidence-informed decision making: strategies for engagement between public health faculty and policymakers in Kenya	M6: Structure & Process for EIDM	Kenya
Johnson et al (2020)	Policy dialogue to support maternal newborn child health evidence use in policymaking: The lessons learnt from the Nigeria research days first edition	M3: Access to evidence M4: Interaction of decision-makers & researchers	Nigeria
Johnston (2013)	Improving African Cabinet Decision-Making Through Evidence and Peer Support	M5: Skills to use evidence M6: Structure & Process for EIDM	Sierra Leone
Jones & Walsh (2008)	Policy briefs as a communication tool for development research.	M2: Agreement on evidence & policy needs M3: Access to evidence	Bolivia, Cambodia, China, Ghana, India, Nicaragua, Zambia
Kasonde & Campbell (2012)	Creating a Knowledge Translation Platform: nine lessons from the Zambia Forum for Health Research	M3: Access to evidence M4: Interaction of decision-makers & researchers	Zambia
Kawooya et al (2020) b	Rapidly responding to policy queries with evidence Learning from Rapid Response Services in Uganda	M3: Access to evidence M6: Structure & Process for EIDM	Uganda
Kawooya et al (2020) a	The influence of local ownership and politics of the use of evaluations in policy	M2: Agreement on evidence & policy needs M3: Access to evidence	Uganda

	making The case of the public procurement evaluation in Uganda	M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	
Keita et al (2017)	The West African experience in establishing steering committees for better collaboration between researchers and decision-makers to increase the use of health research findings	M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Burkina Faso, Nigeria, Senegal, Sierra Leone
Koduah et al (2019)	Use of evidence and negotiation in the review of national standard treatment guidelines and essential medicines list: experience from Ghana.	M2: Agreement on evidence & policy needs M3: Access to evidence M4: Interaction of decision-makers & researchers	Ghana
Kouakanou et al (2020)	The potential and the challenges of evaluations to positively influence reforms Working with producers in the Benin agricultural	M3: Access to evidence M6: Structure & Process for EIDM	Benin
Langlois et al (2016)	Enhancing evidence informed policymaking in complex health systems: Lessons from multi-site collaborative approaches	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Mexico, Nicaragua, South Africa
Langlois et al (2019)	Embedding implementation research to enhance health policy and systems: a multi- analysis from ten settings in Latin America and the Caribbean.	M3: Access to evidence M4: Interaction of decision-makers & researchers	Argentina, Bolivia, Chile, Colombia, Peru

Lawson (2016)	Negotiating stakeholder participation in the Ghana national climate change policy	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers	Ghana
Mane, Diagne & Tiemtore (2020)	Using evidence for tobacco control in West Africa	M2: Agreement on evidence & policy needs M3: Access to evidence M4: Interaction of decision-makers & researchers	Cote d'Ivoire Senegal
Marten et al (2021)	Co-producing the covid-19 response in Germany, Hong Kong, Lebanon, and Pakistan	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Lebanon Pakistan
Mbonye & Magnussen (2013)	Translating health research evidence into policy and practice in Uganda	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Uganda
Mc Sween-Cadieux et al (2019)	A health knowledge brokering intervention in a district of Burkina Faso: A qualitative retrospective implementation analysis	M3: Access to evidence M4: Interaction of decision-makers & researchers	Burkina Faso
McCormick et al (2020)	SMART Vaccines 2.0 decision-support platform: a tool to facilitate and promote priority setting for sustainable vaccination in resource-limited settings	M3: Access to evidence M5: Skills to use evidence	Uganda
McKay et al (2022)	The response is like a big ship': community feedback as a case study of evidence uptake and use in the 2018-2020 Ebola epidemic in the Democratic	M3: Access to evidence	Democratic Republic of the Congo

	Republic of the Congo		
McSween-Cadieux, Dagenais & Ridde (2018)	A deliberative dialogue as a knowledge translation strategy on road traffic injuries in Burkina Faso: A mixed-method evaluation	M3: Access to evidence M4: Interaction of decision-makers & researchers	Burkina Faso
Mehmood, Naseer & Chen (2024)	Training Policymakers in Econometrics	M5: Skills to use evidence	Pakistan
Mijumbi et al (2014)	Feasibility of a rapid response mechanism to meet policymakers' urgent needs for research evidence about health systems in a low income : a case study	M3: Access to evidence M6: Structure & Process for EIDM	Uganda
Mijumbi-Deve et al (2017)	Policymaker experiences with rapid response briefs to address health-system and technology questions in Uganda	M3: Access to evidence M6: Structure & Process for EIDM	Uganda
Mijumbi-Deve et al (2022)	Paper 1: Demand-driven rapid reviews for health policy and systems decision-making: lessons from Lebanon, Ethiopia, and South Africa on researchers and policymakers' experiences	M3: Access to evidence	Ethiopia, Lebanon, South Africa
Mirzoev et al (2012)	Research-policy partnerships - experiences of the Mental Health and Poverty Project in Ghana, South Africa, Uganda and Zambia	M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Ghana, Uganda, Zambia
Miszczak & Patel (2018)	The role of engaged scholarship and co-		South Africa

	production to address urban challenges: a case study of the Cape Town Knowledge Transfer Programme	M3: Access to evidence M4: Interaction of decision-makers & researchers	
Moat et al (2013)	Evidence briefs and deliberative dialogues: perceptions and intentions to act on what was learnt	M3: Access to evidence M4: Interaction of decision-makers & researchers	Burkina Faso, Cameroon, Ethiopia, Nigeria, Uganda, Zambia
Motani et al (2019)	Lessons learned from Evidence-Informed Decision-Making in Nutrition & Health (EVIDENT) in Africa: A project evaluation	M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Ethiopia, Ghana, Morocco, South Africa, Tanzania, Uganda
Mpando et al (2021)	Integrated Knowledge Translation in Non-Communicable Disease Research in Sub-Saharan Africa: A Comparison of Systematic and Ad Hoc Stakeholder Engagement	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers	Ethiopia, Malawi, Rwanda, South Africa, Uganda
Munyoro (2019)	Assessing Parliament of Zimbabwe's informatics database as a tool for providing evidence-based information for decision making	M3: Access to evidence	Zimbabwe
Mutatina et al (2019)	Evaluating user experiences of a clearing house for health policy and systems.	M3: Access to evidence	Uganda
Mwendera et al (2022)	Knowledge translation and evidence generation to increase the impact of vector control in Burkina	M3: Access to evidence M4: Interaction of decision-makers & researchers	Cameroon, Malawi

