Detailed Project Description

NIHR HS&DR Research Brief 12/5004

Rapid evidence synthesis for the NIHR Health Service and Delivery Research programme: Learning for the NHS on procurement and supply chain management

1. Project title

Towards a framework for enhancing procurement and supply chain management practice in the NHS: lessons for managers and clinicians from a synthesis of the theoretical and empirical literature

2. Aims and objectives

The aims of this proposed literature synthesis are to provide intelligence for enhanced procurement and supply chain management practice in the NHS, to understand the strengths, weaknesses and gaps in existing theories about procurement and supply management in terms of its application to health care, and to offer a practical guide to NHS managers and clinicians with responsibility for commissioning and procurement of non-pay goods and services. The four objectives and research questions in more detail are:

Objective 1: To explore the main strands of the literature about procurement and supply chain management (for example in institutional and production economics, operations management, organisation theory, the resource-based view of strategy, business-to-business marketing, public management) and to identify the main theoretical and conceptual frameworks which relate to decisions about and the effective management of third party providers of goods and services.
Research question 1: What are the main disciplinary sources of ideas about procurement and supply chain management (SCM) and what are the principal theories, conceptual frameworks and main paradigms?

Objective 2: To understand to what extent existing evidence on the experiences of NHS managers and clinicians involved in procurement and SCM matches these theories and to provide an explanatory framework for understanding the characteristics of effective procurement policy and practice in the NHS.
Research question 2: How can theories about procurement and SCM in general help NHS managers and clinicians in their procurement activities, in particular in light of recent and planned changes to commissioning structures, incentives and processes in the NHS?

Objective 3: To assess the empirical evidence about how different procurement and SCM practices and techniques can contribute to better procurement processes and outcomes.
Research question 3: What is the empirical evidence about the impact of different procurement and SCM practices and techniques on outcomes at different stages of the procurement process and in different settings and organisational contexts?

Objective 4: To map and evaluate different approaches to improving procurement and SCM practice, including modelling, diagnostic and facilitation tools, and identify how these approaches relate to theories about effective procurement and SCM.
Research question 4: What are the different approaches to improving procurement and SCM practice and which are likely to work best in the different contexts and types of NHS organisations?

3. Background

Theories about procurement and supply chain management

Research on procurement and supply chain management (SCM) draws on a very diverse range of paradigms, disciplinary bases and theoretical frameworks (see, for example, Allen et al., 2009; Croom et al., 2001; Ellram, 1991; Giannakis and Croom, 2004; Harland, 1996; Jain, 2010). Consequently, it is difficult to identify a single, coherent and dominant body of thought relating to procurement and SCM such that it might start to take on a disciplinary status (Giannakis et al., 2004). This is not necessarily a negative situation, however, as Anderson (1983) has argued a subject's scientific status is enhanced if the knowledge base is widely distributed and there are multiple ideas, concepts and perspectives on its constituent parts. Procurement and SCM encompasses a wide range of organisational processes, activities and actors, in many different contexts and types of organisations. It therefore makes sense to adopt a multidisciplinary perspective when seeking to explore and understand this complex and multifaceted aspect of organisational and business life.

We can get a sense of the diverse scope of procurement and SCM if we consider a typical description of the steps involved in the process. An early text by Corey (1978) describes the process as involving:

1. Determination of what to buy and how much to buy, and the physical and performance specifications of the goods or services
2. Identification and selection of potential sources of supply
3. Qualification of potential suppliers and their goods or services
4. Design of the request for proposal/quotation and the solicitation of bids
5. Negotiation of prices, terms and conditions with selected suppliers (contract drafting)
6. Monitoring of supplier performance and the management of on-going supplier relationships
7. Establishment of procurement strategies, control systems and performance measurement systems
8. Management of inventories of purchased parts, materials and supplies
9. Disposal of waste and scrap

This process map provides a useful way to start to categorise and organise the diverse procurement and SCM literatures and to show how they have and might be applied in the NHS context. Other authors have offered categorisations of the literature (see, for example, Giannakis et al., 2004), but these have tended to focus solely on the SCM stage of the process, steps 6-9 above. The discussion in this proposal takes a first step to creating a more comprehensive categorisation, which acknowledges the vital importance of pre-contractual procurement activities for a fuller understanding of what happens once the supply-side processes have been initiated. For the purposes of the proposed review and synthesis we suggest an initial four-fold categorisation as shown in Table 1.

Table 1: An Initial Categorisation of the Procurement and SCM Literature

Literature and Key Concepts	Primary Focus in Procurement Process
Organisational buying behaviour Multi-actor decisions, organisational power and politics	Steps 1-4
Economics of contracting/information economics Supplier opportunism, contractual/extra-contractual mitigation mechanisms	Steps 5 and 6
Inter-organisational relationships Networks, interaction, collaboration, trust and power	Step 6
Operational supply chain management Industrial dynamics, buyer-supplier coordination, process mapping and improvement techniques (lean, agile, Six Sigma)	Steps 6-9

The first broad category of literature focuses on what might be called the internal demand management side of the procurement process, loosely speaking steps 1-4 above. This is typically referred to as the organisational buying behaviour literature and has its roots in the seminal work of authors such as Webster and Wind (1972) and Sheth (1973). The main disciplinary underpinning of this literature is in organisational sociology. The key concerns of these authors are to describe and understand how organisational buying decisions are taken, to identify which actors are involved and how their interactions are organised. Important contributions made by this literature include the observation that the actors involved in a buying decision and the way they are organised will vary depending on the nature of the buying decision. Buying decisions are typically categorised in terms of their newness, importance and complexity, with decisions to buy important and/or complex items for the first time usually bringing together a much wider range of actors with their own preferences and agendas. By viewing organisational buying behaviour as a multi-actor, multi-agenda process, this literature conceptualises buying decisions as being a locus of intra-organisational power and politics (Kohli, 1989; Pettigrew, 1973; Ronchetto et al., 1989; Ryan and Holbrook, 1982; Smeltzer and Goel, 1995). Deciding what to buy, drawing up a specification, choosing a shortlist of potential suppliers and assessing the bids submitted are seen as intensely political rather than purely technical decisions.

