Bench to Bedside?
Boundary Spanning in Academic Health Science Centres

Catherine Ellen French

Thesis submitted for Doctor of Philosophy

University College London

Declaration

I, Catherine Ellen French, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

The problem of mobilising research generated knowledge into practice has received increasing attention from policy makers and scholars internationally. Academic Health Science Centres (AHSCs) are partnerships between universities and hospitals which aim to use research discoveries to improve patient care. Despite their complexity and recent international spread, they have not received much attention from social science.

This thesis, as a study of this emergent organisational form, contributes to addressing this gap. It conceptualises the 'bench to bedside' knowledge mobilisation process within two English AHSC cases as 'boundary work' between the domains of research and clinical practice. By analysing qualitative data collected through semi structured interviews (48), observations (130+ hours) and documentary analysis at micro (research/clinical teams) and meso (organisational) levels, it addressed the research question: **What boundary processes mobilise knowledge within Academic Health Science Centres?**

Epistemic, professional and organisational framings were all important conceptualisations of the research/clinical practice boundary. Epistemic elements motivated knowledge mobilisation, with organisational boundaries often proving least permeable. The most effective boundary work encompassed all three. Networked forms of governance prevailed at the organisational level. Joint fields of practice emerged at the micro level with key (instrumental and symbolic) spanning mechanisms including professional hybrids as boundary spanners (e.g. clinician scientists), and objects (e.g. shared data). The 'bench to bedside' heuristic operated as an overarching boundary concept, motivationally powerful yet vague enough to bring together diverse groups.

This study is one of few to consider the early development of AHSCs from a social science perspective. It contributes empirically and theoretically to the knowledge mobilisation and boundary literature by focussing analysis on the research and clinical practice boundary (as a space for new practice) and the people and objects that work across it, particularly centring on the under-researched role of organisation in this process.

Acknowledgements

This work is independent research arising from a Doctoral Research Fellowship supported by the National Institute for Health Research. The views expressed in this thesis are those of the author and not necessarily those of the NHS, the National Institute for Health Research or the Department of Health.

I would like to thank the NIHR for funding this study. I have felt privileged to have the time and space to inform my practical experience working in AHSC settings with social science research. The combination has given me a richer understanding of the process which I hope to share widely, contributing to supporting knowledge mobilisation practices with the ultimate aim of improving care for patients.

I would like to thank my supervisors, Professor Naomi Fulop and Professor Ewan Ferlie, for their unwavering support and encouragement with this thesis. I have learnt so much from them and they always said the right things at the right time.

This thesis would not have been possible without the input from many people. In particular I would like to thank:

- All participants in the research for their welcome, openness and honesty in conducting this research. In particular, those working in the Connect project and Unite department who gave their time, support and help in this study.
- Scott Hamilton, Ian Abbs, Claire Perry and Marion Ridley for giving me their time to discuss my ideas and the encouragement to undertake this PhD.
- Professor Mafanwy Morgan and Professor Chris McKevitt for their helpful advice at my upgrade review.
- All colleagues at my current and former workplaces for their support, encouragement and camaraderie, including those in the King's Patient Safety and Service Quality Centre, King's Schools of Management and Health & Social Care Research, UCL Department of Applied Health Research and the Collaboration for Leadership in Applied Health Research and Care in Northwest London. In particular, Michael Fischer, Angus Ramsay, Simon Turner, Nora Pashayan, Jean Ledger and Carin Magnusson have all been a great support. My team at CLAHRC NWL, in particular Vimal Sriram, Ganesh Sathyamoorthy and Julie Reed, for helping me finish.

- Pavel Ovseiko, for our AHSC discussions, and Roman Kislov, for our boundary conversations.
- My family and friends for their support and encouragement. In particular my husband Alex for making me dinner, looking after our children and proof reading the thesis.

Finally, this thesis is dedicated to my children, Cara and Leo, who both arrived during its production. Mummy has written her book.

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List of abbreviations used

AHSC - Academic Health Science Centre

AHC - Academic Health Centre

AHP – Allied Health Professional

AMC - Academic Medical Centre

BRC – Biomedical Research Centre

BRU – Biomedical Research Unit

CLAHRC - Collaboration for Leadership in Applied Health Research and Care

CPC – Clinical Programme Cluster (meso level organisational structure in Gamma AHSC)

CoP - Community of Practice

CRC – Clinical Research Cluster (meso level organisational structure in Delta AHSC)

EBM - Evidence Based Medicine

EPR – Electronic Patient Record

HRM – Human Resource Management

IRAS – Integrated Research Approval System

KIF - Knowledge Intensive Firm

MDT – Multi Disciplinary Team

MRC – Medical Research Council

NIHR – National Institute for Health Research

NHS – National Health Service

R&D – Research and Development

STS - Science and Technology Studies

Chapter 1 Introduction

Mobilising research knowledge into practice is of growing importance to policy makers internationally. Healthcare has a particular focus due to both increasing costs and the rapid pace of innovation and development in the biomedical research field.

Governments have responded with a variety of policy initiatives to encourage the knowledge mobilisation process, including through incentivising partnerships between healthcare provider organisations and research institutions. This thesis is a study of one type of partnership, the emerging organisational form of Academic Health Science Centres (AHSCs).

AHSCs have been a key feature of the North American healthcare and university landscape for several decades. The term AHSC is now becoming more widely used internationally, for example in the Netherlands (Davies et al., 2010), Australia (Fisk et al., 2011) and the United Kingdom (Davies, 2002; Ovseiko et al., 2010). The defining feature of these complex organisations is a commitment to pursuing a tripartite mission of 1) achieving high standards of clinical care, 2) leading clinical and laboratory research and 3) educating doctors and other health professionals.

AHSCs are important organisations in many healthcare systems. Their multiple missions are considered vital for the health and wellbeing of wider society, and they are recipients of significant public monies (Dzau et al., 2010). The biomedical innovations developed in AHSCs are often widely disseminated to the research community through established methods, but less is known about how these organisations work to achieve their three missions, or how they try to overcome traditional boundaries to translate research into patient care (French et al., 2014). This thesis contributes to addressing this gap, by conceptualising the 'bench to bedside' knowledge mobilisation process within two English AHSC cases as 'boundary work' between the domains of research and clinical practice.

The purpose of this introductory chapter is to set out the background and policy context to the emergence of AHSCs as a new organisational form, and why studying them using a social science lens may contribute to various literatures. Firstly it discusses the different definitions and missions of these complex organisations. Secondly it considers the policy context of AHSCs and their development in

England. Thirdly, it reports on the current body of literature on AHSCs, discussing four key themes and the key implications for this study. Fourthly, it outlines the reasons for researching AHSCs and the overall approach of this study. Finally it outlines the structure for the rest of this thesis.

1.1 Academic Health Science Centres: Definitions and missions

There is no universally agreed definition of an Academic Health Science Centre, especially when an international perspective is considered. Some view the essential components of an AHSC as a medical school, its associated hospitals and clinical facilities and other health professional schools (Blumenthal, 2005). Others argue that few definitions adequately represent the scope and varied needs of these complex organisations (Lozon & Fox, 2002). The structure and composition of each AHSC is different and determined by a variety of factors, causing many to comment 'when you have seen one academic health center, you've seen one academic health center' (Sanfilippo, 2009, p. 384). The roots of this diversity lie in the complexity of establishing AHSCs in the US where the organisations were seen as 'Hydra headed monsters that have metamorphosed from our medical schools' (Howard, 1970, p. 839).

Given this structural diversity, it may be more appropriate to define AHSCs by the missions they pursue rather than their organisational models. It is generally accepted that the missions of AHSCs in all settings are to deliver high quality basic and clinical research, education to health professionals and clinical care to patients. In addition, some AHSCs in North America have a 'social mission' in caring for uninsured patients (Blumenthal et al., 1997). These multiple missions ensure that the governance and financing of AHSCs are also complex (Blumenthal & Meyer, 1996).

Furthermore, an increasing policy focus on 'translational research' highlights AHSCs as appropriate vehicles through which to deliver research from 'bench to bedside' (Pober et al., 2001). As noted below, translational research is traditionally characterised as a linear process which takes findings from basic research and delivers them as innovations in clinical practice, overcoming gaps along the way (Cooksey, 2006). However, this conceptualisation does not consider how behavioural processes may prevent implementation, allow local interpretation of

results or enable only superficial adoption of findings (Ferlie et al., 2012a). This thesis addresses these issues by using a social science approach to consider the complexities of undertaking 'translational research' in AHSCs, by conceptualising the activity as a process which occurs in the boundaries between the research and clinical practice domains in AHSCs (French et al., 2014).

1.2 'Bench to bedside': Policy context of AHSCs

The changing nature of science and increasing focus on the applicability of research has been characterised as a shift from 'Mode 1' to 'Mode 2' knowledge production (Gibbons et al., 1994). Mode 1 knowledge production relates to traditional views of science, where the search for scientific knowledge alone is the end point with little regard for the applicability of findings to a wider social context. Mode 1 science is developed within traditional distinct disciplinary boundaries (e.g. biology, chemistry) with little interdisciplinary work. Mode 2 knowledge production however views 'good' science as that which responds to economic and social needs. Here multidisciplinary teams of scientists are funded to work together on specific 'real world' problems.

Further, the exponential growth in biomedical research and the requirement for value for money from publically funded studies all drive an interest in the translation of research and therefore potential policy approaches to facilitate it.

In this context, in 2006, Sir David Cooksey was commissioned by HM Treasury to undertake an independent review on the arrangements for public funding of health research in the UK. This report, entitled 'Review of UK health research funding', become known as the Cooksey review and is widely cited as an important policy statement of a government commitment to fund and incentivise the 'translational research' pathway (Cooksey, 2006). In so doing, by conceptualising the process as a linear pathway, it identified several barriers to the translation of research into practice. The report characterised these barriers as cultural, institutional and financial. Cultural barriers included:

- The **'Haldane' principle** – derived from the 1918 review of the structure of Government, which was perceived to reinforce the need for an arms length relationship between scientists and government;
- The dominance of **'curiosity-driven' research** (similar to Mode 1) (Peckham, 1991);

- **Incentives** of scientific publications and research assessment - basic science has greater prestige which discourages scientists from engaging in more translational research;
- **Peer review** processes which are effective in identifying high quality basic research projects whereas 'translational or clinical research tends to benefit from a more iterative approach' (Cooksey, 2006, p. 37);
- **Career choices** – where 'clinical research has had a tendency to be underpowered scientifically and uninstructed by many of the advances in modern biology' (p. 38). Therefore clinical research is not an attractive career option for most medical doctors.

Cooksey described **'institutional and financial barriers'** as relating to the separation of the basic research community (supported by the Medical Research Council) from the 'NHS research community of practice-oriented research' (p. 38) and weaknesses in the UK's arrangements for funding, supporting and regulating clinical trials. Cooksey's barriers apply to AHSCs and are also reflected in the normative literature on these organisations as outlined below.

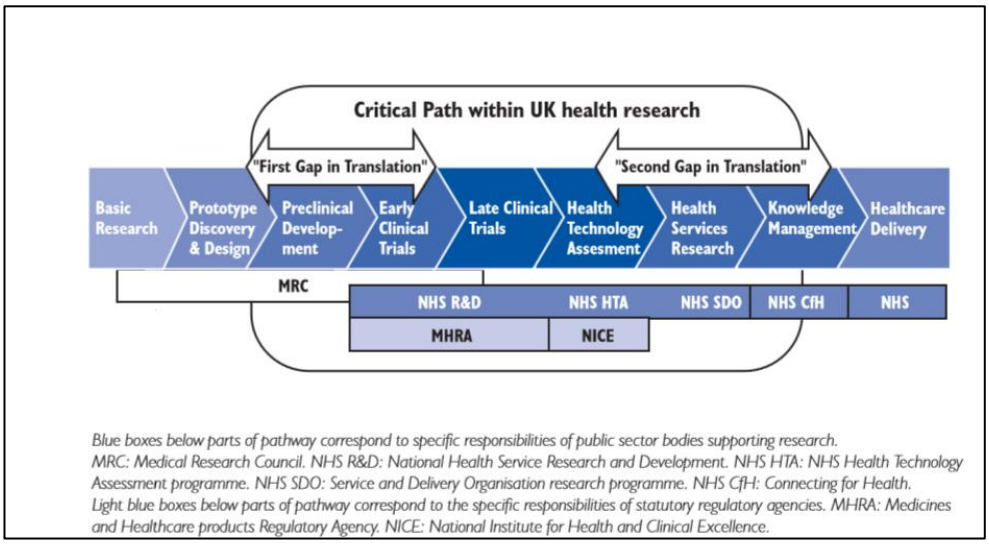


Figure 1 Pathway for Translation of Health Research into Healthcare Improvement (Cooksey, 2006, p. 99)

Cooksey represented these barriers in a linear form describing the pathway from 'bench to bedside' and identifying two gaps in translation. The first was between basic research and treatment developments, and the second between translating new medical interventions into everyday practice (see Figure 1). This 'two

translational gaps' model became a powerful heuristic for many subsequent policy developments in the area, and subsequent funding streams (outlined below) were designed to move from solely research production to encouraging knowledge mobilisation across one or both 'gaps' (Walshe & Davies, 2013).

This linear model has been widely critiqued in the academic literature (Balconi et al., 2010), and I consider this in more detail in Chapter 2. Cooksey however remains widely cited, particularly in the UK (his schematic also contains the relevant UK bodies relating to the various aspects of the pathway). 'Knowledge management' is described as falling into four discrete categories: knowledge production, knowledge transfer, knowledge reception and knowledge use (Cooksey, 2006, p. 99). This conceptualisation of knowledge has also been widely criticised, with these discrete categories being replaced with the broader term 'knowledge mobilisation', which accounts for the different types of knowledge being used, and the situated nature of knowledge creation, use and exchange. I consider this further in the next chapter.

Further, universities in the UK have been gradually financially incentivised to demonstrate the impact of the research they undertake (Smith et al., 2011). Most notably, in the 2014 Research Excellence Framework exercise, which determined the allocation of direct government funding for universities, 'impact' (defined as outside academia) accounted for 20% of overall results (Higher Education Funding Council for England, 2016).

There were a number of other policies and documents launched at a similar time to the Cooksey review which also contributed to the policy context around AHSCs. Following the policy statement Best Research for Best Health (Department of Health, 2006), the National Institute of Health Research (NIHR) was launched in April 2006 with the remit of funding and co-ordinating health research in the UK. This was supported by the Report of the High Level Group on Clinical Effectiveness established by the Chief Medical Officer (Department of Health, 2007). This report reviewed the reasons behind variations of use of evidence in clinical care. The group did not propose a single solution to this problem but instead advocated local clinical engagement through context-specific initiatives, with the link between NHS and education critical to this process.

These major policy statements led to the creation of a number of translational research structures, primarily funded by the newly formed NIHR. These included

Biomedical Research Centres (BRCs) and Collaborations for Leadership in Applied Health Research and Care (CLAHRCs). BRCs were designed to bridge the first translational gap (between basic science and clinical trials) and CLAHRCs the second (clinical trials to populations). Both were partnerships between universities and NHS organisations and were funded with allocations sent directly to NHS trusts to encourage engagement between the NHS and researchers. Both received substantial amounts of public funding, and both were predicated on evidence that interactions between researchers and practitioners help to close translational gaps (Crilly et al., 2010).

1.3 Development of AHSCs in England

Academic Health Science Centres, whilst in the same policy vein, had a different origin. The policy was primarily driven through the Department of Health rather than the NIHR. The major difference between AHSCs and other translational research structures was that AHSCs did not have funding attached. The centres were a key recommendation of the High Level Group on Clinical Effectiveness:

> *"to harness better the capacity of higher education to assist with improving the effectiveness of clinical care through promoting the development of new models of community wide 'academic health centres' to encourage relevant research, engagement and population focus and embed a critical culture that is more receptive to change." (Department of Health, 2007, p. 6)*

Although the concept had been raised before (Davies, 2002), AHSCs really entered the policy lexicon in England with the launch of the first 'self-designated' AHSC in 2007. Ideas were overtly drawn from North American models (Ovseiko et al., 2010) and the policy process to designate these partnerships can be characterised as a policy transfer process (French et al., 2014).

The moniker AHSCs was then adopted at a national level following a review of the English National Health Service led by an eminent academic surgeon. In this review (High Quality Care for All), it was noted that:

> *"we [the government] intend to foster Academic Health Science Centres to bring together a small number of health and academic partners to focus on world-class research, teaching and patient care." (Department of Health, 2008, p. 57)*

In March 2009, five partnerships were accredited as AHSCs by the Department of Health in England following consideration by an 'international panel of experts'. A further accreditation process took place in 2013 when one more AHSC was added

to the original five. Each original designated AHSC partnership consisted of a university with a medical school, linking with between four and seven NHS organisations. Despite the top down designation process, High Quality Care for All (Department of Health, 2008) acknowledged that there would be a range of different organisations, in common with other countries, reflecting local contexts. The models ranged from the integrated models where the university partnered with one large NHS hospital Trust, through to looser partnerships where the university partnered with seven NHS organisations, including hospitals, commissioning bodies and mental health providers. This spectrum of organisational structures mirrors that of North America as outlined in theme three of the literature review on AHSCs mentioned below (French et al., 2014).

These partnerships were not new. Relationships between constituent organisations, particularly those with fewer partners, generally pre-existed through links between medical schools and large teaching hospitals. AHSC accreditation did not bring any direct additional funding to these partnerships. Instead, AHSC accreditation was expected to promote strategic alignment of medical schools and NHS partners, enhance the prestige of these organisations, protect current education and research funding streams, attract new research and health care innovation funding and attract high quality staff (Ovseiko et al., 2010). Policymakers also explicitly stated that AHSCs were intended to compete globally with other centres (Department of Health, 2008), reflecting the fact that biomedical research is seen as a key driver in the UK economy (Department of Health, 2011).

The 'designation' of AHSCs in England represented a typically top down approach when compared to North American models. The policy concept appeared to be overtly 'transferred' (Dolowitz & Marsh, 2000) from North America via policy networks influenced heavily by academic elites used to working across international boundaries (French et al., 2014). However, the nature of the adoption of the policy reflected a particular English context. Whereas in other countries AHSCs were self-designated and self-formed, the process in England was a top down one, and the designation of AHSCs by an international panel reflects the centralised nature of English health policy. Further, at the time of accreditation, the health sector in England was in a period of sustained investment, which enabled an emphasis on quality improvement in the NHS and consequently a conducive environment for the development of AHSCs.

1.4 The AHSC literature – a scoping review

Although AHSCs were a relatively new organisational concept in England, the model has been in use in North America for several decades. Therefore, I undertook a broad scoping review of the AHSC literature, which was published in *Health Policy* (French et al., 2014), attached at Appendix A.

The aim of the review was to obtain a broad overview of the body of work on AHSCs and as such a 'scoping' approach was appropriate (Arksey & O'Malley, 2005; Gough et al., 2012). This method enabled me to identify, examine and summarise the diverse literature on AHSCs, which contains a variety of contributions, and highlight key themes. The inclusion criteria for the review were publications which were in some way concerned with the managerial, institutional, political or cultural aspects of AHSCs and their tripartite missions. The detailed search strategy is described at Appendix A and I reproduce the key findings relevant to this thesis here. In total 372 publications were included in the review, coded for country, year of publication, type of publication and main theme it addressed.

I identified that the literature on these complex organisations was largely normative comprising numerous descriptive single site case studies and opinion pieces not underpinned by social science theory. Despite the literature being largely normative, it was very useful in helping to assess some of the key thinking and themes around these complex organisations. Four broad themes emerged and are important to this thesis for framing potential areas to explore within English AHSCs. I outline each of these themes below. These themes, together with the academic literature on knowledge mobilisation and boundaries outlined in the next chapter, informed the research questions in this study.

1.4.1 Theme 1: AHSC responses to external challenges

The dominant theme of the literature was how AHSCs were responding to external policy and economic challenges. The volume of publications on AHSCs published at any one time mirrors the perceived external challenges faced by the organisations at various points in history. For example, there was an increase in the number of papers in the mid to late 1990s, when AHSCs were facing unprecedented financial challenges as a result of US healthcare market reform (Blumenthal & Meyer, 1996; Iglehart, 1994, 1995). This was due to a reduction in the public funding of research and education, together with an increasing number of managed care patients which

forced expensive AHSCs to compete with cheaper non-academic hospitals, often for payments below cost (Kassirer, 1994). Similar challenges were faced by Canadian AHSCs (Lozon & Fox, 2002; Ludmerer, 2002).

The volume of articles titled with dramatic war metaphors indicates how seriously AHSC leaders and commentators took these financial and organisational challenges. AHSCs were 'under siege' (Kassirer, 1994) and 'passing through the valley of the shadow of death' (Alpert et al., 2001). Despite this, AHSCs emerged from this period still operating, although with some changed organisational structures.

The literature includes a number of personal and organisational case study accounts of AHSC responses to these and other challenges. Blumenthal and Meyer (1996), for example, review seven AHSCs to assess their responses to these perceived threats, and found them to be adopting a variety of strategies. The key documented responses of AHSCs include:

- **Merger** (and often subsequent **de-merger**) of whole or part AHSCs, such as UCSF/Stanford (Kitchener, 2002)
- **Restructuring** the organisations to create clearer governance structures such as creating physician-hospital organisations (Norlin & Osborn, 1998).
- Forming external **partnerships** with organisations such as Health Maintenance Organisations (Griner & Blumenthal, 1998).

This theme is summarised in a review focussing on the changing environment facing AHSCs and their strategic responses (Topping & Malvey, 2002).

1.4.2 Theme 2: The many missions of AHSCs

The second, related theme in the literature is the role of AHSCs in the wider health economy and the missions they set out to achieve. Again, most of the papers in this theme are descriptive case studies or commentaries, and range from those that reflect on the importance of AHSCs as leaders in their healthcare system, particularly in Canada and the USA, to those that describe how AHSCs work towards each individual mission (research, education and patient care), and those that highlight the tensions between the missions, for example Lozon and Fox (2002) and the Commonwealth Fund reports (Task Force on Academic Health Centers, 1999, 2000, 2002).

A fourth mission identified in the North American literature is the 'social mission' of AHSCs of caring for uninsured communities in their localities. Some commentators call for AHSCs to have a stronger emphasis on primary care and community needs (Lewis & Sheps, 1983), whereas others feel that AHSCs should concentrate on high end tertiary care and research (Fuchs, 1982).

The fifth mission of AHSCs identified in the literature is translational research. AHSCs are seen as centres for the delivery of research from 'bench to bedside' due to their joint missions of high quality research and healthcare delivery. Two papers usefully describe obstacles (and potential solutions) to the delivery of translational research in the AHSC setting (Cripe et al., 2005; Pober et al., 2001) and Weston et al. (2010) attempt to assess the involvement of AHSC faculty in translational research.

The tensions between the missions are highlighted by several authors, who describe pressures stemming from a variety of external requirements (Zelman, 1999) as well as internal governance and power dynamics between individuals, such as the roles of the medical school Dean and the Chief Executive of the hospital. These tensions are well summarised as stemming from the need to 'balance the need to fulfil academic goals with the need to fill hospital beds to maintain financial solvency' (Burrow, 1993, p. 586).

1.4.3 Theme 3: Structures of AHSCs

Mission tensions are highlighted further in the third theme, studies on the organisational structures and governance of AHSCs. Several papers use conceptual frameworks and descriptive case studies to consider how to optimally arrange AHSCs. A key message is that the structures of AHSCs lie on a continuum of integration – i.e. the extent to which the academic and clinical missions operate under a single administrative and governance structure (Barrett, 2008).

At one extreme is a model of full structural integration where all the collective components are led by a single Chief Executive Officer and a common overarching board. At the other end is a more loosely affiliated model in which the university academic activities, medical school physician practices and teaching hospital operations are each managed by different leaders and governed by different boards (Barrett, 2008). Under this model, integration is more functional than structural with the different parts of the AHSC remaining distinct legal entities but sharing strategic

planning. All AHSCs lie somewhere on the continuum, with many shifting both up and down the scale over the years.

This conceptual framework is developed by several authors who outline detailed typologies of relationships between medical schools and the 'clinical enterprise'. For example, one US paper offers eight organisational models to medical school leaders and provides guidance on the benefits and drawbacks of each in managing relationships between physicians, hospitals and other parts of clinical delivery (Weiner et al., 2001). This model is also applied to the Dutch academic health system with the conclusion that although adaption to a different national context is required, many of the challenges faced by AHSCs cross national boundaries, and therefore a more theoretically informed study of AHSCs would be a 'rich seam of inquiry' (Davies et al., 2010).

Many more papers describe detailed case studies of the structures of individual or pairs of AHSCs, and how these have adapted and changed over time, for example Pizzo (2008). Barrett (2008) charts the history of the varying structure of the University of Florida AHSC, which was created in the 1950s as a fully integrated AHSC and which now operates under a more distributed management and governance model. Some international case study comparisons have also been made, most frequently comparing US and UK models (Blumenthal & Edwards, 2000; Ovseiko et al., 2010). Overall, unsurprisingly, one of the main lessons from this literature is that the type of model existing at a given institution reflects a combination of history, politics and economics (Wartman, 2008).

1.4.4 Theme 4: "Herding Cats": Management challenges

The final related theme highlights the management challenges for leaders of AHSCs, which Blumenthal (2005) likens to 'herding cats'. Papers reflected on the difficulties associated with managing a variety of accomplished professionals, each with their individual and professional values, performance frameworks and external drivers. Again, many of the papers reflecting this theme are commentaries or descriptive case studies, but there are a few theoretically important papers.

For example, Kitchener (2002) explores the management challenges of the failed merger of UCSF and Stanford. He argues that executives are expected to adopt prevailing managerial innovations in order to maintain organisational legitimacy, but that the intended outcomes rarely emerge when 'sedimented' upon the enduring

power structures and logic of professionalism. In another example, Guo (2002) draws on Mintzberg's typology of work roles to describe the roles (liaison, monitor, entrepreneur, resource allocator) managers undertake at AHSCs, arguing that their input is vital in a competitive managed care environment.

The case study literature provides examples of personal challenges faced by leaders in AHSCs (Detsky, 2010). Souba et al. (2007) surveyed leaders in AHSCs and suggest that closer alliances between deans and surgery chairs may lead to a better performing AHSC. Some cases also provide examples of how performance management frameworks have been implemented at AHSCs, although often only successful ones are described (Grigsby & Kirch, 2006). Kastor's (2001, 2004) accounts of the 'turmoil at Penn and Hopkins' and other AHSCs also reflect these difficulties.

1.4.5 Implications of the scoping review for this study

The scoping review presents a broad overview of the literature published on AHSCs over the last forty years. Most of the papers on AHSCs are commentaries or descriptive case studies, with a North American focus. Whereas many of these do not attempt to contribute to social science theory, what they do provide are rich descriptions of many of the issues, tensions and problems in AHSCs, and are thus a source of data for this thesis (and broader social science) in selecting appropriate research areas to inform theory development. The first theme, on AHSC external challenges, was dominated by the North American healthcare context, which is less relevant to an English setting. The three other themes, those on mission tensions, the structures and governance models of AHSCs, and AHSC management challenges, were particularly relevant to this thesis and appeared to remain important despite the country context of the organisation.

The key gaps highlighted by the scoping review were a lack of social science informed studies on AHSCs as organisational forms, even from North America where the organisational model is well established. Given this under-theorisation, there are many different literatures which can contribute to improving our understanding of these complex organisations and ultimately how mobilising research knowledge may contribute to improving healthcare. The published scoping review (French et al., 2014) (at Appendix A) highlights three potentially useful literatures (policy transfer, debates between the professions and managerialism,

and boundaries). This thesis uses a boundary lens to examine AHSCs, as outlined in the next section.

Since the scoping review was published, there has been some further relevant research on AHSCs, including a paper exploring the concept of competing institutional logics as a framework to study the 'mission tensions' (Lander, 2016), which drew on the scoping review findings. Other recent work includes the study of the early development of an English AHSC (Fischer et al., 2013). This thesis builds further on these recent studies which recognise the limited literature on this empirical case of an organisational response to the problem of mobilising research knowledge into practice.

1.5 The origins of this thesis – why and how to study AHSCs

This thesis originated from both professional and academic interest. My early ideas began forming when I was (as an NHS manager) supporting the development of the organisational structures in one of the AHSC cases featured in this study. Listening to the discussions in various meetings, which were trying to establish appropriate organisational structures to facilitate knowledge mobilisation in the context of 'competing missions', was fascinating and led me to begin to engage the potential academic literature in this area.

Throughout my working life in AHSC settings I have been particularly interested in the 'bench to bedside' concept as a powerful heuristic (representing the translational research policy agenda) which was a driver for bringing diverse partnerships together. I was struck by how this simple phrase was not representative in reality and that the knowledge mobilisation process was much more complex, less linear and dependent on individual agency as much as the design of the organisational structures that were established. This thesis therefore seeks to explore the use of this heuristic and its interplay with organisational structures and relationships between individuals. The 'education' domain, while also a key part of the AHSC mission, is out of scope for this thesis but would be an interesting area for further research.

'Bench to bedside' conjures up images of a process facilitating linkage between two separate domains – the research domain (the bench) and the clinical domain (the bedside). The differences between the two domains are characterised as 'cultural and institutional barriers' in policy terms as outlined in the Cooksey report (2006)

(see above), as mission tensions or competing logics (Lander, 2016) in the AHSC literature and as knowledge/epistemic, or professional 'boundaries' in the knowledge mobilisation in healthcare literature (Oborn et al., 2013b). However, as I outline in the next chapter, 'boundaries' is often used as a descriptive term without much consideration of the theoretical underpinnings of the concept. There is much that the varied literature on boundaries can contribute and it is this which underpins the empirical and theoretical contributions of this thesis as a whole.

Further, the knowledge mobilisation literature is also informed by a range of perspectives from different disciplines. The terminology in the field remains contested – debates continue about whether we refer to knowledge management, transfer, translation or mobilisation (Greenhalgh & Wieringa, 2011; Walshe & Davies, 2013). I do not intend to revisit this discussion in this thesis but refer throughout to the broad concept of knowledge mobilisation, as that which can relate to forms of knowledge 'moving' in some way from one domain to another. In order to transfer between domains, this knowledge may require 'translation', or not, may be 'exchanged' for other knowledge and that process may be managed in some way. I reflect on the knowledge mobilisation process relating to boundary work in the final chapter of this thesis.

As AHSCs remain theoretically under researched (French et al., 2014), this thesis is an early study on this emergent organisational form. As such, I have taken a broad approach to the literature, attempting to integrate across potentially useful streams in diverse fields such as knowledge mobilisation, science and technology studies, sociology (of the professions) and organisational studies, which are themselves contested.

Further, AHSCs can be analysed at different levels: macro – society and policy influences, meso – the level of the organisation, and micro – the level of individuals and 'frontline' teams. My analysis focusses on the meso and micro level (addressing identified literature gaps detailed in Chapter 2) with some reflections at the macro level.

The 'bench to bedside' heuristic, which represents the overall aim of these complex organisations, and the concept of boundary between the two domains, remains the hook which ties the different influences on this thesis together.

1.6 The organisation of this thesis

This chapter has presented some contextual background on the international spread of AHSCs, their policy roots (in North America and England) and a brief review of the normative literature which has highlighted a gap in examining these complex organisations from a social science perspective. It has noted that one representation of the translational research process is through the 'bench to bedside' heuristic, delineating two domains (research and clinical practice). This thesis unpacks this representation using a boundary lens to examine two English case AHSCs. The rest of this thesis is structured as follows.

The next chapter (Chapter 2) outlines the theoretical background to the study by firstly reviewing the literature on knowledge mobilisation, specifically applied to healthcare. Secondly it considers the fragmented social science literature on boundaries and boundary work, drawing on fields such as science and technology studies, sociology of the professions and organisational studies. The chapter highlights gaps in the literature which an empirical study of AHSCs may contribute to addressing and outlines the corresponding aims, objectives and research questions of this study.

Chapter 3 presents the methodology, study design and methods used in this study. It outlines the critical realist assumptions made and how they have informed the study design. It presents the case study design, the reasons for the selection of the two AHSC cases and the tracer cases within them. It details the qualitative data collection and analysis methods used. It then outlines the key reasons behind decisions in the study design process and particularly reflects on my role as a healthcare manager turned researcher and the implications this has had on the study design and findings.

Chapters 4 to 7 present the key findings of this study. Chapter 4 focuses on the meso level and examines the organisational design and responses to the designation of AHSC status of the two cases by highlighting the properties and mechanisms of organisational boundaries at these levels. Chapter 5 introduces the 'positive' tracer cases in this study – 'front line' services and projects working to enact the missions of the AHSCs. Chapter 6 examines how the properties of the research/clinical practice boundary manifest in the tracer cases by using the epistemic, professional and organisational lenses. Chapter 7 focuses on the

mechanisms (or boundary work) at the micro level by analysing the role of clinician scientists as boundary spanners and the role boundary objects play within the tracer cases.

The final chapter of this thesis, Chapter 8, brings together the findings and outlines the main empirical and theoretical contributions of this thesis to the AHSC, knowledge mobilisation and boundary literatures. It also reflects on the overall study, including its limitations and suggests areas for further research as well as lessons for policy makers and practitioners.

Chapter 2 Theoretical perspectives: Knowledge mobilisation and boundaries

The purpose of this chapter is to review relevant literatures, identify gaps and establish research questions through which to analyse AHSCs and how they work towards their rhetorical missions. As highlighted in the previous chapter, there are many relevant literatures which could inform this study (French et al. (2014) attached at Appendix A). This chapter considers two main areas. Firstly, the knowledge mobilisation literature (itself a loosely grouped, diverse range of studies from a number of fields) that has been applied to healthcare and which has a growing stream directly relating to research knowledge and clinical practice.

Secondly, reflecting both a gap in the knowledge mobilisation literature and wider consideration of relevant fields such as science and technology studies and organisational science, I will review the diverse literature on boundaries and boundary work. As noted in the previous chapter, the choice of boundaries as a potential theoretical framework was largely informed by the policy rhetoric on the barriers between research and practice (Cooksey, 2006) as well as the themes highlighted in the normative AHSC literature. Following an initial literature review of the concept (largely influenced by Lamont and Molnár (2002), a widely cited review of how boundaries are considered across the social sciences) and early exploratory interviews within the case AHSCs, I found that there was significant potential in the literature to contribute to our understanding of how AHSCs mobilise knowledge between the domains, and judged that an empirical study of AHSCs may contribute to the wider boundary literature.

As the previous chapter highlighted, this thesis is an early study of the emergent organisational form of AHSCs. As such my theoretical literature review is relatively broad. My review of the knowledge mobilisation literature largely focuses on the healthcare stream as this is directly relevant and well developed (though not without gaps). With the boundaries literature, I draw on wider sociological perspectives (illustrated with empirical studies in healthcare) to inform potentially useful framings of the research/clinical practice boundary (the bench to bedside heuristic).

This chapter is structured as follows. Firstly I review some of the key debates within the knowledge mobilisation literature. I highlight competing framings of the nature of

knowledge and knowing and their use in an AHSC setting. I then briefly review common framings of the knowledge mobilisation process using the 'three generations' groupings (linear models, relationship approaches and systems approaches) (Best & Holmes, 2010), and consider how the concept of organisation has been studied in the knowledge mobilisation literature. I highlight two main gaps in the knowledge mobilisation literature of relevance to a study of AHSCs – namely the under-used lens of organisational form, and the limitations in conceptualisations of boundary and boundary work. I then explore different conceptions of 'boundary' in the diverse literatures of science studies, professions and organisations and how they may inform the study of the research/clinical practice boundary and its properties within AHSCs. The next section of the chapter focuses on 'boundary work' and analyse the key literatures relating to boundary spanning individuals and boundary objects. I conclude the chapter by outlining the research questions, aims and objectives of the thesis.

2.1 Knowledge mobilisation in healthcare

Academic interest in the process of implementing research based knowledge into clinical practice in healthcare has increased in recent years in line with policy developments as outlined in the previous chapter. This growing body of literature is grouped here loosely under the term knowledge mobilisation, although as noted in the previous chapter the terminology is contested (Davies et al., 2015; Greenhalgh & Wieringa, 2011). The field has learnt and borrowed from a range of disciplines, including public policy, science and technology studies and implementation science. The literature has therefore become challenging to navigate, due to a range of often overlapping disciplinary approaches, terminologies, model development and lack of empirical testing of these models (Davies et al., 2015). This section will provide a brief survey of some of the key debates in the knowledge mobilisation field of relevance to this thesis.

2.1.1 The nature of knowledge

The nature of knowing and knowledge is fundamental to discussions of knowledge mobilisation and is consequently a dominant theme in the literature (Crilly et al., 2010). Epistemological questions such as 'what is knowledge?' and 'how do we know what we know?' are fundamental to academic thought and have a long contested history, particularly in the science and technology studies (e.g. Kuhn (1962); Popper (2002)) and management fields (e.g. Gourlay (2006); Nonaka

(1994); Tsoukas & Vladimirou (2001)). Traditional views assume knowledge to be codified and data driven, where knowledge is an object which can be shared. However, the social sciences acknowledge that knowledge is socially constructed and situated and therefore possesses 'loose, ambiguous and rich' qualities which prove challenging to simple definitions (Alvesson & Kärreman, 2001, p. 1012).

In this vein, various taxonomies of knowledge have emerged from a wide range of literatures. These include dualist approaches, such as tacit – explicit (Polanyi, 1962); hierarchies of knowledge, for example Ackoff's (1989) spectrum of data, information, knowledge and wisdom; and practice based, embedded capabilities where knowledge and doing are inextricably linked (e.g. Orlikowski (2002)) (Crilly et al., (2010). The tacit-explicit knowledge distinction developed by Polanyi (1962) has been particularly influential (Nonaka, 1994). In this classic work, explicit knowledge is that which is codified, written down and can be passed onto others using text or other objects. Tacit knowledge, on the other hand, is experiential, embedded and only learnt by doing (like driving a car). Sharing tacit knowledge is therefore more challenging and influenced by context which can affect competence and capability (Weick, 1993, 1996). Both forms of knowledge however are influenced by social structures and power (Dopson & Fitzgerald, 2005; Fitzgerald & Harvey, 2015; Oborn et al., 2013b).

In healthcare and its related sciences, distinctions between different knowledge types are commonplace. The evidence based medicine (EBM) movement dominates views of knowledge in healthcare, relying on explicit knowledge produced by researchers using established and agreed scientific techniques (Nutley et al., 2003). Hierarchies of knowledge feature heavily with systematic review and meta-analyses of randomised controlled trials as the highest (most reliable) form of evidence, and personal experience as the lowest (Davies & Nutley, 1999; Sackett et al., 2000).

However, there is a growing body of literature questioning the usefulness of this view of knowledge from a number of perspectives (Davies & Nutley, 1999). For example, in an ethnographic study of GPs, Gabbay and le May (2004) demonstrate that a wide range of factors ('Mindlines') influence medical decision making, not just formulaic evidence based clinical guidelines. Ferlie et al. (2012b) take a Foucauldian perspective on managed clinical cancer networks and suggest EBM as a power/knowledge nexus enabling the dominance of elite knowledge producers

(clinical managers) over patients. EBM has also been criticised for its failure to consider patient views and narratives and for its dismissal of the role of clinical skills (Lambert, 2006).

Furthermore, EBM provides limited help where evidence is non-replicable or contextual, such as in local and systemic decisions made by healthcare managers. Here decisions are often political, contested and informed by local contexts making it more difficult to apply research knowledge even if it exists (Walshe & Rundall, 2001).

A further important challenge to the EBM movement and codified views of knowledge more generally is practice theories of knowledge (Bourdieu, 1977; Giddens, 1984). This body of literature has grown in the wider organisational studies field and has been applied to the subfield of healthcare (Crilly et al., 2010). Practice can be defined as "recurrent, materially bounded and situated action engaged in by members of a community" (Orlikowski, 2002, p. 256). Through practice, reflexive agents engage in producing, reproducing, or transforming structures which, in turn, enable and constrain their actions (Bourdieu, 1977; Giddens, 1984; Levina & Vaast, 2005).

Practice based perspectives on knowledge assume it to be embedded in the (work) practices of a community (Nicolini, 2011). Knowledge and learning are developed by individuals in specialised 'communities of practice' in response to localised problems (Lave & Wenger, 1991). The distinction between knowledge as an 'object' and 'knowing' is blurred. This notion of knowledge, where 'know-how' instead of 'know-what' (Ryle, 1946) is considered important, as it may explain the barriers to knowledge sharing across communities. Different types of knowledge (including research based explicit knowledge) may be 'sticky' and not flow across organisational and professional boundaries (Brown & Duguid, 1998; Brown & Duguid, 2001; Szulanski, 2000). For example, in her study on an international technology firm, Orlikowski (2002) applies a practice based perspective which suggests that 'knowing is not a static embedded capability or stable disposition of actors, but rather an ongoing social accomplishment constituted and reconstituted as actors engage the world in practice' (p. 249). She uses this conception to explore how actors within this firm perform work across a typology of different boundaries (including technological, political and cultural boundaries). I will explore this further in the next section.

This brief discussion has highlighted two different conceptions of knowledge which may inform this study of knowledge mobilisation processes in AHSCs. The EBM paradigm is central to the mission, purpose and policy rhetoric of AHSCs 'bench to bedside' mission (Straus et al., 2011; Ward et al., 2012). This implies that the main form of knowledge is research based knowledge applied to change 'practice' in clinical settings. However, 'practice' based perspectives argue that knowledge, including codified data driven research knowledge, is formed, shaped and influenced by the community and organisation context in which it is developed. Furthermore, clinical practice and its development is informed by many different factors (Gabbay & le May, 2004; Morlacchi & Nelson, 2011) and new research based knowledge is only one part of a competing body of knowledge. These differing conceptions of knowledge also underpin how knowledge mobilisation processes are framed in various literatures which the next section will explore.