	Faso, Cameroon and Malawi		
Nel et al (2016)	Knowledge co-production and boundary work to promote implementation of conservation plans	M2: Agreement on evidence & policy needs M5: Skills to use evidence	South Africa
Neves et al (2014)	Evaluation of the international forum on evidence informed health policymaking: Addis Ababa, Ethiopia-27 to 31 August 2012	M4: Interaction of decision-makers & researchers	Ethiopia
North, Unterhalter & Makinda (2017)	Engaging the middle: Using research to support progress on gender, education and poverty reduction initiatives in Kenya and South Africa	M2: Agreement on evidence & policy needs M3: Access to evidence M4: Interaction of decision-makers & researchers	Kenya, South Africa
Norton (2019)	Exploring knowledge broker influences on sharing and use of evidence for health policy and practice in low-and middle-income countries	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers	Afghanistan, Albania, Bangladesh, Burkina Faso, Cote d'Ivoire, Guatemala, Guinea, Haiti, India, Kenya, Malawi, Nigeria, Rwanda, Tanzania, Uganda, Zambia
Norton, Howell & Reynolds (2016)	Exploratory study of the role of knowledge brokers in translating knowledge to action following global maternal and newborn health technical meetings	M4: Interaction of decision-makers & researchers	Bangladesh, South Africa
Ogbonnaya et al (2021)	Assessing the usefulness of policy brief and policy dialogue as knowledge translation tools towards contextualizing the accountability framework for	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Nigeria

	routine immunization at a subnational level in Nigeria		
Ongolo-Zogo et al (2014)	Initiatives supporting evidence informed health system policymaking in Cameroon and Uganda: a comparative historical case study.	M3: Access to evidence M4: Interaction of decision-makers & researchers	Cameroon, Uganda
Ongolo-Zogo et al (2015)	Climate for evidence informed health system policymaking in Cameroon and Uganda before and after the introduction of knowledge translation platforms: a structured review of governmental policy documents.	M3: Access to evidence M4: Interaction of decision-makers & researchers	Cameroon, Uganda
Ongolo-Zogo et al (2018)	Assessing the influence of knowledge translation platforms on health system policy processes to achieve the health millennium development goals in Cameroon and Uganda: A comparative case study	M3: Access to evidence M4: Interaction of decision-makers & researchers	Cameroon, Uganda
Onwujekwe et al (2020)	Does improving the skills of researchers and decisionmakers in health policy and systems research lead to enhance devidence-based decision making in Nigeria?—A short term evaluation	M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Nigeria

Onwujekwe et al (2020)	Impact of capacity building interventions on individual and organizational competency for HPSR in endemic disease control in Nigeria: a qualitative study	M5: Skills to use evidence	Nigeria
Opiyo et al (2013)	Comparison of alternative evidence summary and presentation formats in clinical guideline development: a mixed-method study.	M3: Access to evidence	Kenya
Oronje (2017)	Working with Parliamentary Committees of Health to Tackle Health Issues in Africa	M4: Interaction of decision-makers & researchers	Uganda
Oronje & Zulu (2018)	Contribution of a network of parliamentary committees of health to the ecosystem of evidence use in African parliaments	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Kenya, Malawi, Uganda
Oronje et al (2019)	Strengthening capacity to use research evidence in health policy-making: experience from Kenya and Malawi	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Kenya, Malawi
Paing et al (2021)	Development of a knowledge broker group to support evidence-informed policy: lessons learned from Myanmar	M1: Awareness of EIDM M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Myanmar
Pappaioanou et al (2003)	Strengthening capacity in developing countries for evidence-based	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers	Bolivia, Cameroon, Mexico, Philippines

	public health: the data for decision-making project	M6: Structure & Process for EIDM	
Phillips et al (2014)	A focus on M&E of results: an example from the Presidency, South Africa	M6: Structure & Process for EIDM	South Africa
Pophiwa et al (2020)	Using evaluations to inform policy and practice in a government department The case of the Department of Basic Education in South Africa	M1: Awareness of EIDM M2: Agreement on evidence & policy needs	South Africa
Porter & Goldman (2013)	A Growing Demand for Monitoring and Evaluation in Africa	M6: Structure & Process for EIDM	Benin, Ghana, Kenya, Senegal, South Africa, Uganda
Priest et al (2009)	Engaging policy makers in action on socially determined health inequities: Developing evidence-informed cameos	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Bangladesh, Uganda
Ranchod (2017)	Building the Research-Policy Nexus in South Africa: Insights from a Skills Planning Policy Intervention	M3: Access to evidence M4: Interaction of decision-makers & researchers	South Africa
Robson et al (2023)	Embedding rapid reviews in health policy and systems decision-making: Impacts and lessons learned from four low- and middle-income countries.	M3: Access to evidence	Georgia, India, Malaysia, Zimbabwe
Rodriguez et al (2015)	Evidence-informed policymaking in practice: -level examples of use of evidence for iCCM policy. Health Policy Plan	M6: Structure & Process for EIDM	Kenya, Mozambique, Niger

Rogger & Somani (2023)	Hierarchy and Information	M3: Access to evidence	Ethiopia
Rosenbaum et al (2011)	Evidence summaries tailored to health policy-makers in low- and middle-income countries	M3: Access to evidence M6: Structure & Process for EIDM	Argentina, China, Colombia, South Africa
Sakala et al (2022)	A review of the functionality of Technical Working Groups (TWGs) in enabling Evidence Informed Decision Making (EIDM) within Malawi's Ministry of Health and Population: A cross-sectional qualitative study	M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Malawi
Sakala et al (2023)	Functionality of technical working groups in enabling evidence-informed decision-making within Malawi's Ministry of Health: a cross-sectional qualitative study	M4: Interaction of decision-makers & researchers	Malawi
Sell et al (2023)	Developing, implementing, and monitoring tailored strategies for integrated knowledge translation in five sub-Saharan African countries.	M3: Access to evidence M4: Interaction of decision-makers & researchers	Ethiopia, Malawi, Rwanda, South Africa, Uganda
Shroff et al (2015)	Incorporating research evidence into decision-making processes: researcher and decision-maker perceptions from five low- and middle-income countries	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Argentina, Bangladesh, Cameroon, Nigeria, Zambia
Smith et al (2020)	The contribution of civil society generated evidence to the improvement	M1: Awareness of EIDM M3: Access to evidence M4: Interaction of decision-	Ghana

	of sanitation services in Ghana	makers & researchers M6: Structure & Process for EIDM	
Spagnolo et al (2020)	Reflecting on knowledge translation strategies from global health research projects in Tunisia and the republic of Côte d'ivoire	M1: Awareness of EIDM M4: Interaction of decision-makers & researchers	Cote d'Ivoire
Stewart et al (2005)	Exploring the Evidence-Practice Gap: A Workshop Report on Mixed and Participatory Training for HIV prevention in Southern Africa	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Lesotho, Mozambique, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe
Stewart et al (2017)	Working for solutions: a problem-based and relationship centred approach to building capacity to use research evidence in Africa	M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Malawi, South Africa
Stewart et al (2018)	Building capacity for evidence-informed decision making: an example from South Africa	M4: Interaction of decision-makers & researchers M5: Skills to use evidence	South Africa
Stewart et al (2019)	Practical reflections on combining workshops and mentorships to build capacity in demand and use of evidence in government organisations	M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Malawi, South Africa
Struyk & Haddaway (2012)	Mentoring Policy Research Organizations: Project Evaluation Results.	M1: Awareness of EIDM M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Argentina, Bangladesh, Guatemala, Indonesia, India, Kenya, Mexico, Nigeria, Philippines, Tanzania, Uganda
Sudhakar & Woldie (2016)	Increasing evidence use among Ethiopia's health	M3: Access to evidence M4: Interaction of decision-	Ethiopia

