DEcisions in health Care to Introduce or Diffuse innovations using Evidence (DECIDE)

Final report for The Health Foundation

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Executive summary

Background

This report presents findings from the DEcisions in health Care to Introduce or Diffuse innovations using Evidence (DECIDE) study, led by researchers at the University of Manchester and University College London. As a part of the Health Foundation's Evidence-Informed Decision-making in Health Service Innovation and Improvement Programme, DECIDE examined the role of evidence in decisions about innovation. We adopted a broad definition of evidence that included a variety of types of information, including academic research findings, patient experience, professional opinion, clinical guidance and local data. It is known that a range of evidence informs healthcare decision-making, from formal research findings to 'soft intelligence' or local data, as well as practical experience or tacit knowledge. However, cultural and organisational factors often inhibit the translation of such evidence into practice. Using a multi-level framework, this study analysed how interactions between the evidence available and processes at the professional, organisational and local system level influence decisions to introduce or diffuse innovations in acute and primary care within the National Health Service (NHS) in the UK.

Methods

DECIDE used a mixed methods design, combining qualitative and quantitative methods, and involved four interdependent workstreams: (1) systematic scoping review of relevant literature with stakeholder feedback; (2) in-depth case studies of 'real-world' decision-making in acute and primary care; (3) a national survey and discrete choice experiment to establish decision-makers' preferences; and (4) development of guidance for decision-makers and evaluators to support the use of evidence in decision-making. The three case studies examined: responses to evidence on reconfiguring acute stroke services; uptake of new

national guidance in primary care to improve early diagnosis of suspected cancer; and use of evidence to inform development of an extended organisational network of 'virtual' eye clinics. The workstreams were interdependent, in that the scoping review informed the themes examined through the qualitative case studies, which in turn informed analysis of the national survey findings, and all three workstreams informed the development of the decision-making guidance.

Findings

The systematic scoping review found that interactions between contextual processes at different levels (professional group, organisational, local system) shape evidence use in decision-making (e.g. organisations use local systems' views on evidence to legitimise innovation, while local system processes place pressure on professional groups and organisations to use evidence for innovation or service disinvestment). Stakeholder feedback gathered through focus groups on the review's findings suggested that a burgeoning diversity of evidence is now being used to inform decisions about innovation.

The case studies illustrated how the use of evidence in decisions about introducing or diffusing innovations involves ongoing interplay between evidence and the contexts in which it is applied. Evidence informs decision-making through social and material translations in which evidence, and the context in which innovations are being considered, mutually influence one another. The translation or 'unfolding' of evidence into different material forms (e.g. summaries, visual depictions, presentation style) is a key process through which evidence associated with innovations is communicated and used to steer decision-making. Key socio-material processes identified in this study that influence how evidence informs decision-making are: 'connecting' (sharing and interpreting evidence through professional relationships); 'ordering' (constructing evidence to influence decision-making); and 'resisting' (presenting alternative evidence and questioning the implications of evidence for

decision-making). Professional groups use evidence to exert power over decision-making at different levels. In particular, shared preferences for research evidence allow ideas for innovations to circulate within the medical profession, but may marginalise other stakeholders and the perspectives they offer (e.g. anticipating implementation issues).

The national survey identified "impact" as the most important type of evidence in decision-making (with cost effectiveness, patient safety and quality of care provision the three most popular characteristics), although there are some survey data suggesting that "source/context" (e.g. credibility of source, local priority, applicability to local population) and "practicability & acceptability" (e.g. amount of effort required and previous implementation) are important too. Preferences concerning impact, context, and practicability are broadly consistent between the different professional groups surveyed (i.e. doctors, managers, commissioners). The impact on other services/sectors is not considered frequently in decision-making; however, as the case studies show, taking a wider system perspective when considering innovations is important for addressing practical challenges (e.g. resource/coordination issues) in their subsequent implementation.

The discrete choice experiment showed that external evidence (guidelines, published research, and regulators' priorities) was preferred over local data. Some variation exists across professional groups: doctors prioritise research evidence, while managers do not. Innovations requiring low effort, had evidence of previous implementation, and were from a similar context were preferred.

The decision-making guidance, an interactive PDF which can be used online or downloaded, presents a series of questions to consider in decision-making that were distilled from the findings of the previous workstreams and from iterative testing with stakeholders involved in making or informing decisions. It is a dialogical tool to support conversations around the use

of evidence in decision-making on innovation. The questions to consider are organised around six themes (definition, evidence, stakeholders, drivers, organisation, implementation) along the 'long and winding road' of decision-making, and it includes a checklist for considering the questions by theme. The checklist could be used to help plan how evidence will be used in decision-making processes for introducing or spreading innovations. For example, informing how audit and assurance processes for introducing service innovations are met, as set out in recent NHS England commissioning guidance on planning, assuring and delivering service change. The guidance can be accessed via www.ambs.ac.uk/decide.

Discussion

Decision-makers are more likely to be influenced by evidence of impact (particularly cost effectiveness, patient safety, and quality of care) than practicability (e.g. implementation considerations such as 'staff buy-in') or contextual factors (e.g. national priority and credibility of the presenter), although some practicability/ contextual factors are also deemed important (particularly credibility of source and local priority/ applicability). While evaluating the 'impact' of innovations is understandably important, our study suggests that anticipating barriers and enablers to implementation early in decision-making on adoption is critical. Gathering evidence which helps to assess the feasibility of implementation (and make mitigating plans) is necessary to avoid challenges and delays later in the process.

Stakeholder involvement in decision-making (both staff and patient representatives, e.g. charities) aids consideration of implementation issues, albeit sound organisational structures (e.g. effective communication channels) are needed to navigate the often challenging process of capturing and reconciling the variety of perspectives on innovations that involving stakeholders can produce.

This study confirms the importance of the use of professional relationships – for managers, clinicians and commissioners alike – for making sense of research evidence, and seeking out others' experiences with innovations under consideration, in order to assess the nuances of evidence and how it can be applied to the decision at hand. However, our findings deviate from earlier research which suggests that colloquial evidence (e.g. local audit data) is preferable to systematic evidence, including research evidence and clinical guidelines. The survey showed that external evidence was preferred over local data (although managers did not prioritise research evidence) and the case studies showed that external evidence was taken seriously and generated a wealth of activity. Formal evidence also has an important role in helping innovations to spread beyond the local context: it can signal credibility or importance thus improving uptake; it provides standards for assessing fidelity when innovations are applied in different spaces; and its codified form provides an 'object' around which many stakeholders can have a conversation (even if this shows the evidence is not understood, or it is incomplete, or it informs a decision to adapt the innovation to the local context).

Limitations

This study has a number of limitations that should be borne in mind when interpreting the findings. The survey of decision-makers' preferences may have been influenced by response bias, especially the social desirability of choosing 'cost-effectiveness' rather than 'budget impact' as a key characteristic of evidence on innovations. Cost-effectiveness is not the same as impact on budget (an innovation could be cost-effective and not cost saving) and the term may have been interpreted loosely by respondents. The conduct of in-depth case studies allowed us to analyse the characteristics of evidence that inform 'real-world' decision-making. Decision-makers' expressed preferences in the survey conflict with evidence from the systematic scoping review (which highlighted concern with the financial impact of innovations) and the case studies where the cost or budget impact of innovations was cited

more frequently by interviewees than cost-effectiveness. The qualitative data collected only relate to the three cases studies we analysed and decision-making processes may differ for other types of innovation and sites. Moreover, the prospective nature of some case studies means we may have missed some relevant processes in decision-making that took place before or after we conducted the fieldwork (or we were not able to observe at the time).

Implications for policy and practice

Types of evidence required to evaluate innovations

As suggested by the survey, assembling evidence that can be used to evaluate multiple forms of impact would fit with decision-makers' expressed priorities for evidence. While the appropriate types of impact to measure will vary depending on the type of innovation being evaluated, common concerns based on the survey appear to be cost-effectiveness, clinical outcome, and patient safety. However, evidence of impact is necessary but not sufficient for evaluating innovations, as characteristics relating to context (e.g. credible source) and implementation (e.g. changes to resources, staff roles) are also critical, as confirmed by the case study findings. Cost-related evidence may appeal particularly to decision-makers in a context of austerity, and associated budgetary pressures in the health service, by informing decision-makers about which course of action will 'get more bang for your buck'. However, the possibility of social desirability bias, and potential for misunderstanding of the term, means the preference for evidence of cost-effectiveness in particular should be treated with some caution.

Enhancing evaluation methodologies

Evaluation methodologies need to reflect decision-makers' need for diverse evidence and seek to evaluate innovations along multiple dimensions. To maximise the value of evaluation findings to decision-makers, our study suggests the need for novel methodologies that bring together, and explore the relationship between, different dimensions of impact associated

with innovations. To enhance perceived credibility, producers of evidence (e.g. applied health researchers) should seek to work through networks of organisations at the local system and national level (particularly producers of clinical guidance) to increase the potential reach and impact of their research on health care planning and consider how they present findings (e.g. short summaries and visual material are suggested). Given the importance of the credibility of those presenting evidence, developing long-term relationships with users of research to build trust and awareness of local preferences is critical.

Evidence for adopting versus spreading innovations

Innovations that have already been implemented elsewhere are more likely to be favoured (perhaps because they are seen to be lower risk), so evidence of adoption supports further spread. To address concerns about the risk of implementing change, gathering 'pilot' data that can be used to inform decision-making on adoption is also important. To support decisions about adoption, there is a clear role for research infrastructure at the local system level, e.g. Academic Health Science Networks (AHSN) and Collaborations for Leadership in Applied Health Research and Care (CLAHRC), in supporting providers and commissioners with prioritising, piloting and evaluating potential innovations. To support decisions about spread, there is a need to support collaboration at different levels within the health service by prioritising incentives for: crossing professional and service boundaries within organisations; aligning providers and commissioners within local systems; and supporting learning through professional networks at the national level.

Reflections on the 'tipping point' for innovation

In the original study proposal, the study aimed to quantify decision-makers' preferences, including the 'tipping point' of evidence needed to shift stakeholders' views on introducing innovations. We were able to assess the characteristics associated with the type of evidence (further aggregating this into impact, practicability and context), but were not able to

compare this with the strength of evidence. However, this study suggests that sound decision-making on introducing or diffusing innovations is more likely in contexts where: evidence highlighting a range of impacts is available; implementation issues have been anticipated early in decision-making; and there is a receptive local context for evaluating evidence. To help cultivate such a context, organisational leaders need to consider the ways in which the environment surrounding decision-making encourages, or works against, the inclusion and reconciliation of diverse evidence and perspectives.

Funding

This study is part of the Health Foundation's Evidence-Informed Decision-making in Health Service Innovation and Improvement Programme. The Health Foundation is an independent charity committed to bringing about better health and health care for people in the UK.

Ethical approval

This study was considered by the Chair of the UCL Research Ethics Committee on 29 February 2016 and is exempt from the requirement to obtain ethical approval.

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Chapter 1. Introduction

Credit line:

- This chapter draws on the published study protocol: Turner S, Morris S, Sheringham J, Hudson E, Fulop NJ. Study protocol: DEcisions in health Care to Introduce or Diffuse innovations using Evidence (DECIDE). *Implementation Science* 2016;11:48. Paper distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/).

1.1 Introduction

This study was designed in response to a call by the Health Foundation for research that helps to improve the uptake of innovation at scale. The Health Foundation was interested in research that could help to inform development of both novel techniques and guidelines to support innovation diffusion, and evaluation methodologies that better meet the requirements of decision-makers involved in health care quality improvement and innovation. This mixed methods study addressed this need by assessing what is already known about evidence use for innovation from qualitative studies; tracing practices of decision-making through 'real-world' case studies of innovations; ascertaining decision-makers' preferences for evidence; and developing practical guidance to support evidence use in decision-making on innovation.

It is known that a range of evidence informs healthcare decision-making, from formal research findings (Dobbins et al. 2007) to 'soft intelligence' or local data (Martin et al. 2015), as well as practical experience or tacit knowledge (Gabbay and Le May, 2011). However, cultural and organisational factors often prevent the translation of such evidence into practice (Cooksey 2006). As well as the perceived quality of the evidence (e.g. due to its source) and

'strength' (as a working definition, the effect or impact shown on health, costs, and patient satisfaction), decisions to implement innovations or improvements in health services are influenced by the wider context in which decision-making is undertaken, including processes at the micro (individual/group), meso (organisational/system), and macro (regulatory/policy) levels (Fulop and Robert, 2015). Following Yin (2013), we treat 'context' as a multi-faceted concept that covers a range of influences on the phenomena or 'case' of study (using evidence for innovation), from micro level processes such as perceived credibility of those presenting evidence through to macro level policy priorities and regulatory rules. Using a multi-level framework, this study analysed how interactions between the available evidence and processes at the micro and meso levels influence decisions to introduce or diffuse innovations. We adopted a process-based approach (Langley, 1999) to the study of evidence use, defining 'use' as the ways in which different stakeholders and organisations interact with evidence over time during decision-making processes.

This study addressed a need for new research in three areas. First, at the micro (individual/group) level, there was a need to determine the combinations of evidence, including practical or local evidence (Evans et al. 2013), used by a range of stakeholders in decision-making, including different professions (Kyratsis et al. 2014) and functions or roles (Clarke et al. 2013). At the individual level, some studies suggest that research evidence plays a lesser role in decision-making relative to other information (Kapiriri et al. 2007), such as data on local needs (Evans et al. 2013). At the group level, access to and preferences for evidence vary by professional group, e.g. hospital staff's professional background (Kyratsis et al. 2014), while service payers (commissioners) appear to value practical evidence (Clarke et al. 2013). How evidence is presented also influences its use (Orton et al. 2011). Furthermore, evidence is itself constructed through professional practice, in which different interests, framing of the problem, and personal experience and anecdote all play a role in

establishing its relevance and credibility (Green, 2000). Thus, further research was needed at the micro level to determine how different stakeholder groups, in different contexts, use evidence to inform decision-making on innovation, including their responses to different forms of evidence, and how potential tensions between codified research outputs, practical evidence (e.g. local audit data), and personal experience or tacit knowledge (Turner et al. 2014a), are reconciled as different forms of evidence are combined in decision-making.

Second, at the meso (organisational/ local system) level, there was a need to examine how evidence informs 'real-world' decision-making processes through in-depth case studies (Kyratsis et al. 2014), taking into account organisational processes for sharing knowledge (Lowson et al. 2015) and other contextual factors, including strategic fit with local priorities, financial sustainability, and public opinion (Orton et al. 2011). Organisational processes influence how evidence is acquired, shared, and applied to inform decision-making. For instance, implementation of national clinical guidance by National Health Service (NHS) Trusts was found to involve senior engagement, clear organisational processes, and use of committees and hierarchies, resources, and information systems (Lowson et al. 2015). Equally, weak processes for transferring knowledge may act as barriers to its use in decision-making (Orton et al. 2011).

In response to these organisational challenges, a variety of 'agencies' at the meso and macro levels may support the transfer or mobilisation of knowledge (Davies et al. 2015). Further research was needed at the meso level to understand how organisational processes, including the local system or context in which decisions are being made, influence the use and interpretation of evidence, including health professionals' responses. The inclusion of both micro and meso level processes reflects the theorised interaction between levels in quality improvement processes (Fulop and Robert, 2015), i.e. organisational and other contextual

processes may shape professional responses to evidence, while health professionals' responses may influence the adoption of innovation in particular contexts.

Third, studies have shown that stakeholders prefer different types of evidence (including quality and strength) (Kyratsis et al. 2014; Clarke et al. 2013), but little is known about the strength of these preferences, the potential trade-offs between these attributes in relation to different types of innovation, and how preferences vary by type of decision-maker. In addition, little is known about how other characteristics of evidence and other contextual factors inform decisions to introduce or diffuse innovations. Further research was needed to evaluate these preferences, which we investigated using a national survey and discrete choice experiment.

1.2 Research question and objectives

To address the gaps identified in the current literature, and the Health Foundation's call for research, this study addressed the following research question: what is the role of evidence in decision-making on the introduction and diffusion of service innovations in acute and primary care? To address this question, the following objectives for the study were defined:

1. To identify, using a literature review and stakeholder feedback, the factors that influence the use of evidence in decision-making on the introduction and diffusion of innovations in health care;

2. To assess the use of evidence in informing decision-making on the introduction and diffusion of innovation using 'real-world' case studies in acute and primary care;

3. To establish decision-makers' preferences for evidence (types of evidence, quality of evidence, strength of evidence) to inform the introduction and diffusion of innovations;
4. To develop guidance for decision-makers and evaluators to support the evaluation and application of evidence to enable innovation.

1.3 Study overview

This multidisciplinary study uniquely brought together different methodological and disciplinary perspectives (ethnography, organisation studies, improvement science, health economics) to study the role of evidence in decision-making with the aim of meeting these objectives. The following workstreams, which were interdependent and informed one another, were undertaken in relation to each objective. The methods for data collection and analysis are described by workstream in detail in subsequent chapters.

1.3.1 Systematic scoping review

The scoping review of literature, with stakeholder feedback, had two purposes: (a) to map the types of information used to inform decision-making in different contexts and (b) to identify factors at the micro and meso levels that influence how this information informs decision-making on innovation. We obtained stakeholder feedback on the compiled evidence in relation to these purposes using focus groups to identify any gaps or themes that needed to be developed further.

1.3.2. 'Real-world' case studies of decision-making

In-depth case studies were conducted on the use of evidence in 'real-world' decision-making concerning the introduction or diffusion of three service innovations in acute and primary

care. Case studies were chosen because they allow complex phenomena to be studied in-depth, allowing both the case (here, the use of evidence in decisions to adopt innovations) and the context (professional, organisational and local system processes) to be taken into account, as well as interactions between the two (Yin 2013). This approach also addressed a need for ethnographic methods to enable direct observation of 'live' decision-making processes (Kyratsis et al. 2014).

1.3.3 National survey and discrete choice experiment of decision-makers' preferences

Utilising the literature review, stakeholder feedback, and case study data, a survey of providers and commissioners was designed to assess how preferences to introduce or diffuse innovations are influenced by characteristics of the evidence for change, relative to other contextual factors. The first part of the questionnaire elicited preferences for different types and quality of evidence. The second part was a discrete choice experiment that examined preferences for the strength of evidence and contextual factors, and how these preferences varied by types of decision-maker.

1.3.4 Developing guidance to improve evidence use in decision-making

Combining findings from the literature review and focus groups, case studies, and national survey, factors to take into account when seeking evidence to inform decisions to introduce or adopt innovations were distilled into guidance for decision-makers and evaluators working within health services. The guidance describes the combinations of evidence (including type, strength, and presentation) needed to enable innovation, based on what is likely to satisfy different stakeholders in different contexts (e.g. in both primary and acute care and innovation across single or multiple sites).

1.4 Report structure

The report describes the findings from the individual workstreams, with a final discussion chapter pulling together the research findings and policy implications for the study as a whole.

- Chapter 2 describes findings from the systematic scoping review with stakeholder feedback;
- Chapter 3 presents findings from the 'real-world' case studies of decision-making;
- Chapter 4 describes the national survey of decision-makers' preferences and compares key themes with case study findings;
- Chapter 5 describes findings from a discrete choice experiment of decision-makers' preferences for evidence;
- Chapter 6 provides an overview of the development of the decision-making guidance;
- Chapter 7 presents a concluding discussion of study findings and their implications for research and policy and practice.

Chapter 2. Systematic scoping review with stakeholder feedback

Credit line:

- This chapter draws on a published paper: Turner S, D'Lima D, Hudson E, Morris S, Sheringham J, Swart N, Fulop NJ. Evidence use in decision-making on introducing innovations: a systematic scoping review with stakeholder feedback, *Implementation Science*, 2017 Dec;12(1):145. Paper distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/).

2.1 Introduction

A range of evidence informs decision-making on innovation in health care, including formal research findings (Dobbins et al. 2007), local data (Martin et al. 2015) and professional experience (Gabbay and Le May, 2011). However, cultural and organisational factors often prevent the translation of evidence for innovations into practice (Cooksey, 2006). The health care decision-making and innovation studies literature has shown that the role of evidence in decision-making on innovation is influenced by the characteristics of evidence, e.g. accessibility of economic evaluation (Merlo et al. 2015), and processes at the individual level. Individual level processes include preferences for evidence (Kyratsis et al. 2014), how it is interpreted (Gallego et al. 2008; Williams and Bryan, 2007; Teng et al. 2007), and individuals' credibility, personality and experience when sharing evidence (Ahmad et al. 2012; Nembhard et al. 2015; Armstrong et al. 2013). The role of processes at the wider professional group (e.g. preferences, professional interests and power dynamics) and organisational level has been reviewed with regard to the diffusion of innovations (Greenhalgh et al. 2004; Williams, 2011), but not in relation to their impact on how evidence informs adoption decisions specifically.

In diffusion of innovations theory, decision-making is said to pass through five stages in relation to innovations (Rogers, 1995). In relation to the scope of this review, evidence is relevant at the stages of 'knowledge' (information sought about the innovation), 'persuasion' (information sought to reduce uncertainty, e.g. scientific evaluations, peers' opinions) and 'decision' (evidence of trialling of new idea). While diffusion of innovations theory highlights that a variety of evidence influences adoption decisions, it does so predominantly in relation to the individual's attitude toward an innovation to the neglect of decision-making processes at wider contextual levels (Cranfield et al. 2015). There is no consensus about the ways in which processes at the professional group (Kyratsis et al. 2014; Evans et al. 2013; Clarke et al. 2013; Green, 2000), organisational (Lowson et al. 2015) and local system level (Davies et al. 2015), influence the use of evidence in decisions to adopt innovations.

The purpose of this chapter is to understand how processes at different levels influence the use of evidence in decision-making on health care innovations by (1) mapping processes at the professional, organisational and local system levels which influence how evidence informs decision-making on innovation and (2) collecting stakeholder feedback to validate and develop the findings. The systematic scoping review focused on primary qualitative studies as these were appropriate for understanding how and why contextual processes at different levels influence evidence use in decision-making. Qualitative studies can capture this context by focusing on processes and experiences of innovation at the professional group, organisational (defined as an organisation's decision-making systems, culture and management practices) and local system level (the embedding of organisations in the wider environment or context) (Ferlie and Shortell, 2001).

2.2 Methods

Literature on evidence use in decision-making on innovation was identified, selected and analysed using a scoping review approach (Arksey and O'Malley, 2005; Levac et al. 2010; Daubt et al. 2013), which involved six stages: (1) identifying the research question, (2) defining the scope of the review, (3) study selection, (4) charting the data, (5) reporting the results and (6) stakeholder consultation. We used recommendations for undertaking each stage systematically (Levac et al. 2010), including using two researchers to independently review articles for inclusion and defining the consultation stage's purpose and types of stakeholder to involve. The review was completed in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The six stages used in this review are described below.

2.2.1 Identifying the research question

This review's guiding research question was 'How do decision-making processes at the professional group, organisational, and local system level influence the use of evidence in decisions to adopt innovations in acute and primary health care?' Selection of these three levels reflects the theorised influence of these aspects of the local context during quality improvement processes (Cranfield et al. 2015; Fulop and Robert, 2015), with our specific research question seeking to understand their influence on evidence use in decision-making on innovation. In addressing this question, we defined the terms 'evidence', 'innovation' and 'decision-making' and how they would be captured in the review.

Evidence

The conceptual literature on evidence use highlights that a range of evidence may impact on decisions about innovation or improvement. The evidence-based medicine (EBM) movement,

and its extension into other areas, including health care management, has been influential in how evidence is conceptualised. EBM involves providing care by integrating individual clinical expertise, evidence from systematic research and patient choice (Sackett et al. 1996). Those critical of EBM suggests that alternative forms of evidence, such as patients' views on innovations (Fudge et al. 2008), and qualitative research that provides insight into real-world contexts and participants' interpretations (Green and Britten, 1998), should be recognised for their role in decision-making. We adopted an inclusive and broad working definition of evidence that included diverse forms of information, including academic research findings, patient experience, professional opinion, clinical guidance and local data.

Innovation

Innovation was defined broadly as the development and implementation of new ideas, products, processes or organisational forms (Schumpeter, 1934; Van de Ven, 1986). Our use of the term in relation to health care encompasses service or quality improvement. No claim was made a priori about innovation efficacy or effectiveness, as this was assumed to vary by innovation and may not have been assessed. Although the term 'innovation' may not be used in everyday practice to describe changes to product, process or organisational form, these were still considered as potential forms of innovation. These include product innovations such as robotic surgery, process innovations including hospital-wide patient safety programmes and new organisational forms, e.g. reconfiguration of acute stroke services. Innovations might relate to service provision or commissioning and be introduced at a system-wide level or be locally led. Studies of innovations that were not discussed in relation to their adoption within a service or delivery context were excluded, e.g. early phase development of new drugs or medical devices. Conversely, a study of pharmaceutical innovation we included examined decision-making on adopting new drugs for use in clinical practice (Williams and Bryan, 2007).

Decision-making

This review included decisions about whether to adopt new innovations or spread existing innovations up to the point of implementation (implementation itself was considered relevant where it influenced adoption decisions). We adopted a 'processual' approach to the study of decision-making on innovation, understanding it as an ongoing, often non-linear process that unfolds over time (Robert et al. 2010). Different approaches to decision-making are possible which may influence how evidence is used, ranging from more authoritarian to participatory (Rogers, 1995; Culyer and Lomas, 2006). We focused on decision-making at the micro (professional) and meso (organisational/local system) levels.

2.2.2 Defining the scope of the review

The scoping review aimed to identify examples of evidence use in decisions about innovation (or related improvement activity) from studies conducted in relation to the UK NHS and health systems internationally. The review's focus was on the influence of interactions between evidence use and processes at the micro (professional) and meso (organisational/system) level on decisions to introduce or diffuse innovations. Selection criteria were defined a priori and applied by two researchers to the title/abstract, and then full text, of potentially relevant papers. The review focused on decision-making on innovations in health care services (acute, primary) and multi-sectoral studies including health care services. Studies that examined decisions about innovation or other improvement activities, but did not refer to evidence use, were excluded. Only studies conducted in Organisation for Economic Co-operation and Development (OECD) countries were included to aid comparability of health care systems. Only English language references, published since 2006, were included. This date was chosen because it coincided with recognition among policymakers and researchers of the challenges of mobilising evidence in health care, including concerns about

traditional models of translating research into practice (Cooksey, 2006) and critical perspectives on EBM (Lambert, 2006). Studies of decision-making at the national (macro) health system level and public health or prevention were excluded as reviews exist in these areas (Oliver et al. 2014; Orton et al. 2011; Kneale et al. 2017). This review focused on decision-making on innovation by professional groups and organisations within local health systems, rather than the related field of policy development, including intervention design, at the national health system level (Lavis et al. 2012). An online bibliographic database (EPPI-reviewer 4) was used to store and manage references (Thomas et al. 2010).

2.2.3 Study selection

To identify relevant literature, social science and biomedical databases were searched in May 2016. A search strategy was created for MEDLINE. Search terms in the title or abstract were 'innovation or improvement', 'decision or decision-making', 'evidence' and 'health care'. Medical Subject Headings (MeSH) were also used, which included 'diffusion of innovation', 'translational medical research', 'Evidence-based practice', 'knowledge bases' and 'decision-making, organizational'. The search was adapted for other databases: Embase, PsycINFO, Scopus, Health Management Information Consortium (HMIC), and EBSCO Business Source Complete. Suggestions of relevant literature were made by the wider study's project advisory group (PAG) (Turner et al. 2016a), which included academics with relevant expertise, practitioners with clinical insight on delivering service change and patient representatives.

2.2.4 Charting the data

A data extraction framework was used to chart information from the included studies, including setting, type of innovation, characteristics of evidence and quality assessment (Appendix 1, Table 19); and study type and methods, aim and objectives, and professional,

organisational and local system processes that influenced evidence use (Appendix 1, Table 20).

2.2.5 Reporting the results

The review combined aggregative/integrative and configurative/interpretative approaches to the synthesis of evidence (Dixon-Woods et al. 2005; Gough et al. 2012; Noblit and Hare, 1988). First, thematic analysis by two researchers was used to summarise findings from existing studies (aggregative) by tabulating data extracted from the qualitative studies. Analysis focused on the types of evidence referred to multi-level influences on evidence use and sector/stakeholder perspective. Second, using meta-case analysis of the compiled literature, new ideas and themes, i.e. novel third order concepts (Britten et al. 2002), were developed during the review (configurative). The concept of interactions between levels (professional, organisational, local system), and their influence on evidence use, emerged from the meta-case analysis in which relationships between the tabulated themes were explored.

2.2.6 Stakeholder consultation

To test and develop the results from the scoping review, four focus groups, with 18 participants in total, were organised with mixed stakeholder groups comprising acute care providers (4), primary care providers (3), service commissioners (3), patient representatives (5) and knowledge intermediaries (3). Reporting of the focus groups was informed by consolidated criteria for reporting qualitative research (COREQ) checklist (Tong et al. 2007). Focus group participants were identified using different channels. This included web-searches for examples of innovation in relation to the English NHS and inviting participants associated with these activities. The study's project advisory group was utilised to identify

potential participants. The focus groups, lasting two hours each, were structured using discussion topics derived from preliminary analysis of the literature review's results (Appendix 2). The discussion topics were piloted with the study's project advisory group and NIHR CLAHRC North Thames' research advisory panel. Participants read an information sheet and provided informed consent. Prior to the day, the participants were emailed a one-page document which gave an overview of the discussion topics and working definitions of key terms (e.g. organisational processes).

The participants were asked to come prepared to discuss a recent example of innovation that they had been involved in. The themes were discussed in relation to those innovations to examine their 'real-world' relevance and to identify any gaps in the literature review. The focus groups were facilitated by two researchers (ST and DD), with one researcher leading each discussion topic and the other asking follow-up questions or prompting as necessary. Participants were encouraged to have a group conversation and not just respond to the researchers. The discussions were audio-recorded and professionally transcribed. Thematic analysis was applied to the focus group transcripts mirroring the literature review's themes; the resulting discussions were used to confirm or further develop the preliminary findings.

2.3 Results

The database search produced 1816 results, after duplicates were excluded. After screening by title and abstract using the inclusion and exclusion criteria, 184 articles were identified for full-text screening, 23 of which were selected for data extraction (Figure 1). A manual search for relevant studies conducted after the database search, based on searching key journals (*Social Science & Medicine*, *BMJ Quality & Safety*, *Implementation Science*, *Sociology of*

Health & Illness) and suggestions by PAG members, including book chapters, identified eight additional studies for inclusion, meaning 31 studies were reviewed.

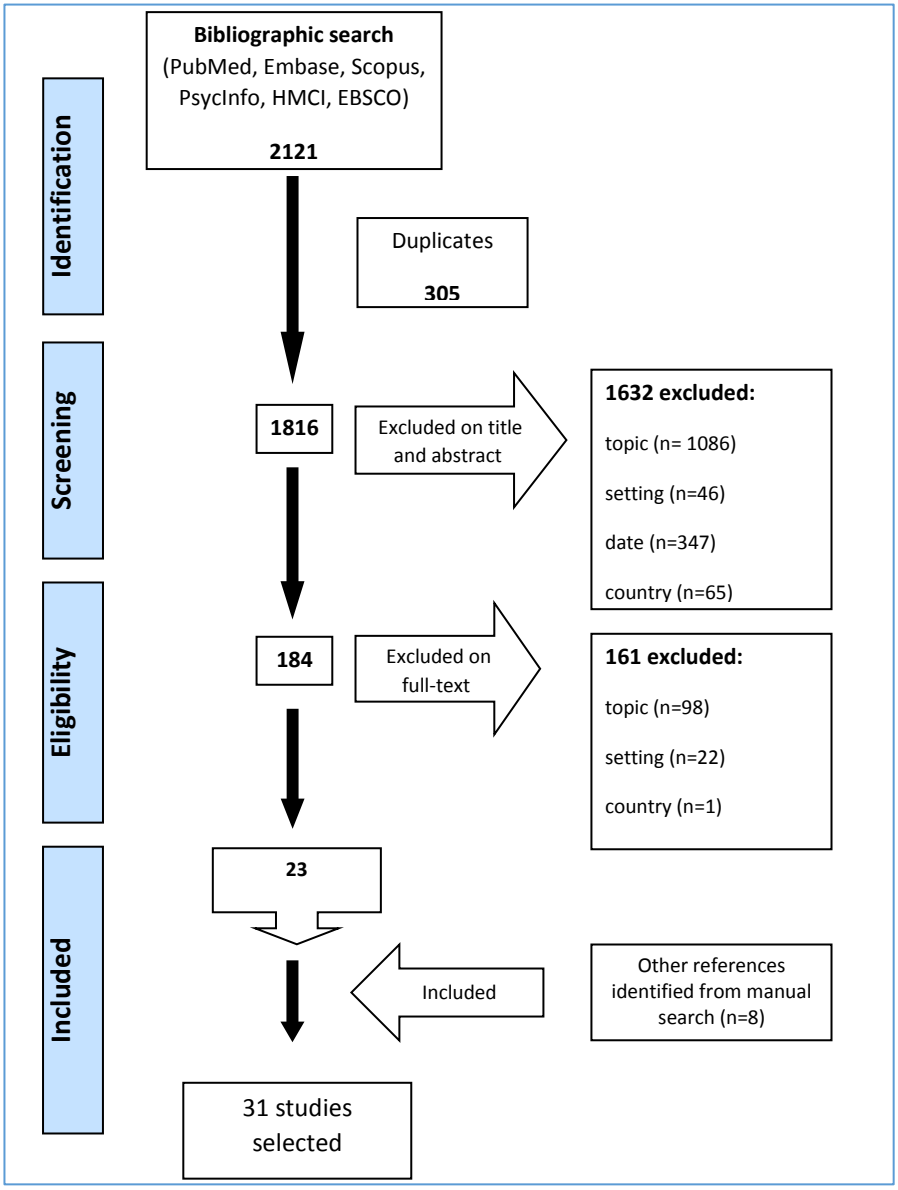

Figure 1: PRISMA flow diagram

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The quality of studies was assessed using the Critical Appraisal Skills Programme (CASP) (2017) Qualitative Checklist, which includes nine questions for assessing the validity of study findings numerically and a tenth, non-quantifiable question for judging the overall relevance or value of the research (recognising that the checklist represents a series of inter-related questions for assessing study quality). After reviewing all of the studies using the CASP checklist, we agreed that seven studies should be considered lower quality studies. This assessment took into account how each study performed against the numerical questions and making a value judgement about the quality of each study as a whole (question ten). Those seven studies were excluded from the thematic analysis due to low confidence in the validity of results (studies shown in 'greyed out' rows in the data extraction tables, Appendix 1, Tables 19 & 20).

2.3.1 Study characteristics

The majority of the studies was conducted in the UK (14), followed by Canada (5), Australia (5), the USA (3), Sweden (1) and Italy (2). An interview-based study (Bouwman et al. 2008), of lower methodological quality, included participants from Australia, Denmark, Ireland, the Netherlands, Slovenia, Switzerland, Spain and Sweden. The types of innovation examined were technological innovation (6), staff and patient involvement in quality improvement (4), responses to clinical guidelines or tools (7), organisational innovation including quality improvement programmes (6) and technology assessment and priority setting (8). The studies covered acute care (16), primary care (11), commissioning (8), health and social care (2) and mental health (1). Nearly all (28) of the 31 studies employed qualitative interviews. In combination with interviews, these studies used observations (9), documentary analysis (9), focus groups (4) and surveys (5). Of the remaining three studies, two relied on observations and one did not specify data collection methods within a case study approach. Research

evidence was the most cited form of evidence in decision-making on innovation (19 studies); other forms of evidence were professional experience (15), local data (12), national guidance (7), translational information, e.g. education/ summaries (4), patient involvement (3) and expert opinion (3).

There were 24 studies of sufficient quality to be included in the thematic analysis. Thematic analysis examined how processes at different levels (professional, organisational, local system) influenced the use of evidence in decision-making on innovation.

2.3.2 Professional level processes influencing evidence use

Preferences for evidence

Preferences for evidence varied by professional group and across health care sectors. Service payers (commissioners) drew on a range of evidence, including alternative evidence such as patient stories, and prioritised local need for innovations over research evidence (Evans et al. 2013; Wye et al. 2015). In the acute sector, nurses tended to combine practical ('how to') and scientific ('principles') knowledge, while medical professionals placed greater weight on the latter (Kyratsis et al. 2012). In primary care, general practitioners (GPs) did not necessarily privilege scientific evidence; research-based studies were contested by GPs as results were weighed up against their knowledge of patient need (Prosser and Walley, 2007). Evidence can be given different meanings by different stakeholders resulting in uncertainty about whether evidence was lacking, was not of good quality, or was limited (Nedlund and Garpenby, 2014).

Professional interests

Some studies highlighted that decisions to develop and adopt innovations reflected professional interests. A study of surgical innovation found that surgeons 'spoke for' patients

by introducing new techniques that would 'make sense' for them, even though supporting data were lacking (Danjoux et al. 2007). A study of remote care (telecare) found that evidence was actively constructed and adapted to fit managers' agendas (Hendy and Barlow, 2013). There was recognition that evidence could be 'gamed' whereby evidence was found to support decisions that had already been taken (Bowen et al. 2009). Professional interests could influence how different stakeholders responded to evidence. A primary care study of the failure to implement externally mandated rules, National Service Frameworks, was linked by GPs to concerns about the accessibility of evidence (e.g. document length, complexity, local applicability), but the authors suggested these were mere 'constructions' because the frameworks did not fit in with GPs' professional identities (Checkland et al. 2007).

Power dynamics

Power dynamics between different professional groups influenced evidence use. A study of interventions to improve prescribing practice in primary care found that managers leading the programme privileged scientific evidence, while attempting to marginalise GPs' clinical and experiential knowledge (Prosser and Walley, 2007). Similarly, managers used evidence to decline clinicians' 'unreasonable' requests for innovation in the area of robotic surgery (Mele et al. 2013). Conversely, a study of committees considering technology coverage found that clinicians, especially those with powerful personalities, were able to influence the committees (Williams and Bryan, 2007). Even where decision-makers agreed on the evidence base for an intervention, there could be disagreement based on practitioner and patient judgements about how such evidence should be used to make decisions and/or change services (Rycroft-Malone et al. 2013).

The stakeholder feedback indicated that professional processes influenced decision-making. They confirmed that professional credibility of those presenting evidence, as well as clinical

leadership and 'soft' persuasion skills and relationship-building (including 'endless discussions'), encouraged evidence to be taken seriously and acted upon. There was recognition that preferences for evidence varied by stakeholder and therefore the same evidence often needed to be framed differently to influence different stakeholders, particularly the needs of commissioners or funders of potential innovations, 'as everybody has different buttons'. The ongoing process of building relationships during decision-making was more apparent in the stories of innovation shared in the focus groups than in the literature review, due perhaps to a lack of processual studies in extant literature (Kyratsis et al. 2014).

2.3.3 Organisational level processes influencing evidence use

Organisational roles

Organisations contributed to assessing non-clinical aspects of innovation. Along with evidence of clinical need or effectiveness, budgetary and financial issues were important in decision-making (Evans et al. 2013; Kyratsis et al. 2012). Organisations enabled stakeholder involvement in decision-making, including staff (Nembhard et al. 2015), which aided subsequent implementation (Ahmad et al. 2012). Stakeholder involvement in quality improvement projects, particularly patients and the public, was supported by effective communication channels and a 'non-hierarchical' environment for decision-making (Armstrong et al. 2013). Centralised approaches to decision-making, coupled with a lack of communication, inhibited evidence use by planners within regional health authorities in Canada (Bowen et al. 2009). Organisations limited innovations proposed by clinicians and other stakeholders where evidence was lacking: funding for surgical innovation was cut by a hospital due to a lack of evidence on cost, safety and effectiveness, despite local surgeons' perceptions that it improved patient outcomes and safety (Danjoux et al. 2007).

Organisational facilitators

A number of organisational facilitators to evidence use in decisions about innovation were identified. In a study of technology adoption within hospitals, access to and use of research evidence in decision-making was enabled by organisational processes, including infrastructure redevelopment projects and an emphasis on collaboration (Kyratsis et al. 2014). In a study of priority setting within a provincial health services authority, evidence use was enabled by strong leadership, a culture of openness and learning, and commitment to being 'data-driven' (Teng et al. 2007). The importance of research culture was borne out by a study of a multi-systemic therapy, where entrepreneurial leaders of adopter sites suggested that they could make decisions to adopt innovations more readily than non-adopters because they were more aware of the evidence base (Carstens et al. 2009). Innovation was supported by creating leadership for change, which included marketing evidence of benefit and building a supportive community of practice (Wade et al. 2016). Another study highlighted the importance of involving both managers and clinicians in decision-making (Spyridonidis and Calnan, 2011). The chairs of decision-making committees moderated the use of evidence type. A study of networks responsible for enhancing multidisciplinary cancer care found that some chairs steered the conversation more to scientific and technical themes at the expense of narrative perspectives (Harden and Fulop, 2015).

Organisational barriers

Underlying organisational issues could act as barriers to introducing innovations (Checkland et al. 2007). A lack of time, resources and pressures inhibited evidence use (Bowen et al. 2009). A lack of authority to make changes to processes also influenced decision-making (Teng et al. 2007). In some contexts, organisations were not receptive to change. A study of telehealth services found that its spread was limited in two out of five cases by a lack of alignment between the adopting organisations' values and managers' agendas (Hendy and

Barlow, 2013). One study suggested that those proposing innovations should ensure these were aligned with other activities already familiar to decision-making stakeholders (Rycroft-Malone et al. 2013). Another study found that involvement processes for enabling patient organisations to participate in funding decisions were inadequate for including patients' experiences (Lopes et al. 2015).

Organisational politics

Organisational politics influenced the type of evidence accessed and how it was interpreted. The use of economic evaluation by committees making technology coverage decisions was limited by unclear relationships with resource allocators, an explicitly political decision-making process, and poorly specified decision-making criteria (Williams and Bryan, 2007). A study of commissioners' information use (Wye et al. 2015) found that organisational processes changed the original information gathered during decision-making (evidence was re-framed over time to suit competing agendas).

The stakeholder feedback confirmed that an innovation was more likely to be adopted when it was aligned with organisational needs, e.g. when it is a priority (including meeting external targets or initiatives) and it addressed a clear, practical problem. The focus groups elaborated on the influence of the decision-making approach taken in relation to innovations of different scales. There was recognition that large-scale change was difficult because a wide range of stakeholders were often involved and that evidence often showed both pros and cons. The stakeholders discussed different approaches to organisational decision-making; 'autocratic' as opposed to 'democratic' organisations were better placed to introduce change, but once a decision had been made, there was the challenge of getting a change accepted and having a culture that valued evidence was deemed important for this.

2.3.4 Local system level processes influencing evidence use

External pressures

External pressures, including system restructuring (Rycroft-Malone et al. 2013), meeting policy targets (Kyratsis et al. 2014) and budgetary constraints (Gallego et al. 2008; Evans et al. 2013; Wade et al. 2016), influenced how evidence was used in decisions about innovation. The political context influenced decision-making (Teng et al. 2007), e.g. decisions needed to stand up to external scrutiny (Wye et al. 2015). Such pressures could lead to an emphasis on 'what works' in making adoption decisions over use of rigorous evidence (Kyratsis et al. 2014). One study reported staff being overwhelmed when using evidence to make decisions about changing services due to competing priorities and variable managerial support during major external change (Rycroft-Malone et al. 2013). A context of austerity could encourage evidence to be viewed differently. To receive funding, home telehealth services needed to demonstrate savings or efficiencies as well as evidence of benefit (Wade et al. 2016). Due to the need to consider rationing of the health care system, another study argued that decision-makers viewed economic evaluation narrowly, based on budgetary impact and costs rather than cost effectiveness (Gallego et al. 2008). Another study found that financial and resource issues facing commissioners made them more conservative when changing services in response to new national guidelines (Spyridonidis and Calnan, 2011).

