



The SPIRIT Action Framework: A structured approach to selecting and testing strategies to increase the use of research in policy



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ABSTRACT

The recent proliferation of strategies designed to increase the use of research in health policy (knowledge exchange) demands better application of contemporary conceptual understandings of how research shapes policy. Predictive models, or *action frameworks*, are needed to organise existing knowledge and enable a more systematic approach to the selection and testing of intervention strategies. Useful action frameworks need to meet four criteria: have a clearly articulated purpose; be informed by existing knowledge; provide an organising structure to build new knowledge; and be capable of guiding the development and testing of interventions. This paper describes the development of the SPIRIT Action Framework. A literature search and interviews with policy makers identified modifiable factors likely to influence the use of research in policy. An iterative process was used to combine these factors into a pragmatic tool which meets the four criteria. The SPIRIT Action Framework can guide conceptually-informed practical decisions in the selection and testing of interventions to increase the use of research in policy.

The SPIRIT Action Framework hypothesises that a **catalyst** is required for the use of research, the response to which is determined by the **capacity** of the organisation to engage with research. Where there is sufficient capacity, a series of **research engagement actions** might occur that facilitate **research use**. These hypotheses are being tested in ongoing empirical work.

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1. Introduction

Governments around the world increasingly recognise the potential of research evidence to improve health outcomes and

optimise resource use (e.g. Cabinet Office, 1999) and are therefore encouraging their staff to use research in health policy and program design. There has been a rapid development of knowledge exchange strategies designed to help policy agencies make better use of research, including the work of organisations like: the Canadian Health Services Research Foundation; WHO EVIPNet; the European Union's DECIDE; the Sax Institute; the Australasian Cochrane Collaboration, and the UK Centres for Public Health Excellence.

At the same time, the past two decades have also seen more sophisticated theoretical and conceptual descriptions of the dynamic iterative process of policy development and the ways in which research can contribute to health policies and programs (e.g. Dobbins et al., 2002; Graham and Tetroe, 2008; Weiss et al., 2005). 'Research use' is increasingly regarded as a social, interactive,

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highly contingent and context-dependent process (Nutley et al., 2007). It has become clear that policy agencies use research instrumentally (to inform specific decisions), apply it conceptually (e.g. in problem reframing), and deploy it strategically (to gain influence) (Nutley et al., 2007). This highlights the need to focus not just on individual attitudes and behaviours, but also on social and organisational context and on the structures, processes and environments that surround them.

Much has been learnt from this theorising. However, the recent proliferation of strategies designed to increase the use of research in policy demands a second phase of conceptual development that focuses more explicitly on assisting the design and testing of intervention strategies. This second phase should build on the existing conceptual work to better identify where, how and what strategies can be employed to help agencies make best use of research in their work, to support the evaluation of these efforts and to build empirically-based cumulative knowledge about knowledge exchange.

Most contemporary conceptual understandings of the research-policy nexus posit that this involves messy, complex processes that defy simple, rational and delineated articulation (e.g. Crilly et al., 2010; Sanderson, 2006). Yet, paradoxically, intervention strategies and evaluation methods necessarily require a degree of structure and simplification. This paper is an attempt to bridge the socio-political messiness of the policy world and the practical requirements in the design and testing of interventions in that world.

Conceptual development in knowledge exchange has produced theories, models and frameworks that attempt to organise what is known about the field (Davies et al., 2011). There is a long history of debate about the differing ways that knowledge organisation can contribute to scientific development (e.g. Kuhn, 1962; Popper, 1983), and these terms are often used loosely and somewhat interchangeably in the emerging field of knowledge exchange (Kitson et al., 2013). We do not attempt to disentangle the terminology here, but we do note a useful distinction between conceptualisations that *describe* the properties, characteristics and qualities of a phenomenon, and those that seek to *explain or predict* by specifying causal relationships, hypotheses and propositions (e.g. Eccles et al., 2005; Gregor, 2002; Rycroft-Malone and Bucknall, 2010). Predictive theories may be particularly useful for the design and testing of interventions because they seek to explain how change can be effected and identify modifiable predictors. In this paper, we refer to theories, models or frameworks that are useful for designing and testing interventions as *action frameworks*.

An *action framework* that underpins the development and evaluation of knowledge exchange interventions will have a number of properties. It will:

1. Have a clearly **articulated purpose** and identify the foci for change – in the individual, the organisation and more widely (Rycroft-Malone and Bucknall, 2010).
2. Be **informed by existing understanding** of what influences the use of research in health policy, including descriptive models and empirical findings (Eccles et al., 2005; Rycroft-Malone and Bucknall, 2010), drawing on the widest possible range of social science.
3. Be capable of **guiding the development and testing of specific and targeted interventions**, including the generation of program logic models and the identification of proximal and distal outcomes and associated measures (Eccles et al., 2005; Gregor, 2002). An action framework creates the rationale for selecting particular intervention points and strategies.
4. Provide an **organising structure to build knowledge** (Eccles et al., 2005; Gregor, 2002; Rycroft-Malone and Bucknall, 2010). It will generate testable hypotheses about the drivers of research

use and assemble these into causal pathways that have predictive value and are capable of explaining why a particular strategy might or might not work, and under what circumstances. This creates a structure to build knowledge about processes and impacts through testing, confirming, refuting and enriching components of the model over time. A useful action framework will drive the collection of empirical data about contested concepts such as the boundaries between research engagement and research use, and the linkages between attitudes and actions.

In sum, an action framework pulls together existing understanding and insights (theoretical and empirical) to allow the design and structured testing of interventions. It summarises and structures existing knowledge, deploys it in action, and provides a framework for the expansion of that knowledge.

There are a growing number of theories, models and conceptual frameworks about research and policy that do seek to identify predictions and prescriptions for knowledge exchange (e.g. Dobrow et al., 2004; Graham and Tetroe, 2008; Greenhalgh et al., 2004; Kitson et al., 2008; McWilliam et al., 2009; Ogilvie et al., 2009; Tabak et al., 2012). While these often provide useful insights, we were unable to locate any attempts to develop an action framework relevant to the use of research to inform policy that was pragmatically-oriented with all the properties outlined above. Too often, existing conceptualisations point to the messy and contingent nature of the policy process but fail to guide necessarily structured and pragmatic responses. This gap is recognised in the field: in recent survey work of agencies active in influencing policy only 4% of respondents disagreed with the statement that ‘many of the existing knowledge mobilization frameworks are hard to operationalize’. (Davies et al., 2015 (in press)).