2.1.2 Framings of the knowledge mobilisation process

The complexity of the knowledge mobilisation process is reflected in the burgeoning literature associated with it. There are also many reviews of the vast literature – Davies et al. (2015) count 71 – covering a wide number of fields. For example, in their scoping review on how research based (clinical and management) knowledge is accessed, applied and embedded, Crilly et al. (2010) identify 10 major streams of literature from management studies and two further ones from healthcare. This section will outline some of the key theoretical framings of the knowledge mobilisation process relevant to this thesis. As it is primarily a study of the organisational aspects of AHSCs, it will focus on the literature and reviews relevant to this, drawn from the healthcare and management fields.

One attempt to manage and summarise the knowledge mobilisation literature which has gained traction is a 'three generations' model (Best & Holmes, 2010; Davies et al., 2015). This model suggests the literature has developed through linear, relational and systems approaches.

Linear approaches to knowledge mobilisation processes are broadly aligned with the policy rhetoric of 'bench to bedside' associated with, for example, the Cooksey (2006) report (as outlined in the previous introductory chapter). This framing suggests knowledge is a codified object, 'discovered' in basic science, developed through clinical research and translated into some form of treatment, product or

other improvement in healthcare and rolled out to the wider population (see Figure 1).

Bush's 'Science: The Endless Frontier' (1945) is credited by many as the origin of the linear model (Balconi et al., 2010). This post war report is generally associated with a unidirectional model of knowledge creation and application where unrestricted scientific research would provide the basis for societal progress. The linear framing formed the basis for early knowledge driven and problem solving models to conceptualise the process as a passive flow of information from research to practice (Weiss, 1979). The linear model continues to hold traction - most knowledge mobilisation models and frameworks in the healthcare field are underpinned by 'rational, linear' assumptions (Davies et al., 2015).

Linear framings are however now much critiqued, primarily because they fail to take account of the complex, socially situated nature of knowledge itself and the social mechanisms by which it is mobilised (Oborn et al., 2013b). Linear models tend to assume individuals and groups have the ability to act independently and rationally in the knowledge mobilisation process and allow for little attention to their organisational and social contexts. However, as Crilly et al. (2010) emphasise, knowledge mobilisation is not just a technical activity, it is also cultural and political. Recognising this, the 'two communities' model was proposed, highlighting the differences between the cultures of academics and practitioners, which was seen as a major constraint to knowledge mobilisation (Caplan, 1979). This work, (which although primarily considered linear can also sit within relationship approaches), starts to emphasise the challenges of the professional differences between the two worlds (their boundaries) but does little to address how the knowledge exchange between the two groups could be facilitated. Furthermore, the notion of two communities does not fully recognise the complex interactions between all actors in the mobilisation of knowledge who may belong to several different disciplines, professions or organisations.

Linear models have also been critiqued for overstating the importance of advancements in the biomedical understanding of disease in how medical practice evolves (Nelson et al., 2011). Using the empirical example of a treatment for advanced heart failure, the Left Ventricular Assist Device (LVAD), Morlacchi and Nelson (2011) argue that the development of medical technologies and learning in clinical practice as also important factors. They point to the fact that there are

asymmetrical developments in a variety of diseases, with some rapid progress made in some areas and not others, without necessarily any further biomedical developments.

Acknowledging continued failures in getting research into practice, the second generation of knowledge mobilisation thinking, loosely grouped and termed *'relationship approaches'* has developed through both the health and management literatures since 2000 (Davies et al., 2015). Relationship approaches emphasise and analyse the dialogue between producers and users of research which manifests itself practically as concerned with linkage and exchange rather than the push and pull process associated with the linear model.

These framings of the knowledge mobilisation process develop ideas of interaction and collaboration (Oborn et al., 2013b). Studies highlight the importance of on-going reciprocal interactions between researchers and practitioners (Lomas, 2007), engaging key leaders and champions (Mitton et al., 2007) and developing long term relationships (Bowen & Zwi, 2005). Relationship approaches also developed the language of knowledge mobilisation, referring to 'knowledge linkage and exchange' and 'knowledge translation', with a strong emphasis on impact (Graham et al., 2006). These terms emphasised the ongoing dynamic involved in reshaping knowledge and its meaning for the various stakeholders (Oborn et al., 2013b). Baumbusch et al.'s (2008) 'Collaborative Model' identifies mutual respect and accountability as important elements for the knowledge translation process.

Relationship approaches are largely based in the healthcare literature, but some research borrows from management scholarship by applying concepts such as communities of practice (Brown & Duguid, 1991; Lave & Wenger, 1991), absorptive capacity (Cohen & Levinthal, 1990; Zahra & George, 2002) and organisational learning (Lam, 2000; Orzano et al., 2008) to the study of knowledge mobilisation in healthcare. The influential concept of communities of practice (Lave & Wenger 1991) is associated with practice based perspectives of knowledge and its boundaries. I will expand on this in the following section on boundaries. Also associated is the relatively new field of 'Implementation Science', which focusses on both the individual and contextual factors affecting the implementation of evidence in practice in healthcare (Eccles & Mittman, 2006). As such some work acknowledges the political dynamic of knowledge mobilisation. However relational approaches have also been critiqued for not fully reflecting differing power relations between

groups of academics and practitioners and the potential for conflict over the meaning of knowledge (Ferlie et al., 2012a; Mørk et al., 2010).

The third generation of knowledge mobilisation thinking is labelled '*systems approaches'* which emphasise that knowledge mobilisation interactions take place in a complex web of interactive, asymmetrical networks which cannot be reduced to linear and rational thinking. Although there is little consistent use of the term 'systems thinking', it is beginning to be used in the knowledge mobilisation literature (Best & Holmes, 2010; Davies et al., 2015; Riley et al., 2012). Reviewers of the literature suggest that there are many aspects of a systems approach which are under researched - for example Best and Holmes (2010) call for further work looking at evidence and knowledge, leadership, networks and communications. Integrating literatures from political science and knowledge mobilisation in the social sciences, Contandriopoulos et al (2010) highlight three influential aspects of a knowledge mobilisation system – a) polarisation (the extent to which researchers and users share preferences) b) cost sharing (the distribution of resources across the system) and c) social structures (such as informal communications networks).

Systems thinking and complexity approaches have developed thinking around connections and relationships, highlighting the limitations of the 'push and pull' and even linkage and exchange models of knowledge mobilisation. They discuss the many boundaries which feature in any complex adaptive system (Riley et al., 2012). However, although systems thinking approaches have begun to feature in the theoretical literature, this has not yet resulted in many empirical examples of systems at work, (and consequently even fewer practical tools for those working in knowledge mobilisation to use) (Best & Holmes, 2010; Willis et al., 2014).

The 'three generations' approach is one way of attempting to summarise a very complex field of overlapping and sometimes incommensurable literatures. Although the notion of 'generations' implies some form of Whiggish historical development, from simple to complex (Davies et al., 2015), in fact each of the three groups have something to contribute to a study of AHSCs. The linear 'bench to bedside' model, although heavily critiqued, remains a powerful heuristic which informed much of the partnerships' early strategic and internal communications work. Relationship approaches to knowledge mobilisation may help inform a more nuanced understanding of the 'linkage and exchange' elements of AHSCs and how different groups across the partnerships may link, inform and communicate. These

approaches are also more informed by the management literature and can contribute at the individual and 'community of practice' level. Systems approaches are still new in development in knowledge mobilisation but an AHSC may be seen as a complex adaptive system with a range of asymmetrical relationships, connections and power dynamics.

2.1.3 The role of organisation in knowledge mobilisation

The second generation of knowledge mobilisation thinking in particular emphasises the role of relationships and the social and situated process of knowledge. As such, the role of organisations and organising processes become important as the sites of these situated practices. Despite major policy driven investment and reorganisation designed to promote 'bench to bedside' research mobilisation and organisational learning, the role of the organisation and its form (at the meso level) in knowledge mobilisation in healthcare is under-researched (Crilly et al., 2010; Ferlie et al., 2012a). AHSCs, as newly formed partnerships, may provide a test bed for exploring the relationship between organisational design and more effective knowledge mobilisation.

Following their major review Crilly et al. (2013) identify three particular gaps (the resource based view of the firm, critical theory and organisational form) and consider further how these literatures could inform the study of knowledge mobilisation in healthcare. Regarding organisational form, the authors survey a diverse literature covering a range of organisational forms, including partnerships (Mitchell et al., 2009; Reimer-Kirkham et al., 2009), networks (Isett et al., 2011; Turrini et al., 2010) and communities of practice (Amin & Roberts, 2008; Bate & Robert, 2002; Lave & Wenger, 1991) which deals with flows or knowledge transfer across these structures. The few recent empirical examples in healthcare and the knowledge mobilisation literature focus mainly on organisational responses to the second translational gap, and in particular on CLAHRCs (e.g. Oborn et al. (2013b)). Others look at clinical networks (Ferlie et al., 2012b) and there is a stream of literature examining the role of genetics parks in the UK (McGivern & Dopson, 2010; Swan et al., 2007). Within this theoretical literature, there are very few studies which examine organisational responses to the 'first' translational gap, such as AHSCs.

For Crilly et al. (2013), 'relationships trump organisational design' (p. 177) - organisations which focus on building relationships of trust, rather than hierarchical

bureaucracies, are better at mobilising knowledge. They advocate that no one 'structure' is best and that it is more important that organisations are adaptable or 'ambidextrous' (p. 136) and able to respond to change and transition. Furthermore, the 'connective ability of individuals' (p. 177) is more important than organisational structure in facilitating knowledge mobilisation. This proposition also supports findings from the normative literature on AHSCs which describe AHSCs taking a wide range of organisational forms (French et al., 2014).

Despite this acknowledgement that no one structure is best, much recent literature has examined the role of networks in knowledge mobilisation. The definition of a network remains contested with some considering the organisation(s) to be central (Turrini et al., 2010) and others acknowledging that relations can be established between individuals and groups as well as organisations (Weber & Khademian, 2008). The literature demonstrates how networks are 'nudging hierarchies and markets as the foremost means to organize to address complex problems' (Weber & Khademian, 2008, p. 344) and have become commonplace as a means of managing public programmes (Crilly et al., 2013).

However, as Turrini et al. (2010) acknowledge, there are doubts about whether public sector networks are actually effective, which, they argue, is because there is as yet no unifying theory about the determinants of network effectiveness, or an answer to the question 'what structural form is best for fostering innovation in networks' (Crilly et al., 2013). Although some earlier literature argued that unstructured, informal professional networks were better than hierarchies at mobilising knowledge (Thompson et al., 1991), more recent empirical examples from UK healthcare demonstrate how some form of 'management' of the network is important in facilitating knowledge mobilisation and professionals play an important role in this (Addicott et al., 2006, 2007; Ferlie et al., 2005; Klijn et al., 2010).

In tandem with the recent policy initiatives incentivising organisations and partnerships/networks to mobilise research knowledge into practice (as outlined in the previous chapter), there have been more empirical and theoretical studies examining these new organisational forms as they have developed, and archetypes have been applied (Davies et al., 2015).

In particular, the recent Collaborations in Leadership in Applied Health Research and Care (CLAHRCs) in England have a growing body of literature analysing their

forms and structure (e.g. Fitzgerald and Harvey (2015); Oborn et al. (2013a)). These structures have proved a rich source of empirical data to analyse the role of individuals, governance structures and networked approaches. Key lessons so far have included the conclusion that setting up the structures alone will not facilitate knowledge mobilisation – lateral systems encouraging producers and users of research to interact are also needed. In a single site example, Fitzgerald and Harvey (2015) find overarching governance structures are important and inappropriate models can impede knowledge mobilisation within networks, particularly in large loose networks where shared governance structures are challenging. Examining modes of organising across the CLAHRCs nationally, Oborn et al. (2013a) develop five archetypes looking to balance 'exploration and exploitation'. In a realist review of all nine CLAHRCs, (Rycroft-Malone et al., 2016) found that some governance structures did not facilitate knowledge mobilisation and instead 'emphasised professional and epistemic boundaries' (p. 1). They further found that the nature of existing relationships between universities and trusts, and differing opinions on who was responsible for 'implementing' research, created a path dependency and persistent direction of travel for the partnerships. Similar findings may be expected in the AHSC cases, which, as noted in Chapter 1, often have established histories.

A key difference between the empirical case of CLAHRCs and AHSCs is that AHSCs focus on the first translational gap (from basic science to clinical trials) whereas CLAHRCs are funded primarily to conduct research at the second translational gap (from proven effectiveness of innovations to usage throughout populations). This difference in missions mirrors potential differences in organisational structures. From the normative AHSC literature, and the 'designated' partnership models in England, AHSC organisational models appear more tightly coupled, and normally consist of partnerships or networked arrangements between universities and healthcare providers which have long and pre-existing histories. Whether these histories have been positive or negative may have an impact on how well knowledge may be mobilised between different constituent organisations. CLAHRCs on the other hand were designed to be much larger accommodating many more partners. AHSC partnerships therefore could be considered as hierarchical and/or networks, and as outlined in the previous chapter, partnerships move up and down this hierarchy over time.

In a selective literature review, Oborn et al. (2013b) further advocate the use of key management literatures to inform our understanding of knowledge mobilisation processes in healthcare organisations (focussing here again on CLAHRCs but acknowledging broader applicability). They suggest three (overlapping) concepts that may have much to contribute to the study of knowledge mobilisation (organisational learning, absorptive capacity and knowledge boundaries). They view organisational learning as conceptualising the need for organisational wide systems to help learning processes using a broad view of knowledge which incorporates tacit and explicit dimensions. Absorptive capacity focuses on developing capabilities that enable innovation through the identification, assimilation and use of new knowledge. Both these concepts focus on strategic/organisational level dimensions. The literature on knowledge boundaries, on the other hand, is perhaps more suited to engaging both micro and meso level dimensions in the analysis. Oborn et al. (2013b) suggest that this literature in the management field usefully problematises the nature of boundaries, why knowledge 'sticks' to them and how boundary objects can facilitate this process. I will consider this literature in more detail in the next section.

Further there is a stream of management literature on 'knowledge intensive firms' (KIFs) which are characterised as organisations where 'qualified' employees form a major part of the workforce and engage in mainly 'intellectual work' (Starbuck, 1992). Examples include management consultancies (Alvesson & Kärreman, 2001; Sturdy et al., 2009), creative industry firms such as advertising and professional services firms e.g. law and accountancy, as well as healthcare providers (Von Nordenflycht, 2010). This may be a useful conceptualisation for AHSCs and has overlap with the literature on professional organisations which I cover later in this chapter. Von Nordenflycht (2010) outlines links between knowledge and organisational form in healthcare. Through developing a taxonomy of professional service firms he identified three distinctive characteristics: knowledge intensity, low capital intensity and a professionalised workforce, which he linked to types of knowledge intensive firms and a range of management challenges and opportunities. AHSCs fall under his 'professional campuses' category where he identifies management challenges such as 'cat herding', which was also a theme in the AHSC literature outlined in Chapter 1.

2.1.4 Knowledge mobilisation – gaps identified in the literature

This brief review of the complex and diverse field of knowledge mobilisation in healthcare has highlighted two major gaps in the literature which are of particular relevance to this thesis. The first is that the role of organisational form in knowledge mobilisation processes is under-researched. This gap is particularly stark in relation to organisations working at the 'first translational gap', such as AHSCs. Therefore (building on the emerging literature on knowledge translation networks focused on the second translational gap, together with the normative literature on AHSCs) a study on the nature of organisational forms of AHSCs may contribute towards addressing this.

A second major gap in the knowledge mobilisation literature is a lack of consideration of different types of boundaries, articulated by Oborn et al. (2013b):

> *"There is also increased realisation that knowledge, unlike water, does not flow evenly but rather is influenced and often constituted by, a number of boundaries. These boundaries may be disciplinary or organisational in nature; examining the nature of the diverse boundaries and their influence on the translation process and the means by which the 'gap' is sustained can be important for further progress in the field."(p. 419)*

The concept of boundaries is widely used throughout the 'three generations' of knowledge mobilisation literature, yet rarely does it take centre stage as the focus of the analysis. Within linear approaches, boundaries between the research elements are presented as 'gaps' which need to be crossed, and an acknowledgement that this is sometimes difficult, but the literature does not problematise this process. The second generation (relational approaches), starts to address this by acknowledging the fact that knowledge is socially created and situated, and influenced by the context in which it is developed. This wider view of knowledge enables the use of concepts such as communities of practice and the 'stickiness' of knowledge to the communities that develop it (Szulanski, 2000). However the analysis of the research to action boundary tends to be limited to a conceptualisation of the boundary as a knowledge one – insights into, for example, the organisational or professional aspects of this boundary are lacking (Oborn et al., 2013b).

Systems approaches acknowledge the complexity of the wide variety of connections and influences on the process of knowledge mobilisation and some studies start to identify their key features. They frequently use the word 'boundary' to describe the 'gaps' between different aspects of the complex adaptive systems they describe, but

again there is little analysis of what a boundary is, little problemisation of the concept and little analysis of ways to navigate it.

In summary therefore a study of AHSCs through an organisational lens with a focus on analysing the various aspects of the research/clinical practice boundary and the mechanisms by which knowledge is mobilised across them would contribute to the knowledge mobilisation literature. The next two sections will provide a potential approach for this.

2.2 Boundaries

This section will explore the concept of boundaries in AHSCs. I firstly present an overview of the different potential boundaries in AHSCs, before drawing on a range of 'boundary' literatures, some of which are under-represented in the knowledge mobilisation field. I make some tentative observations about the concept of boundaries and how it could be usefully applied to the study of AHSCs. I then suggest a potential approach through which to analyse the research/clinical practice boundary within AHSCs that may also be applicable to other translational research initiatives.

2.2.1 Potential boundaries in AHSCs

AHSC partnerships, like other translational research policy initiatives, attempt to bring together a range of roles, knowledge, organisations and cultures to enable integration of research, clinical care and education. AHSCs are particularly complex due to the range of professional groups and associated identities within medicine and its sciences (such as basic research, clinically focussed research, clinical practice and education), as well as other professional groups in healthcare. They also comprise different types of organisations, namely healthcare providers and universities.

As noted in the previous chapter, the moniker of 'bench to bedside' implies that a boundary exists between academia and clinical service. However, within AHSCs, this boundary can take many forms – it can relate to the different, sovereign organisations that make up the partnerships, the different professional groups within them, geographical boundaries between the different campus sites, or even different buildings, the different epistemic cultures or ways of knowing between groups, different knowledge bases and different (scientific or clinical) disciplines.

Therefore the boundaries within AHSCs are multiple and various, both inter and intra professional, inter and intra organisational and often geographical, and the transfer of information and knowledge between these domains can be problematic (Knorr Cetina, 1999; Mørk et al., 2008; Mørk et al., 2010; Oborn & Dawson, 2010).

Drawing on the theoretical boundary literature, the boundary between research and clinical practice can be characterised in several different ways. For example, this boundary can be characterised as an organisational boundary (research and clinical practice take place in different organisations or parts of organisation), an epistemic/knowledge boundary (different types of knowledge and ways of knowing exist in research and clinical practice), or a professional/disciplinary boundary (basic and clinical scientists distinguish themselves from practising clinicians). In common with other taxonomies of boundaries (e.g. Sturdy et al. (2009)), there are overlaps and interplays between the three types of boundaries, for example, different professions have different ways of knowing. However the distinction may help us theorise about this boundary and enables us to draw from different literatures. After briefly considering how to define boundaries, this section will outline some key theoretical perspectives on boundaries from each of the domains.

2.2.2 Defining boundaries

The concept of boundaries has received much recent attention across a range of disciplines within the social sciences, including social anthropology, history, social psychology, and sociology. In their widely cited review, Lamont and Molnár (2002) draw this diverse body of work together and highlight different contributions from each field, arguing that they have much to learn from one another.

While less common in the management and knowledge mobilisation literature, making boundaries central to analysis is popular in social anthropology (Hernes, 2004; Lamont & Molnár, 2002). For example, in his seminal work Barth (1969) urges analysts to focus on the ethnic boundary that defines the group rather than the 'cultural stuff it encloses'. Another social anthropologist, Douglas (1966), places rituals in the context of boundary work (a concept developed further below), noting that boundaries are 'dangerous places' but have 'energy' in their unstructured space. This is in contrast to, for example, much work on communities of practice which tends to analyse the 'things of boundaries' (Abbott, 1995) (learning within the community) rather than their edges (how to make knowledge less sticky (Szulanski, 2000)). In short, the boundary literature on the professions and science often posits

that ‘boundaries are salient and mostly have to do with demarcation’, whereas that from anthropology stresses boundary permeability and hybridization processes (Lamont & Molnár, 2002), this is outlined further below in the section on boundary work.

2.2.3 Epistemic cultures and their boundaries

The concepts of epistemic (how we know what we know) boundaries and their construction are core to social studies of science. Debates on what is ‘science’, as opposed to ‘non-science’ (Gieryn, 1983), as well as those on the divisions between disciplinary domains such as physics and chemistry, are long standing (Chalmers, 1999; Kuhn, 1962). These divisions have been conceptualised as boundaries and have received much attention (Klein, 1996). The concept of ‘boundary-work’ was developed by Gieryn (1983) to describe the practices undertaken to delineate science, the scientific method and scientific claims from ‘non-science’ using a ‘rhetorical boundary’. Outlining such ‘work’ implies that boundaries are both socially constructed and used practically and strategically (Gieryn, 1999), with the purpose of establishing a form of epistemic authority over a specified body of knowledge.

Each discipline or group which claims jurisdiction over a body of knowledge has a distinct way of knowing, which underpins their status as a group and enables their delineation against others. In her seminal work comparing the work of particle physicists and molecular biologists, Knorr Cetina (1999) refers to this way of knowing as an ‘epistemic culture’ which binds the group together. She sees epistemic cultures as those ‘amalgams of arrangements and mechanisms – bonded through affinity, necessity and historical co-incidence – which, in a given field, make up *how we know what we know*’ (p. 9, emphasis in the original).

Ethnographic studies of science demonstrate that these epistemic cultures vary from group to group and will constrict or encourage the transfer of knowledge in different settings (Fujimura, 1996; Knorr Cetina, 1999; Löwy, 1996). Different paradigms may sometimes generate incompatible knowledge and lack common ground for effective interaction and boundary work between different epistemic groups (Morgan & Burrell, 1979). AHSCs contain a wide variety of epistemic cultures (different scientific disciplines, basic science, clinical research, different disciplines in clinical practice) and therefore may be appropriate sites to study these exchanges.

Although much of the epistemic boundaries literature focusses on the distinction between different scientific disciplines (e.g. Knorr Cetina (1999)), there are some studies which focus on the different worlds of basic science and clinical research. For example, in her eloquent ethnographic account of a clinical trial (the IL-2 trial at the Cancer Foundation), Löwy (1996) analyses the boundaries between immunologists and oncologists, finding that the trial was embedded in a 'specific cognitive and material environment – the culture of clinical experimentation in oncology' (p. 34). This structure contributed to loose but stable ties between the groups who operated in 'intermediary zones' and came together around 'clinical' boundary objects such as 'tumour-killing cytotoxic lymphocytes' (p. 248). Potentially useful for a study on AHSCs, Löwy makes the links between this environment and the organisational structures, noting that the IL-2 trial was a vehicle for organisational changes at the Cancer Foundation. Further, Löwy critiques the 'bench to bedside' heuristic, and is sceptical of the 'conviction that a successful linking of an immunology laboratory with an oncology ward would increase the chances of developing a cure for a disseminated cancer' (p. 287).

Despite Löwy's (1996) influential study (and other notable exceptions such as McGivern and Dopson (2010)) the science and technology studies (STS) literature on epistemic boundaries has been applied less to the boundary between the epistemic cultures that make up the research and 'clinical practice' communities. STS perspectives are not generally used in the knowledge mobilisation in healthcare literature, although there are obvious connections with the literature on the nature of knowledge considered earlier. Using a boundary lens, distinctions between the 'two communities' may be based on how knowledge is generated within them. In the biomedical research community, knowledge is based on experimentation and the scientific method, whereas the clinical community draws widely on a range of sources and experiences to inform practice (Gabbay & le May, 2004) and different professional groups may be drawn to different research domains to underpin their practice (Ferlie et al., 2005).

It would be interesting to explore whether the epistemic elements of the research and clinical practice boundary may be less salient than that between different scientific paradigms – it may be relatively permeable given the right conditions and appropriate boundary work. Further, epistemic boundaries are distinctive from the organisational boundaries outlined below – in that they are not formalised through

bureaucracy but are formed through distinct social and cognitive practices. Therefore, if for example an individual (e.g. a clinician scientist) knew and was trained in both epistemic cultures, could they be effective members of both communities and therefore cross the boundaries between them?

The concept of communities of practice (CoPs) has received much critical attention from scholars considering other translational initiatives, such as CLAHRCs (e.g. Kislov et al. (2011). I do not intend to revisit these debates here but one particularly useful concept stemming from the CoP literature in relation to epistemic communities is that of Amin and Roberts (2008) who set out a typology of 'knowing in action', taking issue with the increasingly homogenous use of the term CoPs to describe a variety of very different settings. Based on a review of the CoP literature, they present four types of knowing in action; craft/task based, professional, epistemic/creative and virtual.

Although all four types exist within an AHSC setting, one of the key goals of AHSCs, translating research, necessitates the development and transfer of epistemic and creative knowing. Amin and Roberts (2008) see this process 'as the dynamics of collaboration among experts brought together explicitly to experiment with new knowledge of a path breaking nature' (p. 361). The key features of this 'knowing in action' include a high level of independence of individual participants who bring distributed contact networks, and developed collaborative practices that cross organisational boundaries.

Amin and Roberts (2008) focus their discussion on the challenge of alignment as they perceive that these communities lack a social dynamic of cohesion and mutuality. They argue however that once an appropriate structure is in place to facilitate collaboration (such as a system to codify tacit knowledge), epistemic communities offer 'immense potential for creativity based on the dynamics of situated practice that draw on professional integrity, reputation, weak ties, and deliberate arrangement of the architecture of collaboration' (p. 362).

In summary, the concept of epistemic communities and the boundaries between them (drawn from STS) is largely absent from the knowledge mobilisation in healthcare literature. The concept of the 'architecture of collaboration' starts to draw in the role of organisational form and its role in facilitating epistemic boundary work,

which may be usefully applied to the newly formed AHSC partnerships and their attempts at their 'bench to bedside' mission.

2.2.4 Professions and their boundaries

There is a large body of literature examining the role of professions and professional boundaries in social and work life. This literature is particularly rich (and growing) in respect to professions in healthcare, where the role of medicine has received much attention (Abbott, 1988; Ferlie et al., 2005; Freidson, 1970, 1994).

Professions are characterised by their independence, self-sufficiency and resistance to 'management' of any kind (Freidson, 1970). Professional groups exercise control over an area of practice and knowledge and are fiercely protective of this area. The 'system' of professions (Abbott, 1988) is the outcome of battles between professional groups for jurisdiction over who covers which particular area of knowledge, work or practice. Maintaining and defending professional boundaries in the face of challenge from other groups (professionals or managers) is a key part of professional working life (Powell & Davies, 2012) and thus studying these boundaries and boundary work on them may illuminate these practices.

Professional boundaries within AHSCs can be characterised in a number of ways. The partnerships contain many different healthcare professions including doctors from all disciplines, nurses and allied health professionals, as well as basic and clinician scientists. They are therefore fertile ground for jurisdictional battles between these different groups and the normative literature on AHSCs reflects this (Blumenthal, 2005; French et al., 2014).

The professional boundaries literature may contribute in two main ways. Firstly, AHSCs may be suitable sites from which to examine boundaries between professional groups and managers. Traditionally professions, particularly medicine, have been characterised as being independent, self-sufficient and resistant to most types of 'management', including by their own members, even when congregated in a 'professional bureaucracy' (Freidson, 1970; Mintzberg, 1979). However, this dominance is being challenged by increasingly deregulated markets, among other forces. This phenomenon has been widely considered theoretically (Numerato et al., 2011) and well documented anecdotally in the AHSC literature (Topping et al., 1999).

The organisational form developed in response to these challenges has been conceptualised as a 'managed professional business' (Cooper et al., 1996). Key features of this model include increasing managerial input in decision making, codification of governance arrangements and larger organisational size. These features are reflected in the AHSC literature, particularly as the North American AHSCs developed strategic responses to market challenges (Topping et al., 1999; Topping & Malvey, 2002).

Professional elites are adapting to this new organisational form and finding new ways to maintain professional power and status (Freidson, 1994). In AHSCs leadership positions are often held by academics or clinician scientists, with clinicians and managers in a supporting role. In this way, those in the clinical and research professions are becoming bureaucratised through accepting increased commercial and managerial responsibility, but there is little evidence of doctors becoming 'de-professionalised' (Kitchener, 2000).

Professionals question the sense and logic of managerialism in the normative AHSC literature (Lin, 1996). For example, the merger of Stanford University and University of California failed within a year. Kitchener (2002) suggests in this case the managerialist 'merger myth' (that merger was the only way to ensure the organisations' survival) did not survive contact with the embedded professional bureaucracy.

However, there are some examples of more successful alliances or mergers that have continued to function (Levine et al., 2008). This may be due to the growing ability of senior professionals in clinical/managerial hybrid roles, where strong professional leadership together with managerialist acumen may drive and then stabilise newly formed AHSC organisations.

AHSCs are therefore interesting arenas in which to study the battles for jurisdiction between different professional groups and managers. Considering this boundary and the hybridisation of professional and managerial roles in particular may inform analysis of the newly emerging organisational form of AHSCs.

The second relevant contribution of the professional boundary literature is to characterise the research/clinical practice boundary as a professional one, where basic scientists, clinical scientists and clinical practitioners view themselves as different professional groups. There is a limited literature exploring this

conceptualisation of the research/clinical practice boundary, with some focus on the role of clinician scientists and the objects they use (Mørk et al., 2010; Wainwright et al., 2006; Wilson-Kovacs & Hauskeller, 2012). I will return to this later in the chapter. There is however a much wider literature which explores professional boundaries in healthcare which can be drawn on. A widely held view in this arena is that despite the formation of some hybrid roles (such as clinicians as managers), professionals continue to lay claim to particular knowledge domains and affirm their roles in performing particular tasks in the face of challenge from other professional or managerial groups (Kitchener, 2000; McGivern et al., 2015).

Boundaries between professional groups in healthcare delivery have been found to retard the spread of innovations (Ferlie et al., 2005). This is in part due to healthcare professionals' different approaches to knowledge and evidence. For example, Broom et al. (2009) found that the implementation of evidence based medicine depended on how it was received by particular medical disciplines – they contrasted how a speciality defined by a more experimental and riskier tradition (haematology) appeared more likely to accept 'poorer' quality evidence than oncology. They call for more research into how clinical practice is changing under EBM, how sites of acceptance and opposition are developed and how local responses are differentiated.

The CoP literature has also widely considered professional boundaries in healthcare. For example, Oborn and Dawson (2010) explore how members of different CoPs negotiate and broaden meaning through key boundary processes in the context of a formalised multidisciplinary team (MDT) setting. Through a study of an MDT of cancer specialists, they identify that this collaboration is not so much to learn *from* each other, but to learn *how* to talk to each other.

Therefore the literature on the professional characterisation of the research/clinical practice boundary demonstrates a boundary that is salient but that may be permeated by hybrids provided that incentives exist to do so. Professional boundaries have endured despite managerial and policy efforts to erode them (Currie & Suhomlinova, 2006; Kitchener, 2000), unless powerful members of the different communities are motivated to choose otherwise, such as those identified by Lander and Atkinson-Grosjean (2011). Akin to epistemic boundaries, the policy rhetoric of the linear model and incentives attached to it or in the organisational

forms of AHSCs may provide incentives to mobilise research or motivations may be formed more organically.

2.2.5 Organisations and their boundaries

Most AHSC partnerships are made up of a number of different sovereign organisations, normally universities and healthcare providers, all of which have differing governance structures and monitoring systems. This is a key theme in the wider AHSC literature outlined in Chapter 1. The boundaries between these sovereign organisations manifest themselves in many ways, including in identity, power relations and more functional constructs (Santos & Eisenhardt, 2005). For example, they have different IT systems which do not talk to one another, different staff contracts, pay structures and incentives, and ultimately different organisational roles and purposes which are not necessarily compatible.

Organisational studies has traditionally conceptualised external boundaries as stable, unambiguous formal and defined entities (Paulsen & Hernes, 2003). For example, general systems theory sees boundaries as firm entities demarcating organisation from environment, transaction cost economics represent as boundaries determined by economic efficiency (Heracleous, 2004). Some see boundaries as unproblematic and promote the idea of the 'boundaryless organization' (e.g. Ashkenas et al. (1995); Devanna and Tichy (1990)). Others see the emergence of new organisational forms, replacing bureaucracies, such as virtual organisations and to some extent networks, as contributing to the dissolution of boundaries (Hernes, 2004). Indeed, the designation of AHSC partnerships may be characterised as a policy attempt to 'remove' organisational boundaries from the translational research process.

Internal organisational boundaries are traditionally characterised as problematic to knowledge exchange across organisations (Tushman & Scanlan, 1981). They are a result of specialised work units developing their own norms and values which may improve efficiencies within the unit but are less understood outside. The interaction of local languages and understandings make communication across boundaries difficult and prone to bias and distortion (March & Simon, 1958; Tushman & Scanlan, 1981). In this vein, organisational knowledge boundaries (and work across them) are often studied with reference to enabling innovation or competitive advantage (Carlile, 2004).

The literature on practice based perspectives on knowledge and the communities that produce it (outlined in the previous section) problematises the concept of knowledge boundaries within organisations. This sociologically informed stream has developed primarily in organisational studies. There is some overlap with the epistemic cultures literature with its roots in science studies and there is potential benefit in integrating these literatures further, especially in relation to healthcare and its associated sciences.

While this literature often jumps straight to the study of boundary work using objects and brokers, rather than deconstructing the notion of the knowledge boundary itself, there are some important contributions to understanding knowledge boundaries. Conceptions of knowledge boundaries are primarily based on the notion that knowledge is learnt within a social context and individuals who are not familiar with, or members of, a given social context are likely to ascribe a different meaning or understanding to a specified knowledge set (Barrett & Oborn, 2010).

For example, Carlile (2004) develops a framework exploring the properties of knowledge boundaries (and managing knowledge across them) (see Figure 2). He conceptualises three progressively complex forms of boundary (syntactic, semantic, and pragmatic) and ascribes capabilities to each of these. The least complex, syntactic boundaries, are associated with information processing and are based on a technical conception of knowledge which is unproblematic and requires 'transferring' from one community to another. The transition from a syntactic to a semantic boundary 'occurs when novelty makes some differences and dependencies unclear or some meanings ambiguous' (p. 558). Here, the shared meanings developed in communities of practice (Brown & Duguid, 1991; Lave & Wenger, 1991; Orr, 1996) require translation across the boundaries between them and therefore more skilled levels of boundary work. Pragmatic boundaries occur when a political element is introduced to the knowledge mobilisation process (i.e. when the actors have different interests which need to be resolved). The resolution of these different interests across boundaries is only facilitated through knowledge transformation which results in trade-offs between the different communities. Swan et al. (2007) draw on this framework to examine boundary processes in genetics knowledge parks.

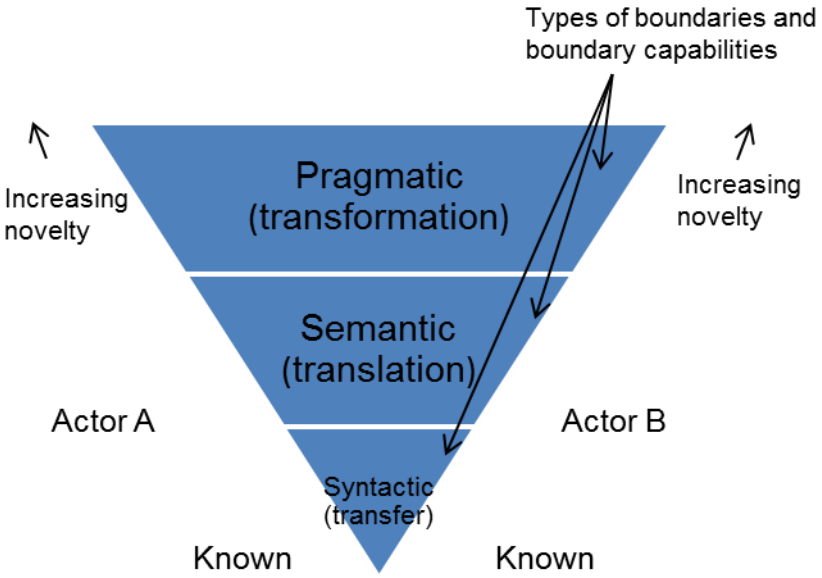


Figure 2 An Integrated/3-T Framework for Managing Knowledge Across Boundaries (Carlile, 2004, p. 558)

Other analyses have often resulted in grouping boundary elements by their characteristics. For example, Hirschhorn and Gilmore (1992) distinguish between authority boundaries, political boundaries, task boundaries and identity boundaries, and Miller and Rice (1967) analyse task and sentient boundaries. Orlikowski (2002), in her influential study developing a practice based conception of knowledge, refers to political, social and geographical boundaries within her empirical case. Sturdy et al. (2009), examining the role of consulting firms as knowledge intensive organisations, acknowledging the interplay and overlap between categorisations, details cultural, political and physical boundaries separating consulting firms from their clients.

Some scholars however, drawing on a sociological perspective (Giddens, 1984) challenge both functional Weberian assumptions and 'one dimensional' groupings. They view organisational boundaries as complex, socially constructed forms with a range of properties which are central to conceptions of 'organisation' (Hernes, 2004; Weick, 1979). Hernes (2004) in particular emphasises the multi-faceted nature of the boundary and its dynamics as a point of departure for organisational analysis. In doing so, he develops three main theories: 1) that boundaries are composite – i.e. organisations operate within multiple sets of co-existing boundaries which vary between settings; 2) boundaries are central not peripheral to organisations, and that

changing processes in organisations are about creating, moving or consolidating boundaries; and 3) boundaries are constantly subject to construction and reconstruction and not static givens. He reflects that some boundaries may be relatively stable and others may undergo rapid change.

Hernes (2004) develops a two dimensional framework of analysis for interpreting organisational boundaries. One dimension describes the actual processes that the boundary circumscribes (mental, social and physical boundaries) and the other describes the influence of the boundary on the organisation.

Table 1 A framework for integrating boundaries and corresponding research questions (Hernes, 2004, p. 13)

	Mental Boundaries (relate to core ideas or concepts that are central and particular to the group or organisation)	*Social Boundaries* (relate to identity and social bonding tying the group or organisation together)	*Physical Boundaries* (relate to formal rules and physical structures regulating human action and interaction in the group or organisation)
Ordering The extent to which boundaries regulate internal interaction	To what extent are the main ideas and concepts decisive for what members do?	To what extent do members feel that they are socially bonded together by, for example, loyalty?	To what extent do formal rules or physical structure regulate the work of members?
Distinction The extent to which boundaries constitute a clear demarcation between the external and internal spheres	To what extent are the core ideas and concepts distinctly different from those of other groups?	To what extent are we socially distinct from other groups?	To what extent does our formal structure set us apart from other groups or organisations?
Threshold The extent to which boundaries regulate flow or movement between the external and internal spheres	To what extent can outsiders assimilate core ideas and concepts?	To what extent is it possible for outsiders to be considered full members of the group?	To what extent do formal structures hinder the recruitment of outsiders?

This framework has potentially useful applicability to the conception of the research/clinical practice boundary which I outline in the following section.

The organisational boundaries literature has been applied to the healthcare knowledge mobilisation field, but this has primarily focussed on internal knowledge boundaries. There are few studies which focus on the organisational elements of

the research/clinical practice boundary, despite working between multiple organisations being a common feature of translational research collaboratives (Oborn et al., 2013b). As AHSCs in the UK are primarily partnerships between one or more sovereign organisations, deconstructing the organisational features becomes important.

In the AHSC context, I will consider organisational boundaries to be those which exist between the constituent organisations that make up an AHSC partnership. The sovereignty of the organisation, and how that manifests itself, defines the boundaries between groups. The defining features of the separate organisations either side of the research and clinical practice boundary are represented by the very different purposes and practices of each organisation.

The properties of this boundary manifest themselves as 'competing mission tensions' as outlined in much of the anecdotal AHSC literature detailed in the previous chapter. Universities undertake research, publish papers and receive grant income; healthcare providers deliver care to patients. In some healthcare systems such as the UK, healthcare providers are more beholden to government policies than universities which has a bearing on senior leaders' abilities to manage and shape the direction and culture of their organisations. The organisational boundaries are defined by the fact that staff are employed directly through one organisation (though they may have an honorary contract with the other), funding streams are allocated to one or other of the organisations and each organisation has its own board and governance arrangements. This conceptualisation of the research/clinical practice boundary as an organisational one adds a further dimension to establishing its key properties.

2.2.6 Boundaries – gaps identified in the literature

In summary therefore, there are a number of diverse literatures which contribute to understanding the properties of the research/clinical practice boundary in AHSCs. The main gap, however, as identified by Lamont and Molnár (2002) is that these literatures rarely overlap and have much to learn from one another. As noted above, they call for research into the properties of boundaries such as their 'permeability, salience, durability and visibility' (p. 186) and the conditions under which they assume certain characteristics.

Studying the research/clinical practice boundary as it manifests within the emergent organisational form of AHSCs may contribute empirically to the epistemic, professional and organisational boundary literatures. In the epistemic cultures literature, it can look to an example beyond different scientific cultures to explore cultures within healthcare practice and biomedical science, following the example of McGivern and Dopson (2010). In the professions literature, it can contribute both to professional hybrids literature on the role of medics and management and also consider the role of clinician scientists as a developing professional hybrid. In the organisational literature, it will add to conceptualisations of boundaries as traditional firm edges or as consistently changing.

2.2.7 Conceptualising the research/clinical practice boundary – a composite approach using three lenses?

This section conceptualised the boundary as an epistemic, professional and organisational one and has outlined relevant literatures from science studies, sociology of the professions and organisational studies. Drawing together these literatures is important for a more complete understanding of the research/clinical practice boundary, yet this task is challenging due to diverse interpretations of the boundary concept.