Pan-regional organisations

Pan-regional organisations influenced how evidence was used in decisions about innovation. On the one hand, such organisations had a downward influence on evidence use in local decision-making. A study of a collective primary care organisation showed how it influenced GPs' prescribing practice by emphasising evidence that appealed to this professional group (i.e. improving quality through prescribing targets), while deemphasising the contribution of

the interventions to cost containment which appealed less to GPs (Prosser and Walley, 2007). A national improvement programme was the source of evidence for improving ward productivity, which had a national organisational profile and established links with providers, aiding adoption (Robert et al. 2011). However, a regional health technology advisory group in Sweden had less influence on decision-making because it was not embedded sufficiently in local decision-making (Nedlund and Garpenby, 2014). On the other hand, an upward relationship from the organisational to local system level existed whereby pan-regional organisations helped legitimise local innovations or encourage disinvestment. Hospitals' participation in a national improvement campaign afforded external validation of decision-makers' opinions at a local level, aiding programme commitment (Mele et al. 2013). One Canadian study found that a regional body was used by a hospital to justify withdrawing funding for an innovation, based on a perceived lack of evidence (Danjoux et al. 2007).

Widening stakeholder involvement

Participation in external systems or networks enabled a wider range of potential stakeholders to inform decision-making on innovation. However, taking into account a range of external stakeholders' views could hinder implementing innovations based on formal evidence alone; the politics of decision-making could be more important than evidence, including the assessment of likely public perceptions of decisions taken (Hendy and Barlow, 2013). Decision-making could be enhanced through the use of deliberative involvement processes enabling multiple stakeholders to participate (Lopes et al. 2015).

The stakeholder feedback indicated that organisations at the local system level played an important role in enabling innovation. The backing of research organisations and other knowledge intermediaries, e.g. AHSNs and CLAHRCs, provided a facilitating role – one participant referred to them as 'ambassadors' for innovation – that could help to bring

together relevant stakeholders. The role of intermediaries in mobilising evidence for innovations by brokering social relationships came through more clearly in the focus groups than in the literature review, possibly because studies of knowledge mobilisation tend to consider implementation processes (which were excluded from the review) rather than adoption decisions (Davies et al. 2015). The focus groups confirmed the importance of the political context, especially perceived pressure to reduce or control costs, and the need for evidence for innovations to align with those setting the political direction.

2.4 Discussion

2.4.1 Summary

The systematic scoping review described in this chapter is the first to examine how processes at multiple levels (professional, organisational, local system) influence evidence use in decision-making on innovation. An overview of the themes identified is provided in Table 1. At the professional level, preferences vary by professional group and health service setting. Commissioners favoured evidence derived from contact with colleagues or professional 'networking', combined with service user involvement and assessment of local needs rather than research evidence. Doctors in acute settings preferred research evidence, while those working in primary care emphasised clinical and experiential knowledge of patients' needs. Preferences for non-research evidence were partly due to barriers to using some forms of research, e.g. cost analyses, or a perceived lack of formal evidence for making the decision at hand. Professional interests, and dynamics of power between professional groups, shaped the construction, interpretation and application of evidence during decision-making on innovation. Organisational roles included influencing the culture of evidence use (e.g. encouraging decisions to be data-driven), assessing non-clinical aspects of evidence (e.g.

financial impact of innovation) and enabling stakeholder involvement. At the local system level, the embedding of pan-regional organisations shaped innovation decision-making at lower levels, while external pressures could encourage particular types of evidence (e.g. cost analyses) or inhibited its use. The politics of decision-making, e.g. linked to the financial context in which innovations were being considered, was an important influence on evidence use at all levels.

Table 1: Overview of the themes identified through the systematic scoping review

<table>
<tr><th colspan="3">Themes</th></tr>
<tr><th>Professional level</th><th>Organisational level</th><th>Local system level</th></tr>
<tr><td>Preferences for evidence:</td><td>Organisational roles:</td><td>External pressures:</td></tr>
<tr><td>• Varies by professional group and across health care sectors.</td><td>• Limit innovations where evidence lacking, assess finance and budgetary issues, and enable stakeholder involvement.</td><td>• Influenced how evidence was used in decision-making.</td></tr>
<tr><td>Professional interests:</td><td>Organisational facilitators:</td><td>Pan-regional organisations</td></tr>
<tr><td rowspan="2">• Influence professional groups' preferences for innovations and responses to evidence.</td><td rowspan="2">• Being 'data-driven', well informed to take risks, strong leadership and structures for stakeholder involvement.</td><td>• Downward influence on evidence use in local decision-making.</td></tr>
<tr><td>• Upward relationship whereby pan-regional organisations legitimised innovations/encourage disinvestment at organisational level</td></tr>
<tr><td>Power dynamics:</td><td>Organisational barriers:</td><td>Widening stakeholder involvement:</td></tr>
<tr><td>• Choice of evidence, its interpretation and use in adoption decisions negotiated.</td><td>• Time, resources and pressures; authority to implement change; centralised approach to decision-making.</td><td>• External networks enable wider range of potential stakeholders to inform decision-making.</td></tr>
<tr><td rowspan="2"></td><td>Organisational politics:</td><td rowspan="2"></td></tr>
<tr><td>• Shapes selection and interpretation of evidence.</td></tr>
</table>

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2.4.2 Multi-level interactions and their influence on evidence use

Much of the existing literature on evidence use in decision-making on innovation has focused on processes at a particular level or not been explicit about the need to study processes at different levels (a notable exception is Prosser and Walley's (2007) study of the ways in which a primary care organisation attempted to influence the prescribing strategies of local GPs). Our synthesis of the current literature instead suggests the importance of the metaphor of a 'system' or 'ecology' to encompass the multi-level influences on evidence use in decisions about innovation. The importance of interactions between levels in influencing evidence use has emerged from our meta-case analysis of the synthesised literature. A map of processes at each level, and influence of the interactions between levels, is presented in Figure 2.

The figure shows interactions between evidence use and processes at different contextual levels (professional, organisational, local system). At the professional level, evidence is constructed and interpreted by members of professional groups. Professional groups can have differing preferences, self-interests and power relationships with other groups with regard to the use of evidence in decision-making. At the organisational level, organisations establish requirements for evidence to support decision-making and select evidence for informing decisions. Organisations have a number of roles in enabling evidence use; organisational barriers, facilitators and politics may shape the incorporation of evidence in decision-making. At the local system level, evidence is validated (e.g. endorsed by pan-regional bodies) and results are tailored to different local groups and organisations. Pan-regional groups can widen stakeholder involvement in decision-making. There are interactions between levels: professional groups apply evidence at the organisational level, while organisations enable professions to access and use evidence; organisations use local systems' views on evidence to legitimise innovation or service disinvestment; and local system processes place pressure on

the use of evidence for innovation (e.g. signalling the need for innovation or service disinvestment).

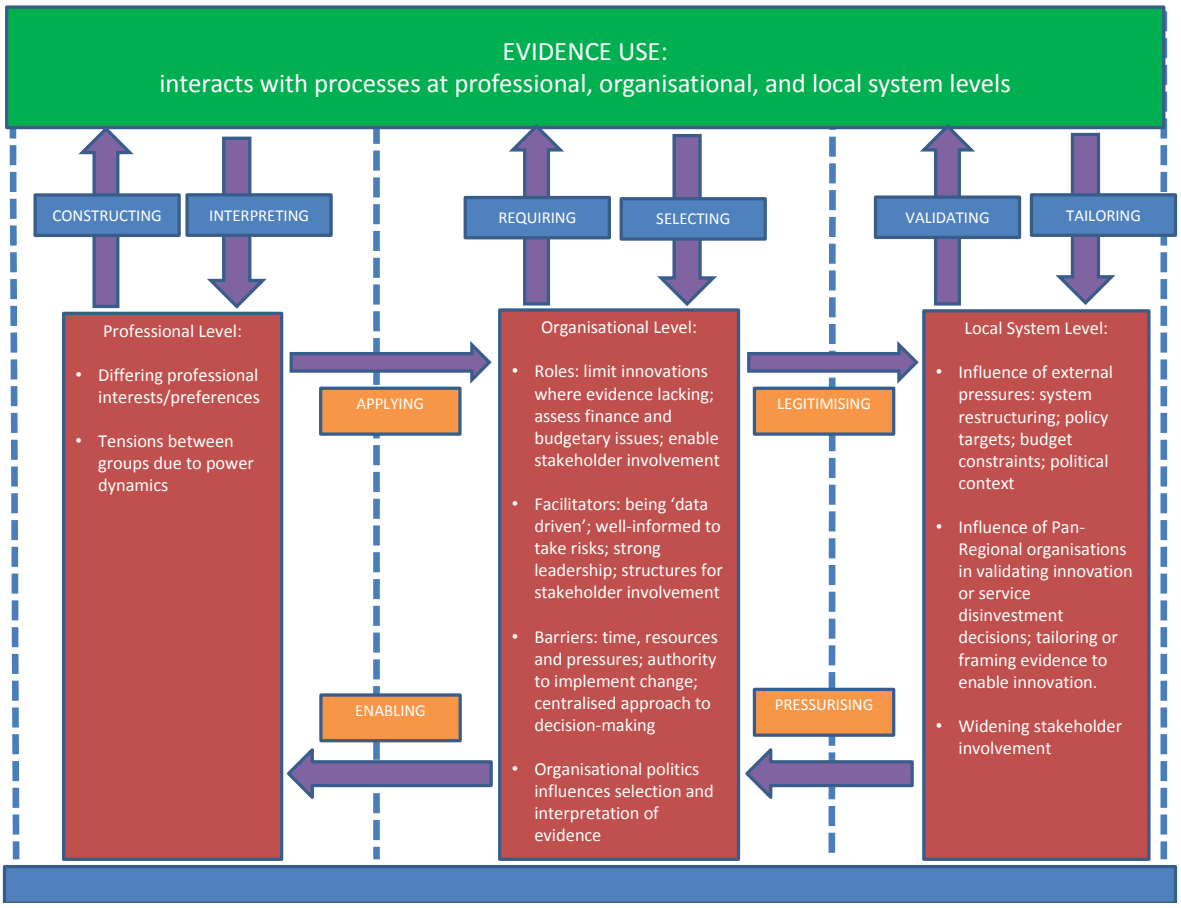

Figure 2: Interactions between evidence use and processes at different contextual levels

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Adopting a multi-level perspective develops diffusion of innovations theory in two ways. Firstly, the decision-making agent is often more diffuse than the individual unit identified in current theory. Multiple stakeholders, including different professional groups, provider organisations and local system intermediaries, can inform adoption decisions collectively, particularly in relation to major system change in health care. Secondly, the analytical distinction found in diffusion of innovations theory between evidence, on the one hand, and

decision-making agent on the other, should be reconsidered to account for the ways in which these phenomena are mutually defined (e.g. evidence informs decision-making when mobilised by health professionals, organisations or local system intermediaries, while such agents draw on different types of evidence to engage with and exert influence on decision-making).

2.4.3 Implications for research

The review suggests implications for how evidence use in decisions about innovation is studied by researchers. Despite critiques of EBM emerging since the mid-2000s, rationalist conceptions of evidence based on this approach continue to inform many primary studies of evidence use in decision-making. This is apparent in discussions by researchers of 'hierarchies' of evidence, where research evidence is still privileged relative to other forms of information or ways of knowing. In such studies, endorsement of a hierarchy among different types of evidence may be implicit or explicit. For example, Evans et al. (2013) were critical of the lack of use of 'high-grade' research evidence by local commissioners on Welsh Health Boards (often due to political and budgetary pressures), highlighting the potential effect on patient care, outcomes and resource use where research evidence was lacking and decision-makers relied on local evidence. This conclusion reflects scholarship advocating EBM whereby the quality of 'scientific' evidence (using recognised and reproducible methods) should be prioritised over local, 'colloquial' evidence (Culyer and Lomas, 2006). Others question the need for research to demonstrate quality according to EBM standards (Lambert, 2006), with pluralistic analyses that take account of multiple effects of change highlighted as one potential cost (Learmonth, 2008).

Rather than evaluate the 'quality' of evidence through an EBM frame which tends to privilege a clinical perspective and formal evidence of effectiveness (Sackett et al. 1996), we

suggest that other forms of evidence and stakeholder perspectives are recognised as contributing to decision-making on innovation in their own right and on their own terms. As the focus groups highlighted, this inclusive approach would reflect the burgeoning forms of evidence now available to decision-makers (e.g. non-health care industry evidence, patient stories, feedback from user groups, reuse of existing data, case studies, infographics, lay summaries and evidence to support implementation). We suggest that such evidence diversity places a responsibility on decision-makers to be explicit about the types of evidence on which decisions are made, the stakeholder perspectives represented and any areas of uncertainty where evidence is lacking or inconclusive. Improvement work by researchers could focus on developing an explicit framework – which includes guidance on judging diverse evidence and stakeholder mapping – to support this activity. This would allow practitioners to consider whether sufficient stakeholder perspectives, and evidence reflecting those, are adequately represented in decision-making on innovations that often affect multiple groups, especially major system change (Turner et al. 2016b).

While the review found that research evidence was the most cited form of information used in decision-making, three-quarters of the studies also referred to other forms of evidence, including local data and professional experience. Thus, studies at both local and policy level indicate the importance of 'informal' information (Oliver et al. 2014). Further qualitative research on practices of decision-making that highlights how and why different types of evidence come to count during decisions, and tracks the political aspects of decisions about innovation, would be fruitful (e.g. how the validity of evidence is constructed, why some forms of evidence might be prioritised and others marginalised and which professional, organisational and system level interests were influential), as we start to address in the next chapter. In existing research, the 'decision-maker' responsible for making decisions about innovation is often unclear. Future studies should be explicit about the approach to decision-

making taken, how stakeholders were involved, e.g. distinguishing between decision-'makers' and decision 'influencers' (Kneale et al. 2017), and how decision-making processes influenced adoption decisions.

2.4.4 Strengths and limitations

In contrast to systematic reviews, some argue that the need to formally assess the methodological quality of studies in scoping reviews is relaxed (Tricco et al. 2016). However, we suggest this review was strengthened by the quality assessment of the included studies, as an objective was to provide recommendations for policy and practice that were based on robust studies. A further strength of this review was the inclusion of stakeholder feedback on the findings, meaning that we were able to test the practical relevance of the themes identified against 'real-world' accounts of decision-making on innovation. It is acknowledged that the focus groups were conducted at a time of significant concern about NHS funding. Nonetheless, the focus groups highlighted the importance of the financial aspects of innovations; information that showed innovations would reduce costs or be cost neutral was a priority when assessing new and existing innovations, confirming a concern with the financial impact of innovations in more recent literature published since the financial crises (Gallego et al. 2008; Evans et al. 2013; Wade et al. 2016; Spyridonidis and Calnan, 2011). The focus groups suggested that evidence use in decisions about service disinvestment should be disentangled from the broader concept of 'innovation' or 'improvement'. In future research, the attributes and impact of innovations should be clearly defined to avoid forms of change due primarily to financial constraints being associated uncritically with the positive connotations of the term innovation.

The results of the database search indicated that some relevant papers were missing, based on the authors' prior awareness of the field to develop the wider study protocol (Turner et al.

2016a). The manual search produced 8/31 included studies; a suggested reason for this relatively high number is that some terms used to describe innovation or improvement were not included in the database search, e.g. service development, planning, redesign and transformation. An additional manual search of selected management and health policy journals, books and grey literature was undertaken which included these terms; bibliographies of recent and highly relevant papers were also consulted.

2.5 Conclusions

The synthesis of results from primary qualitative studies showed that evidence use in decision-making on innovation is influenced by processes at multiple levels. Moreover, our reading of the synthesised literature suggests that interactions (upwards and downwards) between conceptual levels shape evidence use in decision-making (e.g. professional groups can use local systems to legitimise innovations, while local systems can frame evidence in particular ways to influence activity at lower levels).

We conclude this chapter with recommendations for policy and practice based on the review findings in terms of enhancing the use of evidence in decisions about innovation. First, while a range of evidence may inform decision-making, from research evidence through to local data and professional opinion, key decision-makers should reflect on the types of evidence that are routinely used in decision-making and how this influences the outcome (e.g. how might a preference for local data over research evidence contribute to the perceived risk of introducing innovations?). Second, the role of politics and power in decision-making needs to be acknowledged and skilfully managed. Evidence can potentially have an emancipatory role in lending authority to participants beyond other characteristics (e.g. personal credibility and positional power). To enable this role, organisations need to value challenging evidence and

perspectives and build staff and organisational capacity in acquiring and applying evidence. Third, decision-makers need to consider the ways in which the environment in which decisions are made encourages diverse evidence and perspectives. For example, organisational leaders should consider how to mitigate professional interests and power when developing processes for enabling stakeholder involvement in decision-making.

Chapter 3. Case studies of evidence use in decision-making

3.1 Introduction

Health care is a context where barriers to the adoption and diffusion of innovations are well recognised. A period of 17 years is often quoted as the estimated time lag for translating research evidence into clinical practice, although this average figure hides variation across contexts and necessary lags (e.g. for quality and safety) (Morris et al. 2011). In the UK, policies to address the translation of evidence into practice include developing the research infrastructure for mobilising knowledge, e.g. NHS organisations and university collaborations at the local system level (Walshe and Davies, 2013) and encouraging leadership and accountability for introducing innovations among provider and commissioning organisations (Department of Health, 2012). Internationally, various institutions that aim to mobilise knowledge between the research and practice communities have emerged, e.g. Canadian Institute of Health Services and Policy Research.

The research literature offers a number of reasons to explain the difficulty of translating innovations into practice, some relate more to the strength and quality of *evidence* on innovations, others focus more on the receptivity of the *context* for adopting and spreading innovations. The 'evidence' argument, derived from evidence-based medicine (EBM) (Sackett et al. 1996), claims that the knowledge needed to support the adoption of innovations is lacking, whether this be the types of evidence available, its quality and strength, or the style and format in which it is produced. The argument is that as the quality of evidence available improves, the diffusion of innovation becomes more likely. The 'context' argument suggests that, irrespective of the availability of evidence, features of the decision-making context (e.g. potential adopters' pre-existing beliefs) have a more important influence on innovation adoption and diffusion (Rogers 1995; Greenhalgh et al. 2004).

Finding merit in both of these arguments, the systematic scoping review (chapter 2) argued that the interplay between the available evidence and contextual processes inform decision-making on introducing innovations. The review suggested that evidence use is influenced by contextual processes at multiple levels (professional group, organisational, local system) and the interplay between those levels (Turner et al. 2017). Building on this multi-level framework, the aim of this chapter is to explore *how* and *why* evidence informs decision-making (or why barriers persist) with regard to the introduction or diffusion of 'real-world' innovations in different contexts. We address this aim through case studies of evidence use in decisions to introduce or diffuse three innovations within the UK NHS.

To examine how and why particular types of evidence come to count during decision-making, it is important to conceptualise the processes through which the interplay between evidence and context might take place. In the next section, we draw on EBM, its further development through the 'knowledge mobilisation' literature, and Rogerian diffusion of innovations theory, to explore the interplay between evidence and context. However, we argue that, while these approaches offer important insights about the need to adapt evidence to fit the context (knowledge mobilisation), and the ways in which social processes shape adoption decisions (diffusion of innovations), they neglect to address the social *and* material processes through which evidence influences decision-making on introducing or diffusing innovations. To capture both the social and material processes associated with evidence use, we turn to thinking from science and technology studies (STS) which suggests to us that evidence can shape the social and organisational context in which decisions are made, as well as being shaped by it (Law 2004).

3.1.1 Conceptualising the relationship between 'evidence' and 'context' in decision-making

In contemporary writing on the diffusion of innovations, it is now recognised that adoption is influenced by the evidence for a given intervention and the context in which innovations are received. Moreover, it is often difficult to separate the effects of an innovation from the context in which it is applied (Turner et al. 2016c). However, there are important differences among theories with regard to how they describe the relationship between evidence and context. Theories of the adoption of innovations can be placed in a spectrum defined at the one end by those that put more emphasis on evidence and at the other by those that regard the context as more important in shaping decision-making. At the 'evidence' end of the spectrum, EBM suggests that the combination of different forms of evidence – systematic research, professional opinion, and patients' views – is required to make informed decisions about the provision of health care practice (Sackett et al. 1996). In studies informed by EBM, the availability and perceived quality of evidence is treated as a critical input for decision-making. For example, Evans et al. (2013) suggested that decisions made by the Welsh Health Boards they studied could be improved if 'high grade' research evidence had been available rather than local data.

Developing EBM further, practice-based guidance on achieving change, e.g. the Promoting Action on Research Implementation in Health Services (PARIHS) framework, places a high value on the availability and quality of evidence for implementing improvements (adding 'local data' to the other types of evidence outlined by EBM), along with the need for a receptive context and facilitation (Rycroft Malone, 2004). Much of the literature on 'knowledge mobilisation' sees implementation in a similar way, arguing that particular characteristics of knowledge (e.g. that its relational nature and context-dependence make it 'sticky'), are suggestive of techniques for enabling such knowledge to inform practice. These

include ‘knowledge brokering’ roles and ‘boundary objects’ to enable knowledge to travel across professional and organisational boundaries (Powell et al. 2017). A key contribution of this literature is the insight that the characteristics of evidence are important, and may need to be adapted to fit the context, in order to increase the likelihood that new knowledge or innovations get into practice.

Closer to the ‘context’ end of the spectrum, Rogerian diffusion of innovations theory has become a highly influential account of the ways in which both evidence and the local context shape adoption decisions. In contrast to research inspired by EBM, diffusion of innovations theory argues that – while evidence has an important role in adoption decisions – the context plays the leading role. The characteristics of evidence are seen as important but are considered to be fixed; the emphasis instead lies in changing potential adopters’ perceptions of innovations. Rogers (1995) argued that the adoption of innovations was challenging even where there was ‘good’ evidence to support new ideas: “One reason why there is so much interest in the diffusion of innovations is because getting a new idea adopted, even when it has obvious advantages, is often very difficult” (p.1). Innovations are more likely to be adopted when they are perceived by potential users as: advantageous relative to current practice; compatible with existing beliefs; easy to understand and use; can be ‘tried out’ before adoption; associated with visible results; and relevant, of low risk, and adaptable (Rogers 1995; Greenhalgh et al. 2004). The innovation source, and perceived quality and validity of evidence associated with it, also influence diffusion (Damschroder et al. 2009).

In Rogerian diffusions of innovations theory, the social and organisational context is regarded as key in influencing how such perceptions of evidence are formed. Rogers turns to features of the local context, and how these shape potential adopters’ perceptions of innovation, in explaining adoption decisions. For instance, participation in social networks influences

decision-makers' beliefs and – by extension – the ways in which innovations are viewed. Drawing on Rogers' work, conceptual models of innovation present a seemingly ever lengthening list of contextual factors to look for in explaining responses to innovations. For example, Greenhalgh et al. (2004) note the role of 'system antecedents' (organisational factors including knowledge processes, leadership and managerial relations) and 'readiness' for innovation in different settings, including the tension for change and power balance between advocates and opponents. Equally, a lack of resources and political opposition can derail innovation processes at any point from conception to implementation, meaning repeated trials are often necessary (Van de Ven, 2017).

Whilst recognising that social and organisational processes shape adoption decisions, diffusion of innovations theory has little to say about the ways in which evidence has a reciprocal role in influencing such processes. Diffusion of innovations theory has focused predominantly on the attributes of the innovation itself in influencing adoption decisions, rather than the mediating role of the evidence associated with innovations. In describing innovations as having fixed characteristics that can be revealed through evaluative evidence (e.g. information on compatibility), the theory represents a rationalist account of how evidence informs decision-making. Evidence is treated typically as a passive or static resource that awaits activation by contextual processes in order to influence practice. For example, Rogers focusses on the "attributes of innovations" (p.211) that are likely to inform their rate of adoption, and how potential adopters form perceptions of those attributes, but does not explore the mediating role of evidence in helping to construct those attributes and how they are perceived. Consequently, we suggest that appreciation of how adaptations to evidence to fit the context – as suggested by the knowledge mobilisation literature – can shape decision-makers' perceptions has been neglected in diffusion of innovations theory. In order to examine the mediating role that evidence can have in shaping perceptions during

decision-making on introducing or diffusing innovations, we turn to literature that has explored the socio-materiality of practice.

3.1.2 Evidence and socio-materiality

To examine how both the social and material aspects of evidence influence its role in decisions about introducing innovations we engage with organisational writing on 'socio-materiality' (Orlikowski and Scott, 2008) which recognises that material (non-human) elements, e.g. technologies, language and physical spaces, are inseparable from and exert influence on social practices. We have identified three ways that the effects of socio-materiality have been described in health services contexts: connecting, ordering, and resisting. Connecting refers to the use of objects to bring together practices that would otherwise be separate. 'Boundary objects' aid coordination among different professional groups and organisations (Marabelli et al. 2014), including aligning institutional norms across local systems (Monteiro and Nicolini, 2015).

Ordering refers to influencing the social order through the categories, language and intended standards embedded in evidence as a material form. For example, Weiss' (1999) characterisation of the 'subtle influence' of evaluation on policymaking over time suggests that policy enlightenment has a linguistic basis: it takes place through the 'stories' told, use of 'language' that speaks to policymakers (e.g. cost), and delivering 'news' that allows policymakers to be current. Processes of ordering are often underpinned by power relationships (Timmermans and Almeling, 2009). Fischer et al. (2016) describe how managers mobilise management research by becoming 'knowledge objects' – allowing them to exercise the agency necessary to influence their colleagues and the organisational environment – through personal engagement with texts, technologies, and devices.

Resisting refers to the negotiated implementation of interventions, and often unintended consequences, that emerge through their interaction with practice. 'Resistance' can be a rational response depending on the particular stakeholder's perspective on the evidence for innovation, e.g. due to perceived gaps in evidence or lack of fit between the innovation and adopting context. The implementation of technological innovations has been shown to influence both social processes of professional work (Greenhalgh and Stones, 2010; Allen 2012) and patient care (Mort et al. 2013; Langstrup, 2013), including the contesting and re-appropriation of technologies. In relation to this theme, Monteiro and Nicolini (2015) have made a recent call for research on the negative aspects of material elements in institutional settings, including "tension, (material) resistance, and conflict" (p.74).

We contend that such research has shed light on how innovations and other coordination devices shape social practice once they are implemented, but these insights (connecting, ordering, resisting) have not been applied systematically to the ways in which the socio-materiality of evidence may influence decisions about introducing innovations. To move the field forwards, we suggest that there is a need to conceptualise how social and material processes interact as evidence is applied to decision-making (much in the way that diffusion of innovations focusses on social processes to describe how perceptions of innovations are formed). In order to theorise such processes of engaging with evidence as material forms, we draw on STS scholarship on practices of producing scientific knowledge.

The STS literature can be used to argue that evidence influences the social context in which it is produced, as well as being influenced by it (Law, 2004). Knorr Cetina (2001) argues that innovations should not be seen as 'definitive things' that evidence helps to establish but can be considered instead to 'unfold indefinitely' as people interact with innovations. Evaluative activities – including observation and inquiry, technical debate and story-telling, applying evaluation methods and theorising, holding countless review meetings, and report-writing and

communicating findings – all help to produce the innovation; such practices add to its 'changing, unfolding character' (Knorr Cetina, 2001, p.182).

Instead of considering the ways that decision-makers' perceptions of the attributes of innovations are formed, as found in diffusion of innovations theory, STS analyses how the 'unfolding' representations of innovations found in evidence mediate and help to shape perceptions (e.g. how evidence frames the ways in which innovations are evaluated and discussed). For example, Jones and Exworthy (2015) describe how the policy documents advocating centralisation of hospital services (and closures) framed the problem in terms of clinical evidence (including safety), which had the effect of constraining the role for public participation in decision-making (Jones and Exworthy, 2015). Critically, the categories used to represent, evaluate and discuss innovations using evidence can shape other contextual processes associated with decision-making. For instance, STS scholars would argue that being encouraged to use the term 'relative advantage' when considering an innovation (which is a key form of evaluative evidence according to Rogers' work) would help to inform or frame adoption decisions, whether or not this were a property of the innovation itself.

The STS literature shows how the material form of evidence can actively mediate how innovations are seen: evidence should be treated as a variable that can influence practices of decision-making and shape actors' perceptions. However, Knorr Cetina's analysis focusses predominantly on the individual's relationship with evidence to the neglect of the ways in which the social and material aspects of evidence use are influenced by wider contextual levels (e.g. decision-making processes at professional group, organisational, and local system levels) (Turner et al. 2017, chapter two). Along with mediating individuals' perceptions of innovation, it is important to examine how the socio-materiality of evidence influences, and is influenced by, processes at these wider contextual levels. In the remainder of this chapter, we trace the role of evidence in 'real-world' case studies of decision-making on innovation

and explore the relevance of socio-material processes, including connecting, ordering, and resisting, for understanding how evidence informs (or not) such decisions.

3.2 Methods

3.2.1 Sampling framework for case studies

In order to examine 'real-world' decision-making on the adoption of innovations, case studies (Yin, 2013) were conducted on the use of evidence in relation to three service innovations within the UK NHS. As shown in Table 2, the three case studies covered different settings (acute and primary), innovation stages (new and diffusion), type and strength of evidence (academic research, national guidance, and local pilot data), and organisational contexts (including different approaches to the implementation of innovation). The case studies complemented each other in showing how the use of evidence to inform decision-making varies across different care settings, among different types of decision-maker, stages of innovation, and types of evidence (including perceived strength).

The first innovation was the reconfiguration of stroke services in two UK metropolitan areas. Research evidence has shown that centralising stroke services to create a smaller number of high-volume, 'hyper-acute' stroke units in London has improved patient outcomes (Morris et al. 2014). This case study explored the role of research evidence relative to other information (e.g. financial impact and local need) in decision-making across other metropolitan areas of the UK. These included a metropolitan area in NW England where evidence has partly influenced a decision to further centralise stroke services (National Health Executive, 2015), and a Scottish metropolitan area which initially decided not to implement the London model, but then undertook a further review of services which the study traced prospectively.

Table 2: Sampling framework for case studies

Innovation case study	Setting	Innovation stage	Evidence	Context
Reconfiguring acute stroke services	Acute; metropolitan area in NW England and Scotland reviewing stroke services	Diffusion	'Strong'; research shows improvements in mortality in London (Ramsay et al. 2015; Morris et al. 2014)	Major system change; involves multiple providers and commissioners
New national guidance on referral for suspected cancer	Primary care; GP practices in two local health economies with different mix of actors supporting implementation (clinical networks, third sector)	New	'Inconclusive'; national guidance lowers referral threshold (NICE, 2015), with the aim of reducing emergency admissions and diagnosing at earlier stage	Top-down change; responses of GPs and actors at local health economy level
New virtual clinics within extended network of eye services	Acute/community outreach; clinics across large metropolitan area and surrounding region	Diffusion	'Weak'; local pilot data suggesting reduced patient journey time (Kotecha, 2015), but lack of patient outcome data and evidence for networked clinics	Organisational network; from pilot to wider implementation of networked clinics

Source: Turner et al. Implement Sci 2016;11:48 distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/). Figure title, numbering, and contents (citations, chapter numbers) adapted for report.

The second was responses in two Clinical Commissioning Group (CCG) areas to new national guidance on referral for the signs and symptoms of cancer in primary care (NICE, 2015). The case study examined responses to the evidence underpinning the guidance and its implementation in two localities. We explored how involvement and interaction between different organisations (including clinical networks, commissioners, third sector, and service

providers) influenced GPs use of the referral guidance and changes to service planning in two contrasting CCG areas in England ('London CCG' and 'South West England CCG').

The third was diffusion of a 'virtual' or remote review outpatient clinic for stable glaucoma patients across a Trust's organisational network of clinics. The Trust had piloted 'virtual review' clinics for stable glaucoma patients in which, rather than seeing the patient face-to-face, the consultant eye specialist makes diagnostic decisions by reviewing patient data on a computer screen that lower grade health professionals (e.g. technicians) have previously collected from patients. A prospective study analysed diffusion of the 'virtual' clinic to two other sites within the Trust, 'East Clinic' and 'South Clinic', and how evidence and other contextual processes informed decision-making.

3.2.2 Data collection

Case study data were collected via semi-structured interviews, non-participant observations, and documentary analysis (Table 3). Interviews were used to develop an account of the decision-making process at each site from different stakeholder perspectives, including perceived barriers and enablers to evidence use, and included health professionals, provider managers, commissioners, and local system representatives. The interviews were semi-structured using topic guides tailored to each case study (see Appendix 2 for example topic guide for 'stroke'). Ethnographic methods, including non-participant observation of board meetings, strategic review and planning meetings, CCG education events, and GP practice visits, were used to follow decision-making in 'real time' in the prospective cases studies. Documentary analysis was used to trace the types of evidence used to inform decision-making. Interviews were digitally recorded and professionally transcribed; observational data were recorded in researchers' field journals. An anonymised list of interviewees is provided in Appendix 3, Table 21. Analysis of documents (including evidence presented in different

forms) and observation of meetings in particular allowed us to trace the social and material translations of evidence and how these influenced decision-making on innovation.

Table 3: Data collection by case study site

Case Study	Sites/Areas	Interviews	Observations	Documents Collected
STROKE	Scottish metropolitan area	11	5 observations (10 hours	27
	NW England	7	-	-
	National stroke perspective	5	1 observation (2 hours)	5
CANCER	'London' CCG	9	7 observations (13 hours)	3
	'South West' CCG	15	4 observations (8 hours)	10
	Pan-London organisations	6	2 observations (7.5 hours)	6
EYE	Central Trust and clinic (where innovation introduced)	12	9 observations (16.5 hours)	35
	South clinic (diffusion site)	8	-	-
	East clinic (diffusion site)	5	-	-
	External perspectives	2	-	-
TOTAL		80	57 (hours)	86

3.2.3 Data analysis

Thematic analysis was used to process the case study data. Inductive and deductive approaches were combined (Bradley et al. 2007), as analysing the dataset involved

identifying ideas emerging from the empirical material and cross-referencing this with existing literature relevant to evidence use in decision-making (e.g. diffusion of innovations and socio-materiality literature). Two researchers coded the dataset, and discussed findings with the wider team, which involved: (a) coding the data using a multi-level framework which reflected the topics discussed in the interview schedules (evidence preferences and professional, organisational, and local system processes); (b) using the tabulated themes to develop narratives of evidence use in decision-making on innovation by site; and (c) exploring the relevance of the concepts of connecting, ordering, and resisting in relation to the three narratives and coded data.

3.3 Results

In this section, narratives are provided of the approach to decision-making adopted, types of evidence used, and outcomes associated with each innovation, including cross-case comparison of sites within case studies. These are discussed in relation to timelines for the innovations by site (Figures 3-7). Then, we apply, and further develop, the three concepts derived from the socio-materiality literature (connecting, ordering, resisting) to analyse how evidence informed decision-making in the innovation narratives.

3.3.1 Narratives of evidence use in decision-making

Decision-making processes

Multidisciplinary groups were involved in decision-making in all three case studies. In relation to stroke service reconfiguration, decision-making across each metropolitan area was relatively formalised. As shown in Figure 3, stroke services in NW England were partially centralised in April 2010; a 12-month review suggested that not all patients who should have access to hyper-acute stroke care were doing so and questioned the 4-hour window following

onset of symptoms for accessing hyper-acute care (as opposed to London's model where all patients were eligible). However, the review was published at a time of system-wide reform within the English NHS as the Health and Social Care Act 2012 was being developed and implemented, which included significant changes to commissioning (including the shift from larger commissioning groups to more localised CCGs), delaying the response to its findings (Figure 3).

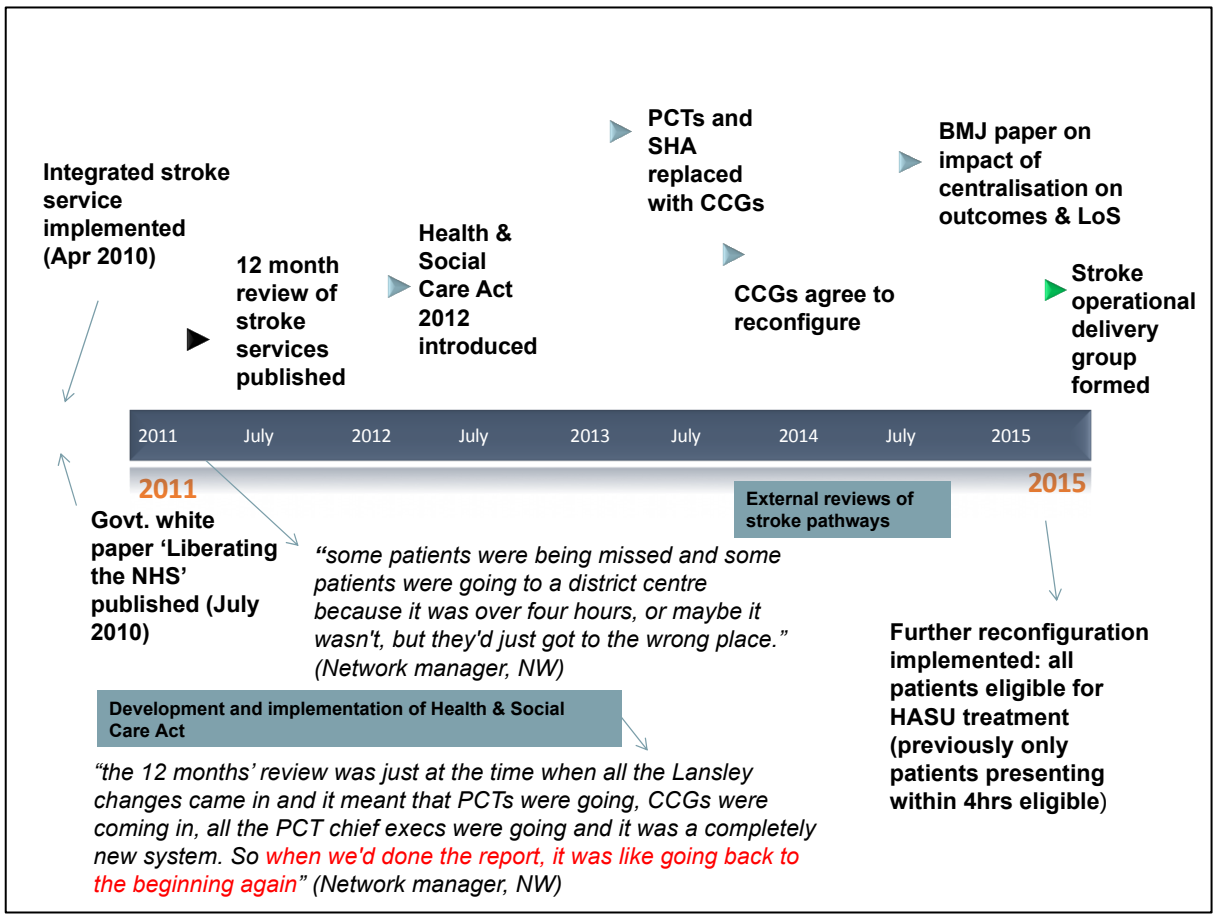

Figure 3: Timeline for reconfiguring acute stroke services (NW England)

In September 2013, CCGs across the metropolitan area agreed on the further reconfiguration of services, and following two external reviews of the proposals, implementation of the reconfigured services was approved and then overseen by a newly-formed operational delivery group. As described below, the 'championing' of research evidence by nationally-recognised stroke leads was critical in securing further centralisation. With regard to

decision-making, the importance of enabling involvement at different levels, including senior leadership and operational staff within provider organisations, was recognised:

"The leaders of the system… they're important, obviously, key to agreeing it and making a decision but then you've really got to get it in at that lower level to deal with, if you like, the ones that are actually going to do the work."

(Manager, Stroke, NW England, SBI3)

In the Scottish metropolitan area, the review of stroke services was led by the pan-regional health board, which drew on the existing improvement programme and membership of the managed clinical network for stroke (Figure 4). However, there was uncertainty over who possessed such authority to make decisions to centralise stroke services, with a tension identified between decision-makers within individual providers and pan-regional decision-making bodies:

> *"I have no idea at the moment who makes the decision for this. So we have our own group, hobby, sovereign, our group doesn't have a formal reporting structure, but I would say there are probably two senior committees and then above that and the board. So the decision could be made in one of four places at the moment. So that needs to be transparent.'*
>
> *(General Manager, Scottish metropolitan area, SAI2).*

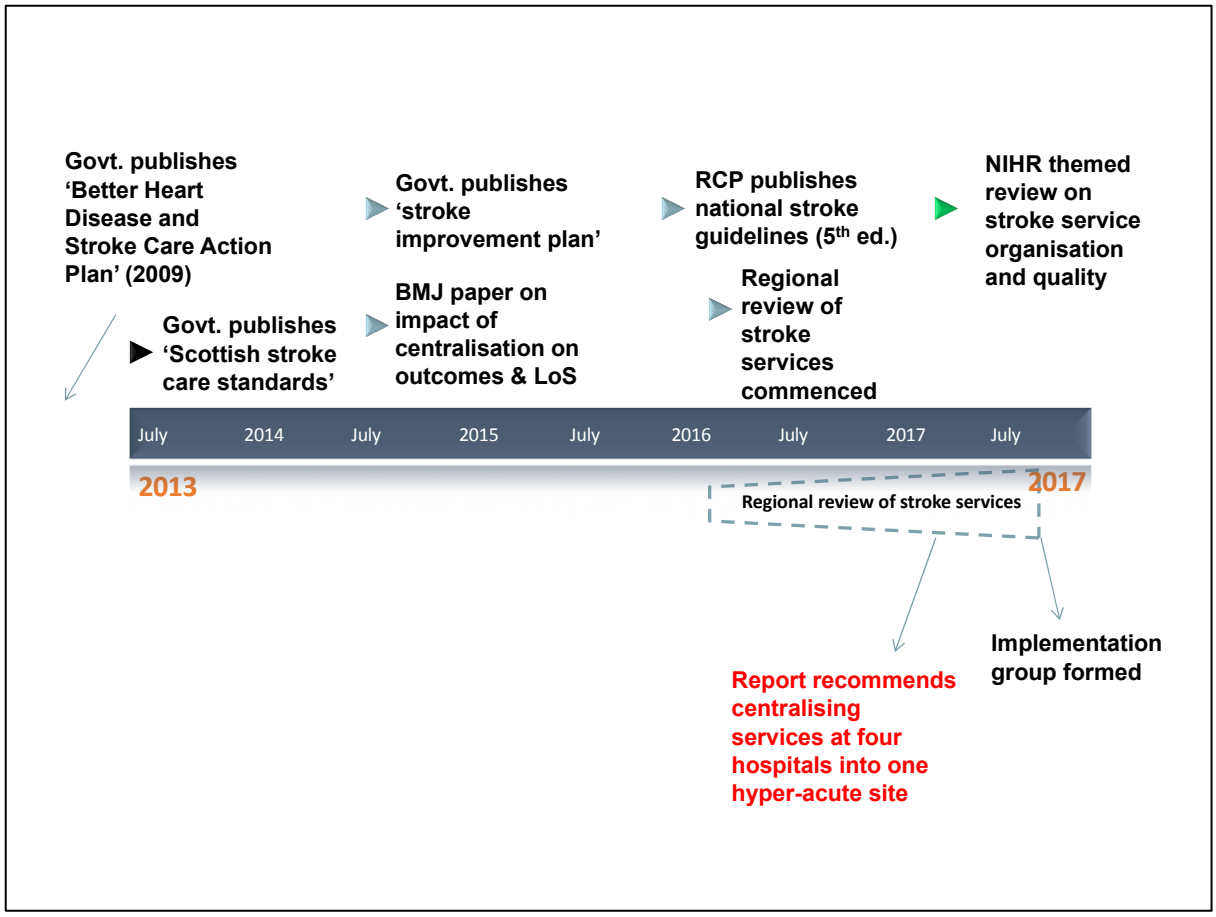

Figure 4: Timeline for reconfiguring acute stroke services (Scottish metropolitan area)

The lack of authority could lead to challenges in deciding on a way forward. During the stroke review meetings we observed, it was suggested that there was a *'fear of change'*, and of making decisions to introduce changes, due to concern about upsetting the different stakeholder interests involved.