	planners and policy makers	makers & researchers M5: Skills to use evidence	
Surgey et al (2019)	Introducing health technology assessment in Tanzania	M1: Awareness of EIDM M4: Interaction of decision-makers & researchers M5: Skills to use evidence M6: Structure & Process for EIDM	Tanzania
Tilahun et al (2021)	Strengthening the national health information system through a capacity-building and mentorship partnership (CBMP) programme: a health system and university partnership initiative in Ethiopia	M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Ethiopia
Tirivanhu, Olaleye & Bester(2017)	Advancing evidence-based practice for improved public performance : lessons from the implementation of the management performance assessment tool in South Africa	M6: Structure & Process for EIDM	South Africa
Tran et al (2013)	Analyzing the sources and nature of influence: how the Avahan program used evidence to influence HIV/AIDS prevention policy in India	M3: Access to evidence M4: Interaction of decision-makers & researchers	India
Uneke et al (2018)	Promoting evidence informed policymaking for maternal and child health in Nigeria: lessons from a knowledge translation workshop.	M5: Skills to use evidence	Nigeria
Uneke et al (2012)	Promotion of evidence-informed		Nigeria

	health policymaking in Nigeria: bridging the gap between researchers and policymakers.	M4: Interaction of decision-makers & researchers M5: Skills to use evidence	
Uneke et al (2012)	Bridging the divide between research and policy in Nigeria: The role of a health policy advisory committee	M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Nigeria
Uneke et al (2014)	Enhancing policy makers' capacity for evidence-informed policy making through mentorship: A reflection on the Nigeria experience	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Nigeria
Uneke et al (2015)	Enhancing health policymakers' information literacy knowledge and skill for policymaking on control of infectious diseases of poverty in Nigeria.	M5: Skills to use evidence	Nigeria
Uneke et al (2015)	Improving Nigerian health policymakers' capacity to access and utilize policy relevant evidence: outcome of information and communication technology training workshop	M5: Skills to use evidence	Nigeria
Uneke et al (2015)	Enhancing the Capacity of Policy-Makers to Develop Evidence-Informed Policy Brief on Infectious Diseases of Poverty in Nigeria.	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Nigeria
Uneke et al (2015)	Implementation of a health policy advisory committee as a knowledge translation platform: the Nigeria experience.	M3: Access to evidence M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Nigeria

Uneke et al (2015)	Promoting Evidence to Policy Link on the Control of Infectious Diseases of Poverty in Nigeria: Outcome of A Multi-Stakeholders Policy Dialogue.	M3: Access to evidence M4: Interaction of decision-makers & researchers	Nigeria
Uneke, Ezeoha & Uro-Chukwu (2018)	Promoting evidence-informed policymaking through capacity enhancement in implementation research for health researchers and policymakers in Nigeria: A cross-sectional study	M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Nigeria
Uneke et al (2018)	Promoting Researchers and Policy-Makers Collaboration in Evidence-Informed Policy-Making in Nigeria: Outcome of a Two-Way Secondment Model between University and Health Ministry.	M4: Interaction of decision-makers & researchers M5: Skills to use evidence M6: Structure & Process for EIDM	Nigeria
Uneke et al (2019)	Fostering access to and use of contextualised knowledge to support health policy-making: lessons from the Policy Information Platform in Nigeria	M3: Access to evidence	Nigeria
Uneke et al (2017)	Using equitable impact sensitive tool (EQUIST) and knowledge translation to promote evidence to policy link in maternal and child health: report of first EQUIST training workshop in Nigeria	M5: Skills to use evidence	Nigeria
Uzochukwu et al (2016)	The challenge of bridging the gap		Nigeria

	between researchers and policy makers: experiences of a Health Policy Research Group in engaging policy makers to support evidence informed policy making in Nigeria	M6: Structure & Process for EIDM	
Vivalt & Coville (2023)	How do policymakers update their beliefs?	M3: Access to evidence	Mexico, Nigeria, Portugal, Senegal, United States of America
Vogel & Punton (2016)	Building capacity to use research evidence (BCURE) evaluation stage 1 synthesis report	M5: Skills to use evidence	Bangladesh, India, Kenya, Sierra Leone, Zimbabwe
Vogel and Punton (2017)	Building capacity to use research evidence (BCURE) evaluation stage 2 synthesis report	M5: Skills to use evidence	Bangladesh, Kenya, Pakistan, Sierra Leone, South Africa, Zimbabwe
Vogel and Punton (2018)	Final evaluation of the Building Capacity to Use Research Evidence programme	M5: Skills to use evidence	Bangladesh, Kenya, Pakistan, Sierra Leone, South Africa, Zimbabwe
Walker (2013)	Democracy think tanks in action: Translating Research into Policy in Young and Emerging Democracies	M3: Access to evidence M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Romania, South Korea, Slovakia, Turkey
Waqa et al (2013)	Participants' perceptions of a knowledge-brokering strategy to facilitate evidence-informed policy-making in Fiji.	M2: Agreement on evidence & policy needs M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Fiji
White et al (2018)	Evidence-informed policy making at level: lessons learned from the South African Tuberculosis Think Tank	M3: Access to evidence M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	South Africa

Witter et al (2017)	Generating demand for and use of evaluation evidence in government health ministries: lessons from a pilot programme in Uganda and Zambia	M2: Agreement on evidence & policy needs M3: Access to evidence	Uganda, Zambia
World Health Organization (2021)	Evidence Informed decision making for health policy and programmes.	M3: Access to evidence M4: Interaction of decision-makers & researchers M6: Structure & Process for EIDM	Indonesia, Uganda
Yearwood (2018)	Applying a logical theory of change for strengthening research uptake in policy: a case study of the Evidence Informed Decision Making Network of the Caribbean	M3: Access to evidence M4: Interaction of decision-makers & researchers M5: Skills to use evidence	Not specified
Yehia & El Jardali (2015)	Applying knowledge translation tools to inform policy: the case of mental health in Lebanon	M2: Agreement on evidence & policy needs M3: Access to evidence M4: Interaction of decision-makers & researchers	Lebanon
Young et al (2018)	Researcher and policymaker dialogue: the Policy BUDDIES Project in Western Cape Province, South Africa.	M4: Interaction of decision-makers & researchers M5: Skills to use evidence M6: Structure & Process for EIDM	South Africa
Zida et al (2017)	Analysis of the policymaking process in Burkina Faso's health : case studies of the creation of two health system support units	M6: Structure & Process for EIDM	Burkina Faso
Zida et al (2018)	Evaluating the Process and Extent of Institutionalization: A Case Study of a Rapid Response Unit for Health	M3: Access to evidence M6: Structure & Process for EIDM	Burkina Faso

	Policy in Burkina Faso.		