The absence of pragmatic action frameworks has been noted in implementation research (e.g. Eccles et al., 2005) and in knowledge exchange (Graham et al., 2013; Kitson et al., 2013). Contandriopoulos et al. (2010)’s narrative systematic review concludes:

...our results suggest that the best available source of advice for someone designing a knowledge exchange intervention will probably be found in empirically sound conceptual frameworks that can be used as field guides to decode the context and understand its impact on knowledge use and the design of knowledge exchange interventions (Contandriopoulos et al., 2010: 48)

This paper describes the development of such a ‘field guide’, the SPIRIT Action Framework, which was designed to underpin an intervention and evaluation study known as SPIRIT -Supporting Policy In health with Research: an Intervention Trial (CIPHER Investigators, 2014). SPIRIT is evaluating the impact of a suite of strategies designed to increase the capacity of health policy agencies to use research. It targets both the organisation and the individual policy maker, defined in this trial as someone who drafts or writes health policy documents or develops health programs, or who makes or contributes significantly to policy decisions about health services, programs or resourcing (Haynes et al., 2015). This paper examines the extent to which the SPIRIT Action Framework has the properties of a useful action framework outlined above. While there is dispute about the terminology (e.g. Davies et al., 2008; Graham et al., 2006; Greenhalgh and Wieringa, 2011; McKibbin et al., 2010), we use the term ‘knowledge exchange’ to denote a broad and inclusive array of activities designed to bring policy processes into closer engagement with research-based knowledge.

2. Method

The SPIRIT Action Framework was co-developed between 2011 and 2013 by the study team of policy makers, researchers and knowledge exchange specialists as follows:

- (i) **The identification and initial categorisation of factors likely to influence the use of research in policy.** A detailed review of the literature was undertaken to identify factors important in determining the use of research in policy. The search was based on a recent integrative review which searched major health, social science and education databases for the period 1999–2009 (Moore et al., 2011). Publications were doubled coded according to types of research, common domains or goals and specific strategies. A series of semi-structured interviews was then conducted with a purposive sample of nine senior highly experienced Australian state and federal health policy makers who were known for their commitment to using research in policy making (Huckel Schneider et al., 2014). Interviews were conducted by members of the research team and used a list of propositional systems and competencies identified from the literature to explore policy makers' views about the factors that would assist policy agencies to use research. Data were analysed using thematic coding to identify common factors emerging from the review of research and from the policy makers, any variations, and any new themes. The factors were then classified as: *predisposers* or *enablers* of research use at either the individual, organisational or external level; *actions* that might be undertaken to engage with or use research; or *outcomes* of research use.
- (ii) **Development of the SPIRIT Action Framework:** An iterative process was used to develop the Framework from the factors identified through the literature review and interviews. The Framework was refined by multiple rounds of independent review by members of the study team which includes experts in knowledge exchange and highly experienced policy makers. At each review comments were sought on face validity, comprehensiveness and utility for guiding the design and testing of interventions.
- (iii) **Examination of compliance with the criteria of a useful action framework:** The SPIRIT Action Framework was assessed against the four properties of a useful action framework outlined in the introduction.

Ethics approval was granted for the overall CIPHER program of work, of which this is a part, by the University of Western Sydney Human Research and Ethics Committee (HREC Approval H8855).

3. Results

3.1. The SPIRIT Action Framework

The literature review and interviews with policy makers identified a broad range of concepts and factors that should be considered as part of an action framework to underpin the development and testing of interventions to increase the use of research in policy as shown in Table 1.

The initial literature review (Moore et al., 2011) located 59 descriptive studies (largely interviews of policy makers); 42 conceptual papers (commentaries or models) and 5 intervention studies. The review was updated in the middle of 2011 using a similar search strategy and identified an additional completed intervention study (Dobbins et al., 2009) and other descriptive papers which largely confirmed the findings of the initial review

(e.g. Orton et al., 2011; Perrier et al., 2011).

The final column in Table 1 shows the proportion of the interviews that mentioned each factor identified in the literature. It is evident that policy makers largely confirmed the factors that emerged from the literature review.

The key concepts in Table 1 were used in the iterative process described above to create the SPIRIT Action Framework shown in Fig. 1.

The upper hemisphere in Fig. 1 shows the context for research use in policy. It makes evident that many inter-related contextual factors contribute to the policy processes and that research is only one influence among these. The ways that research is thought about, engaged with and used will be affected in complex ways by resources, ideology, the media and so on. Over time, the SPIRIT Action Framework can be used to examine the ways in which these factors impact on research use and associated interactions. However, the immediate focus of this paper is to examine the dynamics around research-based knowledge.

These dynamics are unpacked in the bottom hemisphere of Fig. 1 to articulate four steps along a pathway to research use, influence and impact:

- 1 **Catalysts:** The primary task of policy makers is to develop and implement public policy rather than to consider research. The Framework hypothesises that a catalyst or prompt occurs to initiate the process of engaging with or using research. For example, a need for information to answer a particular problem in policy or program design, or to assist in supporting a case for funding or public persuasion. The catalyst might also be compelling new research findings that suggest a different policy agenda or a new slant on an old one.
- 2 **Capacity:** The Framework hypothesises that the extent to which an agency has internal capacity will mediate its response to the catalyst. Capacity includes: the value placed on research by the organisation (as demonstrated through its support and requirements for research use) and by individual staff; the tools and systems the organisation has to support research engagement; and the skills and knowledge of staff.
- 3 **Research engagement action:** The SPIRIT Action Framework hypothesises that if an agency has capacity its staff will be more likely to: access and appraise research findings, commission or undertake research to generate new findings, or interact with researchers. These four 'engagement actions' create a bridge between the potential reflected in the capacity to use research and the eventual outcome of research application.
- 4 **Research use:** Knowing about the evidence and doing something with it are not the same thing. The Framework differentiates research use from research engagement actions and predicts that, where engagement with research has been more effective, there is greater likelihood that the research will inform policy making. The Framework acknowledges that research may be used in conceptual, instrumental, tactical and imposed fashions (e.g. Weiss et al., 2005) and to support policy agenda setting, policy development, implementation or evaluation.

As shown in Fig. 1, the SPIRIT Action Framework hypothesises that the use of research can result in more research informed policies and programs, which in turn may result in better health services and health outcomes. It recognises that this is dependent upon the availability of reliable, relevant research. The Framework also hypothesises that greater activity in capacity development, engagement with research, and research use may stimulate the development of new and perhaps more policy-applicable research.

Table 1

Key concepts in the use of research in policy identified through the literature review and in the interviews.