For the diffusion of 'virtual' glaucoma outpatient clinics, there were different levels of decision-making within the Trust (Figure 5). These included the steering role of the Trust board in overseeing a Trust-wide service improvement programme for outpatient services; a multi-professional group that supported the implementation of innovations within this programme related to glaucoma services; and decision-making by the South and East sites to which the innovation spread that was informed by the use of evidence and implementation

considerations. There were relationships between decision-making groups at different levels as, for example, the multi-professional implementation group cited the Board's interest in improving outpatient services to generate support at the operational level with implementation.

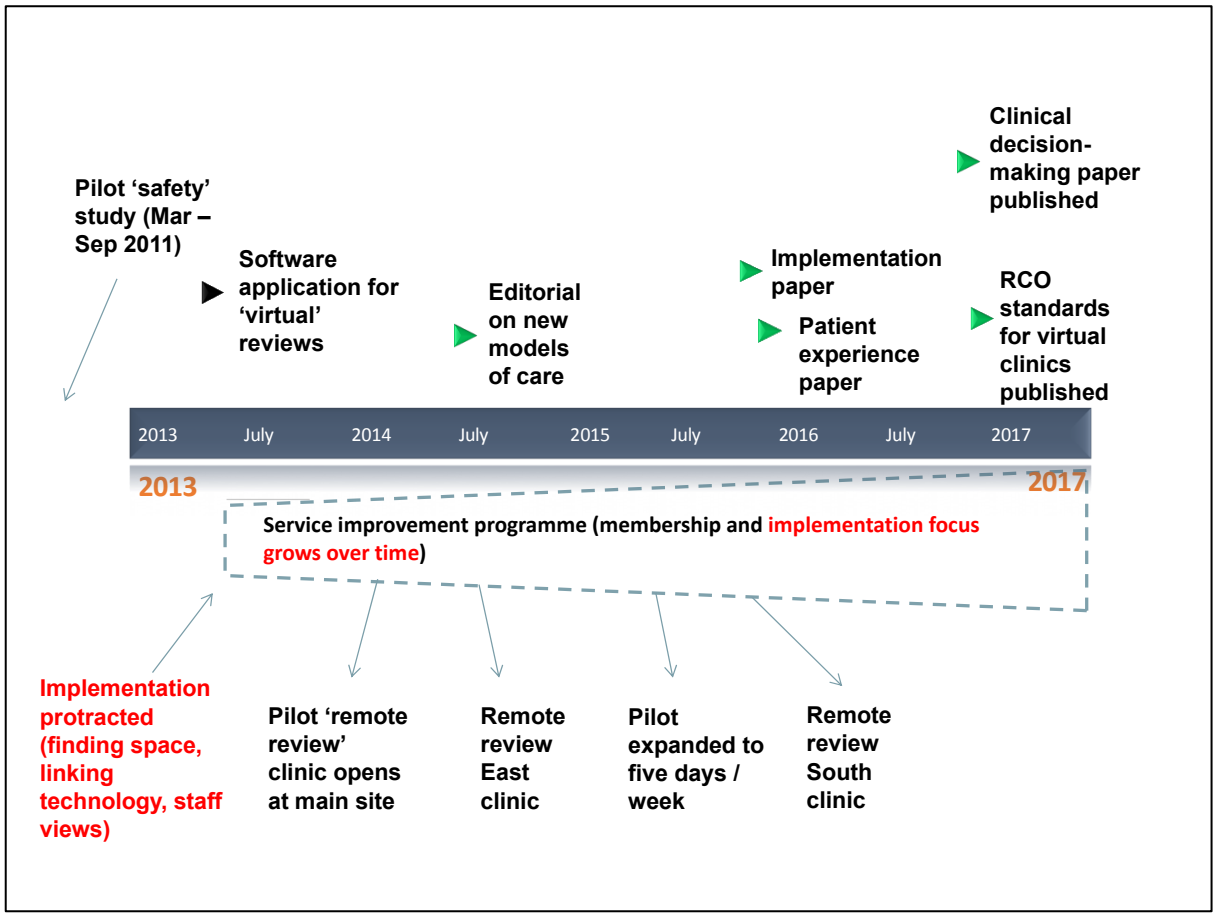

Figure 5: Timeline for spread of new model of care for treating glaucoma outpatients

For the new national guidance on referral for suspected cancer, the jurisdiction of the two bodies that coordinated responses to the new guidance differed. Across London, a pan-regional team (Transforming Cancer Services) developed new referral pathways and referral forms, including revised referral and investigation pathways for suspected cancer, and coordinated educational events and distributed information. The local CCG we studied responded by supporting uptake of the guidance by GPs and changes to referral practice (Figure 6).

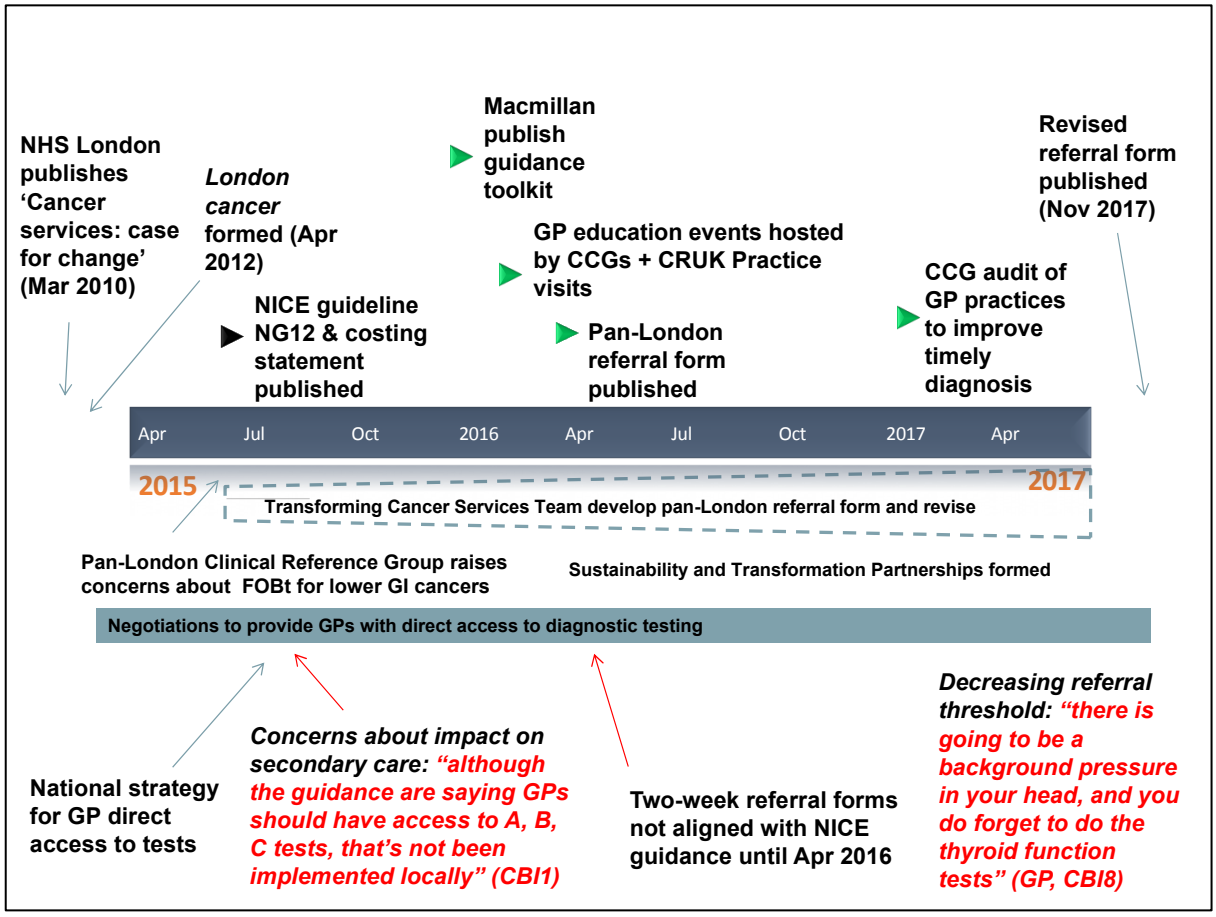

Figure 6: Timeline for implementing NICE cancer referral guidance ('London CCG')

In South West CCG, a multidisciplinary group was formed to implement changes in response to the new guidance, led by a local CCG. In line with national level reform, the group became a 'Cancer Alliance' that included commissioning and clinical leads, aligned with the Sustainability and Transformation Partnership's geography. One advantage of becoming a Cancer Alliance was being able to bid for cancer transformation funding, which the group successfully did to trial and audit diagnostic tests for occult blood in faeces arranged through primary care (to rule out colorectal cancers). The group's composition widened as the actors involved realised that the changes to referral affected a wider range of healthcare professionals across primary and secondary care than originally anticipated (Figure 7).

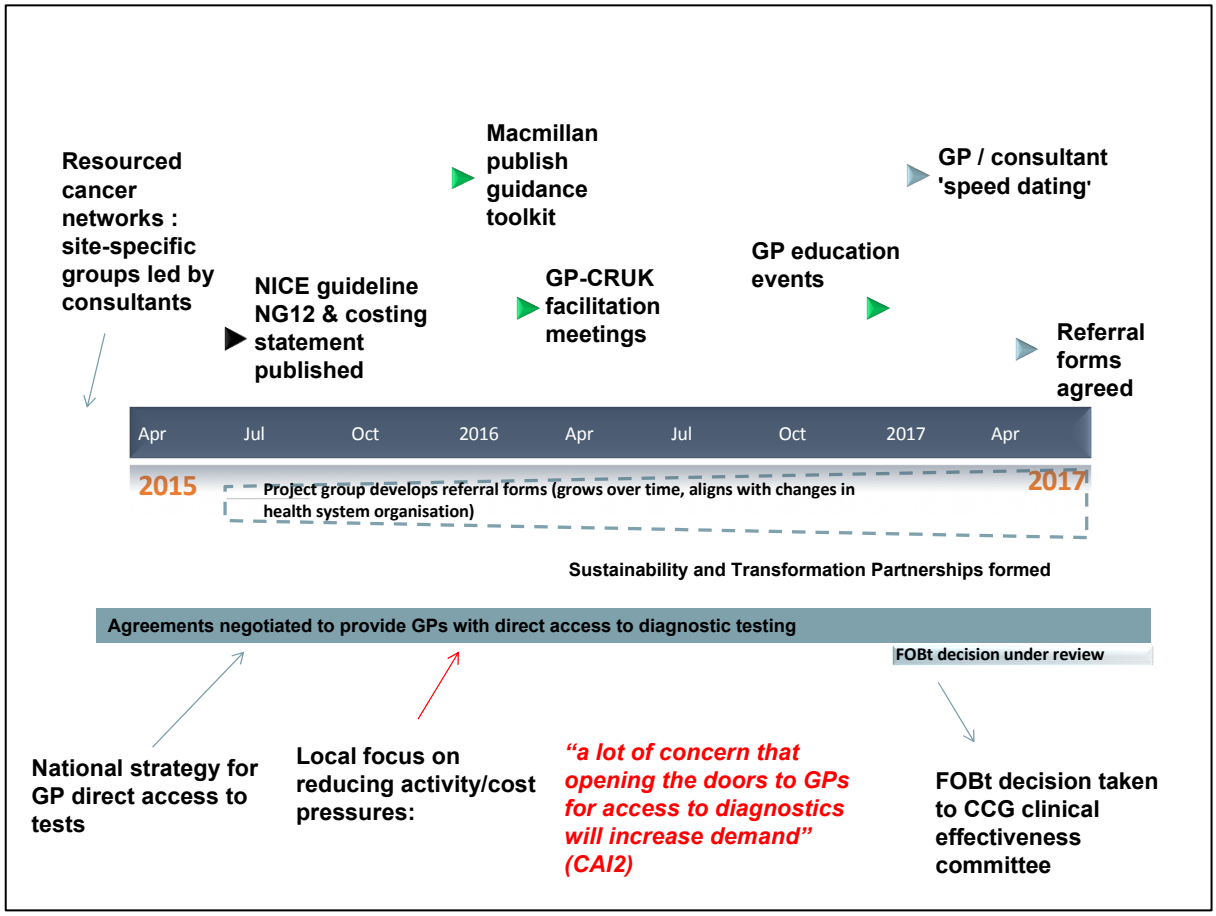

Figure 7: Timeline for implementing NICE cancer referral guidance ('SW England CCG')

Evidence use

For stroke service reconfiguration, a variety of evidence was used during the decision-making process in both areas. This included research evidence, national guidance, local data (e.g. audit data on processes and outcomes of care), and modelling of financial impact. In response to the 12-month stroke review in NW England, the need for further centralisation was constructed by local leads for stroke services, who drew on findings on the impact of reconfiguration on mortality from a study published in a highly-regarded clinical journal in August 2014 (Figure 3) to support their argument. In the Scottish metropolitan area, interactions between those leading the review of stroke services locally with stroke leads and

researchers in other parts of the country were used to help make sense of published research and clinical standards (Figure 4).

For the diffusion of 'virtual' outpatient clinics, local data on clinic capacity relative to projected weekly demand for appointments was shared by those driving implementation of the clinics more widely across the Trust. This was then published in an editorial (July 2014) describing the need for new models of care to improve clinic capacity in the face of increasing demand (Figure 5). Data from the pilot 'remote review' clinic (including evidence of safety, clinical outcomes, and patient experience) was discussed internally with clinical staff, especially consultants, and published subsequently in clinical journals. This 'informal' discussion of findings within the Trust explains the time lag between the expansion of the pilot clinic and its spread to East and South clinics and the publication of the evidence in journal papers. Additionally, evidence on the cost of reviewing patients virtually relative to standard clinics was required by senior managers to support roll out of the new model; this was provided through local audit data reported in business cases and collection of ongoing performance data. However, many front-line staff at adopting sites (e.g. technicians) were not aware of the evidence base underpinning the clinic's introduction.

National guidance on referral for suspected cancer in both CCG areas was used to inform discussion of changes to referral pathways for all services and translated into different forms (e.g. summaries of guidance and updated referral forms) and discussed through a variety of educational fora locally in order to support uptake, which included involvement of national charities (Figures 6 and 7). There were concerns raised in both areas about the impact on resources of changing the referral threshold on both acute and primary care. However, little evidence appeared to be available to satisfy providers on how changes to the guidance would influence demand for diagnostic services.

In summary, external evidence (research studies or national guidance) was important in all three case studies; this was supplemented with local audit data, capacity modelling, and stakeholder discussion (e.g. sharing professional opinion). Patient experience was seen as important in all three areas; it was used by clinicians to justify change in relation to stroke and cancer referral services, while patient experience data was collected in relation to the outpatient clinics implemented. However, it was suggested that patients' experiences were assessed and applied less than other forms of evidence to service redesign (e.g. as seen through interactions between researchers and practitioners at both stroke case study sites in relation to outcome data), as this representative of a stroke charity in NW England described:

> *"there's always a willingness to hear the patient's experience and story and involve people in that way, but there's probably then a little bit of a gap in terms of the capacity and energy that's put into taking that story, unpicking some of the learning from it, and then making the little changes that make a bit of a difference."*
>
> *(Regional director, stroke charity, SBI4)*

Innovation outcome

Innovation outcomes are based on information we had collected systematically until December 2017; given the dynamic nature of innovation, change may have occurred subsequently. In NW England, further reconfiguration of acute stroke services was implemented in April 2015 in which all patients would be eligible for treatment in a hyper-acute stroke unit (in the previous configuration, only patients arriving at hospital within 4 hours of onset of symptoms were eligible). In the Scottish metropolitan area, recommendations to centralise acute services provided across four hospitals into one hyper-acute site were published in June 2017; at the time of writing an implementation group had been established to take the recommendations forward.

For new national guidance on referral for suspected cancer, a common outcome of decision-making across the sites was the development of a new referral form that reflected the updated national guidance to support GPs with making clinical decisions in response to the signs and symptoms of cancer. However, responses to other innovations, including changes to referral pathways between primary and secondary care, varied across the two localities. The national guidance (NICE, 2015) recommended using the faecal occult blood test (FOBt) to assess patients who had unexplained symptoms, but did not qualify for an urgent referral for suspected colorectal cancer. Diagnostics guidance (NICE, 2017) later updated this to recommend using quantitative faecal immunochemical tests (FIT) to guide referral in primary care.

In London (Figure 6), it was decided that the recommendation in the 2015 NICE guidance – using FOBt in primary care before deciding on urgent referral – would not be implemented, following concerns raised by the pan-London Clinical Reference Group about the false-negative rate of the FOBt (Transforming Cancer Services Team, 2016). The London cancer commissioning board has been reviewing NICE's diagnostic guidance (NICE, 2017), and data from an ongoing local pilot of FIT, to inform any further recommendations (Transforming Cancer Services Team, 2017). In SW England, the decision concerning faecal testing was postponed and referred to a clinical effectiveness committee, who decided there was sufficient evidence to commission the FIT test for GPs (Figure 5). In SW England CCG, access to FIT in primary care would 'go live' in June 2018, three years after the NICE guidance was published.

Implementation of the 'remote review' glaucoma outpatient clinic was protracted (due to difficulties with finding space, linking diagnostic equipment, and staff adapting to new roles). The pilot 'remote review' clinic spread to different sites across the organisational network, but rather than being standardised, clinics varied in staffing, equipment, and space, as the

model used was tailored to the local context including lead consultant's preferences. For instance, at one site the model was adapted to include nursing staff (rather than solely technicians) in response to perceived patient need. As the innovation was rolled out to other sites, implementation issues were given greater consideration. Our observations of planning meetings highlighted consideration of: the degree to which pathways could be standardised while giving autonomy to local sites to tailor innovations; the need to provide incentives to engage front-line staff and provide training; and recognition that both time and clinical space were precious resources that required attention in order to avoid delays.

3.3.2 Socio-material translations of evidence

In this section, the role of evidence in the case studies of decision-making is analysed by applying, and further developing, the cross-cutting themes inspired by the socio-materiality literature of connecting, ordering, and resisting.

Connecting professional groups through evidence

Connecting refers to the sharing of evidence within and between professional groups to inform decision-making, and how evidence develops connections between professionals. Professional relationships were used to inform the interpretation of research evidence. In the Scottish metropolitan area reviewing stroke services, decision-makers considered both the published outputs and the professional opinion of colleagues on research findings. Along with reviewing published research, the importance of professional relationships for assessing the practical relevance of the research evidence was described:

> *"I think what people tend to feel is that as well as looking at the research papers you have to go and speak to the people as well though because I think sometimes you*

don't get some of the nuances if you don't actually go and look at it and say: well, how does this work and how do you do that?"

(Lead clinician, clinical network, CAI5).

At this site, making sense of the research evidence included speaking both to members of a research team that had undertaken a national study of stroke reconfiguration, and ensuring that the views of clinicians who had previous experience of stroke reconfiguration informed decision-making. During a planning meeting observed, the chair emphasised that there was potential to learn from other areas - as *'discussions [we are] having not unique here'* – and examples of learning from other areas that had undergone reconfiguration (taking a 'big bang' approach to change and involving the ambulance service in decision-making) were discussed.

Actors at the local system level had an important role in mobilising evidence to connect up the different professions, organisations, and sectors of care involved in change processes. Rather than sharing 'formal' evidence in its original form (e.g. national guidance or journal article), local system actors translated or 'repackaged' evidence into different material forms, depending on the audience in mind. For example, NICE guidance on referral for the signs and symptoms of cancer was summarised in consideration of GPs' needs:

"…but it's just impossible, really, to read it all, so we were trying to give the information in a different way, so that hopefully they would be able to get their heads around it, without being expected to sit down and read through the whole guidance."

(Macmillan GP, SW England, CCI12)

GPs were considered to be time-poor and have competing priorities (e.g. other service demands to respond to). The guidance was shared in a form that took account of the

challenges faced by GPs: *'we produce tools for GPs that are created by GPs because we understand that [sic] challenges that they were facing'* (Macmillan GP, London, CAI4). With the aim of improving guidance awareness and uptake, actors at the local system level (including cancer charities) shared evidence with GPs in different forms, including: summaries on desk easels, benchmarking data on referral rates, and face-to-face education events and educational videos on recognising cancer signs and symptoms.

Local system actors also recognised that the credibility of the presenter could influence responses to evidence, which has also been suggested in previous research (Ahmad et al. 2012; Nembhard et al. 2015; Armstrong et al. 2013). In planning quarterly education sessions with GPs, the London CCG recognised that enabling one GP (the cancer lead) to lead the session should improve how the information was received by other GPs, as opposed to bringing in someone with a different professional background and role. The GP cancer lead talked through the guidance with colleagues at quarterly education events, distilling key aspects of the new guidance into PowerPoint slides (i.e. highlighting those in brief bullet point summaries) and supplementing discussion of these with relevant examples from his own experience:

> *"We find that when [GP cancer lead] puts it in a third person, and then also explains, as a fellow GP, his challenges and what he's found then works, it's the best way to then get the message across to his fellow colleagues. As opposed to me standing up and just walking through it cold, as a manager. As a fellow colleague, if he stands up, it lands better."*
>
> *(Commissioner, London CCG, CBI7)*

The anecdotes told throughout the presentation described patients from the local population who had presented to primary care and experienced delayed diagnosis (including diagnosis in A&E). Anecdotes concerning patients' experiences were used to note that referral rates in the borough could be higher (with the unspoken implication that there was a failing) and to encourage the doctors present to refer more in future. The use of anecdotes – whereby the presenter offered their own experiences of making both timely referrals and failings – appeared to help with broaching a sensitive topic in a way that avoided blaming the GPs present while encouraging those present to be open to learning. However, a secondary care consultant who presented later in the education session mentioned the pressure further on in the system that urgent referrals cause, and suggested that the problem was not a shortage of referrals, but one of finding cancers in the appropriate way (citing challenges for secondary care where patients are referred simultaneously to two different pathways, the use of vague referral criteria, or use of criteria not supported by diagnostic tests). The different views prompted some debate between the consultant and the GP lead, with the latter continuing to emphasise the need to refer if there was any suspicion of cancer.

Evidence was also translated into different forms in order to share findings over a wide canvas, supporting spread of innovations. In the eyes case study, this process appeared to mirror the evidence hierarchy in evidence-based medicine, whereby local actors recognised the value of getting their research findings on, and practical experiences with, innovations translated into clinical guidelines in order to widen the impact of their work. Those leading the diffusion of the 'remote review' model for outpatient clinics sought the endorsement of specialty-specific professional associations. This was achieved by translating standards developed locally into national guidance for running remote review clinics that became enshrined in Royal College guidance:

"We hope that [local optometrist's] guidelines, when they're finished, they're going to be handed to the Royal College, they'll review them and decide whether they're going to mandate them as standard practice and put the Royal College seal onto it, which is obviously what we hope."

(Consultant, central Trust, EAI3)

In summary, research evidence and guidelines are often translated into different forms (e.g. summaries), or combined with other forms of knowledge (including anecdotes and professional experiences), during processes of decision-making. In relation to both the stroke and cancer case studies, summaries of evidence were shared, rather than original evidence (i.e. national guidance or academic studies), and discussion weaved together views on published evidence with contextual information gained from interactions with researchers and professional experiences. The translation of evidence into different forms supported communication at different levels, although this took place predominantly within existing professional and organisational boundaries. Translating evidence included summarising and using anecdotes to illustrate new national guidance on referral for suspected cancer to educate local GPs (local, intra-professional); establishing dialogue with external researchers, and clinicians with experience of centralising stroke services in other metropolitan areas, to inform stroke reconfiguration (national, inter-professional); and translating research findings into professional standards for 'virtual' clinics for glaucoma outpatients for sharing among members of the same professional group nationally (national, intra-professional). However, as illustrated by the divergent views on cancer referral expressed by the GP lead and secondary care consultant, making use of evidence in ways that crossed inter-professional and sectoral boundaries was challenging (which we go on to discuss in subsequent themes).

Ordering decision-making priorities through evidence

Ordering refers to the ways that evidence is used to influence the context of decision-making; this includes both social processes (e.g. 'championing' evidence) and the material form of evidence (including length, format, and key points highlighted) which can shape stakeholders' perceptions of innovations. Evidence was used to help particular stakeholders influence decisions about adopting innovations, including those where changes to professional roles and responsibilities were at stake. For example, senior clinicians used research evidence to exert influence on how innovations were evaluated within their own professional group, while potentially excluding others who were not well versed in using this type of evidence. Across the case studies, senior clinicians (e.g. clinical academics, hospital consultants, and established GPs) dominated decision-making at the organisational and local system level on introducing innovations. Their preferences for evidence helped them to take a dominant role in decision-making, as the types of evidence they prioritised (e.g. academic studies published in clinical journals) were influential in decision-making. However, this could impinge on the ability of other professional groups to engage meaningfully in decision-making (given the need to have relevant background knowledge to produce, interpret, and apply academic research findings):

> *"They [clinical academics] live in a world of studies and you can sometimes see that to them anything that isn't – the value of it is completely negated straight away because it hasn't been published."*
>
> *(General Manager, Stroke, Scottish metropolitan area, SAI2)*

As decisions on *adopting* innovations tended to be dominated by powerful stakeholders (e.g. senior clinicians), there appeared to be less consideration of the practical aspects of

implementing innovations. In the eyes case study, senior clinicians often self-identified as the main decision-makers in deciding how clinics are delivered and should change, while assigning others (e.g. middle managers) the role of implementing their decisions. The consultants became aware of the 'remote review' clinics through their contact with other consultants at uni-professional meetings (where plans, performance and evaluation of the clinics were shared), enabling the innovation to be taken forwards by consultants working at different clinic sites across the Trust's organisational network. A decision to 'roll out' the clinics was made among consultants once they had *'accepted it as a model'* and, following this, resources were then sought (equipment, staff, clinical space) to implement the new clinic:

> *"All the consultants come together regularly and because we were all happy with it at [main hospital site] and most people where the roll outs happened also work at [main hospital site]; they'd already accepted it as a model. So it was more like them saying: how can I have it? I want to have it. Get me the kit and the people and the space."*
>
> *(Clinical director, central Trust, EAI4)*

Evidence was also used creatively by 'champions' to exploit windows of opportunity for improvement, which is an important role in diffusion that has been described in previous research (Rogers, 1995). However, this study showed how manipulating the material form of evidence helped to achieve this impact. In relation to the reconfiguration of stroke services, a nationally recognised, local stroke consultant had summarised academic research on the impact of service centralisation – including the quantitative 'headline' finding derived from the study that further centralisation of services could save '50 excess lives' per year (The

Guardian, 2014; National Health Executive, 2015) – in order to influence local commissioners:

> *"We had simplified one-page summaries of the evidence and all kinds of things that went out to people. And the 50 excess lives did become fairly common currency."*
>
> *(Stroke consultant, NW England, SBI2)*

The introduction of innovations could also influence responsibility for, and control over, clinical decision-making among professional groups, causing concern about changes to professional jurisdictions. This commissioner described tensions between primary and secondary care in relation to changes to referral processes for suspected cancer:

> *"It takes some of the - I hate the word control but do you know what I mean? It takes some of the control and responsibility away from secondary care and shifts it very much to primary care."*
>
> *(Commissioner, SW England CCG, CC1I)*

These tensions played out in how evidence associated with innovation was presented and discussed. In the cancer education event described earlier, the GP lead emphasised following the referral recommendations, and data that suggested the area was one of 'low referrers' (and that local politicians wanted to know what was happening about improving referral rates), while the secondary care consultant suggested that the referral data for the area may no longer be up-to-date and that referral criteria should be applied appropriately given the resource pressures in secondary care. The implications of evidence were debated, and these alternative forms were cited (e.g. professional experiences, politicians' views, resource

pressures), in an attempt to influence or order the shifting responsibility for clinical decision-making among the different professional groups and sectors affected by the changes to referral processes.

In summary, preferences for evidence both influenced which types of stakeholder took a central role in decision-making and the types of impact considered. Evidence played an 'ordering' role in decision-making by encouraging the prioritisation of specific impacts of innovations (e.g. clinical outcomes such as stroke mortality, patient safety with regard to glaucoma clinics, and timely diagnosis of cancer), to the potential neglect of other characteristics (notably feasibility of implementation). The material form in which evidence was presented helped social actors to exert influence on decision-making. An emblematic example of this came from the stroke case study in NW England. While underpinned by research evidence and professional and local system activity, the emphasis placed on saving '50 excess lives' in the summary that was shared by local 'champions' of reconfiguration helped to drive further centralisation of stroke services.

Resisting: considering evidence on implementation

This concept suggests that evidence influences decision-making through a negotiated process that can include tension and resistance. In the case studies, while senior clinicians sought to take control of adoption decisions, the use of alternative evidence (e.g. local data) by other professional groups in attempting to influence their behaviour was highlighted. In the eyes case study, some consultants expressed doubt about making referrals to clinics where patients would not be seen by a specialist face-to-face, citing safety concerns. Although research evidence concerning safety was discussed, alternative forms of evidence were also introduced by managers to influence consultants' views (e.g. audit data on consultants' glaucoma outpatient clinics). Operational managers trying to support change presented non-research

evidence (local data on how existing clinics were performing) to senior clinicians to obtain their approval for introducing new models of care:

> *"We had the presentation, it was all virtual for them, they had the slides, they got the feedback, they had a slide for themselves, and you could see them actually sort of turning the slide over, going wow is that really my clinic, because it was by code, so consultant code, and then it was an overall picture of the glaucoma service at [this site]."*
>
> *(Project manager, South Clinic, EBI1)*

In this example, the manager had an awareness of the need to collect and present local data systematically to appeal to consultants' preference for 'scientific' evidence in evaluating decisions to change practice.

In the cancer case study, there was awareness of the need to use evidence to respond to resistance from GPs and secondary care providers about changes to referral pathways. Concerns were raised in both areas about the impact on resources of changing the referral threshold on both acute and primary care. In South West CCG, observations of those leading the local response to the NICE guidance showed that they recognised the need for evaluation to convince the organisations involved to implement the recommendations. As stated in a planning meeting, the challenge coming back from providers was: *'what will it cost, will you break our hospital?'*. However, little evidence appeared to be available to examine how changes to the guidance would influence demand for diagnostic services:

> *"This thing about increasing demand, there's an anxiety there. All the diagnostic partners are already stretched. Their capacity barely meets the demand and in many*

cases doesn't meet demand at all, so they're already very stretched. So anything new is going to be hard for them to do. They're reluctant. They want reassurance. They want to know where it's working. They want evidence of some sort that it isn't going to cause an upward spiral of demand. Now, you know, that kind of evidence is quite hard to come by."

(Clinical lead, pan-regional organisation, London, CAI2)

The lack of evidence on the effects on demand/capacity was used by hospitals as a tool for resistance, to argue that the impact of lowering the referral threshold on secondary care could not be predicted and may therefore represent a risk to services.

In the stroke case study, concerns about implementing proposed changes to stroke services from the providers involved were felt to slow down decisions to adopt change. In response to new issues being constantly raised during the stroke review in the Scottish metropolitan area, the chair of the review group stated during a meeting: '*thought we were almost there but obviously not!'*. Organisational resources were needed to act upon evidence meaning that the involvement of other stakeholders (particularly managers overseeing change) was needed to understand what resources would be required to implement innovations. As suggested to us by this stroke manager, resources to implement change were thought to be lacking in relation to stroke service reconfiguration:

"I'm not confident that we're going to deliver the kind of change that the papers reflect at all because, as I've said, it takes a big decision and it takes resources and it takes prioritisation and the organisation is not good at that."

(Planning manager, Stroke, Scottish metropolitan area, SAI7)

In summary, a key form of 'resisting' identified in the case studies related to concerns about implementing the recommendations of evidence, including the need to scope out fully the implications of change (including consulting additional stakeholders) and availability of resources available (including service capacity) to implement proposed changes. One way of responding to resistance was by presenting alternative evidence to allay concerns; however, the lack of evidence on how implementing the recommendations made would affect experiences of delivering services was a sticking point (e.g. impact of new referral pathways on capacity/demand).

3.4 Discussion

This chapter suggests the need for a dynamic model of decision-making on innovation in which both the agency of evidence (e.g. how it helps to frame decisions) and contextual processes are given equal attention to capture interplay between the two in decision-making processes. We have described three processes (connecting, ordering, resisting) that show how evidence and the context can interact during decision-making. Examining these processes indicates that evidence can underpin communication among individuals concerning innovations, but its use is associated with structures of power (e.g. professional hierarchies, credibility of source/presenter), and its meaning and implications are often contested. Social and material translations of evidence are key processes in and through which communication, power, and meaning are negotiated.

The systematic scoping review (chapter two) suggested that evidence use is influenced by the interplay between processes at multiple contextual levels (professional group, organisational, local system). The case study findings add to this model by showing how socio-material processes (connecting, ordering, resisting) run through this multi-level framework of evidence use in decision-making on innovation. For example, the 'connecting' theme shows

how shared preferences for evidence at the professional level can support communication within professions (e.g. to interpret 'the nuances' of information). Moreover, the identification of preferences, and relevant professional interests, can inform how evidence is presented by those seeking to influence behaviour within professions or local systems (e.g. presenter's credibility, anecdotes of patient cases, summarising / visual nature of information, and endorsement by professional associations).

The 'ordering' theme illustrates how power dynamics are negotiated within and among professional groups. For example, senior clinicians can turn to research evidence to exercise dominance by influencing the criteria prioritised in adoption decisions. However, this tendency can marginalise other stakeholders' views in decision-making to the consequent neglect of some evaluative aspects of innovations, notably implementation considerations. There are also tensions in how evidence is interpreted reflecting professional jurisdictions and boundaries (e.g. how recommendations from evidence are applied can affect the responsibilities of, and relationships between, primary and secondary care). The material translation of evidence – for example, seeking to draw out and communicate key findings from research to drive change – was used by prominent clinicians and local system actors to place pressure for innovation on decision-makers.

The 'resisting' theme highlighted power dynamics in showing how 'alternative' evidence was presented by non-medical stakeholders to influence change (e.g. managers' use of local audit data to influence hospital consultants). Moreover, claims that evidence was lacking in relation to particular aspects of evaluation (e.g. impact of changes to referral pathways on capacity/demand) were used to resist change where professional or organisational interests were at stake, suggesting some 'gaming' of evidence to support particular interests (Bowen et al. 2009).

While the review looked at processes at different levels, the case studies highlight the key role of professional interests, relationships, and networks in shaping evidence use across all levels (e.g. doctors' role in 'championing' evidence across local systems or spreading evidence across professional networks by translating research into professional standards or use their professional status to 'resist' recommendations by relating evidence to their clinical experiences or by identifying gaps). This finding reflects earlier work on major system change which suggests physicians need to be engaged because of the influence they have on decisions about implementing change (Best et al. 2012), although the importance of involving other stakeholders should not be neglected (Turner et al. 2016b). The review also highlighted the burgeoning forms of evidence used in decision-making and the responsibility this places on decision-makers and evaluators to explicate these. The case studies confirm that a variety of evidence often informs decision-making, but this may hide a hierarchy of forms of evaluative evidence, and stakeholder interests these reflect, that are prioritised in decisions (this suggests the need for a clear decision-making structure, and stakeholder involvement processes, as we go on to discuss below).

The dynamic model of decision-making depicted here, in which both social and material processes influence how and why evidence informs decisions about innovation, adds to existing models of the diffusion of innovations. While Rogers' model of the diffusion of innovation rightly recognises that the social context (e.g. professional group and organisational processes) influences potential adopters' perceptions of innovations, the role of the materiality of evidence in shaping such processes, and in enabling stakeholders to influence the process, should be acknowledged. We suggest that evidence is no longer treated as a passive resource that needs activating by the context, as diffusion of innovation theory suggests, but as an active participant in decision-making that can influence innovation adoption by shaping stakeholders' perceptions of innovations (e.g. through its translation into

different forms). The research implication is that those using diffusion of innovations theory, without losing the emphasis on the importance of social and organisational context, should conceptualise evidence as something that exerts agency too. Incorporating STS, future diffusion research should take account of how the 'unfolding' material forms of evidence inform and shape the social and organisational context of decision-making, while being shaped by it.

With regard to the STS literature, the socio-material processes of developing and applying knowledge at the individual level, e.g. exhibiting knowledgeability, have been well described (Knorr Cetina 2001; Fischer et al. 2016). However, this study suggests the need to take into account the role of contextual processes at multiple levels (professional group, organisational, local system) in understanding the socio-material processes through which evidence is constructed and influences practice. STS analyses tend to argue that relations and power are enacted in and through practice, to the neglect of structures of power associated with the pre-existing context (Turner et al. 2018). For example, belonging to a professional group can influence preferences for particular types of evidence, while organisational and local system processes can signal the need for particular forms of evidence to support innovation (e.g. to fulfil business cases or meet commissioning criteria). Thus, conceptualising decision-making about innovations requires understanding how the social and material aspects of evidence use are influenced by, and geared toward, structures of power at these different contextual levels. For instance, processes of connecting, ordering and resisting will be influenced by relationships within and across these levels, notably structures of power associated with the medical profession identified in this study, but there may be others to be traced in further research. For example, at the macro level, the influence of system-wide reform led by the state on service change and the role of evidence throughout such processes.

Moreover, in STS accounts of innovation, it is important to specify the actor(s)' perspective from which descriptions of evidence use in innovation processes are told. For example, actor-network theory, a key method of describing innovation processes within the STS literature, has been criticised for being 'Machiavellian' in taking the perspective of the 'dominant' or powerful actor, while marginalising others' perspectives (Crawford, 2004). In the case studies described here, distinguishing between processes of 'ordering' and 'resisting' evidence depended on the perspective from which decision-making was described. One actor's process of 'ordering' using evidence could be another actor's 'resistance' to the influence that others were attempting to exert on decision-making. Thus, narratives of innovation should seek to capture and describe the innovation journey from multiple perspectives (e.g. by interviewing and observing stakeholders in a variety of positions in relation to innovations).

In terms of implications for policy and practice, our study showed that considering implementation issues during decisions about adoption and having a clear decision-making authority were important. It is critical to bring relevant stakeholders together to reconcile their potentially divergent perspectives on the adoption of innovations (e.g. through multidisciplinary meetings), including stakeholders likely to be affected by the implementation of innovations (e.g. patients/carers and frontline staff). However, existing literature often highlights barriers to meaningful involvement of less powerful stakeholders in decisions about innovation (McKevitt 2018; Turner et al. 2016b). Building on recognition of the agency of evidence, one way of addressing such barriers is to think of evidence in processual terms, that allows for the unfolding or morphing of evidence through stakeholder engagement and debate, rather than seeing evidence as a product with fixed attributes or characteristics that need to be protected, e.g. during 'tokenistic' public consultation processes. Enabling multiple stakeholders to participate requires a willingness to accommodate different types of evidence in decision-making and its translation into different

forms to support communication and debate. Those leading decision-making need to strike a delicate balance between encouraging this 'unfolding' aspect of evidence and having clear decision-making authority and processes for reconciling the different perspectives that evidence can produce so that decisions on innovation are seen as robust and trustworthy.

This chapter has focused on the social and material context in which evidence informs decision-making. Across the case studies, however, there was a concern among those involved in decision-making with the impact of innovations, or 'what the evidence says', which suggests that the potential impact of an innovation still mattered when choices were being made. As outlined in the forthcoming chapters, quantitative research can complement the qualitative approach presented here by quantifying the relationship between, and relative effect on decision-making of, (a) the characteristics of the innovation (i.e. its potential impact), (b) the characteristics of evidence (e.g. perceived strength and quality), and (c) other contextual processes that may influence evidence use in decision-making about innovation (e.g. professional groups' preferences and stakeholder engagement).

Chapter 4. National survey of decision-makers' preferences

4.1 Introduction

This chapter describes the results of the national survey of decision-makers' preferences for evidence, that was conducted as part of workstream 3, with some comparison to case study findings (from workstream 2). A key contribution of the national survey is to define and measure how a broad range of decision-makers weigh up or 'value' different characteristics of evidence by asking them to rank different pieces or 'characteristics' of evidence, relative to each other. We do this to gain an understanding of decision-makers' priorities for evidence, i.e. which characteristics of evidence they would value more relative to other characteristics.

In this chapter we will initially outline the process that we took in understanding and defining the 'value' of different forms of evidence, and why we conducted the national survey in the way we did. A quantitative national survey complements the qualitative case studies that were described in chapter three, providing breadth of understanding by quantifying decision-makers' preferences nationally to match insights from the qualitative study of decision-making within specific geographical contexts and service areas. The purpose of this chapter is to present our national survey on how decision-makers perceive and prefer different characteristics of evidence (including impact, practicability and acceptability, and source/context) when making decisions to introduce or diffuse innovations. Survey findings are compared with qualitative data collected during the case studies of decision-making for workstream 2 (section 4.4).

4.2 Method

4.2.1 Overview

We developed a national survey in order to explore NHS decision-makers' preferences for evidence when introducing or diffusing innovations. The survey included a number of questions on considerations that are relevant to decisions about implementing innovations. Components of the survey included:

- Basic demographic information about the type of role our respondent decision-makers held, and the type of organisation they worked for within the NHS system;
- A ranking exercise, asking respondents to select their top three characteristics of evidence that they would ideally need in order to make a decision on whether to introduce or diffuse an innovation;
- The breadth of perspective that decision-makers may consider when introducing or diffusing an innovation;
- A question on the maximum 'time horizon' that decision-makers typically consider when introducing or diffusing an innovation;
- A discrete choice experiment (DCE), which allowed more in-depth consideration of key characteristics of evidence that were selected as being relevant to all decisions on innovations, regardless of clinical speciality and size or type of organisation (findings from the DCE are described in chapter five).

The survey was available in online format only, hosted by a third party company (Quality Health Ltd.), and was completely anonymous – no names, ages, job titles or geographic locations were asked for in the survey.

4.2.2 Characterising Evidence – the decisions made to shape the survey and DCE

Types of evidence versus strength of evidence

Originally in the development of DECIDE, the concept of evidence was framed in terms of 'types of evidence' (i.e. impact on: health (mortality, quality of life); behaviour; knowledge; use of services; budget; and incremental cost-effectiveness) and 'strength of evidence' (i.e. the extent to which evidence shows what it purports to show; and the extent to which findings are generalisable to the local area). In this way evidence could be categorised and explored in relation to innovations (in terms of being used to make a decision on that innovation) and could be explored within its own categories, i.e. hierarchies of types of evidence and their strengths and trade-offs between these. However, as the project progressed, it became apparent that this framework was too simplistic, and that the usefulness of a piece of 'evidence' such as a cost-effectiveness value, depends on its 'magnitude' (i.e. how big the 'benefit' was estimated to be) as well as its 'robustness' or 'credibility' (i.e. who presented and vouched for it, or where the evidence came from and the reliability/worthiness of its source) - the 'evidence for the evidence' as it were, and the strength of the evidence for the evidence.

Generic versus specific cases.

An additional difficulty arose in that the 'setting' or 'situation' in which a piece of evidence was being considered is fundamental to the usefulness and relevance of the strength of that evidence. For example, the strength of a budget impact analysis depended on the size of the organisation a decision-maker works for, and the associated budget of that organisation. A piece of evidence on cost-savings might appear to be useful at first glance, but should the upfront cost needed to achieve those savings exceed the budget of a small organisation, then the evidence is undermined. The setting that a piece of evidence is being considered in will shape the attitudes of decision-makers towards riskier innovations, novelty of innovation, and

source of innovation. For example, evidence for an innovation in cardiology would be considerably stronger if it came from an organisation known for leading cardiology research, and would be received as such by other cardiology departments.

In order to explore decision-makers' attitudes towards evidence, we would ideally have to include these 'meta-evidence' characteristics alongside the characteristics of the evidence themselves in some meaningful way. One option would be to present very specific, detailed scenarios for respondents to make decisions on. However, this would be very time-consuming, prone to misinterpretation, and would not be generalisable or relevant to all potential decision-makers. A national survey would need to be as relevant to as many decision-makers as possible.