8.5 Appendix E: Outcome measures

Appendix Table 3 presents an overview of how the measures used in the seven impact evaluations that assessed evidence use by policymakers, either at the individual, team or institutional level. All seven measured an indicator of evidence use for policy design, while two of the seven also measured an indicator of evidence use for policy implementation. Most of the studies relied on self-reported measures of evidence use

Appendix Table 3. Evidence use outcome measures used in the impact evaluations

Study	Measure(s)	Self-report	Level	Source of data	If a survey, is the instrument available in paper?
Crowley et al. 2021a	• Proportion of child & family Congressional bills that include use of research evidence legislative language. • Proportion of child & family Congressional bills that do not include use of research evidence legislative language.	No	Institution	Administrative data - public record of bills introduced to Congress, coded for reference to scientific evidence	NA
Mehmood et al. 2024	• Letter sent about evidence-based policy (deworming) to the Federal Government • Letter sent recommending funds for evidence-based policy (deworming)	No	Individual	Administrative data	NA
Hjort et al. 2020	Adoption of an evidence-based policy (tax compliance letters)	Yes	Institution	Phone survey with municipal officials (mayor and / or bureaucrat responsible for tax policy).	No
Dobbins et al. 2009	• Extent to which research evidence was considered in a recent program planning decision. • How many of 11 evidence-based interventions were being implemented.	Yes	Team	Phone survey with public health decision-makers	Upon request.

Study	Measure(s)	Self-report	Level	Source of data	If a survey, is the instrument available in paper?
Beynon et al. 2012	Completed evidence use actions: • Change current policies/ practice. • Reviewed approach to researching/ evaluating intervention. • Reviewed current policies / practice. • Commissioned new related research.	Yes	Individual	Online survey with participants	No
Fillol et al. 2022	Instrumental use of evidence, measured through statements for which participants estimated the probability that they would perform actions: • Change my current policies or practices. • Develop or sponsor new studies on the topic.	Yes	Individual	Online survey with participants	Yes
Brownson et al. 2017	• Factor created from agreement with statements on use of programme evaluation in department, specifically my work unit: o plans for evaluation of interventions before implementation	Yes	Team	Online survey with public health policymakers	No

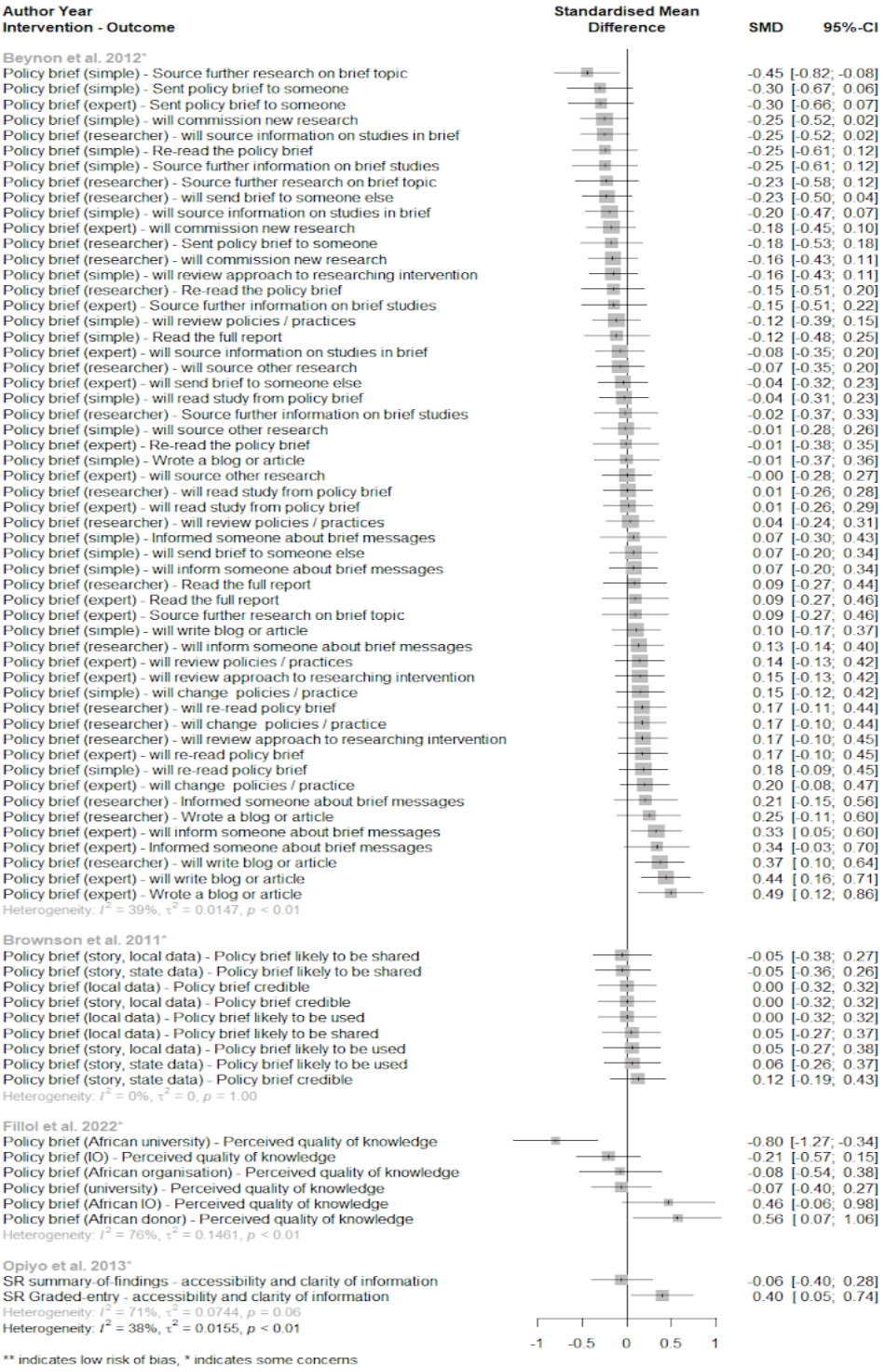
Study	Measure(s)	Self-report	Level	Source of data	If a survey, is the instrument available in paper?
	o uses evaluation data to monitor and improve interventions o distributes evaluation findings to other organisations • Mean of responses to questions on use of research evidence, specifically how often do you use research evidence to: • Write a grant application • Plan or conduct a needs assessment • Select policies, programs, or other interventions • Justify selection of interventions to funders, agency leadership, • Evaluate interventions • Develop materials for local public health, partners		Individual		

8.6 Appendix F: Forest plots from meta-analysis

This appendix presents additional forest plots and tables reporting results of studies included to address research question 1.