Before moving on to look at the literature on boundary work I will make some tentative observations about the properties of epistemic, professional and organisational elements of the research/clinical practice boundary. Epistemic boundaries are those between groups who 'think differently' – they have different ways of knowing. This boundary is cognitive and social in nature and manifests itself in different views of knowledge, such as that between mental and physical health, or in what it takes to understand research or how to treat a patient. Professional boundaries are delineated by the jurisdictional battles between groups over a particular set of work and knowledge practices. This boundary therefore has both formal (professional qualifications and requirements to practice certain tasks) and informal elements (the social power dynamics between doctors and nurses for example). Organisational boundaries are relatively firm and formal and delineate the 'edge' of sovereign organisations, which may manifest themselves in the form of geographical separation, separate IT systems and separate HRM practices.

Of course these interpretations (and the notion of boundary itself) are artificial distinctions and also have considerable overlap. This composite approach (Hernes,

2004), using three lenses, may however be a useful way of exploring knowledge mobilisation processes in the under-researched organisational form of AHSCs. This interpretation of the research/clinical practice boundary (and how the different elements interact with each other) will be tested in the following findings chapters and considered further in the discussion chapter. In so doing, it may help to contribute to Lamont and Molnár's (2002) call for research into the properties of boundaries and the conditions under which they assume certain characteristics.

Identifying the properties of boundaries is inextricably linked to the second of Lamont and Molnár's (2002) calls – that of a 'systematic cataloguing of the key mechanisms associated with the activation, maintenance, transposition or the dispute, bridging, crossing and dissolution of boundaries' (p. 187). It is to this issue, that of boundary work, I now turn.

2.3 Boundary work

The challenge of mobilising research knowledge into clinical practice can be conceptualised as boundary work. Although the knowledge mobilisation literature does not tend to analyse the properties of boundaries themselves, the concept of boundary work (in particular boundary objects), has gained some traction recently.

By accepting the need for some form of boundary work, most theoretical literature in this area takes a sociologically informed view of knowledge as something socially constructed in communities which does not simply 'transfer' to another community. Instead the boundaries are broadly assumed to be semantic or pragmatic (Carlile, 2004), and therefore assumes that the knowledge requires some form of translation or transformation. Further, the concept of boundary work is present in all three literatures (epistemic cultures, professions and organisational studies) outlined in the previous section.

Wenger (1998) identifies three types of boundary bridges used in boundary work between communities of practice – 1) people (boundary spanners or boundary brokers), 2) artefacts or boundary objects (Star & Griesemer, 1989), and 3) boundary interactions (spaces which enable people from different communities to come together). The theoretical literature largely focusses on the first two of these (people and objects). This section will therefore examine these two types of 'bridges' which may have relevance to the research/clinical practice boundary and the emerging organisational form of AHSCs.

2.3.1 Boundary Spanners

Boundary spanners are those individuals who have access to two or more discrete communities enabling them to use, assimilate and mobilise knowledge across otherwise unconnected networks of individuals (Wenger, 1998). Work on boundary spanning actors is primarily located in the management literature on knowledge and the application of this work to knowledge mobilisation in healthcare has gained traction recently (I return to this below).

In the management literature, boundary spanning individuals are seen as those who facilitate the sharing of expertise by linking two or more groups separated by function, location or hierarchy (Cross & Parker, 2004). Studies have examined the roles of IT professionals (Pawlowski & Robey, 2004), managers of research and development groups (Tushman, 1977) and engineers (Allen & Cohen, 1969; Bechky, 2003) amongst others as empirical examples of those individuals spanning intra and inter organisational boundaries.

Many studies have examined these 'designated' boundary spanning roles and developed categorisations of the roles they are expected to perform, which are seen as important to the organisations' ability to face the challenges of managing across boundaries (e.g., Aldrich and Herker (1977); Friedman and Podolny (1992); Leifer and Delbecq (1978); Tushman and Scanlan (1981)). Boundary spanners have variously been described as scout, ambassador, sentry and guard (Ancona & Caldwell, 1992) and others have identified key traits which 'competent' boundary spanners possess (Williams, 2002).

However, the multiple roles that 'designated' boundary spanners possess are often conflicting and can lead to stress and burnout (e.g. (Dubinsky et al., 1992; Lysonski, 1985; Singh et al., 1996). It is also challenging to find individuals who are both emotionally intelligent (Caldwell & O'Reilly, 1982) and capable in more than one domain (Nochur & Allen, 1992). Boundary spanning individuals are however often in management positions and may be reluctant to give up any element of their roles (Wiesenfeld & Hewlin, 2003).

Taking a practice based perspective, Levina and Vaast (2005), drawing on Orlikowski (2002), usefully distinguish between nominated boundary spanners and boundary spanners in practice. Nominated boundary spanners are those who are expected to undertake boundary spanning activity as part of their formal job role.

Boundary spanners in practice are those who actually undertake boundary spanning activity. These two roles are not mutually exclusive, yet the authors argue that 'evidence suggests that the expectations of these roles and practices of boundary spanning often do not coincide' (p. 339). Furthermore, formal organisational structures may not coincide with the reality of practice where actions can have unexpected consequences and diverse interests are represented (Wenger, 1998). This is an important consideration when studying the emerging organisational form of AHSCs.

Unlike nominated boundary spanners, boundary spanners-in-practice must actually engage in the activity of 'relating practices in one field to practices in another by negotiating the meaning and terms of the relationship' (Levina & Vaast, 2005, p. 339). They therefore call for further work to understand the processes through which individuals become boundary spanners in practice and argue that boundary spanners-in-practice develop new joint fields of practice between existing fields where the boundary work can take place. This framing of a boundary as a space for activity is more akin to taking an anthropological perspective than that drawn from the professions or science literatures which conceptualise boundaries as 'lines or gaps' (Lamont & Molnár, 2002).

Healthcare has provided much empirical data for studies on boundary spanners. As noted above, the constraining nature of professional boundaries to knowledge spread in healthcare has been well documented (Ferlie et al., 2005). There is now a growing interest in boundary spanning processes which challenge these constraints. These include policy driven organisational developments such as the establishment of multi-disciplinary teams which may be a breeding ground for boundary spanners in practice (Oborn & Dawson, 2010). There is also a substantial stream of literature examining the hybridisation of professional roles in healthcare, but this mostly relates to work across the medical/managerial domain (see professional boundaries section above).

There is a growing interest in the concept of boundary spanners in the knowledge mobilisation in healthcare field, but the literature remains fairly limited to highlighting empirical examples of nominated boundary spanners in recent translational research initiatives, in particular CLAHRCs, e.g. Harvey et al. (2011). There are however some more theoretically informed examinations, such as Kislov et al.

(2012) and Kislov (2014) who explores the development of communities of practice within the CLAHRC setting.

There are few studies which examine the role of boundary spanners in the earlier stages of the translational research pathway, but they are theoretically informed and useful. For example, Wainwright et al. (2006) explore the views of clinical scientists on human embryonic stem cell research in the field of diabetes. They demonstrate how translational research efforts are frequently limited due to a lack of understanding of the respective other professional domains – clinicians often don't understand the more scientific aspects of laboratory science, and biomedical scientists may lack understanding of the social and organisational issues associated with undertaking research in humans in a clinical setting in the NHS.

This complements the findings of Wilson-Kovacs and Hauskeller (2012) who suggest that the recent clinical implementation of stem cell research brings new legitimacy to the role of the clinical scientist, who straddles the boundary between research and clinical practice and possesses specialist expertise in both domains. They demonstrate how randomised clinical trials help to increase the status of individual actors within their respective teams, but also as a collective group as leaders of change in knowledge translation, becoming clearly established as a 'profession' in their own right. Lander and Atkinson-Grosjean (2011) further highlight the importance of clinical scientists as boundary spanners in helping to capture the complexities taking place on the boundaries of translational science (in their study, a rare genetic defect), and in ensuring the delivery of a genuine piece of translational research. However, concurring with Levina and Vaast (2005), true boundary spanners, who are completely comfortable in two of more communities of practice are quite rare, as it is very difficult for one person to be 'great at everything' (Lander & Atkinson-Grosjean, 2011, p. 542).

2.3.2 Boundary objects

Whatever the characterisation of the boundary, be it organisational, epistemic or professional, the role of objects in knowledge mobilisation across those boundaries is a common feature of all of them, and as such is widely documented in a number of literatures (Trompette & Vinck, 2009). Boundary objects are flexible artefacts which act as translation devices at the boundaries between different disciplines, organisations or epistemic communities. The term originated in Star and Griesmer's (1989) study of Berkeley's Museum of Vertebrate Zoology where they describe it as

an ‘object that lives in multiple social worlds and which has different identities in each’ (p. 409). They see these as being a translation tool between ‘several intersecting worlds’, where they are flexible enough to adapt to local needs, yet robust enough to maintain an identity across different sites. Since then, the role of objects in cross boundary work has been well documented (Bechky, 2003; Carlile, 2002). The concept of boundary objects has been widely applied to both the healthcare and biomedical research settings, for example with reference to standard forms in multidisciplinary meetings (Oborn & Dawson, 2010), care pathways (Allen, 2009), human embryos (Williams et al., 2008) and telemedicine (Constantinides & Barrett, 2006).

The key feature of a boundary object is that it is flexible and can be interpreted differently by groups on either side of the boundary, yet their structure is such that they provide a common frame of reference for both (Bijker et al., 1987). They enable co-ordination across boundaries without the need for consensus or shared goals as they allow individuals’ local understanding to be reframed to form part of wider activities (Bechky, 2003). Building on his analysis of knowledge boundaries, Carlile (2004) suggests that different types of boundary object are used depending on the form of collaborative working. When the situation is routine and familiar, and information simply needs to be transferred, a simple object such as a single word will suffice (syntactic co-ordination). If the situation is more complex, actors may need to establish common meanings and the boundary object would need to contain more information (semantic co-ordination). Finally if negotiation and compromise are required, the object requires flexibility to enable a change or transformation (pragmatic co-ordination).

However Nicolini et al. (2012) argue that the notion of boundary objects has become a portmanteau concept which tries to explain all boundary interaction, with the consequence that it loses its analytical power. They therefore advocate a pluralist approach to examine the different roles objects may play in facilitating cross disciplinary work. Objects may hold a tertiary, secondary or primary role, and each role is best understood through a different theoretical lens. They suggest a framework through which objects may move as they adapt and change their meaning and role in cross disciplinary collaboration.

A tertiary object performs a basic function relating to the material infrastructure of the project. This could be a building, email system or telephone list: ‘boring objects’

(Star, 1999) which enable the project to run but do not drive collaboration. The role of these objects is best understood using infrastructure theory.

A secondary object facilitates the flow of knowledge across boundaries. Here, the traditional notion of a boundary object functioning as a translation artefact between different disciplines or professions provides the theoretical framework (Star & Griesemer, 1989). Objects are flexible enough to be interpreted in different ways by different groups on either side of the boundary, yet hold their structure to enable cross disciplinary work. Examples include forms, slides or drawings (Bechky, 2003).

Finally, primary objects are those that drive and motivate, rather than just facilitate, cross disciplinary collaboration. Here, Nicolini et al. (2012) draw on Science and Technology Studies and frame tertiary objects as epistemic objects. These objects provide platforms for both innovation and conflict, and the nature of the object becomes important as it drives different ways of working. Examples include the scientific puzzle, or the 'unknown'.

Objects therefore provide a useful framework through which to analyse boundary work across epistemic, organisational and disciplinary/professional boundaries within AHSCs. Nicolini et al. (2012) call for future research in this area to examine what objects are used in cross disciplinary collaboration and when, and what is the meaning of the objects and for whom.

Several studies from the management and IT literature also emphasise the importance of both the instrumental effects of objects and their symbolic value. For example, Bechky (2003) demonstrates that objects (in her study engineers' drawings) can be used to signify status as well as share understanding, thus reinforcing boundaries using symbolic power. Pawlowski and Robey (2004) provide an example of how IT systems are used by IT professionals as objects to facilitate knowledge brokering. Levina and Vaast (2005) develop the concept of 'boundary objects-in-use' (p. 354) which acquire shared social capital when developed in association with a new joint field of practice. For example, the symbolic value of the paper prescription to the profession of medicine and pharmacy and to patients is important (Cooper, 2011).

In the biomedical field, Swan et al. (2007) consider both the instrumental and symbolic aspects of boundary objects in an early policy initiative encouraging the translation of research into practice - the Genetics Knowledge Park. They

demonstrate that when objects are symbolically associated with positive ideology and values, it is this that is crucial in facilitating interaction across boundaries, rather than the instruments (such as databases) themselves. The study identified that the objects had high levels of flexibility in how they could be interpreted, which gave them considerable symbolic value which could be leveraged across a range of communities to raise interest in the project. The symbolic association also corresponded with pre-existing policy discourses behind the Knowledge Parks, including the vision of combining cutting edge research with improved clinical practice. In a further example, studying software development teams, Barrett and Oborn (2010) show how the same object can take on different roles over the course of a collaborative project and that it can also highlight and reinforce asymmetrical power relations between the two communities.

Lander and Atkinson-Grosjean (2011) suggest that boundary objects translate or articulate between domains enabling those on different sides of a dispute to identify a common goal and work towards it. Hence, they argue that a particular scientific or clinical problem can act as a boundary object and bring the separate epistemic cultures of science and medicine together. They explore this idea through the use of a rare genetic defect (IRAK-4 deficiency) as a boundary object that linked the academic laboratory and the clinic. In this case, unlike in Mørk et al. (2008), no turf wars were observed. This may be in part due to the lack of direct competition between the epistemic communities, and the overall nature of the scientific puzzle being of greater importance than individual goals.

Linked but subtly different to the notion of boundary objects is that of boundary concepts (Allen, 2009; Löwy, 1992). A boundary concept is a loose concept, but one that is powerful enough to bring diverse groups together. The key feature of a boundary concept is its 'vagueness' – this 'facilitates communication and co-operation between members of distinct groups without obliging members to give up the advantages of their respective social identities' (Allen, 2009, p. 355). Löwy (1992) applies this to the construction of interdisciplinary alliances in science; Allen (2009) builds on this analysis by applying it to care pathways. It would be interesting to explore whether the 'bench to bedside' heuristic operates as a boundary concept within AHSCs, drawing scientists and practitioners together to unite around this 'vague' notion of translating research into practice.

2.3.3 Boundary work – gaps identified in the literature

The concept of boundary work and the role of people and objects associated with it have received attention from the healthcare and knowledge mobilisation literatures and the concepts, in particular boundary objects, are quite well developed theoretically. However there are some gaps in the literature which a study of the emerging organisational form of AHSCs could contribute to.

Firstly the role of clinician scientists makes an interesting empirical case through which to examine the distinction between nominated boundary spanners and boundary spanners-in-practice (Levina & Vaast, 2005) and what impact this has on their ability to form joint fields of practice. Do the roles of potential boundary spanners-in-practice in AHSCs (such as clinician scientists) coincide with nominated boundary spanners (perhaps those in management positions in the organisations), and how does this impact on their (and the organisations') ability to undertake boundary work across the research/clinical practice boundary?

Do these individuals establish new joint fields of practice or are they reluctant to leave their respective fields and therefore reinforce the (organisational, epistemic and professional) boundaries rather than span them? Are these individuals developing into a new professional hybrid, carving out a new area of jurisdiction on this boundary? How do they deal with the competing mission tensions manifest in the research/clinical practice boundary?

The literature on boundary spanners is also light on the organisational context of boundary spanning activity and how this may help or hinder the process. As AHSC partnerships have been established with the 'mission' of spanning the boundaries of research and clinical practice, but they have been formed from sovereign organisations with histories, they may be interesting cases through which to explore whether the organisational forms complement or challenge the reality of boundary spanning in practice. To examine this, it will be useful to consider both meso and micro level actions in the AHSCs and how the two interact.

An appreciation of the symbolic value objects can hold is often neglected in studies of knowledge and innovation which typically focus on their instrumental characteristics (Swan et al., 2007). Linked to this, the political nature of objects (who uses them, how, to what end and how does this change over time?) is under-researched (Nicolini et al., 2012). In exploring the composite nature of the

research/clinical practice boundary it may be helpful to analyse the symbolic role of boundary objects across the different (epistemic, professional and organisational) composite domains. Can objects which acquire high symbolic value encourage boundary work across the different elements simultaneously? For example, in the AHSC context, would a shared IT system between partner organisations have value beyond the organisational benefit? Does it enable boundary work across less tangible epistemic and professional boundaries and, if so, how?

2.4 Conclusion

AHSCs have been under-researched by the social sciences. This chapter has considered numerous different literatures and approaches that, applied to an AHSC setting, could contribute to addressing this gap. As this is an early study of these emerging organisational forms, I wanted to take a broad approach to draw together a diverse literature. This was a challenging task which ran the risk of not addressing relevant literatures in enough depth. However, this was a risk worth taking as the approach had both theoretical and empirical benefits. Theoretically, this approach contributed to highlighting parallels and gaps, particularly in the boundary literatures which, as Lamont and Molnár (2002) observed, have much to learn from one another. Empirically, it provides a wide range of concepts and characterisations to take to the field.

In summary there are three major gaps in the literature requiring further inquiry. Firstly, AHSCs as organisations are under-researched and the knowledge mobilisation literature is short on work on organisational form. Therefore a study of AHSCs as emerging organisational forms, particularly those developing outside of North America, would contribute to these gaps.

Secondly, within the healthcare (and other) knowledge mobilisation literature, the concept of boundaries and their properties is often referred to but rarely analysed theoretically (Oborn et al., 2013b). Further, the literature on boundaries is diverse and there is little integration between the streams (Lamont & Molnár, 2002). Therefore, there may be benefit in taking a composite approach (Hernes, 2004) to the research/clinical practice boundary and exploring its epistemic, professional and organisational properties and interactions between them. This corresponds to Löwy's (1996) multiple lens approach to studying clinical trials where she states that

the ‘heterogeneity of my description matches some of the complexities of my subject’ (p. 34).

Thirdly, the literature on boundary mechanisms requires further empirical cases to analyse the roles of spanners and objects (nominated and in-practice), their symbolic and political characteristics and interactions between the two (Nicolini et al., 2012; Swan et al., 2007). The contextually complex nature of the research/clinical practice boundary in AHSCs and work across it may contribute an empirical example to this literature.

Further, the concepts of boundaries and boundary work may be sufficiently flexible to act as a theoretical hook to draw together analysis of the macro, meso and micro levels of AHSCs, because (as described above) different boundary literatures apply to these various levels (for example STS uses the concept both in macro terms – representing the divisions between scientific disciplines – and at a micro level – in detailed laboratory ethnographies). The meso level (representing in this case the organisation) may be analysed less in STS, but has been applied in the sociology of the professions literature (Greenwood et al., 2002).

2.5 Research questions

The aim of this study is to examine how AHSCs, as an emerging organisational form, mobilise knowledge from research into clinical practice. Given the review above, the concept of boundaries appears to be a suitable lens. This study will specifically focus on examining epistemic, professional and organisational elements of the research/clinical practice boundary, their manifestations and the boundary mechanisms used to work across them. Therefore, drawing on the identified gaps in the empirical and theoretical literatures my overarching research question is:

What boundary processes mobilise knowledge within Academic Health Science Centres?

This is split into three more specific questions:

1) *How does organisational form impact on boundaries and boundary work within AHSC partnerships?*
2) *What are the properties of the research/clinical practice boundary and how do they manifest within AHSCs?*

3) *What boundary mechanisms facilitate knowledge mobilisation within AHSCs and how are they used?*

This study will contribute to the gap in the empirical literature on AHSCs at a time when they are spreading internationally. It will also aim to contribute to the literature on knowledge mobilisation in healthcare by studying this emergent organisational form using a boundary lens. Further it will contribute to the literature on boundaries and boundary work, specifically on the relationship between epistemic, professional and organisational boundaries at the interplay between research and clinical practice, and the role of people and objects that work across them.

Chapter 3 Methodology, design and methods

The purpose of this chapter is to set out the methodology, design and methods of this early study of the emerging organisational form of AHSCs. The previous chapter outlined the aims, objectives and research questions of this study, and a discussion of potentially relevant literatures, particularly different conceptions of the research/clinical practice boundary. This chapter will demonstrate how this study is underpinned by a critical realist paradigm, which is an accepted methodological position for qualitative, theoretically informed enquiry into health service delivery and organisation (Fleetwood & Ackroyd, 2004). It will also detail how a critical realist position influenced the study design and methods, and the practical steps and choices made throughout the research.

Critical realism assumes that there is a reality to be known but that our knowledge of it is theory-laden and imperfect (Archer et al., 1998). The task of research in this paradigm is to improve our interpretation of reality, rather than seek a definitive truth (Blaikie, 2007). It does this by observing 'events' which inform our (theoretical) understanding of the underlying 'mechanisms' (which may not be observable) of the social world. The mechanisms in question in this study are the theory-laden concepts of boundaries and boundary work, which cannot be seen directly and may change over time. Therefore there is a broad theoretical structuring to the enquiry and it is not purely inductive. The 'events' to be observed are the actions of people, the role of objects and how they interact in the organisational context of AHSC partnerships.

Critical realism includes scope for theoretical pluralism (using a diverse range of literatures and theoretical perspectives) which is a key part of this study. This allows for a 'composite' approach to the research/clinical practice boundary (as outlined in the previous chapter) recognising its potential epistemic, professional and organisational elements. Critical realism also favours 'intensive' study design – a detailed examination of a case or cases of the phenomena in question, using qualitative or quantitative data as appropriate. This study of AHSCs (the cases) is based on 'how and why' questions which are concerned with description and explanation, rather than counting. As such qualitative inquiry is used.

This chapter is structured as follows. Firstly, it outlines the methodology of this study - the key features of critical realism and how this paradigm has shaped the study design, from the research questions to data analysis. Secondly, I describe how I undertook the study, including decisions relating to the case study design and qualitative methods, such as case selection, data collection and data analysis. This includes some of the key practical considerations such as gaining access to the cases, ethical considerations, risks to participants and confidentiality, as well as the benefits and challenges of my approach. I conclude the chapter by reflecting on my role as a researcher in the whole process.

3.1 Methodology

Realism, as a philosophy of science, is characterised as being situated between the extremes of positivism and constructivism (Blaikie, 2007). Broadly, positivism is associated with classical views of science where reality consists of discrete events and knowledge of these events is only verified through observation (scientific experimentation) (Blaikie, 2007). At its most extreme, it rejects as meaningless anything that cannot be observed, including all theoretical notions and value judgements. At the other extreme, constructivism posits that all reality is socially constructed. How we divide up the world is the result of historical, social and political processes rather than an inevitable result of our greater understanding of 'reality'. If there is no 'truth' to observe, then it follows that a researcher's (and participants') account of a phenomenon is just one perspective amongst many (a relativist epistemology) and is theory laden. Thus there are many different perspectives on reality and no logical ground for privileging one (such as the biomedical model) over another (Blaikie, 2007). These perspectives may be interesting but have little use for practitioners and policy makers who may expect research to produce an objective 'truth' which can be used (Murphy, 2001). Realism takes a path between these two extremes by positing that there is a reality to be known, whether it is observed (by 'tracking mechanisms') or not. This paradigmatic stance most closely aligns with my view and understanding of the world and our knowledge of it, which has developed throughout this research project.

Within the realist paradigm there are a range of perspectives and categories and the literature abounds with variations (Blaikie, 2007). At one extreme, more associated with a positivist view, naïve/shallow realism assumes that there is one view of reality and therefore that knowledge is theory free. Other forms of realism, including critical

realism (broadly associated with the writings of Bhaskar (1986, 1998a, 1998b)) and subtle realism (Hammersley, 1992), challenge this assumption and account for the use of theory in informing knowledge and are therefore more appropriate for an exploratory study of theoretical constructs (such as boundaries).

3.1.1 Critical Realism

The term 'critical realism' is often used by writers as a 'label for their thoughts' (Losch, 2009, p. 87) and encompasses a range of perspectives. Broadly, contemporary critical realism accepts that there is a real world out there but that there can be multiple perspectives of it. This is informed by Bhaskar (1998a) distinction between intransitive (the 'real' world) and transitive (socially constructed concepts *about* the world) dimensions of knowledge. In other words, rival theoretical approaches acknowledge that one 'real' world exists but they have different concepts through which to see it. Natural and social phenomena are real, but on the other hand, our knowledge about them is theory-laden and imperfect.

Bhaskar (1998a) proposed that experiences, events and mechanisms make up three overlapping domains of reality; the domains of the empirical, the actual and the real. The *empirical* domain consists of events that can be observed; the *actual* domain consists of events whether or not they are observed; and the *real* domain consists of the structures and mechanisms that produce these events (Blaikie, 2007). Critical realism is ultimately a search for these (often unobservable) generative structures and mechanisms (Blaikie, 2007). These mechanisms can be nothing more than the tendencies or powers that things have to act in a particular way in particular circumstances (their context). Critical realists see 'theory' as something that provides a conception or picture of these mechanisms or structures at work. Decisions between competing theories are made based on their respective abilities to explain events most closely (their explanatory power). However, critical realism also accepts the need for eclecticism where theories do not contradict each other, as they may be concerned with different structures or strata of the real domain (Danermark et al., 2002). This has implications for study design as I shall explore in the next section.

A key critique of Bhaskar's critical realism relates to concepts of structure and agency (Blaikie, 2007). For Bhaskar, social structures are central, exist independently of social actors and 'cause' events. For his critics social structures are closely related to social activities, are abstractions and therefore are not able to

'cause' events themselves without the agency of individuals (Harré, 2002). However, critical realist perspectives can still be (and are) applied to settings where the agency of individuals is important, such as those relating to knowledge mobilisation (e.g. Kislov (2012); Rycroft-Malone et al. (2016)).

Tools for practical application of critical realist thinking have been developed through realist evaluation (Pawson & Tilley, 1997) which aims to describe what works, for whom and under what conditions and has been applied to the study of healthcare (Rycroft-Malone et al., 2016). This approach is designed for programme evaluation rather than an 'in depth' study as this one is. However, the language of critical realism, that of processes, mechanisms and context, is a good fit with the boundary literatures (Lamont & Molnár, 2002). The boundary literature emphasises the importance of context in the analysis of boundaries and boundary work and some conceptualisations (particularly in science and technology studies) relate to boundary work as a process, rather than a static construct (Star & Griesemer, 1989). Further, its allowance of theoretical eclecticism chimes with the notion of a composite research/clinical practice boundary which has epistemic, professional and organisational elements. As such, it is a good fit for this study.

3.1.2 Critical realism and study design

Critical realism is seen as a 'metatheory or philosophy of science' (Reed, 2009, p. 430) rather than a research method itself. It informs research questions and corresponding study designs and methods to address them. This subsection will outline the key impact that this perspective has had on the design of this study. Specifically it looks at 1) the relationship between theory and data 2) the intensive study design (case studies) advocated by critical realism 3) the process of retroduction as a method of data analysis which reflects the relationship between theory and data and 4) the nature of this qualitative enquiry and the validation techniques which can be used to ensure the 'critical' in critical realism.

3.1.2.1 Theory and Data

As noted above, critical realism sees theories as models of the mechanisms and structures (and their identifying behaviour) occupying the 'real' domain (Hands, 2001). These (often unobservable) mechanisms are important as they drive events (which can be observed in the 'empirical' domain). Critical realism also accepts that our knowledge of these mechanisms and events is 'theory-laden'. Therefore, theory is an integral part of the critical realist research process and drives the development

of knowledge as well as providing explanations for events. Theory choice normally comes before empirical examination, which is, in turn, used to develop theoretically informed descriptions of events and to challenge and further theory (Danermark et al., 2002). This cyclical development between data collection and theory (informed by retroductive analysis) establishes the nature of mechanisms (Fleetwood & Ackroyd, 2004).

On this basis, this study was largely informed by theories of boundaries and that these mechanisms, boundaries and boundary work, exist (in the real domain) and can be known. The proxies of boundaries and their work (including social interactions, and physical representations such as objects, buildings, roads) can be 'observed' in the empirical domain through data collection and analysis. The previous chapter highlighted that there is a gap in the knowledge mobilisation literature on the application of boundary theory and then outlines potential conceptualisations (epistemic, professional and organisational) from the various boundary literatures. This theoretical framework informed much of the study design including formulating the research questions, selecting appropriate tracer cases and interviewees, designing the data collection tools, providing a framework for data analysis, as well as being instrumental in forming initial ideas about the phenomenon of interest. This element of the study design was an early part of the retroductive process, by outlining a (albeit loose) theoretical framework with which to enter the field.

Empirical data collected from the early stages of fieldwork began to further inform the loose theoretical framework, by developing my ideas about usefulness of the 'composite approach' to the research/clinical practice boundary and the nature of the respective boundaries and whether they broadly held to the literatures' interpretation of them. Reflecting this theoretical eclecticism, I was able to draw more or less on literatures as appropriate for constructing the practically adequate explanations required by a critical realist approach. Due to the exploratory nature of the study on an empirical example (AHSCs) within the knowledge mobilisation literature, my data collection and analysis methods also allowed for new themes to emerge from the literature but these were still largely based within the broader theoretical framework of boundaries.

3.1.2.2 Intensive (case) study design

In common with its approach to theoretical eclecticism, critical realism also accepts methodological pluralism – i.e. using whatever methods and techniques are most appropriate to the phenomena being studied (Sayer, 1992) (the phenomena being, in this case, knowledge mobilisation across boundaries within a new organisational form, AHSCs). Critical realism does however favour 'intensive' research designs exploring phenomena in depth in a small number of cases (using qualitative and/or quantitative data) to generate causal explanation which can then be tested using theory (Danermark et al., 2002; Reed, 2009). These intensive research designs, at least in organisation studies (Fleetwood & Ackroyd, 2004) and health services research (e.g. Rycroft-Malone et al. (2016)) often take the form of case studies. This approach was deployed in this study, where a case study methodology was appropriate for the exploratory nature of the emerging organisational forms of AHSCs and the context specific 'what and how' research questions. I will expand further on this in the next section.

An alternative approach to this study might have been to take a more intense ethnographic approach spending longer periods of time observing each tracer case, analysing using an inductive grounded theory approach (Glaser & Strauss, 2009). However, I chose to shape the study with a loose theoretical framing around boundaries for two main reasons. Firstly, the literature reviewed on knowledge mobilisation and the gaps on boundaries appeared interesting and relevant given my experience working in AHSC settings, and I believed that examining AHSCs may contribute to this body of work. Secondly, the theoretical framework made the fieldwork and data analysis more manageable, given my limited time (particularly with the Unite department tracer case).

3.1.2.3 Retroduction

The method of analysis most closely associated with critical realism and the identification of generative mechanisms (theory) is that of *retroduction* (Blaikie, 2007). This approach enables movement between the empirical domain (what we can observe) and the deeper, real domain involving structures and conditions (which we can't observe) in order to identify the mechanisms and therefore make some explanation of the phenomena under study (Blaikie, 2007). In practical terms, Blaikie (2007) conceptualises this as a cyclical process moving from theory to data and back again, in order to determine how the phenomena under study emerge and

develop. He contrasts this iterative retroductive approach with the more 'linear' inductive (which aims to establish generalisations *from* the data) and deductive (testing pre-established theories *on* the data) approaches.

This study used a broadly retroductive approach to data analysis which developed during the duration of the study, rather than being a clear approach from the beginning. This developed through reconciling the exploratory nature of the study on a novel empirical case, with a (albeit broad and loose) theoretical framework based on an identified literature gap and a key area of interest which 'rang true' with my personal experiences as an NHS manager. The aim of the study therefore became not to 'test' boundary theory on the research/clinical practice boundary in AHSCs or to generate a new theory from the data. Its aim instead was to develop a theoretical explanation of the research/clinical practice boundary and boundary work across it in the context of the emergent organisational form of AHSCs and, to refine this theory through further analysis of the empirical cases (Tsoukas, 2009). Further, there is an explicit acknowledgement that this process is shaped by my background and theory-laden assumptions of the world and consequently one *representation* of the truth, albeit one which uses tools and techniques to ensure it is as accurate as possible.

3.1.2.4 Qualitative Enquiry

The methodological pluralism of critical realism allows for both quantitative and qualitative enquiry. The nature of this research project, as a study of an emergent organisational form (AHSCs), lends itself to qualitative enquiry, because the research questions posed are 'what and how' in nature and not 'how many' and 'how much' (Green & Thorogood, 2009). As (Blaikie, 2007) notes:

> *'What questions require a descriptive answer; they are directed towards discovering and describing the characteristics of social phenomenon […] and How questions are concerned with bringing about change, with intervention and practical outcomes' (p. 6-7).*

Responses to these questions will deal with data that cannot easily be reduced to numbers and as such are suitable for a qualitative approach.

In line with the 'critical' in critical realism, and specifically further advocated by proponents of 'subtle' realism, qualitative enquiry has a number of established 'validation' techniques to ensure that the 'one perspective' of the researcher, which is laden with theoretical assumptions and personal experiences, is as close to an

accurate representation of the truth (the reality of the real domain) as possible. These validation techniques include triangulation, respondent validation, clear exposition of methods of data collection and analysis, 'fair dealing' and reflexivity (Mays & Pope, 2000). Where possible these techniques have been incorporated into the study design and are explained in the appropriate following sections.

In summary, the design of this study was influenced by the overarching paradigm of critical realism. The next section details the practical steps and decisions I took at various points in the study to examine the research/clinical practice boundary in the emerging organisational form of AHSC partnerships.

3.2 Methods

3.2.1 Case Study Design

Case study designs are a common feature of studies of organisations and their processes (Eisenhardt, 1989), as they enable phenomena to be studied without being divorced from the contexts in which they operate. A case study design is appropriate for this study for four main reasons. Firstly, case study designs enable a holistic examination of complex social processes in their real life contexts (Yin, 2009). This lends itself to the explanatory 'what' and 'how' questions of this study which are designed to examine the multifaceted interactions and mechanisms taking place at the boundaries between research and clinical practice within cases of a new organisational form, AHSC partnerships.

Secondly, a case study design is well suited to the exploratory nature of the research questions as it is flexible and allows consideration of planned and emergent theory (Eisenhardt, 1989). This was particularly important given the lack of social science literature on AHSCs and the possibility of many theoretical applications and variations of the phenomena (the research/clinical practice boundary) being studied.

Thirdly, a case study design enables the use of many data sources and collection techniques which provide different perspectives on the phenomena being studied, and allows for triangulation of these methods (Buchanan, 2012). Given the exploratory nature of the research questions, the study will be strengthened by using a number of qualitative data sources (specifically observations, interviews and

documents). This correlates with the critical realist approach requirement to validate findings and to represent the truth as accurately as possible.

Fourthly, one of the aims of the study is to contribute to theory on the research/clinical practice boundary and knowledge mobilisation. In organisation studies, a case study design is commonly used as a framework from which to 'build theory' (Eisenhardt, 1989). The explicit approach of this exploratory study enables the refinement of boundary theory from the selected cases.

3.2.1.1 Multiple Case Design

Case study approaches have single or multiple designs (Yin, 2009). Whereas a single case design can provide an in depth understanding of an extreme situation, critical incident or outlier, or is selected for practical reasons given the resources available to a particular study, theory building is more reliable from multiple cases (Eisenhardt & Graebner, 2007). This study was designed to examine the boundary work within English AHSC partnerships. It was beyond the scope of this study (a single PhD) to examine all five designated AHSC partnerships. Therefore a two case design, of two AHSC partnerships, was chosen.

3.2.1.2 Selecting the cases

The cases were purposively selected for theoretical and pragmatic reasons. In theoretical sampling, case selection is based on 'what develops our understanding of the phenomenon' (Buchanan, 2012, p. 361). In this study, the phenomenon under examination was the research/clinical practice boundary and boundary work in the emergent organisational form of AHSC partnerships. Therefore, contrasting cases were selected, to inform analysis of differing boundary processes at the organisational level and the impact of different organisational contexts on the tracer level cases. Both chosen cases were designated as AHSCs in 2009 and both work towards the missions of 'integrating research, education and patient care' and 'translating research into practice', yet the organisational and governance arrangements are quite different and represent two distinct models (in common with the wider AHSC literature detailed in Chapter 1). Gamma AHSC had an integrated structure where the head of the AHSC combined formal leadership roles in the NHS trust and university. Delta AHSC was a looser, confederated structure comprising a partnership between three NHS Foundation Trusts and a university.

The choice of cases was also pragmatic. I had worked in two of these AHSCs, including in the formation of one of them (Delta AHSC) and was familiar with their overall organisational structures and politics. This 'insider' status afforded some positive benefits. When applying for the NIHR Fellowship which funded this study, I had initial favourable conversations with senior Executives within both organisations which started to open up the access process. Building those relationships prior to the start of the study was crucial in ensuring continued access to meetings, interviewees and documents once the study data collection had begun. However 'insider' status also poses some challenges, such as the researcher having a range of roles and identities which can bias findings (Adler & Adler, 1987). I reflect on these challenges in later sections of this chapter.

3.2.1.3 Meso and micro level enquiry

As boundaries and boundary work are manifest at macro, meso and micro levels (House et al., 1995) levels within the partnerships, it follows that enquiry at these different levels may be required. In this study, as outlined in the introductory chapter, the macro context relates to policy (such as that designed to encourage knowledge mobilisation) and broader societal issues (such as the role of professions) which inform processes and behaviours within AHSCs. These factors informed this study but were not the focus of analysis. This is because the gaps in the literature (and corresponding research questions of this study) relate to the role of organisational form as well as the individuals and objects involved in boundary work, rather than policy enquiry.

Therefore the study focussed on the meso and micro levels within AHSCs and relationships between the two in respect to boundary work. The meso level is defined as the organisational level, where organisational wide processes and mechanisms, such as structures and governance arrangements are considered. Within the two AHSC cases, this refers to both the board level and middle management level. The micro level considers the day to day interactions of 'front line' staff and teams. The two levels of analysis interact, in that the organisational context may shape (to a greater or lesser extent) the work of front line teams, and work at the micro level may influence actions and structures at the organisational level. These interactions are important and observing 'events' at this level may inform the nature of 'generative' mechanisms underpinning knowledge mobilisation work across the research/clinical practice boundary. Therefore, in order to enable

these different levels to be considered, I identified tracer cases (or sub units) (Ferlie et al., 2013) of the case AHSCs to enable micro level data collection and analysis.

3.2.1.4 Tracer Cases

The tracer cases were used as a lens through which to view some of the wider boundaries and boundary work within each AHSC.

3.2.1.4.1 Selecting and defining the tracer cases

At the beginning of the study, my criteria for selecting the tracer cases were as follows:

1) A case that involved knowledge crossing the research/clinical practice boundary (a positive example of the AHSC in action)
2) A case which had an organisational outcome to examine (i.e. which could inform the meso level as well as the micro level)
3) A case that could be clearly defined and was manageable enough to examine in detail
4) A case that had boundary interactions to observe (in the empirical domain) and also had the potential for triangulation between different data sources
5) A case that I would be able to negotiate access to including observations and interviews
6) A case I was not familiar with (i.e. I did not know the staff involved)

I eventually selected tracer cases in both AHSCs which met these criteria. The tracer case in Delta AHSC, the Connect project, was identified through preliminary documentary analysis of the AHSC website, informal discussions with the AHSC Executive team and an email sent to the Clinical Research Cluster (CRC) leads within the AHSC. I then approached the project lead for an interview and at the end of this interview asked if he would be interested in participating as an in depth case study. He agreed, and I then informally met other project members who were also keen to participate in the study.

Although I did consider other examples, it was a straightforward decision to select the Connect case, as it was an AHSC funded project and established following the development of the AHSC. There were very few (if any) other projects funded by either AHSC in a similar vein. It was a discrete, manageable project, data collection opportunities were likely to be numerous and the team were open and keen to participate in the study. This early identification enabled me to follow the case for 12

months which was valuable in terms of getting a longitudinal perspective on the development of the project, its staff and their boundary work.

Identifying a tracer case at Gamma AHSC was less straightforward. There were fewer initiatives relating directly to the development of the AHSC. In a similar fashion to Delta AHSC, I conducted several senior AHSC executive interviews and asked at each of these for a good case example to follow, yet these conversations did not lead to suggestions. This may have been due to the fact that the AHSC Executive was in transition at the time with a new Director recently appointed. In the end, I used an informal discussion with a former colleague to generate ideas – this colleague then acted as a gatekeeper and provided an introduction to the Leads in the Unite department, who then agreed to be part of the study and introduced me to the rest of the team. Without this informal link, it may have proved even more difficult to identify and follow a tracer case within the appropriate timeframe.

Both tracers are identified by AHSC executives as examples of good practice of the AHSC at work, yet are quite different cases. Therefore studying the processes and mechanisms of working across the research and clinical practice boundaries within both of them provided some insight to strengthen our identification and understanding of properties of boundaries and their work at this interface.

3.2.2 Gaining Access

Once identified, gaining access to interviewees and situations in which I could observe them was quite straightforward in both cases. I had a pre-existing familiarity with the structures, acronyms, history and issues of the AHSCs. This had many practical benefits as it enabled me to 'short cut' much of the early familiarisation that needs to take place prior to data collection in a study (Saunders, 2012).

My 'insider' status afforded great benefits in terms of access to key senior individuals. Staff seemed genuinely interested in the research and were willing to be interviewed. In the interviews I pursued, all participants responded to my initial email request, and only three turned down participating in an interview, with reasons given being new into the role, and lack of time. When interviewing individuals I had a prior working relationship with (although these were few, only six out of 48), these individuals were open and honest (even if this was not always captured on tape). In addition, several participants explained at the end of the interview that it had been a

rare opportunity to think about and reflect on the development of the AHSC and for someone to listen to their opinions and issues.

I gained access to all meetings I requested to observe. This access was helped by being persistent, building relationships with senior AHSC executives who were then able to act as gatekeepers and introduce me at the start of the meetings.

3.2.3 Ethical Approval

Gaining appropriate ethical and NHS Research & Development (R&D) approvals for my study was quite complex and provided some direct experience of the challenge of undertaking research in multiple NHS settings in AHSCs. During the early phase of my study, the process for studies involving NHS staff changed. Studies involving staff by virtue of their professional role did not now need NHS ethical approval, but did still need R&D approvals from all participating NHS sites, which required completing an IRAS form.