Concept	Definition	Identification in literature review: Examples	No. of mentions in interviews ^a
External predisposing/enabling factors			
External context	Factors outside the control of the policy maker that might influence their capacity to use research (political influences, media, deadlines, legislative/policy infrastructure, etc.)	(Campbell et al., 2007; Dobrow et al., 2004; Gold, 2009; Green and Bennett, 2007; Jewell and Bero, 2008)	✓ 3/9
Availability of research	Extent to which useful research is available, and seen as salient, relevant and acceptable. Research might include: analysis of quantitative or qualitative data, or theory, found in peer reviewed research papers, technical monographs or books, or in grey literature such as internal studies and evaluations, and reports on authoritative websites	(Campbell et al., 2007; Contandriopoulos et al., 2010; Hanney et al., 2003; Innvaer et al., 2002; Jewell and Bero, 2008; Lavis et al., 2006; Mitton et al., 2007)	✓ 4/9
Internal predisposing/enabling factors			
<i>Individual Factors</i>			
Perception of value of research	Extent to which the individual believes: (a) that use of research in policy/program work is important and valuable, and (b) that research use is valued in their organisation	(Dobbins et al., 2002; Gold, 2009; Lavis et al., 2006; Mitton et al., 2007)	✓ 3/9
Knowledge and skills of staff to engage with and use research	Awareness of the concept of using research in policy, knowledge and skills in the actions to engage with and apply research in policy/program agenda setting, development, implementation or evaluation	(Bowen and Zwi, 2005; Campbell et al., 2009; Dobbins et al., 2002; Jewell and Bero, 2008; Mitton et al., 2007; Potter and Brough, 2004)	✓ 7/9
Engagement with researchers	Interaction, collaboration and communication with researchers through events, projects, networks, committees, etc	(Bowen and Zwi, 2005; Campbell et al., 2009; Dobbins et al., 2002; Green and Bennett, 2007; Innvaer et al., 2002; Jewell and Bero, 2008; Mitton et al., 2007)	✓ 3/9
<i>Organisational Factors</i>			
Organisational policies	Organisational policies that support or require research use in policy/program agenda setting, development, implementation or evaluation	(Bowen and Zwi, 2005; Dobbins et al., 2002; Green and Bennett, 2007)	✓ 6/9
Organisational leadership	Leaders who model and support research use in policy/program agenda setting, development, implementation or evaluation	(Bowen and Zwi, 2005; Gold, 2009; Green and Bennett, 2007)	✓ 4/9
Organisational systems	Systems to support research use such as systems for identifying, collating and disseminating relevant research	(Gold, 2009; Green and Bennett, 2007; Potter and Brough, 2004)	✓ 4/9
Resources to support research use	Resources to support research use such as access to electronic journals, reference management software, staff with specialist research use skills	(Campbell et al., 2009; Campbell et al., 2007; Dobbins et al., 2002; Green and Bennett, 2007; Innvaer et al., 2002; Mitton et al., 2007; Potter and Brough, 2004)	✓ 5/9
Relationships with researchers	Relationships (both formal and informal) between the policy/program organisation and researchers or research institutions	(Canadian Institutes of Health Research (2006); Contandriopoulos et al., 2010; Gold, 2009; Green and Bennett, 2007; Jewell and Bero, 2008; Lavis et al., 2006; Lavis et al., 2008; Lavis et al., 2003; Mitton et al., 2007)	✓ 3/9
Actions			
Access research	Searching for or otherwise identifying research to inform policy/programs	(Innvaer et al., 2002; Kothari et al., 2009)	✓ 6/9
Appraise research	Evaluating the quality of research and the generalisability and reliability of research results, including the applicability of identified research to local policy/program needs.	(Kothari et al., 2009)	✓ 4/9
Generate new research	Commissioning, collaborating in or undertaking new research or new analyses to inform policy/programs	(Lomas, 1997; Weiss, 1979)	✓ 3/9
Interact with researchers	Interaction, collaboration and communication with researchers through events, projects, networks, committees, etc	(Bowen and Zwi, 2005; Campbell et al., 2009; Dobbins et al., 2002; Green and Bennett, 2007; Innvaer et al., 2002; Jewell and Bero, 2008; Lavis et al., 2008; Mitton et al., 2007)	✓ 3/9
Use of research			
Kind of research use: (a) conceptual, (b) instrumental, (c) tactical/symbolic or (d) imposed	Use of research to (a) provide new ideas, understanding or concepts that influence thinking about policy/program; (b) directly develop content or direction of policy/programs; (c) justify or lend weight to pre-existing preferences and actions; (d) meet organisational, legislative or funding requirements that research be used	(Amara et al., 2004; Contandriopoulos et al., 2010; Green and Bennett, 2007; Lavis et al., 2003; Weiss et al., 2005)	Not applicable. Interviews focused on capacity to use research rather than when/how it is used
Purpose of research use in: (a) agenda setting, (b) policy development, (c) policy implementation, (d) monitoring & evaluation	Use of research to help identify which issues or problems are priorities and should be addressed by policy/program development	(Friedman, 2003; Hanney et al., 2003; HM Treasury, 2011)	

^a Huckel Schneider et al. (2014).