8.6.1 Access to evidence use interventions

Appendix Figure 1. Effect of access interventions on motivation to use evidence outcomes

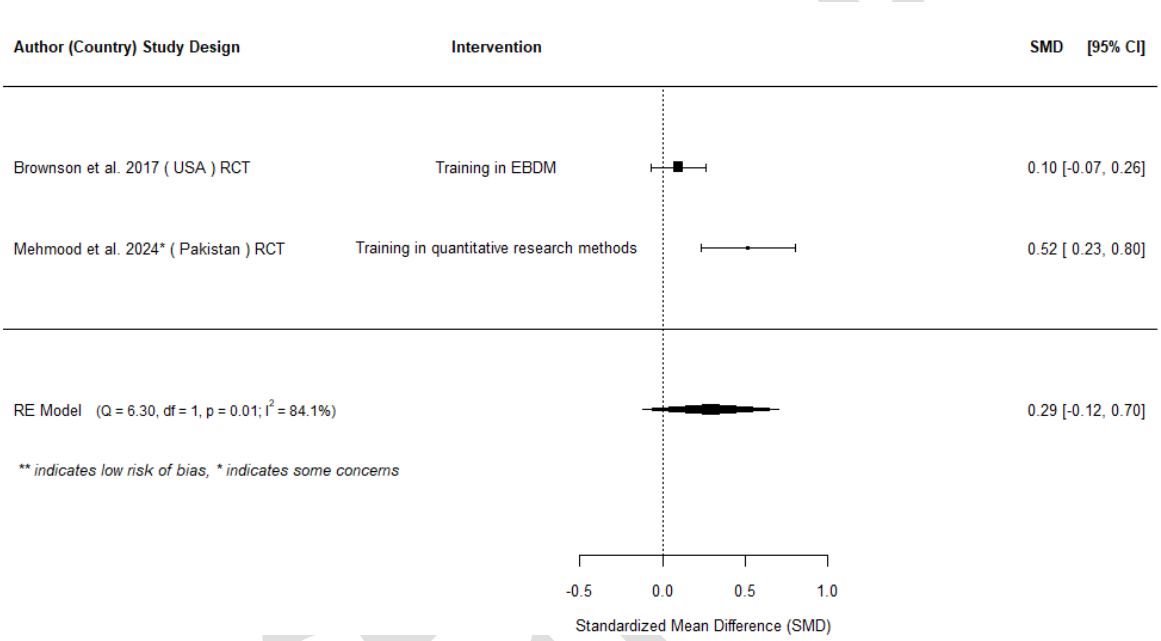


8.6.2 Skills to use evidence interventions

Evidence use

Skills interventions **had a moderate positive but not statistically significant effect on** ***evidence use*****.** The overall weighted average effect from the two included estimates is 0.29 standard deviations (95% CI: -0.12 to 0.70; p= .17) (Appendix Figure 2). There is substantial heterogeneity across included estimates (Q1= 6.30, p= .01, $\hat{\tau}^2$ = 0.27, I^2= 84.14.%). Given the small number of included studies, this result should be interpreted with caution.

Appendix Figure 2. Forest plot showing observed outcomes and estimates of the random-effects model for the effect of skills interventions on evidence use.



Note: A synthetic effect size was created for both included studies.

8.7 Appendix G: Detailed risk of bias assessments

Appendix Table 4: RCT full risk of bias assessment results – bias due to confounding and bias due to departures from intended interventions

	Bias due to confounding					**Bias due to departures from intended interventions Was the intervention implemented as laid out in the study protocol?**					
Study	Eligibility criteria for study entry are specified	There is a clear description of the randomisation process and methods are robust	Unit of randomisation and number of participants is clearly stated (pay special attention to treatment and control locations/ balance)	Characteristics of both baseline and endline sample are provided and at endline the treatment and control group are comparable. Select one of the following:	**Overall risk of bias**	Critical co-interventions were balanced across intervention and control groups	Treatment switches were low enough to not threaten the validity of the estimated effect of the intervention	Implementation failure was minor and unlikely to threaten the validity of the estimated effect of the intervention	It is possible that the intervention was taken by the controls (contamination and possible crossing-over)	It is possible that knowledge of group allocation affects how the two study groups are treated during delivery and evaluation of the intervention	**Overall risk of bias**
Beynon et al. 2012	Yes	Yes	Yes	No statistically significant differences	Low risk	Yes	Yes	No	No	No	Some concerns
Brownson et al. 2011	Yes	Yes	Yes	No statistically significant differences	Low risk	Yes	Yes	No	Yes	No	Some concerns
Brownson et al. 2017	Yes	Yes	Yes	Significant descriptive differences	High risk	Yes	Yes	Yes	No	Yes	Low risk

	Bias due to confounding					**Bias due to departures from intended interventions** **Was the intervention implemented as laid out in the study protocol?**					
Study	Eligibility criteria for study entry are specified	There is a clear description of the randomisation process and methods are robust	Unit of randomisation and number of participants is clearly stated (pay special attention to treatment and control locations/ balance)	Characteristics of both baseline and endline sample are provided and at endline the treatment and control group are comparable. Select one of the following:	**Overall risk of bias**	Critical co-interventions were balanced across intervention and control groups	Treatment switches were low enough to not threaten the validity of the estimated effect of the intervention	Implementation failure was minor and unlikely to threaten the validity of the estimated effect of the intervention	It is possible that the intervention was taken by the controls (contamination and possible crossing-over)	It is possible that knowledge of group allocation affects how the two study groups are treated during delivery and evaluation of the intervention	**Overall risk of bias**
Crowley et al. 2021a	Yes	No	Yes	No statistically significant differences	Low risk	Yes	Yes	Yes	No	No	Low risk
Crowley et al. 2021b	Yes	No	Yes	No statistically significant differences	Low risk	Yes	Yes	Yes	No	No	Low risk
Di Noia et al. 2003	Yes	No	Yes	No statistically significant differences	Low risk	Yes	Yes	Yes	No	No	Low risk
Dobbins et al. 2009	Yes	Yes	Yes	Unclear	Low risk	Yes	Yes	Yes	No	Yes	Low risk
Fillol et al. 2022	Yes	Yes	Yes	Unclear	Some concerns	Yes	Yes	Yes	No	No	Low risk

	Bias due to confounding					**Bias due to departures from intended interventions** **Was the intervention implemented as laid out in the study protocol?**					
Study	Eligibility criteria for study entry are specified	There is a clear description of the randomisation process and methods are robust	Unit of randomisation and number of participants is clearly stated (pay special attention to treatment and control locations/ balance)	Characteristics of both baseline and endline sample are provided and at endline the treatment and control group are comparable. Select one of the following:	**Overall risk of bias**	Critical co-interventions were balanced across intervention and control groups	Treatment switches were low enough to not threaten the validity of the estimated effect of the intervention	Implementation failure was minor and unlikely to threaten the validity of the estimated effect of the intervention	It is possible that the intervention was taken by the controls (contamination and possible crossing-over)	It is possible that knowledge of group allocation affects how the two study groups are treated during delivery and evaluation of the intervention	**Overall risk of bias**
Hjort et al. 2020	Yes	Yes	Yes	No statistically significant differences	Low risk	Yes	Yes	No	No	No	Some concerns
Mehmood et al. 2024	Yes	No	Yes	No statistically significant differences	Some concerns	Yes	Yes	Yes	No	No	Some concerns
Nellis et al. 2019	Yes	Yes	Yes	NA	Low risk	Yes	Yes	Yes	Yes	No	Some concerns
Opiyo et al. 2013	Yes	Yes	Yes	NA	Low risk	Yes	Yes	Yes	No	No	Low risk
Rogger & Somani, 2023	Yes	No	Yes	No statistically significant differences	Low risk	Yes	Yes	Yes	Yes	Yes	Some concerns