As such, we decided to reframe our conception of evidence into 'characteristics of evidence' which allowed us to include a wider range of possible evidence, including meta-characteristics such as the presenter of the evidence - which is relevant to all decisions on innovations but would otherwise have been categorised as a 'contextual factor'. We also decided to reframe the DCE, and move away from the idea of looking at specific scenarios with specific trade-offs which, as discussed, would be prone to myriad problems of design and interpretation. A DCE would still prove useful to investigate the relevance and trade-offs between characteristics of evidence to decision-makers working in a range of contexts, and were identified as relevant in relation to the case studies, as well as the piloting work to inform the survey's development (see chapter 5 for further details on the construction of the DCE).

4.2.3 Developing the list of characteristics of evidence and discrete choice experiment

Survey design

The conception of the national survey hinged upon a ranking exercise of a list of characteristics of evidence, and a DCE (findings from the DCE aspect are described in chapter five).

Stage 1: first draft of survey

Building upon the work of the scoping review, the research team designed a first draft of the survey, focusing predominately upon generating a list of characteristics of evidence. This list was to be as comprehensive as possible. The aim was to test the relevance of all characteristics on the list to a real-world decision-making context, and the validity of the characteristics to real-world decision-making.

Stage 2: first phase of piloting

The participants in our piloting phases were drawn from decision-makers the investigator team knew and had worked with previously, and members of the study's project advisory group. The pilots were jointly conducted by a health economist and qualitative researchers. For both interviews we used variants of the 'think aloud' or 'cognitive walkthrough' method (Eccles and Arsal, 2017). The first phase consisted of eight semi-structured interviews with decision-makers, using a limited cognitive walkthrough and some priority questions. Prior to the interview, the interviewee was sent a long list of potential characteristics of evidence that we had developed through several discussion sessions within our team, and from published studies identified by a systematic scoping review conducted by the investigator team (Turner et al. 2017, chapter two). The contents of the list changed with each successive interview, as new items were suggested from previous interviews. The topic guide of questions we asked

the interviewees in Pilot Phase 1 can be found in Appendix 2. Based on the results from piloting phase one, a first draft of the survey was constructed.

Stage 3: second phase of piloting

In phase two, we conducted five full 'cognitive walkthroughs' or 'think-alouds' wherein we asked participants to complete the survey while voicing their thoughts and understanding of the questions as they completed them. The participants were then interviewed on their understanding and perception of the survey.

Based on these results we reformatted some of the wording of the DCE introduction, and some of the levels of the attributes. For example, we changed 'low Credibility' to 'Credibility unknown' on the basis of the argument that an innovation lead with 'low' credibility would never make it far through the process of getting an innovation to the final stages of decision-making that the DCE was attempting to emulate (see chapter five for further details about the construction of the DCE).

Stage 4: finalising the survey

Based on the two piloting phases, the survey was finalised (see Appendix 4 for the final version). We had to drop questions on monetary trade-offs (between e.g. risk or QALYs and budget as either an absolute value or a percentage) from the final version because it was not possible to frame such questions in a way to make them generalisable and relevant to all types of decision-makers in the NHS. We also decided to extend the survey invitation beyond decision-makers only to encompass those who also inform decision-making, acknowledging that decision-making is often a lengthy process and that decision informers have significant roles to play in decisions to introduce or diffuse innovations (Kneale et al. 2017).

Stage 5: sampling

The survey was sent out nationally to reach as many respondents as possible. To do this we advertised the survey through as many routes and organisations as were willing to circulate the survey invitation among their members and distribution lists. The list of organisations who agreed to disseminate the survey is presented in Appendix 4. Each organisation we approached agreed to disseminate the survey to their relevant mailing lists twice (the second time as a follow-up). We do not know the extent of these organisations' mailing lists, and it is likely that a sizeable proportion of individuals belong to multiple organisations' mailing lists. Each organisation that disseminated the survey was followed up roughly two months later and asked to re-send the survey as a follow-up or reminder. Each of the medical directors received a reminder email inviting them to participate (a total of 2 emails each).

Stage 6: data analysis

The survey (not including the DCE) was analysed using cross-tabulation using groups drawn from the demographic questions and identifying key subgroups for further analysis. Subgroup analysis was then conducted on the whole of the survey, based on the most common and relevant role and organisations identified by the demographic questions. Thematic analysis was used to group the characteristics in the ranking exercise and the free text responses.

4.2.4 Comparative thematic analysis using case study data from WS2

The results of the survey were compared and contrasted with a review of published primary studies that use qualitative methods and related literature on evidence-informed decision-making (Turner et al. 2017, chapter two) and primary case studies of 'real-world' decision-making (chapter three). As described in chapter three, case studies of decision-making on innovation were undertaken of: (1) acute stroke service reconfiguration in different

metropolitan areas; (2) responses to new guidance on referral from primary care on the signs and symptoms of cancer; (3) the diffusion of 'remote review' outpatient clinics for glaucoma across an organisational network. The results of the national survey were used to inform analysis of the case study data; the survey results were used deductively to identify ideas in the qualitative dataset that spoke to the survey findings (e.g. how expressed preferences for characteristics of evidence compared with those seen in 'real-world' decision-making).

4.3 Results

4.3.1 Participant characteristics

The survey was completed by 190 respondents. As described above, the methods we used to disseminate the survey mean we cannot calculate the response rate. The survey as a whole can be found in Appendix 4.

Of those who responded, 118 said they were involved in decision-making, 67 said they informed decision-making, and five said they were neither involved in nor informed decision-making. These last five respondents were excluded from all analyses, meaning the final number of survey responses used in the analysis was in fact 185.

Most respondents said they worked for either secondary care, commissioning or tertiary care organisations (Table 4). Those who said they worked for 'other' types of organisation typically worked for health-related charities, or worked for 'support' or 'advisory' organisations like AHSNs, NHS Improvement (NHSI), Strategic Clinical Networks, NHS England, or Commissioning Support Units (CSU). There were 13 respondents who said they were not employed by the NHS but they all worked for a support organisation, charity, or were retired health service practitioners. As such they were retained in the analysis.

Table 4: Respondents by organisation type

Type of organisation	Number	Percentage
Secondary care	66	36%
Commissioning	47	25%
Tertiary care	31	17%
Other	25	11%
Primary care	9	5%
Mental health	3	1.5%
Community care	3	1.5%
Mixed-services provider	3	1.5%
Charity	3	1.5%
No response	1	<1%
Total Responses	**185**	

The most common roles that respondents said they had when making decisions were "doctor", "management" or "commissioner" (Table 5). Respondents were allowed to choose more than one role. Respondents who said 'other' gave a variety of roles, and where appropriate were recoded.

Table 5: Respondents by role

Role	Number	Percentage of respondents
Management	78	42%
Doctor	75	40%
Commissioner	22	12%
Nursing/Midwifery	14	8%
Other	13	7%
Clinical academic	11	6%
Health Informatics/health science	11	6%
Pharmacy	6	3%
Public health	6	3%
AHP	3	2%
Mental Health	2	1%
Patient representative	2	1%
Dentist	0	0%
Ambulance service	0	0%
Total Responses	**243**	

4.3.2 Ranking exercise – characteristics of evidence

For the ranking exercise, respondents were given a list of 25 characteristics of evidence and asked to choose the "top three types of evidence that you would prefer to base a decision on". We did not ask respondents to rank their top three, so the responses given were effectively weighted equally. The three most popular characteristics chosen were: "cost-effectiveness", "patient safety" and "quality of care provision" (see Table 6 below). The least chosen characteristics were: "impact on other sectors", "credibility of presenter", "funder of the evidence", and "infection risk".

Table 6: Respondents' 'Top three' characteristics of evidence

Characteristic	Number of times chosen for Top three
Cost-effectiveness	78
Patient safety	54
Quality of care provision	44
Quality of life	41
Morbidity	30
Credibility of source of evidence	29
Local priority	28
Applicability of evidence to target population	27
Budget	26
Amount of effort required	24
Mortality	23
Previous implementation	22
Quality Adjusted Life Years (QALYs)	21
Survival rate	16
Use of services	15
Inequality	13
Time to benefit realisation	10
Staff buy-in	9
Patient perspective	9
Alignment with national priority	4
Impact on other services	3
Funder of the evidence	2
Credibility of the presenter	2
Infection risk	1
Impact on other sectors	0
Total	**531**

Respondents were asked to suggest any other characteristics of evidence that they would consider important but were not in the list of 25 (Appendix 4, Table 22). Common themes among responses were around: implementation issues; non-specific health outcomes; non-specific effectiveness; and non-specific contextual factors. Many comments suggested that respondents could not choose between characteristics, or chose a specific characteristic as an amalgamation of other characteristics (e.g. quality of care as a combination of mortality, morbidity and safety). Practical concerns about implementation and 'scalability' were commonly raised.

These results were divided into subgroups based on the three most common roles that respondents said they held: doctor, manager, and commissioner. These subgroups had slightly different priorities to the collective whole and to each other. The top three characteristics valued by doctors were: patient safety, cost-effectiveness, and quality of life, respectively. Managers valued cost-effectiveness, quality of care provision, and patient safety, respectively. Commissioners value cost-effectiveness overall, and then quality of life and budget were the other two most common top three choices (Table 7).

Table 7: Top three choice of characteristics of evidence by respondent role

Values	Doctor	Manager	Commissioner
Cost-effectiveness	28	41	12
Patient safety	33	17	2
Quality of care provision	18	27	6
Quality of life	20	13	8
morbidity	18	11	2
Credibility of source	12	13	3
Local priority	8	15	6
budget	10	16	8
applicability	12	10	6
mortality	16	9	2
effort	10	10	3
Previous implementation	11	14	2
QALYS	14	7	4
Use of services	2	12	2
Survival rate	10	4	3
inequality	2	7	6
Time to benefit	1	8	3
Staff buy in	2	6	0
Patient perspective	3	5	1
National priority	2	3	2
Impact other services	0	3	1
funder	1	2	0
Infect risk	0	1	1
Credibility presenter	0	2	0
Impact other sectors	0	1	1
Total	**75**	**78**	**22**

The results were also divided into three subgroups or themes of characteristics. The first theme represented characteristics concerned with impact and outcomes (referred to hereafter as "impact"). The second theme concerned issues of practicability and acceptability ("practicability"), and the third theme concerned the source and context of the evidence ("context"). Table 8 below shows the list of characteristics broken down into the three themes. Thematically sorting the characteristics in this way suggests that respondents prioritised the potential impacts of an intervention over practical and contextual considerations. Figure 8, presented below Table 8, shows the breakdown of these themes

more clearly as a Venn diagram. In the sections of the Venn diagram where two circles overlap, this indicates that the three choices were split as, e.g. two impact and one practicability characteristics.

Table 8: Respondents ranked characteristics by theme

Characteristic	Number of times chosen for Top three
1) Potential impact and outcomes	
Cost-effectiveness	78
Budget	26
Patient safety	54
Quality of care provision	44
Quality of life	41
Morbidity	30
Mortality	23
Quality Adjusted Life Years (QALYs)	21
Survival rate	16
Inequality	13
Infection risk	1
2) Practicability & acceptability	
Amount of effort required	24
Previous implementation	22
Use of services	15
Time to benefit realisation	10
Staff buy-in	9
Patient perspective	9
Impact on other services	3
Impact on other sectors	0
3) Source/context	
Credibility of source of evidence	29
Local priority	28
Applicability of evidence to target population	27
Alignment with national priority	4
Credibility of the presenter	2
Funder of the evidence	2
Total	**531**

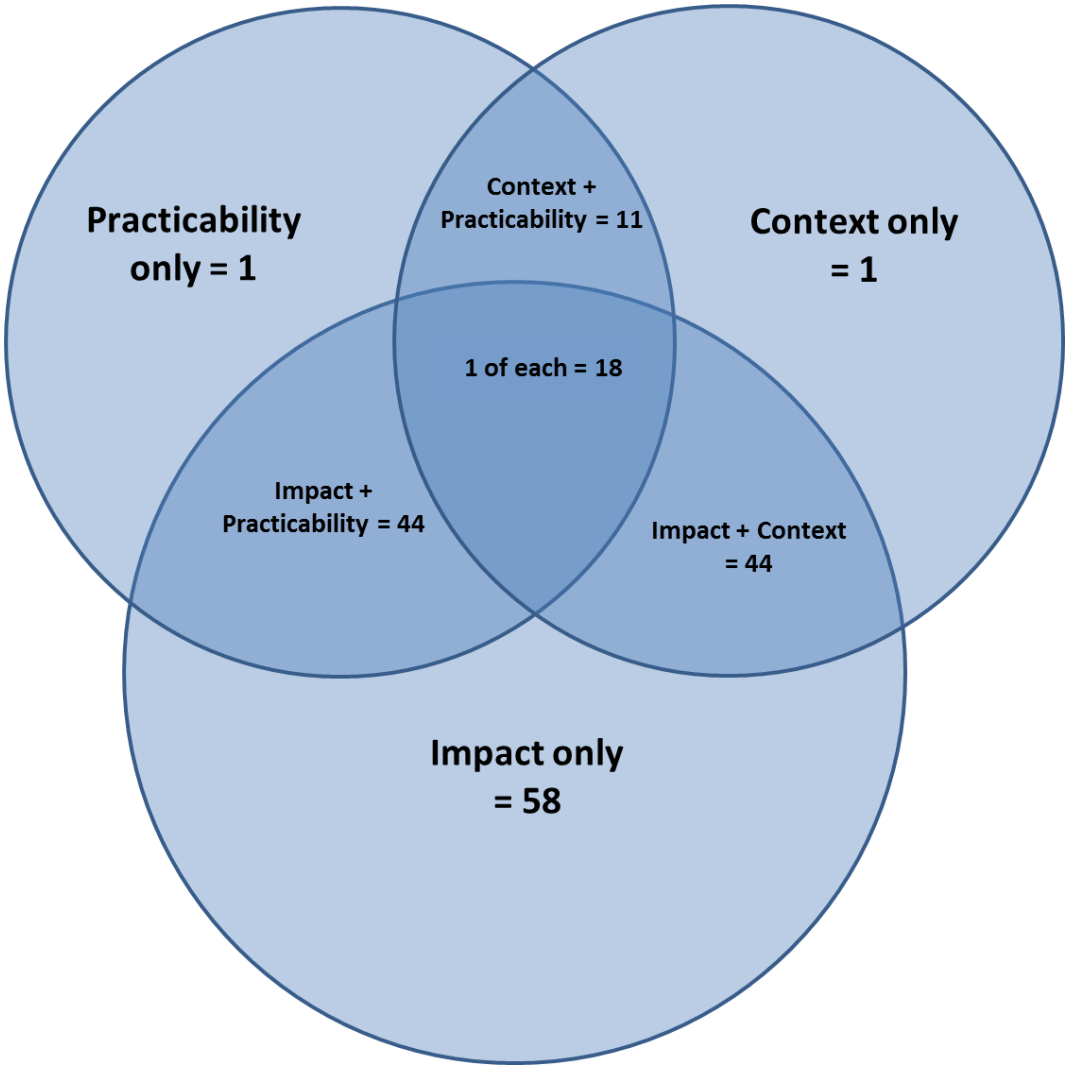

Figure 8: Venn diagram showing the breakdown of characteristic themes

The above figure shows that impact characteristics were almost always chosen by respondents, and 33% of respondents chose impact characteristics for all of their top three choices. Comparatively, context and practicability characteristics were typically only chosen in conjunction with impact characteristics. Only 7% of respondents chose non-impact characteristics for all of their top three choices. Of those who split their top three between impact and practicability or context, 34 out of 44 selected 2 impacts and 1 practicability; and 33 out of 44 selected 2 impacts and 1 context characteristic. The Ranking exercise included a free text question, asking respondents: "Are there any other characteristics that you consider

to be important?". The responses to this question were also analysed in terms of the three characteristics themes (Appendix 4, Table 22). There were 40 individual responses. Of these, 20 concerned impact, 18 concerned practicability, 11 concerned context, 2 concerned all three, and 2 suggested that the required evidence depended entirely upon the specifics on a given innovation. This indicates that several respondents had a more nuanced attitude towards evidence needed for decision-making than can be inferred by the ranking exercise alone. However, as the question did not ask for additional characteristics that should be in the top 3, we cannot infer from this that impact characteristics are not the priority.

4.3.3 Participants' perspective, beyond their own organisation

Respondents were asked a question on their typical perspective when considering innovations, framed as whether they consider the costs and benefits of an innovation that might fall outside the scope of their organisation's sector (survey section 4, question 1). The results suggest that respondents do not only consider the impact of an innovation on their own organisation, they often consider the impact of an innovation on many different sectors, including those outside of the healthcare sector (see Table 9, below). Secondary care services were the most frequently considered, although the largest number of respondents came from secondary care organisations (n=66). That being said, reference to Table 10 below suggests that respondents from other types of organisation frequently consider the impact of innovations on secondary care services, giving them priority over all health care services other than their own. It is, however, somewhat peculiar that 5 respondents from a secondary care organisation did not say they consider the costs and benefits of the secondary care sector. There is no obvious pattern to the other perspectives that these 5 did select. This may be an artefact of the survey, if some respondents spanned multiple health care sectors but they were forced to choose only one organisation type.

Table 9: Breakdown of respondents' reported perspectives on impact

Perspective taken for calculating costs/benefits	Frequency*	Percentage
Secondary care services	156	84%
Public health services	147	79%
Primary care services	140	76%
Community care services	106	57%
Tertiary care services	90	49%
Mental health services	76	41%
Outside health sector	73	39%

*Nb. Respondents could choose as many perspectives as they felt appropriate to their decision-making so the total adds up more than the number of respondents.

Table 10: Perspectives considered by organisation type of respondent

Organisation type (of respondent)	Perspectives considered: Primary	Secondary	Tertiary	Community	Mental Health	Public health	Outside Healthcare sector	Number of respondents in organisation type
Primary	9 100%	4 44%	2 22%	6 67%	4 44%	9 100%	4 44%	9
Secondary	43 65%	61 92%	22 33%	24 36%	8 12%	57 86%	15 23%	66
Tertiary	18 58%	22 71%	25 80%	13 42%	8 26%	21 68%	8 26%	31
Community	1 33%	3 100%	1 33%	2 67%	1 33%	2 67%	2 67%	3
Mental Health	2 67%	1 33%	0 0%	0 0%	1 33%	3 100%	2 67%	3
Commissioning	44 93%	42 89%	22 47%	42 89%	37 78%	33 70%	23 49%	47
Other	23 92%	23 92%	18 72%	18 72%	17 68%	21 84%	18 72%	25

The responses were broken down further by respondent role (Table 11). Overall, commissioners said they took the most multi-sectoral view as they have the highest percentage of responses in each row. Mental health care rated particularly low for both

doctors and managers (either lower than, or almost as low as, outside health sector), and yet was considered more frequently than tertiary care by commissioners.

Table 11: Perspective by respondent role

Perspective	Doctor		Management		Commissioner	
Primary care	56	75%	58	74%	22	100%
Secondary care	61	81%	65	83%	22	100%
Tertiary care	28	37%	47	60%	14	64%
Community care	35	47%	53	68%	20	91%
Mental health care	21	28%	34	44%	17	77%
Public health care	62	83%	60	77%	18	82%
Outside healthcare sector	24	32%	32	41%	14	64%
Total	**75**		**78**		**22**	

4.3.4 Time horizons considered by decision-makers

Respondents were asked to estimate the typical time horizon over which they consider costs and benefits of an innovation (survey section 4, question 2). A 5-year and a 3-year time horizon respectively were the most common responses (Table 12). Only 14% of respondents had a time horizon beyond 5 years. The majority of these were doctors, who had a much greater range of responses than did managers or commissioners (Table 13). While the 5 and 3 year time horizon were the most common response regardless of role, this was most pronounced for managers (78% of whom said 5 or 3 years), less so for commissioners (73%) and least for doctors (58%).

Table 12: Typical timeline for which respondents said they consider the costs and benefits of an innovation

Number of years of costs/benefits typically calculated	Frequency	Percentage
No response	4	2%
1 year	8	4%
2 years	18	10%
3 years	41	22%
4 years	5	3%
5 years	83	45%
6 years	2	1%
7 years	2	1%
8 years	0	0%
9 years	0	0%
10 years	9	5%
More than 10 years	13	7%
Total	**185**	

Table 13: Typical timeline responses by respondent type

Time Horizon	**Doctor**		**Management**		**Commissioner**	
1 year	4	5%	1	1%	1	5%
2 years	9	12%	7	9%	3	14%
3 years	10	13%	26	33%	4	18%
4 years	1	1%	3	4%	0	0%
5 years	34	45%	35	45%	12	55%
6 years	1	1%	1	1%	0	0%
7 years	2	3%	0	0%	0	0%
8 years	0	0%	0	0%	0	0%
9 years	0	0%	0	0%	0	0%
10 years	4	5%	3	4%	1	5%
10 + years	8	11%	2	3%	1	5%
No response	2	3%	0	0%	0	0%
Total	**75**		**78**		**22**	

4.4 Comparative thematic analysis with case study findings

In this section, we further analyse the thematic breakdown of the ranking exercise (above) into 'impact', 'practicability' and 'context' themes. Using those themes we compared the results of the survey with the results of the case studies undertaken in workstream two. Two aspects we examine here are (1) the financial/economic aspects of decision-making, and (2) decision-makers' consideration of the impact of innovations on other services/sectors. We chose these aspects because the finding that cost-effectiveness was more of a priority than budget impact contrasts with existing literature, including findings from the scoping review (Turner et al. 2017). We further analysed the impact on other sectors because the case studies included different contexts for innovation, including those where other services/sectors were relevant (e.g. changes to referral pathways between primary and secondary care for suspected cancer and reconfigurations to the pathway for stroke patients that affects multiple providers of care).

4.4.1 Financial/economic considerations

In order to assess financial/economic considerations in the interviews, we started by searching the interview transcripts for synonyms related to these terms. We searched on cost*, budget, money and finance* and specifically included the term cost-effective*. Issues of funding and cost were described frequently in the interviews. Across the case studies, 26/30 described funding and cost issues in relation to the cancer case study; 19/27 in the eyes case study; and 16/23 did so in the stroke case study. Funding and cost issues were often described as barriers to adoption, as these examples from the cancer case study illustrate:

"If you've got a budget to manage… we can't do this because we've already overspent and services for colonoscopy are already crippled. If we just say now refer against the lower threshold, A, we can't afford it, and B, the hospitals can't cope."

(Commissioner, SW England CCG, CCI2)

"*It's a lovely position to be able to make top grade clinical recommendations when you haven't got to pay for the consequences of it. And so NICE are totally dissociated from the costs of their recommendations and they seem to act in a bit of a silo. And it all stems from a government problem really. They set up NICE as an arms-length body to make recommendations that the rest of the system then have to try and deal with. So some of them are very expensive; others are major service reconfigurations*"

(Commissioner, SW England CCG, CAI2)

In relation to the same case study, a decision to provide funding for a change was seen by one interviewee as sufficient to ensure adoption, irrespective of whether the decision was aligned with the evidence for the innovation:

"I think the main issue with evidence is money – so if something is being funded, it'll get done, whether it's evidence-based or not."

(GP, London CCG, CBI8)

In contrast to budget or finance considerations, cost-effectiveness was mentioned much less frequently in the case studies. It was mentioned in only five of the cancer interviews, four of the interviews from the eyes case study, and one of the stroke interviews. In the cancer case study, when cost-effectiveness was mentioned, it was to clarify that it had a lower priority relative to other forms of evidence, as this interviewee describes:

"Often there's then many layers before it might get down to the person who's going to implement it because it's going to be… good evidence, scientific evidence, and then maybe it has to be shown that it's cost-effective."

(Macmillan GP, pan-London organisation, CA14)

More frequently, evidence of cost saving, rather than cost-effectiveness, was perceived to be necessary for decisions to be made in relation to introducing service innovations. As this interviewee describes, such evidence was more relevant for the evaluation of new medicines or treatments than complex service innovations:

"You know we get the NICE technology assessment appraisal? A drug is approved, you have got … three months rather, to implement it, it is cost effective but not cost saving. Get on with it, pay for it. Anything else though, anything else comes out, unless it is cost saving, and actually is cost saving in a reasonably short period, it is going to struggle, which means that we need to find the way of more rapidly getting to that kind of understanding. … so I think that the evidence is going to have to do more than it has traditionally done, which is you make the clinical case and then people want to use it."

(Early diagnosis lead, SW London CCG, CCI6)

In relation to the new model of care for glaucoma outpatients, cost/financial considerations were cited by the majority of senior managers and clinicians leading decision-making. However, rather than being privileged relative to other impacts, cost-related evidence was seen as only one type of evidence that should be used with others to inform decision-

making. These interviewees describe the importance of other forms of evidence (patient experience and safety), and how these should be prioritised, relative to the potential impact on cost:

> *"It is available out there, sometimes not a lot of evidence, but it is available, and we look at costing, we look at all these things, we look at what patients feel and what their experience is, we look at what others have done. That was all part of the process."*
>
> *(Improvement lead, central Trust, EAI2)*

> *"The patient thing is the priority. So if the patients disliked it we just wouldn't be doing it, and safety is really important. So I think those two are our priority. I mean, I don't know whether this can be published but literally our finance director yesterday was saying: there may be things that we just have to do for quality and safety that aren't financially viable. The fact that it's potentially financially a little bit better than seeing them in a consultant clinic helps but yeah, you know, we can do things that aren't just about the money, you know, because there's other things where you can try and make money and, you know - because we have to be financially viable."*
>
> *(Clinical director, central Trust, EAI4)*

Moreover, where innovations may potentially increase costs, demonstrating that the innovation is likely to have a positive impact on other aspects of care could be influential in encouraging 'buy-in' at senior management level:

> *"Well, it's a very good selling point to the Trust, you know. If costs are accrued up, or it's slightly more expensive, if you say: Well, look, well it does this to the patient experience, you know? Okay, they'll go with it. […] Whereas if it's, you know, double*

the price and the patient experience is good, then they'll say: well, can you improve the patient experience a little less, but still improve it for not so much money, you know?"

(Service director, central Trust, EAI10)

In relation to stroke service reconfiguration, financial considerations were also seen as a barrier to adopting innovations, despite the availability of evidence that supported the case for introducing the centralisation of services. This is described by these interviewees in relation to the Scottish metropolitan area that was reviewing stroke services:

"I think in a way it does overrule a lot of what we can do, because we come up with what we want to do, which is evidence based, and then if there is not the funding put in, then it can't happen. And very often the funding, which is why we have done it on the hoof, and we are back here again looking at this, and it is not the first time, before that we were looking at stroke review, and we have done this a few times now!"

(Stroke consultant, SAI6)

"One of the big differences [with London] is they had a huge amount of funding pumped into them to do what they did. They had a different... It was a complete redesign of everything across London with a lot of money behind it. This is... because it's more locally driven and there possibly is a bit of "but why?" so the kind of push for it's different, the lack of allocation of any sort of resources. So everybody gets a bit twitchy about "Well how will be able to repatriate? What discussions are we having with the Ambulance Service? What about rehabilitation both on the wards and on the community to let us get these patients home quicker rather than keeping

them in the hospital?" A lot of the conversations you have, it does come down to "Well we don't have an added resource for that".

(Clinical network coordinator, SAI4)

In this and other cases, strong evidence of impact was not sufficient for deciding to adopt innovations. As the quotes above suggest, as well as financial issues, there were also implementation considerations to take into account, e.g. the need for conversations with ambulance services about moving patients to and from different hospitals.

In relation to stroke reconfiguration in NW England, it was suggested that decisions to change services needed to be informed by a range of considerations (including cost and clinical impact), as this interviewee described:

"I don't think there's anything that shouldn't progress along the basis of only hitting a bullseye in one of those considerations, whether it's around affordability or around clinical impact, because actually that's not the way that we actually like to run the system is it? You know, in a tax funded system that is just not a freedom that we have. So I think there's always been a balance between investment impact and being split in terms of financial, clinical, health impact. And that hasn't changed in the years since, that's still how we weigh compositions now, and we've just got probably I think slightly better at the models of cost benefit analysis that means we've got a bit more science in the way that we make some of those judgements and project those impacts".

(Strategy lead, commissioning, SBI7)

These comparisons suggest that the case study evidence differs from the results of the survey. The priority placed on cost-effectiveness in the survey is particularly contentious, and leads

to questions about whether cost-effectiveness was understood by respondents as we intended, and whether there is a degree of 'social desirability bias' in choosing cost-effectiveness rather than cost or budget impact that influenced respondents' choices. The case study data suggests that the impact of innovations on cost is important (especially in the wider context of NHS austerity), but it is typically considered alongside other forms of evidence of impact (e.g. clinical quality, patient experience and safety). With this in mind, it is perhaps the case that respondents saw 'cost-effectiveness' in the ranking exercise as an opportunity to draw together two forms of impact in comparing the relative cost and outcomes of different courses of action, while representing only one choice out of the limited top three characteristics of evidence they were able to choose.

4.4.2 Impact on other sectors and services

In the survey, impact on other services and sectors was rarely a priority for respondents; they were chosen only three (services) and zero times (sectors) respectively in respondents' top three priorities for evidence (Table 8, above). When prompted, respondents did report taking account of secondary care most commonly but the majority (61%) did not take into account costs outside the health sector (Table 9, above). Interviews in relation to the implementation of guidance for GPs on referral for suspected cancer, however, indicate that impacts on secondary care were one of the most important barriers to adoption:

> *"… that's one part of it is the GP side of it side of thing, I mean, another is the sort of trust side, so I guess the direct access to diagnostics and things like that. I mean, it's an issue here as well because although the guidance are saying something, are saying, you know, GPs should have direct access to A, B, C tests, that's not been implemented locally".*
>
> *(Practice facilitator, London CCG, CBI1)*

These direct and tangible impacts were frequently described, in terms of capacity, volume and costs, and a lack of evidence to allay concern about these impacts, as these two interviewees described:

> "*There is a fair bit of resistance from all sides, I think. There's a lot of concern that opening the doors to GPs for access to diagnostics will increase demand."*
>
> *(Clinical lead, pan-London organisation, CAI2)*

> *"The secondary care clinicians objections are really driven from a perspective of having too much work. ...So it is a difficult thing to implement, in the context of a lack of understanding of the service's current capacity constraints."*
>
> *(Early diagnosis lead, SW London CCG, CCI6)*

Important intangible impacts on other sectors were also described, referring to a shift in culture, control and responsibility, required by changes to referral pathways:

> *"To deal with three acute trusts is obviously you know brings about its own challenges so I think there's quite a culture shift in our experience from the consultants, the MDTs […] to GPs rather than the CCG taking some ownership of it so in itself, that was quite a different approach."*
>
> *(Commissioner, SW England CCG, CC1I)*

Some GPs also observed there was a risk that a focus on meeting NICE recommendations – including consideration of the lower threshold for referral for suspected cancer – may lead to other areas of patient care being neglected during patient consultations:

"…trying to measure something objective, like weight, it's so easy, but a lot of the time, it doesn't get done because there's this focus on blood tests and more technological things – from the patients as well. But with the pressure to refer […] if they do really want to decrease the threshold of two-week waits, there is going to be a background pressure in your head, and you do forget to do the thyroid function tests."

(GP, London CCG, CBI8)

Another GP observed that the impact on other sectors/services is not considered in adoption decisions, but that decision-making should be more 'linked up' by considering impacts on other services (e.g. access to endoscopies):

"I think there's a sort of general feeling of […] A sort of question mark over, okay, sure, this can be done, how will it impact on the wider, and are the other services sort of aligned to allow these sorts of things to happen in terms of the volume, you know, it's going to increase the volume of direct referrals for services like endoscopies and so on and I'm not sure that that's all been necessarily the whole thing has been linked up necessarily."

(Senior nurse, SW England CCG, CCI5)

In the eyes case study, in which new approaches to the delivery of glaucoma outpatient clinics were described from the perspective of a secondary care provider, the impacts on other services and sectors did not appear to be given major consideration. Decision-making concerning the innovation tended to consider the impact on their own organisation, rather than taking the perspective of the local health system in which such services were provided.

The neglect of the wider system, and influence of actors at the local system level, was described by the following interviewee:

> *"I mean if you think about it we're in a health economy and you probably add up all the financial positions of all of our organisations we're probably in deficit, they should probably be doing something about that, serious risk to the sustainability of the health economy and their partners, they should probably be doing something about that. They should probably be helping with, you know, health analytics and understanding the demography and what might happen there, they should probably be helping translate learning across the different organisations more effectively than they are, clinically, managerially, operationally, corporately, so, yeah, we don't see much of that, there's not much facilitation of learning across different dimensions. They may be doing a fantastic job in the research arena, I've no idea, I don't think so though."*
>
> *(Finance director, central Trust, EAI11).*

In relation to stroke services, there was recognition that redesigning acute services had an impact, in terms of potential costs and benefits, along the whole patient pathway, including rehabilitation and social care. In relation to the Scottish metropolitan area that was undertaking a review of stroke services, this interviewee described the challenge of getting stakeholders involved in decision-making to adopt a system-wide perspective with regard to costs and benefits, as the focus tended to be limited to their own sector (e.g. acute or social care):

> *"There's also a structural problem that it always appears to be impossible to realise any cost reductions, in a way which allows you put resource back into the other parts*

of the service. When we say, "By improving the acute treatment, we would save so many bed days in hospital, we'll save all that," then the comeback is always, "That's fine, and it saves social care costs, but we don't see any benefit. It just costs us more." Whether it's cardiology, whether it's radiology, whether it's nursing, whether it's A&E, it's always perceived we want more. If any perceived benefits are invisible to them, they don't get that, so that's a big problem, trying to get people to recognise how that translates back. I believe it provides some visible flow of resource funding, whatever form it comes in, back to the people that actually feel that they're being imposed upon to do the initial work."

(Consultant, Scottish metropolitan area, SAI8)

The case study evidence above indicates that impact on other services and sectors were a major influence on whether and how the guidance was implemented. These concerns about the impact on other services/sectors reflect the importance of anticipating implementation issues in decision-making, as described in more detail in the theme on this topic in chapter three. The suggestion is that assessing the impact of innovation on other services and sectors is regarded as important to some of the interviewees we spoke to (e.g. taking a system-wide view on stroke service reconfiguration), but challenging to adopt in practice due to structural constraints (e.g. competing provider organisations, separate budgets, etc.) This is in line with the results from the perspective question in the survey, but the results of the ranking exercise suggest that inter-sectoral considerations are far from a priority. This raises questions about whether respondents gave different answers depending on whether they were 'unprompted' (in the ranking exercise) or 'prompted' (in the perspective question). Additionally this may be interpreted as decision-makers answering prospectively in the survey, and retrospectively in the case studies. In this case, if decision-makers don't prospectively consider impacts beyond

the targeted service, the results may yield insight into why some decision-makers struggle to get innovations adopted. Further, this asks the question of the extent to which existing guidelines enable or stifle this kind of consideration in relation to innovations that cross service or sectoral boundaries when they often focus solely on one clinical area.

4.5 Discussion

4.5.1 Ranking exercise

Cost effectiveness was the most commonly cited type of evidence for informing decision-making, while the other characteristic that takes into account the financial aspect of innovations - 'impact on budget' - was seen as important but less of a priority than cost-effectiveness. This finding conflicts with existing literature on evidence use which suggests that the impact on budget is of paramount importance since the 2008 financial crisis (i.e. innovations which reduce costs or are cost neutral are more likely to be favoured) (Evans et al. 2013; Gallego et al 2009; Wade et al. 2016). Moreover, some evidence suggests that decision-makers view economic information narrowly – referring to budgetary impact and costs rather than cost-effectiveness – due to the pressure on health services to save or control costs (Spyridonidis and Calnan, 2011). We posit a number of reasons for the different preference found in our survey.

As respondents could only choose three characteristics, it could be that they only chose one related to 'finance' (with other priorities including safety and quality) even though both cost-effectiveness and impact on budget may have been important considerations in practice. The primacy of cost-effectiveness may reflect the style of the survey and sample of respondents – it involved choosing between alternative courses of action and was administered by a university department and led by health economists – so it may have appealed more to

respondents interested in research evidence generally, and using health economic data specifically, to inform choices. There is also the possibility that prioritising cost-effectiveness, rather than budget impact, is seen as more desirable among respondents given public concern about the threat of health care rationing in times of austerity. Another possibility is that decision-makers' preferences reflect a 'mature' state of austerity with regard to NHS funding, and longstanding concern with the financial aspects of innovations, and techniques and training have grown to evaluate cost-effectiveness (e.g. as endorsed by NICE) rather than budget impact to inform decision-making about innovation.

Many of the 'contextual' characteristics (e.g. credibility of presenter) were rated less highly than those relating to impact (e.g. quality, safety and cost effectiveness of care). Of the contextual factors, credibility of the source of evidence was considered more of a priority than the credibility of the presenter. From the discrete choice experiment, we know that guidelines, research publication and regulators' priorities were all preferred over local data (see chapter five). It is possible that, if research evidence and other external forms of evidence such as guidance tended to be favoured, then the source could be seen as more important than the presenter (as irrespective of who is presenting the evidence it comes from an 'official' source). It could be argued that the presenter may be more important when dealing in local data as there may not be an external authority or 'rubber stamp' to endorse its use. Both patient perspective and staff 'buy-in', which could be seen as stakeholder involvement in decision-making, were also a relatively low priority (chosen 10 and 11 times respectively). While stakeholder involvement in decision-making is widely endorsed in the literature, this finding may reflect practical challenges with involving stakeholders in decision-making processes (e.g. time and resources needed) and that, while being an important aspiration, is seen as less of a priority than collecting evidence of impact. This

suggests the need to reflect on what 'impact' might mean to decision-makers and whether working definitions of this term that are used in decision-making need to be expanded in order to consider the perspectives of staff and patients as a key aspect of evaluating impact.

4.5.2 Time horizon and perspective

The most common time horizons chosen were 5-years and 3-years, respectively. This may well be a reflection of the typical budget cycles that larger innovations are expected to be delivered in (for example, having a year of set up, a second year of troubleshooting with some benefit, and a third year of fully realised benefits). A 2-year time horizon was the third most common, which might reflect smaller scale innovations, or innovations with 'quicker' time-to-benefit expectations. A number of respondents selected very long time-horizons of 10 or more years. On the one hand these may be innovations that affect public health services (we did not have an 'organisation' category for public health) but could also reflect the argument that an organisation such as a hospital will continue to track the costs and benefits of an innovation it sustains in the long term.

Breaking these results down by respondent's role suggests that doctors are far more varied in their responses, with many more selecting very short and very long time horizons, when compared with managers and commissioners. This may suggest that doctors feel less constrained by budget cycles that typically run for 3 and 5 years, particularly when considering the funding of innovations.

The results of the survey that concern respondents' perspective are somewhat contradictory. The ranking exercise suggests that inter-service and inter-sectoral considerations are a non-priority. Yet the perspective question suggests that these considerations are far broader than may be expected, given that decision-makers may rationally be expected to prioritise the service they are responsible for, and would therefore need extra incentives to consider other

services and sectors. It is therefore particularly surprising that perspectives 'outside the health sector' were considered by 39% of respondents, although these respondents may be referring to social care. These contrasting results may be a product of 'unprompted' preference in the ranking exercise, and 'prompted' preference in the perspective question. Prompting in this way may have resulted in introducing a 'desirability bias' in the respondents, making them want to embellish reality. It may be argued that the unprompted responses are a more accurate account of real-world decision-making, whereas the prompted responses are an 'ideal world' account. As suggested by the case study evidence, some decision-makers, or those influencing decisions, do not consider impacts outside their own sector (e.g. capacity in other areas of acute care in the cancer case study and provision of services for chronic eye disease outside hospital setting taking into account the potential role of community optometry). Not adopting this wider perspective can adversely affect the system's capacity to implement change that crosses service and sectoral boundaries.

4.5.3 Novelty and strengths

A national survey allows a broad investigation of decision-makers' preferences for evidence nationally, and complements the in-depth case studies of decision-making in relation to specific service areas. Conducting a ranking exercise covering multiple characteristics of evidence, informed by qualitative research methods, is a key strength of this work and a relatively novel way of investigating decision-makers' preference for evidence. For example, analyses of decision-makers use of evidence have highlighted how preferences for types of evidence vary by professional group (Clarke et al. 2013), organisational role (Wye et al. 2015), and local system context (Mele et al. 2013), but these have not considered the ordering of priorities across a range of characteristics. The survey adds to existing literature by specifying decision-makers' priorities across a range of characteristics of evidence – taking

into account the 'impacts' or outcomes of an innovation, as well as concerns about the acceptability/practicability and source/context of evidence. The findings are useful for producers of evidence: the ranking exercise tells us that demonstrating the 'impact' of innovations is likely to be a priority for decision-makers, but also that shedding light on implementation concerns and enhancing the perceived credibility of evidence is important for improving its uptake. Comparing these 'unprompted' responses gathered through the ranking exercise, with responses to specific questions on time horizon and perspective, allows a more nuanced understanding of issues, and potential conflicts, that affect all innovations in healthcare.

An additional strength is comparing and contrasting the survey findings with the case study findings. In this way, the survey can be understood as the 'stated preference' of decision-makers, and the case studies as preferences enacted in the 'real-world' (with the benefit of hindsight). The survey could also be understood as decision-making preferences made prospectively, whereas the case studies examined decision-making either in the moment or retrospectively. The study also highlights where surveys such as this could be liable to 'social desirability' bias (particularly around taking into account cost of care in decision-making) and where problems in interpretation among respondents, e.g. terms like cost-effectiveness, may be variably understood. When stated preferences are compared with 'real-world' influences it can reveal limitations in decision-makers' strategies to ensure adoption of innovations. For example, while evidence of impact is necessary for innovations to be adopted, consideration of dimensions of impact to the exclusion of context and practical concerns was common in our survey, despite the fact that in the case studies, it was clear that context and practical concerns were major influences on adoption.

4.5.4 Limitations

There were a number of limitations to this study. We cannot estimate the response rate to the survey, as we do not know the number who received an invitation to complete the survey. Given that we had only 185 responses to a survey advertised as widely as possible within the UK, it can be assumed that the response rate was very low, despite the fact that many recipients would have received multiple copies of the invitation from many different sources. With 185 respondents we can be confident in the accuracy of the main effects, but some of the subgroups have very small numbers (e.g. only 22 commissioners), meaning there is a degree of uncertainty around the accuracy of these subgroup analysis results. Regarding the list of characteristics of evidence, some of the types of evidence are components or subcategories of others and this may have affected respondent's choices. For example, respondents may have been inclined to choose the broader option such as 'patient safety' or 'quality of care' over 'infection risk', unless infection risk was the driving force behind that decision maker's priorities within patient safety to the extent that it warranted being chosen in its own right. In this way it may not be appropriate to compare two items if one of them could be considered a subcategory of another.

4.5.6 Summary of findings

The results of the ranking exercise suggest that the three characteristics of evidence that were most frequently chosen by respondents were: cost-effectiveness; patient safety; and quality of care provision. The role of respondents affected these results to a degree. Impact and outcome considerations were much preferred over implementation and contextual considerations. The most frequent time horizon that respondents said they consider for measuring the costs and outcomes of innovations was over 5 years. There is some contradiction over the breadth of

the inter-service and inter-sectoral perspective that decision-makers take that may be explained by prompting and bias. There is also a difference between the national survey and case studies with regard to consideration of cost-effectiveness (prioritised among survey respondents) and cost (cited more frequently in the case studies). This disparity may also reflect social desirability bias. The survey can be understood as the 'stated preference' of decision-makers and the case studies as preferences enacted in the 'real-world' based on the requirements for evidence and constraints faced in specific decision-making contexts.

Chapter 5. Discrete Choice Experiment

5.1 Introduction

A Discrete Choice Experiment (DCE) is an attribute-based method of preference elicitation that is being used increasingly in health economics. In a DCE, respondents are asked to choose between multiple options that have the same 'attributes' (such as 'wait time', 'amount of information', 'mode of diagnosis'). The specifics of these attributes are divided into 'levels' (e.g. long wait vs short wait, or CT vs MRI vs endoscope) and variations of these levels are asked multiple times over several 'would-you-rather-have A or B?' questions. This meant that the research team needed to develop an appropriately comprehensive list of characteristics and, from these, to select five key attributes required to conduct a DCE (as described in chapter four).