The study also required approval from a university ethics committee. Ethical approval was obtained from the King's College London Ethics committee in November 2011. During my studies, I moved to UCL and thus required new approval, which was granted by UCL ethics committee on 30th March 2012 (ref no: 3859/001). Each of the four NHS sites of the study had different approval processes, including at the three NHS foundation trusts which comprised Delta AHSC, despite an AHSC strategic priority being to streamline this process. I finally obtained sign off at the four sites by May 2012. Thankfully this did not delay data collection as I was able to interview staff employed through the university prior to this date, as this did not need the NHS R&D approval.

There were several minor ethical considerations for the study. I cover how I ensured participants had informed consent of participation in the study in the following sections relating to interviews and observations. The other key ethical considerations were as follows:

3.2.4 Risks to participants

The study involved NHS and university staff being interviewed about their professional role and opinions, and being observed while undertaking parts of their day to day work. The potential for distress or risks for participants in this study was low. I was however aware that some participants may feel nervous about being observed or interviewed. To mitigate this potential discomfort, I built a rapport with

the individuals concerned and kept checking that they were still happy to participate in the study and were happy for me to observe the meetings. In addition, I largely relied on these individuals as gatekeepers to the meetings they held, so if they felt uncomfortable by my attendance in advance of any meeting they could simply chose not to inform me of it.

The inconvenience to interview participants was minimised by asking them to choose the place and time of interviews, and I also took care not to inadvertently place participants under any pressure to participate in the study. Participants were informed that they were free to withdraw from the study at any time and that they could withdraw their data at any time until 30th April 2013 (see study information sheet and consent form at Appendix C). No participants chose to withdraw their data, and at no stage did I need to stop an interview or withdraw from a meeting observation, although I was prepared to do so.

3.2.5 Confidentiality

Confidentiality was maintained throughout the project and interview transcripts and information were stored securely in accordance with the Data Protection Act 1998 and University College London processes. The names of participants were not audio recorded during the interviews and each participant was assigned a unique identifier code. Names and contact details were kept in a separate, password protected file stored separately from the main computerised data set on UCL secure servers.

Due to the necessary detailed description of the two AHSCs and tracer cases, informed readers of the research may able to identify the AHSCs in the study, and potentially also the tracer cases. However, even if the AHSCs and tracer cases were identified, I have ensured confidentiality of individual participants by not using job titles, but by using phrases such as “senior leader of AHSC” or “member of Connect Project team”. This was explained to participants as part of the study information sheet (Appendix C) and at the start of every interview. All data remained fully confidential and findings are reported in an aggregated manner without reference to individuals’ names. The process will ensure that no individual participant might be identified from this thesis, subsequent publications of the work, or any form of feedback provided to the funder or other stakeholders.

3.3 Data collection

One benefit of a case study design is that it enables data collection from a number of methods and sources. Data was collected using three methods: 1) documents (including for example websites and strategy documents such as the initial AHSC applications) 2) semi-structured interviews and 3) non-participant observations. This approach enabled me to collate a rich picture (Yin, 2009) of the phenomenon under consideration (boundary work in AHSCs) and, in line with the principles of critical realism and quality in qualitative research, supported triangulation from a number of perspectives (Mays & Pope, 2000).

3.3.1 Triangulation

Triangulation is consistent with the methodological pluralism of critical realism. It helps with the 'critical' element of the paradigm – in ensuring that the researchers' account is as close to the 'real domain' as possible, by offsetting the weaknesses and biases of each method (Denzin, 1970; Green & Thorogood, 2009). There are different types of triangulation which are appropriate in different circumstances. In this study, I primarily used methodological triangulation (Denzin, 1970) - each method of data collection (documents, semi-structured interviews and observations) brought a different yet complementary perspective to the research questions.

For example, *documents* provided an 'official' version of events as websites and strategy documents were external facing and publically accessible (Shaw et al., 2004). *Semi structured interviews* provided an opportunity to delve into some depth to individuals views and motivations on working in AHSCs, boundaries and boundary work. *Observations* were designed to see boundary work in practice at different levels within the organisation. These were particularly valuable for developing an understanding of knowledge mobilisation in practice within the selected settings. Observations also often presented topics which could be explored in depth in a subsequent interview and provided an opportunity to recruit more potential interviewees who I may not have considered interviewing before. For example, when observing a 'roll out' meeting in the Connect case, one participant offered to stay on and be interviewed about the process. I was able to use this opportunity to explore some of her immediate thoughts on the Connect project by discussing what had just happened in the prior meeting. I expand on the data collection process for each method later in this chapter.

3.3.2 Exploratory conversations and observations

Prior to the formal period of data collection, I undertook several exploratory conversations and observations. This had three main purposes. Firstly, it helped me identify some of the key themes and structures of the AHSC which, together with the literature review, informed the development of the research questions. Secondly, participants helped identify key potential interviewees and meetings to observe, together with suggestions for tracer cases to follow. Thirdly, they enabled me to practice data collection techniques, particularly observations. I consulted with the ethics committee of one of the organisations which identified this part of the study as service evaluation and therefore it did not require ethical approval.

I conducted eight exploratory conversations. These were informal and took place with some individuals I already knew within the organisations, and others suggested by these individuals or identified on the AHSC website. The informal nature of the conversations, together with the fact that I knew most of the individuals, enabled me to conduct more 'off the record' conversations and pursue potentially controversial or sensitive areas which may not have materialised in quite the same way in the formal interview context. For example, themes relating to the tensions between the missions of the AHSC, tensions between the acute trusts of Delta AHSC and the complexity of attempting to bring together research and clinical practice missions were discussed.

I conducted two exploratory observations which enabled me to practice data collection, sample data collection templates and observation techniques prior to commencing the study proper. Both observations were conducted of CRC level meetings within Delta AHSC. One meeting had participants I knew well and had worked with previously, and discussed topics I was familiar with. This setting was not conducive to practicing non-participant observation as those attending treated me as an insider, by smiling, making eye contact and whispering to me if something controversial was said. However this observation was very useful as it illuminated the potential pitfalls of familiarity of the topic area and a prior bias towards a particular group or grouping.

The second observation was introduced through a gatekeeper known to me but I was unfamiliar with the setting and topics discussed. This enabled me to practice observational techniques in a more realistic setting to that in the main study and was useful both in terms of understanding how I would feel in this scenario, participants'

potential reactions to being observed and the challenges of capturing as much relevant information as possible whilst listening carefully to topics covered and opinions of individuals within the room.

These informal conversations and observations were very valuable in terms of preparing for the main study in terms of themes identified and practicing data collection techniques and potential challenges.

3.3.3 Documents

Documents are a useful source of data often underused in qualitative research (Lee, 2012). The primary purpose of collecting and analysing documents (including web pages) in this study was to gain an understanding of the 'official' position on the approach to the research/clinical practice boundary within the AHSCs, and to gather formal information on the organisational governance arrangements, potential tracer cases to follow and potential interview participants. This 'formal' data complemented the more personal and 'informal' data collected through interviews and observations.

The documents were collected primarily through desk based research, using in particular the AHSC case websites. These documents included the original application forms made when AHSCs were designated in 2009, strategic documents and minutes of meetings (such as the board meeting minutes of the NHS organisations). I acquired others through attending meetings and retrieving minutes from these situations, or requesting sets of minutes from particular meetings I knew occurred. Collection of publically available documentary data was particularly intense at the start of the collection process as it did not require ethical approval. I then regularly checked the AHSC partnership websites and other sources throughout the collection process, up until 31st March 2013. 22 key documents were uploaded onto NVIVO software for categorisation and analysis (see Table 3).

3.3.4 Semi structured interviews

Semi structured interviews are a widely used method of collecting qualitative data to inform case studies (Fitzgerald & Dopson, 2009). They are typically based on a flexible framework which provides a loose structure of open ended questions to explore attitudes and experiences (Pope & Mays, 2006). The main benefit of this approach is that it is a flexible way of obtaining information face to face from individuals and enables an in depth exploration of the phenomenon being studied

(Silverman, 2004). Semi-structured interviews are typically based on a flexible topic guide that provides a loose structure of open ended questions to explore experiences and attitudes (Silverman, 2004). In this study the interviews enabled me to gain an in depth understanding of the perspectives of a range of staff working within the case AHSCs on boundaries, boundary work and knowledge mobilisation to inform the research questions.

Interviewees were selected using purposive sampling (Pope & Mays, 2006; Saunders, 2012) which enabled me to approach individuals with a variety of perspectives on boundary spanning at different levels within the AHSC and tracer cases. These individuals were largely identified by prior knowledge of the study setting, a review of official documents (including websites), snowball sampling, whereby I asked participants to recommend individuals who may be able to contribute further to the study, and through meeting observations.

In total, 48 semi structured interviews were conducted across both study sites. Individuals fell broadly into two main categories: 1) those at a senior level within the AHSCs; and 2) those connected to the tracer cases. These two categories naturally overlapped (as those within the tracer cases also held senior positions within the AHSC so I also used the interview to gather data on this aspect of the research questions).

I began by conducting senior level interviews which enabled me to gain an understanding of the organisational level motivations, structures and drivers of the AHSCs. In addition, these early interviews helped identify potentially suitable tracer cases, as noted above.

Individuals were approached in person or via email. Potential participants were sent a copy of the study information sheet and an interview time and venue was set at the convenience of the individual. Interviews primarily took place in the participants' offices, or a familiar location to them, which ensured they were in a comfortable environment and the interview was of little interruption to their day to day work (Silverman, 2004). Although the vast majority of interviews took place in private, one took place in an open plan 'café' environment at the request of an interviewee. This was fine as the conversation was broadly 'private' in that it was unlikely anyone was listening in, but became difficult from practical perspective when a leaving party

also occupied the space (the digital recorder picked up the sound of popping champagne corks and it was a challenge to fully hear the recording).

Two further interviews took place in an office which was shared with one other person (a work colleague) and this person was present for at least some of the interview. The presence of the other person was not clear until I arrived to conduct the interview, at which point I double checked with the participant that they were happy to pursue it with another person in the room. Both cases confirmed that they were comfortable with this (and said something along the lines of 'my colleague has heard it all before and I have nothing to hide'). Although not ideal, I chose to pursue the interviews in this context, as agreeing an alternative time was problematic. One further interview took place via Skype, which again I chose to conduct as the interviewee was a key informant and was not able to conduct the interview face to face.

All interviews were tape recorded and transcribed verbatim by a company recommended by colleagues and used widely across UCL. I listened to each interview whilst following the transcript to correct any errors and clarify acronyms and other complex information. The transcripts were then uploaded to NVIVO (qualitative data analysis software package) to be analysed.

Interviews were loosely semi structured (see Appendix E) with broad topic areas to cover but leaving scope for the conversation to be led by the interviewee. The most challenging aspect of the process was encouraging interviewees to describe specific examples of boundary spanning rather than describing generally what happens. Most interviews generated rich, thick descriptions of life within an AHSC and insights into boundaries and boundary work within them.

One particularly interesting aspect of the interviewing process was the range of different individuals I interviewed, from senior executives of the AHSCs and trusts through to research workers, administrators and frontline nursing staff. The difference in status of these individuals within the organisation contributed to a different power dynamic in the interview process and required a flexible approach to techniques of putting interviewees at ease. With more junior members of staff I reassured them that there was no 'wrong answer' to the questions, and that their views, experiences and opinions were very valuable to the study. Many participants

reflected that it was 'nice to be asked' and that the interview gave them space and time to reflect on their work which they didn't ordinarily get to do.

3.3.4.1 Elite interviews

Many interviews were with senior executives and could be described as ‘elite’ interviews (Harvey, 2011). Elite interviews are commonly defined as those with powerful individuals at the ‘top’ of a stratification system (Denzin & Lincoln, 1994), where there is a status differential between the interviewee and interviewer. This type of interview presents challenges. In particular, the status differential can lead to the interviewer feeling unable to probe or challenge what the interviewee is saying, and therefore cannot extract honest opinions, instead only receiving the ‘party line’ (Harvey, 2011).

In this study, many interviews were with executives or academics in senior roles. I, in my status as ‘PhD student’ or ‘NHS middle manager’, could have been perceived as being of a lower status. However, I had varying experiences in these interviews, and gradually developed techniques over the course of data collection to deal with certain scenarios.

In some interviews I was treated with slight suspicion or mildly patronised. Some interviewees were apprehensive of being tape recorded or signing the consent form. This suspicion tended to ease as the interviews progressed and interviewees relaxed into the process.

One interview with a senior executive was particularly challenging. He sat throughout the interview with very defensive body language, and constantly questioned the validity of the study. At one stage, he said "I hope you realise that is an incredibly naïve question" when asked about differences between the university and trust. This made me feel quite uncomfortable and was clearly designed to unnerve me, yet I persisted with the interview. Despite this comment, the interview generated some rich data reflecting on the high level challenges of managing an AHSC, as well as some of the motivations of clinician scientists.

There was a mixture of interviewees who stuck to the ‘party line’ and rhetorical, general statements about the AHSC and the importance of ‘bench to bedside’, and those who gave honest, personal opinions about the AHSC and its challenges. One tactic I developed was to ask questions such as ‘do you enjoy your job’ or ‘tell me

about the biggest challenges in your role', which often elicited interesting informative responses about the nature of boundaries and boundary work.

I was also regularly asked my opinion about the topic area, which seemed natural when interviews progressed in conversational form. In this scenario, I would avoid giving my opinion but talk in general terms about AHSCs and my literature review findings to prompt further thoughts from the interviewee.

Given the multi-professional and multi-hierarchical nature of the groups under investigation, ensuring '*fair dealing'* (Mays & Pope, 2000, p. 51) was particularly important to avoid presenting the views of a certain group (such as clinician scientists) or individual as a universal truth. I sought to mitigate this risk by ensuring that I interviewed a wide range of individuals from across the AHSC, including managers, accountants and IT specialists as well as clinicians and clinician scientists. In addition, when it became clear that the role of clinician scientists was particularly important in mobilising knowledge across the research and clinical practice boundary it would have been easy just to pursue this line of enquiry so I made a conscious effort to include other perspectives.

These interviews revealed some of the hidden organisational aspects of the research/clinical practice boundary which would not have come to light if I had just concentrated on interviewing scientists and clinicians. For example, my interview with an IT manager informed much of my thinking on the role of technology (in particular the iPad) in boundary work in the Connect project and has become a key finding in this research.

Overall the semi structured interviews generated a rich body of data with which to address the research questions. The interviewees represented different professional groups, levels and viewpoints from across the AHSC. Within the tracer cases, the data collected reached saturation point when similar responses were coming from the interviews with participants and little new data was being generated. The interviews, whilst enabling the opportunity to generate in depth data, were steered and presented only what interviewees wanted to present. For a study of the day to day practice of knowledge mobilisation within the AHSC, I triangulated the interview data with observations of the cases in practice.

3.3.5 Observations

Observations enable the study of individuals and teams operating in an everyday context (Hammersley & Atkinson, 1995). In this study, conducting non participant observations helped me gain an understanding of boundary work within AHSCs by directly experiencing events (Brannan & Oultram, 2012). I had overt access (the status of myself as a researcher was known to participants) and did not participate in the interactions observed (Brannan & Oultram, 2012). I drew on ethnographic techniques to collect and document data on my observations.

This was most applicable at the tracer case level where I observed both informal and more formalised team interactions where work between the research and clinical practice boundary was played out. These interactions included general conversations between team members, team meetings, and meetings between team members and others within the AHSC organisations (see Table 2).

The two tracer cases required slightly different approaches to the identification of 'events' to observe. In the Connect project, which I followed over the course of one year, I was not based directly with the team, but rather came into the environment for specific events. I made this decision as the key areas of boundary interaction occurred during meetings the teams had with potential roll out sites of the Connect project, together with team and steering group meetings. Observations of the team at work would involve sitting watching them at work in an office environment (where many had different offices) and therefore would not be productive in terms of time taken and data gathered.

This method meant I relied heavily on the Connect project team as gatekeepers to potential observation events. If there was one they did not wish me to attend, they could simply not inform me of it. Thankfully the team were happy to be part of the research and were very accommodating to my requests. Building relationships with the team was critical to this access.

Once I was informed of a suitable meeting to observe, I contacted participants by email. I attached the study information sheet and informed them that I wished to observe the particular 'event', and asking them to contact me if any did not wish to consent (see Appendix B for a sample email). I did not have any meetings where I was requested not to attend - in fact many participants emailed to say that they were very happy to participate.

At the start of each meeting I briefly explained the study, asked for verbal consent of the participants and recorded this in my notes. Throughout the study all participants consented and I was able to observe every meeting I was informed of. If participants had not consented, I would have excluded their contribution from my notes or withdrawn from the meeting as appropriate.

Access to the Unite project 'events' was slightly different. In this case I was embedded with the team for approximately 2 days per week over a three month period. I had access to a desk within the research nurses office and from there observed the day to day activity of the department, together with the regular meetings (which occurred on a Monday and Friday) and any ad hoc meetings that arose at other times. I was also able to base myself there before and after interviews. This approach enabled me to access team members for informal conversations, more easily arrange interviews as this could be done face to face rather than via email, as well as being able to observe any ad hoc meetings which occurred. The intensity of these observations meant that a three month period was enough to approach data saturation (Silverman, 2004), as most regular meetings occurred weekly or fortnightly. Furthermore within this timeframe three meetings occurred where the AHSC and tracer case interacted so I was also able to observe this. The consent process was similar to that of the Connect project, and I also placed the study information sheet on notice boards around the department to raise awareness of the research.

The different approaches of the two tracer cases were largely driven by practical considerations of time and access, and I felt this was appropriate in ensuring that sufficient and relevant observation data was gathered in each. The 'dipping in and out' approach of the Connect Project enabled me to follow the project over the course of one year, to witness the development of the project and its boundary work, including interactions with a number of different roll out sites, which were instrumental to the process. The Unite department was more 'static' - a well-established department where it was more appropriate to take a three month 'snap shot' - it was unlikely that I would have gathered much new data had I observed for much longer than a three month period.

Table 2 Summary of observations

	Delta AHSC **Tracer case: Connect Project**	**Gamma AHSC** **Tracer case: Unite Department**
AHSC level	3 AHSC wide public seminars showcasing AHSC work (15 hrs) 1 AHSC wide CRC leaders meeting (1 hr) **Total: 4 meetings (16hrs)**	1 AHSC research meeting (2 hrs) 1 Department of Health and AHSC meeting (1 hr) 1 Inaugural lecture (1.25 hrs) **Total: 3 meetings (4.25 hrs)**
Tracer case	5 Connect project public seminars (16.5hrs) 17 Interactions between Connect project team and acute trust roll out teams (19.5 hrs) 3 Interactions between Connect project teams and other strategic partners (3 hrs) 7 Connect project team meetings (9.5 hrs) 4 Connect project oversight/governance meetings (5hrs) **Total: 36 meetings 53.5hrs**	7 Unstructured observations in department (i.e. not 'meeting' structure), including of medical team, nursing team, basic scientists, ad hoc discussions and 'corridor' interactions (19.5 hrs) 6 Research presentation meetings (5.75 hrs) 13 Clinical meetings (discussions of patient treatment plans, including those on clinical trials) (10 hrs) 16 Operational meetings (day to day running of service, including senior leadership meetings) (11 hrs) 1 National nursing policy meeting (3 hrs) **Total: 43 occasions/meetings 49.25hrs**
AHSC/Tracer case interface	1 Mental health Clinical Research Cluster Leads meeting (1 hr) 2 Strategy meetings between Connect project and AHSC Executive (2 hrs) **Total: 3 meetings 3 hrs**	2 Strategy meetings between Unite Department and AHSC office representatives (4.5 hrs) **Total: 2 meetings 4.5 hrs**
Total	**43 meetings 72.5 hrs**	**48 occasions/meetings 58 hrs**

Overt observations have an impact on the situations being observed (Brannan & Oultram, 2012), even when the researcher is considered 'neutral'. In this study, my presence in certain situations drew comment and potentially impacted on the behaviour of individuals, particularly when those being observed were aware of my NHS management background. For example, in the Unite case, comments such as 'I still think she is a management spy' were quite common when I observed informal conversations in the department. However, I don't think my presence particularly altered discussions or outcomes of meetings/interactions – those being observed quite quickly got used to my presence and appeared to continue in their normal patterns of behaviour.

3.3.6 Recording observations

I recorded the majority of observations in a field note book. At the start of each observation I recorded the date, time, meeting/event being observed, location and the attendees and how verbal consent for the observation was obtained. I then recorded key interactions between participants and anything else of note including the room layout, body language, other communication by participants. The initial fieldnotes were 'free text', and kept all in one place (the notebook).

Shortly after each period of observation/meeting, I typed up these notes by summarising the key observations in a structured template (see Appendix D). I developed this template iteratively and it was informed by my literature review and early analysis of semi structured interviews and documents. This summary process served two related purposes. Firstly, it condensed the large amounts of fieldwork data into manageable chunks that could be added to NVIVO. Secondly, it acted as early thematic analysis of observations data alongside that obtained from interviews and documents. This iteratively informed theory development, subsequent decisions regarding events to observe and key informants to interview, and as such began the data analysis process.

Table 3 Data collection summary

Collection method and primary purpose	Delta AHSC	Gamma AHSC	Total
Documents- To gain an understanding of the formal structures and processes of the AHSCs including overall strategic visions and organisational arrangements	12 documents (e.g. strategic vision documents, applications for AHSC designation)	10 documents (e.g. strategic vision documents, minutes of research meetings, applications for AHSC designation)	**22 documents**
Interviews - To gain an in depth perspective on boundary work within the AHSCs from individuals working at different levels and in different roles	**AHSC level: 12** (5 clinician scientists, 1 medical doctor, 6 non-clinical managers) **Tracer case** (Connect project): **13** (4 clinician scientists, 3 medical doctors, 1 non-clinical manager, 2 non clinical researchers, 3 psychologists)	**AHSC level: 6** (3 clinician scientists, 3 non-clinical managers) **Tracer case** (Unite department): **15** (3 clinician scientists, 1 basic scientist, 5 medical doctors, 1 non-clinical manager, 5 nurses)	**46 participants** (48 interviews in total – 2 participants from the Connect project tracer case were interviewed twice, once at the beginning and once at the end of data collection) (see Appendix F for detail)
Observations – To gain an understanding of individuals and teams operating in a day to day context within the AHSCs	**AHSC level:** 4 meetings (16 hrs) **Tracer case:** 36 meetings (53.5 hrs) Tracer case and AHSC level **interface** meetings: 3 (3 hrs)	**AHSC level:** 3 meetings (4.25 hrs) **Tracer case:** 42 occasions/meetings (49.25 hrs) Tracer case and AHSC level **interface** meetings: 2 (4.5 hrs)	**91 meetings/ general observations** (approx. 130 hrs) (see Appendix F for detail)

3.4 Data analysis

A major challenge of qualitative research is how to usefully analyse the large volume of often unwieldy data into a contribution to the literature (Buchanan, 2012; Fitzgerald & Dopson, 2009). A critical realist methodology calls for a systematic approach, clear justifications and reflexivity when analysing data to enable a useful conception of the 'truth' as represented by the researcher (Mays & Pope, 2000).

As noted above, a critical realist perspective is associated with a retroductive approach to data analysis. This cyclical approach, moving between the data and theory, is set against the linear inductive and deductive approaches (Blaikie, 2007). However, I found that in practice I used all three elements depending on the stage of the analytical process (Fulop et al., 2001). Initially the process was largely *deductive* as I entered the field 'theory-laden' with ideas about boundaries and knowledge following my initial literature review, as well as my assumptions and knowledge about the organisations I had previously worked for. However, once data collection had started, other concepts *inductively* emerged from observations of the empirical field. These findings further empirically informed and refined my understanding of boundary theory (hence *retroductivism*).

Practically, the first step of analysis is to 'simplify the complexity of reality into some more manageable classification system' (Patton, 1990, p. 382). In this study, as my research questions called for a broad perspective of boundary work and knowledge mobilisation within AHSCs at an organisational and service level, the primary method of analysis was thematic content analysis (Green & Thorogood, 2009). This is a common approach in qualitative research and enables categorisation of the data into recurrent and common themes. This method was used across the whole data set (summarised observation notes, interview transcripts and key documents) using NVIVO software. The themes were informed by the a priori theoretical frameworks of boundary theory and knowledge mobilisation but these were kept deliberately broad.

In order to capture any interesting phenomena beyond my broad theoretical framework, I used elements of a grounded theory approach to analyse the first ten interviews and observation summary notes, by 'open coding' the data. Open coding involves breaking down, analysing, comparing and categorising the data. These codes, together with the broad boundary codes, were then refined, grouped and re-tested on the data. I used memos during the process to capture my thoughts on the meaning of each code, which helped with refining and grouping them.

The case study design required comparative analysis at several different levels between the two AHSC cases (meso level), between the tracer cases (micro level) and between the meso and micro levels. It became apparent early on in the data collection and analysis phase that these different levels of analysis could become quite complicated and overwhelming due to the volume of rich data I was collecting.

I therefore tried to simplify this process by undertaking a cross case analysis at the organisational level (this is presented in Chapter 4) and then at the tracer case level (Chapters 5, 6 and 7) and the interactions between the two levels. The total body of data informed the different analyses (i.e. if a finding from the tracer case informed the organisational level of analysis this was included and vice versa).

Thematic content analysis proved to be a useful way of ordering and categorising the large volume of qualitative data and identifying the properties and mechanisms of boundaries within the AHSC settings, which was the primary purpose of the thesis. However, a key drawback of this process is that in recording themes some of the rich, thick description of interviewees' narratives may be missed (Green & Thorogood, 2009). These narratives tend to weave together a number of interconnecting themes, and by attempting to break the text down into codes, the coherent, interesting stories of respondents can be lost. At the same time, long chunks of data (sometimes whole transcripts) could be categorised under one code, which makes the data difficult to handle.

This was compounded by my realisation, particularly during interviews (and also informed through the literature review), that there was some fascinating and informative narratives from those operating across the research/clinical practice boundary, which could contribute to answering the research questions of this thesis but also would prove to inform a future research agenda. However, the sheer volume of data made it impractical (and unnecessary, given the research questions) to undertake detailed narrative analysis of all interviews and observations. I therefore selected a group of participants (clinician scientists) and undertook more detailed narrative analysis with a selection of these interview transcripts, concentrating on elements which directly related to the research questions of this study. This contributed to addressing a key gap identified in the literature (Wilson-Kovacs & Hauskeller, 2012) and also indicated a future research agenda on this group of individuals.

Qualitative research requires constant reflexivity by the researcher during the data collection and analysis phases. In this study the whole process of analysis was iterative and undertaken in parallel with data collection. Undertaking observations and summarising the notes in memos in particular provided regular analytical opportunities to develop ideas. Through this process, I was able to identify boundaries within the AHSCs and two tracer cases, draw out their properties and

mechanisms of work across them, and compare and contrast across the tracer cases, and upwards to the organisational level within the AHSCs. I began building the broad theoretical framework of this thesis by outlining the epistemic, professional and organisational boundaries present within the AHSCs, and examples of how and where this occurred.

For example, I identified the iPad as a boundary object in the Connect project following early observations. I then tested this concept in subsequent observations and interviews. I did not specifically ask team members about it so as not to bias their responses, but I asked general questions about the IT process as they were relevant to organisational boundary work. This observation also encouraged me to pursue an interview with a member of the IT department, which proved to be very enlightening but which I may not have undertaken otherwise.

3.4.1 Analysing and presenting findings from different data collection methods

The findings chapters draw on data collected through all three sources: interviews, observations and documents, which were analysed together thematically. The meso and micro levels of analysis required slightly different approaches due to the data sources.

At the meso level, the analysis (presented in Chapter 4) was mainly based on interviews and documentary analysis. Identifying and accessing senior interactions to observe was more challenging at this level as I was not 'embedded' in the same way as within the tracer cases. Further, the nature of the senior meetings I did observe was more staged, with participants representing a particular perspective. This was very interesting to observe and reinforced in particular my findings on the persistent nature of organisational boundaries. In interviews, particularly in the later interviews when I had gained more experience in the process, it seemed that participants were able to give a more authentic account of their views.

At the micro (tracer case) level, both observations and interviews (and some documents) informed the findings (presented in Chapters 5, 6 and 7). Observations in particular were important to build a rich picture of the cases and to understand their context (Yin, 2009), as well as providing opportunities to observe boundary maintenance and boundary work in practice. Depending on the events observed (see Table 2), observations provided data which was both contextual (provided a

background understanding of the project) and directly informed the analysis. For example, within the Connect project, I observed several team meetings, which provided rich contextual data on the progress of the project. However, the main observation data which informed analysis of the mechanisms of boundary work (such as the iPad) was that obtained when observing interactions between the Connect project team and acute trust teams where they were rolling out the project, as it was in these scenarios where work between different epistemic, professional and organisational groups was enacted.

Therefore data obtained from observations (see Table 2) underpinned much of the rich description and analysis of my account presented in the tracer case findings, and quotations from interviews further illustrate when appropriate and relevant.

Combining observation and interview data can sometimes be challenging as the two data collection methods can provide different accounts (Silverman, 1987). In this study however, at the tracer case level, my accounts from fieldwork observations and participant accounts from interviews were generally consistent. Participant behaviour I observed in meetings was similar to their accounts in interviews. For example, many interactions between participants I witnessed in the Unite department related to developing 'workarounds' to organisational issues, and this was also reflected in the interviews.

3.4.2 Validation

Validating data analysis is an important facet of a critical realist approach as it enables the researcher to refine findings to enable an accurate representation of the 'truth' of a phenomenon (Mays & Pope, 2000). The following sections describe the various methods used at different stages of the research project to ensure its findings are accurate from different standpoints, including the research participants, peer readers of the account and myself as the researcher.

3.4.2.1 Research Participants

Undertaking respondent validation, or member checking, which involved taking data and interpretations back to the research participants for review and comment (Bloor, 1978; Mays & Pope, 2000), was a critical part of the validation process. It was applied at three main stages in the study. Firstly, all participants were offered, verbally and in writing, the opportunity to comment on their interview transcripts. Only one participant took up this offer.

Secondly, I presented my initial findings to both tracer case teams after I had finished data collection and during an early stage of analysis. At these presentations I introduced the concept of boundaries and boundary work, particularly looking at the framing of epistemic, professional and organisational boundaries. These sessions were very useful in gaining feedback from the core participants in the study, who provided further interesting reflections on the conceptualisation of the research and clinical practice boundary, which fed into the analysis process while writing up the findings of this study.

Thirdly, I sent a draft empirical paper (based on the Connect project) to members of the project team for feedback. Research participants were asked if the account was realistic and accurate and if the interpretation of the data made sense. Two participants engaged in this process and feedback was incorporated into later versions of this manuscript, which was presented at the Organisational Behaviour in Healthcare Conference in Copenhagen, April 2014.

3.4.2.2 Readers of the research

Three main types of validation were used from the perspective of readers of the research. Firstly, *peer debriefing* is the review of the data and research process by someone familiar with it (Creswell & Miller, 2000). Throughout this study, my supervisors have provided support, asked difficult questions and challenged my assumptions. My supervisory sessions were extremely useful in helping me reflect on and shape the research process, particularly at the analysis phase. In addition, the upgrade process from MPhil to PhD provided a useful checking point - at which my ambitious data collection ideas were scaled down (from four tracer cases to two) and ensured the process was manageable and the initial theoretical framings made sense. Furthermore, undertaking most work in an office environment alongside colleagues experienced in qualitative research enabled me to informally discuss findings and approaches and these conversations helped shape and develop my analysis.

Secondly, *external audit* enabled feedback from reviewers who were (unlike peer debriefers) new to the researcher and the study and therefore provided an independent assessment (Creswell, 2003). In addition to the peer reviewed paper published in Health Policy (French et al., 2014), a full paper following the trajectory of the iPad in the Connect project as a boundary object was reviewed by two anonymous referees and presented at the 9th Organisational Behaviour in

Healthcare Conference held in Copenhagen in April 2014. In addition, I gave presentations of my early findings on the role of clinician scientists as boundary spanners to the Health Services Research Network symposium in June 2014 and the CLAHRC Northwest London Research Partners meeting in October 2014 and received helpful questions and feedback at both events. I also presented early findings at a seminar at the University of Karolinska, an Academic Medical Center in Stockholm which I visited as part of my Fellowship in April 2013. I have reflected on all external feedback and incorporated it as appropriate when writing up this thesis.

Thirdly, Mays and Pope (2000) advocate '*clear exposition of methods of data collection and analysis*'(p. 51) in the research process which I have attempted to do in this chapter and further reflect on in the final discussion chapter. The thesis format enables space for quite a 'rich description' of the findings and the following findings chapters present the data drawn from three different sources and having undergone several rounds of analysis.

3.4.2.3 Self as researcher

Qualitative research does not search for an objective 'truth', acknowledging that researchers bring values, subjective impressions and previous experiences which may bias the findings. It is an accepted part of the research process that researchers are 'reflexive' about these potential biases and acknowledge and critically assess their practice throughout the research process (Green & Thorogood, 2009).

Whilst accepting that some of these beliefs, assumptions and biases are likely to remain in the subconscious (Seale, 1999), I attempted to recognise potential areas of bias (such as those stemming from my career history as a manager within the case AHSCs) and 'bracket' them (Ahern, 1999) to acknowledge their potential effects on the research. This reflexive activity took place throughout the research process, as:

> *"A researcher's background and position will affect what they choose to investigate, the angle of investigation, the methods judged most adequate for this purpose, the findings considered most appropriate, and the framing and communication of conclusions" (Malterud, 2001, pp. 483-484)*

Furthermore, researchers normally enter the field as an outsider trying to work out what is puzzling, new and strange, and make this familiar. This process is 'reversed' for the 'researcher-employee' (Tietze, 2012). However the

insider/outsider dichotomy has been challenged and reframed as a continuum with multiple dimensions which researchers move back and forth along depending on time, location, participants and topic (Mercer, 2007). Further, in organisational studies, 'insider' researchers are acknowledged as having numerous different roles and identities - they are employees, bosses, colleagues, friends as well as researchers (Adler & Adler, 1987) and may also have ongoing relationships before, during and after the research.

This can cause biases. There is a fine balance between what insiders gain in terms of an extensive knowledge of the culture and actors involved, and what they lose with an inability to make the familiar strange (Mercer, 2007). 'Bracketing' this bias was challenging but helped by taking a critical realist approach to the study. This approach ensured that, whilst accepting that my 'biased' position was still valid in producing one interpretation of the truth, following it also advocated constant validation which helped me in part disentangle my bias from 'truth'.

I documented my thoughts on this in an informal research diary (Nadin & Cassell, 2006). Writing and rereading this diary has been a very useful way of ensuring that biases, judgements and decisions were understood and acknowledged and could be discussed with others. The next section describes the outcomes of this reflexive process and how it has influenced the study.

3.5 Reflections on my role as a researcher

My background as an NHS manager working in two designated AHSC partnerships has had a profound influence throughout this research process. I tried to use the benefits of this status (gaining access and a pre-existing understanding of the organisational context) to best effect, whilst mitigating against the drawbacks with robust validation throughout the research (in line with a realist approach). This is illustrated in the following three examples.

Firstly, practitioners have the benefit of being consistently 'in the field' and regular (if time limited) opportunities to consider what research questions may be appropriate (Tietze, 2012). The initial idea for research on the realities of how to integrate an AHSC developed while I was employed by a partnership Trust at Delta AHSC. In addition to my day job as a service manager, I was asked by a Director of the Trust to support one of the work streams established to set up the AHSC middle management groupings (CRCs) in anticipation of the AHSC accreditation process. I

took minutes at the fortnightly meetings of this work stream, comprising multi professional (though clinician scientist dominated) executives drawn from across the four partnership organisations. Listening to (and trying to minute) conversations at these meetings, I constantly reflected on what a complex and difficult process it was trying to draw together four linked but different organisations around one shared mission. I then changed jobs and was employed by the trust in Gamma AHSC, and was struck by the differences in organisational structures, culture and corporate framing of the concept of the AHSC between the two cases. I had regular conversations with colleagues at both organisations about potential research opportunities on the topic in advance of applying for the NIHR fellowship which funded the study.

Secondly, as noted above, 'insider' researchers have different (sometimes competing) roles and identities (Adler & Adler, 1987). I occasionally struggled with a tension between being a researcher and being a manager. As a manager, I was acutely aware of how complex and challenging making changes in the NHS and mobilising knowledge between research and clinical practice often is. Therefore, when I began collecting data on the Connect project, which effectively bridged boundaries in a novel way and identified ways around issues such as IT in the NHS, it was hard not to become too excited by the project and 'go native'. I made a conscious effort not to romanticise events in this case. Linked to this, as I gradually became more aware of the project it was very challenging not to participate in meetings. I developed very good relationships with the research participants and found it challenging not to 'help' in certain situations, where for example I knew a potential way round a particular problem the team were grappling with. The process of presenting my findings and discussing them with the team at the end of the data collection process helped with this potential conflict of interest.

Thirdly, this 'insider or outsider' status (Merton, 1972) was visible and occasionally manifested in situations where my previous background was problematic to my status as a non-participant observer. I mitigated this risk by selecting tracer cases that were unfamiliar to me, but could not completely avoid it. For example, in one observation the Connect team met with a former colleague of mine. I informed the Connect team and the former colleague about the situation and all agreed to me observing the meeting. On the day, I travelled to the meeting with the Connect team and, as I knew where the meeting room was, led the way:

I opened the door to the meeting room, with Sue and Joan behind me. Mark, a former consultant colleague, looked up, saw me, stood up and with his arms outstretched, cried "Catherine!.. Great to see you!" And embraced me with a big hug.. [observation 32:28/11/12]

The meeting then progressed, but my status as a non-participant observer was challenged. Thankfully however this was a rare situation across the whole data collection process.

Overall I felt my background was of benefit to the study, but that the reflexive process was vital to ensure validation of the findings.

3.6 Conclusion

This chapter has outlined the research process for this study and highlighted some of the key decisions and choices made along the way. It describes the critical realist approach underpinning this study and how this has influenced the case study design, selection of cases and quality control of what is a fascinating if potentially overwhelming and complex topic. I have outlined how the data were collected and analysed and how I attempted to use the benefits of my career background (such as gaining access to the cases) whilst mitigating the risks associated with my prior assumptions and biases. My approach however has had (practical and theoretical) limitations, particularly in relation to case selection. I return to this in the final discussion chapter (Chapter 8), as it is more logical to discuss them following the presentation of the empirical cases.

The following four chapters present my study findings. Chapter 4 details the organisational boundaries and boundary work in the AHSCs. Chapter 5 introduces the two tracer cases. Chapter 6 details the properties of boundaries within the tracer cases and wider AHSCs, and Chapter 7 the mechanisms of boundary work across them.

Chapter 4 Findings: AHSCs as an emerging organisational form

"It's about, on the one hand, the concern for the next MRSA case on the ward and on the other hand the concern for the next article in Science."

[Delta AHSC, Non-Clinical Manager, Interview 5]

The main purpose of this chapter is to consider the first sub research question:

How does organisational form impact on boundaries and boundary work within AHSC partnerships?

It will also provide some wider context to the other sub research questions:

What are the properties of the research/clinical practice boundary and how do they manifest within AHSCs?

And

What boundary mechanisms facilitate knowledge mobilisation within AHSCs and how are they used?

As outlined in Chapter 2, the role of organisational form in shaping knowledge mobilisation processes in healthcare has been under-researched (Crilly et al., 2013). AHSCs are an emergent organisational form which has received little attention from the social science literature (French et al., 2014). The narrative AHSC literature (presented in Chapter 1) has a focus on structural and organisational forms (Culbertson et al., 1996; Weiner et al., 2001), with organisations moving along a continuum between a tight partnership (hierarchical model) and a more confederated model (looser network) over time. The 'tight partnership' represents a hierarchical model where all the collective activities of the partnership are managed by a single Chief Executive Officer and a common overarching board - akin to the

'owner' and 'subsidiary' models outlined by Weiner et al. (2001). The 'confederated model' is more loosely affiliated in which the academic activities and clinical work are each managed by different leaders and governed by different boards - akin to the 'community leader' and 'community partner' models outlined by Weiner et al. (2001). In this model, organisations remain sovereign but share strategic planning (Barrett, 2008).

Like many of the case studies documented in the narrative literature, the two AHSC cases presented here moved (or attempted to move) along the continuum. Gamma AHSC went from a hierarchical model (with a single Chief Executive) to a more networked approach, and Delta AHSC was a looser confederation which considered moving to a more hierarchical form (in the form of a merger) but in the end remained as a networked structure.

This chapter will introduce the emergent AHSC cases and present findings on how their developing organisational forms, manifest at the meso level (board and middle management) impacted on organisational boundaries and boundary work. It will identify the key characteristics of organisational boundaries within each AHSC case and examine how the partnerships established governance structures (boundary mechanisms) designed to encourage knowledge mobilisation across them. The findings in this chapter are based on analysis of strategic documents, some observations of strategic and management meetings, and interviews with senior executives, clinician scientists and middle managers in the AHSCs.

The structure of the chapter is as follows. Firstly, it presents an overview of each AHSC, its constituent members, overall aims and a brief history of the development of each partnership. Secondly, it outlines the key organisational boundaries within each AHSC, how these are conceptualised by AHSC staff and how they manifest themselves in organisational work. Thirdly, it describes the emerging organisational forms of each AHSC through their governance arrangements and how these have changed over time. Fourthly it considers the middle management level arrangements established in each AHSC (primarily to drive the delivery of the tripartite mission) and considers how these dimensions of the organisational forms impacted on organisational boundary spanning. It concludes by drawing the key themes together and establishing the wider organisational contexts for the tracer cases in the following chapters.