This line of reasoning has been applied to the NHS context in a number of recent papers. Allen et al. (2009, p. 508) for example note that, despite the rise of managed professional business archetypes in the NHS, healthcare professionals continue to dominate procurement decisions 'through the referrals they make, the tests they order, and the drugs they prescribe.' Indeed, the current move to GP-led commissioning may well serve to formalise this dominance (Mannion, 2011). Lonsdale and Watson (2005) apply a political model of procurement decision-making to the buying of pathology equipment and consumables in an NHS acute hospital trust, and identify the key role of powerful actors (most notably senior clinicians) in pursuing their own preferences as a major driver of fragmented expenditure leading to extracting poor value for money from suppliers. Cox et al. (2005), similarly, discuss the ways in which NHS buying decisions lead to fragmented patterns of expenditure and thereby damage value for money and the scope to improve supplier performance. Watson et al. (2012), finally, develop earlier work on buying decisions in NHS trusts to create a framework for understanding when an agreement between actors on the consolidation of their demand requirement is most likely to be achieved.

The next two steps in the typical procurement process (5 and 6 above) are the focus of the economics of contracting literature, grounded in institutional economics. Key strands of this literature draw on transaction cost economics (Williamson, 1985), agency theory (Klein, 1996; Klein et al., 1978; Hart, 2003), and information economics (Akerlof, 1970; Milgrom and Roberts, 1986). These theories focus attention on the various hazards

that can arise when a buyer engages an external supplier to deliver a good or service, and the mechanisms (contractual or otherwise), that are available to mitigate such hazards. A basic assumption of the literature is that suppliers can and do exhibit various forms of opportunistic behaviour, which can damage the value for money received by the buyer.

These behaviours include adverse selection, strategic misrepresentation and moral hazard, which occur when a supplier exploits an information advantage over a buyer to win and execute a contract on an unfair or misleading basis. The information economics literature draws attention to the notion of 'credence goods' (Akerlof, 1970; Eisingerich and Bell, 2007), the types of goods or services most likely to be characterised by such an information asymmetry between buyer and seller. The problem in the case of credence goods is that the buyer cannot acquire the necessary information, even after consumption, to assess whether he has received good value for money. Professional services, including legal services, management consultancy and indeed health and social care, are all classic examples of credence goods which are particularly prone to adverse selection and moral hazard problems (Arrow, 1974). The buyer's requirements will typically be complex and, to some extent, unique and therefore difficult to specify in detail. The supplier will therefore be in a position to deliver, or under-deliver, the service in a way that increases their returns, but which the buyer will be unable to detect. There is some literature on the hazards associated with buying professional services (see, for example, Ellram et al., 2008; Homburg and Stebel, 2009; Mitchell et al., 2003; Schiele and McCue, 2006). As Allen et al. (2009) note, however, this issue has not yet been properly addressed in the area of health and social care services, an important knowledge gap which the proposed review hopes to fill. One notable exception is Hoque et al. (2008), which considers the procurement of agency workers in the NHS. Lonsdale et al. (2010) also provide a more general discussion of the hazards associated with supplier opportunism in the context of the English NHS and we will build on this work in the proposed review.

Another opportunistic behaviour widely discussed by the economics of contracting literature is 'hold-up' (Joskow, 1987; Klein, 1996; Klein et al., 1978; Williamson, 1985). This refers to a situation where a supplier is able to cease (hold-up) delivery of a good or service until the buyer agrees to a more favourable deal. The buyer is forced to agree to the supplier's demands, because they are locked-in to the contract by significant and asymmetric sunk cost investments in assets like land, buildings, machinery or management systems/knowledge (Lonsdale, 2001). Hold-up is often seen as a particularly acute hazard in long-term contracts, associated with large and complex capital investments. The complexity and long time scales associated with such contracts tend to result in contractual incompleteness, which creates the scope for renegotiation and therefore hold-up. Projects funded under the UK's Private Finance Initiative (PFI) have many of these characteristics. Evidence of hold-up problems associated with PFI construction projects in the NHS are discussed in detail in Lonsdale and Watson (2007).

A third broad category of literature that focuses our attention particularly on the on-going management of supplier relations (step 6) is that dealing with inter-organisational relationships (Oliver, 1990). This literature, like that addressing organisational buying behaviour, has its roots in organisational and economic-sociology, but here the focus is outward, on the on-going interactions between firms in the context of their wider environment. Major contributors to this literature include Van de Ven and Walker (1984), Sako (1992) and various members of the IMP Group (Ford, 2002; Ford et al., 2003). Key themes common to this research are the dynamic nature of interactions between buyers and sellers over time, the gradual emergence of close, high trust relationships in some cases, and the importance of seeing individual buyer-supplier relationships as part of and interacting with a wider network of relationships. This literature has thus made a major contribution to the development of the concept of the supply network. There is limited evidence, however, that the ideas and concepts proposed by these writers have been applied to the NHS or to healthcare provision more generally, although exceptions include the analysis of the role of trust and cooperation in facilitating commissioner-provider relationships in health and social care markets (Connel and Mannion, 2003; Goddard and Mannion, 1998; Mannion and Smith, 1997). At first glance, this might seem surprising given that the NHS is perhaps best understood as 'a network of multiple, extended supply chains, with purchaser and provider relationships operating as critical coordinating mechanisms at every level' (Allen et al., 2009, pp. 506-07). Moreover, the reform process supporting greater patient choice in NHS service provision through the introduction of wider supply-side competition has made this