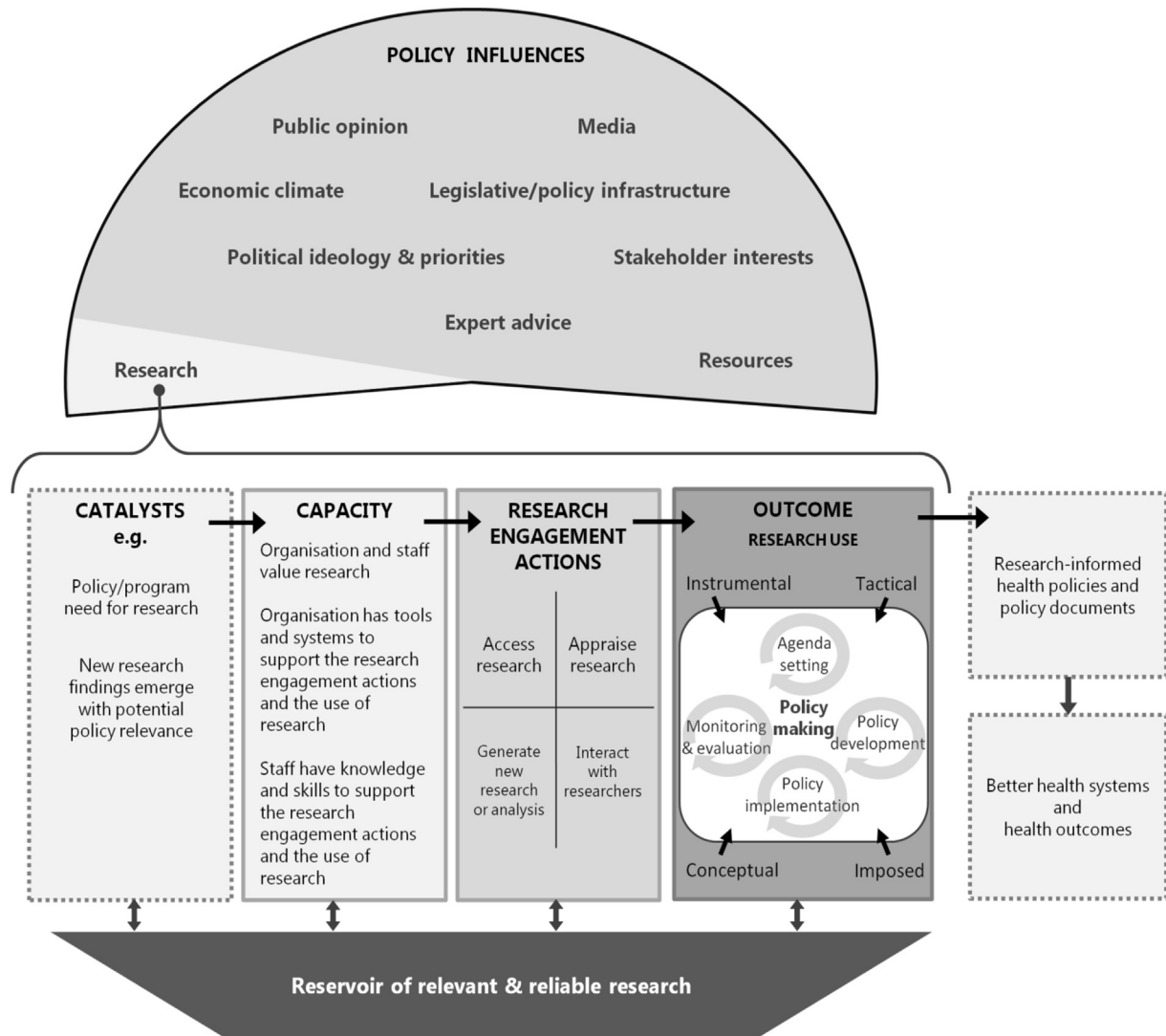


Fig. 1. The SPIRIT Action Framework.

3.2. Does the SPIRIT Action Framework have the properties of a useful action framework?

The extent to which the SPIRIT Action Framework has the four properties of a useful action framework is as follows:

(i) Articulated purpose

The SPIRIT Action Framework has been developed for an explicit purpose, namely to guide action including the identification of where, how and what should be done to help agencies improve the use of research in their work. The locus for change is clearly defined as the policy organisation.

(ii) Informed by existing understanding

As shown in Table 1, the Framework draws on existing models and empirical findings about the use of research in policy. It takes the diverse insights from existing conceptualisations of the research-policy nexus and recasts these to assist the development of a structured engagement process and the evaluation of that process.

(iii) Guiding the development and evaluation of interventions:

The utility of the Framework for designing a test of knowledge exchange strategies was examined in the development of the SPIRIT intervention trial. The Framework implies that building organisational capacity will lead to increased use of research and this was selected as the focus for SPIRIT. The Framework drove the program logic as shown in Fig. 2.

Fig. 2 illustrates how the program logic drove the selection of implementation strategies in SPIRIT. In row one we see the Framework hypothesis that increasing the extent to which agencies value research will build capacity. SPIRIT drew on organisational change, systems, and cognitive behavioural theory to identify specific strategies. For example, in the SPIRIT intervention, the CEO of each participating organisation was asked to explicitly articulate the value of research to his or her organisation. This was based on theory indicating the influence of modelling by credible experts (Bandura, 1977) and reinforcement by leaders (Flodgren et al., 2011; Herold et al., 2008). In another example, the Framework hypothesises that building staff skills in research appraisal will build capacity. SPIRIT drew on adult learning theory that suggested the value of interactive exchanges using practical examples from

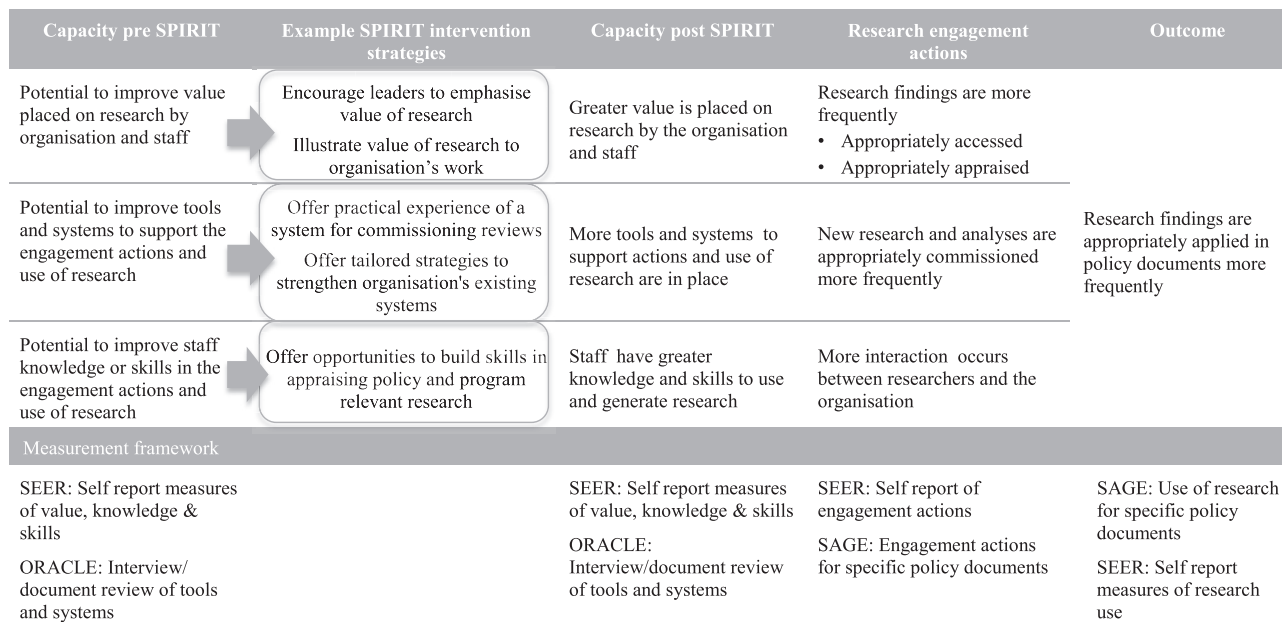


Fig. 2. Using the SPIRIT Action Framework to identify intervention strategies, causal pathways and a measurement framework.

participants' own experience (Adams and Dickinson, 2010; Bryan et al., 2008) and recent work emphasising the role of concepts like generalisability, scalability, dose and reach in appraising research in policy and program contexts (Glasgow et al., 1999; Green and Glasgow, 2006; Hawe and Potvin, 2009; Milat et al., 2013). The intervention included interactive workshops to build skills in research appraisal using examples relevant to the work of the organisation, including consideration of these concepts.