4.1 The early history of the AHSC partnerships

4.1.1 Delta AHSC

Delta AHSC is a large NHS – university partnership based in an urban environment, serving a diverse population. It comprises four partners: the university, two large acute NHS Foundation Trusts (Alpha Trust and Beta Trust) and a mental health NHS Foundation Trust (Kappa Trust). It was first formally designated as an AHSC by the English Department of Health in March 2009. Although AHSC designation has led to new structures being established, there were pre-existing links between the organisations. The four partners have a lengthy history, with long standing relationships existing between the trusts and university to enable the delivery of medical education and clinical research.

As well as having a research intensive medical school with one of the highest undergraduate intakes in the UK, the university also has research strengths in the basic sciences, humanities, social sciences and law. The School of Psychiatry is one of the largest in Europe with an international reputation in teaching and research. It has close links and a statement of common purpose with the mental health trust (Kappa Trust). Research and clinical practice in mental health is a key feature of Delta AHSC, described as pursuing 'whole person' health by integrating mental and physical healthcare.

The two acute trusts both have close links with the university through the medical school. The clinical settings provide a practical teaching environment for students within the school, and facilitate the recruitment of patients to clinical trials conducted through the trusts and university. Many medical staff employed through either the Trusts or university have honorary contracts with the other organisation.

Alpha Trust is a large, financially stable well established organisation comprising two main hospital sites and a variety of community settings. Beta Trust comprises one main hospital site located approximately three miles away from Alpha Trust, together with other community sites. Reflecting their joint history, the trusts and university are co-located on a variety of different campuses within a small geographical area. As a result, within each campus, there is considerable overlap regarding use of space and estate, with a complex arrangement of some buildings owned by the trusts and leased to the university, and vice versa. The main hospital

site of Kappa Trust, and the School of Psychiatry, are co-located and 'across the road' from the main site of Beta Trust.

The four organisations that make up Delta AHSC remain sovereign and their governance frameworks did not change on AHSC designation. At the time of data collection, the AHSC structure was led through a partnership board made up of the Chairs and Chief Executives of each of the three Foundation Trusts, together with the Principal and Head of Administration of the University, and the Chair and Executive Director of the AHSC. This board was supported by an executive team consisting of Leads for clinical strategy, education, research and performance delivery. The AHSC office also housed leads for communications and HR and project managers for AHSC related projects (see organisational chart at Appendix F).

The network approach initially pursued by Delta AHSC is reflected in the main organisational structures it established to promote knowledge mobilisation between research and clinical practice. These were known as Clinical Research Clusters (CRCs) and brought together similar clinical specialties across the trusts with corresponding research teams within the university, though without merging corresponding budgets or line management responsibilities. The AHSC Executive viewed CRCs as key delivery mechanisms for the integration of research, education and clinical care, and an attempt to drive bottom up change within the partnership. The CRCs as boundary spanning mechanisms had varying degrees of success in integrating organisational elements of the research/clinical practice boundary, which I will return to later in this chapter.

4.1.2 Gamma AHSC

Like Delta AHSC, Gamma AHSC is a large NHS-university partnership based in an urban environment serving a diverse population. It formed as an AHSC (prior to its official designation by the Department of Health in March 2009) following the merger of two acute trusts, based across three main hospital sites, to form one large NHS Trust (Gamma Trust) which 'integrated with' the medical school of the university. Again, there were long standing pre-existing links between the trusts and medical school in Gamma AHSC.

The university is research intensive and consistently achieves very high rankings in university league tables. As well as the medical school, it has particular strengths in

basic sciences and engineering. At the time of data collection the AHSC was characterised as the partnership between the medical school and the merged NHS trust.

The merger of the two NHS trusts formed one of the largest NHS trusts in England. There are five distinct hospital sites, with three main acute sites and two smaller specialist sites. The three acute sites are all three to four miles apart. The trust covers the full range of acute specialties with some areas of highly specialist care. The NHS Trust does not have foundation status (although this has been pursued since its inception) and as such has less financial freedom and is more closely monitored through the NHS regulatory framework than the Trusts at Delta AHSC. In a similar fashion to Delta AHSC, the university has campuses co-located with each of the main hospital sites, and in turn overlapping space and estates.

The university also has relationships with several other NHS organisations which do not form part of the AHSC. These include partnerships with highly specialist organisations which are research leaders in their fields and have formal research links with certain specialties within the medical school.

The hierarchical nature of the initial AHSC organisational form were emphasised by the governance arrangements (a 'line management' model), where the leadership roles for the NHS trust and the medical school were brought together into one, Chief Executive, post. These arrangements changed with the data collection period of this study. The Chief Executive left the AHSC and the line management model evolved into a partnership model. I will expand on this later in the chapter.

The new meso level structures within the organisation, Clinical Programme Clusters (CPCs), although initially conceptualised as structures to facilitate integration between academia and clinical practice, primarily focussed on the delivery of NHS operations and targets. Although there was some broad mapping of CPCs onto the departments within the medical school, for some areas the fit proved difficult and linking arrangements at the meso level were not formalised. In addition, since the period of data collection, the seven CPCs have been replaced with four divisions which retain a primary focus around NHS matters.

Table 4 AHSC case features

	Delta AHSC	Gamma AHSC
Constituent Organisations	Delta University 3 NHS Foundation Trusts: Alpha Trust (acute), Beta Trust (acute), Kappa Trust (mental health)	Gamma University 1 (newly merged) NHS Trust: Gamma Trust (acute)
Governance structure	Partnership Board AHSC Executive	Line management model, then restructured to partnership board
Meso level structures	Clinical Research Clusters (CRCs)	Clinical Programme Clusters (CPCs)
AHSC type (Ovseiko et al., 2010)	Joint partnership board model	Joint leadership & management model to joint partnership board model
Organisational form (Ferlie et al., 2012a)	Network	Hierarchy to network

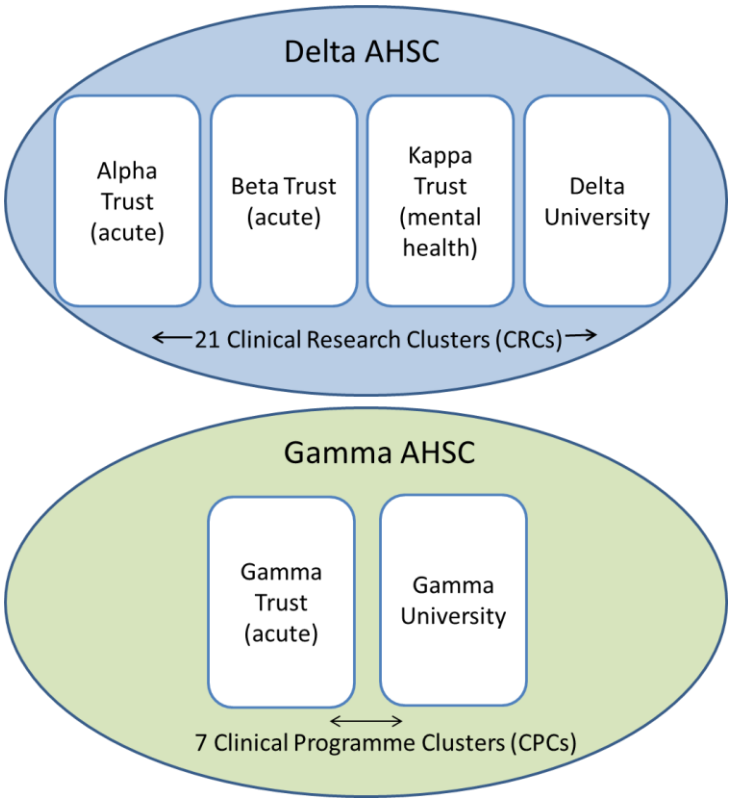


Figure 3 AHSC constituent organisations

This very brief overview of the case AHSCs provides some context to the rest of this chapter which firstly analyses the organisational boundaries manifest within the partnerships. Secondly it analyses the structural boundary spanning mechanisms established by each partnership (at board level, and through the CRCs in Delta AHSC and the CPCs in Gamma AHSC) to encourage knowledge mobilisation.

4.2 Key properties of AHSC organisational boundaries

The organisational boundaries within the AHSC partnerships were many and varied. They can be characterised as external boundaries between the constituent organisations in the AHSC partnerships – stable, unambiguous and formal entities (Paulsen & Hernes, 2003) based upon the functional requirements of staff, resources and estates to be owned or employed by a single organisation. An alternative framing is as internal boundaries within the partnership, seeing the partnership as a whole entity rather than as individual sovereign organisations. Internal boundaries are often characterised as problematic, something which impedes knowledge flow and therefore something which needs to be removed (Tushman & Scanlan, 1981). Essentially this is a distinction based on the organisational boundary literature and both interpretations may be helpful when considering boundaries and boundary work in AHSC partnerships.

This section is an introduction to these overarching organisational boundaries, manifest as Hernes' (2004) 'physical' boundaries which relate to 'formal rules and physical structures regulating human action and interaction in the organisation', and 'social' boundaries which are the 'identity and social bonding tying the group or organisation together' (p. 13). I draw out the properties of these boundaries more fully in Chapter 6 using further data from the tracer cases to inform the analysis.

I explore two main boundaries. Firstly, I examine those between the university and trusts in both cases. Secondly, I outline the properties of the boundaries between the constituent organisations which remained sovereign in Delta AHSC.

4.2.1 Properties of organisational boundaries between universities and trusts

The fact that most of the activities (or practices) of research and clinical practice are generally undertaken in different organisations is one of the most visible manifestations of the boundary between the two domains, although it is under analysed (Oborn et al., 2013b). As highlighted in the introductory chapter, despite

the historical linkages between medical schools and teaching hospitals, and clinical research being undertaken in NHS trusts, at the organisational level they operate in broadly separate environments. They have different objectives, funding streams, reporting lines and regulatory frameworks, and competing institutional logics (Lander, 2016) reflecting the 'mission tensions'. Analysis of this organisational boundary was a universal theme in interviews across both cases and upheld findings from the AHSC literature of constant tensions between the missions of AHSCs:

> *"so these are organisations that get their funding from different government departments so you cannot put the funds together, you can align them, but you can't mix them.*
>
> *So that's the first thing, they have different accounting. And secondly they had different goals, and they have different masters and they have different levels of interference from central government - so universities are very much at arm's length from central government and hospitals are not..*
>
> *So ... you're mixing in a sense oil and water and there are considerable tensions in that process at all sorts of levels." [Gamma AHSC Executive, Interview 32]*

The organisational boundary was highly political (pragmatic in Carlile's (2004) framing) as negotiations across it reflected power dynamics and vested interests (as I explain below). This tension was manifest at all levels within the organisations but particularly at board and middle management levels.

The organisational boundaries had numerous manifestations, for example, through geography, finance and human resources management. Geographically, the situation was complex. In some cases, the universities and NHS trusts were in separate buildings, with participants using phrases such as 'over the road' to describe activity taking place in the 'other' domain. However, over the course of the data collection period I observed that the nature of the campuses within both case AHSCs meant that there was much overlap between organisations in terms of space use. There were numerous examples throughout the partnerships of 'university' or 'trust' space being co-located. For example, in the Unite tracer case (which I discuss in further detail in the following chapters), the department was located in a building owned by a trust, with some rooms rented to the university for research activity and office space. Participants reflected that this split lead to complex contractual arrangements which were challenging to unpick.

Financially, the constituent organisations had different funding streams. As outlined in Chapter 1, these are determined by the wider policy landscape and the fact that universities and NHS trusts operate in different contexts, with different financial freedoms (Ovseiko et al., 2010). The case AHSC partnerships presented here were no exception with both universities funded through a combination of government grants and private research income. The NHS trusts were primarily funded through public money. The merger which formed Gamma trust meant that the financial situation at this partnership was more precarious. This situation had some influence on the changing organisational form of the partnership which I shall outline further below.

In human resource management terms, the universities and NHS trusts had different functional and cultural features. Participants perceived that the university was a much more unforgiving environment, where if a member of staff did not reach specified targets relating to research grants, publications or teaching load, then they were dismissed. This was not the case in the NHS settings, where jobs were perceived as more secure. Further, beyond the more functional issues such as staff contracts (I will consider these in more detail in the next chapter) the differences on either side of the (pragmatic) boundary reflected the mission tensions theme highlighted in the AHSC literature:

> *"at an organisational level, there clearly are still cultural barriers, and it's about on the one hand the concern for the next MRSA case on the ward and on the other hand the concern for the next article in Science" [Delta AHSC Executive, Interview 5]*

4.2.2 Properties of organisational boundaries between NHS trusts

The relationship between the university and NHS partners was not the only organisational boundary to impact on knowledge mobilisation within the AHSC partnerships. Participants implied that the far more salient and less permeable boundary was that between the NHS trusts at Delta AHSC. These trusts, unlike the merged structure at Gamma AHSC, remained sovereign following the designation of AHSC status. This followed a long history of competition between the two acute trusts, which, again, was a common theme throughout the interviews:

> *"The most difficult parts of it arise from .. managing what is currently a partnership between organisations that are essentially competing." [Delta AHSC Executive, Interview 45]"*

The merged structure of Gamma Trust had been driven by the development of the self-designated Gamma AHSC, whereas the Delta AHSC was characterised by bringing together three successful, financially stable NHS organisations with the university partner. This competitive relationship was reflected on by several participants and war analogies were common:

> *".. they invented Trusts and then they invented Foundation Trusts and life became extremely competitive, it's obviously wrong and so you had these terrible arms races going on, every time we appointed somebody, say, a new bone marrow person, then Alpha Trust would appoint a bone marrow person. Every time you appoint a cardiac surgeon, somebody else appoints a cardiac surgeon. It drives you absolutely bloody crackers." [Delta AHSC Executive, Interview 9]*

Or from the perspective of the mental health trust:

> *"it's a bit like the last scene in Jurassic Park, you know the Pterodactyl and the Tyrannosaurus Rex will fight it out and we'll just hide behind the pot plants.." [Delta CRC Leader, Clinician Scientist, Interview 4]*

This competitive environment was also reflected in participants' perceptions of the social boundaries (Hernes, 2004) between the two acute Trusts:

> *"I .. can see both cultures, Beta Trust, 'We're street fighters, we're this and we're that, but we're successful and our peaks are big', whereas Alpha Trust is much more, 'we've been here for a thousand years and we're very civilised and we ain't going anywhere'. They've got problems … each Trust has got problems of its own." [Delta AHSC Executive, Interview 1]*

The enduring nature of this organisational boundary ensured that boundary spanning mechanisms across it were very difficult to design and enact, as I shall outline in the next section of this chapter.

Relationships within the AHSC partnerships appeared to be influenced by physical proximity. This was particularly evident in the case of the boundary between Kappa trust and the two acute trusts. Participants viewed Kappa Trust as having closer ties to Beta Trust than Alpha Trust, due to the co-location of the campuses. The two trusts were divided by a main road – and this physical boundary became a metaphor for the organisational (and potentially epistemic and professional) boundaries between the two trusts. The main links between the trusts were through staff who worked in both organisations. Typically these were mental health professionals, including liaison psychiatrists and clinical psychologists. These individuals were employed through one NHS organisation (or through the school of psychiatry) and

usually held an honorary contract with the other organisation as in the following example:

> *"I'm a head of department .. so I'm an academic ..standard normal academic but even that's slightly different because I'm also with another academic department...so I'm already .. across an academic boundary ..then I'm the Vice Dean which also covers Gamma Trust for education, so I've got responsibility for post graduate, under graduate training which is .. another boundary ...and one of the leaders of the CRC.. And I'm vaguely a consultant as well at Beta Trust .. and I used to run a, clinical service but actually I don't run it now, I'm just a consultant on the service" [Delta AHSC, Clinician Scientist, Interview 4]*

The divisive nature of the boundaries between competing sovereign NHS trusts in Delta AHSC contrasted with that of Gamma AHSC, which had undergone a full merger. Despite the merger not resulting in the economies of scale which were envisaged, and geographical boundaries creating operational difficulties for staff (such as travelling between sites), the creation of the AHSC and the 'vague' 'bench to bedside' heuristic it sought to embody facilitated co-operation between diverse groups. In this way it appeared to act as a boundary concept (Löwy, 1992) and helped with the 'hearts and minds' element of the merger:

> *"I mean overall in Gamma it's been quite good, considering the amount of blood there could have been on the carpet, there's been relatively little.*
>
> *CF: Why do you think that is?*
>
> *People have wanted to do it, people with vision, you know. If you're putting together the three different [hospitals].. under one sort of umbrella with the college was a fantastic idea and then branding it as AHSC that's actually the vehicle that has been very successful." [Gamma AHSC Executive, Interview 16]*

In summary, the organisational boundaries within the AHSCs were varied. The boundary between the university and NHS trusts was common to both AHSC cases and salient due to the differences in goals, objectives and regulatory environments in which they operate. These differing purposes also reflect social boundaries between the organisations in the form of contrasting cultures, which proved resistant to certain types of boundary spanning mechanisms. The properties concur with both the wider AHSC normative literature reflecting tensions between the AHSC research and clinical missions (Blumenthal, 2005) and the limited literature on institutional logics (Choi & Brommels, 2009; Lander, 2016).

The boundaries between the different NHS trusts in Delta AHSC, particularly the acute trusts, were also salient. They were enduring particularly due to the competitive environment in which the trusts operated. These boundaries, although not overtly represented on the linear knowledge mobilisation pathway (i.e. not necessarily requiring the mobilisation of research based knowledge between the two organisations), remain important as they were a key feature of Delta AHSC and had an impact on the design of the partnerships' organisational form and boundary work at all levels.

In both cases this organisational boundary had pragmatic characteristics (Carlile, 2004). The boundary had semantic and syntactic elements, but the distinction between the organisations was driven by political imperatives and the actors had different interests at stake which need to be negotiated for boundary work to take place.

4.3 AHSC organisational boundary spanning mechanisms

The differing organisational forms that each partnership pursued can be characterised as attempts at boundary work to ensure a supportive organisational context to facilitate knowledge mobilisation between research and clinical practice at the micro level. Both partnerships developed different structural boundary spanning mechanisms at the organisational and meso level. This section will examine these contrasting mechanisms.

4.3.1 AHSC board level structures as boundary spanning mechanisms

4.3.1.1 Delta AHSC – a network model

Delta AHSC pursued a 'network' model where the four constituent organisations remained sovereign. The AHSC was 'enacted' through a governance framework comprising a partnership board, Executive and executive support team which has remained in place (with some adjustments) since the formal designation of the partnership in 2009. This structure reflected the networked arrangements and reinforced the sovereign nature of each organisation.

However, many of the early discussions (visible in board papers and in public meetings) focussed on whether there should be formal consideration of closer integration, cumulating potentially in a merger process between the three foundation trusts. The idea was to create a new form of academic health organisation, with a

devolved leadership model. These discussions were formalised through the commissioning of an initial scoping exercise, followed by an outline business case by the partners. Consultations were held on the potential for merger, in the form of 'town hall' style meetings [e.g. observation 21:13/09/12] with open support given from the senior leadership to create of this 'new form' of organisation. The model proposed would have represented a more hierarchical organisational form (Ferlie et al., 2012a), further along the AHSC continuum to full integration, with a more integrated governance structure (Barrett, 2008).

However, this process gradually stalled. Documents produced by the partnership reflected that such a large organisation may in fact breach competition law as patients in the local area would not have a choice of providers for many aspects of care. In addition, the enduring nature of the competitive relationship between Alpha and Beta trusts (and the organisational boundary between them) had an impact on this decision, particularly following Beta Trust's decision to acquire another hospital in the middle of the AHSC merger talks. Several participants implied that this acquisition led to a further breach of trust between the two acute trusts:

> *"The particular business of the moment, really, is the strategic decisions and the process, regarding the potential merger of the foundation trusts and the deeper integration of the college into the organisation, so discussing the upside and downside of that ... and ultimately trying to help take a decision around that in the interests of both the Trust and the partnership. [We] are trying to deal with the interface issues between different members of the partnership, particularly interfaces between two acute trusts at an operational, tactical level ...where issues of competition or different directions of travel, are potential barriers to realising the early value of this collaboration." [Delta Trust Director, Interview 48]*

The open pursuit of full merger had finished by the end of the data collection process for this study. This ensured that the organisational model remained a network approach and that the competitive elements of the relationship between the two acute trusts continued. Executive attention turned to further developing the middle management structures of the AHSC, the CRCs, as the primary driver for knowledge mobilisation at the frontline level. These structures were having differing levels of success within the organisations, which I shall expand on further below.

4.3.1.2 Gamma AHSC – integrated to network model

At the same time as Delta AHSC was pursuing a more integrated approach, Gamma AHSC was broadly heading in an opposite direction. Its initial hierarchical 'line management' model consisted of the leadership roles of the newly merged NHS

Trust and the medical school being brought together into one, Chief Executive post, which was supported by an experienced NHS manager in a Managing Director role within the Trust. This model was at the integrated end of the spectrum in terms of AHSC typologies outlined based on American models (Barrett, 2008; Culbertson et al., 1996; Weiner et al., 2001) and was novel in the UK:

> *"Executive personnel have been appointed with responsibilities that straddle both the College and the Trust allowing a level of cross-partnership leadership and management previously unseen in the UK." [Gamma AHSC, Strategic Vision Document]*

This new structure, a newly merged NHS Trust and a clear vision saw the launch of the AHSC with considerable fanfare. A widespread branding campaign within the AHSC and externally aimed to galvanise staff and create motivation and excitement for the new organisation. Early strategic vision documents laid out very ambitious targets for the AHSC to meet, such as:

> *"Its ten year objective is to establish itself as one of the world's top five academic health science centres, as assessed by quality of patient outcomes, patient satisfaction, level of research income, number of patients in clinical trials, and other measures of research esteem." [Gamma AHSC, Strategic Vision Document]*

Several participants reflected that the hierarchical line management model, together with the personal drive and vision of the Chief Executive, a senior clinician scientist, was crucial to the formation of the AHSC and the whole merger process:

> *"The joint role of .. CEO and Principal gave him clear executive authority in a large part of the university .. but also being the CEO of the hospital so in some ways he embodied the AHSC." [Gamma AHSC Executive, Interview 7]*

Furthermore, as ultimate responsibility for both the medical school and the trust rested with one person, the role was effective as an organisational boundary spanning mechanism between the university and NHS trust, particularly with respect to physical boundaries such as the separation of budgets and estate ownership:

> *"We reckon that [Chief Executive] because he had this combined role, took two weeks to resolve the development of the academic facility on the [trust] site which is about to open, and it would have taken years and years to negotiate that through the Trust and then we used to laugh and say but if you were holding both jobs why did it take two weeks.. but you know that was a massive, massive benefit…" [Gamma AHSC Executive, Interview 10]*

However, within three years, the appointed Chief Executive had left the post and the AHSC governance arrangements were under review. Senior AHSC participants felt this change was caused by two interconnected factors – firstly, the financial difficulties faced by the Trust, and secondly, due to the inherent difficulties in the hierarchical line management model.

In contrast to the starting position of Delta AHSC, which brought together three financially stable NHS trusts, Gamma AHSC was in a position of financial difficulty from its conception. Participants reflected that these financial difficulties were threefold. Firstly, the constituent NHS organisations were not financially strong pre-merger, and, as in many cases (Fulop et al., 2005), the economies of scale promised through the Trust merger failed to fully materialise. Secondly, 2008 saw the start of the financial crisis which had a considerable impact on the projected growth of NHS budgets. Thirdly, a change in arrangements for research and development funding within NHS Trusts had a particularly negative effect on Gamma AHSC. Ironically this was caused by a change in NHS R&D policy which was designed to improve translational research by redistributing previously embedded funding in a more targeted fashion (through the BRCs and BRUs outlined in Chapter 1). The financial difficulties encountered by the NHS Trust had a considerable impact on the key deliverables of the AHSC, which was often seen as an added extra:

> *"AHSCs were formed at a time of I would say of not necessarily largesse but the NHS .. had significant growth in its budgets and was expected to do more and more with that, particularly around innovation .. but when times are tough people focus on their core business and try to make the AHSC part of that core business I think is more challenging when people are concerned about how do they balance the books." [Gamma AHSC Executive, Interview 7]*

The second, interconnected issue was the inherent tensions and competing priorities of the dual, boundary spanning role across the university and trust boundary. One participant labelled this the "*Monday morning phenomenon*":

> *"So if you start on a Monday morning.. and you have an inbox, and the inbox contains stuff from the university and stuff from the Trust then I think what became clear, really quite early on was there's nothing in that inbox from the university that can't be put off until next week and there's nothing in the inbox from the Trust that can't be put off until the end of that day, you know it's got to be done immediately. There's an immediacy around the NHS issues which is not there around university issues and no matter how you planned it*

you couldn't away from the Monday morning phenomenon, so the NHS issues dominated.

CF: And what impact did that have?

Well ultimately it led to the Chief Exec being sacked so I think that was the impact." [Gamma AHSC Executive, Interview 32]

The implication was that university issues would always be secondary to the immediacy and urgency of NHS financial and clinical targets. The regulated nature of NHS trusts compared with the relative freedom of universities' exacerbated this tension. This was less of an issue at Delta AHSC as the organisations remained sovereign and therefore different individuals had different responsibilities for the university and NHS arms of the partnership.

Following the departure of the Gamma AHSC Chief Executive and other members of the senior management team, an interim Chief Executive of the Trust was brought in while a review of the AHSC governance arrangements took place. This review, incorporating a staff survey with the AHSC, recommended a partnership model be established, replacing the previous line management model. The leadership roles for the medical school and the Trust would be split once more and the mechanisms for AHSC activity would be facilitated through 'shared machinery' and cross representation on Trust and College boards rather than through a single post. This change coincided with the data collection period for this study, so the interviews with senior AHSC managers were undertaken at a time when the AHSC structures were under review:

"We're now in a period of transition and have moved to a different place from that. That [dual] role worked well at the outset to.. get the energy and drive, but the circumstances and events have moved too and we need to find a different dynamic between the university and the trust that will not have a single person trying to bear that responsibility singularly" [Gamma AHSC Executive, Interview 7]

As the period of formal data collection for this thesis finished, the new partnership structure was starting to embed. A joint working agreement was signed between the Trust and university which outlined the formal working mechanisms between the two organisations, including joint posts and intellectual property ownership. AHSC business was primarily conducted through an executive group which reported to a partnership board (similar to the Delta AHSC model). The representation on the executive group was evenly distributed between the AHSC office, Trust and university. The partnership board in turn reported into the sovereign Trust and

university boards. A new AHSC Director was appointed who established a small team within an AHSC directorate, which sat outside of both Trust and College structures (both contributed funding to the office and positions). The two organisations remained sovereign and the main formal linking mechanisms were cross representation of AHSC/Trust/university staff on their respective boards. In addition, certain key posts, such as Research Director, were held by the same individual for the trust, university and AHSC Executive.

In summary, the narratives of the emergent organisational forms of the two case AHSCs were quite different. However, both cases rejected a hierarchical model and (at the time of data collection for this thesis) instead broadly settled into partnership/network models.

The story of the developments of the AHSCs at a governance level informs this study in two main ways. Firstly that the governance arrangements, as an organisational level boundary spanning mechanism, were quite loose and the respective sovereignties of the constituent organisations ensured that the interests of the respective partners were put ahead of the AHSC at large. This both reflects the findings of the normative literature that there are inherent tensions between the different missions of AHSCs, that these missions are driven by external, contextual factors such as differing funding streams, regulatory frameworks and organisational purposes. These missions manifest themselves as organisational elements of the research/clinical practice boundary (that between universities and NHS trusts) and ensure that these remain salient, fixed and permanent, as traditional conceptions of external organisational boundaries are (Paulsen & Hernes, 2003). Furthermore it reflects the fact that AHSC organisations restructure regularly (Barrett, 2008), and that therefore there is no one size fits all model.

The second key point is the fact that both, despite very different starting points, settled on a network approach, reflects the dominance of this model in the literature on organisational form and knowledge mobilisation (Crilly et al., 2013). However, a further question remains – what impact does the overarching governance framework have on knowledge mobilisation work across the research/clinical practice boundary at the frontline of the partnerships? Is organisational form (which occupies much of the discussions at executive level) important, or do ‘relationships trump organisational design’ (Crilly et al., 2013)? To address this question it is necessary to analyse boundary work at both Clinical Research Clusters (CRCs) and Clinical

Programme Clusters (CPCs) level and 'frontline' teams within the organisations. I consider the 'frontline' (micro) level in the following chapters through identified tracer cases. The next section details the middle management (meso) level responses – those of CRCs and CPCs in the respective organisations.

4.3.2 AHSC middle management structures as boundary spanning mechanisms

At the establishment of the AHSCs both partnerships undertook to develop new middle management level structures with the aim of providing infrastructure support to the knowledge mobilisation process at the front line level. At first sight, the structures at Delta and Gamma looked and sounded similar in the organisational rhetoric espoused by both partnerships. However the structures were very different in practice and further, the perceived 'success' of them varied across the organisations.

The CPCs and CRCs were an ambitious experiment in developing a boundary spanning mechanism at the middle management level within the AHSCs. They differed in a number of ways. The CPCs in Gamma AHSC, although designed to be groups in which research, education and clinical practice came together and were performance managed through the CPC leads, in reality were dominated by NHS issues. Participants reflected that there was no real accountability mechanism through to corresponding departments in the medical school, and a constant focus on NHS targets ensured that research and education were not at the forefront of many discussions. Therefore, although a conduit through which organisational boundary spanning could occur, the CPCs had very little impact on epistemic or professional manifestations of the research/clinical practice boundary. These appeared to be spanned more effectively at a person to person level, rather than through organisational structures, supporting Crilly et al.'s (2013) assertion that 'relationships trump organisational design'. This will be explored further in the following chapters by examining the tracer cases in each AHSC partnership.

The CRCs were designed as a 'bottom up' solution to the organisational boundaries within Delta AHSC. The mental health CRCs appeared to be more successful at spanning organisational boundaries as they facilitated joint funding mechanisms and joint appointments through their model. Critically, they only had the one (non-competitive) organisational boundary to cross, and a number of mechanisms with which to do it, including dual roles, the ability to mix funding streams and make joint

appointments, and, in the CRC observed, a number of individuals who held dual leadership roles in both organisations. These individuals acted as organisational boundary spanners which mirrored their profession, liaison psychiatry, which, by its nature, attracts those comfortable operating at the boundaries of communities.

The acute CRCs had a more difficult task, largely due to the organisational boundaries between the two acute trusts. This boundary was the least permeable of all the boundaries present within the AHSC, due to the fact that the two organisations were essentially competing, in an 'arms race' that showed little sign of slowing down during the data collection period or following. Many interviewees, despite acknowledging early enthusiasm, were deeply sceptical about the ability of the CRCs to facilitate knowledge mobilisation. Furthermore, due to this organisational boundary, the acute CRCs did not have a devolved budget or line management responsibilities which prove critical in negotiating across an organisational boundary. Again, participants implied that any epistemic or professional boundary spanning tended to occur on an individual or team to team basis rather than at a CRC level.

4.3.3 Clinical Programme Clusters in Gamma AHSC

Seven CPCs were established at the time of the AHSC creation, and given the size of the overall trust each CPC was also large, broadly the size of a small district general hospital themselves. The initial corporate vision for these structures was one of integration and boundary spanning:

> *"The CPCs will be clinically led and will be the main interface between fundamental research, clinical research and patient care. The AHSC's approach to strategy, management and service delivery converges in the CPCs and consequently they are critical. To allow them to fulfil their role they will be organised by groups of specialties and not geography, and they will benefit from a greater scale, increased accountability and the removal of institutional barriers between research and clinical delivery." [Gamma AHSC, Strategic Vision Document]*

The main concept for the CPCs was that they would be semi-autonomous business units 'clinically led' by a boundary spanning clinician scientist who would be held to account for all research, education and clinical activity taking place within the CPC. However, this strategic vision was not realised for two main reasons. Firstly, while the new structures drew together the diverse elements of the newly merged trust, they did not fully align with the departments of the medical school, which remained broadly unchanged and unaffected by their development. For example, some key

areas of trust activity did not have equivalent research activity. Other areas were very small clinical specialties, but had a strong research presence. This issue is summarised in the following quote:

> *"So when it was first established there wasn't a direct link between, within the faculty of medicine, its management structure so you would have two or three linking. So if you take the worst fit which was women and children you had no academic particularly for obstetrics, not very much anyway and in paediatrics, that sat in one part of the faculty of medicine and then the surgery of gynaecology sat within another part of the faculty, so and then there was neonatal .. was sitting in one part and linking, so there wasn't a here's one, so we never aligned our CPC structure and the faculty of medicine structure to get a direct link.." [Gamma AHSC Executive, Interview 10]*

This mismatch in structures ensured that it became even harder to tie together the management reporting lines or funding arrangements of the university and trust and thus that organisational boundaries remained salient and impermeable.

Secondly, participants reflected that it became clear early on, in parallel with challenges to the governance arrangements, that CPCs would always primarily be driven by NHS operational delivery, financial balance and NHS target achievement. Participants explained how this agenda, particularly within the context of a large, newly merged trust, would dominate over any academic discussion. One attempt at this was to appoint NHS based research managers, who would report into the CPC boards and be responsible for the co-ordination of NHS research and work to ensure the funding streams were clear, and establish links within the medical school. These postholders, however, would often be drawn into NHS operational issues and not necessarily receive appropriate support:

> *"And I have a pile of stuff that ends up as - it's okay [Research Manager] will do it because she knows about that stuff. So on the one hand I think I would have to say that I think it's been very successful, I am on the board, I get to input … but its less about my having managed to get it on their agenda so much as them saying oh you decide." [Gamma AHSC, CPC Non-Clinical Manager, Interview 40]*

What the CPCs were effective at, however, was bringing together different specialties from across the merged NHS organisations, and thus overcoming internal physical boundaries within the NHS side of the AHSC. As the CPC directors had line management responsibilities, they were able to direct staff through this mechanism. This was in contrast to Delta AHSC, which, due to the multiple

Trusts, had a necessarily different approach to the establishment of middle management structures.

4.3.4 Clinical Research Clusters in Delta AHSC

Clinical Research Clusters (CRCs) were an integral part of the design of Delta AHSC and were established prior to the formal AHSC application in 2009. The high level strategic vision for these meso level boundary spanning structures in Delta AHSC was similar as that for CPCs in Gamma AHSC:

> *"When we were thinking about how to design the AHSC in order to do something different, given that it's all about integrating the tripartite mission of service, research and education we thought that we should develop managerial structures that do exactly that. And so that was the basis of the CRC model, and so we mapped all clinical activity in all three of the Trusts, and the majority of research activity in the health schools of the university into these new things" [Delta AHSC Executive, Interview 9]*

However, the actual structures were very different. Whereas the Gamma structures were aligned to line management and financial responsibilities (albeit predominantly NHS ones), the Delta CRC structures were not. In fact, CRCs did not have any direct or ring fenced funding associated with them. As the organisations which made up the AHSC remained sovereign, budgets were not merged between them. This proved to be a major barrier to the functioning of CRCs.

The AHSC executive team made a decision early on in the process that all clinical services and as much health research as possible would be mapped to a CRC (there were 21 in total). They would be inclusive and no one would be 'left behind' or not challenged to deliver the AHSC agenda. However, the AHSC Executive also recognised that different CRCs would move at different paces with respect to development and integration towards the tripartite agenda. Therefore, three 'early adopter' CRCs were identified (and mentioned in the AHSC application document), in areas where positive existing collaborations between academia and clinical practice existed. Analysis of these early adopters is detailed in Fischer et al. (2013).

For some CRCs the process of designation, and the appointment of a leader, were straightforward as there were close matches between clinical services and research departments within the university. For others, it was more complex as some areas could fit into one or more CRCs. For example, palliative care services were linked to oncology and haematology in the clinical acute settings, but the research undertaken in this area also has close links to psychological medicine.

As noted above, the positions of the mental health and acute CRCs were very different, reflecting the organisational boundaries inherent in the AHSC partnership and the histories of the different trusts and university schools. The mental health CRCs were established prior to the AHSC, following a decision to restructure the mental health trust and its relationship with the School of Psychiatry. The School of Psychiatry and the mental health trust had long established relationships, and the CRC relationship involved (only) bringing together the two (non-competing) organisations.

Previously, mental health services were delivered based primarily on a geographical split by borough. The introduction of the CRC structure was designed to facilitate management by services or patient pathways. This restructure enabled better alignment of patient service to research interest, and the CRC structure mapped onto this. The individuals leading the CRCs were boundary spanning clinician scientists from both research and clinical communities, together with NHS managers. Importantly, it was also agreed that research and clinical budgets would be effectively pooled at CRC management level.

The mental health CRC directors interviewed generally felt the model was proving successful. In particular, the pooling of research and clinical service budgets has enabled more joint appointments (boundary spanners) between the clinical service and research and a clearer understanding of the financial flows between research and clinical practice, thus enabling them to be maximised. I observed this boundary work in a CRC meeting [observation 16: 25/07/12] and the process was further described by a clinician scientist CRC leader:

> *"I think where the CRC works best is by bringing academic and clinical people into the same room .. it enhances a kind of working relationship which makes one better able to spot opportunities and address them, .. we're much lighter on our feet in terms of being able to make strategic appointments and decide this is an area we're going to invest in and go for it.*
>
> *… before I think what would've happened is you probably go up the ladder in both sides of the organisation .. there might be a meeting of minds which would allow something to happen but now .. it's a bit more devolved and a bit more flexible." [Delta AHSC, CRC Leader, Clinician Scientist, Interview 3]*

This quote particularly emphasises the mental health CRCs potential capacity as an effective organisational boundary spanning mechanism within the AHSC, albeit between two organisations which historically have a relatively successful working relationship. However, interviews and observations of a CRC meeting [observation

16: 25/07/12] also revealed that the CRC may also provide a platform for epistemic or professional boundary spanning, in particular between research and clinical practice/NHS management. For example, NHS managers reflected on how participating in CRC meetings helped them develop a more sophisticated understanding of research and the research process, which enabled them to be more flexible with respect to budgets and joint appointments.

The acute CRCs were in an altogether more challenging and complex environment, primarily because of the competitive relationship between the two acute trusts:

> *"So we are part of that CRC. Does it impact on us that much? No. On the basis that, simply put that, try to do anything with [Alpha Trust] is hopeless. it's just not feasible.*
>
> *CF: Why is that?*
>
> *Because they want to take all the elective work.. So it's sort of political and whatever and as individuals they're fine, or some of them are. But as [Alpha Trust] basically their idea of where they want to go is very different from where we want to go." [Delta AHSC, Medical Doctor, Interview 20]*

As noted above, the development of both the AHSC and subsequently the CRCs and the 'bench to bedside' heuristic they represented can be seen as a 'boundary concept' (Löwy, 1992), a 'neutral', positive umbrella under which the two acute trusts could come together to discuss the possible integration of clinical services. However, at the time of data collection, this did not prove a strong enough driver to bring the two organisations together. Despite being led by senior clinician scientists and managers, CRCs were seen as remote new structures with little power or influence by clinicians:

> *"I'm part of the [CRC] executive committee, so I go to the occasional executive meeting, and get the emails. I'm going to give you a very honest play, I'm not so sure that the CRC has really taken a step forward to be relevant on a day to day perspective for ninety to ninety five percent of academics and clinicians" [Delta AHSC, Medical Doctor, Interview 21]*

And academics:

> *"the response that they've done so far is they've avoided all the important issues by just creating separate structures and I just think that's …a disastrous policy .. they've not merged anything, they've not removed anything, the old centres of power are as far as I can see completely unchanged and therefore …folks like me who have got limited time and limited attention and get bored easily just opt out of things." [Delta AHSC, CRC Leader, Clinician Scientist, Interview 4]*

Participants felt that decision making still resided in the processes within the sovereign organisations, as the CRCs did not hold a budget or any line management responsibility:

> *"CF: And so what difference has the AHSC made to your day to day work?*
>
> *It's added an extra layer of meetings … It's a great paper exercise but in terms of what it really means in terms of delivery, operational issues, etc, we are still, we are three years into the process and we really have not got a tangible idea about what is merging with what and what the operational issues are and how we are going to balance the books and as regards any of this activity it has cost, there's no money, there's no added money associated with [the AHSC] activity." [Delta AHSC, CRC Leader, Clinician Scientist, Interview 13]*

Another key factor influencing the acute CRCs was the more complex mapping of different specialties between the trusts and university. Some participants felt that their research interests and work did not align closely with the CRC in which they were based. This was particularly the case for those whose research was social science based:

> *"So I'm keen to embrace the idea that the CRC brings with it … but that's not because I've had a declaration from on high … I can see genuine difficulties with the fusion of academia with clinical practice … I think a lot of the difficulty within my own CRC, well actually I can't speak for my own CRC, I can only speak for my own sort of directorate if you like … is that a lot of the academics to date have been basic scientist academics. There is beginning to now be more of a vogue of clinician scientists … but there are precious few who are related to an area of work that I am in or sort of social science type population type person type orientated work." [Delta AHSC, Clinician Scientist, Interview 24]*

Interestingly, however the potential of CRCs as an enabling boundary spanning mechanism between research and clinical practice was evident in some of the 'early adopter' CRCs. These groups, where the leaders worked together, were pushing to integrate services and budgets in order to pursue the tripartite mission, but were unable to do so due to the sovereignty of the constituent organisations (Fischer et al., 2013):

> *"Because although the CRCs want to do stuff they then get impeded from doing stuff because we have separate organisations, so I spend a lot of my life trying to sort that out." [Delta AHSC Executive, Interview 9]*

4.3.4.1 Linkages between AHSC Executive and Clinical Research Clusters

In order to facilitate communication across the network structure, Delta AHSC established a number of mechanisms linking the AHSC Executive and CRCs, and

different CRCs together. Participants reflected on two of these mechanisms – the CRC Leaders meeting and the Performance Council.