network view of the NHS even more salient. A possible reason for this lack of NHS application, however, is that this literature is heavily descriptive in its approach. It has provided richly detailed representations of the complexity of relationship and network interactions, but is short on practical, managerial implications. It remains important to see, however, if this neglected literature can provide some useful insights for NHS procurement and SCM practice, a key knowledge gap which the proposed research aims to fill.

A noteworthy sub-set of the inter-organisational relationships literature, with more obvious managerial implications, is that addressing the concept of power relationships in supply chains (Cox et al., 2000, 2002, 2003; Sanderson, 2004, 2009; Sanderson and Cox, 2008). This work also draws on organisational and economic sociology, particularly resource dependency theory (Emerson, 1962), but brings in additional strands from industrial economics (Porter, 1980). The literature has made an important contribution by providing a conceptual framework that can be used to map power relationships between buyers and suppliers and by exploring how power impacts on the scope for and the nature of collaborative interactions to improve supply performance (Cox et al., 2005). To date, these ideas have been developed and empirically tested primarily in private sector supply chains, although Sanderson (2004, 2009) and Sanderson and Cox (2008) have focused extensively on the public-private interface in UK defence industry supply chains. There is little evidence of this work being applied in the NHS context, but it may have much to offer in helping us to understand the likely success of GP-led commissioning consortia in their efforts to manage their relations with potentially very powerful actors on the supply side. As Allen et al. (2009, p. 526) comment, 'Elements of these concepts could be used to map the new commissioner-led institutional structure of the NHS, and to provide a stepping stone to develop new practice for market management in this different environment.'

Finally, we turn to the literature that focuses primarily on what might be called the operational fulfilment steps (7-9) in the standard procurement process, but also has some engagement with the monitoring and management of supplier relationships (step 6). This literature encompasses work from logistics (Christopher, 2010; Cooper et al., 1997), materials management (van Weele, 1994) and operations management (Slack, Chambers and Johnston, 2010; Waller, 2003). Its underlying disciplinary bases are game theory and systems theory. Game theory, originally developed by von Neumann and Morgenstern (1944), argues that many economic decisions involving more than one actor (e.g. a buyer and a supplier) take the form of a strategic game involving anticipation by one player of the other player's actions. Research in procurement and SCM has applied this reasoning to develop an understanding of how buyers and suppliers can be encouraged to cooperate and innovate to create a larger pool of value rather than competing over a static pool of value (Macbeth and Ferguson, 1994). Systems theory was initially developed within the natural sciences (biology and physics) (von Bertalnffy, 1950), but has subsequently become widespread in organisation and management theory as a means of explaining processes within and between firms. One particularly influential application of systems thinking is the work by Forrester (1961) on the dynamic behaviour of firms and their supply chains, which has spawned a significant interest in the use of mathematical modelling techniques to predict and improve performance outcomes in supply chains. Popular variants of this thinking in recent years have been lean (Lamming, 1993; Womack and Jones, 1996), agile (Christopher, 2000; Mason-Jones and Towill, 1999) and build-to-order supply (Gunasekaran and Ngai, 2005).

This literature has probably been applied to the NHS context and to healthcare provision in general more than any of the others discussed above. Given its explicit and heavy emphasis on technical problem identification and continuous performance improvement, this is not surprising. Rather than looking primarily at supply chains delivering physical goods (pharmaceuticals, medical equipment, consumables etc.) to healthcare providers, however, most of this research has focused on the mapping and improvement of care processes and patient pathways. Typical examples include work that explores the scope to introduce lean and Six Sigma production principles into healthcare organisations (Ben-Tovim et al., 2007; Fillingham, 2007; Powell et al., 2009, 2009a). Other work has looked at the modelling of patient flow through the phases of a treatment episode, seeing it as analogous to product flow in an industrial process and with a similar emphasis on quality and delivery performance (Boaden, 2009; Keen et al., 2006; Towill, 2006; Towill and Christopher, 2005). As Allen et al. (2009) argue this literature has been highly influential in the work of the US Institute for Health Improvement and the NHS Institute for Innovation and Improvement. As the National Audit Office noted in a recent report,

however, there is still substantial scope to introduce these kinds of improvement tools and techniques into supply chains delivering physical goods to the NHS (NAO, 2011).

Summary of knowledge gaps to be addressed by this study

As this brief review has indicated, a wide range of literatures concerned with procurement and SCM have been applied in the NHS context, but this application is patchy and a key aim of the research is to identify and bridge these significant knowledge gaps. Key gaps identified include:

- Knowledge about the hazards associated with buying complex professional services in the NHS (in particular adverse selection and moral hazard problems) and how these might best be mitigated. Work has been done on the procurement of IT and legal services and management consultancy, but there is little or no evidence of an application to the NHS context in relation to the commissioning of health and social care services.

- Knowledge about how inter-organisational buyer –supplier relationships develop over time in the context of a wider network of organisational interactions, and about how trust and collaborative efforts can be engendered to deliver supply improvement and innovation in the NHS. The work on power relationships in supply chains is likely to be of particular significance as it draws attention to the resources that Clinical Commissioning Groups need to have at their disposal to balance the influence of potentially powerful supply-side actors and bring about desired innovations and improvements.