Fig. 2 also demonstrates how the Framework drove our measurement strategy. It is widely recognised that measuring the use of research in policy is complicated by the heterogeneity of policy development, the paucity of relevant research and the impact of factors outside the control of policy makers (Nutley et al., 2007; Oliver et al., 2014). Within these constraints, the Framework indicates the need for measures of research capacity, research engagement actions and research use (assessed across individuals, the policy organisation and in policy documents).

The measures described in Table 2 (SEER, ORACLE and SAGE) are described elsewhere (CIPHER Investigators, 2014) and are currently being tested for reliability and validity. Together these tools provide detailed measures of each concept in the SPIRIT Action Framework and generate data to test the hypothesised relationships. Fig. 2 shows how these measures operate to capture information along the various components of the Framework. The wider contextual aspects of policy making in the upper hemisphere of the Framework 1 are captured to some extent in SAGE. A detailed process evaluation conducted as part of the SPIRIT intervention trial uses qualitative methods to explore and document the interaction between the intervention, participants and context (Haynes et al., 2014). Findings will be used to supplement the quantitative measures and shed further light on the hypothesised relationships.

(iv) Organising structure to build knowledge

The Framework can be used to create testable hypotheses about the drivers of evidence use, causal pathways and intervention strategies that are likely to be effective. For example, it predicts that if an organisation is not perceived by its staff as valuing the use of research, or where there are few structures in place to support

evidence use, staff will less often access, appraise or use research compared to an agency that overtly values research. Similarly, it predicts that training in research appraisal will build capacity and that this will impact on research engagement. It is possible to confirm or refute this by testing whether changes in research appraisal are associated with more research engagement actions.

The Framework also creates an organising structure for building knowledge: it can be used to explore how the components of capacity operate separately and together. For example, are any components of capacity more or less important than the others in driving research engagement? If organisational structures are strengthened, do staff perceive their organisation as valuing research more? Are there ways in which the research engagement actions interact (e.g. do agencies use all of these actions or are some more important in some settings)? How do the strategies work in practice (e.g. does training in research appraisal simply increase the research engagement action 'appraisal' or does it also drive other responses such as greater engagement with researchers and/or more generation of new research)? Several hypothetical examples of how the Framework might be refuted, confirmed or refined are shown in Table 3, but myriad possibilities exist.

4. Discussion

Contemporary political discourse places great emphasis on the use of research-informed evidence for public policy making. Much has been written about the complexity of policy processes and, more recently, about the use and influence of research in and on those processes. There has been a proliferation of models that have – to some extent – been drawn on to create strategies aimed at increasing the use of research in policy processes. However, it is often difficult to make full use of this theoretical and empirical knowledge. There is need for a more action-oriented approach to underpin programs designed to strengthen the use of research in policy.

This paper has described the SPIRIT Action Framework. It was developed because we found it difficult to use existing models to map the program logic for an intervention trial with sufficient detail to guide specific actions and the testing of those actions.

Table 2
Using the SPIRIT Action Framework to establish a measurement framework.

Level of measurement	SPIRIT Action Framework dimensions captured at each level	Tool	Mode
Individual policy makers	Capacity Value placed on research Perceived value organisation places on use of research Confidence in skills and knowledge in accessing, appraising and generating research Perceived availability of organisational tools, systems, training and programs to assist in accessing, appraising, generating research and interacting with researchers Research engagement actions Self-reported extent of accessing, appraising, generating research and interacting with researchers Research Use Self-reported use of research	‘Seeking, Engaging with and Evaluating Research’: SEER	Online survey
Policy organisation	Capacity Policies that encourage or mandate the examination of research in policy and program development Tools, systems, training and programs to assist in accessing, appraising, generating research and engaging with researchers	‘Organisational Research Access, Culture and Leadership’: ORACLE	Interview (face-to-face or phone) plus collection of documentation
Policy Documents	Research engagement actions Evidence of attempts to access, appraise and/or generate research for each policy document Research use Extent of conceptual, instrumental, tactical & imposed research for each policy document Context in which policy document was produced, including barriers to using research	‘Staff Assessment of enGagement with Evidence’: SAGE	Independent assessment based on interview and documentation

While many of the conceptual models provided useful insights, often the purpose was to examine how policy is developed or how policy and research interact, rather than to identify causal theories and modifiable points for intervention. This is perhaps unsurprising given that only 22.5% of interventions within the field of implementation research have an explicitly stated theoretical rationale (Davies et al., 2010). Nevertheless, there is a growing interest in more purpose-focused models such as the co-KT Framework designed explicitly to guide an integrated knowledge strategy in a population health study (Kitson et al., 2013). Outside of health, Ouimet and colleagues have developed a conceptual framework that attempts to create causal pathways and tested the hypothesised relationships (Ouimet et al., 2009).

The SPIRIT Action Framework has the properties of a useful action framework. It has an explicit purpose: to guide the development and testing of strategies to increase the use of research in

policy. It draws on and organises previous empirical findings and conceptual models and has confirmed these through interviews with policy makers. Although the Framework drew on literature available at its time of development (2012), subsequent work (e.g. Brown, 2012; Ettelt et al., 2013; Evans et al., 2013; Moat et al., 2013; Oliver et al., 2014; Panisset et al., 2012; Pitchforth et al., 2013; Yost et al., 2014) have largely confirmed previous reviews and the basis of the Framework.

As shown using the SPIRIT trial as an example, the Framework can be used to drive the program logic, the development of an intervention and a measurement strategy. Thus the SPIRIT Action Framework can create a unifying structure to bring together intervention design, outcome measures and process evaluation.