The CRC Leaders meetings were held fortnightly and I observed one as part of my fieldwork [observation 6:14/05/12]. These meetings, chaired by a member of the AHSC Executive, were designed as a forum through which CRC leaders could come together, discuss AHSC related issues and hear about other work undertaken in the AHSC. AHSC Executive members acknowledged that these meetings were in the early days and issues were being ironed out. However, some CRC leaders felt that the meetings were not the most useful fora to enable cross CRC collaboration:

> *"Well I've been to those a couple of times, I mean presumably they are useful for those CRC leads as a peer support group, I know they meet far too frequently they say and what it is they are there to achieve? If it's just a communication portal that's unfortunate, but I don't know how much more it does. I've been to a few where it's been relevant for me to go.. where it's a question.." [Delta AHSC, CRC Leader, Clinician Scientist, Interview 13]*

The Performance Council consisted of key members of the AHSC Partnership board, together with the AHSC Executive. CRCs were invited to present to this meeting on progress they had undertaken in relation to the tripartite agenda. CRC leaders questioned the relevance and importance of this meeting (reflecting AHSC competing logics):

> *"the Performance Council, so I've been to that for the CRC on three occasions now … We went to our last performance council about 6 weeks ago and it was just sort of a random set of questions made up out of the blue.. all the important people just left the room because all the beds were blocked .. they all went off to try and take people out of beds .. so you know what is important to these leaders? the strategic thing about getting CRCs in place? well actually sorting out the beds.." [Delta AHSC, CRC Leader, Clinician Scientist, Interview 3]*

The views of CRC leaders on these meetings reflect the challenges of a networked approach to organisational form. The first quote demonstrates how a boundary spanning interaction forum needs to be more than an information sharing exercise. The second meeting, the Performance Council, reflected the tensions with attempting to impose a hierarchy structure on a network model of CRCs – there are few mechanisms which can hold the CRCs to account.

4.3.5 CPCs and CRCs as boundary spanning mechanisms

In summary, in common with the key themes identified in the AHSC literature (outlined in Chapter 1), the challenges faced by the CPCs in Gamma AHSC and the

CRCs in Delta AHSC reflected the challenges at the governance level of the partnerships. With the potential exception of the mental health CRCs in Delta AHSC, the structures were dominated by NHS organisational issues, be that the competitive nature of the acute trusts in Delta AHSC or the financial and performance issues in Gamma Trust. They had not yet developed into effective boundary spanning mechanisms across durable and salient organisational boundaries.

The mental health CRCs had more tools at its disposal. These included a less complex organisational context (two organisations), more closely epistemically and professionally aligned groupings (along the patient pathway rather than by borough), a pooled budget with the same leaders responsible for all elements of it, and a structure which brought NHS managers into the process.

Therefore the examples highlighted here suggest that organisational boundaries remain real, salient and enduring throughout the partnerships. Supportive organisational structures can be established, but only when the organisational context is an enabler rather than when the incentives do not align.

4.4 Conclusion

This chapter has outlined the key features of the organisational forms of each AHSC partnership case, the nature of the organisational boundaries present in the partnerships and some of the structural boundary work which attempted to establish a supportive organisational environment for knowledge mobilisation between research and clinical practice.

The analysis contributes empirically to two broad literatures. Firstly, it contributes to two themes identified within the AHSC literature presented in Chapter 1, that of a) the many missions of AHSCs and b) their changing organisational structures (French et al., 2014). Secondly it contributes a 'new' emergent 'networked' organisational form to the literature on knowledge mobilisation and organisations outlined in Chapter 2.

The two cases presented here demonstrated similar challenges to those identified in the normative AHSC literature, particularly the challenges of 'integrating research, education and patient care' as competing institutional logics (Lander, 2016) with respect to the mission tensions theme. The immediate requirements of clinical care

together with constant fire-fighting of management in NHS trusts sat at odds with the longer term goals of the universities in delivering research. This 'Monday morning phenomenon', which participants in both trusts reflected on, was challenging to manage and manifested through continuous discussions at both board and CRC/CPC level, as well as structural changes to governance arrangements.

The second theme, on AHSC structures, was also evident in the findings presented here. In particular, both AHSCs attempted to move up or down the continuum of AHSC integration outlined by Weiner et al. (2001). Gamma AHSC began as an integrated (hierarchical) model, and shifted to a confederate (network) model. At the same time, Delta AHSC started out as a confederate model, then explored a more integrated approach but ultimately retained a looser governance structure.

Building on this, a key finding of this chapter is that a 'managed network' (Addicott et al., 2007) approach, rather than a hierarchy, seemed to prevail as the preferred organisational form for the two case AHSCs. Indeed, the hierarchical approach used by one of the AHSCs 'failed', further strengthening the correlation with the wider literature on knowledge based organisations in healthcare where professional groups are less likely to be organised through strict hierarchies (Crilly et al., 2013).

Within this broad organisational form (a 'managed network'), varying organisational contexts and incentives existed which manifested as organisational boundaries between research and clinical practice and facilitated or blocked boundary work. These organisational boundaries were firm and continuously reinforced, primarily by the underlying competing institutional logics inherent in the partnerships (Lander, 2016). Barriers to boundary work appear to be path dependent with the key features being competition between partner organisations (and a lack of incentive to stop competitive behaviour) and the immediacy of (financial and regulatory) NHS demands taking precedent over long term research aims. Necessary conditions appear to include a good epistemic and organisational fit and joint budgets and line management structures.

This chapter has addressed (at the meso level) the sub research question: *How does organisation form impact on boundaries and boundary work within AHSC partnerships?* However, in order to address this question (and the other sub research questions) more fully, it is necessary to analyse the ability of front line staff to mobilise knowledge across the research/clinical practice boundary in the

organisational contexts which have been outlined in this chapter. Do 'successful' teams undertake boundary work despite or because of their organisational contexts? How does this interact with the epistemic and professional features of the research/clinical practice boundary? In other words, to address Crilly et al.'s (2013) proposition, do relationships trump organisational design? The following three chapters will consider these points by presenting findings of the tracer cases and analysing them within the wider AHSC contexts. I will then draw the meso and micro level analysis together in the final discussion chapter.

Chapter 5 Findings: Introducing the tracer cases

"We're an AHSC, we're just waiting for the university and trust to catch up"

[Gamma AHSC, Unite case, Nurse, Interview 29]

The purpose of this chapter is to introduce the micro level tracer cases studied within the AHSCs and the contexts in which they operate. This will provide background to the following two chapters which will in turn examine the research/clinical practice boundary and boundary mechanisms relating to knowledge mobilisation within the AHSCs and tracer cases. The chapter will contribute to answering the overarching research question:

What boundary processes mobilise knowledge in AHSCs?

The previous chapter considered the research question from a meso level by examining the organisational boundaries within AHSC partnerships, how they manifested themselves at this level and what governance and organisational practices were used as boundary spanning mechanisms. This chapter moves analysis to the micro level.

I outlined the key criteria for tracer case selection in Chapter 3. Although empirically quite different, the two cases selected were identified by senior AHSC staff as positive examples of frontline teams working towards the tripartite mission of integrating research, education and patient care and successfully mobilising research knowledge into clinical practice.

The first case is the 'Unite' department in Gamma AHSC. This department is regarded by many in the AHSC (and presented to outsiders) as an exemplar service which integrates research, education and clinical care, with cutting edge basic science being undertaken, a large proportion of NHS patients having access to clinical trials, patient outcomes being amongst the best in the country and the

department contributing to teaching professionals at all levels. The service existed long before the development of the AHSC and the links between research and clinical care have been strong for many years.

The second case is the Connect project in Delta AHSC. Like the Unite department, it spanned the domains of research, education and clinical practice. However, unlike the Unite department, the Connect project was specifically funded by the AHSC executive to implement a research project which was designed to improve the mental health of patients in acute settings. In so doing it was the core part of the 'whole person approach' of Delta AHSC and a cornerstone of the designation bid.

Analysis of both cases can usefully contribute to theories of boundary properties and mechanisms and can reflect issues with enacting the AHSC tripartite mission in practice. This chapter is primarily descriptive and introductory and provides the wider contextual background differences and commonalities of the cases, thus setting up the analysis of the research/clinical practice boundary and boundary work in the following two chapters. The findings presented are primarily based on field notes from observations as outlined in Table 2, and interviews with participants linked to both cases.

This chapter is structured as follows. It first provides some background to each case. It then examines some of the key features of the cases relevant to the research/clinical practice boundary and boundary work. These features are: their context in the wider AHSC, funding arrangements, staff arrangements, main research domains, main clinical practice domains and key 'knowledges' to be 'mobilised' between the domains. In conclusion it will summarise these key features, how they differ between projects and how they relate to the following two chapters which examine the research/clinical practice boundary and boundary work using epistemic, professional and organisational framings.

5.1 Introducing the Unite department

The Unite department combined an academic department within the medical school of Gamma AHSC and an NHS service through which patients had access to a large number of commercial clinical trials, as well as standard NHS care. The aim of the department was to conduct research activity (basic science and translational research), commercial clinical trials and NHS care in a rapidly moving field of medicine primarily relating to a group of infectious diseases. The NHS and clinical

research service was based within an urban hospital setting, with a basic science laboratory (in a dedicated facility in the medical school) on the same campus but in a different building to the clinical service.

The department was established many years prior to the designation of the AHSC and was funded through research income (grants and commercial trials) and NHS commissioning. The academic department and NHS service were both led by the same senior clinician scientist and comprised a team of about 40 staff, including clinician scientists, basic scientists, NHS consultants and research and clinical nurses. Many staff worked in both domains of research and clinical practice and as such conducted work across the research/clinical practice boundary.

5.2 Introducing the Connect project

The Connect project was funded by Delta AHSC to champion and pursue the integration of mental and physical care. The project was run from an academic department within the mental health school, and was implemented in clinical settings within the acute trusts. As such it needed to span numerous epistemic, professional and organisational boundaries.

An early aim of the project was to improve mental health care provision in acute settings within the AHSC. To achieve this, the project was designed so that components mapped to each of the three core missions of the AHSC (research, clinical care and education). These components formed a 'package' which the project team sought to implement in clinical settings across the two acute trusts. From a clinical perspective, the package included implementing an informatics system which facilitated the collection of patient-reported (mental health) outcomes in physical health settings, providing clinicians with real time feedback to guide care. From a research perspective, this system facilitated linking these patient reported outcomes with their physical health record, which provided a rich source of data on which to conduct research. From an education perspective, the Connect project team conducted bespoke training and support in core mental health skills for the clinical teams and organised a series of termly seminars in mental and physical health issues for staff across the AHSC.

5.3 Key features of the tracer cases

To help with analysis of the research/clinical practice boundary properties and boundary work mechanisms, and how they relate to the wider AHSC, the following

table (Table 5) and next section outlines some key features of each case. This is designed to provide context and background to the following chapters which explore the epistemic, professional and organisational boundary features (Chapter 6) and boundary work mechanisms (Chapter 7).

Table 5 Tracer case features

	Unite Department	**Connect Project**
Context	Well established medical school department in Gamma AHSC also undertaking NHS care	Project initiated at service level and scaled up through Delta AHSC
AHSC context	Little influence from wider AHSC but used as a beacon and good example of how it should work	Funded by AHSC Used as good news story by AHSC
Funding arrangements	Research grants, drug companies, NHS commissioned	Core AHSC funding, potential applications for further applied research funding
Staff arrangements	Some staff employed through Gamma university and some through trust. All identify with and work in same department	Core team primarily employed through university. Physical health teams employed through acute trusts
Main research domains	Molecular biology Virology Commercial clinical trials	Health Services Research, patient reported outcomes Relationship between physical and mental health
Main clinical practice domains	Infectious disease	Various physical health conditions where mental illness is likely to be prevalent
Knowledges (to be mobilised)	Research knowledge – basic science e.g. cell data Clinical knowledge - Patient data e.g. blood test results, pathology, scan results, demographics The linkages and interactions between the two forms of knowledge	Research knowledge – mental health conditions and interplay with physical health Clinical knowledge -Mental health patient reported outcomes & physical health clinical information Awareness of mental health issues and how to deal with them

5.3.1 AHSC context

Both tracer cases had direct relationships with their respective AHSC executive teams and wider partnerships. These contexts had important roles to play in

understanding the aims of the department/project, the constraints they faced and the respective manifestations of the research/clinical practice boundary and boundary work.

Although participants reflected that both cases were often used by the wider AHSC or Trust/University senior management as best practice exemplars of how the AHSC was achieving its goals in day to day work, they had quite different relationships with the AHSC Executive team. This reflected both on the cases and the approach of the Executive. The Unite department was well established and not apparently reliant on the Gamma AHSC Executive team. The Connect project however was funded through Delta AHSC and required/used the AHSC label to unblock some key organisational issues and to promote engagement across the partner organisations. This interaction between the Connect project and the AHSC was a key part of boundary work which I shall explore in Chapter 7.

The Unite department was often showcased as a successful department by the AHSC executive team and often received external visitors. I observed three instances of this process [observations 53:01/02/13; 66:15/02/13; 80:06/02/13]. Firstly, staff from other parts of the partnership visited the department to learn about its work and for a tour around the clinical and research facilities. Secondly, senior AHSC executives used the department to host a visit from the Department of Health which explored whether and how Gamma AHSC was meeting government targets for time taken to set up clinical trials, and the main barriers and facilitators to quick set up. The third instance was a meeting requested by a member of the AHSC executive to seek the Head of Department's views on a strategy document being developed for the AHSC reaccreditation process which took place in late 2013. This meeting enabled the Head of Department to input into the wider AHSC strategy and ensure that the needs of the department fed into this process. Staff within the department appeared to take pride in their status as an AHSC exemplar and welcomed external visits, interacting positively during them.

This exemplar status had implications for how the Unite department could design and implement boundary spanning mechanisms across the research and clinical practice boundary. The status ensured that the AHSC was hands off in approach, and gave the department a degree of freedom which enabled key individuals to drive boundary spanning processes, without necessarily strictly conforming to trust or university management requirements.

The Connect project had a different relationship with the Delta AHSC Executive. As it was directly funded, the project was required to report regularly to the AHSC Executive on its progress and spend, and to secure continued funding. These reporting mechanisms included one to one meetings with the Operations Director in the AHSC Executive, as well as presentations to the Performance Council and CRC Leaders meetings (described in Chapter 4). The project lead was successful in this relationship building:

> *"Well [Project Lead] is very clever at communicating and has a great ability to have a vision about where this might go, and he's also very good at getting buy in from senior members of organisations so the idea that he's done this [is] generally a real achievement." [Delta AHSC, Connect Project, Clinician Scientist, Interview 31]*

Like the Unite department, the Connect project was held up as a positive example of Delta AHSC integrating research, education and patient care in practice. However, in the Connect project case this role went further as the implementation of the project could be directly connected to the formation of the AHSC – it did not exist in its current form pre-designation. Furthermore, it was a key mechanism through which the Delta AHSC goal of integrating mental and physical healthcare was being pursued, and was therefore strategically important to the partnership. The project team were aware of this strength:

> *"[the project has] a sense of coherence that I think sits quite neatly within the whole Delta model" [Delta AHSC, Connect Project, Clinician Scientist, Interview 3]*

Further, the project was not seen as particularly threatening to the sovereignty or core business of individual organisations, and as such was perhaps a relatively straightforward area for the partnership to work together on, compared with areas of high value clinical work which the two acute trusts were essentially competing over.

Unlike the Unite department, it was also part of the remit of the Connect project to raise awareness about the integration of mental and physical healthcare across the wider AHSC. It did this through a series of termly seminars and presentations at AHSC wide meetings and I observed five of these interactions during fieldwork [observations 1:21/03/12; 9:12/06/12; 25:18/10/12; 31:21/11/12; 79:04/03/13]. The Connect project team was motivated to undertake this broader AHSC work:

> *"One thing I've been really impressed by with the team in general has been around ambition and thinking big. And in some ways that's something*

relatively new to me, I'm used to quite small scale stuff, with one post and development in one service. And actually something that's so ambitious across Beta Trust and up into Alpha Trust as well is quite different from where most of my previous experience has been and that's been interesting to see and interesting to see how that's done and also impressive." [Delta AHSC, Connect Project, Clinician, Interview 11]

5.3.2 Tracer case interactions with AHSC meso level structures

The two cases also had direct relationships with the middle management organisational structures implemented by the AHSCs as described in Chapter 4. In the Unite case, interactions with the Clinical Programme Cluster (CPC) appeared fairly light touch. Participants reflected that this was because the department was primarily managed through university structures and was financially beneficial to the NHS trust whilst also meeting NHS targets, so needed little focus from CPC management who were focused on operational and financial pressures elsewhere. Both the Head of Department and Lead Nurse in Unite were experienced in their roles and appeared to manage the relationship with the CPC effectively to the benefit of the department.

The Connect project was primarily linked to the Clinical Research Cluster (CRC) structure in Delta AHSC through the project lead, who was also Director of the CRC. Occupying these two roles meant that the project lead was able to drive the Connect project progress through the CRC structures as well as more directly to clinical teams across the AHSC. For example, one of the early pieces of work undertaken by the Connect team was to map mental health services across the two acute trusts. This work was driven through the CRC leads who were also asked to identify a mental health lead within each CRC to take this work forward.

Therefore both cases had links with their respective CRC/CPCs and executive teams within the AHSCs. However, they did not appear closely connected to facilitating the day to day work of the Unite department and Connect project and to supporting the boundary work of these teams. This may be because the structures were new and not fully embedded into the partner organisations, and that power structures based on the sovereignty of partner organisations endured, as outlined in Chapter 4. However, the ability of both cases to undertake boundary work depended in part on AHSC executive team and CPC/CRC support and these themes will be explored further in Chapter 7.

In summary the Unite department and Connect project had different organisational contexts within the respective AHSC partnerships. The Unite department pre-existed AHSC designation and continued to function in a similar fashion post designation. Its links with the central AHSC were limited to information sharing and being displayed as a model of best practice. The Connect project was funded by the Delta AHSC executive and as such was required to regularly report progress against its (and the AHSC) goals [observation 3:22/03/12]. Its success, at least initially, was partially dependent on the support of the Delta AHSC Executive, financially and to help remove organisational barriers such as IT (see Chapter 7).

5.3.3 Funding arrangements for the tracer cases

As noted in Chapter 4, different funding streams reinforced the impermeable nature of the organisational boundaries between universities and trusts within the AHSCs. In both 'positive' cases outlined here however, funding arrangements were not perceived as a barrier to boundary work. Participants in both cases reflected that they were sufficiently resourced from appropriate sources, and had sufficient flexibility with budgets to ensure that funds could be used in the most appropriate manner to facilitate boundary work.

The Unite department pursued a range of research and clinical activities and consequently received income from a number of sources. Primarily the department was a research unit within the university and was therefore predominantly funded by investigator led research grant income from awarding bodies such as the Medical Research Council and Wellcome Trust.

The Unite department also provided NHS treatment to patients funded by NHS commissioners. Furthermore, the department conducted clinical trials, testing new treatments and combinations of drugs, in partnership with drug companies. NHS patients were assessed for eligibility and entered into these trials when appropriate. The department received administrative overheads for conducting the trials and the drugs being tested were provided free of charge. Therefore, conducting these clinical trials meant that patients had access to the latest treatments and also that NHS commissioners did not have to fund the cost of the drug for these patients. The department also benefitted from charitable income, which was primarily invested in estates and building work.

This variety of income sources enabled the department to remain fairly independent from the financial controls of university or trust. These financial arrangements were conducive to enabling boundary spanning activities within the department and were managed by clinician scientists who sat across both university and trust. For example, the charitable income enabled the department to design and build a co-located research and clinical facility, which, staff reflected, may not have been possible without an independent funding source as both university and trust funding had certain constraints.

The Connect project had a very different funding arrangement. It was directly funded by the AHSC executive team using the budget top sliced from individual partner organisations to facilitate AHSC activity. The main funding required for the Connect project was for staff in the project team, together with some hardware costs, such as the iPads used to collect data in waiting areas. The funding was secured on a year by year basis through discussion and negotiation between the project lead and the Operations Director within the AHSC [observations 3:22/03/12; 18:29/08/12]. Unlike the Unite department, this pump priming funding meant that the project was not initially required to generate income, although it was expected that the project would become self-funding in time, through research grants and NHS commissioning services. This requirement was summarised by one AHSC executive:

> *"CF: So thinking about the Connect project, what, what are your views on how that project's going?*
>
> *Respondent: I think it's going very well; it's done some really good stuff. So it's done screening, it's .. set-up some of these clinics co-staffed by physicians and psychologists, and so on. The problem it has is sustainability, and it will become sustainable only if we persuade the commissioners that they should be commissioning this kind of approach to integrated mental and physical healthcare and the commissioners will only be convinced if we provide evidence that it leads to better outcomes. So, the challenge, I think, for the [project team] is to generate proper evidence that we can then use to get this commissioned. I'm, personally, pretty convinced that the business case would stack up, because I suspect you would .. even reach the point of reducing the drug budget, you'd reduce the number of hospital visits, you might even reduce the number of admissions ...if you're properly able to manage the psychological aspects of a long term condition better. But that's words .. and we need some evidence." [Delta AHSC Executive, Interview 45]*

Both cases appeared broadly insulated from the 'oil and water' effects of AHSC funding streams from different bodies, and had found workarounds to these boundary manifestations. This ensured that boundary work was generally not

restricted for financial reasons, although other organisational barriers remained, as outlined later in this chapter.

5.3.4 Staff as potential boundary spanners

Both cases had a range of staff employed through the universities and the NHS on a variety of direct and honorary contracts who had the potential to act as boundary spanners between the domains of research and clinical practice.

5.3.4.1 Unite department

The Unite academic department and NHS service employed a broad range of clinical and non-clinical staff who performed a variety of roles across the domains of basic and clinical research, education and clinical care. The department was led by an internationally renowned clinician scientist, who chaired the European research group for the specialty. He was employed through the university medical school, conducted and supervised basic and clinical research and undertook limited NHS clinical work.

5.3.4.1.1 Medical staff

All medical staff within the department undertook varying proportions of research, education and clinical work as part of their job plan. This ranged from clinician scientists whose primary focus was basic research, through to medical consultants whose role mainly consisted of treating NHS patients. Clinician scientists were employed by the university and held honorary contracts with the NHS Trust, whereas medical consultants were employed through the NHS and held honorary contracts with the university. Responsibilities for the clinical, research and teaching tasks with the department (such as conducting commercial clinical trials, conducting academic research trials, delivering education and training to medical students and junior doctors) were divided up between the senior doctors. The medical team also consisted of junior doctors, registrars and fellows employed to run commercial clinical trials. All medical staff were trained in research and medicine, undertook varying proportions of both in their everyday work and therefore all had the potential to act as boundary spanning individuals as they were able to some extent understand both sides of the research and clinical practice boundary.

5.3.4.1.2 Basic scientists

There were also a number of basic scientists based in the department who were not practising clinicians and conducted primarily laboratory based research. These

individuals were employed by the university and funded by research grants. I observed that some laboratories were based next to the clinical department, but most staff were based in a different building at the time of data collection, although they were due to move to a space close to the clinical service. The main links between basic scientist staff and clinical staff took place at departmental meetings such as the fortnightly research meetings [observations 41:18/01/13; 50:01/02/13; 59:08/02/13; 76:01/0313; 81:08/03/13; 88:22/03/13], and the two most senior basic scientists attended the senior management team meetings within the department [observations 36:11/01/13; 52:01/02/13; 68:15/02/13; 78:01/03/13; 82:08/03/13; 86:15/03/13; 90:22/03/13].

5.3.4.1.3 Nursing staff

The nursing team were active in NHS care, research and education and were a critical first point of contact for patients in the department, and therefore responsible for knowing the latest clinical trials available for each patient and their options for treatment. The nursing team were primarily employed through the NHS (as was the lead nurse) with a small number of research nurses employed through the university.

The lead nurse had both clinical and research experience and was also active in national nursing policy in the discipline. She was well respected throughout the department and referred to by one of the consultants as '*our greatest asset*'. The lead nurse ensured all nursing staff were trained in NHS core skills and clinical research skills. The nurses were also regularly encouraged to undertake training and further study themselves particularly in clinical research. For example, one nurse was undertaking a Masters in Research through the university and was being supported by a (medical) clinician scientist within the department.

The clinical team was supported by an administrative team consisting of secretaries and clerks employed by the NHS, and a PA and clinical trials administrator employed through the university.

A key feature of the department was the extent to which staff acted as a team in respect to the division of labour of research, clinical and teaching tasks. All staff were able to very clearly articulate their role within the team and state the contribution they felt they made to the work of the department, which differed

depending on their research or clinical interests, and were comfortable with colleagues doing the same.

5.3.4.2 Connect project

The Connect project very broadly had two types of groups of staff associated with it – the core project team and those involved in its supporting mechanisms (the research domain); and those in acute trust teams (the clinical domain) 'receiving' the Connect project and implementing it in their clinical areas. This section will briefly consider the former (and the latter will be discussed briefly in the 'clinical domains' section).

The core multidisciplinary Connect project team comprised two full time researchers to co-ordinate the project, and several more part time staff to fill various specialist roles, including researchers, clinical psychologists and psychiatrists employed by the university, acute trust or mental health trust. The role of the project lead was a crucial one -a Professor of Psychiatry who had a long history of working across the boundary between mental and physical healthcare. The project lead was well respected and had considerable networks and knowledge across the wider AHSC. With a background in acute liaison psychiatry in NHS settings and in epidemiological research within the university, he was very experienced in working across epistemic, professional and organisational boundaries and was a 'competent boundary spanner' (Williams, 2002).

The project co-ordinators were both from a research background. Neither had experience of working directly in the NHS but both had experience in research with mental health services. Therefore, although guided by the project lead, they approached the NHS implementation being relatively unfamiliar with the environment in which they needed to enact the project (with clinical teams and support functions such as IT) and the 'clinical practice' side of the research/clinical practice boundary. Despite this, both were held in very high regard by the NHS teams they worked with and were effective in the role.

The project co-ordinator roles were complemented by senior clinical staff who performed specific specialist roles including in training and providing clinical support to develop care pathways. These clinicians had more familiarity with NHS settings and were variously employed by the mental health trust and university but practiced clinically in the acute trusts as in the following example:

> *So I am employed by Kappa Trust … I'm paid for by Beta Trust so my main role is a clinical one. I have a Honorary Contract with the [university school] so I do some academic and lecture based teaching and I do some supervising and I'm on some of their committees and stuff. [Delta AHSC, Connect Project, Clinician, Interview 11]*

The Connect team met monthly [observations 7:14/05/12; 13:09/0712; 17:20/08/12; 22:08/10/12; 35:10/12/12; 39:14/01/13; 64:13/02/13] but also had more regular informal meetings outside of this, with the project co-ordinator having weekly supervision sessions with the project lead. The whole project was guided by a wider steering group which met quarterly [observations 8:17/05/12; 27:25/10/12; 28:25/12/012]. This group comprised clinical staff from the mental health trust and acute trusts experienced in the mental and physical health interface, representatives from the IT departments at all three trusts and academic staff from the university also working at the mental and physical health interface. The role of this group was to provide expert guidance and steering for the project. Each meeting involved the team giving an update on the project and asking for specific guidance on particular aspects, such as research ethics applications and IT issues. This meeting started off as a meeting representing all parties but part way through the year it was decided to split the group between clinical and IT issues so members could attend the relevant sections to them (or both).

In summary both the Connect project and Unite department comprise staff employed from different organisations and professional backgrounds, who work together towards common goals and were effective at work across epistemic, professional and organisational boundaries. Common to both were staff who seemed naturally adept at boundary spanning, and who had chosen careers reflecting this dualism, such as clinician scientists or liaison psychiatrists. I will return to these examples of boundary spanners in practice in Chapter 7.

5.3.5 Research domains

In order to analyse the properties and mechanisms of boundaries between research and clinical practice in the cases, we need to first consider what the domains of 'research' and 'clinical practice' are. These are the 'things' of boundaries (Abbott, 1995) and there are many ways in which these domains could be analysed – as epistemic cultures (Knorr Cetina, 1999), or professional groups (Freidson, 1970), or sub parts of organisations. These conceptualisations will be considered further in the following chapters. This section will concentrate on outlining the actual

practices, or activities, undertaken in each domain. If applied to activities represented in the Cooksey linear model of research translation, the Unite department spanned the whole spectrum of activity, from basic science to clinical trials and implementing new treatments into NHS clinical care. Activities undertaken in the Connect project included more applied research and implementation and as such participants saw themselves operating at the implementation and roll out end of the spectrum, covering the second translational gap.

5.3.5.1 Unite

The research conducted in the Unite department can broadly be split into two categories (and was so done by the team). Firstly, the department ran a number of investigator led studies funded through national research bodies such as the Medical Research Council. These studies were across the scientific research spectrum and included molecular biology based studies, animal studies, first in man studies and clinical trials. These studies were administered through the university which receives direct costs and overheads relating to them.

Secondly, the department was a centre for a large number of commercial drug trials. These were run through the NHS and were funded by drug companies to test different combinations of new drug therapies, primarily for a group of infectious diseases. The NHS Trust received income for these studies which were administered by NHS staff and conducted on NHS premises.

All patients who attended the department were considered for eligibility into a commercial trial. These trials had strict criteria for entry such as the type of virus, whether or not the patient has relapsed, their age and demographics. Some patients were faced with a range of options such as whether to opt for the NHS standard of care which included regularly injecting a drug which has a number of unpleasant and potentially life threatening side effects, or to wait because they may be eligible for a new commercial trial that was coming on line imminently and which would normally involve a mixture of orally administered drugs. The standard NHS care has a good cure rate, but often the different drug combinations in the clinical trials proved more effective and were also a more palatable treatment for patients. This not only was beneficial to patients but also increased the overall departmental cure rate.

Several staff within the department felt that the different types of research (broadly investigator led studies and commercial trials) had differing status. The investigator led studies were held in higher status primarily because they involved 'basic' science, were awarded through highly competitive application processes and brought large overheads (funding) and status to the university. The commercial trials did not involve 'discovery' by departmental staff – instead the role of the department was broadly one of finding patients and administration. The funding brought into the department by commercial trials was enough to run them but did not include large overheads. These trials were however of great benefit to patients of the department as they were offered the latest treatments, and of financial benefit to the Trust (and to commissioners) as the drug company paid for the drugs and a fee to the trust to administer the trials.

The range of different research activity within the department, which also included biobank activity (collecting and storing biological samples for research) and overseas development work, together with qualitative research primarily conducted by the nursing staff, broadly covered the whole 'spectrum' of research from basic science to health services research. However, it presents a problem for the Cooksey model of research in that the 'pipeline' did not exist in a linear fashion. Participants' accounts reflected that basic science research was not always conducted primarily with a view to being of use to patients in years to come, and the findings did not get automatically translated to the next stage of research in a linear, pipeline fashion through the department. The reality was much messier, with research being dependent on achieving appropriate funding, the specialist interests of the clinician scientists and the luck of whether a particular study had positive findings (Nelson et al., 2011). However, the close proximity of the clinical service, being housed in the same department, and the leadership of senior clinician scientists meant that the conditions were conducive to conducting research with improved patient care as the focus.

5.3.5.2 Connect

The research 'domain' occupied by the Connect project was very different to the Unite department. The Connect project conducted broadly epidemiological and observational research on the prevalence, association and interactions of mental and physical health over time and across a number of physical conditions. The strength of the project from a research perspective was that it enabled the team to

link patient reported outcomes data with data from their physical health record. This connection between routinely collected sets of clinical data was rarely made in a clinical or research setting (primarily due to the separation of mental and physical health services) and the Connect project team was one of the first UK research groups to do this.

Enabling data collected through the Connect project to be used for research purposes was an important aspect of the project and one which enabled the boundary between research and clinical practice to be crossed. In order to use the patient reported outcomes data collected in clinics for audit and research, the team developed a pseudo-anonymised database which combined this data with demographic and clinical data from the hospital electronic patient record (EPR). The team gained generalised NHS ethical approval for research using this combined data, which clinical teams could access via a simple application process to the Connect team. This removed one of the major barriers to clinical teams carrying out research, as they may not have had the time or expertise to undertake the ethical approvals process. It also enabled the Connect project team to have control over the data and ensure that it was not used inappropriately. I observed this boundary work discussion on several occasions when observing the Connect project team and acute trust teams' interactions [e.g. observations 15:18/07/12; 55:05/02/12].

Data were gathered from patients with a range of physical health conditions, through clinical teams engaging with the Connect project. These clinical teams decided which patients would be surveyed and in which setting (e.g. an outpatient clinic) and the suite of questions they were asked were decided between the Connect project team and clinical teams (this was an important element of boundary work, which I shall return to in Chapter 7).

Therefore the Connect project was not based on a traditional 'bench to bedside' model, in that there was no 'basic science' research conducted within the project to 'translate'. The research to be 'mobilised' into clinical practice was the results of the validated questionnaires (which themselves were developed as a result of extensive research). This research was much more applied – in that the results could almost be instantaneously used in clinical practice, (for example to identify patients with severe anxiety and depression and to suggest an appropriate care pathway for them) together with the broader epidemiological data drawn from the total number of patients completing the questionnaires.

In summary, although both focussed on the overall goal of implementing research into clinical practice, the research domains of the Unite department and Connect project were different in two main ways. Firstly, the Unite department concentrated on scientific research in a 'traditional' sense – basic science involving cellular and virological research and clinical trials with patients. The Connect project did not involve clinical trials – this was observational research made possible by the collation of two distinct data sets.

Secondly, each case drew on different epistemological and ontological approaches linked with the academic disciplines they were associated with. The Unite department focussed primarily on the physical health aspects of the disease and patients, whereas the Connect project overtly brought together the mental and physical health needs of the patients. The Unite department was based in the School of Medicine in Gamma AHSC and took a classic biomedical approach. The Connect project was based in the School of Psychiatry in Delta AHSC which potentially took a wider approach looking at the 'whole person' and their social settings. Despite these differences, the properties of the research/clinical practice boundary and mechanisms of boundary work in each setting have much in common, as I will expand on in the following chapters.

5.3.6 Clinical practice domains

Although the research domains of the two cases were quite different, the other sides of the boundary, the clinical practice domains, were similar - both were based in NHS acute trusts treating physical health conditions.

5.3.6.1 Unite

The clinical practice in the Unite department treated patients whose conditions included cancer and infectious diseases, and patients often had complex social backgrounds. Furthermore, the drugs used in the treatment of some conditions often caused mental health issues for patients, and as such psychology services were also involved.

The clinical services were mainly provided in the Trust outpatient departments and, for inpatients, general wards. Departmental consultants also rotated through the general medicine rota, caring for patients outside of their specialty when necessary. The area of clinical practice was quite self-contained, in that much of the clinical care could be undertaken by members of the department. However some

conditions, such as cancer, required the input of a much broader multidisciplinary team including pathology, radiology and oncology.

5.3.6.2 Connect

Due to the nature of the project, which aimed to roll out patient reported outcome questionnaires in many different clinical settings, the Connect project case had many different clinical practice domains. These domains were located in self-selecting clinical teams within the two acute trusts in the AHSC partnership. The staff within these teams comprised a variety of individuals ranging from consultants to senior nurses and psychologists allied to those teams. The processes of clinical teams' self-selection were varied and provided insight into the properties of boundaries within AHSCs and the boundary work needed to cross them – I consider these processes in more detail in the next two chapters. Suffice to say here that one or two key members of these teams were in some way concerned about their patients' mental health and the interaction this had with their condition or treatment. Clinical areas partaking in the project included those treating long term debilitating chronic conditions, those where patients have suffered major trauma and those where treatments for the disease includes use of drugs which can cause depression and anxiety. Although the project started in Beta Trust, it was gradually rolled out to Alpha Trust and the number of clinical teams involved grew from one to five over the course of my data collection period.

5.3.7 Characterising research/clinical practice domain interactions

The Connect project was a very small part of what the clinical teams dealt with on a day to day basis in the treatment and care of their patients. This was unlike the Unite case, where the research domain and clinical practice domain overlapped as they were broadly located in the same department and there was regular joint practice developing knowledge about research studies and multi-disciplinary team decision making about patient care. In the Connect case, the interactions between the project and clinical teams were brief, generally without a long history of working together and specifically about implementing the Connect project. Furthermore, I observed that there were differences between clinical teams in how research active they were within their own specialty. Some teams were heavily research active, leading clinical trials, others concentrated on the clinical service. The teams who were less research active saw the Connect project as a way to become research

involved (not only to benefit their patients but also for professional development and AHSC monitoring purposes).

Therefore, although the clinical practice domains were similar as both were NHS acute services, they differed in the awareness of the 'other side' of the boundary – the research domain. In the Unite case, the conception of the 'team' reflected a potential joint field of practice, a hybrid domain whose practice based knowledge being developed was not just 'basic science' or how to treat patients, but the interactions between the two. The Connect project involved many joint fields of practice, but these were a much smaller part of the day to day work of each team. The new knowledge produced in these joint fields related to the links between mental and physical health in each of the conditions, which was used both to improve care and generate research outputs. However, the boundary work between the two domains is also influenced by what types of knowledge need to be mobilised across the differing boundaries.

5.3.8 Types of knowledge

In order to assess the properties and mechanisms of boundaries and boundary work within AHSCs, we need to have a conceptualisation of what 'knowledge' is within the cases in order to examine how it is developed and mobilised. Chapter 2 briefly outlined various conceptions of knowledge, particularly drawing on the literature distinguishing between explicit knowledge as a codified object (Polanyi, 1962) and knowledge as situated in practice (Nicolini, 2011).

Both cases regularly developed research generated knowledge which can then be codified (by publishing in a peer reviewed journal for example), but this far from the only goal of the teams. Furthermore, this codified knowledge is only a small part of the improvements to clinical care and practice that the teams wished to see.

A potentially more useful conceptualisation of the knowledge mobilised in the teams is that developed in the joint fields of practice between research and clinical care. I observed that the knowledge developed by boundary processes in the joint field of practice (Levina & Vaast, 2005) has a more tacit form (Polanyi, 1962) which links research generated knowledge directly to the patients the department or departments are treating. Knowledge is less 'sticky' (Szulanski, 2000) because it is developed in this joint field rather than in one domain or the other, and it involves the input of all actors in the team in this joint domain.

5.3.8.1 Unite

As outlined above, the Unite department encompassed a wide spectrum of research relating to a specific set of diseases, which the clinical service treated. From an epistemic perspective, the types of knowledge were many and varied and ranged from 'knowing' about the behaviour of particular cells or viruses in test tubes or mice, through to knowing what effect this may have on individual patients. These different types of knowledge were brought together, or created, in a joint field spanning both research and clinical practice domains.

The skills required to generate new knowledge in this joint field was held by different members of the team. From the interactions I observed, particularly in the research meetings, these skills can be characterised in different ways. For example, it appeared that basic scientists knew about 'how T cells work', clinician scientists applied this to the physiology of individual patients. Clinical nurse specialists knew which patients may be eligible for which commercial trials, which was not just based on their clinical presentation but also on their personal circumstances. Trials administrators knew the timescales of internal regulatory processes and whether a particular trial, which required fast recruitment, would be approved in time. All of these types of knowledge were crucial to boundary work between the research and clinical practice domains and relate to organisational and professional issues as well as epistemic ones. This challenges traditional linear models of knowledge mobilisation which view knowledge as published research evidence (Balconi et al., 2010; Cooksey, 2006). Instead, these different types of knowledge were brought together (or co-created) by boundary spanners, such as clinician scientists, in the joint domain. Creating this 'new' knowledge by combining that from the different domains also acted as a boundary object drawing those from both domains together. I will analyse this process further in Chapter 7.

5.3.8.2 Connect

In the Connect project case, the 'knowledge' mobilised across boundaries to help the project achieve its goals (improved mental and physical health) was not just codified and research generated. As I observed on a number of occasions [e.g. observations 5:13/04/12; 10:13/06/12; 11:29/06/12] the Connect project team shared already established research generated knowledge (that of a validated mental health questionnaire) with clinical teams. The physical health teams brought knowledge of the specific physical health condition and their clinical settings (where

data would be collected from patients). Therefore the 'new' knowledge developed in the joint field of practice on the boundary between the teams was how these two elements (physical and mental) relating to patient care interacted. The physical health teams ultimately wanted an understanding of the questionnaires, what to do with the information inputted by patients and what the onward referral processes were when needed. One of the main reasons they took part in the project was to provide better clinical care for patients with (often previously undiagnosed) mental health problems.

For those that were interested in research, the knowledge mobilisation was less unidirectional than 'bench to bedside' would suggest. The research studies would draw on the mental health researchers' expertise combined with the physical health clinicians' knowledge of the particular physical health issue. The Connect project lead specialised in this area of knowledge (on the boundary between mental and physical healthcare and the research on it). As such the new joint fields of practice were many, but were a small part of the work of any one team. The added value the Connect project brought was to draw these elements together – this was then used in a codified manner (published in peer reviewed journals) and also to further the project across the wider AHSC.

In summary, in line with the second and third generations of knowledge mobilisation literature, the 'knowledges to be mobilised' are complex and do not fit a neat 'bench to bedside' linear model. They do include research generated codified knowledge, but this is one part of that knowledge developed in the joint fields of practice on the boundaries between the domains. This practice based knowledge is developed from multiple sources and individuals which come together to actually make changes in clinical practice, and includes both tacit and explicit dimensions (Polanyi, 1962).