- Knowledge about the scope to apply various operational supply chain management tools and techniques (lean, agile, Six Sigma, build-to-order supply) to supply chains delivering physical goods to the NHS. The use of such ideas is currently heavily focused on improving patient care pathways.

Perhaps the most significant, over-arching knowledge gap for the NHS, however, flows from the very limited application of these literatures and theories to the roles and activities performed by NHS commissioners. Most research applying procurement and SCM frameworks and concepts to the NHS 'has tended to take the healthcare provider as the focus of the research, assuming it (rather than the purchaser) is the entity responsible for managing the supply chain' (Allen et al., 2009, p. 518). Moreover, the 'healthcare provider' is typically seen as the local hospital, rather than the community provider or GP (Glasby et al., 2006). The current policy reforms to develop more devolved, clinically informed commissioning and to extend patient choice make this knowledge gap more evident than ever. GPs will, in the context of many commissioning decisions, be required to interact with a commercial environment of which they have little direct experience. A key aim of the proposed research, therefore, is to review and synthesise the procurement and SCM literature to draw out lessons for the Clinical Commissioning Groups as well as to inform the more strategic work of the National Commissioning Board.

4. Need

The main contribution of the proposed research is to draw out lessons from procurement and SCM theory and from empirical evidence from a range of other sectors and countries, to assist NHS managers and clinicians in developing more effective approaches to procurement and supply management. The research will meet an expressed need in the NHS management community flowing from two primary sources.

Firstly, the NHS is under pressure to save money through a combination of cost cutting, productivity improvements and innovation in service delivery. Despite the implementation of various organisational and process reforms over the past 15 years (e.g. the development of national framework contracts by NHS PASA, creation of regional procurement hubs) a recent report from the NAO (2011) shows that there are still significant variations and inefficiencies in current NHS procurement practice. At the same time, the NHS is under massive pressure to make its contribution to the Government's deficit reduction plan by saving £20 billion by 2015. A more efficient and effective approach to procurement, which accounts for around 30% of hospital operating

costs, will play a key role in delivering these savings. Procurement has also been identified as a key part of the Quality, Innovation, Prevention and Productivity (QIPP) initiative.

Secondly, the proposed research is needed to assist NHS managers and clinicians in meeting the challenges thrown up by the new commissioning structures and policies being introduced by the 2012 Health and Social Care Bill in which GPs, other clinicians and managers in Clinical Commissioning Groups will be required to exercise commercial skills and make contract award decisions in the context of wider healthcare markets of which most have very limited experience and knowledge. The proposed research will provide a vital source of knowledge and guidance to GPs and NHS managers responsible for commissioning as the reforms are implemented over the coming years.

5. Method

The study is an evidence synthesis of a diverse theoretical and empirical literature on procurement and supply chain management, drawing on material from a variety of different disciplines, sectors and countries to identify lessons for more cost-effective policy and practice in the NHS. The research terrain is characterised by considerable complexity in terms of the multiple sources of evidence across different disciplinary traditions, by weakness and ambiguity in terms of association and causation, and by the influence of contextual factors on the appropriateness, effectiveness and outcomes of different procurement and supply chain management practices and techniques. Given these characteristics, a conventional systematic review, with its emphasis on a hierarchy of evidence and randomised controlled trials as the chosen research design to address questions of effectiveness, would not be appropriate. Indeed, a traditional literature review would almost certainly be unable to take account of the multiple and inter-connected variables that impact on the effectiveness of procurement and supply chain management practices and techniques.

A realist review approach, on the other hand, emphasises the contingent nature of the evidence and addresses questions about what works in which settings, for whom, in what circumstances and why (Pawson et al., 2005). A realist synthesis also emphasises an iterative approach between programme theory and predicted theory (Selim et al., 2009). A realist approach has recently been used by one of the applicants to explore the evolution of commissioning strategies in the NHS (Greener and Mannion, 2009). It can be used to generate a theory map exposing the differences between programme theories and theories in use. This is appropriate given that a key aim of the proposed study is to illuminate differences between how NHS procurement and SCM might be carried out and current policy and practice. We therefore propose to use this as our over-arching research design.

Realist synthesis belongs to the family of theory driven review. It begins with knowledge and theory and ends with more refined knowledge and theory, in the process ‘stalking and sifting’ ideas and empirical evidence (Pawson et al., 2005). In this research, the synthesis will address questions in particular about how procurement and supply chain management practices are carried out, how and why these practices are influenced by context and circumstances, the impact of these practices on procurement outcomes, and the appropriateness and effectiveness of approaches to improving procurement and supply chain management. The focus is therefore very much on the mechanisms within these practices rather than on the practices *per se*. Realist review learns from, rather than controls for, real world phenomena. Our study thereby acknowledges that no two procurement processes are exactly the same in terms of the context or the actors involved.

The limitation of realist synthesis is that it is a relatively new method, still in development and with a relatively small number of exemplar studies (Pawson et al., 2005). Based on the reviews and literature published to date, however, it is an approach that seems to address the limitations of traditional systematic review methods when dealing with complex social interventions across different circumstances, using a range of mechanisms, and with varying underlying beliefs and assumptions (Greenhalgh et al., 2007). It is focused on offering explanations (what is) rather than making normative judgements (what should be), and developing principles and guidance rather than making rules. For the purpose of this evidence synthesis, we believe that this is the most appropriate approach to take. It will offer insights for managers and clinicians to take note of and make use

of in enhancing their procurement and supply chain management practice. This judgement is further reinforced by an analysis of alternative approaches to systematic review, presented in Table 2, which underlines that only realist synthesis focuses on mechanisms rather than whole programmes. In our case, this will allow us to focus on particular discrete aspects of the procurement process (specification of requirement, provider selection and evaluation, contract drafting and negotiation, contract and relationship management and so on) rather than having to consider 'procurement and supply chain management practice' as the overall unit of analysis.