The Framework also has the potential to more broadly guide knowledge development and practical decisions. The need for this is recognised; for example, Eccles and colleagues describe the

Table 3
Hypothetical scenarios: An empirical approach to confirming, refining or refuting the Framework.

Empirical focus	Hypothetical impact following intervention	Implications for the model	Confirm, refine or refute model
Test link between capacity and research engagement actions	Significant increase in capacity No increase in research engagement actions	Increasing capacity does not impact engagement as predicted by the Framework.	Refute the Framework as it stands. The Framework may require a restructure.
Test link between specific capacity components and research engagement actions	Significant <u>increase</u> in systems and structures and no change in skills and knowledge <u>Increase</u> in research engagement actions	Better systems and structures alone can increase engagement actions; in some contexts, they may be more important than skills and knowledge	<u>Refine</u> the model. Some kind of weighting or reordering of the Framework may be required.
Test link between research engagement actions and research use	Significant <u>increase</u> in research engagement actions Significant <u>increase</u> in research use	The relationship between research engagement actions and research use occurs as the Framework predicts	<u>Confirm</u> the model.
Test the flow from research capacity, to research engagement to research use	Significant <u>increase</u> in capacity and <u>no change</u> in research engagement <u>Increase</u> in research use	Research engagement does not mediate between capacity and research use	<u>Refute</u> the Framework as it stands. The Framework may require a restructure.
Test the generalisability of the Framework	<u>Increase</u> in capacity Associated increases in research use in some but not all organisations	Other factors not captured by the Framework are important in determining research use	<u>Refine</u> the Framework. The Framework may require expanding.

process of implementation research in the absence of agreed frameworks as:

...akin to exploring the clinical role of an antihypertensive drug (1) without any understanding of the pharmacology of the drug, the physiology of blood pressure control, or the pathophysiology of hypertension and (2) without phase I trials of the pharmacodynamics This is an expensive version of trial-and-error, with no a priori reason to expect success or to have confidence of being able to replicate success if it is achieved. (2005, p. 108)

As shown in Table 3, the SPIRIT Action Framework establishes testable and refutable hypotheses about increasing the use of research in policy by examining whether changes in one or more components result in changes further along the program logic pathway. It therefore establishes the basis for empirical testing that confirms or refutes the Framework or suggests refinements are required. Given the current limited empirical data, the boundaries and order of the components in the Framework are to some extent arguable. However, the Framework attempts to make hypothesised relationships explicit as a first step in empirical testing and refinement. It also establishes ways to examine the relative value of different intervention strategies – for example, it could be used to test the hypothesis that interventions that result in increased availability of systems and tools are more likely to result in sustained changes in research use, than those that target skill development.

Our work on the SPIRIT Action Framework has focused on detailing the research segment in Fig. 1. However, the Framework provides a structure to explore the role of other factors outlined in the top hemisphere and the way in which they interact with research. For example, future work could expand the Framework by detailing how media or stakeholder influence shapes research use. Is there for example, less opportunity to use research when there is strong stakeholder influence or where a policy is part of an election commitment? How do factors such as organisational capacity interact with say media pressure to determine the use of research? Similarly, the availability of relevant research could be empirically tested to examine whether, for example, different kinds of research availability have a greater effect on the use of research in policy and which steps in the SPIRIT Action Framework are more or less affected.

The Framework can be used to identify where an agency might best invest its likely limited resources to improve the use of research. In the SPIRIT intervention trial, participating agencies receive feedback on measures of capacity, research engagement and outcomes. They use this feedback to determine what aspects of capacity are most in need of additional effort. The relevant strategies can then be selected; for example, if the data show that organisational leaders are not perceived as valuing the use of research, an agency might choose a program like EXTRA, which provides support and development for leaders in using research (Canadian Foundation for Health Care Improvement). If the data show that the agency has few systems for accessing research reviews, a program like Evidence Check might be used to provide a structured approach to commissioning reviews (Campbell et al., 2011). With the growing emphasis on strategies to increase the use of research in policy, it will be increasingly important that agencies have the tools and knowledge to select those strategies and programs that will work best for them, working in partnership with external research expertise and intermediary agencies.

Despite this potential, the SPIRIT Action Framework should be regarded as the beginning of a process of articulating and testing causal pathways in the use of research by policy agencies. We readily acknowledge that the labelling of categories and pathways

is open to challenge – for example, is ‘interaction with researchers’ a component of capacity or a ‘research engagement action’? Are resources part of the external environment or should they be seen more as one of the tangible capacities within an organisation? These and other similar questions can be explored conceptually and empirically over time, and the insights used to strengthen or refute the Framework. However, the most important test of the Framework will be its value to policy agencies in selecting which strategies are likely to be most effective for them in building their research responsiveness, and its usefulness to researchers in testing new approaches and organising new knowledge.