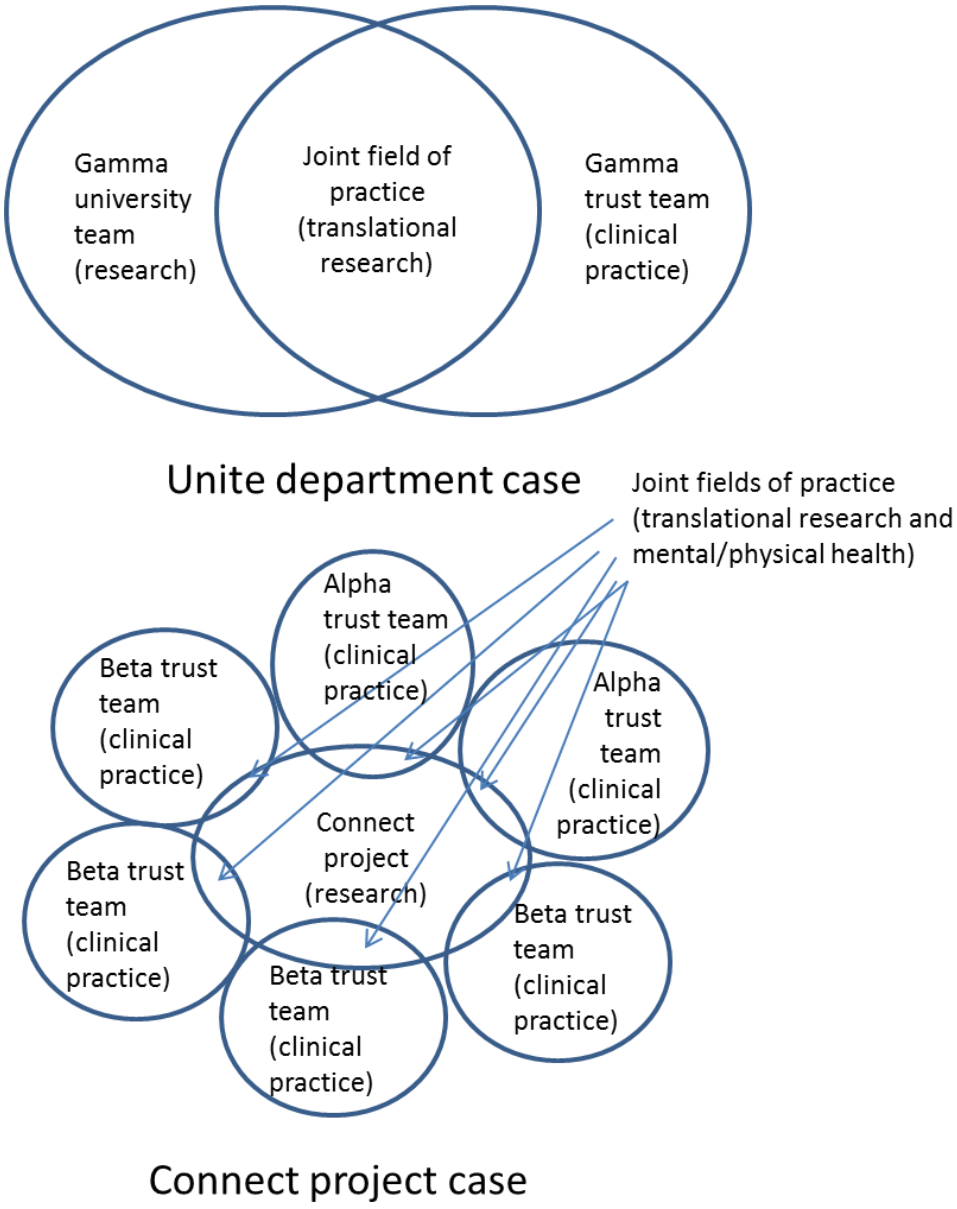


Figure 4 Tracer cases and their fields of practice

5.4 Conclusion

The purpose of this chapter was to outline the two tracer cases which I will use to analyse the properties and mechanisms of boundaries within the AHSCs. It has highlighted the key features of the two cases in relation to the research/clinical practice boundary and their organisational contexts and drawn out the differences and similarities between them.

Although the two cases were both positive examples of front line teams working towards the AHSC goals, they had different organisational contexts within the

AHSCs. The well-established Unite department saw itself as broadly independent from the wider Gamma AHSC. The team saw the boundary work undertaken in the department as being despite the organisational barriers present in the AHSC, rather than being facilitated by any organisational level changes. The path dependent trajectory of the department was being followed regardless of the AHSC development. Staff were motivated by interest in the research field and a desire to improve care of patients by being able to offer them the latest treatments.

The Connect project has a different relationship with the wider Delta AHSC. Although the initial boundary work to establish the project took place at a local level and was driven by two parties keen to collaborate, Delta AHSC then played an important role in encouraging the spread of the project, through funding and organisational support. This support meant that there were regular reporting requirements and cross AHSC work undertaken by the Connect project team, which was an important manifestation of the AHSC project.

Furthermore, the two cases had differing research and clinical practice domains, and the knowledges requiring mobilisation between them varied. The Unite department undertook a wide variety of research from across the spectrum, ranging from basic science to commercial clinical trials and provided a clinical service for patients under one specialty. The Connect project undertook more applied research and mobilised knowledge with several clinical services.

The differences (and similarities) between the cases enables a fuller examination of the 'research and clinical practice boundary' within AHSCs and its epistemic, professional and organisational properties. Furthermore, both cases have similar examples of boundary work, including the role of clinician scientists, and boundary objects. Key questions to consider between the cases therefore are: how similar are the epistemic, professional and organisational elements of the research/clinical practice boundary? To what extent do the different organisational contexts, path dependencies and maturity of the cases impact on boundaries and boundary work? How do the epistemological and ontological differences of the research domains impact on boundary work?

This chapter has set the scene and highlighted the key features of the cases. The next Chapter (Chapter 6) will examine the properties and nature of the research/clinical practice boundary in both cases through three key lenses

(epistemic, professional and organisational), all potentially relevant literatures as outlined in Chapter 2. Chapter 7 will consider the boundary mechanisms (or boundary work) associated with mobilising knowledge across the research/clinical practice boundary.

Chapter 6 Findings: Research/clinical practice boundary properties

"One major issue is that scientists dislike clinicians."

[Gamma AHSC, Unite case, Clinician Scientist, Interview 46]

The purpose of this chapter is to outline the properties of the research/clinical practice boundary and how they impact on knowledge mobilisation processes in the case AHSC partnerships, and in particular, in the tracer cases. In doing so it addresses the research question:

What are the properties of the research/clinical practice boundary and how do they manifest in AHSCs?

The previous chapter outlined the key features of the tracer cases, including their organisational contexts, framed the research and clinical practice domains occupied by both cases and outlined the types of knowledge the teams aimed to mobilise. This chapter will use this context to examine the properties of the research/clinical practice boundary in the tracer cases through epistemic, professional and organisational lenses. In so doing, it will contribute to addressing the gap in the literature, highlighted in Chapter 2, regarding the under-analysed nature of boundaries in knowledge mobilisation processes (Lamont & Molnár, 2002; Oborn et al., 2013b).

Epistemic boundaries are those between groups with different ways of knowing (Knorr Cetina, 1999). They are social and cognitive in nature. Different ways of knowing, or conceptions of knowledge, may ensure that knowledge can 'stick' to the communities in which it is created (Brown & Duguid, 1991; Brown & Duguid, 2001; Szulanski, 2000). Professional boundaries are delineated by the jurisdictional battles between groups over a particular set of work and knowledge practices (Abbott, 1988). This boundary therefore has both 'formal' (professional qualifications and requirements to practice certain tasks) and 'informal' elements

(the power dynamics between doctors and nurses for example). Organisational boundaries are relatively firm and formal, and delineate the 'edge' of sovereign organisations, which may manifest themselves physically in the form of geographical separation, separate IT systems, separate HRM practices (Hernes, 2004).

The distinction between the three boundary types is not fixed and there is much overlap, especially between the epistemic and professional framings (as different professional groups draw on and create different knowledges). However it provides an analytical framework (drawing on relevant literatures) through which to specifically analyse the research/clinical practice boundary.

As outlined in the previous chapter, both tracer cases represent attempts within the AHSC context to 'integrate research, education and patient care' and move research findings into clinical practice. The Unite case is an 'exemplar' AHSC service model being an integrated department undertaking basic science, commercial trials, NHS care and education in an infectious disease specialty. The Connect case aimed to integrate mental and physical healthcare through a project which started as a local collaboration but then expanded once funded by the wider AHSC.

The findings presented in this chapter are based on data collected through observations of interactions (as outlined in Table 2), as well as interviews within participants from both tracer cases.

This chapter is structured as follows. Firstly it will outline the properties of the research/clinical practice boundary through an epistemic lens. Secondly it will examine the aspects of the boundary created by professional groups and thirdly those arising from the organisational distinctions (primarily focussed around the 'physical' dimensions). In conclusion this chapter will draw the findings together and reflect the differences and similarities of the boundary properties between the two tracer cases.

6.1 Epistemic boundaries

The epistemic element of the research/clinical practice boundary refers to the factors which distinguish the different types of knowledge developed and used in the two domains, how the groups obtain this knowledge and the impact this has on how it is mobilised.

The tracer cases in this study, as outlined in Chapter 5, were operating in different domains with different research and clinical knowledge bases. The Unite department operated across the range of the 'translational research' spectrum – from basic science through to commercial clinical trials, through to treating patients with the NHS standard of care. The Connect case attempted to mobilise more applied knowledge into an unfamiliar clinical setting. As such, the epistemic cultures and their ontological underpinnings varied (Knorr Cetina, 1999). There were however commonalities between the two cases.

This section first outlines the epistemic manifestations of the 'basic science' research/clinical practice boundary and draws some inferences from across the two cases. This epistemic boundary was largely anticipated from the literature review. However a further type of epistemic boundary emerged from the data in relation to the Connect project (unsurprisingly given its core aims) – that between mental and physical conceptions of health, healthcare and associated research. For the Connect project this mapped onto the research/clinical practice boundary (in that mental health researchers were mobilising knowledge to physical health clinicians) and as such warrants some analysis in this section.

6.1.1 Research and clinical practice

Despite the differences in organisational context, knowledges and epistemic backgrounds of the communities, the epistemic boundaries in both tracer cases showed similar features. The boundaries were visible yet permeable.

In both cases, the range of knowledges was represented and generated through different aspects of the teams' work, which I observed throughout the data collection process. This distinction was visible though the various meetings, or boundary interactions (Wenger, 1998) held (see Table 2), which I observed, and was also alluded to in interviews. I make two related points in this section – firstly, I outline the differences between the epistemologies of knowledge in the two domains, and secondly that despite these, knowledge was not too 'sticky' (Szulanski, 2000) and the boundaries were permeable, and perhaps better conceptualised as a joint field of practice (Levina & Vaast, 2005).

6.1.1.1 Epistemology of knowledge in the two domains

In the 'basic science' domain in the Unite department, codified knowledge was generated through the traditional scientific method, through the study of cells and

viruses in lab based settings. This knowledge was derived from work at the microscopic level:

> *"So I'm still very much an immunologist and my background is cell biology and T-cells and K-cells, so I don't necessarily do disease models either, I just try to figure out how T-cells and K-cells work and recognise target cells." [Gamma AHSC, Unite case, Basic Scientist, Interview 47]*

Codified knowledge was derived through lab based experiments and scientific models, generated both from the Unite department and also the wider (basic) scientific community. The process of knowledge generation was akin to that described by Löwy (1996) in her ethnographic study of a cancer trial.

The key features of this knowledge, and therefore the epistemic boundary, was its specialised nature, which appeared highly complex to those operating broadly in the clinical practice domain:

> *"I wouldn't say I was particularly academic and going to some of the research meetings … I found that some of it was almost a bit too sci-fi. I thought, I need to probably understand a bit more about the methodology here and a bit more about the stats" [Gamma AHSC, Unite case, Nurse, Interview 39]*

This was also the case for basic scientists when attempting to understand the more clinically based knowledge:

> *"all the questions in my head don't get answered because they're all very basic science questions.. I find the very clinical research […] there's a bit of a difficulty to getting the backgrounds." [Gamma AHSC, Unite case, Basic Scientist, Interview 47]*

At the other end of the spectrum, clinical staff on the frontline treating patients gained their knowledge from many different areas, including research evidence, experience and the patient, as in the following quote from a clinical nurse specialist:

> *"Predominantly I'm employed to be a Nurse Specialist. So I deal with [specialty] patients. We do a lot of clinical trials so when we are doing a discussion and an assessment for patients, when we first see them we actually talk to them about the fact that we are a research unit and the availability for studies should they require them really. Or should they want to be involved in that and to have access to newer treatments. So that's part of what I do really. And the other part of my role is sometimes if patients don't actually respond to the standard of care then you then talk to them about opportunities to be part of a clinical trial for their category; basically whether they've been a non-responder or a relapse.." [Gamma AHSC, Unite case, Nurse, Interview 28]*

And an NHS physician:

> *"I still do general medicine, so I still have a general medicine take, I look after in-patients, out-patients, across two different sites and it's a full time NHS job." [Gamma AHSC, Unite case, Medical doctor, Interview 33]*

On the clinical side, the knowledge generated was more sociologically informed. For example, within the clinical meetings [observations 37:14/01/13; 45:28/01/13; 61:11/02/13; 73:25/02/13; 83:11/03/13] where the multidisciplinary team discussed with patients would be eligible for clinical trials, clinical (particularly nursing staff) brought a dimension from the patient perspective:

> *One patient was highlighted as meeting the clinical criteria for a particular commercial trial. The Clinical Nurse Specialist explained that while he was very keen on getting onto a trial and starting treatment, his living conditions may not be suitable. She explained that he was currently seeking asylum and was staying in temporary accommodation. He was sharing a bedroom and therefore did not have anywhere private to lock away the injecting equipment and drugs he required. The Clinical Nurse Specialist felt that unless his circumstances changed this would make him unsuitable for the trial [observation 73:25/02/13]*

This knowledge was developed through interactions with patients and was more tacit in nature. Experienced clinical (particularly nursing) staff gained this knowledge not through scientific experimentation but through interactions and experiences with patients, with tacit knowledge forming over time over which patients may be suitable for enrolment onto a trial.

Despite the different contexts and purposes of the Connect project, similar findings were noted about the epistemic boundaries. In this case, the ontological underpinnings of the research domain (broadly members of the Connect project team) were more applied. Their 'research generated' knowledge was not derived from laboratory based experiments. Rather, it came from (undertaking and reading) more epidemiologically informed studies, with the subject matter being humans rather than cells or viruses. Further, the senior individuals in the core team also practiced clinically, and therefore had an understanding of the ontological and epistemological underpinnings of clinical practice. The epistemic framing of the physical health clinical teams was similar to that of the clinical domain in the Unite case.

The way knowledge was generated within the respective communities did not appear to block knowledge mobilisation between them. In both cases, in the interactions I observed, there appeared to be sufficient respect and acknowledgement that all the knowledges (regardless of their ontological

underpinnings) had something to contribute to achieving the goals of the department. Interestingly, within the teams there did not appear to be much conflict between those on either side of the epistemic boundary. The boundary appeared to be one of joint work rather than demarcation. I reflect on the boundary work undertaken in this joint space in Chapter 7 and on the conceptualisation of boundary as joint space rather than demarcation further in Chapter 8.

6.1.1.2 The epistemic boundary as a joint field of practice

The second related finding was that despite the drive for knowledge mobilisation across the two domains, and the ability of staff to understand both camps, the epistemic boundary was not necessarily seen as a negative manifestation or a block to knowledge mobilisation. Participants acknowledged that the knowledge bases of scientists and clinicians were different and this was not necessarily problematic. Some of the basic science undertaken in the Unite department did not yet have any clinical implications and scientists were not necessarily working on disease models. Clinicians reflected that they did not need to have an in depth understanding of molecular biology in order to treat patients effectively, even when discussing clinical trial options with them. However, participants did acknowledge that, in order to facilitate advances in translational research, where 'science' is applied to a clinical problem, work at the epistemic boundary was needed. This manifested itself as 'new knowledge' being generated in a joint field of practice – this concept will be explored further in the next chapter.

The joint fields of practice (Levina & Vaast, 2005) demonstrated that the epistemic boundary was permeable in both tracer cases, but this was for different reasons. In the Unite department, many staff had grounding in both epistemic communities. Most of the medical staff were either clinician scientists or NHS clinicians with a significant research component to their work. This also applied to the nursing staff, where NHS nurses had a significant research component to their practice and were trained appropriately (such as through good clinical practice certificates, or by undertaking further academic work such as through a Masters in Research). As such a significant proportion worked in the joint field of practice between the research and clinical practice domains. How these individuals worked as boundary spanners in practice will be analysed further in the next chapter.

Within the Connect project, the epistemic boundaries were also permeable. This appeared to be because the ontological underpinnings of the research undertaken

by the Connect project team (collecting patient reported outcomes) was more 'applied' - it did not involve molecular biology, or mice. In the linear model, it was 'further along' the continuum towards clinical practice. This made it accessible to clinical groups operating in a different specialty, as I observed in interactions between the teams. Also, like the Unite department, once boundary work was incentivised (in this case primarily through a desire to improve the mental health of acute trust patients), 'new knowledge' generated in the joint fields of practice required the skills and practice based knowledges of both domains. In the Connect project, this joint work manifested itself as a boundary object (Star & Griesemer, 1989) in the form of collaboration around patient data.

Mobilising knowledge across the (epistemic) research and clinical practice boundary was more than information sharing, it required some form of knowledge 'translation', (e.g. through clinician scientists, or in interactions such as 'trials' meetings). Further, as noted above, contrary to what might be expected from the literature (e.g. Knorr Cetina (1999)), epistemic elements of the research/clinical practice boundary in the frontline tracer cases appeared to not create much conflict or political difficulties, unlike the professional and organisational domains at the meso level within the AHSC partnerships (as outlined in the previous chapter). Therefore, in Carlile's (2004) language, the epistemic boundaries in this case appeared to be primarily semantic rather than pragmatic or syntactic.

6.1.2 Mental and physical health

The second feature of the epistemic boundary between research and clinical practice in the Connect project was that of mental and physical health. Interest in this element emerged inductively from the observation and interview data as part of my ongoing analysis. Despite extensive searches and asking relevant experts in the field who may be able to guide, I did not find any literature directly examining the mind/body dualism as an epistemic boundary. It was, however, a key feature in the Connect project case, appearing to be another dimension of the (epistemic) research/clinical practice boundary and therefore I consider it here.

A key feature of the mental/physical health epistemic boundary appeared to be to what extent communities and individuals considered a 'whole person' approach to the care of patients. In other words, were patients' mental health needs thought about alongside their physical ones as part of a care package and were care givers

aware of the inter-relationship between the two? As a Connect project team member reflected:

> *"it can be a challenge to get physical health teams really on board about the importance of mental health. It doesn't seem to be … it's not prioritised or integrated into their way of thinking." [Delta AHSC, Connect case, Non-Clinical Researcher, Interview 8]*

This difficulty was despite physical health teams self-selecting to be part of the Connect project, and therefore already acknowledging the importance of mental health in treating their patient cohort. One Connect project team member reflected on the 'whole person approach' distinction when describing how education sessions with the different teams were shaped:

> *"So some teams have really not seen any alternative to dealing with psychological need, the way they've always approached it is with their patients as .. whole people. And often they don't have specific knowledge, and maybe muddle through a bit, but their intention has been very much to address the whole person, and that takes you such a long way. And to be able to start from that framework …and to .. add in some booklets and some strategies, that's quite easy, really.*
>
> *It's the beginning to talk about psychological stuff that's more difficult to do. I mean, in some services there's a .. culture of .. very frantic, very fast moving, and they're just not feeling that there's any space to do more psychological stuff." [Delta AHSC, Connect case, Clinician, Interview 11]*

It may be that the different epistemic cultures on either side of the mental/physical health boundary stem from the fact that knowledges about mental and physical health are formed in different ways. Physical manifestations of an individuals' ill health are often visible or can be validated with external diagnostic tests using biological data (e.g. blood). Mental health diagnosis and treatment (knowledge) often cannot be diagnosed in the same way, may not be visible or validated through physical specimens and therefore may be considered less tangible. The knowledge used to identify mental ill health may be more tacit in nature. Whereas care providers may be confident in using their knowledge to manage a variety of physical conditions, even if not their specialty, they may be less certain about mental illness. The Connect project team saw overcoming this boundary as part of their role:

> *"one of the main goals of the Connect project is to just raise awareness and for people to not feel that identifying addressing, managing psychological need is difficult or beyond them or onerous or scary." [Delta AHSC, Connect case, Clinician, Interview 11]*

The epistemic boundary between mental and physical health was visible within the Connect project and, like the wider research/clinical practice boundary, was permeable through interactions (such as the education and training of clinical teams [observations 14:16/07/12]), and objects (such as establishing appropriate care pathways (Allen, 2009)) by trained boundary spanners (psychologists and liaison psychiatrists, and researchers) in the Connect project team. I will expand on these approaches in Chapter 7.

In summary this section has considered the epistemic elements of the research/clinical practice boundary. The overarching finding was that although visible, the epistemic boundaries in both cases were permeable (through competent boundary work) owing broadly to their cognitive natures as well as having fewer pragmatic qualities (Carlile, 2004). Further, this section has briefly introduced the concept of a mental/physical element to this epistemic boundary, a finding inductively driven from the Connect case. The paucity of literature on boundary framings of the mental/physical health dualism, together with the findings noted above, makes this a potentially exciting area for future research, which I will return to discuss briefly in Chapter 8.

The different epistemic cultures of the research and clinical practice (and mental/physical healthcare) domains are inextricably linked to the professional cultures of the communities they bound. The distinctive (and broadly separate) training and socialisation of different groups of clinicians, or researchers in their respective professions reinforce the concept of boundaries between the domains. It is to these 'professional' boundaries I now turn.

6.2 Professional boundaries

Boundaries define professions and professional work and maintaining them is a key part of professional life (Ferlie et al., 2005; Powell & Davies, 2012). Healthcare is well represented in the professions literature which has a particular focus on the boundaries between doctors and other healthcare groups including nurses and allied health professionals, and doctors and managers. The relationship between the latter combination has also been framed as hybridisation of the two roles (McGivern et al., 2015; Numerato et al., 2011). However, little attention has been given to the professional elements of the research/clinical practice boundary (Wilson-Kovacs & Hauskeller, 2012). Conceptualising this boundary as professional

is useful as it helps us consider the domains by virtue of the specific tasks members complete and their socialisation through professional training (rather than this being limited to the way they view knowledge, as in the epistemic boundary).

In these positive cases, although I observed that professional roles of individuals were identifiable and visible through the allocation of tasks (Abbott, 1988) the boundaries between them appeared to be less about demarcation than the literature suggests. Each team member knew their work role in the departmental/project work and were respectful of other roles in the knowledge mobilisation process.

This section will first outline the properties of the professional boundaries between 'researchers' and 'clinicians' in both cases. It will then consider the context of the wider professional boundaries in the cases between members of the different healthcare professions, including those between 'mental health' and 'physical health' professionals, again a category which emerged inductively from the data as the per previous section on epistemic boundaries.

6.2.1 Researchers and clinicians

The professional boundary between 'researchers' and 'clinicians' was visible in both cases, through both the division of tasks and work practices between the two communities. At first sight, in line with linear conceptions of the knowledge mobilisation process, these boundaries appeared more permeable in the Connect project (using applied research) rather than the Unite department (with basic science). In the Unite department, one clinician scientist who managed both basic scientists and clinicians as part of his research team reflected on the relationship between the two groups:

> *"I spent a year and a bit in a basic science lab and I wasn't comfortable […] One major issue is that scientists dislike clinicians. It's not a big generalisation but it's often what you see. There's a preformed notion and I've seen it and there are very good reasons for that. Clinicians can be very arrogant they can assume that they know a lot of things and although they might be true it's the way they portray it. I think we've been given a bad name with the lack of humility, and a lack of recognition for the skills that the scientists possess. They might not be able to have that kind of clinical insight and understanding pathogenesis but they have very, very good robust quality control and they do their job very, very well on the whole.*
>
> *But on the flipside scientists need to also be very cognisant of what clinicians have to offer and the fact that actually clinicians can be a clinician scientist and have that niche role and bridge the two but it's being aware of one's boundaries in a way of one's limitations and some clinicians are not and*

some scientists are not. I think that's the way I see it and if you have an appropriate level of respect and understanding for the job that each other do then you can work reasonably well in harmony but often that's not the case unfortunately." [Gamma AHSC, Unite case, Clinician Scientist, Interview 46]

This quotation reflects the battle for jurisdiction (Abbott, 1988) that is a key feature of professions working to define their boundaries. This battle is further illuminated in the following quote from a research active NHS clinician when discussing his perceptions of the 'elitism' of basic science:

CF: "So where do you think that elitism [of basic science] comes from?

I mean I think it's historic and I think as I say because I think translational medicine is a relatively new concept, and because the incumbents in the senior position in the university mainly come from a basic science background. I think it is just simply the fact that they have done, and increasingly we seem to have academics who actually have no clinical interactions, they don't see patients at all, and to my mind that's actually sort of missing the point of medical research.

You know that obviously there is a place for pure basic scientists but I think if you don't actually have clinical responsibilities you don't quite fully understand the interaction between science and medicine." [Gamma AHSC, Unite case, Medical Doctor, Interview 30]

These findings highlight the nature of boundary demarcation between the two groups and the fact it is related to identities of the two communities as well as the work tasks they undertake. However they also both allude to the joint field of practice (Levina & Vaast, 2005) locating boundary work between the two domains, which reflects the nature of the positive cases and the commitment of the department to the knowledge mobilisation process. This is similar to other studies which have considered this form of boundary work, such as Wilson-Kovacs and Hauskeller (2012). The most visible form of this boundary work within the Unite department was that a number of staff undertook tasks within both professional domains. The clearest examples of this were clinician scientists who undertook basic and clinical research as well as clinical duties. The role of these clinician scientists is an important feature of boundary work in both cases and I consider it in more detail in the next chapter.

In line with the linear model of knowledge mobilisation, the professional boundary between the more applied researchers and clinicians appeared more permeable in the Connect project. In this case, I observed, the tasks between researchers and clinicians were clearly different, were a small part of each groups' work roles and

therefore did not result in a 'battle for jurisdiction' between the two groups – they were not encroaching on each other's work domains. As such a joint field of practice appeared easier to develop. Working together on the Connect project was considered positive by both sides and something that they both chose to do.

6.2.2 Healthcare professionals and their boundaries

The professional boundaries between different healthcare groups in the two cases were also relevant to knowledge mobilisation processes within the cases and wider AHSC. Perhaps unsurprisingly, given the positive nature of the two cases, boundaries between healthcare professions were relatively permeable compared to most study findings (for example Ferlie et al. (2005)).

In the Unite department case, the professional boundary between doctors and nurses for example was visible through a division of work tasks (not necessarily sources of knowledge as per an epistemic framing). The nursing staff were trained in both research and clinical care and drew on knowledges from both epistemic communities. These dual roles were largely driven by the senior nurse, who, I observed, had a strong sense of responsibility to the patients as well as the professional development of the whole nursing team. The nursing team undertook much of the front line clinical care of patients in both commercial and investigator led studies, as well as standard NHS care. They held many of the discussions with patients about the clinical trials available and many of the regular appointments with patients. Medical care was reserved for the more complex cases.

Therefore, although the professional boundaries were observable and present, there was little evidence of active boundary demarcation by the groups, and the boundaries did not restrict the process of knowledge mobilisation in this case. In interviews participants felt that the relationships between the medical and nursing staff were generally strong and that all members of staff were approachable. This was supported by the many observations I undertook of team meetings and corridor interactions between medical and nursing staff. Indeed, the nursing participants I interviewed felt that the relationships between themselves and the medical staff were some of the best they have had in their professional career.

Interestingly however, the team often reflected that professional boundary crossing in the team operated despite the AHSC development, not because of it. One participant felt that the line management model imposed when the Trusts merged

reinforced professional boundaries and impeded the delivery of both research and clinical objectives:

> *"So the Trust has never got to grips with management properly, so within the Trust we have Nurses who answer to senior Nurses, Doctors who answer to senior Doctors, Porters who answer to senior Porters, management who answer to senior management and they have missed the point completely about sensible management structure is that you create a unit, and a unit requires all of those disciplines but its relatively self-governing with the leadership of that unit being accountable to you know the CPC or whatever.*
>
> *And so we've tried to achieve that working as a unit across all the disciplines and that not just, you know obviously across all the disciplines of clinical delivery but also research delivery as well.*
>
> *.. originally when this was set up as an AHSC we were supposed to be clinically academic run units - that's what the aspiration was, that's what the unique selling point was, that was the basis of the integration of the three hospitals and it's entirely spin. It's not how it's been implemented in practice. I think we're reasonably integrated but I think we work at making sure it's integrated." [Gamma AHSC, Unite case, Clinician Scientist, Interview 23]*

This quotation reinforces the view present within the department that they were 'all in it together' working for the benefit of their patients and despite the wider bureaucratic and organisational issues in the AHSC. It also recognises that being 'integrated' takes work and does not happen automatically – the natural state of affairs is for staff to demarcate professional boundaries (Ferlie et al., 2005; Powell & Davies, 2012). Furthermore, appropriate leadership appeared vital in this boundary spanning process – by senior nursing staff and senior clinician scientists – particularly the Departmental Head. I will return to examine the role of senior clinician scientists as boundary spanners (of epistemic and organisational, as well as professional boundaries) in more depth in the next chapter.

6.2.2.1 Mental/physical health professional boundaries

The main clinical professional boundary manifest in the Connect project was that between mental and physical health professionals. The Connect project team consisted of researchers and clinicians with mental health backgrounds, who were working with physical health multi-disciplinary teams, some of whom had little experience in mental health. This professional boundary was underpinned by epistemic differences, as noted in the previous section, and some physical health clinicians attributed their difficulties with this area to professional background:

> *"So it has occasionally caused a bit of upset but I think that's mainly because it's not an area that .. most of us are [specialty] inclined. We're not*

psychiatrists, or a psychologist or whatever. So it has been out of our comfort zone a little bit." [Delta AHSC, Connect case, Medical Doctor, Interview 20]

However, the physical health teams had a range of professionals working within them, and had self-selected to be part of the Connect project. Each team normally had an individual who was particularly keen on engaging the Connect project and delivering it in their clinical setting. The profession of this individual differed from team to team. In some cases it was driven by medical consultants, in other by allied health professionals including pharmacists and physiotherapists, and a nurse consultant in another setting. I observed that these individuals were influential within the teams and appropriately engaged other staff in order to ensure the roll out of the Connect project. Perhaps unsurprisingly, professional boundaries within these teams were relatively permeable when navigated by the initial individuals interested in Connect. The permeability of these boundaries was also evident in the interactions I observed between the Connect team and clinical teams, for example in the training sessions run the Connect team [observation 14:16/07/12]. The team reflected on some differences in the professional groups they were teaching but overall commented that most were engaged in the process:

"CF: And have you found a difference between any different professions, say, between nursing, teaching nurses and teaching physicians or surgeons?

In some ways the most receptive groups that I've worked with have been the therapy groups, so Physio and Speech and Language Therapy, and I think that's because this kind of approach, the kind of problem solving approach, is quite inherent in their training and the way they do things. With nursing, I think there is still something around an orientation towards care as opposed to supporting the patient towards problem solving, so this kind of stuff can be a bit different from that. And sometimes with physicians, it can't be the ideal role, I've only a got seven minute consultation, it's got to be other members of the team who do this. But actually that's varied, and I think it varies on the kind of personality and the path that someone's taken to where they are now through their training and their professional experience. And I do think it's absolutely crucial we have some kind of impact on physicians." [Delta AHSC, Connect case, Clinician, Interview 11]

The Connect project team also reflected on a difference in the way professionals interacted with each other in a physical health setting compared to a mental health setting:

CF: And have you found a difference being from a mental health background and going into a physical health environment?

Participant: Yes, I think there are some differences. I think, if anything, the hierarchy seems even more apparent in the physical health settings - the hierarchy between the doctors and the nursing team. The researchers and nurses call their supervisors doctor this and doctor that, whereas I wouldn't feel comfortable doing that in the mental health settings … it doesn't seem to be part of that culture. But particularly in specialties like surgery, it seems very hierarchical. And I think it can be a challenge to get physical health teams really on board about the importance of mental health. It's not prioritised or integrated into their way of thinking. And particularly the more senior, more experienced doctors, who I'm sure are amazing in what they do, but then they're not very open to taking up the training we're offering in mental health..

CF: And how have you tried to overcome some of those issues?

Participant: Well, I mean, we're offering the training, and [Connect team member] developed this core mental health skills course, which she's been delivering to the [clinical specialty] team, and it's open to all, but she does report that it's the nurses that have been coming. They're the ones who seem to sort of take on board the psychological considerations probably more than the doctors. … I think it's just more part of nursing culture, is to ask patients how they're doing and how do they feel, rather than focus on the actual pathology" [Delta AHSC, Connect case, Non-Clinical Researcher, Interview 6]

This quotation demonstrates that although professional boundaries remain present and visible, they are permeable with boundary work (which will be further analysed in the next chapter).

In summary therefore professional boundaries were visible in both cases but were permeable and did not necessarily hinder knowledge mobilisation processes. The conceptualisation of the research/clinical practice boundary as a professional one is perhaps more relevant to the Unite department, as this was a well-established case with the possibility of boundary tensions and battles over jurisdiction, whereas in the Connect case clinical teams largely self-selected to participate in the project and there were fewer potential jurisdictional battles. The professional boundaries in this case were primarily about mental and physical health practice and knowledge, which is perhaps better analysed through an epistemic lens.

In the Unite department, professional boundaries between medical and nursing staff were present but not barriers to effective joint working as staff on both sides of the boundary were respected and knew their roles in the team. The professional boundary between basic science researchers and clinicians was also visible and salient and some tensions were commented on by participants. However working across this boundary was fundamental to solving the 'scientific puzzle' and

improving patient care – both key motivators for staff. Therefore, despite real and potential tensions and battles over jurisdiction between scientists and clinicians, this boundary was permeable and knowledge exchange was pursed and broadly not limited. I will consider this boundary work in more detail in the next chapter.

Like the epistemic elements, the professional manifestations of the research/clinical practice boundary had the potential to develop pragmatically (Carlile, 2004) due to the wider vested interests and political nature of professional groups. However, in these cases, they broadly remained semantic – knowledge required some form of translation between groups (e.g. the development of mental health skills or training of nursing staff in research skills) but it did not appear to take on a political nature.

Interestingly over the two cases there were few findings which related to the professional boundaries between managers and clinicians. In both cases, managers (as a grouping) were not largely present. However, several of the senior clinician scientists (including medical, nursing and AHP staff) held various management positions in both trust and university settings, and as such were able to span epistemic, professional and organisational boundaries. I will analyse this process more fully in the next chapter.

6.3 Organisational boundaries

As outlined in Chapter 2, the application of an organisational boundary approach to knowledge mobilisation processes in healthcare has been limited (Oborn et al., 2013b). Traditional conceptions of external organisational boundaries are as stable, unambiguous, formal and defined entities (Paulsen & Hernes, 2003). This conceptualisation has been subject to some challenge, through the concept of the boundaryless organisation (Ashkenas et al., 1995) or bringing the boundary to the centre stage of analysis (Hernes, 2004). Internal organisational boundaries are seen as problematic entities which require elimination (Tushman & Scanlan, 1981).

The principal organisational manifestation of the boundary between research and clinical practice in both cases was that between the universities and the NHS trusts. As I outlined in Chapter 4, working across these organisational boundaries was at the heart of the missions of the AHSC and the subject of much discussion and effort at the organisational level. The particular characteristics of this boundary relate to the fact that research and clinical practice take place in separate organisations with separate funding streams, governance structures and accountability mechanisms.

Further, the organisational boundaries between sovereign NHS foundation trusts in Delta AHSC also proved problematic to the development of knowledge mobilisation processes. These boundaries reflect 'social' and 'physical' boundaries evident in Hernes' (2004) framework.

This section will examine how organisational boundaries manifested at the tracer case level. It will consider three examples of this across both cases: estates, IT systems, and human resource management (HRM) practices. Organisational boundaries, unlike epistemic and professional ones, remained largely impermeable and presented constant barriers to knowledge mobilisation processes which required 'workarounds' as overarching solutions were out of the control of the Unite department/Connect project.

6.3.1 Estates

In both cases organisational boundaries were the most visible due to the physical separation of different departments and positioning both within and between campuses.

I observed how the space in which the Unite department operated played a key role in how the service functioned. The main location of the department was in the main building of the hospital, which was owned by the NHS trust. However the clinical facilities in this area (the space for seeing patients) were technically research spaces leased by the trust to the university, the development of which had been primarily funded through a large charitable donation. However, this space was also used to see and treat NHS patients. This dual use of space, whilst providing an integrated location for research and clinical care, and a seamless service for both NHS and research patients, caused many problems, which reinforced the impermeability of organisational boundaries within the AHSC. For example, even the use of university offices by staff holding NHS contracts was problematic:

> *"The number of times that they've tried to evict me from this room because this is university space and I'm NHS employed and they want me to have an office over in [another department] which is an NHS department and all credit to [former departmental head], he defended that quite rigorously, and again I guess one of the advantages of the AHSC and this coming together of University and Trust is that it is now easier to cross charge and transfer, and what have you." [Gamma AHSC, Unite case, Medical Doctor, Interview 33]*

Furthermore, the dual use of clinical space for both NHS and research patients caused regulatory complications, as outlined by one participant:

> *"So we get a Trust health and safety check because of course there's NHS patients. And then we get the academic health and safety check because there's labs.." [Gamma AHSC, Unite case, Nurse, Interview 29]*

These issues however were not insurmountable for staff who were driven by a patient centred approach and were prepared to develop knowledge of the other domain:

> *"Why I wouldn't I want to take responsibility or do anything to sort out a college issue when I'm NHS. Or vice versa. My patients are on this floor and therefore I'll sort out anything. Their safety is not compromised because I'm the only one to contact." [Gamma AHSC, Unite case, Nurse, Interview 29]*

The organisational boundaries remained consistent and stubborn, but were less salient as boundary spanning individuals, particularly those in leadership positions, were able to bypass some of the core issues by working around the problem.

While the main department had estates challenges, organisational boundaries also manifested themselves between this department and the NHS care and clinical, more applied research that took place within it, and the basic science laboratories which were located in another building on the campus. At the time of data collection, however, senior staff in the department were drawing up plans to move most of the lab space to co-locate it with the clinical setting and clinical team. This move had been achieved when I revisited the team in May 2014 to present back some of my initial findings for feedback, although I was unable to discuss with them in great detail about how the move had gone and whether the co-location had started to achieve the desired effect. Only virology remained, and had to remain on the other site. One basic scientist reflected on how this geographical separation affected the integration with the rest of the team:

> *"We are quite physically separate from the other side and we rarely have a reason to go there. We go there for research meetings on a Friday, which may or may not happen, and then we don't stay over there and I've got a foot in the staff meetings, which .. half the stuff I don't necessarily fully understand what all the trials they're doing, but it's useful, all the different things which are going on in the department. So it will be actually better as interacting with the clinical side is definitely better once we're over there. Because you just have to be physically next to each other, and have a big coffee room and areas to discuss stuff … and find out what other people are working on, which doesn't happen right now, because, at least we once a*

week go over to the department on the other site, they never come here (laughs). You know, no-one from up there ever comes down here, so (laughs) it's kind of a bit schizophrenic the way it's run." [Gamma AHSC, Unite case, Basic Scientist, Interview 47]

Another senior staff member in the department reflected on why he felt this move was a positive step forward:

"there is one other factor that's important is that the clinical side are all here … and the basic science side are in a different building, they're still on the same campus but they're in a different building and only the senior members of the team meet probably once a week or once a fortnight … and so its one of the reasons why the, we have a new plan to develop the laboratory facilities here adjacent to the clinical facilities and also to have a combined coffee room where people can meet up.

CF: and do you think that's important for the department?

I do actually, I want to end up with as integrated as a department as possible … and I think people feed off each other in terms of ideas. I think for the scientist to see what the clinical problems are with patient groups gives them ideas … and the clinicians can see what the scientists are doing and perhaps offer direction in terms of how they see treatment responses or natural history progression." [Gamma AHSC, Unite case, Clinician Scientist, Interview 23]

The above quote, and my observations of the physical space in which the team operated, demonstrated that the organisational boundary, that of estates and department location, influenced epistemic boundary work. This is similar to the findings of Löwy (1992) who describes the role of a corridor dividing clinical and research work. The Unite department lead felt strongly that co-location would drive epistemic boundary work between different staff members, by creating opportunities for interaction and the development of epistemic boundary objects in the form of the 'scientific puzzle' (Nicolini et al., 2012).

The Connect project also faced 'physical' organisational boundaries (Hernes, 2004) manifest through estates and geographical differences. However, as the project and clinical teams were not part of the same department, and were only coming together for a specified activity which was not the core practice of the clinical team, the physical boundaries were not as critical. Project team members were able to travel to the appropriate sites where the Connect tool was rolled out and adapt to each clinical setting. The Connect project however was dependent on some level of integration between IT systems within the AHSC partnerships, which proved more problematic.

6.3.2 IT

The organisational boundaries were further highlighted through IT infrastructure issues which impacted on knowledge mobilisation processes in both cases. In both AHSCs, the trusts and universities had different IT systems which were not integrated. For the Unite department, this proved time consuming and was a hindrance for staff but did not broadly affect the work of the department. The Connect project however relied on the development of the IT infrastructure in order to facilitate data collection and was therefore a critical part of the project.

In the Unite department, I observed staff within the department constantly using both systems through two computers at each desk. This was further identified through participant interviews:

> *"we need two computers for everything because one's academic and one's NHS. We need two telephone points because one's academic, one's NHS". [Gamma AHSC, Unite case, Nurse, Interview 29]*

Staff also had different email addresses depending whether they were primarily trust or university staff. This proved problematic in that any patient identifiable data from the NHS could only be sent to other NHS emails. Therefore, some staff had to regularly check two email accounts when they felt they barely had the time to keep up with one. This led to occasional breakdowns in communication via email lists, or potential breaches of security for NHS patient data. These issues were problematic on a day to day basis but workarounds were generally possible (such as two phone lines, or email addresses). The issues relating to the Connect project were more fundamental to knowledge mobilisation processes in that case.

For example, one mental health CRC Director felt a lack of IT integration was a major barrier to joint working across the organisations:

> *"we need IT because we can't really do much stuff with the acutes because of the non talking of IT, … and that's a real problem, well it's a problem for our junior doctors who have to double entry everything … which adds about, we think about forty five minutes to their, everyday they spend forty five minutes duplicate entering which is a total waste of time, no progress at all made on that." [Delta AHSC, Clinician Scientist, Interview 4]*

Within the Connect project itself, there were constant frustrations with IT organisational barriers, particularly at the start of the project. I observed several team and governance meetings where these issues were discussed [e.g. observation 28:25/10/12]. Further one team member reflected on these issues:

"It seems to me that the Connect project has highlighted that Delta AHSC is not as connected and as linked as, and as not as much a partnership as it could be [..] For example it took ages and ages and ages to be able to access our own data, I mean we're in the clinic collecting it and actually there talking to the patients … But actually being able to see the data was impossible until about a month ago because we didn't have Beta trust log-in information, we didn't have a Beta trust network, we can't get a link between Delta university and Beta trust because of data protection which I understand is very important but it was unbelievably complicated to do something which should really be very simple like collecting the data. Just because it's on a different network we were totally unable to access it. Things like needing to email people who have NHS email addresses, really hard because unless they've got a [university] email address I can't find them in the directory. […] It's so simple in theory .. you should be able to email who you want and call who you want and access your own data but it makes it very, very difficult.