5.2 Method

5.2.1 Attributes and levels

The final selection of attributes and levels of the DCE are shown in Table 14 below. These attributes of innovations were found in the piloting phase to be of importance to all decision-makers, regardless of healthcare sector or type of organisation. The number of attributes was limited to five in order to keep the number of choice-sets (i.e. questions) needed to a reasonable number to capture useful information without overburdening respondents. In order to ensure generalisability we needed to focus on practical and contextual characteristics that are universal to NHS decision-makers. None of the impact factors on the list of characteristics we generated met this criterion of generalisability (even cost-effectiveness

depends on budget which depends on organisation size). In addition, we attempted to present budget impact as a percentage. However, this confused our pilot interviewees who did not think of changes to their budgets in this way. For the 'Credibility' attribute, a level of 'unknown credibility' was chosen to contrast with 'high credibility', reflecting the reality that an innovation is only going to reach a decision-maker if the presenter/innovation lead is well-regarded, or at least unknown (results from the pilot phases suggested that an innovation lead with low credibility is unlikely to progress very far). The table of priority characteristics that we used to choose the five DCE attributes, based on interviewee responses, is presented in Appendix 4, Table 23.

Table 14: The Attributes and Levels used in the Discrete Choice Experiment

Attribute	Levels
The Credibility of the presenter/innovation lead	High Credibility Credibility unknown
The Applicability of the Evidence to the target population	Evidence drawn from local context Evidence drawn from similar context Evidence drawn from dissimilar context
Previous Implementation	Evidence of previous implementation exists No evidence of previous implementation exists
The level of Effort required	High effort required to introduce innovation Low effort required to introduce innovation
The Source of the Evidence	Published Research Guidelines Regulator's priorities Local data only/local opinion

5.2.2 DCE design

The DCE was a pairwise forced-choice design, where each choice was described by a unique combination of the levels of the attributes, and each respondent was asked to complete eight choice questions. Two blocks of eight choices were generated using a d-efficient design (reducing the possible number of 'choice-sets' from 96 to 16, while ensuring that no single attribute level was over-represented in the choices and bias the results). This was done using the -dcreate- command in Stata15 (Hole 2017). This meant the survey itself was split into versions A and B. Each version was identical except for the DCE which consisted of either the eight questions in block A or the eight questions in block B. No opt out was allowed in the choice, reflecting the pressure to innovate that decision-makers expressed in the piloting phases. Respondents were given an example question before being asked to complete the eight questions (Figure 9). For the full set of 8 DCE questions in block A, see Appendix 4.

Figure 9: Example question from DCE

Example question

A person has been asked to consider the characteristics of two innovations, A and B listed below and then answer the question at the bottom of the table saying which of the two innovations they would prefer.

Which innovation would you choose? (Tick one box only.)

Factors	Innovation A	Innovation B
Credibility	Presenter has high credibility	Presenter credibility is not known
Applicability	The evidence on costs/outcomes was drawn from a similar context	The evidence on costs/outcomes was drawn from local context
Previous Implementation	NO evidence of previous implementation exists	Evidence of previous implementation exists
Effort required	High effort required to introduce/roll-out innovation	Low effort required to introduce/roll-out innovation
Source of evidence	Local data only / local opinion	Guidelines recommendation

Innovation A ☐ Innovation B ☐

So if, on balance, the person would prefer Innovation B as described in the table rather than Innovation A, s/he would have ticked the box for Innovation B:

Innovation A ☐ Innovation B ☒

Alternatively, if the person would prefer Innovation A as described in the table rather than Innovation B, s/he would have ticked the box for Innovation A:

Innovation A ☒ Innovation B ☐

5.2.3 Analysis of data

The DCE was analysed using a conditional logistic regression model (a fixed-effects logit model). This was done using Stata15 statistical analysis package (the -clogit- command). Subgroup analysis was conducted using the same command, and the significance tests for the

equality of coefficients of individual attribute levels and subgroups were done in post estimation.

This produced an estimate for each attribute level being chosen relative to another (reference) level. These are shown as the β coefficients in the tables in the results section. In this way, a β coefficient represents the strength of preference for that attribute level relative to the reference level. For example, if 'high credibility' had a β coefficient value that was positive and above '0', this means it was preferred over 'credibility unknown' (the reference level). A larger β coefficient signifies greater likelihood of being in the chosen option of the choice-task.

Using the regression analysis results, we calculated the predicted probabilities of each combination of attribute levels being chosen over all other potential combinations. In particular we compared the probability of the worst scenario being chosen (i.e. the lowest, reference, levels) against the all-but-worst scenarios in which each attribute level was chosen in place of its respective reference level.

Minimum sample size calculation

An important question when conducting a DCE is how big a sample is required to provide reliable answers to the research question. To this end, we calculated minimum sample size using two methods. The first uses a methodology proposed by Johnson and Orme (1998; 2003), following the formula:

$$N > 500c/(t \times a)$$

where t is the number of choice tasks, a, is the number of alternatives and c is the largest number of levels for any of the attributes. This produces an estimate of N = 63 for minimum sample size needed.

The second method we used follows the methodology of Bliemer and Rose (2010), using a parametric approach based on the most critical parameter. Out of necessity, this was done retrospectively as it relies upon having a parameter estimate for each attribute (which we could only obtain post-hoc from the analysis). This method used the following equation (as presented by de Bekker-Grob et al. 2015):

$$N > max_k(1.96 \sqrt{\sum\nolimits_{\gamma k}} / \gamma k)^2$$

where γk is the parameter estimate of attribute k, and $\sum_{\gamma k}$ is the corresponding variance of the parameter estimate of attribute k. We used the β coefficients in Table 15, below, and associated standard errors for this equation. This gave a minimum sample size estimate of N = 147, which is due to the relative small parameter estimate of the 'credibility of presenter' attribute.

Using either method, our sample was large enough to meet the minimum estimate required for interpretation of the main results.

5.3 Results

5.3.1 Main results

The results of the DCE were largely as expected in that respondents preferred the objectively better level within each attribute. For the binary options (i.e. attributes with only 2 levels) the results show that:

- Innovations requiring 'low effort' to implement were preferred over 'high effort'
- Innovations where 'existence of previous implementation exists' were preferred over 'no evidence of previous implementation exists'

- ‘High credibility of presenter’ was preferred over ‘credibility of presenter was unknown’

For the attributes with 3 or 4 levels the results suggest that:

- ‘Guidelines’, ‘published research’ and ‘regulators priorities’ were all preferred over ‘local data’ as sources of evidence
- ‘Similar context’ and ‘local context’ were preferred over ‘dissimilar context’ in terms of the applicability of the evidence to the target population

Table 15 shows the results for all respondents. For each attribute, the ‘ref’ or ‘reference level’ was the least preferred option. The Beta Coefficients shows the relative strength of preference for each attribute level relative to its reference level (a β coefficient of 0 would mean that respondents were indifferent between a given level and its reference level). For each of the attributes, the reference level was significantly disfavoured compared to the other attribute levels. However, there was no statistically significant difference between the coefficients for any of the non-reference attribute levels within the Applicability or Source of Evidence attributes.

Table 15: Regression results for all respondents

Attribute & Level	β Coefficient	SE
Applicability: similar context (ref: dissimilar context)	1.22	0.13***
Applicability: local context (ref: dissimilar context)	1.11	0.10***
Source of evidence: published research (ref: local data)	1.12	0.11***
Source of evidence: guidelines (ref: local data)	1.11	0.12***
Source of evidence: regulator's priorities (ref: local data)	1.01	0.08***
Previous implementation: yes (ref: no)	1.04	0.12***
Effort required: low (ref: high)	0.69	0.07***
Credibility: high (ref: unknown)	0.45	0.07***
Number of observations	2916 (44 observations missing)	
Number of respondents	185	

***p < 0.001

5.3.2 Subgroup analysis

Further analysis stratified the results into subgroups based on the most common roles and organisation types. Tables 16, 17 & 18 (below) show the results for subgroups based on roles. Comparing the groups as a whole, there was a significant difference in preferences between Managers and non-managers, and no significant difference in preferences between Doctors and non-doctors (although this is only marginally so). Doctors placed much greater

importance on published guidelines as a source of evidence than non-doctors, as well as greater preference for low-effort innovations. Managers placed much lower priority on guidelines as a source of evidence than non-managers, and while they had a preference in favour of high credibility presenters of evidence this preference was not as strong as for non-managers. Commissioners preferred to have the existence of previous implementation compared to non-commissioners; however this preference was not quite significant (which may be due to low numbers in the commissioner group). Further subgroup analysis was conducted by organisation type (see Appendix 5, Tables 24-27). The preference for previous implementation by commissioners was reflected by those working in commissioning organisations vs those working in non-commissioning organisations. Those working in secondary care organisations preferred both published research and guidelines vs those not working in secondary care organisations. No significant differences were found between tertiary care and non-tertiary care organisations, and primary care organisations were far too few in number (n=9) to draw any robust conclusions from.

Table 16: DCE results for those who said their role involved being a doctor vs not being a doctor

Attribute & Level	If Role = 'Doctor' B Coefficient (SE)	If Role = 'Not Doctor' B Coefficient (SE)	Attribute level difference **(Doctor vs Not Doctor)**
Applicability: similar context (ref: dissimilar context)	1.36 (0.23)***	1.16 (0.16)***	p = 0.47
Applicability: local context (ref: dissimilar context)	1.35 (0.17)***	1.00 (0.13)***	p = 0.08
Source of evidence: guidelines (ref: local data)	1.50 (0.20)***	0.89 (0.15)***	p = 0.01*
Source of evidence: published research (ref: local data)	1.33 (0.18)***	1.02 (0.14)***	p = 0.17
Source of evidence: regulator's priorities (ref: local data)	1.03 (0.20)***	1.03 (0.16)***	p = 0.99
Previous implementation: yes (ref: no)	1.02 (0.12)***	1.05 (0.10)***	p = 0.86
Effort required: low (ref: high)	0.92 (0.13)***	0.61 (0.09)***	p = 0.04*
Credibility: high (ref: unknown)	0.62 (0.12)***	0.38 (0.09)***	p = 0.12
Number of observations	1,188 (12 observations missing data)	1,728 (32 observations missing data)	
Number of respondents	75	110	

***p < .001, *p < .05

All-choice test for difference between Doctor and Not Doctor: chi2(8) = 15.32, p = 0.05

Table 17: DCE results for those who said their role involved management vs not management

Attribute & Level	If Role = 'Manager' B Coefficient (SE)	If Role = 'Not Manager' B Coefficient (SE)	Attribute level difference **(Manager vs Not Manager)**
Applicability: similar context (ref: dissimilar context)	1.08 (0.19)***	1.42 (0.18)***	p = 0.20
Applicability: local context (ref: dissimilar context)	0.95 (0.15)***	1.28 (0.14)***	p = 0.10
Source of evidence: published research (ref: local data)	0.97 (0.17)***	1.26 (0.15)***	p = 0.20
Source of evidence: guidelines (ref: local data)	0.80 (0.18)***	1.38 (0.15)***	p = 0.01*
Source of evidence: regulator's priorities (ref: local data)	0.10 (0.19)***	1.10 (0.17)***	p = 0.70
Previous implementation: yes (ref: no)	1.11 (0.12)***	0.97 (0.10)***	p = 0.37
Effort required: low (ref: high)	0.72 (0.11)***	0.72 (0.10)***	p = 0.95
Credibility: high (ref: unknown)	0.27 (0.10)**	0.62 (0.10)***	p = 0.01*
Number of observations	1,234 (14 observations missing data)	1,682 (30 observations missing data)	
Number of respondents	78	107	

***p < .001, **p < 0.01, *p < 0.05

Test for difference between Manager and Not Manager: chi2(8) = 16.13, p = 0.04*

Table 18: DCE results for those who said their role involved commissioning vs not commissioning

Attribute & Level	If Role = 'Commissioner' B Coefficient (SE)	If Role = 'Not Commissioner' B Coefficient (SE)	Attribute level difference **(Commissioner vs Not Commissioner)**
Applicability: similar context (ref: dissimilar context)	1.75 (0.38)***	1.17 (0.14)***	p = 0.14
Applicability: local context (ref: dissimilar context)	1.60 (0.34)***	1.07 (0.10)***	p = 0.14
Source of evidence: published research (ref: local data)	1.36 (0.34)***	1.09 (0.12)***	p = 0.47
Source of evidence: guidelines (ref: local data)	0.98 (0.36)**	1.14 (0.13)***	p = 0.67
Source of evidence: regulator's priorities (ref: local data)	0.78 (0.36)*	1.08 (0.13)***	p = 0.45
Previous implementation: yes (ref: no)	0.62 (0.22)**	1.06 (0.08)***	p = 0.05
Effort required: low (ref: high)	0.76 (0.21)**	0.69 (0.08)***	p = 0.76
Credibility: high (ref: unknown)	0.56 (0.23)*	0.45 (0.08)***	p = 0.64
Number of observations	352 (no observations missing data)	2,564 (44 observations missing data)	
Number of respondents	22	163	

***p < .001, **p < 0.01, *p < 0.05

Test for difference between Commissioner and Not Commissioner: chi2(8) = 13.49, p = 0.10

5.3.3 Predicted probabilities

Using the regression analysis results of the DCE we calculated the predicted probabilities of each combination of attribute levels being chosen over all other potential combinations. Figure 10 (below) shows the predicted probability for each attribute level against the worst possible combination. The worst possible combination would be a choice comprised of all the reference levels given above: dissimilar context; evidence sourced from local data only; no evidence of previous implementation; high effort required; unknown credibility of innovation lead/presenter. Each red bar below represents this choice. Each blue bar represents the worst choice except for the labelled attribute level (i.e. the worst combination except for 'high presenter credibility', or 'evidence sourced from published research'). Comparatively, the right-hand bar shows the predicted probability of choosing the best combination. These results suggest that high presenter credibility and level of effort required were the least likely attribute levels to be in the choice that respondents chose. These results also suggest that evidence from a similar context was the most important.

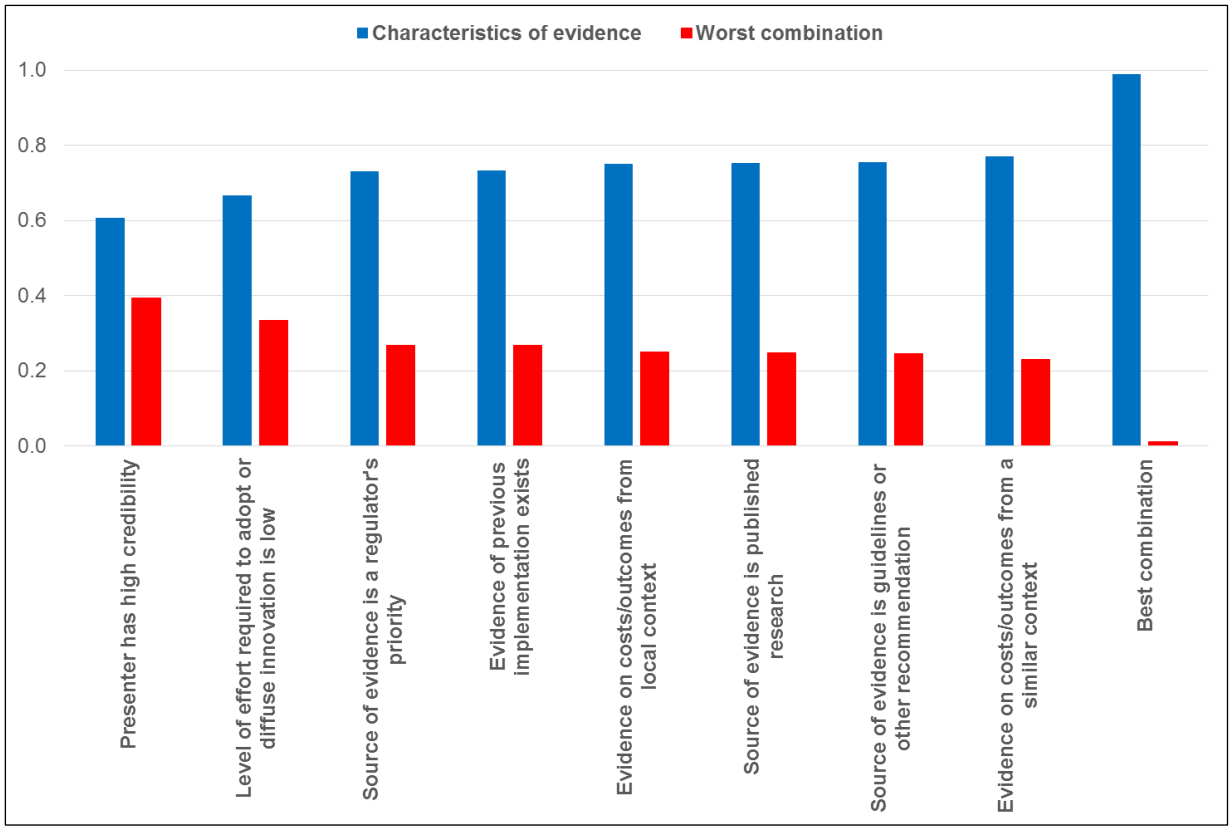

Figure 10: Discrete choice experiment predicted probabilities

5.4 Discussion

5.4.1 Main findings

The DCE confirmed the relevance of the 'contextual' attributes selected from the piloting work and other DECIDE workstreams to all NHS decision-makers. In particular, the importance of 'Applicability', 'Credibility of Source', 'Effort', and 'Previous Implementation' was reflected in the ranking exercise. However, 'Credibility of presenter' was not highly ranked and had the lowest predicted probability of any of the attribute levels (and indeed had some of the lowest β coefficients across all the subgroups).

Some notable differences came out in the subgroup analysis: specifically doctors' preference for low-effort, and priority for guidelines as evidence; managers' non-priority of guidelines

and non-priority of innovation leaders' credibility; and commissioners' priority for previous implementation. Concerning the preferences of doctors, preference for low-effort may reflect a very high workload, as well as resistance to change. Any change in practice is likely to impact patients, and so it is understandable that the medical profession are risk-averse when it comes to doing harm. This in turn explains a preference for guidelines, as evidence of the highest quality would be needed to underpin any changes and alleviate rational fears of change adversely affecting patient care and outcomes. Concerning the preferences of managers, managers are less likely to rely upon highly technical guidelines, especially since this is the role given to doctors. Managers did not have as strong a preference for credible innovation leads as non-managers, however, indicating that while this attribute was not unimportant, others were more important. Concerning commissioners, these respondents' preference for evidence of previous implementation of an innovation is straightforward: if an innovation has been trialled successfully before, it is more likely to be successful again, and less likely to fail and waste money and resources. During the piloting phases we encountered the attitude that not all organisations can be leaders of innovation, but every speciality knows which organisations are leaders in their clinical area. Thus only a few decision-makers in these 'vanguard' organisations would be incentivised to invest in novelty for novelty's sake (to preserve their organisational status as vanguard). The majority of other decision-makers would prefer to follow their lead (except, perhaps, those that wish to contend the 'vanguard' title).

5.4.2 Novelty and strengths

Discrete Choice Experiments are popular in health economic analysis, as a robust way of eliciting preference in a way that uses qualitative methods to inform a quantitative design and analysis. DCEs go beyond the traditional ranking and rating exercises that do not provide the

same level of depth on strength of preference, trade-offs, or probability of selection. Furthermore, this study represents a novel way of conducting a DCE. Typically, the aim of DCEs is to look into trade-offs between linear variables like money or time. Using one to look at relative trade-offs between categorical variables is quite unusual, partly because of the difficulty of drawing causal links between probability of choosing an attribute level, and preference for an attribute level over other attributes and levels. For this reason we have focused on drawing comparisons between preferences for different levels of the same attribute (this causal link is much clearer), and used subgroup analyses to compare preferences for attribute levels between subpopulations.

5.4.3 Summary of findings

The results of the DCE indicate that all the attribute levels included were of importance to respondents relative to their respective reference levels. Of all the attribute levels, the credibility of innovation presenter/lead was probably the least important relative to its reference level. The subgroup analyses suggested that: doctors had a preference for low-effort innovations vs non-doctors, and priority for guidelines as evidence; managers' non-priority of guidelines and non-priority of innovation leader's credibility vs non-managers; and commissioners appeared to prefer evidence from previous implementation vs non-commissioners, a result that was reflected in those who said they worked for commissioning organisations vs non-commissioning organisations.

Chapter 6. Guidance development and dissemination

6.1 Introduction

As described in the study protocol, the final objective of DECIDE was to develop guidance for decision-makers and evaluators to support the evaluation and application of evidence to enable the adoption and/or spread of innovations within the NHS. In response to this objective, we produced an interactive PDF guide accessible via: www.ambs.ac.uk/decide. See Appendix 7 for screenshots of the guidance pages.

The potential audience for the guidance was conceived broadly as it needed to apply to decision-making in a range of contexts to reflect the focus of the case studies (e.g. both primary and acute care and innovation across single of multiple sites). Moreover, the potential stakeholders involved in using evidence to inform decision-making in such contexts could be very broad (e.g. commissioners, clinicians, health service managers, patients/carers, knowledge intermediaries (e.g. CLAHRCs, AHSNs), and third sector organisations such as charities), meaning that the guidance needed to be relevant to a range of audiences. We originally aimed the guidance at both decision-makers and evaluators. The term 'evaluator' was not explicitly defined in the protocol. Given the range of decision-making contexts and roles that the guidance might apply to, we decided to conceive of evaluators narrowly as those involved in evaluation roles associated with the NHS (e.g. an operational manager responsible for audit or improvement), rather than producers of evidence in higher education institutions (such as applied health researchers).

Thus, the guidance is aimed predominantly at those who inform or make decisions about the adoption or spread of innovations who work within the NHS, including providers and commissioners of care. However, the guidance can also be useful for producers of evidence,

including researchers, as it provides information on approaches to improving uptake of research by practitioners (e.g. reflecting on the internal and external drivers for innovation facing decision-makers; identifying and mapping stakeholders in relation to evidence presented; and navigating the politics of decision-making when sharing evidence, e.g. tailoring messages to particular audiences). As the guidance conceives how decision-making processes may proceed, it can provide a resource for conceptualising and undertaking evaluations of decision-making on innovation in health care.

In this chapter, we describe the methods through which the guidance was developed, provide a summary of the content of the guidance, and reflect on the perceived strengths and limitations of the process and final product (the guidance) of this workstream, including broader lessons for developing non-traditional research outputs such as decision-making guidance.

The need for this guidance can be seen in previous work that has considered the role of evidence, broadly defined, in decision-making. For example, taking staff views as a form of evidence, the importance of engaging staff in decision-making to improve NHS care, including the need for leadership, cultures and governance structures for promoting involvement, has been highlighted (The King's Fund, 2014). However, the emphasis in that report was on using involvement processes to improve the delivery of existing care; in the DECIDE guidance, the focus is on decision-making on introducing innovations.

More guidance is available for decision-making on the provision of clinical treatments relative to service innovations. This includes supportive documentation to assist the decision-making process relating to medicines and other treatment areas; for example, the Clinical Priorities Advisory Group (CPAR) (2013) developed a decision-making framework for use within the NHS. This framework provides a systematic approach to guide commissioners'

decision-making on prioritising innovations. However, it is limited to medicines and treatments rather than service innovations. The CPAR guidance assumes both a particular type of innovation (clinical treatments) and that a certain level of evidence (e.g. cost effectiveness, clinical effectiveness, safety, and value for money) will be available to inform decision-making. It was clear from the DECIDE workstreams that such evidence may not be available, or be of sufficient quality, to inform many decisions, and that guidance is needed on using a diversity of evidence to inform decisions about service innovation.

6.2 Methods

The development of the guidance was informed by five activities: (1) case study interviews; (2) rapid review of examples of related guidance; (3) summarising the findings from the previous DECIDE workstreams (systematic scoping review, 'real-world' case studies, and national survey and discrete choice experiment); (4) stakeholder consultation; and (5) engaging a creative design agency. These methods are described in turn.

6.2.1 Case study interviews

For the case study interviews, a topic area was included to cover interviewees' preferences for evidence (Appendix 2). Interviewees were asked about the characteristics of effective evidence and approaches to decision-making that they deemed to be effective.

6.2.2 Rapid review of guidance

A rapid review of existing guidance related to evidence use and/or decision-making was undertaken in 2017. The guidance was identified through internet searches for relevant terms (e.g. 'decision-mak* guidance and evidence') and by looking at examples of guidance the study team was already aware of (e.g. Quaser hospital guide, 2014). We summarised the

content and format of seven examples of guidance identified (Appendix 6, Table 28) and considered how these could be used to inform the style of the guidance being developed.

With regard to gaps in current guidance, we noted through this rapid, pragmatic review that more guidance was available for public health rather than health care; the guidance focused more on decision-makers than producers of evidence (i.e. evaluators); it focused predominantly on identifying and applying research evidence (and may consequently neglect other forms of evidence that our case studies suggest to be important); it did not appear to distinguish between decisions to adopt and decisions to diffuse innovation based on evidence; and it did not comment in detail on broader contextual factors that may interact with evidence use (e.g. processes at the professional, organisational and local system level). In terms of strengths to build on, we were influenced by guidance that asked questions from decision-makers' perspectives, e.g. Agency for Healthcare Research and Quality (AHRQ) toolbox, and sought to build this into the design.

6.2.3 Summarising study findings

The findings from the first three workstreams were reviewed and aspects that could inform the development of the guidance were identified. A list of main topic areas or themes that related to different aspects of evidence use in decision-making was generated. The long list of themes was discussed among members of the research team; this was distilled into six themes as key or recurrent ideas were prioritised and some ideas were brought together or amalgamated into the same theme. Once the overall themes headings had been defined (e.g. 'implementation'), a summary of relevant findings derived from earlier workstreams was produced to explain the theme and subthemes were developed. Then, questions to consider in decision-making were produced in relation to the overarching themes. Potential ways of addressing each question were developed by drawing on the study findings and considering

their implications for practices of decision-making. Finally, examples from the case studies (work stream 2) were added to illustrate the issues for decision-making associated with the themes.

6.2.4 Stakeholder consultation

We consulted a group of stakeholders in order to revise, refine and test the guidance iteratively; feedback was gathered not only on the content of the guidance but also on the design of the interactive pdf. The consultation process included interviews with a purposively sampled range of stakeholders conducted face-to-face or by telephone. Some stakeholders provided feedback via email. These stakeholders represented those both responsible for decision-making and those who inform decision-making using evidence. Those interviewed included clinicians, research funders, patient representatives, academics with subject expertise, those working in research and evidence evaluation roles, commissioners, and health care managers. An interview topic guide was developed to aid the discussion during the interviews (Appendix 2). Interviewees were asked to comment on the concept, format, content and potential applications of the guidance. However, flexibility in the topic areas discussed was allowed to ensure that the views of those interviewed could be included. To help prepare for the interview, interviewees were asked to consider how they would apply the guidance in relation to their particular field of work. The interview itself was organised around mutual discussion of the guidance (e.g. navigating through and reviewing the guidance on screen during face-to-face interviews). The design and usability of the interactive document (e.g. navigating between different sections, compatibility with different computer devices) was also reviewed during the interviews. Permission to audio-record interviews was sought and obtained prior to each interview.

A version of the interactive PDF was also presented and discussed at the DECIDE end-of-study workshop in May 2018 which was attended by policymakers, health care practitioners, patient representatives, research funders, and researchers working in related fields. During an interactive workshop, participants were asked to: consider in small groups how they might apply the guidance to their own practice; give feedback on the format and content of the guidance; and provide suggestions about how we should share the guidance to maximise its impact on decision-making.

The views of the interviewees on the guidance were summarised and reviewed by the study team. The comments and suggested changes were divided into those concerning 'content' and 'format' and assessments were made about whether changes were in or out of scope and the feasibility of addressing them in the context of the time and resource constraints of the study. Changes to the content and design were prioritised, shared with the agency, and incorporated into subsequent versions of the guidance. This iterative approach allowed for 'live', iterative development of the guidance and resulted in the refining of the main themes (content) and how they were presented in the document (the style or format). The stakeholder interviews, and subsequent workshop, also represented a form of usability testing or 'piloting' for the design of the interactive PDF to ensure that it was accessible and readable for decision-makers.

6.2.5 Engaging a creative design company

An external creative design agency was briefed and contracted to produce the guidance as an interactive PDF. The brief for the work allowed for an ongoing relationship with the agency, in which three revisions to the guidance were permitted, to enable the product to develop iteratively in response to stakeholder feedback and testing. Advice was sought from the creative design company during face-to-face meetings to discuss layout approaches to make

the guidance both comprehensive and user friendly. The style and content of the guidance, including the concept of the 'long and winding road', was drafted and revised by members of the DECIDE study team; this was translated into an interactive PDF design by the creative agency. An interactive PDF that can be accessed on a website or downloaded, as well as a printable version, were produced by the agency.

6.3 Findings

In this section, we describe the findings in relation to (a) the themes that emerged from summarising the study findings; (b) feedback from the iterative development of the guidance; and (c) the implications for the content and format of the finished product.

6.3.1 Emergent themes

The main themes, and associated questions, that emerged from the detailed review of the findings of the previous workstreams formed the six key areas of the guidance. These were:

- Definition – can the innovation and its potential impact be clearly described?
- Evidence – what evidence is available in relation to the innovation?
- Stakeholders – who will be involved in decisions and how?
- Drivers – what are the key external and internal drivers for introducing innovation?
- Organisation – what organisational factors should be considered during decision-making?
- Implementation – can likely barriers and enablers to implementation be anticipated early in decision-making?

Within each of these themes a small number of subthemes, with associated key questions and possible actions to address these questions, were developed to guide the decision-making process. For example, the 'stakeholder' theme included three questions, and associated actions, around 'identifying' and 'involving' stakeholders and 'reaching decisions'. Furthermore, for the evidence, stakeholders, drivers, organisation and implementation themes, each of the subthemes includes an associated example from one of the three case study areas. These case studies helped to illustrate the possible actions to take in relation to each question and provide examples of different decision-making contexts that may appeal to a range of users of the guidance (e.g. examples from both acute and primary care).

It was clear from the summary of the workstream findings, and previous research, that the processes through which a decision to adopt or spread an innovation is agreed is complex and cannot in any way be considered a linear process. It was therefore important that the conceptualisation of decision-making used in the guidance reflected this. The metaphor of the 'long and winding road' of decision-making was used to capture its non-linearity. A graphic of a winding road with signposts for each theme was used to represent that the process could be quite convoluted and iterative, with potential feedback loops between the main themes.

6.3.2 Feedback from iterative development of the guidance

The main changes to the format which were suggested concerned: the readability of the document (e.g. addressing the high volume of small text); the need for more case studies or examples to illustrate the findings within each theme; and improving the 'interactive' aspect of the document where users could make practical use of the document in relation to decision-making. Suggested content changes included: referring to models or methods for addressing the questions (e.g. quality improvement tools); expanding on the types of evidence used and how they influence decision-making; reconsidering the role of stakeholders in

decision-making (including challenges of achieving consensus); reducing overlap between some of the themes (e.g. drivers and organisation) or moving content between themes; drawing out the influence of organisational culture on evidence use in decision-making; and increasing the focus on the implementation of innovations. Some of the feedback, while useful, was deemed to be out of scope (e.g. comments on aspects of decision-making that were not related explicitly to evidence use) or was not feasible to address due to time and resource constraints (e.g. producing a list of all the types of evidence and ways of grading or assessing them). Moreover, we took some of the feedback to be an indication that the guidance was being used by the interviewee to reflect on and describe local decision-making processes, rather than as a signal to incorporate every change suggested (i.e. to attempt to reflect the idiosyncrasies of decision-making in different contexts).

6.3.3 Implications for content and format of the final product

In response to the stakeholder feedback, we made a series of design and content changes to the guidance. An example of the changes in relation to the 'evidence' theme before and after the stakeholder feedback is shown in Figures 11 and 12. We reduced the amount of information within each theme by shortening the summary of findings and actions, reducing the volume of text and allowing the font size to be increased and making it easier to read. Examples from the case studies were added to five of the six themes, which were presented as clickable 'pop ups', in order to illustrate challenges around the themes from the case studies we examined or stimulate ways of addressing the questions by looking at the experiences of others. To improve the 'interactive' element of the guidance, we increased the 'pop ups' that users could click on, and we moved away from extended summaries of findings and long lists of actions, while making the questions to consider more prominent and shortening the bullet points to cover potential ways of addressing these.

Figure 11: Appearance of 'evidence' theme before stakeholder feedback

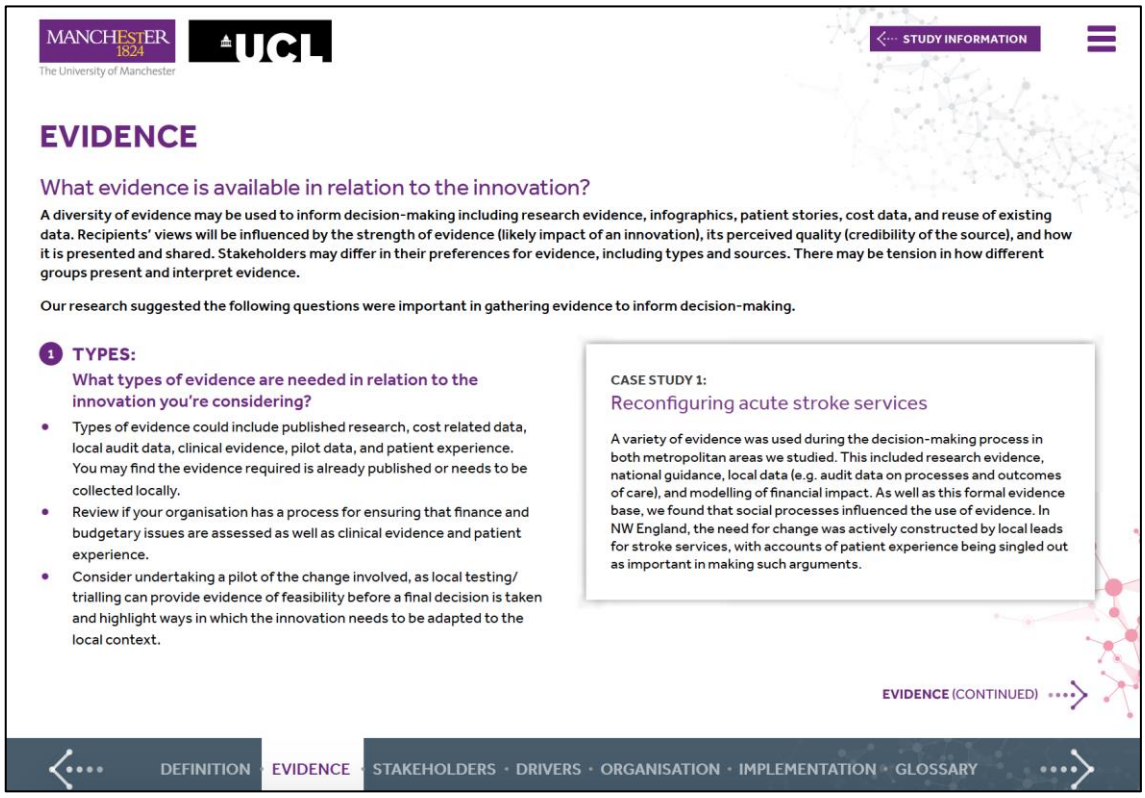

Figure 12: Appearance of 'evidence' theme after stakeholder feedback

With regard to content changes, we included links to models that could be useful for reflecting on some of the questions (e.g. tools related to implementation). The order of the themes was revised (e.g. 'evidence' theme was moved forward) and effort was made to distinguish more clearly between the 'drivers' and 'organisation' themes (which included increasing the emphasis on culture within the latter theme). The 'stakeholders' theme in particular was made less prescriptive in recognition of the real-world challenges of decision-making (e.g. the emphasis moved away from 'achieving consensus' per se to promoting discussion and engagement around innovations and prioritising the reaching of agreement for the most important decisions). In response to feedback from the workshop, we added a checklist to the guidance to enable users to reflect in one place on whether they had considered the questions associated with each theme in decision-making. This was added with the aiming of improving the practical value of the guidance to decision-making (e.g. the checklist could be reviewed by individuals when planning a new programme or used collectively by participants during a planning meeting).

6.4 Discussion

The guidance that has been developed aims to support the use of evidence in decision-making about the adoption or spread of innovations within the NHS. It has been developed through consideration of published literature, 'real-world' evidence generated through case studies, and decision-makers' preferences for evidence. The study findings, and stakeholder feedback, show that the use of evidence in decision-making is complex, iterative, and context-dependent. Thus, producing guidance that reflects such a complex or 'messy' process (i.e. one that is not linear or involves standardised steps) and yet remains relevant to decision-making in a range of contexts is challenging. We have responded to this challenge by organising the guidance around a schematic of a long and winding road, with feedback loops

between the main themes, that aims to be broad enough to apply to different forms of decision-making on innovation, while highlighting specific themes, and experiences of decision-making, that users may identify with across disparate decision-making contexts within the NHS. The guidance has incorporated case study illustrations throughout to help users reflect on evidence use in decision-making by sharing the experiences of others in relation to the themes and questions presented.

The study protocol described this workstream as developing guidance to improve evidence use. The guidance developed does consider the use of evidence as one of its principle themes. It was clear from the outcomes of the previous workstreams that to focus solely on the use of evidence does not reflect the complexities of the decision-making process associated with the wider context in which decisions concerning innovation are made (e.g. alignment of innovations with local or national priorities and preferences and interests of different professional groups). The decision to adopt a very broad working definition of evidence in this study, and to represent decision-making processes as being quite convoluted in nature, was supported throughout the interviews with relevant stakeholders who highlighted that for any individual decision on adopting or spreading an innovation there will be many influencing factors.

The guidance therefore refers to the use of the available evidence within the overall context that decision-making occurs, to reflect 'real-world' contexts of decision-making where drivers, stakeholders, organisational factors, and implementation processes will inform the selection and use of evidence in decision-making.

The challenge within the development of this guidance was to fulfil these aims of applying guidance to what may be a wide range of available evidence, reflecting the 'real-world' contexts that had been highlighted as important throughout the DECIDE work, and to make it

potentially applicable to many audiences, including providers and commissioners of care across acute and primary care settings. It can be difficult to draw out implications from study findings, and use these to help inform actual practices of decision-making, without recourse to traditional methods of representation (e.g. written summaries of findings), even when placing these within an interactive design. Using a consultation process with stakeholders, and an iterative development approach with frequent review by the DECIDE team, we have refined the guidance so that the document, though wide-ranging in its approach, attempts to make the findings relevant to decision-makers' perspectives. Moreover, it provides a checklist of questions, case study examples, and links to further resources that take it beyond a summary of research findings.

During the end-of-study workshop, three participants indicated unprompted that they are interested in applying the guidance to their own field of practice, which covers a commissioning support unit, a strategy unit, and quality management for the delivery of care pathways. This interest suggests one potential application of the guidance at the local system level, for use by 'decision-informers' who aim to support evidence use, and its evaluation, in decision-making by both commissioners and providers of care in particular geographies or populations (e.g. informing design and delivery of new care models). As described in chapter seven, a further feasibility study would be needed to inform an evaluation of the uptake and impact of the guidance and decisions to further develop and/or roll out the guidance within the NHS.

The main learning points from developing the guidance were: (1) the considerable time required for the iterative testing process of gathering and responding to stakeholder feedback, and then briefing the design agency on suggested changes and the implementation and review of these; (2) pitching the content in a way that is broad enough to appeal to those who inform or make decisions in a range of contexts (i.e. by having broad themes along the 'long and

winding road' of decision-making), while being specific enough to reflect some of the idiosyncrasies of the drivers and evidence needs in those contexts (which we attempted to do by including case study examples from different decision-making settings); and (3) translating the study's 'academic' research findings into practical implications that can be of use to 'real-world' decision-making which we addressed by phrasing questions from the decision-maker's perspective (e.g. for stakeholders, 'How can you promote consensus for the most important decisions?') and then sign-posting to more detailed study information and resources, if required. The guidance reflects an ongoing tension between including contextual details and nuances that reflect the study's academic findings, while attempting to keep the guidance broad and accessible enough for potential users to engage with and apply to their practice. The ways of navigating these challenges suggested may be applicable to those developing 'non-traditional' outputs from research studies (e.g. guidance / toolkits) more broadly.

Chapter 7. Discussion and implications for policy and practice

7.1 Introduction

This study aimed to enhance understanding of decision-makers' use of diverse forms of evidence. It sought to provide insights into how and why some evidence does inform decisions to introduce health care innovations, and why barriers persist in other cases. We adopted a broad definition of evidence that included a variety of types of information, including academic research findings, patient experience, professional opinion, clinical guidance and local data. As set out in the opening chapter, the four objectives of the study were to (1) identify which factors influence the use of evidence in decision-making; (2) assess how evidence informs decision-making using 'real-world' case studies; (3) establish decision-makers' preferences for evidence, including types, quality, and strength; and (4) develop guidance for decision-makers and evaluators to support the evaluation and application of evidence in relation to the introduction and diffusion of innovation. In this concluding chapter, we summarise the overall findings from the study, compare these to existing research, describe their implications for policy and practice, reflect on the study's strengths and weaknesses, and outline a future research agenda.

7.2 Summary of findings

- Interactions between contextual processes at different levels (professional group, organisational, local system) shape evidence use in decision-making (e.g. local system actors place pressure on using evidence for innovation or service disinvestment at the organisational level).

- Professional groups use evidence to exert power over decision-making (shared preferences for research evidence allow ideas for innovations to circulate within the medical profession, but may marginalise other stakeholders' views on innovations).

- The use of evidence in decision-making is a socio-material practice: the social and material translation or 'unfolding' of evidence into different forms (e.g. summaries, visual depictions, presentation style) influences how it comes to inform decision-making in different contexts.

- Key processes through which the interplay between evidence and the context influences decision-making are 'connecting' (communication concerning evidence predominantly within professional groups), 'ordering' (shaping priorities for evaluating innovations through the construction and interpretation of evidence), and 'resisting' (presenting alternative evidence and questioning the implications of evidence for innovation).

- As a range of evidence, and stakeholders' views, can inform decisions about innovation, sound organisational structures are needed to facilitate and navigate the often challenging process of capturing and reconciling the variety of perspectives on innovations.

- Anticipating barriers and enablers to implementation early in decision-making on adoption is important.

- The national survey identified "impact" (particularly cost effectiveness, patient safety, and care quality) as the most important type of evidence in decision-making, although there is some survey data suggesting that "context" (e.g. credibility of source, local

priority, applicability to target population) and "practicability" (e.g. effort required and previous implementation) are important too.

- Preferences concerning impact, context, and practicability are broadly consistent between the different professional groups surveyed (i.e. doctors, managers, commissioners).

- The discrete choice experiment showed that external evidence (guidelines, published research, and regulators' priorities) was preferred over local data. Some variation exists across professional groups: doctors prioritise research evidence, while managers do not.

- Innovations requiring low effort, had evidence of previous implementation, and were from a similar context were preferred.

7.3 Synthesis of findings from the four workstreams

In this section, we bring together and reflect on the findings from the different workstreams, which drew on different epistemological approaches, and quantitative and qualitative research methods. The national survey found that decision-makers were more likely to be influenced by evidence of 'impact' (particularly cost effectiveness, patient safety, and quality of care) than practicability (e.g. implementation considerations such as 'staff buy-in') or contextual factors (e.g. national priority and credibility of the presenter), although some practicability/ contextual factors were also deemed important (particularly credibility of source and local priority/ applicability).

'Implementation considerations' was a key theme in the case studies whereby the importance of anticipating these in decision-making on adopting innovation was identified (i.e.

implementation processes, such as securing resources or staff buy-in, were sometimes neglected or they represented thorny issues to resolve and achieve consensus on among stakeholders which contributed to delays in implementation). While evaluating the 'impact' of innovations is understandably important, as suggested by the survey, findings from the case studies suggest that, in practice, such evidence is often necessary but not sufficient for informing decision-making on innovation adoption and spread. Our qualitative findings from the 'real-world' case studies suggested that gathering evidence which helps to assess the feasibility of implementation (and make mitigating plans) is needed to avoid challenges and delays later in the process. Similarly, the scoping review highlighted the importance of stakeholder involvement in decision-making (both staff and patient/carer representatives) to aid implementation.