Table 2: Summary of Alternative Approaches to Systematic Review

Approach	**Unit of Analysis**	**Focus of Observation**	**End Product**	**Application**
Meta-analysis	Programme	Effect sizes	Relative power of like programmes	Whole programme application
Narrative review	Programme	Holistic comparison	Recipes for successful programmes	Whole or majority replication
Realist synthesis	Mechanisms	Mixed fortunes of programmes in different settings	Theory to determine best application	Mindful employment of appropriate mechanisms

Source: Popay (2006, p. 89)

One of the principles of realist synthesis is the importance of sense-making. The meta-narrative mapping approach to synthesising evidence is attractive, because it acknowledges different disciplinary traditions and changes to dominant narratives over time. This approach has been used, for example, to reveal changing paradigms across different disciplines in relation to studies about the diffusion of innovations (Greenhalgh, 2004). Procurement and supply chain management is also a good example of an area of practice where the dominant narrative has shifted over time, from the highly technical and rational discourse of production economics to a more hybridised one in which, amongst others, issues of power, politics and bounded rationality from various branches of organisation theory are now playing a much greater role. We therefore propose using a meta-narrative mapping exercise within the realist framework specifically to address our first research question, which is to identify and explain the rise and fall of dominant theories about procurement and supply chain management practice.

A key test for HS&DR funded studies is that the research questions and subsequent research findings are relevant to and useful for the target audience, those responsible for the organisation and delivery of healthcare services as well as users of those services. We would therefore suggest, in accordance also with the principles of realist review, that the proposed research questions are provisional. We would plan to hone and refine these with a joint expert advisory and stakeholder group composed of academic researchers and consultants with an active interest in procurement and supply chain management, a number of non-NHS procurement practitioners, together with members of the target audience of NHS managers, clinicians and service users/patients. We would convene this group on a face-to-face basis in Birmingham early on in the study, and by means of a facilitated workshop we would elicit programme theories about different approaches to procurement and supply chain management and develop the research questions. Contact with members of the advisory group would thereafter be maintained electronically. In particular we would seek their feedback on the provisional findings and a draft of the final report. This would embed the linkages between practitioner, service user and researcher communities, which are advocated as a key feature of realist synthesis and help to translate findings from

research into practice (Lomas, 2000). We anticipate that, in addition to academic researchers and consultants, the advisory group would include: the managing director of an NHS collaborative procurement hub; a GP and chair of a clinical commissioning group; a GP and chair of the NHS Alliance; the chief executive of a third sector provider of NHS services for older people; an ex-social worker now involved in setting up a mental health commissioning support unit; one or two lay people/patients experienced in advising CCGs or hospital trusts; a number of non-NHS procurement practitioners; and a representative of the UK Chartered Institute of Purchasing and Supply (the professional body for procurement managers). We will also seek input to the advisory group from the proposed West Midlands Academic Health Science Network once this is formally established, as expected, in the latter part of 2012. A list of individuals who have already confirmed their willingness to participate is given in Appendix 1 at the end of this document.

A detailed plan of the proposed research is presented in Table 3. Further specific details about the literature search and review strategy, which forms the core of the study, are provided in Table 4. It is worth noting here that the four main objectives discussed earlier, and their associated research questions, are closely inter-related. For example, the mapping and evaluation of different approaches to improving procurement and supply chain management practice (Objective 4) will be founded on literature presenting and discussing theories about procurement and supply chain management, the application of those theories in NHS and other contexts, and evidence about how various practices impact on procurement outcomes. Equally, although Table 3 suggests a sequential set of phases, in realist review there is iteration between the phases. So, for example, it is likely that theories about procurement and supply chain management and explanations about effective procurement practices in NHS contexts will be shaped and reshaped throughout the course of the study.

With respect to managing the potentially very large volume of papers, from diverse sources, a purposive sampling strategy will be used to set strict boundaries in relation to relevance, allowing for iteration. Data extraction and inclusion/exclusion is less linear than in traditional systematic reviews. Decisions here will call for pre-existing knowledge of the subject area and the use of expert judgment on what to include in or exclude from the review. Advice from the research team and from the advisory/stakeholder group will be drawn upon as required.

Table 3: Plan of Research Drawing on Realist Synthesis and Meta-Narrative Mapping

Phase	**Actions**
Define the scope of the review RQ1Theories about procurement and supply chain management RQ2 Evidence on experiences of NHS managers and clinicians RQ3 Impact of practices on outcomes at different stages of procurement process RQ4 Different approaches to improving procurement and supply chain management practice	• Explore literature and evidence across different disciplines, sectors and countries • Clarify research questions with advisory/stakeholder group • Find and articulate the programme theories • Select 'landmark studies' • Identify main research traditions associated with procurement and supply chain management • Develop theory maps
Search for, extract and appraise the evidence (see Table 3 below for more detail)	• Decide purposive sampling strategy • Define search sources, terms and methods • Develop data extraction forms • Test for rigour and relevance • Set thresholds for saturation
Synthesise findings	• Compare and contrast findings from different studies • Seek confirmatory and contradictory findings • Final search in light of emerging findings • Refine theory maps and programme theories in the light of evidence
Draw conclusions and make recommendations in relation to the original objectives of the study OB1 Explanation of theoretical and conceptual frameworks about procurement and supply chain management OB2 Application of theories to understand characteristics of effective procurement practice in NHS contexts OB3 Assessment of the evidence about how different practices can contribute to better procurement outcomes OB4 Mapping and evaluation of different approaches to improving procurement and supply chain management practice	• Consult advisory group members in a review of findings • Further refinement of findings • Disseminate review conclusions both in theoretical terms and in the form of a practical procurement guide for NHS managers and clinicians