	Bias due to confounding					**Bias due to departures from intended interventions** **Was the intervention implemented as laid out in the study protocol?**					
Study	Eligibility criteria for study entry are specified	There is a clear description of the randomisation process and methods are robust	Unit of randomisation and number of participants is clearly stated (pay special attention to treatment and control locations/ balance)	Characteristics of both baseline and endline sample are provided and at endline the treatment and control group are comparable. Select one of the following:	**Overall risk of bias**	Critical co-interventions were balanced across intervention and control groups	Treatment switches were low enough to not threaten the validity of the estimated effect of the intervention	Implementation failure was minor and unlikely to threaten the validity of the estimated effect of the intervention	It is possible that the intervention was taken by the controls (contamination and possible crossing-over)	It is possible that knowledge of group allocation affects how the two study groups are treated during delivery and evaluation of the intervention	**Overall risk of bias**
Scott et al. 2023	Yes	Yes	Yes	No statistically significant differences	Low risk	Yes	Yes	Yes	Yes	No	Some concerns
Toma & Bell, 2022	Yes	No	Yes	NA	Low risk	Yes	Yes	Yes	No	No	Low risk
Vivalt et al. 2023	Yes	No	Yes	Unclear	Some concerns	Yes	Yes	Yes	No	No	Low risk

Appendix Table 5: RCT full risk of bias assessment results – bias due to missing/incomplete data and measurement of outcomes

	Bias due to missing/incomplete data (attrition) Are the intervention and control groups free of critical differences in participants with missing/incomplete data?						**Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?**						
Study	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/ incomplete data and reasons for missing/ incomplete data similar across groups?	If level of attrition Is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**	There was an adequate period for follow up	Outcome measure was clearly defined and objective	Outcomes were assessed using standardised instruments and indicators	outcome measurements reflect what the experiment set out to measure	Methods of outcome assessment were comparable across groups	Were outcome assessors aware of the intervention received by study participants?	**Overall risk of bias**
Beynon et al. 2012	No	Yes	Yes	No	Yes	High risk	Yes	No	Yes	Yes	Yes	NA	Low risk

	Bias due to missing/incomplete data (attrition) Are the intervention and control groups free of critical differences in participants with missing/incomplete data?						**Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?**						
Study	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/ incomplete data and reasons for missing/ incomplete data similar across groups?	If level of attrition Is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**	There was an adequate period for follow up	Outcome measure was clearly defined and objective	Outcomes were assessed using standardised instruments and indicators	outcome measurements reflect what the experiment set out to measure	Methods of outcome assessment were comparable across groups	Were outcome assessors aware of the intervention received by study participants?	**Overall risk of bias**
Brownson et al. 2011	No	No	Yes	No	Yes	High risk	Yes	Yes	Yes	Yes	Yes	NA	Low risk
Brownson et al. 2017	No	Yes	No	No	Yes	High risk	Yes	No	Yes	Yes	Yes	NA	Low risk

	Bias due to missing/incomplete data (attrition) Are the intervention and control groups free of critical differences in participants with missing/incomplete data?						**Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?**						
Study	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/ incomplete data and reasons for missing/ incomplete data similar across groups?	If level of attrition Is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**	There was an adequate period for follow up	Outcome measure was clearly defined and objective	Outcomes were assessed using standardised instruments and indicators	outcome measurements reflect what the experiment set out to measure	Methods of outcome assessment were comparable across groups	Were outcome assessors aware of the intervention received by study participants?	**Overall risk of bias**
Crowley et al. 2021a	Yes	NA	NA	NA	NA	Low risk	Yes	No	Yes	Yes	Yes	NA	Low risk
Crowley et al. 2021b	Yes	NA	NA	NA	NA	Low risk	Yes	No	Yes	Yes	Yes	NA	Low risk

	Bias due to missing/incomplete data (attrition) Are the intervention and control groups free of critical differences in participants with missing/incomplete data?						**Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?**						
Study	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/ incomplete data and reasons for missing/ incomplete data similar across groups?	If level of attrition Is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**	There was an adequate period for follow up	Outcome measure was clearly defined and objective	Outcomes were assessed using standardised instruments and indicators	outcome measurements reflect what the experiment set out to measure	Methods of outcome assessment were comparable across groups	Were outcome assessors aware of the intervention received by study participants?	**Overall risk of bias**
Di Noia et al. 2003	Yes	NA	NA	NA	NA	Low risk	Yes	No	Yes	Yes	Yes	Unclear	Low risk
Dobbins et al. 2009	Yes	NA	NA	NA	NA	Low risk	Yes	No	Yes	Yes	Yes	Unclear	Low risk

	Bias due to missing/incomplete data (attrition) Are the intervention and control groups free of critical differences in participants with missing/incomplete data?						**Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?**						
Study	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/ incomplete data and reasons for missing/ incomplete data similar across groups?	If level of attrition Is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**	There was an adequate period for follow up	Outcome measure was clearly defined and objective	Outcomes were assessed using standardised instruments and indicators	outcome measurements reflect what the experiment set out to measure	Methods of outcome assessment were comparable across groups	Were outcome assessors aware of the intervention received by study participants?	**Overall risk of bias**
Fillol et al. 2022	Yes	NA	NA	NA	NA	Low risk	No	No	No	Yes	Yes	NA	Some concerns
Hjort et al. 2020	Yes	NA	NA	NA	NA	Low risk	Yes	No	Yes	Yes	Yes	No	Low risk

	Bias due to missing/incomplete data (attrition) Are the intervention and control groups free of critical differences in participants with missing/incomplete data?						**Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?**						
Study	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/ incomplete data and reasons for missing/ incomplete data similar across groups?	If level of attrition Is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**	There was an adequate period for follow up	Outcome measure was clearly defined and objective	Outcomes were assessed using standardised instruments and indicators	outcome measurements reflect what the experiment set out to measure	Methods of outcome assessment were comparable across groups	Were outcome assessors aware of the intervention received by study participants?	**Overall risk of bias**
Mehmood et al. 2024	Yes	NA	NA	NA	NA	Low risk	Yes	Yes	Yes	Yes	Yes	No	Low risk
Nellis et al. 2019	Yes	NA	NA	NA	Yes	Low risk	No	Yes	Yes	Yes	Yes	NA	Some concerns