Both the scoping review and case studies assessed how contextual factors influence evidence use in decision-making. In contrast to the survey findings, the credibility of the presenter was found to be important in shaping responses to evidence in these two workstreams. The stakeholder feedback we gathered through focus groups on the scoping review's findings underlined the importance of professional credibility, persuasion skills, and developing relationships in order to encourage decision-makers to act on evidence. In one of the CCGs we studied for the cancer case study, the cancer lead's credibility was found to be influential in shaping GPs' responses to the new referral guidance. During numerous presentations on the new national guidance, the cancer lead, who was a fellow GP, shared his professional experience in order to illustrate the importance of the timely referral of patients with possible signs and symptoms of cancer. Having the credibility to act as a 'champion' for evidence can also have an influence on other contextual factors that were identified as being important in the national survey. For example, a credible presenter could help to spell out the 'applicability of evidence to the target population', as the cancer lead appeared to do by

candidly describing for GPs the trajectories of local patients who had suffered delays in diagnosis.

Comparing findings from the different workstreams allows us to reflect on different professional groups' preferences for evidence. The discrete choice experiment found that doctors prioritise guidelines, while managers do not. However, the scoping review suggested that doctors' preferences differ according to the part of the health service in which they work: acute care doctors tend to prefer 'scientific' evidence (Kyratsis et al. 2012), which appears to confirm the guidelines preference found in the survey, while doctors in primary care tend to weigh up research evidence against professional experience (Prosser and Walley, 2007) and can resist guidelines (Checkland et al. 2007). These findings were also borne out by the case studies. In the eyes case study, the innovation originated in acute care: the clinical academics involved helped to translate the supporting research evidence into clinical guidelines partly because they thought the credibility and visibility of this type of evidence would help to diffuse the 'remote review' model of care for glaucoma outpatients nationally. In the primary care case study on cancer referral, actors at the local system level attempted to support uptake of the new national guidelines among GPs by highlighting their relevance to local patients' needs (e.g. the CCG cancer lead's account of patients' experiences, and the summarising of guidance and local facilitation work undertaken by cancer charities).

7.4 Comparing findings with previous literature

Much of the previous literature related to the NHS has focused on the implementation of innovations, e.g. improving the adoption and spread of established innovations, rather than the preceding step of deciding whether an innovation warrants this adoption or spread. This study has focused on the role of evidence in making such decisions and, drawing on the study

findings, has produced guidance on factors to consider for decision-makers and influencers. Guidance on decisions around innovation adoption or spread is sparse, relative to frameworks aimed at supporting the implementation of innovations (although the guidance acknowledges the importance of anticipating implementation issues at an early stage of decision-making).

The findings show both similarities and differences with a suite of nationally funded studies on evidence use by NHS commissioners (NIHR, 2018). These studies highlight the challenges that managers face with understanding and making use of evidence, and consequently the need for skilled individuals to help interpret evidence. This finding was borne out by the DECIDE study (e.g. the need to summarise research evidence and guidelines to help enable non-research experts to participate meaningfully in decision-making). The NIHR studies suggest that managers tend to prefer 'informal' evidence (including local information, trusted colleagues) over formal research studies and guidelines. Our qualitative evidence also highlighted the importance of professional relationships – for managers, clinicians and commissioners alike – for making sense of research evidence, and seeking out others' experiences with innovations under consideration, in order to assess 'the nuances' of evidence (as a stroke manager suggested) and how it can be applied to the decision at hand. This finding also chimes with earlier research on the 'informal' relationships that underpin the use of formal evidence, including the tacit or experiential knowledge that health professionals rely on to form 'clinical mindlines' when interpreting clinical guidelines (Gabbay and Le May, 2011).

However, this study deviated from earlier research which suggests that colloquial evidence (e.g. local audit data) is preferable to systematic evidence, including research evidence and clinical guidelines. The survey showed that external evidence was preferred over local data (although managers did not prioritise research evidence). The case studies showed that external evidence was taken seriously: recent published evidence on stroke reconfiguration

informed decisions to centralise services in both metropolitan areas, while the updated NICE guidance on referral for suspected cancer generated a wealth of activity, including discussions about pathway redesign, GP education events, and various summaries with the aim of supporting implementation. Moreover, the case study of the diffusion of the 'remote review' model of care for glaucoma outpatients highlighted clinical academics' desire to translate the research evidence associated with the clinic into professional guidelines, to lend endorsement to the innovation and standardise its spread nationally. Such socio-material translations of 'formal' evidence were important processes through which evidence informed decision-making on innovation.

Formal evidence also has an important role in helping innovations to spread beyond the local context: it can signal credibility or importance thus improving uptake; it provides standards for assessing fidelity when innovations are applied in different spaces; and its codified form provides an 'object' around which many stakeholders can have a conversation (even if this shows the evidence is not understood, or it is incomplete, or it informs a decision to adapt the innovation to the local context). Making use of evidence in this way to stimulate wider stakeholder engagement on the adoption of innovations could be seen as preferable to basing decisions on tacit or implicit rules understood by the few 'in the know' (e.g. small conversational circles).

Another recent study of innovation adoption and spread by The King's Fund (Collins, 2018), while not focussing specifically on evidence, examines aspects of the context that either enable or challenge adoption. These include encouraging entrepreneurship, availability of technology, and delegating decision-making to local systems and providers. Our study similarly recognises the importance of resources for implementing innovations, and the need to take account of these at an early stage of decision-making. We also recognise the importance of delegating authority, if this helps to encourage stakeholders locally to

participate in decision-making. For instance, we suggest involving appropriate stakeholders in decisions to consider implementation issues (e.g. front-line staff on potential changes to working practices and roles, and patient/carer representatives on experiences of care). However, given the important role of external evidence we found in this study – and the multi-disciplinary and multi-sectoral nature of innovations that involve major system change across professional and sectoral boundaries – it is important that 'local' decision-making is able to connect up with entities at a wider level (e.g. local system actors, external research teams, comparative areas that have implemented innovations, and decision-making bodies for neighbouring service areas or sectors) that can influence responses to evidence and implementation processes.

7.5 Implications for policy and practice

In this section, we reflect on the implications of the study findings in relation to four areas that were prominent in the Health Foundation's call for proposals: types of evidence required to evaluate innovations; enhancing evaluation methodologies; evidence for introducing versus spreading innovations; and reflections on the 'tipping point' for innovation.

7.5.1 Types of evidence required to evaluate innovations

The study suggests that multiple forms of evidence are needed to support decision-making on innovation. As suggested by the survey, assembling evidence that can be used to evaluate multiple forms of 'impact' would fit with decision-makers' priorities for evidence. While the appropriate types of impact to measure will vary depending on the type of innovation being evaluated, common concerns based on this study appear to be cost-effectiveness, clinical outcome, and patient safety. However, evidence of impact is necessary but not sufficient for evaluating innovations, as characteristics relating to context (e.g. credible source) and

implementation (e.g. changes to resources, staff roles) are also critical, as confirmed by the case study findings.

The priority of cost-effectiveness, rather than budget impact, identified in the survey may reflect decision-makers' desire to base decisions on different dimensions of evaluative evidence (cost effectiveness fits in with this approach by comparing two dimensions – relative costs and outcomes). However, as this finding deviates from the scoping review and case study findings where cost or budget impact was prioritised, it needs to be treated with caution. Decision-makers' use of the term 'cost-effectiveness' may in some circumstances be used synonymously with budget impact to reflect their concern over financial aspects of innovations. Cost-related information may appeal particularly to decision-makers in a context of austerity, and associated budgetary pressures in the health service, by informing decision-makers about which course of action will 'get more bang for your buck' (i.e. a no worse or better outcome relative to investment).

7.5.2 Enhancing evaluation methodologies

Evaluation methodologies need to reflect decision-makers' need for diverse evidence and seek to evaluate innovations along multiple dimensions. The case studies highlighted interviewees' desire to include a range of evidence in decision-making that speaks to different forms of impact and goes beyond cost-effectiveness (e.g. taking into account the impact on both patient experience and resource use in relation to innovations in delivering glaucoma outpatient clinics). Turner et al. (2014b) provide an outline framework to evaluate the cost and cost-effectiveness, implications for resource use, and implementation of service innovations. However, to maximise the value of evaluation findings to decision-makers, our study suggests the need for novel methodologies that bring together, and explore the relationship between, different dimensions of impact associated with innovations. Returning

to the example of the eyes case study, evaluators would need to design studies, and share findings, in a way that helps decision-makers to weigh up the impact of different models of care along multiple dimensions (e.g. relative impacts on safety, patient experience, staff wellbeing, resource use, cost, and clinical outcome). Operational research provides insight into techniques that can be used to support the socio-material practice of translating disparate strands of research evidence into policy recommendations, e.g. data visualisation techniques (see Crowe et al. 2017).

Evaluators should reflect on the ways in which they produce evidence can influence uptake and impact on decision-making. During the case studies, interviewees commented on the need for evidence that was clear and concise, timely, relevant and actionable (e.g. lessons from previous 'real-world' experiences), and from a credible source. Many of the characteristics cited by interviewees reflect those described in previous literature on methods for evaluating service innovations (e.g. Raine et al. 2016). The stakeholder focus groups that were conducted as part of the scoping review highlighted the burgeoning forms of evidence being used to inform decision-making. A range of forms of evidence beyond research articles or clinical guidelines is used to inform decision-making, including non-health care industry evidence, patient stories, feedback from user groups, reuse of existing data, case studies, infographics, lay summaries and evidence to support implementation. Equally, the case study on the national guidance for improving timely referral for suspected cancer showed how this was presented in different material forms with the purpose of improving uptake (e.g. as summaries on desk easels, benchmarking data on referral rates, and face-to-face education events and educational videos on recognising cancer signs and symptoms).

Producers of research should consider how they can draw on alternative forms of evidence, and share research findings in different forms, that are likely to resonate with, and reflect the constraints of, the 'real-world' contexts of decision-making (e.g. short summaries and visual

material). The development of long-term relationships between research producers and users should support shared understanding of evidence needs in different contexts and effective ways of presenting findings to the range of stakeholders within each. The commissioning of evaluations should also take into account the types of evidence that need to be collected, and ways in which they are shared, that are most likely to be useful in 'real-world' decision-making, in particular for evaluation of policy changes and national programmes, such as New Care Model Vanguards, Test Beds or integrated care systems.

The credibility of evidence has been a recurrent theme across the workstreams of this study. The survey, and case studies, highlighted the perceived importance of external evidence (e.g. clinical guidelines) for informing decision-making (e.g. the translation of research findings into clinical guidance by clinical academics in the eyes case study to support the spread of innovation nationally). Equally, the importance of endorsement by actors external to where innovations were being pursued (e.g. by pan-regional organisations or national improvement programmes) was highlighted by the scoping review. As well as being a potential source of credibility, the importance of external advocacy may reflect responsiveness to the 'top-down' or mandated processes through which some innovations are typically implemented within the NHS. Notwithstanding this, producers of evidence (e.g. applied health researchers) should seek to work through networks of organisations at the local system and national level (particularly producers of clinical guidance) to increase the potential reach and impact of their research on health care planning.

7.5.3 Evidence for adopting versus spreading innovations

A critical policy question is whether the types of evidence for supporting the adoption or spread of innovations need to differ. The national survey found that commissioners tend to prefer innovations that had been implemented previously, while most doctors preferred 'low

effort' innovations. One interpretation of these findings is that innovations that have already been implemented elsewhere are more likely to be favoured (perhaps because they are seen to be lower risk), so evidence of adoption supports further spread. In the stroke case study, the Scottish metropolitan area looked at research evidence from stroke reconfiguration, and clinicians' experiences from other parts of the UK when reviewing services, suggesting an important role in spread of learning from others' experiences. To address concerns about the risk of implementing change, gathering 'pilot' data that can be used to inform decision-making on adoption is also important. In the eyes case study, the piloting of new clinics, and review of evidence from this (including safety, outcomes, patient experience, and implementation), was critical in informing adoption and further spread.

To support decisions about adoption, there is a clear role for research infrastructure at the local system level (e.g. CLAHRC, AHSN) in supporting providers and commissioners with prioritising, piloting and evaluating potential innovations. For example, the CLAHRC programme supports health professionals' exposure to research by providing training to introduce health professionals to evaluation methods and enabling practising clinicians to spend time working in applied health research. As described in the stakeholder focus groups (workstream one), AHSNs were seen by those developing evidence-based innovations (e.g. NHS Innovation Accelerator fellows) as 'ambassadors' for innovation that supported adoption by helping to 'open doors' within the health service.

To support decisions about spread, there is a need to support collaboration at different levels within the health service, including: crossing professional expertise and service area boundaries within organisations; aligning providers and commissioners within local systems; and supporting learning through professional networks at the national level. Our study suggests that spread often takes place informally through interactions between peers (e.g. uni-professional networks). Despite this, boundaries to the sharing of evidence persist at different

levels (e.g. uni-professional 'silos' and providers' incentives for competition). As suggested by Cooksey (2006) over a decade ago, strengthening the culture of collaboration around evidence use – and prioritising system-wide incentives to underpin this – is needed to support the sharing of experiences concerning innovation and contribute to its spread across health services.

7.5.4 Reflections on the 'tipping point' for innovation

In the original proposal, the study aimed to quantify decision-makers' preferences, including the 'tipping point' of evidence needed to shift stakeholders' views. However, the 'tipping point' that was in the original proposal aimed to compare the strength of evidence against the type of evidence, but in the national survey and discrete choice experiment we were only able to assess the characteristics associated with the type of evidence (further aggregating this into impact, practicability and context). From a qualitative perspective, we can say that sound decision-making on introducing or diffusing innovations is more likely in contexts where: evidence highlighting a range of impacts is available; implementation issues have been anticipated early in decision-making; and there is a receptive local context for evaluating evidence. Receptivity of the local context would depend on existing conventions of evidence use at the professional group, organisational, and local system level, and on the mechanisms in place for facilitating positive interactions between levels for using evidence in decision-making (as show on Figure 2, chapter two).

To help cultivate such a context, organisational leaders need to consider the ways in which the environment surrounding decision-making encourages, or works against, the inclusion of diverse evidence and perspectives. As preferences for evidence may vary across different professional groups (e.g. preference for research evidence over local data), decision-makers should reflect on the prevailing types of evidence that are used in decision-making and the

aspects of innovation and stakeholder perspectives these tend to represent. Enabling multiple stakeholders to participate requires a willingness to accommodate different types of evidence in decision-making. We suggest that organisational leaders need to (a) value challenging evidence and perspectives, (b) build staff and organisational capacity in acquiring and applying evidence, (c) address professional interests and power when developing processes for enabling stakeholder involvement in decision-making, and (d) support the translation of evidence into different forms to support communication and debate among a range of stakeholders.

7.6 Strengths and weaknesses

The strengths of this study were the use of 'real-world' case studies in different contexts, meaning that types of evidence (academic research, national guidance, local data, etc), innovations (e.g. new or diffused), and processes of decision-making could be captured across a variety of settings, enabling the drawing of comparisons about how evidence is used to inform decisions making (or not) across different settings. In particular, the analysis of 'live' decision-making processes – which included attending planning meetings, training sessions, educational events, and GP practice visits – provided insight into how evidence is introduced, discussed, and evolves as it 'unfolds' into different forms, during decision-making processes. This approach met a need to analyse evidence use in 'real time' (Kyratsis et al. 2014), as a corrective to approaches that only capture espoused preferences through surveys or retrospective analyses.

The collection of rich observational data in relation to activities where evidence was presented and discussed (e.g. attending planning meetings and education events) allowed us to develop new metaphors to describe three processes through which evidence influences

decision-making, using the processual terms of ‘connecting’, ‘ordering’, and ‘resisting’. Analysing documents related to the innovations also played an important role in capturing the materiality of evidence use (e.g. tracing the translation of research findings and clinical guidance into different material forms, including summaries and research highlights).

Another strength of this study was the combining of qualitative and quantitative approaches to evaluate evidence use. This allowed us to examine ‘how’ and ‘why’ evidence informs decisions about innovation, as well as ‘what’ types of evidence (including impact, practicability, and context) are most sought after by practitioners during the decision-making process. By bringing together findings from the different workstreams, we have been able to develop interactive guidance around six key themes (definition, evidence, drivers, stakeholders, organisation, implementation) to be considered during the ‘long and winding road’ of decision-making. The questions we have developed around each theme, and potential ways of addressing these and examples from the case studies, represent an additional way of making the study findings available to inform future practices of decision-making.

However, the inclusion of three case studies in different service areas, and the need to collect data from multiple sites within each, did place limitations on the depth of analysis that could be undertaken within any one case study site (i.e. the number of interviews and observations that could be conducted in any one site was limited by the time and resources needed to generate insight into decision-making processes across all case studies). Moreover, for the prospective case studies, we were not in control of the stage of decision-making observed (e.g. where decisions had already been made or were still ongoing when the time available for data collection was complete) which undoubtedly excluded some of the activities and people relevant to decision-making from the data collection and analysis process.

Limitations of the administration of the national survey were the relatively small sample size and the presumed low response rate. Some findings on decision-makers' preferences also need to be interpreted with caution. In particular, the preference for 'cost-effectiveness' information deviated from the scoping review literature and case study findings where budget or cost impact was cited more often as a consideration in decision-making. That 'cost-effectiveness' was prioritised by decision-makers over budget impact may reflect social desirability bias (i.e. more desirable to base decisions on effectiveness not budget); that it is an 'ideal' preference rather than one applied in practice; or that the term may have been misunderstood as referring to cost by some respondents.

As the survey highlighted, expressed preferences for evidence may include social desirability bias. Thus, the inclusion of case studies of 'real-world' decision-making processes was important in order to qualify what respondents say they do in a survey. Moreover, we included in the case studies observational work, e.g. attending meetings, to avoid relying on what people say they do in interviews and observe actual processes of decision-making. That said, if social desirability influences expressed preferences for evidence this may have influenced the data collected through non-participant observations (i.e. even in a meeting people might behave differently if they know they are being observed). This potential bias does underline the importance of sustained observational methods through which researchers may become 'insiders' to complement the collection of other forms of data in future studies of evidence use in decision-making on innovation.

7.7 Future research agenda

The guidance to inform evidence use in decision-making has been developed with stakeholder feedback and will be freely available to download. Future research could usefully examine uptake of the current guidance, its impact on policy and practice, and develop it further for piloting more widely to inform health care decision-making and evidence production. The pilot study would need to: take into account ways of measuring uptake; have 'champions' to help drive uptake by practitioners; evaluate its use in different settings and by different actors (e.g. decisions concerning adoption or spread, experience level of those using the guidance, and provider vs commissioning contexts); seek to develop the content and format of the guidance further in response to the piloting; and evaluate the feasibility of rolling out the guidance more widely in the health care service.

The findings also suggest the importance of examining evidence use in decision-making in other contexts, especially the 'macro' level from which recommendations that have a strong influence on innovations (if not mandatory) in health and social care delivery often emerge. This could include the development of national guidance, including the review of evidence and incorporation of stakeholders' views, and the formation of policy, including learning from emergent evidence, including policy 'pilots' (e.g. new models of care including Vanguards and integrated care systems), as decisions about rolling out 'innovations' more widely are made. Including this level of 'upstream' decision-making – along with evidence from case studies of local interpretation of evidence and implementation – would help to complete the picture concerning the translation(s) of evidence into changes in service delivery. Research could usefully examine whether unintended consequences with implementation 'downstream' could be anticipated earlier by examining the ways that evidence (broadly defined) feeds into national policy and guidance development, and identify ways of overcoming potential barriers to this process.

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Appendices

Appendix 1. Supplementary data for chapter 2: systematic scoping review

Table 19: Characteristics of primary studies included in full text review and quality assessment

Reference	Setting (country; acute or primary care provision, commissioning)	Type of Innovation/ Service Improvement	Type(s) of Evidence	Quality Assessment Score out of 9
Ahmad et al. (2012)	UK; Acute and Primary Care	Infection prevention and control technologies (covering environmental hygiene; catheter care; medical devices hygiene; diagnostics; hand hygiene; information management and communication; patient hygiene; training).	• Staff involvement in implementation, with some organisations prioritising 'specialist' knowledge of IPC team. • Staff understanding of 'patient perceptions' (e.g. number of complaints as 'soft data')	6
Armstrong et al. (2013)	UK; Acute and Primary Care	Three case study quality improvement projects	• Role of 'patient and public involvement' in quality improvement; whether and how patients can be involved in distinctive and meaningful ways relative to professional roles and knowledges.	8
Bouwman (2008)	Denmark, Ireland, The Netherlands, Slovenia, Spain, Sweden, Switzerland and Australia; Primary care	Gene-based personalised nutrition advice	• Nutritional studies	5
Bowen et al (2009)	Canada; Commissioning	Regional health authority planning	• Little consensus on definition of evidence; often assumed to be limited to 'research' or 'quantitative data'.	6
Carstens (2009)	United States; cross-cutting systems of care covering mental health, social welfare, justice, education, and other child-serving agencies.	Multi-Systemic Therapy	• Evidence that multi-systemic therapy improves clinical outcomes for both children and families and also enhances system performance.	9
Challans (2006)	UK; Commissioning	Service improvement	• Patient involvement as form of knowledge	0
Checkland (2007)	UK; Primary Care	Models of clinical management and service delivery for a variety of chronic diseases	• National Service Frameworks (policies)	8
Danjoux et al	Canada; Acute Care	New technology for repair of abdominal aortic	• Adoption based on surgeons' perceptions of improved patient	7

(2007)		aneurysms (endovascular aneurysm repair [EVAR])	outcomes and safety (however, only preliminary data on safety and effectiveness existed). • Decision to stop funding based on cost, lack of evidence of safety and effectiveness and the fact that vascular surgery was not a local priority at the time.	
Evans et al. (2013)	UK; Commissioning	National chronic conditions management policy	• Research evidence one among many influences: variety of information sources informed decision-making; 'high-grade' research evidence (e.g. systematic reviews) lacking in decision-making. Evidence of local need important. • Rather than being seen by participants as research evidence, evidence defined as information derived from contact with colleagues or professional 'networking', involving service users, and assessing local needs (idea of 'responsive practice').	8
Gallego (2008)	Australia; Commissioning	New health technologies at the regional and institutional level	• Economic evaluation	7
Harden and Fulop (2015)	Australia; Acute Care	Multi-disciplinary cancer care	• Knowledge as 'fact', 'expert opinion', and 'narrative' used in decision-making conversations. • Lack of 'narrative' evidence used by the networks, as factual and expert talk often dominated.	7
Hendy and Barlow (2013)	UK; Health and social care organisations	Remote care (telecare) services	• Experiential knowledge, e.g. stories (actual practice) • RCT / clinical trial / cost-effectiveness (aspiration) • Internal, e.g. questionnaires completed by front-line staff	7
Hutchinson and Johnston (2008)	Australia; Acute Care	Clinical management tools	• Involved use of practical knowledge (e.g. clinical scenarios with patients), professional opinion (e.g. 'what worked best'), contextual knowledge, and research evidence (latter was limited).	5
Kyratsis (2012)	UK; Acute and Primary Care	Infection Prevention and Control technologies	• Different types of innovation knowledge: Awareness knowledge (information that an innovation exists); 'how-to' knowledge (information required to use an innovation properly at individual and organisational levels); 'principles' knowledge (information about an innovation's functioning principles).	8
Kyratsis et al (2014)	UK; Acute Care	Specific technology examples	• Evidence types included research-generated information on innovation decisions from national bodies and agencies, local trial data, peer exchange or, less often, input from external agents such as management consultants. • 'Evidence templates' shape evidence use, including: 'biomedical-scientific' (thorough testing); 'practice-based' (learning from others); and 'rational-policy' (policy requirements).	7
Lettieri (2009)	Italy; Acute Care	Technology assessment at the hospital level	• Evaluations used to make adoption decisions. Assessment of uncertainty partial and variable relative to assessment suggested by literature. Approaches include using scenario analysis, sensitivity analysis, and expected variability of clinical practice.	5

Lopes et al (2015)	Australia; Commissioning	New health technologies	• Stakeholders conceptualised and valued evidence differently, from clinical outcomes and patient preferences to patients' experiences in living with illness.	8
Mele et al. (2013)	Italy; Acute Care	Technological innovation (Da Vinci surgical robot)	• Prevailing types of evidence vary by region, ranging from scientific evidence to experiential knowledge.	6
Nedlund and Garpenby (2014)	Sweden: Acute and Primary Care	New health technology at the regional level	• Scientific studies (awareness that technologies could not always be evaluated using criteria used in randomised controlled trials).	7
Nembhard (2015)	United States; Acute Care	Quality improvement in the care of patients experiencing heart attack	• Staff voice in decision-making	7
Noël et al. (2014)	United States; Primary care	Chronic Care Model	• Practice facilitation, including evidence-based 'toolkit'.	4
Panzano and Roth (2006)	Canada; Mental health Coordinating Centres of Excellence	Four innovative mental health practices (cluster based planning/multi-systemic therapy/the Ohio medication algorithms related to schizophrenia and depression/integrated dual disorder treatment)	• Scientific evidence and experiential evidence	4
Prosser and Walley (2007)	UK; Primary care	Primary care group/trust prescribing strategies	• Development of formularies, educational outreach, prescribing feedback, dissemination of drug information, educational meetings, and peer group review.	7
Richer et al. (2013)	Canada; Acute Care	Major organisational transition	• Participants identified range of evidence: historical and local data, best practices, benchmarking with other organizations, and literature review with quantitative and qualitative studies.	5
Robert et al. (2011)	UK; Acute Care	National quality improvement programme: The Productive Ward in England.	• Programme led by a national body, the National Health Service Institute for Innovation and Improvement (NHSI) in England.	7

Rycroft-Malone et al. (2013)	UK; Acute Care	Evidence based guideline recommendations for reducing peri-operative fasting times	• Research evidence in the guideline ('strong', underpinned by RCTs); patient guideline; facilitation (championing, awareness raising, role modelling); local evidence and practitioner experience.	8
Spyridonidis and Calnan (2011)	UK; Acute and Primary Care and Commissioning	In response to guidelines for obesity and CHF, introduction of changes to prevent obesity and a community CHF service respectively.	• National guidelines (NICE). • Local guidelines and dissemination plans (face-to-face meetings, educational and teaching workshops).	8
Teng et al. (2007)	Canada; Commissioning	Priority setting by a provincial health authority	• Evidence use in priority setting perceived to need improvement (currently ad hoc and more based on 'whoever yells the loudest'). • Suggested improvement strategies include: decision-making criteria (inconsistent); 'best practice information'; creation of 'Strategic Plan'; stakeholder opinion (including public opinion).	7
Wade et al (2016)	Australia; Primary care	Telehealth in the home	• Published evidence of benefits from trial evaluation.	9
Williams and Bryan 2007	UK; Acute and Primary care	Medical technologies	• Cost-effectiveness analysis information	8
Wye et al (2015)	UK; Commissioning	Commissioning	• Wide range of sources. Local data often preferred to national or research-based information. Barriers to use of academic research, which had a lesser role in decision-making.	9

Note: Greyed out references were not included in the thematic analysis

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Figure title, numbering, and contents (citations, chapter numbers) adapted for report.

Table 20: Charting of themes across primary studies included in full text review

Reference	Study type and methods	Aims and objectives	Professional processes	Organisational processes	Local system processes
Ahmad et al. (2012)	Multiple case study design; thirty-eight technology adoption decisions and implementation processes across 12 NHS organisations (121 interviews).	To investigate innovation adoption decisions and implementation processes from an organisational perspective, particularly stakeholder involvement.	- Credibility of senior clinicians (e.g. medical director) used to legitimise decision-making on innovation.	- Early engagement of frontline clinical staff and technology users in decision-making aids implementation (however, some organisations took 'exclusive' approach limed to the central infection prevention and control (IPC) team as perceived to hold necessary 'specialist' knowledge).	-
Armstrong et al. (2013)	Ethnography; case studies of three quality improvement projects within the 'Closing the Gap through Clinical Communities' programme ('Lung Cancer', 'Aneurysm', and 'Kidney' projects). Data collected using non-participant observations, 126 interviews, documentary analysis.	To characterise patient involvement in three improvement projects and identify strengths and weaknesses of contrasting approaches.	Patient representatives rely on broader knowledge, skills and experiences to contribute and have potential roles as 'persuader' and 'knowledge broker'. However, when discussion focused on technical issues (e.g. specifications for equipment standards), it was less clear how patients could contribute. Clinicians doubted patients' ability to contribute to technical and safety issues, questioning their knowledge/experience.	Meaningful involvement is supported by early involvement in the project, effective communication channels, creation of a non-hierarchical structure, and clearly defined patient roles.	-
Bouwman (2008)	Qualitative; 15 GPs were interviewed to collect their perceived barriers and opportunities towards involvement in gene-based nutrition advice.	To explore the issues that facilitate or hinder the involvement of GPs in an early stage of the development process of innovative, personalized nutrition advice.	Most GPs contested the results of nutritional studies. GPs' arguments against gene-based nutrition advice related to (1) little knowledge of field (i.e. General Practice), (2) relevance and quality of evidence, (3) perceived needs of patients.	-	Findings suggest need for early involvement of GPs in development process (e.g. in order to provide expertise about patients).

Bowen et al (2009)	Qualitative study involving planners and decision-makers in 11 health authority regions. 17 focus groups and 53 interviews with managers (205 participants in total).	Explore views on the nature and use of evidence, and barriers to making decisions based on evidence.	- Research capacity and data availability less important relative to political and organizational factors; suggestion that evidence could be 'gamed'	- Lack of time and resources (more resources could be allocated if considered organisational priority). - Centralised decision-making and lack of communication inhibited evidence use. - Crisis management 'culture', excessive workload, fracturing of attention	Majority of barriers seen as 'external'. Politics often more important than evidence, e.g. reactions to public perceptions
Carstens (2009)	Mixed methods study of 13 systems of care; qualitative key informant interviews (n=39) and follow up quantitative surveys.	To analyse decision-making about the adoption and implementation of evidence-based practices within local systems of collaboration.	Entrepreneurial leaders of adopter sites suggested that they made more evidence led decisions (e.g. well informed on research and data) than those in non-adopter sites.	EBP seen by leaders as way of increasing agencies' competitive advantage.	Adopting EBP understood as way of enhancing local system legitimacy, e.g. to attract public funding.
Challans (2006)	Case study of clinical audit patient panel. Information provided by Sheffield South West Primary Care Trust, England.	To identify the ways in which patients can be involved in service improvement and the ways in which they are able to contribute to improvement agenda.	Staff initially apprehensive about involving patient panel members in the project team. Patient involvement requires change in culture for some health care professionals.	-	-
Checkland (2007)	Case studies of four general medical practices based on interviews (n=36), non-participant observation and documentary analysis.	To investigate how general medical practices in the NHS react to a mandated external initiative, National Service Frameworks (NSFs), and to explore the value of using 'barriers to change' for understanding this.	Failure to implement NSF were linked by participants to concerns about NSFs as a form of evidence (e.g. document length, complexity, local applicability), but the authors suggest these were constructions that were used by GPs because the NSFs did not fit in with their 'identity work'.	Non-implementation of policy was related to underlying organisational issues.	-
Danjoux et al (2007)	Qualitative case study and evaluation; interviews (n=5) with those leading a surgical innovation and documentary analysis.	To describe and evaluate the adoption of a new health technology used by surgeons for the treatment of aortic aneurysms (endovascular aneurysm repair).	Surgeons' desire to introduce new techniques and innovative approaches that 'make sense' for the patient (the "medical-individualistic" perspective).	Innovation encouraged as an academic health science centre. Cost and lack of evidence of safety and effectiveness informed decision to cut funding.	Ontario's Ministry of Health and Long-Term Care recommended against adoption (citing need for long-term follow-up data from clinical trials), influencing hospital's decision to cut funding.

Evans et al. (2013)	Mixed methods; national email survey of health service commissioners in Local Health Boards (n=22) and semi-structured interviews (n=5).	To understand the role of research evidence at the local level in relation to the implementation of a national chronic conditions management policy.	According to one senior manager, preference for approach to care 'informed by professional contacts' over other forms of evidence.	Tension between resources required to appraise research to inform commissioning decisions and that required to implement changes to services.	Government policy, initiatives, and targets influenced commissioning context and drove decision-making. Evidence-based policy valued but its use in practice constrained by budgetary pressures.
Gallego (2008)	Qualitative study of decision-makers' perceptions; interviews (n=12) with senior managers, clinical service (medical), middle managers, medical clinicians, and nurse managers.	To aid the design of a new process of technology assessment and decision-making.	Some decision-makers lack knowledge and understanding of economic evaluation; its credibility and accuracy, especially at a local system level, questioned.		Decision-makers' narrow view of economic evidence - based on costs and budgetary constraints – influenced potentially by need for rationing in health care system (budgetary impact and costs main deciding factor).
Harden and Fulop (2015)	Qualitative study of seven Cancer networks, responsible for enhancing multi-disciplinary cancer care. Data collected through video-recordings of fifty-three network sub-committee meetings.	To explore how decision-making can be improved in healthcare contexts, such as cancer care networks, by adopting 'relational' leadership practices.	Committee chairs' moderate use of different types of evidence (leadership) (what the authors term the difference between 'single ontology' and 'multi-ontology' sense making).	Institutional or management issues in the organisation of care steered conversations toward scientific and technical themes at the expense of narrative perspectives, representing 'single ontology' sense-making.	-
Hendy and Barlow (2013)	Ethnography; five comparative, longitudinal case studies of remote care (telecare) services using formal interviews (115 hours), informal discussions and	To explore how managers' use evidence to inform decisions about innovation adoption.	- Evidence adapted to benefit managers and local staff based on managers' agendas (e.g. alignment with existing practices and needs, moderating	- Innovation spread mediated by its alignment with recipient organisation (non-alignment of organisation's values and expectations and managers'	-

	meetings (41 hours), observations (70 hours), and documentary analysis.		innovation).	agendas in 2/5 cases).	
Hutchinson and Johnston (2008)	Qualitative, non-participant, observational design. Two multidisciplinary teams' meetings observed (n=7) and interviews with participants (n=10).	To investigate the process of evidence use by health professionals during development of evidence-based clinical management tools.	Multidisciplinary meetings were dominated by doctors' professional opinions, while those of allied health professionals and nurses were less able to influence tool development.	-	-
Kyratsis (2012)	Qualitative, multisite, comparative case study design, individual and group interviews (n=121) and observations (20 hours).	To understand organisational technology adoption (initiation, adoption decision, implementation) by looking at the different types of innovation knowledge used during this process.	- Professional networks important source of three knowledges. - Preferences varied by professional group. Nurses used both 'principles' (scientific) and 'how-to' knowledge'; medical professionals prioritised 'principles' knowledge.	Research active organisations sought and prioritised 'principles' knowledge. - Need for clinical and financial justification for innovations.	-
Kyratsis et al (2014)	Comparative mixed methods case studies of 27 technology product journeys within nine acute NHS Trusts. Data collected using surveys, in-depth interviews (n=191) and documentary analysis.	To investigate the use of research-based knowledge in health care management decisions about innovation.	Managers with different professional backgrounds sought and used different forms of evidence in decision-making, based partly on 'plausibility to self'. Doctor managers and non-clinical managers were concerned with evidence that helped their own decision-making, whereas nurses were also concerned with providing evidence to aid others' decision-making.	Access and use of evidence in decision-making aided by organisational processes, e.g. infrastructure redevelopment projects and emphasis on patient safety, collaboration or teamwork (i.e. through organisational culture).	External pressures and critical events, e.g. national performance targets and financial pressures, influenced decision-making. Encouraged more emphasis on 'what works' than rigorous evidence.
Lettieri (2009)	Multiple case study on current practice of technology assessment in 5 hospitals using interviews (n=15) and documentary analysis.	To assess the extent to which and how uncertainty is taken into account for budgeting technology adoption at a hospital level.	Sponsors of new technologies were often doctors who understood the clinical case for particular innovations, but were less confident with organisational and financial issues, suggesting a need for other stakeholders to use evidence to assess these issues.	Suggests organisational ways of managing uncertainty related to technology adoption, including building evidence based practice for technology selection and a reporting system regarding technology performance to inform future decision-making.	-

Lopes et al (2015)	Qualitative interview study (n=13)	To explore the views of patient organisation representatives and members of Advisory Committees providing advice to the Australian Department of Health (DoH) on decisions related to public funding for new health technologies.	Mismatch between conceptions of useful evidence used by advisory committee (disease) and patient organisations (lived experience of illness), hindering involvement.	Involvement processes for including patient organisations in health care funding decisions inadequate. Patient organisations partnered with other stakeholders to e.g. increase influence on policy making.	Suggest need for 'deliberative' involvement process with multiple stakeholders to make decision-making more inclusive and transparent, while recognizing power dynamics.
Mele et al. (2013)	Qualitative, multiple case study design. Data collected via interviews (n=148) and documentary analysis.	To explore the role of evidence in governing the adoption of technological innovation (Da Vinci surgical robot) in health care.	Managers use evidence to decline unreasonable requests from clinicians.	-	Four archetypes of regional decision-making based on policymakers' preferences found: 'competency network' (research evidence); 'authorization' (secondary data, e.g. health technology assessment); 'incentive' (technical knowledge and monitoring), 'central planning' (experiential judgements and monitoring).
Nedlund and Garpenby (2014)	Qualitative case study of Health Technology Advisory Committee (HTAC) based on interviews (n=19).	To shed light on how problem frame differences on evidence based policy (EBP) in a regional healthcare context, shape the puzzling over how to handle the influx of new technologies.	Evidence given different meanings and problem frames by different individuals (e.g. "some of the actors would suggest that ''a lack of evidence'' was the problem, while other actors related to a situation where the available information was not underpinned by ''good'' evidence or that the introduction of new technology had been founded on limited evidence").		Unit managers suggested HTAC was not embedded in the ordinary decision-making structures. Unit managers often preferred other solutions e.g. using professional reference groups and other professional and scientific networking groups.
Nembhard (2015)	Qualitative study of staff perceptions in 12 hospitals using individual and group interviews (n=99).	To examine the drivers of voice for health professionals in hospitals. Specifically, to investigate the factors that influence their voice, why these factors are influential, and the purposes for which staff use their voice.	Staff willingness to voice influenced by individual's personality and perceived expertise (e.g. tenure), and availability of data to provide authority or legitimacy (e.g. performance data, benchmarking data, or national guidelines).	Leader supportiveness, organizational culture, and structures supporting voice.	External validation of opinion voiced, e.g. participating in a national improvement campaign.
Noël et al. (2014)	Mixed methods: cluster randomized controlled trial and ethnographic field notes recorded by the facilitators during 'monthly facilitation meetings' at practices over a 12-month period.	To examine the specific activities and Chronic Care model (CCM) components that primary care practices implemented and sustained in response to a 12-month Practice Facilitation (PF) intervention.	Practice staff were more likely to implement aspects of the model that were compatible with their own values, i.e. taking from the evidence the need to change patients' behaviour, rather than their own.	The most popular interventions were simpler to implement and were proposed for a trial period reducing commitment among staff to implementing them beyond the short term.	Suggests more complex re-design require performance management, feedback, incentives.

Panzano and Roth (2006)	Study focused on seventy-eight projects involving organisational decisions to adopt one of four innovative mental health practices. Key informants provided information on the adoption decision via interviews and a survey (participant numbers not reported).	To examine the extent to which a risk-based decision-making framework is useful for understanding the decision to adopt research-guided, innovative mental health practices.	-	Organisations that are well informed about innovations, which extends to gathering information from peers, are more likely to adopt innovations due to a greater reported capacity to manage associated risks.	-
Prosser and Walley (2007)	Qualitative study of stakeholders' perspectives; data collected using focus groups (n=4) and interviews (n=24) with GPs and others in primary care.	To examine key stakeholders' perspectives on primary care prescribing strategies in context of managerial and organisational changes in primary care at the time.	Managers privileged scientific, evidence-based medicine, while marginalizing GPs' clinical and experiential knowledge. GPs sceptical of managers as objective decision-makers and information providers (for GPs, clinical knowledge encompasses knowing the patient, too).		- in response to opposition from GPs, local primary care organisations (PCO) emphasised quality in prescribing targets rather than more controversial issue of cost containment. - peer performance is an important influence on behaviour (e.g. data showing that practice an outlier).
Richer et al. (2013)	Qualitative, single case study based on interviews (n=11) with key decision-makers across hospital.	To examine the body of literature around notions of 'evidence' in the decision-making process.	Leaders relied on courage, an ability to 'rally' others around goals, and 'displaying coherence' between evidence and changes made.	Clinical basis for change considered first; however, political value/cost powerful influence on how evidence used in transformational change. 'Push' (clear vision, guidelines, support) and 'pull' (incentives) factors needed to implement change.	The organizational, social, and political context in which the organisation was at this time.
Robert et al. (2011)	Mixed methods, including qualitative approach. Five organisational case studies of NHS acute hospitals, including 58 interviews.	To explore why innovations in service and delivery are adopted and how they are then successfully implemented and eventually assimilated into routine nursing practice.	'Champion' for programme and staff having practical need for change.	Enablers of adoption include solid financial footing; leadership and support from senior staff; local ownership and empowerment of staff; and resources to support innovation.	Source of evidence (NHSI) - had national organisational profile and established links with providers – which aided adoption.

Rycroft-Malone et al. (2013)	Randomized controlled trial with embedded process evaluation based on interviews (n=139) and focus groups (n=5).	To provide an explanation of implementation processes from one of the first national implementation research randomized controlled trials with embedded process evaluation conducted within acute care, and a proposed extension to the Promoting Action on Research Implementation in Health Services (PARIHS) framework.	Evidence base believed to be robust and was relatively uncontested. However, research base mediated by practitioner and patient judgements about the need for caution, and perceived attitudes to risk taking (difference between agreeing with evidence, and using it to make decisions and/or change services).	Aligning implementation with existing relevant activities enhanced the chances of more successful implementation.	Study conducted at time of major NHS changes; staff reported feeling overwhelmed by competing priorities and managerial support variable. Success vested in individual's enthusiasm and commitment.
Spyridonidis and Calnan (2011)	Comparative, longitudinal case-study design (74 interviews).	To inform 'evidence-based' implementation by using an innovative methodology to provide further understanding of the implementation process in the English NHS using two NICE clinical guidelines as exemplars.	Implementation influenced by doctors' and managers' receptivity; may engage or disengage with organisational initiatives for implementing new services in response to guidelines.	Implementation not 'single decision' but 'numerous decision events' The variations in the implementation process could be best accounted for in terms of differences in the structure and nature of the local organisational context. This points to the importance of managers as well as clinicians in decision-making about implementation.	Financial incentives enhanced adherence to guidelines.
Teng et al. (2007)	Qualitative study; 25 interviews with decision-makers in a provincial health services authority.	To assess how evidence is used in setting priorities by a provincial health authority, including organizational barriers and facilitators.	Stronger physician role needed, e.g. to provide and interpret clinical evidence ('conflict of interest' a barrier, as have fee-for-service model).	Organisational context influences decision-making processes; lack of authority to change process. Strong leadership and commitment to priority setting needed. Culture of 'openness', 'learning' and being 'data-driven' needed.	Politics influences decisions.
Wade et al (2016)	Action research; data collected using semi-structured interviews (n=19) and 'deliberative forum' on preferred implementation models.	To produce a preferred implementation approach for sustainable and large-scale operations, and a process model that offers practical advice for achieving this goal.	Clinician acceptance, quoting interviewee: "one of the issues is having sufficient data to say this is a change that should be service wide"	Move from trials to large-scale services of home telehealth services still at early stage, requires leadership support to overcome variety of implementation barriers. Leadership is enabled by 1) showing solutions to the problems of service demand and budgetary pressure, 2) demonstrating how home	Budgetary constraint at state and federal level meant that services demonstrating savings or efficiencies more likely to be funded.

				telehealth aligns with health service policies, and 3) achieving clinician acceptance through providing evidence of benefit and developing new models of clinical care. Change enabled by marketing telehealth to patients, clinicians and policy-makers, and building a community of practice.	
Williams and Bryan 2007	Mixed-methods study. Qualitative case studies of four decision-making committees including documentary analysis, observation of committee meetings (n=11), and interviews with committee members (n=31). Survey in primary and secondary care to collate information proformas used by decision-making committees when considering proposed new technologies.	To explore how local committees operate when making technology coverage decisions, the information they use and the extent to which economic evaluation featured in this.	Other factors influenced the committees, such as the perspectives of committee members, especially clinicians. Some respondents felt that the committees were susceptible to powerful personalities on, or attending, the committee.	In order to be useful, cost effectiveness analysis needs to better reflect the constraints of the local decision-making environment. Decision-making environment appeared to militate against emphasis on cost-effectiveness analysis, including unclear relationships with resource allocators, an explicitly political decision-making process, and poorly specified decision-making criteria.	-
Wye et al (2015)	Qualitative study of four commissioning organisations in England, using interviews (n=52), meeting observation (n=14), and documentary analysis.	To identify the reasons that prompted commissioners to seek information, to clarify which sources and types of knowledge commissioners commonly consulted, and to describe the use of research evidence in decision-making.	Commissioners acquired information through conversations, stories (clinical and patient) and documentation (especially bulleted summaries to capture attention)	-Competing proposals for funding (persuasion needed). -Organisational processes change the original information.	Decisions need to stand up to external scrutiny (locally and nationally)

Note: Greyed out references were not included in the thematic analysis.