Table 4: Search and Extraction Strategy

Decide purposive sampling strategy	• Scope the range of material to be retrieved to test particular theories and to answer specific questions • Repeat as necessary as theoretical understanding develops
Define search sources, terms and methods	• Sources to include 'grey' literature as well as research literature • Terms to be decided which will elicit theory and evidence and answer questions important to stakeholders • Methods will include database searching, snowballing, citation tracking and hand searching • 'Key word' searching of databases including ABI-Inform, Business Source Premier, EBSCO, Pro-quest, Medline, HMIC
Develop data extraction forms	• Title of paper • Name of reviewer • Theoretical lens, e.g. institutional economics • Type of paper, i.e. research design • Mechanisms as units of analysis, e.g. specification of requirement, selection and evaluation of providers, contract design, relationship management, etc. • Findings • Importance for our research questions • Methodological strength of paper in its domain
Test for rigour and relevance	• Does the paper make an original and scholarly contribution? • Is the paper about the topic under scrutiny? • Does it add value for NHS managers and clinicians?
Set thresholds for saturation	• Check whether additional searching will add new knowledge, within limits of available time and resources

The responsibilities of the research team will be broadly divided as follows: Joe Sanderson (JS), who has extensive subject knowledge and experience of working with NHS procurement practitioners, will lead on project management, including supervision of the data gathering activities of the research fellow, and convening and facilitating the initial advisory group workshop and subsequent electronic communication. JS will also lead on the high level literature synthesis, lesson drawing and producing the final synthesis report and the associated practical guide for NHS managers and clinicians. Chris Lonsdale (CL) will contribute to the appraisal and synthesis of the review findings, particularly in relation to research on procurement and supply chain management policy and practice in the NHS and other public sector organisations, and will help to draft the final report and practical guide. Russell Mannion (RM) will provide advice on the technical aspects of realist review and synthesis, contribute to the appraisal and synthesis of the review findings, particularly in relation to NHS commissioning policy and practice, and help to draft the final report and practical guide.

6. Contribution to collective research effort and research utilisation

All three lead applicants are skilled communicators and are embedded in wide range of professional and academic networks suitable for disseminating and mobilising the findings. It is envisaged that the proposed research will generate and disseminate knowledge products or outputs in seven main categories. These are:

- The main evidence synthesis report submitted to the NIHR, which will provide intelligence for enhanced procurement and SCM practice in the NHS. This will be founded on an analysis of the strengths, weaknesses and gaps in existing theories about procurement and supply management in terms of their application to healthcare, and on insights for the NHS from empirical evidence drawn from other sectors and countries.

- A set of PowerPoint slides presenting the main findings from the research.

- A practical guide drawing out the main managerial implications of the research. This will be made available to NHS managers and clinicians with responsibility for commissioning and procurement to assist them in the enhancement of their practice. HSMC has a number of outlets for facilitating the dissemination of findings, including a quarterly electronic newsletter directed at NHS managers and clinicians.

- A seminar in Birmingham, arranged by the applicant researchers for 40 NHS commissioners and procurement managers to listen to, discuss and debate the research findings. This seminar will provide an opportunity for participants to relate the study findings to their own experiences and contexts, and will help to promote distribution and use of the practical guide.

- Presentations at two conferences, one targeted at academics and one at practitioners, for wider dissemination of the theoretical and practical findings of the study. The most suitable academic conference would be that staged by the European Health Management Association, an acknowledged international meeting point for researchers, teachers, managers and policy-makers with an interest in healthcare. The most suitable practitioner conference would either be that staged by the NHS Confederation for a general audience of NHS senior managers, or the National NHS Procurement Conference for a more targeted audience.

- It is anticipated that the outcomes of the study will be submitted for publication in at least one high-ranking, peer-reviewed academic journal (for example Organization Studies) as well as in a practitioner journal (for example the Health Services Journal or the British Journal of Health Care Management).

- The findings will be disseminated through the teaching activities of the research team. RM will feed the findings into teaching programmes run by HSMC, including the NHS Management Training Scheme run jointly by HSMC and Manchester Business School. The findings will also be directly relevant to the Procurement and Market Management module taught by RM, CL and JS as part of the MSc in Health Care Commissioning taken by NHS managers and clinicians.

7. Plan of investigation and timetable

The proposed monthly project timetable is provided in Table 5 below.