	Bias due to missing/incomplete data (attrition) Are the intervention and control groups free of critical differences in participants with missing/incomplete data?						**Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?**						
Study	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/ incomplete data and reasons for missing/ incomplete data similar across groups?	If level of attrition Is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**	There was an adequate period for follow up	Outcome measure was clearly defined and objective	Outcomes were assessed using standardised instruments and indicators	outcome measurements reflect what the experiment set out to measure	Methods of outcome assessment were comparable across groups	Were outcome assessors aware of the intervention received by study participants?	**Overall risk of bias**
Opiyo et al. 2013	Yes	NA	NA	NA	NA	Low risk	Yes	Yes	Yes	Yes	Yes	NA	Low risk
Rogger & Somani, 2023	Yes	NA	NA	NA	NA	Low risk	Yes	Yes	Yes	Yes	Yes	NA	Low risk

	Bias due to missing/incomplete data (attrition) Are the intervention and control groups free of critical differences in participants with missing/incomplete data?						**Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?**						
Study	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/ incomplete data and reasons for missing/ incomplete data similar across groups?	If level of attrition Is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**	There was an adequate period for follow up	Outcome measure was clearly defined and objective	Outcomes were assessed using standardised instruments and indicators	outcome measurements reflect what the experiment set out to measure	Methods of outcome assessment were comparable across groups	Were outcome assessors aware of the intervention received by study participants?	**Overall risk of bias**
Scott et al. 2023	Yes	NA	NA	NA	NA	Low risk	Yes	Yes	Yes	Yes	Yes	NA	Low risk
Toma & Bell, 2022	Yes	NA	NA	NA	NA	Low risk	No	Yes	Yes	Yes	Yes	NA	Some concerns

	Bias due to missing/incomplete data (attrition) Are the intervention and control groups free of critical differences in participants with missing/incomplete data?						Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?						
Study	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of participants with missing/ incomplete data and reasons for missing/ incomplete data similar across groups?	If level of attrition Is more than 20%, were appropriate statistical methods used to account for missing data? (e.g., sensitivity analysis)	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**	There was an adequate period for follow up	Outcome measure was clearly defined and objective	Outcomes were assessed using standardised instruments and indicators	outcome measurements reflect what the experiment set out to measure	Methods of outcome assessment were comparable across groups	Were outcome assessors aware of the intervention received by study participants?	**Overall risk of bias**
Vivalt et al. 2023	Yes	NA	NA	NA	NA	Low risk	No	Yes	Yes	Yes	Yes	NA	Some concerns

Appendix Table 6: RCT full risk of bias assessment results – bias due to selection of results reported and overall assessment

	Bias in selection of results reported **Are the reported outcomes consistent with the proposed outcomes at the protocol stage?**							**Overall risk of bias**
Study	It is unlikely that the reported effect estimate has been selected for publication due to it being a particularly notable finding among numerous exploratory analyses	It is unlikely that the reported effect estimate is prone to selective reporting from among multiple outcome measurements within the outcome domain	It is unlikely that the reported effect estimate is prone to selective reporting from among multiple analyses of the outcome measurements, including sub-group analysis	If sub-group/ancillary/adjusted analyses are presented, are these pre-specified or exploratory?	The analysis includes an intention to treat analysis. (If so, was this appropriate and were appropriate methods used to account for missing data?)	Do the authors report on all variables they aimed to study (as specified in their protocol or study aims/research questions)?	**Overall risk of bias**	**Overall risk of bias**
Beynon et al. 2012	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Some concerns
Brownson et al. 2011	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Some concerns
Brownson et al. 2017	Yes	Yes	Yes	NA	Yes	Yes	Low risk	High risk
Crowley et al. 2021a	Yes	Yes	Yes	NA	Yes	Yes	Low risk	Low risk
Crowley et al. 2021b	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Low risk
Di Noia et al. 2003	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Low risk
Dobbins et al. 2009	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Low risk

	Bias in selection of results reported **Are the reported outcomes consistent with the proposed outcomes at the protocol stage?**							**Overall risk of bias**
Study	It is unlikely that the reported effect estimate has been selected for publication due to it being a particularly notable finding among numerous exploratory analyses	It is unlikely that the reported effect estimate is prone to selective reporting from among multiple outcome measurements within the outcome domain	It is unlikely that the reported effect estimate is prone to selective reporting from among multiple analyses of the outcome measurements, including sub-group analysis	If sub-group/ancillary/adjusted analyses are presented, are these pre-specified or exploratory?	The analysis includes an intention to treat analysis. (If so, was this appropriate and were appropriate methods used to account for missing data?)	Do the authors report on all variables they aimed to study (as specified in their protocol or study aims/research questions)?	**Overall risk of bias**	**Overall risk of bias**
Fillol et al. 2022	Yes	Yes	Yes	Yes	NA	Yes	Low risk	Some concerns
Hjort et al. 2020	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Low risk
Mehmood et al. 2024	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Some concerns
Nellis et al. 2019	Yes	Yes	Yes	NA	Yes	Yes	Low risk	Some concerns
Opiyo et al. 2013	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Low risk
Rogger & Somani, 2023	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Some concerns
Scott et al. 2023	Yes	Yes	Yes	Yes	Yes	Yes	Low risk	Low risk

	Bias in selection of results reported **Are the reported outcomes consistent with the proposed outcomes at the protocol stage?**							**Overall risk of bias**
Study	It is unlikely that the reported effect estimate has been selected for publication due to it being a particularly notable finding among numerous exploratory analyses	It is unlikely that the reported effect estimate is prone to selective reporting from among multiple outcome measurements within the outcome domain	It is unlikely that the reported effect estimate is prone to selective reporting from among multiple analyses of the outcome measurements, including sub-group analysis	If sub-group/ancillary/adjusted analyses are presented, are these pre-specified or exploratory?	The analysis includes an intention to treat analysis. (If so, was this appropriate and were appropriate methods used to account for missing data?)	Do the authors report on all variables they aimed to study (as specified in their protocol or study aims/research questions)?	**Overall risk of bias**	**Overall risk of bias**
Toma & Bell, 2022	Yes	Yes	Yes	Yes	NA	Yes	Low risk	Low risk
Vivalt et al. 2023	Yes	Yes	Yes	NA	NA	Yes	Low risk	Some concerns

Appendix Table 7: QED full risk of bias assessment results – bias due to selection of participants into the study and confounding

	Bias in selection of participants into the study. **Are participants selected in a way that minimizes selection bias?**					**Bias due to confounding (a)** **Is confounding potentially controllable in the context of this study?**					
Study	There is an adequate description of how and why sample was chosen (i.e., identified/selected/ recruited)	Participants in the control group were sampled from the same population as that of the treatment	Group allocation process minimised potential risk of bias (e.g., using computer algorithms)	Selection of participants into the study (or into the analysis) is based on participant characteristics observed after the start of the intervention	Overall risk of bias	There is potential for confounding of the effect of the intervention in this study.	Where matching was applied, it featured sufficient criteria	Where relevant, the authors conducted an appropriate analysis that controlled for all potential/ remaining critical confounding domains	Authors avoided adjusting for variables identified after the intervention has been administered	The treatment and control group are comparable after matching/controls have been done	**Overall risk of bias**

								after matching had been applied			
Jacobs et al. 2014	Yes	Yes	No	No	Some concerns	Yes	No	Yes	Yes	Significant descriptive differences	High risk
Wilson et al. 2017a	Yes	Yes	No	No	High risk	Yes	NA	No	No	No statistically significant differences	Some concerns
Wilson et al. 2017b	Yes	Yes	No	No	High risk	Yes	NA	No	No	No statistically significant differences	Some concerns