Figure title, numbering, and contents (citations, chapter numbers) adapted for report.

Appendix 2. Topic guides

Discussion guide for focus groups (Workstream 1)

1. **Introductions and sharing examples of innovation [20 mins]**
    - Name
    - Your role and sector you work in (acute or primary care, commissioner or service provider, describe yourself as a clinician or manager, a patient representative, or another type of stakeholder)
    - Please describe a recent example of innovation or improvement you have been involved in. *For the purposes of this exercise, innovation is defined broadly as the development and implementation of new ideas, products, processes or organisational forms. Our use of the term in relation to health care encompasses service or quality improvement.*
    - *Follow up if necessary:*
        i. Was the innovation new or had it come from another setting?
        ii. How did this influence adoption?
        iii. If the innovation was adopted, what role did evidence play in this?
        iv. How did evidence become a 'tipping point' for change?

2. **Preferences for evidence [20 mins]** *For the purposes of this exercise, evidence is defined broadly as including diverse forms of information, from academic research findings, local forms of data, e.g. audit reports, and stakeholders' views.*
    a. What types of evidence were used in your example of innovation or improvement?
        Prompts: research evidence (quant and qual), local data, expert opinion, patient need, implementation knowledge.
        Do you think that the type of innovation influences the need for evidence or the type of evidence required/wanted?
    b. Where did the evidence come from?
        Prompts: Was it published in a peer-reviewed journal? Was it a national guideline? Who conducted the research/launched the guideline, and how reliable/independent were they?
    c. Who presented the evidence (i.e. who was the messenger/source and what effect did this have)?
        Prompts: Senior or junior member of staff and how did this influence its use? How much air time did it get and how did this influence its use? Internal/external person/body and how did this influence its use? Overall influence of credibility, personality and perceived expertise.
    d. (If multiple forms of evidence have been mentioned) How were the different types of evidence prioritised?
    e. What other forms of evidence or information do you think <u>should</u> be used in decision-making?
        Prompts: How important is it to have certain information such as the number of deaths prevented/quality of life/costs/patient satisfaction/impact on inequalities etc. How does the evidence used align with your prior expectations of what would/should be used? Does this matter?
    f. What are the barriers to use of these <u>other</u> forms of information?
        Prompts: What might better enable their use in future? What determines whether or not a piece of evidence is used?
    g. Are there any other types of information that may not be framed as evidence but can/should be used as evidence?

Patient specific questions

- What constitutes evidence from patients?
- How is evidence concerning patients acquired?
- In what forms can evidence from patients be presented? Can you give some examples of what forms tend to be more effective? What impact does this have?
- How are these types of evidence received by different decision-makers in different innovation contexts?
- How much of an impact does it have on the decisions that are made?
- What prevents it from having more of an impact?
- How does/can evidence from patients compete with other forms of evidence?
- Have there been any changes over time in the ways in which evidence from patients is used?

3. **Influence of professional processes on evidence use [20 mins]** *For the purposes of this exercise, professional processes are defined as the characteristics, standards, behaviour, values and guiding principles of different professionals (at the individual and group level) that may contribute in some way to use of evidence in decision-making about innovation.*

a. B'GROUND. In your example of innovation, how do you think your professional background influenced your use of evidence?

- *Receptive to particular types of evidence (academic research, local data, knowledge gained through experience, patient perspective)*
- *Barriers too (e.g. economic evaluation, qual research, systematic reviews)*
- *Influence what evidence is presented (types of evidence); how it is interpreted (what picked out or emphasised); and applied (degree to which you are able to influence decision-making using evidence)?*
- *Plausibility to self versus others trying to influence?*

b. OTHER GROUPS. In your examples of innovations, how did other groups respond to the evidence?

- *doctors in acute or primary care*
- *doctors vs nurses and other allied health professionals*
- *managers vs clinicians*

c. TENSIONS. In your example of innovation, how were potential tensions between groups' preferences resolved?

- *doctors and nursing/ allied health professionals – marginalize?*
- *managers' and clinicians' views – potential tensions?*
- *Commissioners versus service providers*
- *How does evidence of patient views fit in with professionals' views?[differences across groups; credibility/perceived expertise]*

4. **Influence of organisational processes on evidence use [20 mins]** *For the purposes of this exercise, organisational processes are defined as organisational level values, beliefs, policies, structure and culture that may contribute in some way to use of evidence in decision-making about innovation.*
    - In your example of innovation, what was the role of your organisation in evidence use and decision-making?

- How can your organisation either support or inhibit you in using evidence to make decisions about innovation?
- What are the organisational level enablers and barriers to use of evidence in decisions about innovation?
    i. *Possible enablers:*
        - *Well-informed organization (high level of peer awareness)*
        - *Supportive infrastructure*
        - *Leadership/managerial approaches (promoting evidence use)*
        - *Culture (teamwork/institutional fashions)*
        - *Data driven*
        - *Promoting stakeholder involvement at all levels*
    ii. *Possible barriers:*
        - *Lack of time, resources and pressure*
        - *Not receptive to innovation*
        - *Lack of authority*
        - *Degree to which evidence on innovation aligned with organisational needs*
        - *Overall maturity/capability of the organisation to effectively use evidence to make decisions. For example, do they have the appropriate expertise (i.e. analysts), access to sufficient evidence, awareness of that access and opportunity to make use of it?*
- How did these barriers/enablers influence the decision-making around your innovation specifically? (This might already be covered as people respond to the first question)

5. **Influence of local system processes on evidence use [20 mins]** *For the purposes of this exercise, local system processes are defined as factors associated with the local health care system (i.e. beyond the limits and control of individual organisations and the individuals/groups within it) that may contribute in some way to use of evidence in decision-making about innovation.*
    - ROLE In your example of innovation, were other organisations at the local system level relevant in decision-making or evidence use (e.g. commissioners, other providers, patient groups, AHSNs, clinical networks)?
        - If so, how did they influence the use of evidence?
        - Did they help to produce consensus around the adoption of innovation or was this challenging? What role did evidence play in this?
    - BARRIERS/ENABLERS In your example of innovation, were there barriers and enablers to use of evidence in decision-making at the local system level?
        i. *Possible enablers:*
            - *legitimize need for innovation;*
            - *enable wider range of stakeholder views (how negotiated?);*
            - *influence behaviour at lower levels (e.g. by presenting evidence in particular ways to appeal)*
        ii. *Possible barriers:*
            - *system pressures, including austerity ('what works' over rigour, and preference for narrow economic information);*
            - *not embedded enough in decision-making at lower levels.*

6. **Are there any other factors/processes that we have not yet discussed that you think influence the use of evidence in decision-making about innovation?**

Topic guide for stroke case study (Workstream 2)

Research questions from protocol:

1. At the micro level: how both stroke clinicians and senior managers within individual provider organisations' use, and negotiate understandings of, research evidence relative to other information, e.g. financial impact and local need, when considering reconfiguration.

2. At the meso level: how individual 'champions' and collective decision-making groups influence how evidence is used and consensus reached among providers and commissioners across health systems considering reconfiguration.

TOPIC AREAS:

1. Please can you tell me 'the story' of the reconfiguration of stroke services in this area from your individual perspective, including your role in the process?

2. What decisions needed to be made (e.g. changes in practice at professional and organisational level) about the reconfiguration of stroke services in this area?

3. What role, if any, did evidence play in the decisions to reconfigure stroke services in this area?

4. What role did different professional groups play in the decisions to reconfigure stroke services in this area?

5. What role did your organisation play in the decisions to reconfigure stroke services in this area?

6. What role did stakeholders at the local system level play in the decisions to reconfigure stroke services in this area?

7. Do you have any recommendations for the production of evidence to support decision-making about innovations such as the reconfiguration of stroke services?

THE REMAINDER BECOMES A SET OF KEY FOLLOW UP QUESTIONS TO PROMPT AND PROBE FURTHER

BACKGROUND AND INTRODUCTION TO THE INNOVATION
1. Please tell me about your role, and how it relates to the use of evidence or innovation (including service improvement) generally. **2. How does your role relate to the reconfiguration of stroke services specifically?** **3. What are the aims of the reconfiguration of stroke services in relation to your organisation/service area/profession?** • How would you judge success of the reconfiguration of stroke services for your organisation/service area/profession? **4. What has happened so far?/What stage are things currently at?**

- Knowledge (the evidence)
- Persuasion (the influence of the evidence)
- Decision-making (the various interactions with the evidence at different levels)
- Adoption/Rejection (the decision)
- Implementation (putting the decision into action in the local context) –this then goes on to become part of future knowledge

EVIDENCE USE FOR DECISION-MAKING

5. **What decisions needed to be made (e.g. changes in practice at professional and organisational level) about the adoption of reconfiguration of stroke services in this area?**

- Who was involved in decision-making?
- What was your role (if any)?

6. **What types of evidence were used in decision-making about the reconfiguration of stroke services in this area?**

- Academic/scientific research? Types?
- Local data? Types?
- Patient 'narratives' or similar
- Personal experience or tacit knowledge?
- What evidence emerged from the reconfiguration of stroke services in other areas? What information did it give you about the reconfiguration of stroke services as an innovation?
- How did this evidence influence the decision-making about broader adoption? Did it confirm or question the value of broader adoption or did gaps remain?
- Are there any other types of 'information' that may not typically be labelled as evidence but are being used to inform decision-making about the reconfiguration of stroke services in this area?

7. **Where did the evidence come from (what was its source) and what effect did this have (if any)?**

- How did credibility, personality, perceived expertise of an individual/group influence use of evidence in decision-making about the reconfiguration of stroke services in this area?

8. **Who presented the evidence (who was the messenger) and what effect did this have (if any)?**

- Senior or junior member of staff and how did this influence its use?
- How much time/effort was spent communicating the evidence to managers and how did this influence its use?
- How much time/effort was spent communicating the evidence to front line staff and how did this influence its use?

9. **(If multiple types of evidence are mentioned) How have different forms of evidence been weighted or prioritised in relation to the reconfiguration of stroke services in this area?**

- How have differences between evidence been reconciled? (e.g. differences in message/strength/focus/provenance/applicability to local setting)

10. **Were there any unintended consequences of using these types of evidence in relation to the reconfiguration of stroke services in this area?**

- Were there (or could there be) any potential negative effects/issues/problems with this type of evidence? (For example, certain groups feeling isolated/certain groups not adequately represented/important information lost)

11. **Are there any other forms of evidence that you think should have been used in relation to the reconfiguration of stroke services in this area?**
- Is there a disparity between the types of evidence that were used and the types of evidence that you think should be used in this context?
- Why were these types of evidence not used?
- Were there any barriers or resistance to use of these other types of evidence?

ROLE OF PROFESSIONAL, ORGANISATIONAL AND LOCAL SYSTEM PROCESSES

12. **In what way have the roles of different professional groups influenced evidence use for decision-making about the reconfiguration of stroke services in this area? (Can also ask if they expect them to)**
- Consider Clinicians/Senior managers/Providers/Commissioners
- Do decision-making processes about the reconfiguration of stroke services in this area vary across these different professional groups?
- Are there different preferences for evidence across these groups?
- Are there any professional barriers to use of particular forms of evidence (e.g. understanding and acceptability)?
- Does this cause any tension between the groups? If yes, how are these being negotiated? Do organisational processes/interventions help to overcome these or not?

13. **In what ways has the role of the organisation influenced evidence use for decision-making about the reconfiguration of stroke services in this area? (Can also ask if they expect it to)**

Possible enablers:
- Well-informed (peer awareness)
- Supportive infrastructure
- Leadership/managerial approaches (promoting evidence use)
- Culture (teamwork/institutional fashions)
- Data driven
- Promoting stakeholder involvement.

Possible barriers:
- Lack of time, resources and pressure
- Not receptive to innovation
- Lack of authority
- Degree to which evidence on innovation aligned with organisational needs
- Overall maturity/capability of the organisation to effectively use evidence to make decisions. For example, do they have the appropriate expertise (i.e. analysts), access to sufficient evidence, awareness of that access and opportunity to make use of it?

14. **Does evidence use for decision-making about the reconfiguration of stroke services in this area vary at different levels of the organisation (i.e. service/board level)?**

15. **In what ways have other stakeholders at the local system level influenced evidence use for decision-making about the reconfiguration of stroke services in this area? (Can also ask if they expect it to)**
- Types of organisations and their roles

Possible enablers:
- Legitimize need for innovation
- Enable wider range of stakeholder views (how negotiated?)
- Influence behaviour at lower levels (e.g. by presenting evidence in particular ways to appeal)

Possible barriers:
- System pressures ('what works' over rigour, and preference for narrow economic

information)
- Not embedded enough in decision-making at lower levels

OVERALL REFLECTIONS AND CLOSE

16. **What recommendations would you make for the production of evidence that can best support decision-making about innovations such as the reconfiguration of stroke services?**
- Different evidence for different professional groups?
- Different evidence for different levels of the organisation?

17. **What recommendations would you make for decision-making about innovations such as the reconfiguration of stroke services? How can it be ensured that there is space for evidence to inform it?**
- Different approaches to decision-making for different professional groups?
- Different approaches to decision-making for different levels of the organisation?

18. **Do you currently use any tools to support use of evidence in decisions about innovation?**
- Can you describe them?
- What are their strengths/weaknesses?

19. **Is there anything else you would like to add either in relation to the reconfiguration of stroke services or other innovations more broadly?**

Topic Guide for Pilot Phase 1 Interviews (Workstream 3)

List of interview questions to explore:

Which characteristics are definitely not important?

Which characteristics are most important?

Where are the overlaps between the characteristics?

How do we choose between the characteristics that overlap?

Are there any other characteristics of evidence that are not on this list that you would judge to be important?

How should we define 'provenance' as attribute? What does it mean to you? (can apply this question to any of the attributes)

Who should we be considering to be decision-makers for the purposes of this study?

If your organisation was going to consider whether or not to implement a new innovation, what would the process be by which it is considered – focussing especially on the different points at which evidence is considered?

Topic guide for feedback on DECIDE guidance (Workstream 4)

Researchers at the University of Manchester and University College London have been undertaking a study on the role of evidence in decisions about introducing or spreading health care innovations. Based on the preliminary study findings, they have produced draft guidance to improve the ways in which evidence informs decision-making. Please consider the draft guidance in relation to decision-making on health care innovation that you might come across in your field of work. The researchers are interested in discussing with you the concept, format, content and potential applications of the guidance. In giving your views, please consider how you would apply the guidance in relation to your particular field of work.

1. Concept
    a. What do you think about the 'long winding road' diagram?
    b. What do you think about the producing the guidance as an interactive PDF?
    c. Would you be more likely to view the guidance online, download it and view on screen, or use a paper copy?

2. Format
    a. Please consider the proposed format for the guidance:
        i. summary of study findings by theme
        ii. questions to consider based on key themes
        iii. subthemes with examples
        iv. how others have addressed questions, using study findings
        v. signposting to further resources, e.g. quality checklists for academic research.
    b. How useful is this overall format and each of the steps?
    c. Are there any steps that are missing or should be removed?

3. Themes:
    a. What are you views on the seven overarching themes?
    b. Do any of the theme headings need changing?
    c. Should any be removed or merged?
    d. Are any themes missing?

4. Questions for decision-makers:
    a. Are the questions useful, based on your experience of decision-making?
    b. Are any overly simple or complex to aid decision-making?
    c. Should the questions be phrased in the first or third person?
    d. Are you already able to answer these questions (e.g. professional experience, other guidance, or conforming with internal processes, e.g. completing business cases)?
    e. What, if anything, does the guidance add to existing guidance or knowledge?

5. Subthemes:
    a. Are the subthemes useful for decision-making?
    b. What about the level of detail on each theme?
    c. Are any subthemes missing?
    d. Should any be removed, modified, or added?

6. Application
    a. How might you use this guidance to inform decision-making (if at all?)

b. What could be changed to increase its value to decision-makers?
c. Who are the main potential audiences for the guidance?
d. How could we target these audiences and improve uptake of the guidance?

7. Impact
    a. How do you think we should measure uptake and impact of the guidance?
    b. How would you feel about giving some details before you can download the guidance (which would allow us to measure uptake demographics?)
    c. How would you feel about being asked in future about how you've used the guidance?

Appendix 3. Supplementary data for chapter 3: case studies

Table 21: Anonymised list of interviewees

Code	Case Study	Site	Descriptive role	Sector	Stakeholder type
CAI4	Cancer	pan-London organisation	Macmillan GP	Primary Care Sector	Clinician
CAI1	Cancer	pan-London organisation	Manager	Primary Care Sector	Manager
CAI2	Cancer	pan-London organisation	Clinical lead	Primary Care Sector	Clinician
CAI3	Cancer	pan-London organisation	Manager	Primary Care Sector	Manager
CAI5	Cancer	pan-London organisation	Project manager	Primary Care Sector	Manager
CAI6	Cancer	pan-London organisation	Manager	Primary Care Sector	Manager
CB12	Cancer	London CCG	Consultant	Secondary Care Sector	Clinician
CBI1	Cancer	London CCG	Practice facilitator	Primary Care Sector	Administrative
CBI3	Cancer	London CCG	GP	Primary Care Sector	Clinician
CBI4	Cancer	London CCG	GP	Primary Care Sector	Clinician
CBI5	Cancer	London CCG	GP	Primary Care Sector	Clinician
CBI6	Cancer	London CCG	GP	Primary Care Sector	Clinician
CBI7	Cancer	London CCG	Commissioner	Commissioning	Manager
CBI8	Cancer	London CCG	GP	Primary Care Sector	Clinician
CBI9	Cancer	London CCG	Cancer lead	Primary Care Sector	Clinician
CCI1	Cancer	SW England CCG	Commissioner	Commissioning	Manager
CCI10	Cancer	SW England CCG	Macmillan GP	Primary Care Sector	Clinician
CCI11	Cancer	SW England CCG	Macmillan GP	Primary Care Sector	Clinician
CCI12	Cancer	SW England CCG	Macmillan GP	Primary Care Sector	Clinician
CCI13	Cancer	SW England CCG	GP	Primary Care	Clinician

Code	Case Study	Site	Descriptive role	Sector	Stakeholder type
				Sector	
CCI14	Cancer	SW England CCG	GP	Primary Care Sector	Clinician
CCI15	Cancer	SW England CCG	GP	Primary Care Sector	Clinician
CCI2	Cancer	SW England CCG	Commissioner	Commissioning	Clinician
CCI3	Cancer	SW England CCG	Cancer lead	Primary Care Sector	Clinician
CCI4	Cancer	SW England CCG	Practice facilitator	Primary Care Sector	Administrative
CCI5	Cancer	SW England CCG	Senior nurse	Secondary Care Sector	Clinician
CCI6	Cancer	SW England CCG	Early diagnosis lead	Commissioning	Manager
CCI7	Cancer	SW England CCG	Practice facilitator	Primary Care Sector	Administrative
CCI8	Cancer	SW England CCG	Service manager	Secondary Care Sector	Manager
CCI9	Cancer	SW England CCG	Clinical lead	Primary Care Sector	Clinician
EAI1	Eye	central Trust	Consultant	Secondary Care Sector	Clinician
EAI10	Eye	central Trust	Service director	Secondary Care Sector	Clinician
EAI11	Eye	central Trust	Finance director	Secondary Care Sector	Manager
EAI12	Eye	central Trust	Senior manager	Secondary Care Sector	Manager
EAI2	Eye	central Trust	Improvement lead	Secondary Care Sector	Clinician
EAI3	Eye	central Trust	Consultant	Secondary Care Sector	Clinician
EAI4	Eye	central Trust	Clinical director	Secondary Care Sector	Clinician
EAI5	Eye	central Trust	Research manager	Secondary Care Sector	Manager
EAI6	Eye	central Trust	Service director	Secondary Care Sector	Clinician
EAI7	Eye	central Trust	Consultant	Secondary Care Sector	Clinician
EAI8	Eye	central Trust	Senior executive	Secondary Care Sector	Manager

Code	Case Study	Site	Descriptive role	Sector	Stakeholder type
EAI9	Eye	central Trust	Senior executive	Secondary Care Sector	Manager
EBI1	Eye	South Clinic	Project manager	Secondary Care Sector	Administrative
EBI2	Eye	South Clinic	Administrator	Secondary Care Sector	Administrative
EBI3	Eye	South Clinic	Nurse	Secondary Care Sector	Clinician
EBI4	Eye	South Clinic	Consultant	Secondary Care Sector	Clinician
EBI5	Eye	South Clinic	Service manager	Secondary Care Sector	Manager
EBI6	Eye	South Clinic	Technician	Secondary Care Sector	Clinician
EBI7	Eye	South Clinic	Administrator	Secondary Care Sector	Administrative
EBI8	Eye	South Clinic	Consultant	Secondary Care Sector	Clinician
ECI1	Eye	East Clinic	General manager	Secondary Care Sector	Manager
ECI2	Eye	East Clinic	Matron	Secondary Care Sector	Clinician
ECI3	Eye	East Clinic	Technician	Secondary Care Sector	Clinician
ECI4	Eye	East Clinic	Clinical director	Secondary Care Sector	Clinician
ECI5	Eye	East Clinic	Nurse	Secondary Care Sector	Clinician
EDI1	Eye	External Eye Perspective	Consultant	Secondary Care Sector	Clinician
EDI2	Eye	External Eye Perspective	Consultant	Secondary Care Sector	Clinician
SAI1	Stroke	Scottish metropolitan area	Consultant	Secondary Care Sector	Clinician
SAI10	Stroke	Scottish metropolitan area	Consultant	Secondary Care Sector	Clinician
SAI11	Stroke	Scottish metropolitan area	Planning director	Secondary Care Sector	Manager
SAI2	Stroke	Scottish metropolitan area	General manager	Secondary Care Sector	Manager
SAI3	Stroke	Scottish metropolitan area	Planning director	Secondary Care Sector	Manager

Code	Case Study	Site	Descriptive role	Sector	Stakeholder type
SAI4	Stroke	Scottish metropolitan area	clinical network coordinator	Secondary Care Sector	Administrative
SAI5	Stroke	Scottish metropolitan area	lead clinician, clinical network	Secondary Care Sector	Clinician
SAI6	Stroke	Scottish metropolitan area	Consultant	Secondary Care Sector	Clinician
SAI7	Stroke	Scottish metropolitan area	Planning manager	Secondary Care Sector	Clinician
SAI8	Stroke	Scottish metropolitan area	Consultant	Secondary Care Sector	Clinician
SAI9	Stroke	Scottish metropolitan area	Senior nurse	Secondary Care Sector	Clinician
SBI1	Stroke	NW England	Operational manager	Secondary Care Sector	Manager
SBI2	Stroke	NW England	Consultant	Secondary Care Sector	Clinician
SBI3	Stroke	NW England	clinical network manager	Secondary Care Sector	Manager
SBI4	Stroke	NW England	Regional director, stroke charity	Third Sector	Manager
SBI5	Stroke	NW England	Clinical director	Secondary Care Sector	Clinician
SBI6	Stroke	NW England	Clinical lead	Secondary Care Sector	Clinician
SBI7	Stroke	NW England	Strategy lead	Commissioning	Manager
SCI1	Stroke	National Stroke Perspective	National lead	Secondary Care Sector	Clinician
SCI2	Stroke	National Stroke Perspective	CCG chair	Commissioning	Manager
SCI3	Stroke	National Stroke Perspective	National director	Government	Clinician
SCI4	Stroke	National Stroke Perspective	Consultant	Secondary Care Sector	Clinician
SCI5	Stroke	National Stroke Perspective	Programme lead	Commissioning	Manager

Appendix 4. Supplementary data for chapter 4: national survey

The full DECIDE survey (version A)

Decisions in health Care to Introduce or Diffuse innovations using Evidence (DECIDE) Survey

This survey is asking for your views about different types of evidence that are used when making decisions to adopt or diffuse innovations in the NHS. Innovation in the NHS can take many different forms. It usually involves developing a new idea to meet a health care need. Often innovation may be related to clinical or administrative processes, but it may also involve the development of new medical technologies or clinical tools. Examples of health care innovations might be information systems, surgical equipment, new drugs and new therapeutic uses for drugs or medical devices. An innovation does not have to be completely novel – for example, you can adopt a service development that is being done elsewhere and it is still an innovation in your organisation and in your local context.

We are interested in your experience of decision-making in the NHS and the kinds of evidence that you prioritise in your decision-making when deciding whether or not to adopt an innovation.

Taking part in this survey is voluntary. No personal details will be asked of you in this survey, and published reports about this survey will not contain any personal details.

Completing the questionnaire

For each question please tick the box that is closest to your views. For some questions you will be instructed that you may tick more than one box. Sometimes you will find the box you have ticked hides other questions, this ensures you will miss out questions that do not apply to you.

Part 1. Information about you

We would like to ask a few questions about you to help us analyse the results of the survey

Are you involved in decisions to adopt or diffuse (i.e. spread) innovations in your organisation?

- I am involved in decision-making on the adoption or diffusion of innovations
- I am involved in informing decision-making
- I am neither involved in informing decision-making nor the decision-making itself

If you selected 'neither', please describe your involvement with decision-making in the NHS?

_____

Which type of health care organisation do you work for? (If you work for more than one then please pick the one that reflects your main role.)

- Primary care provider organisation
- Secondary care provider organisation
- Tertiary care provider organisation
- Community health services provider organisation
- Mental health provider organisation
- Commissioning organisation

Other organisation (please specify) _____

Are you employed by the NHS?

- Yes
- No

If 'No', please specify the type of organisation you are employed by from the list below:

- Charity
- Community Interest Company (CIC)
- Private sector
- Local Authority
- Self employed

Other (please specify) _____

Which of the following best describes your role when making decisions on adopting or diffusing innovations?

(Please tick as many as appropriate.)

- Allied Health Professional
- Pharmacy
- Mental health / Psychological therapies
- Doctor
- Nursing / Midwifery
- Health informatics / Healthcare science
- Public Health
- Management
- Dentist
- Ambulance services
- Commissioner
- Patient representative
- Clinical academic

Other (please specify) _____

Part 2. The importance of different characteristics of evidence for adopting or diffusing innovations

We would like to ask you about the types of evidence you consider important (in your role within your organisation) when a decision is needed to adopt or diffuse an innovation in the NHS. This could be the type of evidence you would prefer to see when reviewing a business case, research proposal, or other application for the adoption or diffusion of an innovation. We are not concerned with the innovation itself, but with evidence associated with an innovation. Evidence can take many forms, and so we have drawn up a long list of potential characteristics of evidence that NHS decision-makers may prioritise.

From the list of characteristics, please choose the top three types of evidence that you would prefer to base a decision on. (Please tick the relevant box next to each of the 3 characteristics you have chosen.)

For example, when considering whether or not to adopt an innovation you may believe it is most important to know: what the impact of the innovation is on use of services; the impact on infection risk in your organisation; and also the source of the evidence, and so you would tick the three corresponding boxes.

Please see the next page

List of Characteristics	Top three
Information on impact on mortality	☐
Information on impact on morbidity	☐
Information on impact on infection risk	☐
Information on impact on patient safety	☐
Information on impact on life expectancy/survival rate	☐
Information on impact on quality of life	☐
Information on impact on use of services	☐
Information on impact on quality of care provision	☐
Information on impact on budget	☐
Information on impact on health inequality/inequity	☐
Information on QALYs (Quality Adjusted Life Years)	☐
Information on cost-effectiveness	☐
Information on how long until the benefit of the innovation is achieved	☐
Information on the impact on other services	☐
Information on the impact on other sectors	☐
Information on patient perspectives on the innovation	☐
Information on staff 'buy-in' for the innovation	☐
Information on whether the innovation has been implemented previously	☐
Evidence that the innovation is aligned with local priorities	☐
Evidence that the innovation is aligned with national priorities	☐
Applicability of the evidence to target population	☐
The funder of the information/evidence	☐
The credibility of the presenter/innovation leader	☐
The credibility of the source of the information included	☐
Information on effort required to implement innovation (in terms of set-up time and cost)	☐

Are there any other characteristics that you consider to be important but are not listed above? (Please specify)

_____

_____

_____

Part 3. Choosing between different characteristics of evidence

We would like you to imagine that you need to make a decision about adopting an innovation in your organisation.

Over the next few pages we have listed a number of alternative innovations, and we will ask you to choose which of the two possible innovations sounds best to you based on the characteristic s of the evidence available.

As before we are interested to know what types of evidence you would like to see (in your role in your organisation) to decide whether or not to adopt the innovation. The specifics of the innovations themselves are not detailed, but please assume that both options have identical estimated costs and benefits, and are in line with your organisations priorities.

Each choice is between two innovations which differ according to the following factors:

The Credibility of the presenter/innovation lead – key questions: is the presenter known to you? Whether they have a track record of adopting or diffusing innovations? And whether they have a successful track record or not?

Possible options:

- Presenter has **high credibility**
- Presenter **credibility is not known**

The Applicability of the evidence – is the evidence relevant to your organisation? I.e. to what extent is the evidence drawn from a similar population, economic context, geographic context, UK or international, or the health system it comes from? Evidence from a local context would be the most applicable, whereas evidence from a dissimilar context would be the least applicable.

Possible options:

- There is evidence on costs/outcomes, drawn from **local context**
- There is evidence on costs/outcomes, drawn from a **similar context**
- There is evidence on costs/outcomes, drawn from a **dissimilar context**

The existence of Previous Implementation – has this particular innovation already been implemented somewhere else? It can be assumed that this previous implementation would have been at least partly successful, or *presented* as being successful, else it would not be used as supporting evidence.

Possible options:

- **Evidence** of previous implementation exists
- **NO evidence** of previous implementation exists

The level of Effort required in order to adopt or diffuse an innovation –How easy or difficult would it be to implement in terms of resources needed to set-up and to adopt the innovation? (Resources being: e.g. staff numbers, financial cost, level of oversight, etc.) And of how amenable or resistant to change are staff and systems in order to adopt the innovation?

Possible options:

- **High effort required** to introduce/roll-out innovation
- **Low effort required** to introduce/roll-out innovation

The Source of the Evidence – the origin of the underlying justification for the particular innovation. I.e. the main source that the evidence comes from, and where the impetus for innovating comes from.

Possible options:

- **Published Research** (Qualitative or Quantitative)
- **Guidelines or other recommendation** (produced by e.g. NICE, King's Fund, Royal Colleges)
- **Regulator's priorities** (CQC, NHSI)
- **Local data only/local opinion**

Now first an example…

Example question

A person has been asked to consider the characteristics of two innovations, A and B listed below and then answer the question at the bottom of the table saying which of the two innovations they would prefer.

Factors	Innovation A	Innovation B
Credibility	Presenter has high credibility	Presenter credibility is not known
Applicability	The evidence on costs/outcomes was drawn from a similar context	The evidence on costs/outcomes was drawn from local context
Previous Implementation	NO evidence of previous implementation exists	Evidence of previous implementation exists
Effort required	High effort required to introduce/roll-out innovation	Low effort required to introduce/roll-out innovation
Source of evidence	Local data only / local opinion	Guidelines recommendation

Which innovation would you choose? (Tick one box only.)

Innovation A ☒ Innovation B ☐

So if, on balance, the person would prefer Innovation B as described in the table rather than Innovation A, s/he would have ticked the box for Innovation B:

Innovation A ☐ Innovation B ☒

Alternatively, if the person would prefer Innovation A as described in the table rather than Innovation B, s/he would have ticked the box for Innovation A:

Innovation A ☒ Innovation B ☐

In the next 8 questions, you are asked to consider the characteristics of two innovations, A and B. For each questions indicate which innovation you would choose

Choice 1	Innovation A	Innovation B
Credibility	Presenter has high credibility	Presenter credibility is not known
Applicability	The evidence on costs/outcomes was drawn from a dissimilar context	The evidence on costs/outcomes was drawn from local context
Previous Implementation	NO evidence of previous implementation exists	Evidence of previous implementation exists
Effort required	Low effort required to introduce/roll-out innovation	High effort required to introduce/roll-out innovation
Source of evidence	Regulator's priorities	Guidelines recommendation

Which innovation would you choose? (Tick one box only.)

Innovation A ☐ Innovation B ☐

Choice 2	Innovation A	Innovation B
Credibility	Presenter has high credibility	Presenter credibility is not known
Applicability	The evidence on costs/outcomes was drawn from a similar context	The evidence on costs/outcomes was drawn from local context
Previous Implementation	NO evidence of previous implementation exists	Evidence of previous implementation exists
Effort required	Low effort required to introduce/roll-out innovation	High effort required to introduce/roll-out innovation

Source of evidence	Local data only / local opinion	Regulator's priorities

Which innovation would you choose? (Tick one box only.)

Innovation A ☐ Innovation B ☐

Choice 3	Innovation A	Innovation B
Credibility	Presenter has high credibility	Presenter credibility is not known
Applicability	The evidence on costs/outcomes was drawn from local context	The evidence on costs/outcomes was drawn from a dissimilar context
Previous Implementation	NO evidence of previous implementation exists	Evidence of previous implementation exists
Effort required	High effort required to introduce/roll-out innovation	Low effort required to introduce/roll-out innovation
Source of evidence	Published Research	Local data only / local opinion

Which innovation would you choose? (Tick one box only.)

Innovation A ☐ Innovation B ☐

Choice 4	Innovation A	Innovation B
Credibility	Presenter credibility is not known	Presenter has high credibility
Applicability	The evidence on costs/outcomes was drawn from a similar context	The evidence on costs/outcomes was drawn from local context

Previous Implementation	NO evidence of previous implementation exists	Evidence of previous implementation exists
Effort required	Low effort required to introduce/roll-out innovation	High effort required to introduce/roll-out innovation
Source of evidence	Guidelines recommendation	Local data only / local opinion

Which innovation would you choose? (Tick one box only.)

Innovation A ☐ Innovation B ☐

Choice 5	Innovation A	Innovation B
Credibility	Presenter credibility is not known	Presenter has high credibility
Applicability	The evidence on costs/outcomes was drawn from local context	The evidence on costs/outcomes was drawn from a dissimilar context
Previous Implementation	NO evidence of previous implementation exists	Evidence of previous implementation exists
Effort required	Low effort required to introduce/roll-out innovation	High effort required to introduce/roll-out innovation
Source of evidence	Regulator's priorities	Published Research

Which innovation would you choose? (Tick one box only.)

Innovation A ☐ Innovation B ☐

Choice 6	Innovation A	Innovation B
Credibility	Presenter credibility is not known	Presenter has high credibility

Applicability	The evidence on costs/outcomes was drawn from a similar context	The evidence on costs/outcomes was drawn from local context
Previous Implementation	Evidence of previous implementation exists	NO evidence of previous implementation exists
Effort required	Low effort required to introduce/roll-out innovation	High effort required to introduce/roll-out innovation
Source of evidence	Published Research	Guidelines recommendation

Which innovation would you choose? (Tick one box only.)

Innovation A ☐ Innovation B ☐

Choice 7	Innovation A	Innovation B
Credibility	Presenter has high credibility	Presenter credibility is not known
Applicability	The evidence on costs/outcomes was drawn from a similar context	The evidence on costs/outcomes was drawn from local context
Previous Implementation	NO evidence of previous implementation exists	Evidence of previous implementation exists
Effort required	High effort required to introduce/roll-out innovation	Low effort required to introduce/roll-out innovation
Source of evidence	Local data only / local opinion	Guidelines recommendation

Which innovation would you choose? (Tick one box only.)

Innovation A ☐ Innovation B ☐

Choice 8	Innovation A	Innovation B
Credibility	Presenter credibility is not known	Presenter has high credibility
Applicability	The evidence on costs/outcomes was drawn from local context	The evidence on costs/outcomes was drawn from a dissimilar context
Previous Implementation	No evidence of previous implementation exists	Evidence of previous implementation exists
Effort required	Low effort required to introduce/roll-out innovation	High effort required to introduce/roll-out innovation
Source of evidence	Local data only / local opinion	Published Research

Which innovation would you choose? (Tick one box only.)

Innovation A ☐ Innovation B ☐

Part 4. Further views about innovations in health care

We would like to ask you about other factors you take into account when deciding whether or not to adopt or diffuse an innovation (in your role within your organisation). We recognise that there are many factors and compromises in decision-making, and so we are interested in what you would do in reality, not what would you would like to do in an ideal world.

When considering an innovation for adoption/diffusion, do you consider the costs/benefits of the innovation that might fall outside the scope of your organisation? (Please tick all options that apply)[1]

I consider the costs and benefits to primary health care organisations ☐

I consider the costs and benefits to secondary health care organisations ☐

I consider the costs and benefits to tertiary health care organisations ☐

I consider the costs and benefits to community health care organisations ☐

I consider the costs and benefits to mental health care organisations ☐

I consider the costs and benefits to patients and the public (e.g. time off work, transport costs, etc.) ☐

[1] Nb. Get Quality Health to be clever and add in "other X health care organisations" based on previous responses

I consider the costs and benefits to organisations outside the health sector (e.g. in the local authority/social services/housing/education) ☐

When considering the costs and benefits of an innovation (in your role within your organisation) and deciding whether or not to adopt or diffuse it, what is the maximum time period over which you would typically account for the costs and benefits? For example, would you only take into account costs and benefits that are incurred during the following, say, three years, or would you consider a shorter or longer time period than that?

"I would typically consider costs and benefits from the present up until a maximum of _____" (please select one of the following options)

1 years

2 years

3 years

4 years

5 years

6 years

7 years

8 years

9 years

10 years

More than 10 years

End of Survey

Thank you for taking part in this study. Your answers will be very valuable to us.

If you have any comments, questions or suggestions about this survey or the study in general, please write them in the box below. We would be especially interested to know about any specific issues that you took into account when choosing between the two options in each of the Discrete Choice Experiment tasks.