Table 5: Outline Project Timetable

Months
(Month 1 is February 2013, Month 9 is October 2013)

Activity	1	2	3	4	5	6	7	8	9
Delineate and reconfirm scope of the review	X	X					X	X	
Contact and consult advisory/stakeholder group	X					X	X	X	
Convene advisory/stakeholder group workshop			X						
Exploratory trawl of literatures	X	X	X						
Search, extract and appraise evidence (purposive sampling)			X	X	X	X	X		
Synthesise findings					X	X	X		
Draw conclusions							X	X	
Make recommendations/produce practical procurement guide							X	X	
Progress report and draft final report to NIHR						X			X
Dissemination seminar									X

8. Approval by ethics committees

Ethical approval is not required as this is an evidence synthesis concerned with secondary data. We are proposing to convene an expert advisory and stakeholder group, not for the purpose of gathering primary data but to refine the research questions, review programme theories and test our provisional findings. The University of Birmingham, as the host institution, does however scrutinise the ethical aspects of all research carried out under its auspices through the University Ethics Committee, which is based upon the robust external ethics review principles developed by the Economic and Social Research Council (ESRC) and the NHS National Research Ethics System.

9. Project management

We are dedicated to, and highly experienced in, robust and structured project management and risk management procedures to ensure excellence in the delivery of our work. The University of Birmingham operates internal quality assurance procedures based on the principles that underpin ISO 9000 in relation to the conduct of research. Staff evaluation and development procedures are in place to ensure that:

- Projects are being carried out in an effective and efficient manner;
- The necessary capacity is available;
- Any training needs of staff are identified and met; and
- Strategies are in place to cover contingencies such as illness and staff changes.

The overall excellence of the academic staff, in terms of both scientific innovation and applied practice, is our most important quality assurance mechanism. All of the project team have experience of managing multi-partner projects for external funders, and are ably equipped to ensure successful delivery of the project.

As the principal investigator (PI), Joe Sanderson (JS) will dedicate 45 days (1.25 days per week) to the project, taking lead responsibility for its implementation. This time allocation has been carefully chosen to allow JS

sufficient time to assist with the day-to-day management of the project, including instructing and supervising the research fellow, establishing and coordinating the expert advisory and stakeholder group, as well as providing academic direction and ensuring the timely delivery of all milestones and outputs.

The co-investigators, Chris Lonsdale (CL) and Russell Mannion (RM), will each dedicate 18 days to the project, providing expert advice and guidance, particularly in relation to NHS procurement and commissioning policy and practice. Both are based at the same institution as JS, which will facilitate joint working. Regular meetings are proposed to consider progress at team and working group levels. These discussions will form another part of our management and coordination structures, as regular reviews of the project's progress will ensure that all parties are informed and positive about the project's direction.

10. Public users/public involvement

As this is an evidence synthesis, the requirement for public involvement is not as central as it would be for an empirical primary research study. Nevertheless, given the realist synthesis method that we have proposed, we acknowledge the need for linkage with health service users as well as medical and procurement practitioners and academic researchers acting as critical friends. The plan is therefore for the expert advisory and stakeholder group to include individuals from the 'NHS user community'. We have invited a number of public and patient representatives to join the group, including charities representing the voice of the patient/service user (National Voices and Age UK) and lay advisors to CCGs or hospital trusts. The project team will also seek advice from the advisory group to ensure opportunities for public involvement are maximised.

11. Expertise and justification of support required

The research team will be composed of three senior members and one research fellow (Grade 7) hired for the duration of the project. Given that the research fellow will only be recruited if funding is secured, we are not able to provide details of their experience and expertise at this stage. We will, of course, ensure that the person recruited is appropriately qualified and experienced to be able to undertake the tasks of literature search, reading systematically and writing literature summaries. We will also ensure that he/she has knowledge of the relevant social science literatures. The research fellow will not be expected to undertake the high level literature synthesis, lesson drawing and report writing tasks. These will be done by the principal investigator and the co-applicants. The expertise of the senior team members is as follows:

Joe Sanderson (principal investigator) is Senior Lecturer in Procurement and Supply Management in the Business School at the University of Birmingham. Joe has over 15 years' experience of research and teaching in the area of procurement and supply management, and has developed particular expertise in public sector procurement focusing on the health and defence sectors. He has been involved in a number of major research projects funded by the EPSRC, which developed and tested a power perspective on supply chain relationships. He was also principal investigator on a DTI-funded study looking at the scope for collaborative performance improvement in defence sector supply chains. Joe has published his research findings in a number of research monographs and articles in internationally leading journals such as Public Administration and Supply Chain Management: An International Journal. Joe has considerable experience of providing education and training to NHS managers involved in procurement and commissioning. Between 2002 and 2009, he was responsible for leading the delivery of a series of short courses in procurement and supply and world class commissioning, funded by the Department of Health and targeted at acute trust and PCT managers. Well over 200 managers attended during that period. Joe also teaches on the Procurement and Market Management module delivered as part of HSMC's bespoke MSc in Healthcare Commissioning, and has delivered short courses in procurement to various other clients including NHS Pro-Cure.

Chris Lonsdale (co-investigator) is Reader in Procurement and Supply Management in the Business School at the University of Birmingham. During his time researching and teaching in the area of procurement and supply management, Chris has built up considerable knowledge of NHS procurement policy and practice both on the

supply side and on the commissioning side. He has conducted two funded research projects in the area, the first (funded by the NHS) looking at commercial-clinical relationships within the acute sector, and the second (funded by the ESRC) looking at the procurement and management of agency nurses and other health professionals. Chris also has considerable experience of providing procurement-focused education and training to NHS managers. Between 2002 and 2009, he was involved in providing CPD courses, funded by the Department of Health, to both acute trust and PCT managers. He has taught on bespoke MSc modules run by HSMC for the NHS, and provided various other short courses to NHS organisations such as the Oxford Radcliffe Hospital Trust, NHS Pro-cure and NHS Somerset. Chris has also published a number of articles about NHS procurement and supply management in internationally leading journals such as Public Administration, Work, Employment and Society, the British Journal of Industrial Relations, and Policy and Politics.