Appendix Table 8: QED full risk of bias assessment results – bias due to departures from intended interventions and missing/incomplete data

	Bias due to departures from intended interventions **Was the intervention implemented as laid out in the study protocol?**						**Bias due to missing/incomplete data (attrition)** **Are the intervention and control groups free of critical differences in participants with missing/incomplete data?**					
Study	Critical co-interventions were balanced across intervention and control groups	Treatment switches were low enough to not threaten the validity of the estimated effect of the	Implementation failure was minor and unlikely to threaten the validity of the estimated effect of the intervention	It is possible that the intervention was taken by the controls (contamination and possible crossing-over)	It is possible that knowledge of group allocation affects how the two study groups are treated during	Overall risk of bias	Outcome data are reasonably complete (80% or above)	If level of attrition (or other forms of missing/incomplete data) is more than 20%, are reasons for the missing data reported?	If level of attrition is more than 20%, do the authors demonstrate similarity between remaining participants and those lost to attrition and are the proportion of	If level of attrition is more than 20%, were appropriate statistical methods used to account for	If not possible to control for missing/incomplete data, are outcomes with missing/incomplete data excluded from analysis?	**Overall risk of bias**

		intervention			delivery and evaluation of the intervention				participants with missing/incomplete data and reasons for missing/incomplete data similar across groups?	missing data? (e.g., sensitivity analysis)		
Jacobs et al. 2014	Yes	Yes	Yes	No	No	Low risk	No	Yes	Yes	No	Yes	Some concerns
Wilson et al. 2017a	Yes	Yes	Yes	No	No	Low risk	No	Yes	Yes	Yes	No	High risk
Wilson et al. 2017b	Yes	Yes	Yes	No	No	Low risk	No	Yes	Yes	Yes	No	High risk

Appendix Table 9: QED full risk of bias assessment results – bias due to measurement of outcomes and in selection of results reported

	Bias in measurement of outcomes Are measurements appropriate, e.g., clear origin, or validity known?							Bias in selection of results reported Are the reported outcomes consistent with the proposed outcomes at the protocol stage?							
Study	There was an adequate period for	Outcome measure (e.g., incom	Outcomes were assessed using standardised	Outcome measurements reflect what the experiment	Methods of outcome assessment were compara	Were outcome assessors aware of the interventi	Overall risk of bias	It is unlikely that the reported effect estimat	It is unlikely that the reported effect estimate is	iii) it is unlikely that the reported effect estimate is	If sub-group/ancillary/adjusted analyses are presented, are these pre-	Analysis includes an intention to	The authors report on all variables they	Overall risk of bias	Overall Risk of Bias

	follow up	e) was clearly defined and objective	instruments and indicators	set out to measure	ble across groups	on received by study participants?		e has been selected for publication due to it being a particularly notable finding	prone to selective reporting from among multiple outcome measurements within the outcome domain	prone to selective reporting from among multiple analyses of the outcome measurements, including sub-group analysis	specified or exploratory?	treat analysis.	aimed to study (as specified in their protocol or study aims/research questions)		
Jacobs et al. 2014	Yes	No	Yes	Yes	Yes	NA	Some concerns	Yes	Yes	Yes	Yes	Unclear	Yes	Low risk	High risk
Wilson et al. 2017a	Yes	No	Yes	Yes	Yes	No	Low risk	Yes	Yes	Yes	NA	Yes	Yes	Low risk	High risk
Wilson et al. 2017b	Yes	No	Yes	Yes	Yes	No	Low risk	Yes	Yes	Yes	NA	Yes	Yes	Low risk	High risk

8.8 Appendix H: R output

8.8.1 Appendix H.1: R-output from Interaction/Skills/Structure/Access on Motivation

Random-Effects Model (k = 2; tau^2 estimator: DL)

tau^2 (estimated amount of total heterogeneity): 0.0097 (SE = 0.0789)

tau (square root of estimated tau^2 value): 0.0986

I^2 (total heterogeneity / total variability): 17.42%

H^2 (total variability / sampling variability): 1.21

Test for Heterogeneity:

Q(df = 1) = 1.2110, p-val = 0.2711

Model Results:

estimate	se	zval	pval	ci.lb	ci.ub
-0.0925	0.1664	-0.5560	0.5782	-0.4185	0.2336

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

8.8.2 Appendix H.2: R outputs meta-analysis

R-output from Access on Capability

Random-Effects Model (k = 2; tau^2 estimator: DL)

tau^2 (estimated amount of total heterogeneity): 0 (SE = 0.0153)

tau (square root of estimated tau^2 value): 0

I^2 (total heterogeneity / total variability): **0.00%**

H^2 (total variability / sampling variability): 1.00

Test for Heterogeneity:

Q(df = 1) = 0.0008, p-val = 0.9780

Model Results:

estimate	se	zval	pval	ci.lb	ci.ub	
0.1042	0.0490	2.1270	0.0334	0.0082	0.2002	*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-output from Skill on Evidence Use

Random-Effects Model (k = 2; tau^2 estimator: DL)

tau^2 (estimated amount of total heterogeneity): 0.0750 (SE = 0.1261)

tau (square root of estimated tau^2 value): 0.2739

I^2 (total heterogeneity / total variability): 84.14%

H^2 (total variability / sampling variability): 6.30

Test for Heterogeneity:

Q(df = 1) = 6.3040, p-val = 0.0120

Model Results:

estimate	se	zval	pval	ci.lb	ci.ub

0.2908 0.2104 1.3816 0.1671 -0.1217 0.7032

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

R-output from Skill on Capability

Random-Effects Model (k = 3; tau^2 estimator: DL)

tau^2 (estimated amount of total heterogeneity): 0 (SE = 0.0127)

tau (square root of estimated tau^2 value): 0

I^2 (total heterogeneity / total variability): 0.00%

H^2 (total variability / sampling variability): 1.00

Test for Heterogeneity:

Q(df = 2) = 0.0002, p-val = 0.9999

Model Results:

estimate se zval pval ci.lb ci.ub

0.3349 0.0617 5.4256 <.0001 0.2140 0.4559 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

R-output from Skill on Motivation

Random-Effects Model (k = 3; tau^2 estimator: DL)

tau^2 (estimated amount of total heterogeneity): 0.3934 (SE = 0.4254)

tau (square root of estimated tau^2 value): 0.6272

I^2 (total heterogeneity / total variability): 96.80%

H^2 (total variability / sampling variability): 31.26

Test for Heterogeneity:

Q(df = 2) = 62.5107, p-val < .0001

Model Results:

estimate	se	zval	pval	ci.lb	ci.ub
0.3576	0.3687	0.9699	0.3321	-0.3651	1.0802

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1