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References

- Adams, J., Dickinson, P., 2010. Evaluation training to build capability in the community and public health workforce. *Am. J. Eval.* 31, 421–433.
- Amara, N., Ouimet, M., Landry, R., 2004. New evidence on instrumental, conceptual, and symbolic utilization of university research in government agencies. *Sci. Commun.* 26, 75–106.
- Bandura, A., 1977. Self-efficacy: toward a unifying theory of behavioral change. *Psychol. Rev.* 84, 191–215.
- Bowen, S., Zwi, A.B., 2005. Pathways to “evidence-informed” policy and practice: a framework for action. *PLoS Med.* 2, 600–605.
- Brown, C., 2012. The ‘policy-preferences model’: a new perspective on how researchers can facilitate the take-up of evidence by educational policy makers. *Evid. Policy* 8, 455–472.
- Bryan, R.L., Kreuter, M.W., Brownson, R.C., 2008. Integrating adult learning principles into training for public health practice. *Health Promot. Pract.* 10, 557–563.
- Cabinet Office, 1999. Modernising Government, White Paper (CM4310). Cabinet Office, London.
- Campbell, D., Donald, B., Moore, G., Frew, D., 2011. Evidence Check: knowledge brokering to commission research reviews for policy. *Evid. Policy* 7, 97–107.
- Campbell, D., Redman, S., Jorm, L., Cooke, M., Zwi, A.B., Rychetnik, L., 2009. Increasing the use of evidence in health policy: practice and views of policy makers and researchers. *Aust. N. Z. Health Policy* 6, 21.
- Campbell, S., Benita, S., Coates, E., Davies, P., Penn, G., 2007. Analysis for Policy: Evidence-based Policy in Practice. Government Social Research Unit, London.
- Canadian Foundation for Health Care Improvement. Executive Training for Healthcare Improvement (EXTRA).
- Canadian Institutes of Health Research, 2006. Evidence in Action, Acting on Evidence: a Casebook of Health Services and Policy Research Knowledge Translation Stories. Canadian Institutes of Health Research, Ottawa.
- CIPHER Investigators, 2014. Supporting policy in health with Research: an intervention Trial (SPIRIT)—protocol for a stepped wedge trial. *BMJ Open* 4, e005293.
- Contandriopoulos, D., Lemire, M., Denis, J.-L., Tremblay, É., 2010. Knowledge exchange processes in organizations and policy arenas: a narrative systematic review of the literature. *Milbank Q.* 88, 444–483.
- Crilly, T., Jashapara, A., Ferlie, E., 2010. Research Utilisation & Knowledge Mobilisation: a Scoping Review of the Literature. Report for the National Institute for Health Research Service Delivery and Organization. Queen's Printer and Controller of HMSO, London.
- Davies, H., Nutley, S., Walter, I., 2008. Why ‘knowledge transfer’ is misconceived for applied social research. *J. Health Serv. Res. Policy* 13, 188–190.
- Davies, H., Powell, A., Nutley, S., 2015. Mobilising Knowledge to Improve UK Health Care: Learning from Other Countries and Other Sectors. National Institute for Health Research (in press).
- Davies, H., Powell, A., Ward, V., Smith, S., 2011. Supporting NHS Scotland in Developing a New Knowledge-to-action Model (Report). University of St Andrews.
- Davies, P., Walker, A.E., Grimshaw, J.M., 2010. A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *Implement. Sci.* 5.
- Dobbins, M., Ciliska, D., Cockerill, R., Barnsley, J., DiCenso, A., 2002. A framework for the dissemination and utilization of research for health-care policy and practice. *Online J. Knowl. Synth. Nurs.* 9, 149–160.
- Dobbins, M., Hanna, S.E., Ciliska, D., Manske, S., Cameron, R., Mercer, S.L., et al.,