Russell Mannion (co-investigator) is Professor of Health Systems in the Health Services Management Centre (HSMC) at the University of Birmingham. Russell has over 25 years' experience of health services research and has been principal investigator on many mixed methods research projects, including literature reviews, funded by the Department of Health and the NIHR. He has a particular interest in organisational economics, the evaluation of healthcare markets, and healthcare procurement and commissioning. He has published widely in these areas and has won several international awards for his research, including the Baxter Award presented by the European Health Management Association. He jointly leads (with Chris Lonsdale) the Procurement and Market Management module on the MSc in Healthcare Commissioning delivered by the HSMC. Over the past three years this module has been taken by more than 150 NHS commissioning managers and GPs funded by NHS London and NHS West Midlands.

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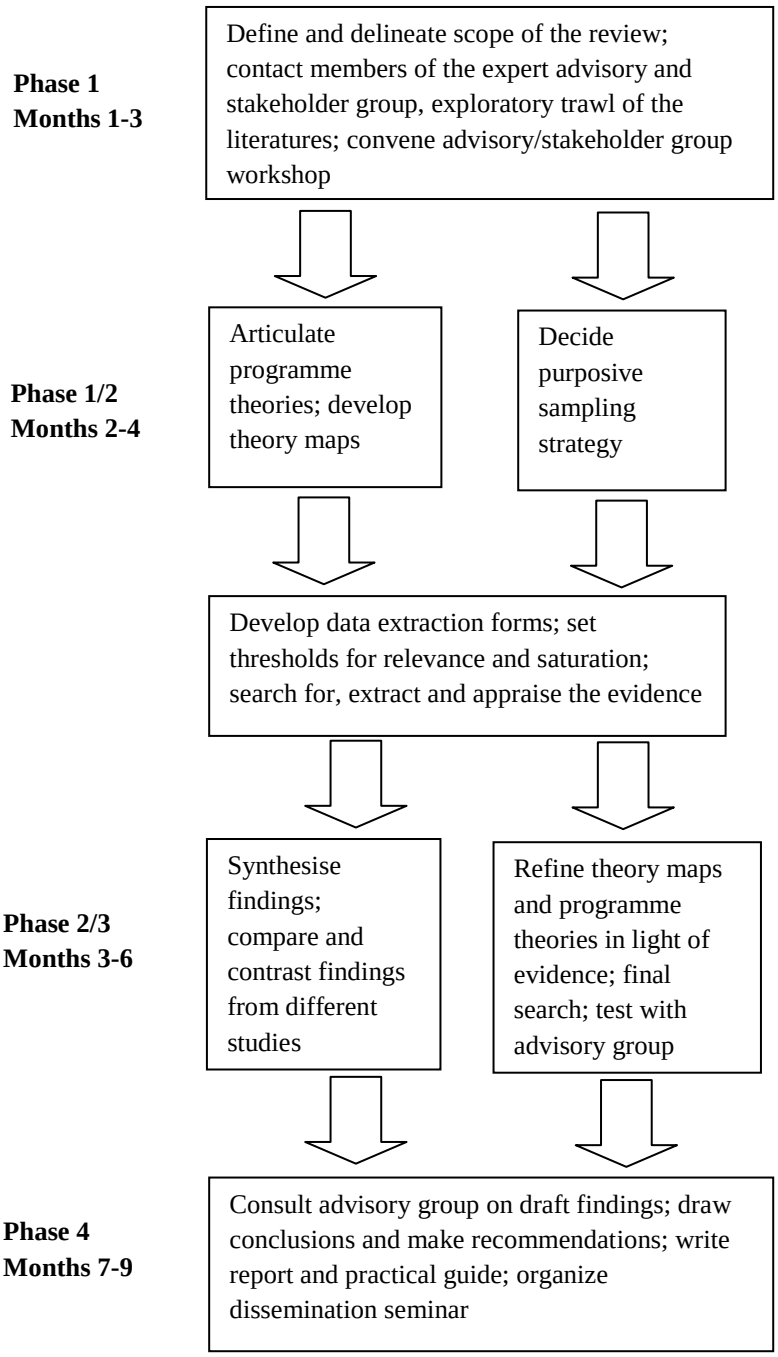
13. Flow diagram

Towards a framework for enhancing procurement and supply chain management practice in the NHS: lessons for managers and clinicians from a synthesis of the theoretical and empirical literature



Appendix 1: Expert Advisory and Stakeholder Group
Individuals who have already confirmed their willingness to participate

Gerard Chick
Head of Research and Knowledge Management, Chartered Institute of Purchasing and Supply

Lee Collins
Managing Director, Pro-Cure Collaborative Procurement Hub

Liam Condron
Chief Executive, Age UK Northamptonshire

Marc Day
Professor of Strategy and Operations Management, Henley Business School, University of Reading

Jon Glasby
Professor of Health and Social Care, Health Services Management Centre, University of Birmingham

Alan Greig
Head of Supply Chain, BAE Systems, Submarine Solutions

Ian Kirkpatrick
Professor of Work and Organisation, Leeds University Business School

Louise Knight
Senior Lecturer in Management, Aston University

Douglas Macbeth
Professor of Purchasing and Supply Chain Management, School of Management, University of Southampton

Robin Miller
Senior Fellow, Health Service Management Centre, University of Birmingham

Terry Prior
Senior Consultant, Niche Health and Social Care Consulting Ltd

Peter Smith
Managing Director, Procurement Excellence and ex-President of CIPS

Claire Tapping
Purchasing Development Executive, Rolls Royce plc