If you have any questions about this study please contact:

Nicholas Swart

Email: n.swart@ucl.ac.uk

If you would like more information about the study, please go to:

https://www.ucl.ac.uk/dahr/research-pages/DECIDE

List of Organisations approached to disseminate national survey

National Institute of Health Research (NIHR) Collaborations for Leadership in Applied Health Research and Care (CLAHRCs)

DECIDE Newsletter to stakeholders (including those involved in other workstreams and participants of focus groups, observations, and interviews)

The Health Foundation

Academic Health Science Networks (AHSN)

NHS Contact, Help, Advice and Information Network(CHAIN)

University College London Partners (UCLP) Newsletter

NHS Vanguard Newsletter

Royal Colleges (opportunistically approached using team and stakeholder contacts)

NHS England Clinical Commissioning Groups (CCG) bulletin

GP Practice Team Bulletin

NHS Chief Nursing Officer Bulletin

Targeted emails to all NHS Medical Directors

Targeted emails to key DECIDE stakeholders

Table 22: List of other characteristics that respondents considered to be important, in addition to those in the ranking exercise

Respondents' answers to Section 2, Question 2, "Are there any other characteristics that you consider to be important?"	*Theme (Impact; Practicability; Context/Source)*
Ease of implementation	Practicability
Evidence base for innovation	Context/ Source
Evidence that is actually is effective for patients/achieves what it claims in previous implementations AND evidence it is cost effective taking into account whole health +/- social care aspects as relevant and not just one organisations budgets! (holistic social-health economic assessment)	All three
Evidence use of treatments of known worth	Impact
Evidence. Feasibility. Outcome.	Impact and Practicability
Health outcomes Clinical effectiveness	Impact
How much additional clinical time does the innovation release	Impact
How the innovation helps the 'system; to be more joined up and avoids perverse incentives	Context and Practicability
I am a radiologist. Innovations which increase the accuracy and clinical usefulness of my report is important. We try to implement NICE guidance when the guidance makes sense in our organisation.	Impact and Context
I am afraid I am struggling to answer this as this is quite context specific - if an innovation was designed to improve efficiency with same quality the evidence required would be different if we wanted to focus on improving quality of life (regardless of its effect on mortality e.g. in palliative care)	Evidence required is Dependent on specifics of the innovation
I wanted to tick clinical outcome - quality of care came closest. I don't mean quality of care process, more a combination of mortality, morbidity, safety. Could have ticked QALY instead but that's gold standard and we don't have benchmarks to enable our board to judge	Impact
If it is a politically palatable proposal	Practicability
Impact on health outcomes for the population - possibly covered by the quality of care/ quality of life factors above. They are all relevant, but some more important than others and the relative importance will vary depending on the local deprivation levels and current health outcomes/ priorities.	Impact and context
Impact on patients	Impact
Impact on quality of care.	Impact

Impact on service improvement.	
In a small DGH it may not be as easy or cost effective to bring in a particular innovation and sometimes it is better to refer the case to a specialist centre.	Practicability
In reality one would consider all of the above in making a decision, out probably in an unstructured format. Often these decisions are put forward by experts in the specialty.	All three
Information on desirability of the innovation to patients	Practicability
Information on how to implement on going evaluation in your population and services.	Practicability
Information on implementation 'what works and how'	Practicability
Information on sustainability	Practicability
Information on the skills and attitudes needed by mainstream staff to shift to adopting the innovation, including motivation to shift from current practice (i.e. that the innovation in question clearly identifies the need to improve current practice)	Practicability
Information on the validity / quality of the evidence	Context/Source
Information related to the problem that is being addressed; 'if it's not broke don't fix it'. I would be more interested in an innovation which is a solution to a problem, rather than improving an already good service (due to financial constraints, of course we should always be improving everywhere).	Context and Practicability
It depends greatly on what the innovation is which of the above criteria are most important	Evidence required is Dependent on specifics of the innovation
Low priority but consideration of impact on institutional reputation	Impact and Context
Numbers of high-level management staff who will be recruited to oversee a project likely delivered by lower-level staff	Practicability
Patient experience	Impact
Probably subsets of characteristics above - Impact on operational performance, operational targets Evidence that the benefits will actually be delivered	Impact
Publication of evidence of the value of the innovation NHS requires publication of evidence before it can agree to implement an innovation and there can be a mismatch in timing of evidence publication and patients benefitting from the innovation leading to premature mortality and poor patient quality of life.	Context/Source
Return on investment, UK specific evidence is often useful	Impact

Safety	Impact
Scale of benefit (no point in putting energy and resources into projects with only small benefits)	Impact and Practicability
Social good - i.e. the impact of the approach on populations over time.	Impact
Technical aspects of the innovation, standards adopted, testing and certification/accreditation	Practicability
This is very much context specific - my requirement for, and way of prioritisation would depend entirely on the proposed innovation.	Evidence required is Dependent on specifics of the innovation
Use of measurement and statistical significance	Impact
Value to patient health and well being created by the innovation. Scalability to cover the necessary population.	Impact and Practicability
Who will be responsible for ensuring innovation follow-through	Context and Practicability
Yes. The single largest constraint on the effective implementation of projects in the NHS and elsewhere is management capability, whether in relation to competence or in relation to resources/stretch, given other priorities. Your survey implicitly assumes that the organisation can effectively implement the project or innovation. This tacit assumption is made too often and I fear your work will underestimate the importance of this effect because you have not taken it into account.	Practicability

Appendix 5. Supplementary data for chapter 5: DCE

Table 23: Priorities of characteristics from interviewees

Interview No:	1	2	3	4	5	6	7	8	
Information on impact on health	Y	M	M	M		-	Y	Y	Always important
Information on impact on mortality	Y	Y	-	-	-	-	-	-	Too specific
Information on impact on morbidity	-	-	-	-	-	-	Y	-	Too little info
Information on impact on quality of life	Y	N	-	N	M	-	-	Y	Rarely important
Information on impact on use of services	Y	Y	-	-	Y	-	-	-	Important when raised
Information on impact on quality of care provision	Y	-	M	-	M	-	-	Y	Linked to 'use of services'
Information on impact on budget	Y	Y	Y	Y	Y	Y	Y	Y	Always important
Information on impact on health inequality/inequity	Y	N	-	N	N	Y	N	-	Rarely important
Information on QALYs (Quality Adjusted Life Years)	N	N	-	N	N	Y	N	-	Rarely important
Information on cost-effectiveness	M	N	Y	M	-	Y	Y	Y	Sometimes important (not well understood)
Information on the time until impact realisation	-	Y	Y	Y	Y	N	Y	Y	Always important
Information on the impact on other services	N	Y	M	M	M	-	M	Y	Sometimes important
Information on the impact on other sectors	N	N	M	M	N	-	M	-	Linked to 'other services'
Information on the likelihood of success of the innovation	N	Y	Y	Y	-	-	-	-	Understood in terms of other characteristics
Information on patient perspectives on the innovation	-	M	M	N	N	-	N	Y	Rarely important
Information on staff acceptability and support ("buy-in") for the innovation	Y	-	-	-	Y	-	Y	-	Usually important
Information on whether the innovation has been implemented previously	Y	-	Y	Y	-	-	Y	-	Always important

Alignment of the evidence with local priorities	M	M	M	M	-	Y	Y	Y	Always important
Alignment of the evidence with national priorities	M	M	M	M	-	Y	M	M	Linked to 'local priorities'
Applicability of the evidence to target population	Y	-	Y	Y	Y	Y	Y	Y	Always important
Funder of the information/evidence	-	N	M	-	-	Y	-	-	Rarely considered
The credibility of the presenter/innovation leader	M	Y	-	Y	Y	Y	Y	-	Always important
The quality of the source of the information included	Y	M	M	Y	-	-	-	-	Inferred from others
Information on effort required to implement innovation (in terms of set-up time and cost)	-	-	-	-	Y	Y	M	Y	Always important

Key: "Y" = Yes, "M" = Maybe, "N" = No, "-" = not raised in interview.
= include in contextual DCE, = possibly include in contextual DCE

Further subgroup analyses results for the Discrete Choice Experiment

Table 24: DCE results for those who said they worked in primary care vs not

Attribute & Level	If Organisation = 'Primary Care' B Coefficient (SE)	If Organisation = 'Not Primary Care' B Coefficient (SE)	Attribute level difference **(primary vs not primary)**
Applicability: local context **(ref: dissimilar context)**	1.93 (0.73)**	1.12 (0.10)***	p = 0.23
Applicability: similar context **(ref: dissimilar context)**	0.94 (0.77)	1.26 (0.14)***	p = 0.60
Source of evidence: regulator's priorities (ref: local data)	2.63 (0.78)	1.00 (0.08)***	p < 0.001***
Source of evidence: guidelines **(ref: local data)**	1.02 (0.95)	1.14 (0.12)***	p = 0.89
Source of evidence: published research (ref: local data)	-0.65 (0.82)	1.20 (0.11)***	p = 0.02*
Previous implementation: yes **(ref: no)**	2.63 (0.63)	1.00 (0.08)***	p = 0.01*
Effort required: low **(ref: high)**	1.67 (0.83)*	0.68 (0.07)***	p = 0.07
Credibility: high **(ref: unknown)**	-0.38 (0.51)	0.49 (0.07)***	p = 0.03*
Number of observations	142 (2 observations missing data)	2,758 (42 observations missing data)	
Number of respondents	9	175	

*p < 0.05, **p < 0.01, ***p < .001

Test for difference between Primary Care Organisation and Not Primary Care Organisation: chi2(8) = 24.37, p = 0.002**

Table 25: DCE results for those who said they worked in secondary care vs not

Attribute & Level	If Organisation = 'Secondary Care' B Coefficient (SE)	If Organisation = 'Not Secondary Care' B Coefficient (SE)	Attribute level difference **(secondary vs not secondary)**
Applicability: similar context	1.22	1.21	p = 0.94
(ref: dissimilar context)	(0.25)***	(0.14)***	
Applicability: local context	1.22	1.08	p = 0.53
(ref: dissimilar context)	(0.18)***	(0.12)***	
Source of evidence: guidelines	1.51	0.91	p = 0.02*
(ref: local data)	(0.21)***	(0.15)***	
Source of evidence: published research (ref: local data)	1.50	0.92	p = 0.01*
	(0.20)***	(0.13)***	
Source of evidence: regulator's priorities (ref: local data)	1.07	0.99	p = 0.89
	(0.13)***	(0.09)***	
Previous implementation: yes	1.06	0.99	p = 0.63
(ref: no previous imp)	(0.21)***	(0.09)***	
Effort required: low	0.76	0.69	p = 0.68
(ref: high)	(0.13)***	(0.09)***	
Credibility: high	0.57	0.39	p = 0.24
(ref: unknown)	(0.13)***	(0.09)***	
Number of observations	1,042 (14 observations missing data)	1,874 (30 observations missing data)	
Number of respondents	66	119	

*p < 0.05, **p < 0.01, ***p < .001

Test for difference between Secondary Care Organisation and Not Secondary Care Organisation: chi2(8) = 11.09, p = 0.20

Table 26: DCE results for those who said they worked in tertiary care vs not

Attribute & Level	If Organisation = 'Tertiary Care' B Coefficient (SE)	If Organisation = 'Not Tertiary Care' B Coefficient (SE)	Attribute level difference **(tertiary vs not tertiary)**
Applicability: similar context	1.34	1.22	p = 0.69
(ref: dissimilar context)	(0.35)***	(0.14)***	
Applicability: local context	1.03	1.14	p = 0.71
(ref: dissimilar context)	(0.28)***	(0.11)***	
Source of evidence: regulator's priorities (ref: local data)	1.17	0.98	p = 0.30
	(0.22)***	(0.08)***	
Source of evidence: published research (ref: local data)	0.75	1.19	p = 0.18
	(0.29)*	(0.12)***	
Source of evidence: guidelines	0.59	1.18	p = 0.09
(ref: local data)	(0.32)	(0.13)***	
Previous implementation: yes	1.17	0.98	p = 0.34
(ref: no)	(0.18)***	(0.08)***	
Effort required: low	0.80	0.69	p = 0.58
(ref: high)	(0.19)***	(0.08)***	
Credibility: high	0.61	0.42	p = 0.32
(ref: unknown)	(0.19)**	(0.08)***	
Number of observations	488 (8 observations missing data)	2,428 (36 observations missing data)	
Number of respondents	31	154	

*p < 0.05, **p < 0.01, ***p < .001

Test for difference between Tertiary Care Organisation and Not Tertiary Care Organisation: chi2(8) = 11.2, p = 0.19

Table 27: DCE results for those who said they worked in commissioning vs not

Attribute & Level	If Organisation = 'Commissioning' B Coefficient (SE)	If Organisation = 'Commissioning' B Coefficient (SE)	Attribute level difference **(commissioning vs not commissioning)**
Applicability: similar context (ref: dissimilar context)	1.25 (0.24)***	1.23 (0.15)***	p = 0.94
Applicability: local context (ref: dissimilar context)	1.24 (0.20)***	1.08 (0.12)***	p = 0.50
Source of evidence: published research (ref: local data)	1.23 (0.21)***	1.10 (0.13)***	p = 0.61
Source of evidence: guidelines (ref: local data)	0.99 (0.22)***	1.16 (0.14)***	p = 0.49
Source of evidence: regulator's priorities (ref: local data)	0.70 (0.14)***	1.13 (0.09)***	p = 0.68
Previous implementation: yes (ref: no)	0.96 (0.23)***	1.13 (0.09)***	p = 0.009**
Effort required: low (ref: high)	0.63 (0.14)***	0.73 (0.09)***	p = 0.56
Credibility: high (ref: unknown)	0.36 (0.14)**	0.48 (0.08)***	p = 0.44
Number of observations	746 (6 observations missing data)	2,170 (38 observations missing data))	
Number of respondents	47	138	

*p < 0.05, **p < 0.01, ***p < .001

Test for difference between Commissioning Organisation and Not Commissioning Organisation: chi2(8) = 13.07, p = 0.11

Appendix 6. Supplementary data for chapter 6: guidance development

Table 28: Scoping of existing guidance

Guidance/Tool	*Relevance to project*	*Weblinks for further information*
NICE Briefing on using evidence in practice	This briefing summarises the approach NICE takes to assessing what evidence to use as the basis of our public health recommendations. It provides an introduction to how to use evidence to inform decisions about public health issues ('evidence-informed' decision-making). It may also be useful for people working in other local authority departments.	https://www.nice.org.uk/advice/lgb23/chapter/Introduction
NCCMT Evidence Informed Decision-making Checklist/ NCCMT Informed decisions toolbox: Tools for knowledge transfer and performance improvement	Developed these tools in collaboration with Canadian public health professionals to: •Help find & use research evidence •Help public health organizations document and share lessons learned Health Evidence created the Evidence-Informed Decision-making (EIDM) Checklist. It guides users through the seven-step process of EIDM in public health: 1.Define 2.Search 3.Appraise 4.Synthesize 5.Adapt 6.Implement 7.Evaluate	http://www.nccmt.ca/resources/search/237 https://www.healthevidence.org/practice-tools.aspx http://www.nccmt.ca/resources/search/46
Canadian Best Practices Portal Evidence-	Canadian information and tools on Evidence	http://cbpp-pcpe.phac-aspc.gc.ca/resources/evidence-

Informed Decision-Making: Information and Tools	Informed Decision-making for Public Health.	informed-decision-making/ http://ccebn.mcmaster.ca/documents/2013_%20Introduction-to-EIDM.pdf
Canadian Best Practices Portal Introduction to Evidence-Informed Decision-making Learning Module	Learning module based on Canadian information and tools on Evidence Informed Decision-making for Public Health.	http://www.cihr-irsc.gc.ca/e/45245.html
Agency for Healthcare Research and Quality Informed Decisions Toolbox	To promote evidence-based management in health care, the Agency for Healthcare Research and Quality (AHRQ) funded development of tools to help decision-makers find and interpret evidence related to decisions. The Toolbox was created to help bridge the gap between research evidence and organizational decision-making. It describes six steps for managers and policymakers to consider when gathering evidence to make a well-informed decision.	https://archive.ahrq.gov/policymakers/measurement/decisiontoolbx/index.html
Innovation Agency Self-assessment tool: evidence in commissioning (SaTEiC)	SaTEiC is a simple self-assessment tool, designed to highlight how well a CCG uses evidence for innovation, improvement and transformation. SaTEiC takes the format of a maturity matrix and provides a framework for improvement for CCGs to achieve organisational consistency in how evidence is used in commissioning. The tool enables a conversation around evidence "that reflects a wider set of subjects other than just technology or NICE guidance and encourages a	http://www.innovationagencynwc.nhs.uk/media/PDF/NHSI_FINAL_INFOGRAPHIC.pdf

	more systematic approach to using evidence in the commissioning process"	
SUPPORT Tools for evidence-informed health Policymaking (STP)	Focus on health policy. The series addresses four broad areas: 1. Supporting evidence-informed policymaking 2. Identifying needs for research evidence in relation to three steps in policymaking processes, namely problem clarification, options framing, and implementation planning 3. Finding and assessing both systematic reviews and other types of evidence to inform these steps, and 4. Going from research evidence to decisions. The focus of each tool is on supporting the use of research evidence in health policymaking (recognises that power relations among stakeholders and 'values' also inform decision-making, but are out of scope).	https://health-policy-systems.biomedcentral.com/articles/supplements/volume-7-supplement-1

Appendix 7. Copy of printable PDF version of DECIDE guidance

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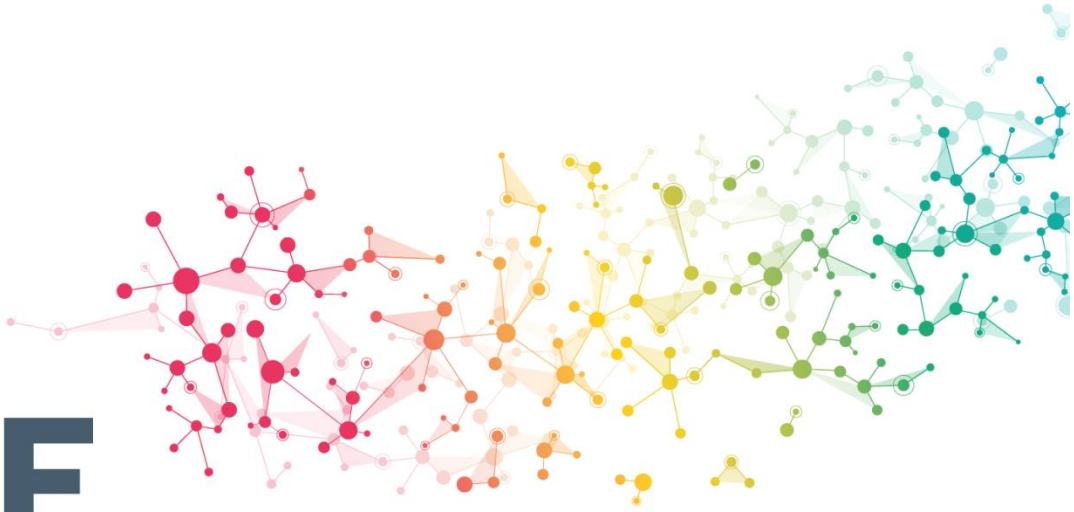
Version 1, May 2018



DECIDE

Guidance

IS THIS GUIDANCE FOR YOU?

The guidance is aimed at anyone concerned with informing or making decisions about introducing or spreading innovations within the UK National Health Service, including providers and commissioners of care.

STUDY INFORMATION

This guidance comes from the "DEcisions in health Care to Introduce or Diffuse innovations using Evidence" (DECIDE) study, funded by the Health Foundation, which was led by researchers at the University of Manchester and University College London. DECIDE examined the role of evidence in decisions about introducing or spreading innovations in health care. DECIDE is a mixed methods study involving four workstreams (see study protocol for detailed overview, Turner et al. 2016):

1. Systematic scoping review of relevant literature with stakeholder feedback (Turner et al. 2017).

2. Three case studies (CS) of real world decision-making on innovations in NHS acute and primary care, covering:
   - **CASE STUDY 1**
     acute stroke service reconfiguration in a metropolitan area of England and Scotland (CS1);
   - **CASE STUDY 2**
     diffusion of 'virtual' or 'remote review' clinics for stable glaucoma outpatients within a Trust's network of clinics within southern England (CS2);
   - **CASE STUDY 3**
     responses to NICE national guidance on referral from primary care for cancer signs and symptoms in two geographical areas of England covered by Clinical Commissioning Groups (CCGs) (CS3).

3. A national survey and discrete choice experiment (DCE) of decision-makers' preferences for evidence, including providers and commissioners.

4. Development of guidance for decision-makers and evaluators in health care to support the use of evidence in decision-making.

To develop this guidance, we identified six themes that were prominent findings in workstreams 1-3. We then translated these themes into six key questions that decision-makers may want to consider during the decision-making process. Examples from the three case studies are included to illustrate the themes. We mapped the themes onto a visual depiction of the 'long and winding road' of decision-making to represent the often iterative, distributed, messy, and lengthy nature of this process.

In order to support decision-making at each stage, we provide a summary of our findings, questions for decision-makers to consider, and potential ways of addressing the questions using examples from the case studies. We also sign-post users of this guidance to further resources where appropriate. The guidance was developed in consultation with clinicians, health managers, commissioners, patient representatives, and researchers. Consultation involved a face-to-face workshop (May 2018) and semi-structured interviews.

Broad themes in this guidance

The six themes identified, and associated questions for decision-making, are as follows:

- **DEFINITION**
  Can the innovation and its potential impact be clearly described?
- **EVIDENCE**
  What evidence is available in relation to the innovation?
- **STAKEHOLDERS**
  Who will be involved in decisions and how?
- **DRIVERS**
  What are the key external and internal drivers for introducing innovation?
- **ORGANISATION**
  What organisational factors should be considered during decision-making?
- **IMPLEMENTATION**
  Can likely barriers and enablers to implementation be anticipated early in decision-making?

> *In the remainder of this guidance, we invite readers to explore these themes and questions. The guidance is presented as an interactive PDF, meaning that readers can either work through each stage of the guidance or dip into specific themes that are of interest along the long and winding road of decision-making. A checklist of questions to consider in your decision-making is provided at the end of this guide.*

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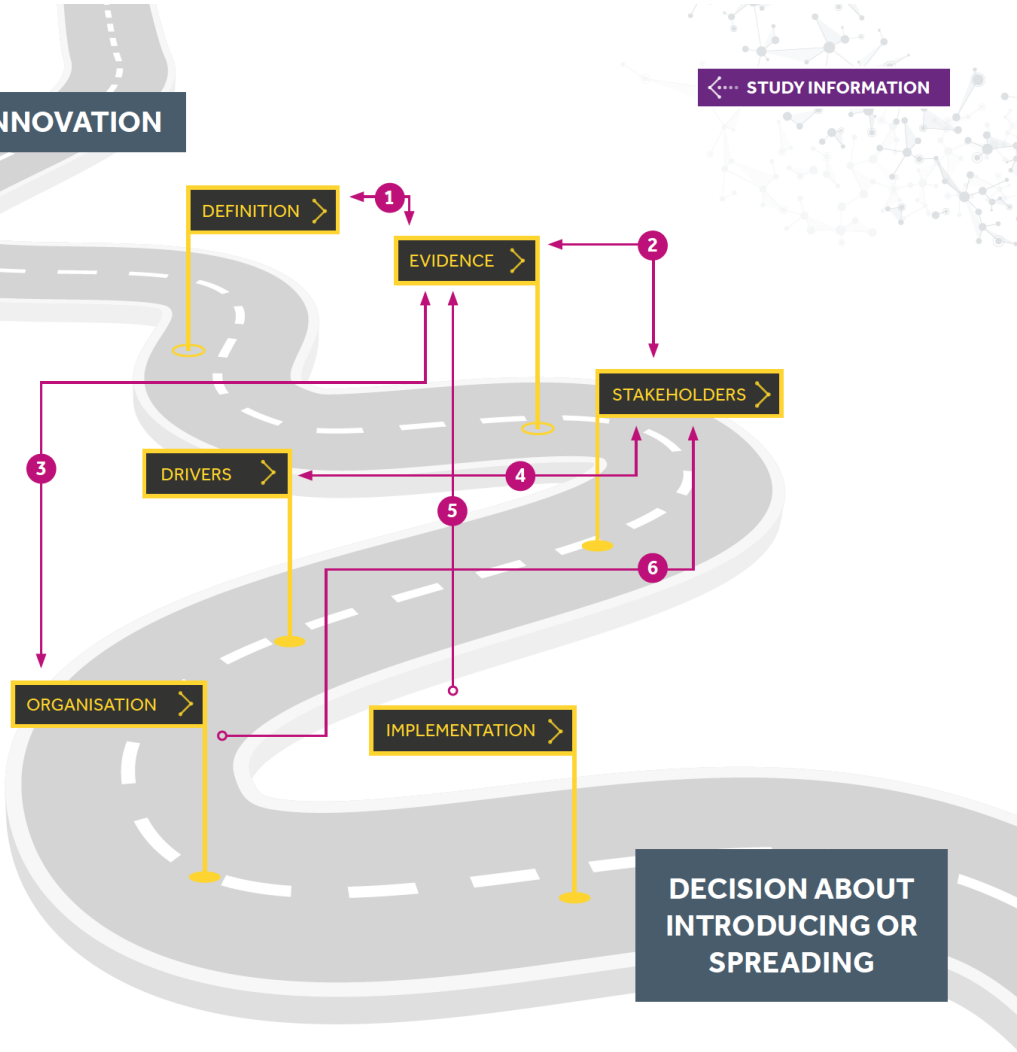
STUDY INFORMATION

QUESTIONS TO REFLECT ON WHEN CONSIDERING INTRODUCING AN INNOVATION IN HEALTHCARE

VIEW RELATIONSHIPS WITHIN THE DECISION MAKING PROCESS



1. Gathering evidence can help to define the innovation, while defining the innovation clearly can point to the evaluative evidence needed.
2. Considering evidence required will inform which stakeholders to involve, while involving stakeholders will inform the types of evidence needed.
3. Use organisational structures to gather evidence and clarify evidence needed to inform decision-making.
4. Understanding drivers will inform the stakeholders to involve in decision-making, while involving stakeholders can help to identify the drivers.
5. Gather evidence on implementation to anticipate likely barriers and enablers at an early stage.
6. Use organisational structures to involve stakeholders

DEFINITION

Can the innovation and its potential impact be clearly described?

To make any decisions about whether to introduce an innovation there needs to be clarity about what the potential change will involve and the impact on patients, staff roles, and service delivery. This will help people to understand how the innovation can be differentiated from existing practice and competing practices. We suggest identifying the information needed to summarise the innovation and the areas of impact:

1 SUMMARY:

Can you describe the key features of the proposed innovation?

- Consider whether sufficient information is available to produce a summary of the intervention.
- Your summary could include its aim, main features (e.g. components of the intervention), proposed changes to processes and outcomes, and possible unintended outcomes.
- Identify intended outcomes of the innovation if it is implemented (e.g. improvements in patient safety, decrease in length of stay, enabling self-management by patients).
- Consider developing a plan for mitigating any unintended consequences.

2 IMPACT:

Can the possible impact(s) of the innovation be described?

- Consider whether the innovation has been piloted or implemented elsewhere, as there may be documentation from other sites (e.g. business case, audit data, evaluation reports) that are useful for describing the innovation and its impact.
- Identifying areas impacted could include gathering information on the patient groups affected, changes to clinical processes and outcomes, working practices of staff, and organisational sites affected (e.g. internal departments and 'handovers' between departments or organisations).
- Developing a logic model may help with defining your innovation and how it will achieve its intended impact. Guides to creating logic models are available from Midlands and Lancashire CSU and NHS Health Scotland.

EVIDENCE

What evidence is available in relation to the innovation?

A diversity of evidence may be used to inform decision-making including research evidence, infographics, patient stories, cost data, and reuse of existing data. Recipients' views will be influenced by the strength of evidence (likely impact of an innovation), its perceived quality (credibility of the source), and how it is presented and shared. Stakeholders may differ in their preferences for evidence, including types and sources. There may be tension in how different groups present and interpret evidence.

Our research suggested the following questions were important in gathering evidence to inform decision-making.

1 TYPES:

What types of evidence are needed in relation to the innovation you're considering?

- Types of evidence could include published research, cost related data, local audit data, clinical evidence, pilot data, and patient experience. You may find the evidence required is already published or needs to be collected locally.
- Review if your organisation has a process for ensuring that finance and budgetary issues are assessed alongside clinical evidence and patient experience.
- Consider undertaking a pilot of the change involved, as local testing/ trialling can provide evidence of feasibility before a final decision is taken and highlight ways in which the innovation needs to be adapted to the local context.

CASE STUDY 1:

Reconfiguring acute stroke services

A variety of evidence was used during the decision-making process in both metropolitan areas we studied. This included research evidence, national guidance, local data (e.g. audit data on processes and outcomes of care), and modelling of financial impact. As well as this formal evidence base, we found that social processes influenced the use of evidence. In NW England, the need for change was actively constructed by local leads for stroke services, with accounts of patient experience being singled out as important in making such arguments.

EVIDENCE (CONTINUED)

EVIDENCE

2 REVIEW:

How is this evidence going to be collected and evaluated?

- Find out if evidence has already been reviewed (e.g. published review) or if a new review of the evidence is required. The NHS library and knowledge service may be a useful starting point (Click Here).
- Consider how you are going to assess the quality of evidence you include. One example is the Critical Appraisal Skills Programme (CASP) checklist (Click Here). Other resources on evidence assessment and quality appraisal can be found in the Cochrane library (Click Here) and the Centre for Reviews and Dissemination (Click Here).

CASE STUDY 1:

Reconfiguring acute stroke services

Those leading decision-making at one of the metropolitan areas we studied spoke directly to producers of evidence (e.g. with a research team that had evaluated the implementation, outcomes and cost of stroke reconfiguration) to help to make sense of the available research evidence and discuss it in relation to their local situation.

3 SHARE:

How is the evidence going to be shared with those involved in decision-making?

- Consider how the evidence reviewed is going to be summarised/ presented to the various stakeholders to ensure that there are appropriate opportunities to feedback their views on the innovation and associated evidence.
- There may need to be several types of summaries of the evidence produced, e.g. 'lay' and 'scientific' summaries.
- The Health Foundation has published a guide to communicating health research findings. (Click Here)

CASE STUDY 1:

Reconfiguring acute stroke services

In one of the sites, we found that research evidence was used creatively to exploit windows of opportunity for improvement. A stroke consultant had summarised academic research on the impact of service centralisation – including the quantitative 'headline' finding that further centralisation of services could contribute to the saving of '50 excess lives' – in order to influence local commissioners: *"we had simplified one-page summaries of the evidence and all kinds of things that went out to people. And the 50 excess lives did become fairly common currency."* (Consultant, Stroke).

EVIDENCE (CONTINUED)

EVIDENCE (CONTINUED)

4 DIVERSITY:

Are any forms of evidence over or under represented?

- Those wishing to influence the adoption or spread of an innovation make select evidence to support their view. Consequently, it can be challenging to reach a shared view among different stakeholders of the evidence.
- Consider if there are mechanisms in place to mitigate the potential influence of politics on decision-making in relation to the evidence assembled. See scoping review for more information on politics of evidence use in decision-making (Turner et al. 2017).
- Consider how to ensure the evidence reflects both dominant and more peripheral voices in decision-making (e.g. evidence on the clinical case for change as well as patients' views).
- Ensure that evidence reflects different perspectives in relation to an innovation, e.g. for multi-sectoral innovations that the evidence relates to the impact on different sectors, organisations, and implications for patients in each setting.

CASE STUDY 1:

Reconfiguring acute stroke services

Across the three case studies, senior clinicians (e.g. clinical academics, hospital consultants, and established GPs) tended to dominate decision-making at the organisational and local system level on introducing innovations. Evidence empowered clinicians to take a leading role in decision-making. This dominant role in decision making was reinforced by their preferences for evidence, as the types of evidence they prioritised (e.g. academic studies published in clinical journals) had a significant influence on decision-making. This preference impinged on the ability of other professional groups to engage meaningfully in decision-making using other forms of evidence:

"they [clinical academics] live in a world of studies and you can sometimes see that to them anything that isn't – the value of it is completely negated straight away because it hasn't been published." (Manager, Stroke).

Although senior clinicians were felt to be key stakeholders in decisions about innovation, members of other professional groups used alternative evidence as a way of influencing their views (e.g. in the eyes case study, managers presented local audit data systematically with the aim of appealing to consultants).

STAKEHOLDERS

Who will be involved in decisions and how?

Patients, user groups, service managers, commissioners, and health professionals may all be involved in your decision-making process. Their involvement could take different forms: some may have a formal role in decision-making if they have responsibility for a budget; others may be impacted by the decisions, professionally or personally, but could still exert a powerful influence on decisions. Individuals may be advocates or opponents for change; others may not have strong views, but still act as powerful enablers or barriers to change. Different stakeholders may also be variably receptive to different forms of evidence.

In planning adoption of an innovation, our research suggested the following stages were important in adopting innovations.

1 IDENTIFY:

Who might have a stake in the decision-making process?

- Start with individuals who have budget and clinical responsibility for making decisions about the innovation.
- Consider who may be affected by the proposed innovation (and those who may be impacted if the decision is made not to introduce the innovation).
- Think beyond your organisation, to regional groups and external systems or networks.
- Ask clinical or other experts to identify others who you were not aware of.
- 'Map' your stakeholders – organise your list into groups - by organisation, clinical area, or potential support/opposition or interest in the innovation. The Health Foundation has published a guide to engaging stakeholders (Click Here)
- Stakeholders can also be identified through desktop research of local NHS sites, attending events/ networking opportunities, and engaging with your local AHSN for advice. Review your list as things change in the project or your wider health system.

CASE STUDY 3:

Implementing NICE cancer referral guidance aimed at GPs

In both case study sites, a group was set up to agree referral forms. In one site, the group got wider and wider as the actors recognised that the guidance affected a broader range of healthcare professionals across primary and secondary care than initially anticipated. It also changed as health system alignments changed, for example, after Sustainability and Transformation Partnerships were formed, the group changed in composition.

STAKEHOLDERS (CONTINUED)

STAKEHOLDERS (CONTINUED)

2 INVOLVE:

How can you best involve them?

- Review existing systems or processes for communicating with stakeholders.
- Use different methods for different individuals or groups.
- Develop a plan (and timetable) for communication and involvement.
- Identify what resources (time, materials) will be needed.
- Seek feedback from stakeholders and consider how this will feed into the decision-making process.

CASE STUDY 3:

Implementing NICE cancer referral guidance aimed at GPs

Areas used a range of methods to share information. NHS organisations disseminated news to GPs through newsletters but some were not widely read. They also ran events – both conventional presentations and less conventional 'speed dating' events between primary and secondary care where two different groups could raise and discuss issues of uncertainty together. As one GP commented, *"the importance of…educational events – it's a bit about networking, [and] hearing it from somebody else's perspective"*

In both areas, agencies (charities, educational companies) with expertise in communication about cancer also shared information, provided education and discussed the guidance with GPs.

STAKEHOLDERS (CONTINUED)

STAKEHOLDERS (CONTINUED)

3 REACH DECISIONS:

How can you promote consensus for the most important decisions?

- Consider opportunities for multiple professional groups to discuss the innovation together.
- It may not be possible to reach agreement on everything. Identify where you need consensus to move forward and prioritise shared decision-making in these instances.
- Sharing summaries of evidence, rather than individual studies, may help to facilitate discussion among multiple, often time poor stakeholders. One possible source of summaries of research evidence is the NIHR Dissemination Centre.

CASE STUDY 3:

Implementing NICE cancer referral guidance aimed at GPs

It took both sites nearly two years to agree referral forms for all of the cancer pathways. Reaching decisions required considering a range of perspectives, including the evidence to address providers' concerns about the risk of demand outstripping supply and, commissioners' concerns about the cost of increased referral volumes. Involvement of one influential GP committee from the beginning meant they were more likely to be on board with the changes.

It was not possible to reach full consensus about all issues: *"There were some clinicians who said they didn't agree with the guidelines, but we just have to say: but they're the guidelines (Service Manager, Secondary Care)."* In one case study area, the group decided not to adopt one key recommendation; in the other area, the decisions about this recommendation were postponed.

DRIVERS

What are the key external and internal drivers for introducing innovation?

Internal and external drivers that may influence the need for innovation should be acknowledged (e.g. influence of local professional interests or the national context of austerity). Such drivers can encourage evidence to be viewed differently. For example, our scoping review suggested information that showed innovations would be cost neutral or reduce costs would be prioritised. The plans or priorities of managers, medical staff or other professional groups may also influence the way in which evidence is selected or interpreted; groups may use evidence to encourage the adoption of innovations or create resistance. Mapping out the internal and external drivers could make it easier to subsequently collect relevant evidence that will help to satisfy each driver when the innovation is being evaluated.

1 EXTERNAL DRIVERS:

What external priorities beyond your own organisation are driving the need for innovation (or could act against introducing change)?

- Consider if there are current national policies that may either be driving the need for a potential change or influencing the organisation not to want to change.
- Review appropriate national organisations (e.g. NICE, NHS England, NHS Improvement) and professional associations (e.g. Royal Colleges) to ascertain if there is recent relevant guidance or other directives available.
- Consider whether there are current patient group or related charity organisations that are driving the changes and, if not, how they might become involved. For example, Healthwatch represents the views of local health and social care service users.
- Ascertain how existing services, and proposed changes, are commissioned and paid for. Financial incentives in relation to NHS activity can be an important barrier or enabler to uptake of innovations.

CASE STUDY 2:

New model of care for treating glaucoma outpatients

Key external drivers were annual increases in referrals to hospital for suspected glaucoma due to population ageing and the introduction of national guidance lowering the clinical threshold for referral. Increasing demand has placed pressure on hospital eye services nationally.
In response to these drivers, the Trust we studied introduced an organisation-wide improvement programme to improve outpatients' experiences of care, which included reducing patient journey times through glaucoma clinics.

DRIVERS (CONTINUED)

DRIVERS (CONTINUED)

2 INTERNAL DRIVERS:

What drivers within your own organisation are supporting the need for innovation (or could act against introducing change)?

- Consider if there are current local policies, or priorities of influential stakeholders, that may either be driving the need for a potential change or influencing the organisation not to want to change.
- Review how the time, resources and other service pressures may influence the decision-making process. Can a plan be developed to manage these pressures? Consider the time and resources that are likely to be needed for engaging front-line staff affected by change and/or gathering and reviewing evidence.

CASE STUDY 2:

New model of care for treating glaucoma outpatients

Senior management had prioritised improvement in outpatient services and requested regular updates on progress with the programme. This lent authority to those leading change locally who cited the endorsement of the Trust's board when trying to rally others to support adoption.

ORGANISATION

What organisational factors should be considered during decision-making?

Internal organisational factors include the culture of evidence use and approach to decision-making. External factors include wider system pressures (e.g. restructuring, policy targets, budgetary constraints) and the role of pan-regional organisations (e.g. AHSNs) in legitimising the introduction of innovations or, alternatively, encouraging service disinvestment.

Our research suggested that the following organisational factors were important in decision-making.

1 CULTURE:

How does the culture of your organisation influence the use of evidence in decision-making?

- Consider how your organisation ensures it is informed about current developments in your field (e.g. through participation in professional and other external networks). Being connected could provide the reassurance to take 'risks' (e.g. to pursue more radical or experimental innovations).
- Try reflecting on previous examples of decision-making in your organisation and consider the ways in which evidence was encouraged (e.g. is there a 'data-driven' culture?).
- Think about the prevailing types of evidence used in decision-making (e.g. whether there is an emphasis on research evidence or local forms of data) and how this has fed into changes.

CASE STUDY:

New model of care for treating glaucoma outpatients

Professional networking within and beyond the Trust (e.g. by attending speciality-specific conferences) was seen as an important mechanism through which professional opinions on new ways of working were shared: *"Ophthalmology is quite a close knit community, and certainly for glaucoma if I needed to know...or if I've got a patient who's moving to a particular town I'll usually know the relevant consultant that they'll be going to. So we do tend to talk amongst ourselves and say: hey, I'm doing this thing, it works really well" (Consultant Ophthalmologist).*

ORGANISATION (CONTINUED)

DEFINITION · EVIDENCE · STAKEHOLDERS · DRIVERS · ORGANISATION · IMPLEMENTATION · GLOSSARY · CHECKLIST

ORGANISATION (CONTINUED)

2 APPROACH:

What decision-making approach is appropriate for considering evidence and making adoption decisions?

- Consider whether your organisation has the authority to take decisions and who this tends to lie with.
- Our research suggested that clinical leadership often plays a key role in decision-making and implementation (however, it is important that other stakeholders' views are not neglected).

CASE STUDY 2:

Reconfiguring acute stroke services

The case studies pointed to the importance of having a clear decision-making authority for incorporating evidence in decision-making and agreeing on ways forward. In one of the metropolitan areas we studied, the presence of a recognised decision-making authority (a stroke service implementation board) meant that there was a home for sharing and considering established and emerging evidence and seeking agreement among local stakeholders for reconfiguring stroke services. In relation to the other area we studied, there was uncertainty over who possessed such authority to make decisions to centralise stroke services, with a tension identified between decision-makers within individual providers and pan-regional decision-making bodies: *"I have no idea at the moment who makes the decision for this. So we have our own group, hobby, sovereign, our group doesn't have a formal reporting structure, but I would say there are probably two senior committees and then above that and the board. So the decision could be made in one of four places at the moment. So that needs to be transparent."* (General Manager, Stroke).

ORGANISATION (CONTINUED)

3 EXTERNAL RELATIONSHIPS:

How are relationships with other organisations at the local system level being used to support evidence use in decision-making?

- Review the extent to which relationships with local research and professional organisations (e.g. AHSNs) are being used to support evidence use in decision-making.
- Consider if relationships could be leveraged more to either support staff training in evaluation, to facilitate access to evidence, or to support the

CASE STUDY 2:

New model of care for treating glaucoma outpatients

Those leading the diffusion of the 'virtual' model for outpatient clinics sought the endorsement of specialty-specific professional associations. This was achieved by translating standards developed locally into national guidance for running 'virtual' clinics that became enshrined in the Royal College's guidance: *"We hope that [local optometrist's] guidelines, when they're finished, they're going to be handed to the Royal College, they'll review them and decide whether they're going to mandate them as standard practice and put the Royal College seal onto it, which is obviously what we hope."* (Consultant Ophthalmologist).

IMPLEMENTATION

Can likely barriers and enablers to implementation be anticipated early in decision-making?

Our research suggested that considering implementation issues early in decision-making influenced perceived success. It is also important to consider the resources available for implementing change. The case studies showed that processes of implementing change were often given less consideration in decisions to adopt innovations. However, organisational and managerial resources are required to act upon evidence for change and implement innovations. To help anticipate likely implementation issues, our research suggested that addressing the following questions were important.

1 ANTICIPATE:

Can evidence be identified to anticipate likely barriers and enablers to implementing the innovation?

- Try reviewing similar innovations that have been implemented in your own organisation from which learning can be drawn (e.g. from a different service area). Review with those involved (especially managers overseeing change) to identify barriers/enablers to implementation that were encountered.
- Use professional or local system networks to find out if the innovation has already been adopted outside your organisation (contacting those involved could help to identify local evaluation reports or to obtain their accounts of implementation issues).
- Identify local clinical leadership to persuade their peers to carry decisions through to implementation.

CASE STUDY 2:

New model of care for treating glaucoma outpatients

Processes of implementing change slowed down the introduction of the new model of care when it was piloted initially (its implementation was delayed by approximately 18 months). Decisions on adopting innovations tended to be dominated by powerful stakeholders (e.g. senior clinicians) who appeared to be less concerned with the practical aspects of implementing innovations. However, as the 'virtual' clinic was rolled out to other sites, implementation issues were given greater consideration. Observation of planning meetings highlighted consideration of: the degree to which pathways could be standardised while giving autonomy to local sites to tailor innovations; the need to provide incentives to engage front-line staff and provide training; and recognition that both time and clinical space were precious resources that required attention in order to avoid delays.

IMPLEMENTATION (CONTINUED)

DEFINITION · EVIDENCE · STAKEHOLDERS · DRIVERS · ORGANISATION · IMPLEMENTATION · GLOSSARY · CHECKLIST

IMPLEMENTATION (CONTINUED)

2 RESOURCES:

What information do you need to understand the resources required to support implementation?

- Ensure managers concerned with overseeing change are involved in decision-making in order to understand what resources are required to implement innovations.
- Organisational barriers such as time, resources and other service pressures could make organisations less receptive to change and these should be reviewed as part of the decision-making process.
- Where there are competing priorities for resources, which is likely in the current NHS funding environment, assessing the impact on resource use may be an important aspect in evaluating the case for change (or maintaining the status quo).
- Consult with facilities, IT and other relevant support departments to determine what resources are needed to support the change (e.g. changes to information systems and clinical spaces).
- Consider educational and training needs that are required to support the translation of the innovation into practice (e.g. staff learning due to changes to roles).

CASE STUDY 1:

Reconfiguring acute stroke services

Implementation issues were given a great deal of consideration in relation to stroke reconfiguration – to the point where it was felt to slow down decisions to adopt change. Organisational resources were needed to act upon evidence meaning that the involvement of other stakeholders (particularly managers overseeing change) was needed to understand what resources were required to implement innovations. However, as suggested to us by this stroke manager, resources to implement change were thought to be lacking in relation to stroke service reconfiguration:

"I'm not confident that we're going to deliver the kind of change that the papers reflect at all because, as I've said, it takes a big decision and it takes resources and it takes prioritisation and the organisation is not good at that."

GLOSSARY

AHSN:
Academic Health Science Networks.
For further information: Click Here

Context:
The context or environment in which change is being undertaken influences both the adoption and spread of innovations, as well the use of evidence in decision-making. In this study, relevant contextual processes were divided into activities at the professional group, organisational, and local system level.

Decision-making:
We adopted a 'processual' approach to the study of decision-making, understanding it as an ongoing, often non-linear process that unfolds over time.

Evidence:
We adopted an inclusive and broad working definition of evidence that included diverse forms of information, including academic research findings, patient experience, professional opinion, clinical guidance and local data

Implementation:
Refers to the translation of research knowledge and other forms of change (e.g. technological innovations) into health care practice.

A number of frameworks that aim to support implementation exist, e.g. normalization process theory (Click here) and the behaviour change wheel (Click Here).

Innovation:
The development and implementation of new ideas, products, processes or organisational forms, encompassing service or quality improvement.

NICE:
National Institute for Health and Care Excellence.

STAKEHOLDER:
A person or entity that has an interest in an organisation or issue. You could divide those with an interest into 'deciders' and 'influencers' according to their role in the decision being considered.

This project is part of the Health Foundation's Evidence-Informed Decision Making in Health Service Innovation and Improvement Programme. The Health Foundation is an independent charity committed to bringing about better health and healthcare for people in the UK.

CHECKLIST

Questions to consider in decision-making about introducing or spreading innovations

This checklist provides a summary of the questions to consider in decision-making presented in the DECIDE guidance. The checklist could be used to help plan how evidence will be used in decision-making processes for introducing or spreading innovations. This could be used to inform how audit and assurance processes for introducing service innovations are met, for example, NHS England commissioning guidance on Planning, assuring and delivering service change for patients.

	Have you considered the following questions in your decision-making?		
	Yes (How?)	No (Actions needed?)	N/A
DEFINITION: Can the innovation and its potential impact be clearly described?			
Summary: Can you describe key features of the proposed innovation?			
Impact: Can the possible impact(s) of the innovation be described?			
EVIDENCE: What evidence is available in relation to the innovation?			
Types: What types of evidence are needed?			
Review: How is this evidence going to be collected and evaluated?			
Share: How is the evidence going to be shared with those involved in decision-making?			
Diversity: Are any forms of evidence over or under represented?			

CHECKLIST (CONTINUED)

CHECKLIST

	Have you considered the following questions in your decision-making?		
	Yes (How?)	No (Actions needed?)	N/A
STAKEHOLDERS: Who will be involved in decisions and how?			
Identify: Who might have a stake in the decision-making process?			
Involve: How can you best involve them?			
Reach decisions: How can you promote consensus for the most important decisions?			
DRIVERS: What are the key external and internal drivers for introducing innovation?			
External drivers: What external priorities beyond your own organisation are driving the need for innovation (or act against introducing change)?			
Internal drivers: What drivers within your own organisation are supporting the need for innovation (or could act against introducing change)?			

CHECKLIST

	Have you considered the following questions in your decision-making?		
	Yes (How?)	No (Actions needed?)	N/A
ORGANISATION: What organisational factors should be considered during decision-making?			
Culture: How does the culture of your organisation influence the use of evidence?			
Approach: What decision-making approach is appropriate for considering evidence and making adoption decisions?			
External relationships: How are relationships with other organisations at the local system level being used to support evidence use in decision-making?			
IMPLEMENTATION: Can likely barriers and enablers to implementation be anticipated early in decision-making?			
Anticipate: Can evidence be identified to anticipate likely barriers and enablers to implementing the innovation?			
Resources: What information do you need to understand the resources required to support implementation?			