2009. A randomized controlled trial evaluating the impact of knowledge translation and exchange strategies. *Implement. Sci.* 4.
- Dobrow, M.J., Goel, V., Upshur, R.E.G., 2004. Evidence-based health policy: context and utilisation. *Soc. Sci. Med.* 58, 207–217.
- Eccles, M., Grimshaw, J., Walker, A., Johnston, M., Pitts, N., 2005. Changing the behavior of healthcare professionals: the use of theory in promoting the uptake of research findings. *J. Clin. Epidemiol.* 58, 107–112.
- Ettelt, S., Mays, N., Nolte, E., 2013. Policy–research linkage: what we have learned from providing a rapid response facility for international healthcare comparisons to the Department of Health in England. *Evid. Policy* 9, 245–254.
- Evans, B.A., Snooks, H., Howson, H., Davies, M., 2013. How hard can it be to include research evidence and evaluation in local health policy implementation? Results from a mixed methods study. *Implement. Sci.* 8.
- Flodgren, G., Parmelli, E., Doumit, G., Gattellari, M., O'Brien, M.A., Grimshaw, J., et al., 2011. Local opinion leaders: effects on professional practice and health care outcomes. *Cochrane Database Syst. Rev.* 8.
- Friedman, R.M., 2003. A conceptual framework for developing and implementing effective policy in children's mental health. *J. Emot. Behav. Disord.* 11, 11–18.
- Glasgow, R.E., Vogt, T.M., Boles, S.M., 1999. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *Am. J. Public Health* 89, 1322–1327.
- Gold, M., 2009. Pathways to the use of health services research in policy. *Health Serv. Res.* 44, 1111–1136.
- Graham, I.D., Tetroe, J., 2008. Some theoretical underpinnings of knowledge translation. *Acad. Emerg. Med.* 14, 936–941.
- Graham, I.D., Logan, J., Harrison, M.B., Straus, S.E., Tetroe, J., Caswell, W., et al., 2006. Lost in knowledge translation: time for a map? *J. Contin. Educ. Health Prof.* 26, 13–24.
- Graham, I.D., Tetroe, J., KT Theories Group, 2013. Planned action theories. In: Straus, S.E., Tetroe, J., Graham, I.D. (Eds.), *Knowledge Translation in Health Care: Moving from Evidence to Practice*. Wiley Blackwell, Chichester, pp. 277–287.
- Green, A., Bennett, S., 2007. Sound Choices: Enhancing Capacity for Evidence-informed Health Policy. World Health Organization, Geneva.
- Green, L.W., Glasgow, R.E., 2006. Evaluating the relevance, generalization, and applicability of research issues in external validation and translation methodology. *Eval. Health Prof.* 29, 126–153.
- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., Kyriakidou, O., 2004. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q.* 82, 581–629.
- Greenhalgh, T., Wieringa, S., 2011. Is it time to drop the 'knowledge translation' metaphor? A critical literature review. *J. R. Soc. Med.* 104, 501–509.
- Gregor, S., 2002. A theory of theories in information systems. In: Gregor, S., Hart, D. (Eds.), *Information Systems Foundations: Building the Theoretical Base*. Australian National University, Canberra, pp. 1–20.
- Hanney, S.R., Gonzalez-Block, M.A., Buxton, M.J., Kogan, M., 2003. The utilisation of health research in policy-making: concepts, examples and methods of assessment. *Health Res. Policy Syst.* 1, 2.
- Hawe, P., Potvin, L., 2009. What is population health intervention research? *Can. J. Public Health* 100, 18–114.
- Haynes, A., Brennan, S., Carter, S., O'Connor, D., Huckel Schneider, C., Turner, T., et al., 2014. Protocol for the process evaluation of a complex intervention designed to increase the use of research in health policy and program organisations (the SPIRIT study). *Implement. Sci.* 9, 1–12.
- Haynes, A., Turner, T., Redman, S., Milat, A.J., Moore, G., 2015. Developing definitions for a knowledge exchange intervention in health policy and program agencies: reflections on process and value. *Int. J. Soc. Res. Methodol.* 18, 145–159.
- Herold, D.M., Fedor, D.B., Caldwell, S., Liu, Y., 2008. The effects of transformational and change leadership on employees' commitment to a change: a multilevel study. *J. Appl. Psychol.* 93, 346–357.
- HM Treasury, 2011. *The Magenta Book: Guidance for Evaluation*. HM Treasury, London.
- Huckel Schneider, C., Campbell, D., Milat, A.J., Haynes, A., Quinn, E., 2014. What are the key organisational capabilities that facilitate research use in public health policy? *Public Health Res. Pract.* 25.
- Innvaer, S., Vist, G., Trommald, M., Oxman, A., 2002. Health policy-makers' perceptions of their use of evidence: a systematic review. *J. Health Serv. Res. Policy* 7, 239–244.
- Jewell, C.J., Bero, L.A., 2008. "Developing good taste in evidence": facilitators of and hindrances to evidence-informed health policymaking in state government. *Milbank Q.* 86, 177–208.
- Kitson, A.L., Powell, K., Hoon, E., Newbury, J., Wilson, A., Beilby, J., 2013. Knowledge translation within a population health study: how do you do it? *Implement. Sci.* 8.
- Kitson, A.L., Rycroft-Malone, J., Harvey, G., McCormack, B., Seers, K., Titchen, A., 2008. Evaluating the successful implementation of evidence into practice using the PARIHS framework: theoretical and practical challenges. *Implement. Sci.* 3.
- Kothari, A., Edwards, N., Hamel, N., Judd, M., 2009. Is research working for you? Validating a tool to examine the capacity of health organizations to use research. *Implement. Sci.* 4, 46.
- Kuhn, T., 1962. *The Structure of Scientific Revolutions*. The University of Chicago Press, Chicago.
- Lavis, J.N., Lomas, J., Hamid, M., Sewankambo, N.K., 2006. Assessing country-level efforts to link research to action. *Bull. World Health Organ.* 84, 620–628.
- Lavis, J.N., Oxman, A.D., Moynihan, R., Paulsen, E.J., 2008. Evidence-informed health policy 1—Synthesis of findings from a multi-method study of organizations that support the use of research evidence. *Implement. Sci.* 3, 7.
- Lavis, J.N., Robertson, D., Woodside, J.M., McLeod, C.B., Abelson, J., 2003. How can research organizations more effectively transfer research knowledge to decision makers? *Milbank Q.* 81, 221–248.
- Lomas, J., 1997. *Improving Research Dissemination and Uptake in the Health Sector: Beyond the Sound of One Hand Clapping*. Centre for Health Economics and Policy Analysis. Department of Clinical Epidemiology and Biostatistics. McMaster University.
- McKibbin, K.A., Lokker, C., Wilczynski, N.L., Ciliska, D., Dobbins, M., Davis, D.A., et al., 2010. A cross-sectional study of the number and frequency of terms used to refer to knowledge translation in a body of health literature in 2006: a Tower of Babel. *Implement. Sci.* 5, 16.
- McWilliam, C.L., Kothari, A., Ward-Griffin, C., Forbes, D., Leipert, B., South West Community Care Access Centre Home Care Collaboration, 2009. *Evolving the theory and praxis of knowledge translation through social interaction: a social phenomenological study*. *Implement. Sci.* 4, 26.
- Milat, A.J., King, L., Bauman, A.E., Redman, S., 2013. The concept of scalability: increasing the scale and potential adoption of health promotion interventions into policy and practice. *Health Promot. Int.* 28, 285–298.
- Mitton, C., Adair, C.E., McKenzie, E., Patten, S.B., Wayne Perry, B., 2007. Knowledge transfer and exchange: review and synthesis of the literature. *Milbank Q.* 85, 729–768.
- Moat, K.A., Lavis, J.N., Abelson, J., 2013. How contexts and issues influence the use of policy-relevant research syntheses: a critical interpretive synthesis. *Milbank Q.* 91, 604–648.
- Moore, G., Redman, S., Haines, M., Todd, A., 2011. What works to increase the use of research in population health policy and programmes: a review. *Evid. Policy* 7, 277–305.
- Nutley, S.M., Walter, I.C., Davies, H.T.O., 2007. *Using Evidence: How Research Can Inform Public Services*. The Policy Press, University of Bristol.
- Ogilvie, D., Craig, P., Griffin, S., Macintyre, S., Wareham, N.J., 2009. A translational framework for public health research. *BMC Public Health* 9, 116.
- Oliver, K., Innvar, S., Lorenc, T., Woodman, J., Thomas, J., 2014. A systematic review of barriers to and facilitators of the use of evidence by policymakers. *BMC Health Serv. Res.* 14, 2.
- Orton, L., Lloyd-Williams, F., Taylor-Robinson, D., O'Flaherty, M., Capewell, S., 2011. The use of research evidence in public health decision making processes: systematic review. *PLoS One* 6, e21704.
- Quimet, M., Landry, R., Ziam, S., Bedard, P.O., 2009. The absorption of research knowledge by public civil servants. *Evid. Policy* 5, 331–350.
- Panisset, U., Koehlmoos, T.P., Alkhatib, A.H., Pantoja, T., Singh, P., Kengey-Kayondo, J., et al., 2012. Implementation research evidence uptake and use for policy-making. *Health Res. Policy Syst.* 10, 20.
- Perrier, L., Mrklas, K., Lavis, J.N., Straus, S.E., 2011. Interventions encouraging the use of systematic reviews by health policymakers and managers: a systematic review. *Implement. Sci.* 6, 43.
- Pitchforth, E., Nolte, E., Miani, C., Winpenny, E., 2013. Options for Effective Mechanisms to Support Evidence-informed Policymaking in RMNCH in Asia and the Pacific. World Health Organization, RAND Corporation. www.rand.org/pubs/external_publications/EP51481.html.
- Popper, K., 1983. *Realism and the Aim of Science: From the Postscript to the Logic of Scientific Discovery*. Routledge, USA.
- Potter, C., Brough, R., 2004. Systemic capacity building: a hierarchy of needs. *Health Policy Plan.* 19, 336–345.
- Rycroft-Malone, J., Bucknall, T., 2010. Using theory and frameworks to facilitate the implementation of evidence into practice. *Worldviews Evid.-based Nurs.* 7, 57–58.
- Sanderson, I., 2006. Complexity, 'practical rationality' and evidence-based policy making. *Policy Polit.* 34, 115–132.
- Tabak, R.G., Khoong, E.C., Chambers, D.A., Brownson, R.C., 2012. Bridging research and practice: models for dissemination and implementation research. *Am. J. Prev. Med.* 43, 337–350.
- Weiss, C.H., 1979. The many meanings of research utilization. *Public Adm. Rev.* 39, 426–431.
- Weiss, C.H., Murphy-Graham, E., Birkeland, S., 2005. An alternate route to policy influence: how evaluations affect D.A.R.E. *Am. J. Eval.* 26, 12–30.
- Yost, J., Dobbins, M., Traynor, R., DeCorby, K., Workentine, S., Greco, L., 2014. Tools to support evidence-informed public health decision making. *BMC Public Health* 14.