CF: How do you get round that normally?

Well we got around the data issue after months and months and months of negotiation through having to buy a new laptop, a Beta trust registered laptop rather than a university laptop which now we can only access from one point in the entire building which is the only network place that's been set up to be able to access Beta trust data." [Delta AHSC, Connect case, Non-Clinical Researcher, Interview 8]

These frustrations were indicative of the organisational boundary between the Connect project team (housed in the university) and Beta trust which remained firm, as per a traditional external organisational boundary (Paulsen & Hernes, 2003). However, this boundary was relatively permeable when compared with that between the Connect project team and Alpha trust (the other acute trust in Delta AHSC). This was interesting because it highlighted both the path dependent nature of organisational boundaries and the impact this can have on epistemic and professional boundary work and knowledge mobilisation processes.

The path dependent nature of the issues appeared to relate back the geographical co-location of Beta Trust and the school of psychiatry on the same campus which was about 4 miles from the sites of Alpha Trust. The impact of this co-location and other issues on the epistemic and professional boundaries between researchers (the Connect project team) and clinical practitioners (within acute trusts) were well described by one participant:

"There is an issue which is a historical one where Beta trust and Alpha trust have operated in slightly different ways when it's come to addressing the mental health needs of their patients, so Beta trust has tended to come to us for you know developing things and it's much more sort of integrated. At Alpha trust there's been a tradition of having clinical psychologists employed by the acute trusts who have been embedded in services and done a

fantastic job being embedded in services but in a different structure from ours and they come under therapies and therapies was with cancer [CRC] and I don't know where it's going to be in due course…" [Delta AHSC, Connect case, Clinician Scientist, Interview 3]

In addition to these varying epistemic and professional issues, the Connect project lead undertook clinical work at and had an honorary contract with Beta Trust. He therefore had established professional links with this organisation, both clinically and with support services, such as the IT department.

These historical links across organisational boundaries between the school of psychiatry and Beta trust meant that this organisational boundary was more permeable than at Alpha trust, where similar links did not exist. Establishing the project at Alpha trust was more challenging, despite similar epistemic and professional boundaries being in place. I will outline the processes of boundary work around this in the next chapter.

6.3.3 Human resource management practices

A further manifestation of the organisational elements of the research/clinical practice boundary was that of the different HRM practices in each organisation. This was particularly evident in the Unite department case as I observed staff working alongside each other on a day to day basis and undertaking similar roles, unlike the Connect project where the boundary work was bounded and occurred on selected ad hoc basis. All staff within the Unite department (and both wider AHSCs) had to be primarily employed by one sovereign organisation or another. This split was present across all professional groups, with some doctors, nurses and administrative staff employed by either the trust or university and most with honorary contracts with the other organisation. There were two main findings in the Unite department case worth noting here.

Firstly, the differences in trust or university employment dictated the type and levels of clinical or research work undertaken by each member of staff. Those with university contracts generally had more research in their job plan, compared to those employed through the NHS, who were more likely to be undertaking clinical work. However, there were exceptions to this. For example, one NHS clinician led the commercial trials portfolio within the NHS, so was very active in research (though not in a basic science sense), but was also very active clinically.

The different HRM practices had implications for service delivery. For example, university staff were allocated 'closure days' between Christmas and New Year so they were not obligated to attend work. This meant that the NHS staff had to pick up any gaps in the clinical rota and ensure that the NHS services were able to continue over this time. As there were fewer medical staff employed through the NHS this meant that there were far fewer members of the team available to cover the work at this time, which mildly irritated one NHS member of staff:

> *"I don't get the terms and conditions of an Imperial contract, they all take 8 days off over Christmas and New Year and I'm sat here on my own because the NHS contract doesn't give me 8 days holiday of Christmas and New Year, but they just swan off" [Gamma AHSC, Unite case, Medical Doctor, Interview 33]*

Secondly, the HRM practice manifestation of the organisational boundary was also visible through the status of individuals in the department. In general, participants reflected that university staff had a perceived 'higher' status. This was because investigator led studies were considered to be 'gold standard' in terms of research, brought in large research grants to the university and bestowed a certain status on the individuals who were successful in obtaining them. This reflects the hierarchy of evidence associated with knowledge types in evidence based medicine (Davies & Nutley, 1999). The other side of this 'status' was that being employed through the university was riskier as HRM practices enabled staff redundancies if they (or their supervisors) did not reach grant income or publication targets. At the time of data collection, one medical member of staff had recently been through this process and reflected on it:

> *"The university said they wouldn't pay my salary any longer unless I got lots of grant money. So either I switched or I would have had to find another job. .. I was given a year to get lots of grant money and some very high impact publications. Frankly, a very difficult task." [Gamma AHSC, Unite case, Clinician Scientist, Interview 34]*

One critical factor for participants was that this pressure existed if any part of the salary of the individual was paid for through the university, regardless of whether the individual undertook a large proportion of clinical work in the NHS. Those employed through the NHS were not subject to the same personal pressures – once a doctor had been appointed to a permanent NHS Consultant post, dismissing them was very rare. In addition, NHS work, treating patients, was always needed – patients were referred and presented themselves so, if individuals chose, there was little proactive work required, compared to research. One participant felt that this

imbalance led doctors to decide not to pursue a research career, as the risks were great and the corresponding lifestyle stressful:

> *"So as an academic, if any of your salary comes from the University, increasingly it's about getting grants […] and the problem with being a clinician is getting grants is really difficult. [..] it takes a lot of time to get the grants and write papers. And if you are doing a significant amount of clinical work, you just don't have the time to get the grants and papers that you need to be safe academically. Which is why almost all clinicians, although having done research, most of them in my field have done MDs or PhDs at some point along the line almost all of them think, well, this is not really a lifestyle I want. Because every three to five years, you are analysed and if you haven't got the grant money, you are at risk of being unemployed.*
>
> *And the ones that do go down the academic route, as you have seen, don't do any clinical work.. Do they? None. They do no clinical work because they haven't got the time and so you have to think at some point when you do a bit of both, at some point you have to ask yourself what do you enjoy most. And to me it's always been the clinical work, that's why I became a doctor. And academia is doing this [points at desk], that is all academia is, it's doing this [gestures to computer], it's sitting down at a desk, typing grant after grant after grant, writing paper after paper after paper. That's not why I became a doctor." [Gamma AHSC, Unite case, Clinician Scientist, Interview 34]*

Despite (or because of) these challenges, those individuals who chose to do both research and clinical practice were crucial individuals in the knowledge mobilisation process. These clinician scientists were often also in important organisational roles and therefore could span epistemic, professional and organisational elements of the research/clinical practice boundary. I therefore return to consider this role in more detail in the following chapter on boundary spanning mechanisms.

In summary applying an organisational lens to the research/clinical practice boundary highlights some issues that would not come to light through either an epistemic or professional framing, with estates, IT and HRM being outlined as examples. These examples primarily relate to underlying infrastructure which facilitates knowledge mobilisation and therefore a means to an end rather than the driver itself (which is the epistemic object, the 'scientific puzzle', or improved patient care).

One theoretical challenge in respect to AHSC partnerships is whether the organisational boundaries are considered to be internal or external (Paulsen & Hernes, 2003). The establishment of the AHSC partnerships tends to frame the organisational boundaries as internal knowledge boundaries, which are problematic

and must be eliminated or blurred for knowledge to be mobilised across them. However, my findings have demonstrated that the boundaries may be more appropriately framed as external boundaries between sovereign organisations, which are more stable, bounded and harder to penetrate.

6.4 Conclusion

This chapter has outlined the findings from the two tracer cases in relation to the research question:

What are the properties of the research/clinical practice boundary and how do they manifest in AHSCs?

It has demonstrated that the 'meta' research/clinical practice boundary has varying properties which manifest in many different ways within the AHSC tracer cases. This chapter has used epistemic, professional and organisational lenses (as guided by the literature) to provide a frame to analyse these properties.

Despite their differing organisational contexts, epistemological underpinnings and histories, the two cases demonstrated theoretical commonalities. These are summarised in the table below.

Table 6 Key boundary features across cases

Key Boundary features	**Unite Department**	**Connect Project**
Epistemic		
Visibility and permeability	Visible yet permeable	Visible yet permeable
Nature of joint field of practice	Established joint field of practice acted as a motivator for knowledge mobilisation processes	Potential for new knowledge to be created in joint field of practice acted as a motivator for knowledge mobilisation processes Included mental/physical dimension
Syntactic, semantic or pragmatic? (Carlile, 2004)	Respect for 'other domain's knowledge' Syntactic and semantic, work was rarely pragmatic	Respect for 'other domain's knowledge' Syntactic and semantic, work was rarely pragmatic
Professional		

Visibility and permeability	Visible - Evidence of jurisdictional battles over knowledge shaped by professional group e.g. 'scientists dislike clinicians' Partially permeable through hybrid roles e.g. clinician scientists	Visible – roles of different professional groups clear but this did not prevent knowledge mobilisation – rather it was a condition to enable 'new knowledge' creation in joint field of practice Partially permeable through hybrid roles e.g. liaison psychiatrists
Nature of joint field of practice	Large joint field of practice established with many in hybrid roles operating in this boundary space	Established boundary spanners (professional hybrids such as liaison psychiatrists) promoted work in many (small) joint fields of practice
Syntactic, semantic or pragmatic?	Mainly semantic with some pragmatic work	Mainly semantic with some pragmatic work
Organisational		
Visibility and permeability	One university & one trust Visible, generally impermeable	Multiple organisations & departments Visible, generally impermeable
Nature of joint field of practice	Despite some work, retained 'external' firm organisational boundary properties – separate estate, HR and IT domains Org boundaries impacted from AHSC hierarchy (through board and CPC level) workarounds broadly developed at tracer case level	Retained 'external' firm organisational boundaries (despite AHSC level funding and support for project) Some success around joint IT platform and located in mental health CRC which reflected more permeable organisational boundaries
Syntactic, semantic or pragmatic?	Pragmatic work required	Pragmatic work required

The two cases both demonstrated that although all three elements were visible, the epistemic and professional boundary elements were more permeable than organisational boundaries. Using Carlile's (2004) integrated/3T (transfer, translation and transformation) framework for translating knowledge across boundaries, epistemic and professional elements of the boundary were broadly semantic, with knowledge requiring some form of translation to be effectively mobilised. The organisational boundaries however were more pragmatic in nature. It was at this level that different interests needed to be resolved and the boundary became overtly political. Although this politicisation was more visible at the higher levels of the partnership, there was also evidence at lower levels within the tracer cases, particularly in relation to HRM practices.

Despite the AHSC and policy rhetoric relating to the partnerships working to remove 'internal' boundaries, the organisational boundaries in both cases remained 'external' (Paulsen & Hernes, 2003), delineating firm edges between the partner organisations within each AHSC. However, these organisational boundary manifestations appeared less salient in the Connect project, as the joint fields of practice were specific and largely bounded to the project and tasks at hand. Once the IT platform had been established, organisational boundaries were less important than in the Unite department which appeared to be developing workarounds (such as using two computers and two phones) on a day to day basis. I will focus on this boundary work further in the next chapter.

This chapter has presented findings from the 'positive' tracer cases within the partnership AHSCs. It contributes empirically to the boundary literature by finding that the epistemic, professional and organisational framings of the 'meta' research/clinical practice boundary were useful to analyse different aspects of the complex knowledge mobilisation processes at work. Despite the challenges of artificially separating them, the framings proved useful as both a normative tool which enabled the unpicking of these complex processes and facilitated categorisation of the different elements, and informing the respective literatures.

This chapter contributes to the theoretical literature in two main areas. Firstly, it contributes to the literature on knowledge mobilisation by bring the concept of boundary to the centre of analysis (Hernes, 2004). In so doing, it responds to Oborn et al.'s (2013b) call to analyse the types of boundary which exist between the domains of research and clinical practice.

Secondly, it demonstrates the importance of considering the role of 'organisation' in analysing knowledge mobilisation processes between research and clinical practice, an area traditionally under-analysed in healthcare, where literature has largely focussed on professional dynamics (Crilly et al., 2013).

I present a more detailed discussion of these empirical and theoretical contributions in Chapter 8, following the next chapter which will analyse boundary work as key activities, objects and people taking place in this space.

Chapter 7 Findings: Research/clinical practice boundary spanning mechanisms

"And I think when you have someone like Joan come along with an iPad it doesn't get less scary than that ... she's very clever, she's very amiable and she's come in with a beautiful bit of kit that will help you"

[Delta AHSC, Connect case, Clinician Scientist, Interview 31]

The purpose of this chapter is to present research findings on the mechanisms (or boundary work) used to span the research/clinical practice boundary in AHSCs. It will address the sub research question:

"What boundary mechanisms facilitate knowledge mobilisation within AHSCs and how are they used?"

The previous chapter highlighted the various aspects of the research/clinical practice boundary by examining it through epistemic, professional and organisational lenses. This chapter will examine the mechanisms (boundary work) associated with knowledge mobilisation across the research/clinical practice boundary. Analysis of each tracer case revealed numerous examples of boundary work in action facilitating the mobilisation of (research based) knowledge. This chapter will focus on presenting those examples which can contribute to the gaps in the literature highlighted in Chapter 2. Using Wenger's (1998) categorisations of different types of boundary work, it will firstly examine the role of 'boundary spanners' within both cases (specifically focussing on the role of clinician scientists as this was highlighted as a potentially important gap in the literature); and secondly the role of boundary objects (specifically focussing on the examples of patient data and an 'iPad' and using Nicolini et al.'s (2012) framework to analyse these).

The main gaps on boundary work related to the research/clinical practice boundary and therefore to this organisational study of AHSCs were on hybrid roles, such as clinician scientists (Wilson-Kovacs & Hauskeller, 2012). Chapter 2 noted that while healthcare often provides examples of professional hybrid roles, these are typically related to relationships or doctors and managers (Numerato et al., 2011). There is little literature which focusses on the empirical example of clinician scientists as boundary spanners or hybrids. This gap is particularly relevant to the study of AHSCs as clinician scientists occupy key organisational leadership positions within the partnerships and embody the concept of 'bench to bedside'.

Further, Chapter 2 highlighted that studying the role of clinician scientists using the boundary work literature may contribute particularly to work on how joint fields of practice are developed (Levina & Vaast, 2005). Are clinician scientists carving out joint fields of practice (of 'translational research') and if so how do they deal with the competing mission tensions present in the AHSC (Lander, 2016)?

The tracer cases contained many examples of how different boundary objects were used in mobilising knowledge between research and clinical practice domains. These objects ranged from epistemic objects which motivated boundary work through to 'boring' objects which facilitated it (Nicolini et al., 2012). The boundary literature presented in Chapter 2, highlighted that the role of the 'scientific puzzle' is important in driving knowledge mobilisation in these complex partnerships (Wainwright et al., 2006). I explore the notion of the scientific puzzle in both tracer cases and how it motivates and drives boundary work. Further however, both cases also contained examples of 'boring' objects which underpinned boundary work infrastructure and whose roles were variously highlighted at different times. In this chapter I concentrate on the specific example of IT and the 'iPad' in the Connect project case.

Chapter 2 highlighted that the analysis of the symbolic nature of objects is often neglected as studies focus on their instrumental characteristics (Swan et al., 2007). The findings presented in this chapter, drawing on observation (detailed in Table 2) and interview data, demonstrate how the iPad and its use in an NHS setting became a symbol of the effectiveness and credibility of the Connect project team and this enabled epistemic and professional boundary elements to be addressed at the same time as organisational ones. Further, this example contributes to the research agenda set out by Nicolini et al. (2012) who call for further work into the political

nature of objects (who uses them, how, to what end and for whom), as well as the interactions between boundary-spanners and boundary-objects-in-practice in the work associated with developing a joint 'translational research' field of practice (Levina & Vaast, 2005).

The chapter is structured as follows. Firstly, I present findings on the practices of boundary spanners within the tracer cases, specifically focussing on the role of clinician scientists and how they cross epistemic, professional and organisational aspects of the research/clinical practice boundary. Secondly it presents findings on how boundary objects drive and facilitate knowledge mobilisation within the tracers across the research/clinical practice boundary and in particular how the 'scientific puzzle' and the iPad worked as objects and changed roles over the course of the Connect project. The chapter concludes by examining how the most effective boundary work accommodates all epistemic, professional and organisational elements of the research/clinical practice boundary.

7.1 Clinician scientists as boundary spanners

As outlined in Chapter 2, boundary spanning individuals can be defined as those who facilitate the sharing of expertise by linking two or more groups separated by function, location or hierarchy (Cross & Parker, 2004). They play an important role in boundary work. Although there are many empirical studies exploring these roles generally which have contributed to theory development (e.g. Bechky (2003)), the literature on these roles operating on the boundary between research and practice, particularly in a basic science setting, is limited. Further, studies generally concentrate on the epistemic elements of this boundary work (Lander & Atkinson-Grosjean, 2011; Wainwright et al., 2006) without much consideration of the professional and particularly organisational boundary work boundary spanners undertake (Oborn et al., 2013b).

As outlined in Chapter 5, there were many different individuals in the 'positive' tracer cases who could be identified as 'competent' boundary spanners (Williams, 2002) attempting to link the domains of research and clinical practice. The Unite case participants consisted mainly of clinical/research hybrids (doctors and nurses) whereas the Connect project had non-clinical mental health researchers as well as academic liaison psychiatrists, who were crossing a research/clinical practice boundary which also incorporated a mental/physical health dimension. As noted

above, the boundary spanning activity can be conceptualised as developing, operating in and delineating a 'joint field of practice' (Levina & Vaast, 2005) where clinician scientists are carving out a new area of jurisdiction underpinned by the ability to apply 'basic' (or other) science to clinical practice, or in other words to link basic science data to individual patient (or population) physiologies.

Levina and Vaast (2005) call for further research on how joint fields of practice (or boundary work) are established by boundary spanners (and how they use objects – discussed in the next section). Although the rhetoric of 'bench to bedside' relates primarily to the epistemic work clinician scientists do to mobilise knowledge, this view underplays the importance of professional and organisational boundary work clinician scientists undertake in this process. The findings outlined below demonstrate that establishing this joint field involves work on epistemic, professional and organisational elements of research/clinical practice boundary, and that competent boundary spanners can negotiate all three elements.

The role of clinician scientists as boundary spanners was a key feature of both tracer cases and the wider AHSC partnerships. These individuals had high status within the AHSC partnerships with many in leadership positions within sovereign organisations as well as the senior leadership and 'middle' management roles of the AHSC infrastructure. As the name suggests, clinician scientists are trained in and practice both research and clinical practice. Generally the term refers to doctors who have trained and qualified in medicine, are practicing clinicians and who also undertake research, although the term can also refer to those in other healthcare professions who also undertake research as part of their role.

Epistemically, clinician scientists had an interest in and experiences of the 'knowledges' in both research and clinical practice through training. Professionally, they identified as and have been trained as doctors yet were also familiar with and often leaders in scientific communities (as described in Chapter 6). Organisationally, as the activities of 'research' and clinical 'practice' often take place in separate organisations (universities and trusts) these individuals often have contracts with and are accountable to more than one organisation.

Both tracer cases employed clinician scientists who all undertook different aspects of research and clinical practice in their job roles. Within the Unite case, each doctor in the department undertook some form of both research and clinical work.

The extent to which staff pursued either research or clinical care as part of their job plan was driven by how their posts were funded, their personal interests and preferences and the view of the departmental lead in terms of bringing together a balanced team. Some were employed through the university, undertaking investigator led studies with a large proportion of basic science, while also having an honorary contract with the NHS and performing clinical work in some capacity. Some were medical consultants employed through the NHS whose job plans included a large proportion of research (either in translational medicine or more basic science) and education. The (medical) clinician scientists were complemented by a team of nursing staff who were also competent in both research and clinical practice domains.

The Connect team comprised individuals who naturally felt comfortable operating at the boundaries of different domains. The clinician scientists within the team were also liaison psychiatrists and had a background of operating across the mental and physical health boundary, which was at the core of their clinical practice. More specifically, they were trained in mental health and are then required to apply this knowledge in the domain of physical healthcare, for example in conditions where the mental and physical are clearly interlinked, or in specific specialties where certain drug treatments are known to cause depression in patients (such as the use of interferon in treating Hepatitis). These scenarios all require the ability to translate knowledge from the mental health environment and to apply it in a physical health setting.

Participants described the role of a clinician scientist as demanding but rarely dull. Most participants interviewed had a genuine drive and interest in both research and clinical practice, and had different paths into these boundary spanning roles. They described a career that was stressful but fulfilling.

7.1.1.1 Epistemic boundary work: motivations from bench to bedside

Epistemic boundary work is a primary 'mission' of the AHSC underpinning the 'bench to bedside' approach. This powerful rhetorical construct acted as a 'boundary concept' (Löwy, 1992) and motivated those working at the research/clinical practice boundary in the tracer cases. They had a genuine interest in the 'knowledge' informing both domains and a particular interest in how to apply 'research based knowledge' to the clinical setting. Boundary spanners undertook semantic boundary work (knowledge requiring translation) but in these positive

tracer cases this rarely took on a political or pragmatic nature (Carlile, 2004) as interests appeared to be served through collaboration rather than competition (as noted in Chapter 6). Participants reflected that the research work was typically translational in nature:

> *"So the research looks into the role of monocytes and macrophages and .. immune systems … developing mechanisms to understand why these patients develop infections and how to best treat them.*
>
> *CF: And how would you categorise it – is it basic science?*
>
> *Translational. Again that will go through peaks and troughs but at the moment, there are two different streams to the research, one stream is exceptionally basic science, the other stream is much more translational. All of it involves immunological based research, so if I gave it a proportion it would probably be more towards, basic science but it's all got a translational theme to it." [Gamma AHSC, Unite case, Clinician Scientist, Interview 46]*

Most clinician scientists interviewed began their careers in medicine and at some stage developed a strong intellectual interest in the 'scientific puzzle' which they saw as underpinning their chosen specialty and consequently the improvement of clinical care for patients. Typically, developing an interest in the academic underpinnings of the clinical specialty appeared to be in part driven by luck (Brannigan, 1981), by being in the right place at the right time and for a research 'hunch' to pay off:

> *"I started my research and it was just an idea that monocytes don't work very well in these patients and during the course of my PhD I found out that these monocytes indeed didn't work very well. I wasn't particularly interested in science, I just liked to be a good clinician and do good work and look after patients with [specialty disease], that was my real interest, [..] but towards the end of that research period I actually started getting interested in this further, so when I started doing my clinical Registrar jobs, I kept this research continuing […] and then at one point, [..] I said I think I'd like to do academic work and do a combination of both." [Gamma AHSC, Unite case, Clinician Scientist, Interview 46]*

This quotation also highlighted that a primary motivator beyond the 'scientific puzzle' was being able to offer patients better treatments and care. This was a common thread with most participants (particularly with those involved in commercial studies):

> *"I genuinely get satisfaction from offering my patients these treatments long before they're going to get them otherwise. I do like my patients and it's nice to be able to offer - and that's why I do this sort of research and not molecular biology or something more esoteric that actually carries greater kudos for the university, because you know this is actually real medicine, and I'm sorry I didn't invent the drugs and I'm very grateful that there were back*

room people that did, but this is actually about delivering care to patients and being able to tell more people that you're cured from [disease]." [Gamma AHSC, Unite case, Medical Doctor, Interview 33]

Evidence of epistemic elements driving and motivating boundary work was also present in the Connect project. Team members in this group were experienced boundary spanners, for example liaison psychiatrists who trained in the interface between mental and physical health:

"I enjoy the intellectual bit of having to disentangle the physical from the mental and decide what needs my input and what needs the physician's input and being able to translate that into something that's meaningful for the physician and the patient. I think intellectually that is fascinating, much more exciting than schizophrenia. So I'm in the right job." [Delta AHSC, Connect case, Clinician Scientist, Interview 31]

Further, (non-clinical) researchers particularly valued the ability to work in research but be a little closer to practice:

"Sometimes I found research a little bit remote, so it really appealed to me, the idea of being able to combine that with more service development and something that you felt was a bit more real on a day to day basis, and working with clinicians in practice" [Delta AHSC, Connect case, Non-Clinical Researcher, Interview 31]

The 'right job' and 'right place' was a theme in both cases. For example, during my informal observations and conversations, several participants within the Unite case reflected on how they had deliberately sought out and chosen a unit which had high levels of research, rather than working in a smaller hospital with a purely clinical focus:

Walking back from the meeting I asked one of the medical staff about the reasons he did this job. He talked at length about the stresses of being a clinician scientist, particularly the time constraints and the contractual arrangements. I asked him if he would leave because of this and he replied emphatically not. He said he had many friends who work at District General Hospitals who were much richer and less stressed, as they had much more time to do private practice so 'get their Porsches' but they also got very bored and 'had affairs'. He implied that his motivations were different, stating that he did not come into medicine for the money, he did so because he liked treating patients and felt privileged to do so in a research rich environment. [observation 57:08/02/13]

This was even the case for those staff who did not directly undertake research themselves:

"I have always been more interested in the clinical than the academic side of it. I never wanted to pursue an academic route, so I've always done this kind

of job. I worked previously in a DGH where there was very little research and less teaching. I like working in a department where there's active research going on and I like the fact that I can stand back, I don't need to lead that, I can just be a contributor. .. I think we do have enough leaders and we have enough people with ambition that it doesn't hurt to have some people who stand back from that." [Gamma AHSC, Unite case, Medical Doctor, Interview 36]

In the Connect project, participants valued the chance to work with a broad range of individuals with different backgrounds:

"The people who are represented in our oversight group so from the technological and data management side of things to health psychology researchers, IAPT representatives and things like that, so a very large range of people which I love, I think it's great. I love these meetings, I love other people's opinions and how what they specialise in brings a totally different perspective to things." [Delta AHSC, Connect case, Non-Clinical Researcher, Interview 8]

In summary the majority of individuals in both tracer cases were genuinely motivated by a desire to mobilise knowledge from both domains and therefore work across an epistemic boundary. The mobilisation did not tend to take on a pragmatic form (Carlile, 2004) as most were interested in making the epistemic elements work – the heuristic of bench to bedside was a useful hook and motivator, even if the knowledge mobilisation process was far from linear. I observed that the use of particular epistemic objects was also important alongside the motivations of staff within the tracer cases and I shall explore these in the next section.

This conclusion regarding epistemic work was perhaps unsurprising given the nature of the positive cases which were identified as exemplars in the AHSC settings. However, barriers to knowledge mobilisation were still visible and other elements of the boundary proved less permeable, and more in need of boundary work and 'workarounds'. The fact that professions are defined by their ability to maintain jurisdiction over a body of knowledge tightly couples framings of the professional boundary with that of an epistemic boundary. The next two sections highlight the professional and then organisational elements of the research/clinical practice boundary which, although not the motivator, still required intensive work.

7.1.1.2 Professional boundary work: developing hybrids and joint fields of practice

Professional boundaries have been demonstrated to slow the spread of innovation (Ferlie et al., 2005), particularly when there is little motivation for cross boundary work. The literature on medical/managerial hybrids (Numerato et al., 2011) however

demonstrates that professionals, particularly medical professionals, adapt and change their practices in order to maintain a jurisdiction over a particular body of knowledge. In the tracer case settings, there was evidence of clinician scientists developing into a new professional hybrid role, operating in a joint field of practice (Levina & Vaast, 2005) with jurisdiction over a body of knowledge known as 'translational' research. In the Unite case, the specialist expertise associated with this joint field lies in the ability to link basic science data to patient physiologies:

> *"the nature of the work is purely translational. It means recruiting patients, understanding the physiology of the patient at the time, getting the right time point, doing the analysis in the lab and then going back with the patient, so it's bench to bedside " [Gamma AHSC, Unite case, Clinician Scientist, Interview 46]*

In the Connect project, the specialised expertise in the joint fields was the ability to link research based knowledge about mental health in individual patients and populations to that of specific physical health conditions and consequently develop an understanding of the interactions between the two. Those developing these new 'joint fields of practice' were however experienced boundary spanners who had histories of working across boundaries (in for example liaison psychiatry). It however appeared that both competent boundary spanners and a supportive organisational context were essential for a joint field to emerge.

Further, the liaison psychiatrists within the Connect project were drawn to boundary spanning roles beyond their original professional career choice of medicine. Participants inferred that they felt comfortable in the role as the mental health 'outsider' in a physical health setting:

> *"CF: And how do you find working with physical health physicians?*
>
> *Much better than working with psychiatrists.*
>
> *CF: Why's that?*
>
> *I don't particularly like psychiatrists I think they're a bit strange. I'm very happy working with physicians and I may be lucky with the physicians that I've worked with, they're clever and absolutely committed, I really like that, and I quite admire a number of the [specialty] doctors that I work with have very little ability to manage psychological difficulties in their patients, but completely recognise the importance of doing it and those are separate things. Clearly there are a number of hospital specialities where they can't manage them and they've got no recognition and then you're really struggling...*

I quite like that contract where they know it's important but they also know that they can't do it and they're happy to hand that bit over to you, so they rely on that bit, you are integral to that part of that team but you have your own sort of defined area in that. I quite like working in a general hospital, I don't mind seeing physically ill people, I don't mind putting my hands on patients if I need to.." [Delta AHSC, Connect case, Clinician Scientist, Interview 31]

Clinicians in the team had similar views:

"When I first qualified I worked in General Adult Mental Health, so I worked on a Community Mental Health Team and on the Acute Psychiatric Ward, but I was always interested in physical health and when the opportunity came up to come here full time, I did that. I really enjoy working in a physical health setting, because it seemed a great place to work. I'm interested in [specialty] and the interplay with anxiety and things around mind body interaction …" [Delta AHSC, Connect case, Clinician, Interview 11]

These quotations also demonstrate the interplay between the epistemic interests driving boundary spanning across professional boundaries. This is particularly strong in the culture of liaison psychiatry which is by nature a boundary spanning specialty.

However, the traditional nature of the professions to retain that jurisdiction ensures that boundary-spanners-in-practice still find boundary work challenging. Participants reflected Lander and Atkinson-Grosjean's (2011) finding that it was hard to be 'great at everything' (p. 542):

"It's been very stressful I must say.. the academic path is not for people like me or people who also want to do a lot of clinical medicine is not quite there and nowadays they say you either can do science very well, you can do clinical very well, you can't do both and that's true to a degree I think unless you work twenty four hours a day for both but you can't achieve that" [Gamma AHSC, Unite case, Clinician Scientist, Interview 46]

Further, participants reflected that the traditional training pathways in the professions of science or medicine do not always provide the appropriate support for boundary spanning roles:

"It's becoming increasingly busy and you're pulled in many, many directions and I'm increasingly learning that you have to be quite militant with your time and, actually quite organised with how you run your group and I think its acquiring managerial roles which as a kind of Registrar you're never trained to do and as a Scientist .. all of a sudden being a PI, you're not really trained to, you're not even given that kind of skill base and you kind of acquire it through trial and error so that's what I'm learning now." [Gamma AHSC, Unite case, Clinician Scientist, Interview 46]

However participants also reflected on the value of policy incentive mechanisms, particularly through prestigious clinical academic fellowships funded through national bodies such as the National Institute for Health Research and the Medical Research Council. Senior leaders reflected that AHSC accreditation enabled the partnerships to attract more of these awards. These fellowships specify that awardees are funded to undertake scientific research and clinical practice and as such are support to develop a career on the boundaries between the domains. The competitive nature of these awards was evidence of their popularity and status, yet even with the protected time the boundary work may be challenging and have an impact on career development as one participant reflected:

> *"I'm a Clinician Scientist. That entails doing a combination of clinical work in [specialty] and running a research group. My research group are funded by the MRC to do this work [...] there's a research split and there's a clinical split. […] so formally the MRC is paying me to do ten sessions of which eight sessions are research, two sessions are clinical. Getting the balance right is tricky. It's always been the problem with academic clinical research, so getting the balance of clinical progression versus academic progression and it tends to go in peaks and troughs in my experience and sometimes I'll focus more on academic work and sometimes I'll focus more on clinical development." [Gamma AHSC, Unite case, Clinician Scientist, Interview 46]*

This may mean that a focus on boundary work may cause the individual to become distanced from the group or community from which they were based. Within a research/clinical practice setting, this could have an impact on professional and career development in both domains. For example, clinician scientists may see peers solely working in a clinical environment being promoted before them.

This career phenomenon was also visible for the non-clinical researchers working on the Connect project. My observations of team meetings and interactions at the early phase of the project demonstrated that the key issues involved setting up systems and fire-fighting issues as well as trying to recruit new clinical teams to participate. This did not leave much time to pursue grants or write papers, key performance objectives within a research career. The team were aware of this and felt that the time invested in establishing the project, gaining generic ethical approval for data usage and the access to potential data mitigated the risks.

Levina and Vaast (2005) argue that several boundary spanners-in-practice are required to ensure the development of a joint field of practice. This supports Wainwright et al's (2006) assertion that translational research efforts are limited to a lack of understanding of the 'other' domain. The case of the Unite department

demonstrated that the critical mass was achieved and that enough individuals operated in the joint field of practice (or translational research space) to enable meaningful work and shared understanding to take place. Developing this joint field of practice involved clinician scientists in leadership positions drawing on expertise from both domains:

> *"so [my research team] is predominantly in the form of clinicians but I've tried to change that because you need to have proper science infrastructure by having a postdoctoral Scientist and also now non-clinical PhD students.." [Gamma AHSC, Unite case, Clinician Scientist, Interview 46]*

Leadership by senior clinician scientists was critical to the role of developing the careers of new boundary spanners as well as ensuring that work in the joint field of practice (and thus knowledge mobilisation) continued. In several of the team and operational meetings I observed, senior clinician scientists within the teams discussed these issues. A core part of this role was that these senior clinician scientists were able to span organisational boundaries (as the research and clinical practice broadly took place in different organisations). This supports findings in the literature that medical doctors move into management positions to continue and support work, but they show no evidence of becoming de-professionalised (Kitchener, 2000). This area of boundary spanning, although the least permeable of the different dimensions of the research/clinical practice boundary (as demonstrated in Chapter 6), is under-analysed in the knowledge mobilisation literature. The next section addresses the work of boundary spanners across the organisational elements of the research/clinical practice boundary.

7.1.1.3 Organisational boundary work: managing competing logics

As outlined in Chapter 4 and Chapter 6, organisational boundaries, formed both through competing institutional logics of AHSCs (Choi & Brommels, 2009; Lander, 2016) and practical dimensions such as separate IT systems, are visible and arguably the least permeable of the research/clinical practice boundary. The findings from both the Connect project and Unite department demonstrate that organisational boundary work is challenging and that much of the work involved is workarounds. Senior clinician scientists in particular who have moved into managerial roles appeared critical to this process, and their ability to understand and span the epistemic and professional elements of the boundary work appeared essential. These leaders were able to establish boundary interactions within the departments which proved important arenas for boundary spanning to take place.

As demonstrated in Chapter 6, organisational boundaries between the university and trust in Gamma AHSC and between the university and trusts in Delta AHSC manifest as barriers to knowledge mobilisation (boundary work) across the research/clinical practice boundary. Both tracer cases were led by a senior clinician scientist with a track record of boundary work. These key individuals, supported by the teams around them, were both employed through the university partner, externally recognised as leaders in their academic fields and both also practiced clinically.

From an organisational perspective, those in leadership positions in both teams were able to manage the competing institutional logics of 'research' and 'clinical practice' by tightly controlling their own areas and respective joint fields of practice. I observed, in the regular team, oversight and operational meetings, that organisational issues which prevented work in this joint field were regularly discussed and workarounds adopted. Leaders were able to achieve this precisely because they had expertise in both domains and had achieved a certain status that clinician scientists had within the AHSC settings (including prior to designation). Participants reflected that while it was essential for leaders to act as both nominated and boundary spanners-in-practice (Levina & Vaast, 2005), not everyone on the team needed to have expertise in both domains:

> *"CF: and do you think it's important that you know both sides, that you've got a foot in both camps?*
>
> *Yeah. Absolutely.*
>
> *CF: and do you think your other consultant colleagues have to have a foot in both camps?*
>
> *No, it's perfectly reasonable that you know some people entirely have got their feet in the clinical and some have got both feet in the research … that's fine but in order to have an effective academic clinical department you need the leader to have their foot in both sides.[…] Actually [in] all the successful departments across Europe[…] the Head of each department is usually a clinical academic and he has control over the beds, the out-patients, the labs, everything." [Gamma AHSC, Unite case, Clinician Scientist, Interview 23]*

Within both the Unite department and the Connect project, the senior clinician scientists maintained control over the complex system of contractual arrangements and cross charging which were used to span the organisational boundary of the AHSC and ensured that both research and clinical practice domains remained

strong. Within the Unite department case, these negotiations took place at the CPC level, with the Head of Department representing in discussions. The Connect project, although also reporting directly to the AHSC board, was also managed through a CRC (where the lead for the Connect project was a Director). This mental health CRC in Gamma AHSC had a pooled budget, and more autonomy over how funding was allocated (in the best interests of the joint field of practice, whilst maintaining strengths in the fields of both domains) [observation 16:25/07/12].

In line with the literature on how and why medical managers continue in their positions (Numerato et al., 2011), clinician scientists retain control as they are more likely to remain in post for longer than finance or general managers and as such retain organisational memory. One described how he felt this was vital to help span the organisational boundary between the university and trust and in particular to link up general managers between the organisations:

> *"In some ways people always see it as them and us. I think it works a lot better to be honest in my head at least, because I'm intimate with both things. I think if you're not as au fait with those things then I think that can be difficult. So I think the people who are purely NHS find the University a complete labyrinth that they don't understand … whereas actually I think the academic standard as I understand it is a bit better because they tend to have contracts in both, so they will by necessity also have NHS contracts and will know the NHS Managers and will know the [university] Managers. It would be nice if the Managers were the same in both things as it should be within the AHSC but that's never happened. There is some degree of overlap but you know its still a bit disjointed but I think it probably works better than in most institutions. I think people grumble but I think it works a lot better than I see in other places personally.*
>
> *It's my opinion because actually I think after a while the management system is now aware that both exist. I mean University exists and who to get to and the Trust exists and actually I was trying to, one of the e-mails I was trying to do was to try and share the monies between Trust and University and actually the people now know each other to, who to do it with you know this sort of stuff.*
>
> *CF: And how have they sorted themselves out?*
>
> *I think it has needed people such as myself who's now on both sides to be able to say look this is your counterpart here and once people begin to talk to each other and actually see the whites of people's eyes and actually go okay, yeah I know that they're a real person now and this is the person I can deal with then that's what happens, it has to be people contact really" [Gamma AHSC, Unite case, Clinician Scientist, Interview 22]*

Senior clinician scientists also provided the vital link between micro level boundary spanning work and the wider meso level within the AHSC. They held senior roles

within both the universities and trusts and spent a good proportion of their time defending their department/project and influencing the wider AHSC agenda. As described in Chapter 5, both were identified as positive cases within the AHSC setting and senior leaders used them as exemplar cases to AHSC outsiders.

The organisational memory of senior clinician scientists was also helpful in reflecting on the impact of AHSC development which was not always positive. For example, one senior clinician scientist described how the AHSC development had made organisational boundaries less permeable when describing the requirements to delineate how staff apportioned their time between research and clinical care:

> *"two years ago, I realised from the financial side even though we'd merged as an AHSC actually it's forced us into defining people's roles a bit more clearly. You would have thought in some ways it could allowed the grey areas between research and clinical delivery to remain but in fact its not, it's gone the other way" [Gamma AHSC, Unite case, Clinician Scientist, Interview 23]*

Although he found this frustrating his competence in organisational boundary spanning meant that he was able to use this process to the departments' advantage by growing staff numbers:

> *"So we've ended up saying well .. they're employed by the university therefore they will do predominantly university work and we will restrict what they do on the clinical side. It also means therefore that the amount of research time the NHS guys get is potentially restricted. On the other hand most of them are probably not doing that much anyway. So we've defined our roles but then when we realised okay well these are the people who are there to provide the NHS service, you then say well there aren't enough of them, so we've had to increase the number of Consultant posts. So we've built that side up and then it becomes mutually supportive rather than one side draining off the other." [Gamma AHSC, Unite case, Clinician Scientist, Interview 23]*

Negotiating the role of a boundary spanner, particularly one required to span the research/clinical practice boundary, is not without challenges, particularly organisational ones. The management literature reflects on the difficulties of undertaking boundary spanning roles which can be challenging (Caldwell & O'Reilly, 1982; Nochur & Allen, 1992) and conflicting, leading to stress and burnout (Dubinsky et al., 1992). The findings in these tracer cases support this analysis, with clinician scientists reflecting at length about the stresses of the job:

> *"There are different types of pressures […] I mean research pressures are performance, management based, targets, deadlines, whereas clinically you*

have quite obvious targets that you have to meet, patients to look after, standards of care that you've been trained to do for how many years whereas science you're learning, you're acquiring the skill, and you're then expected just to look after people and mentor them and I feel quite an over bearing responsibility if they fail that they've put all their career choices in my hands and I'm supposed to be supervising them through and that is quite a pressure, a different type of pressure which actually is very acute given that I'm looking after seven people now, so it is very different." [Gamma AHSC, Unite case, Clinician Scientist, Interview 46]

The organisational elements of the research/clinical practice boundary work were therefore challenging but undertaken by senior clinician scientists who, using their status gained through epistemic and professional expertise developed different knowledge in management and organisational know how and used this to maintain control over their work and that of the tracer cases. The boundary work was often pragmatic in nature as there were different (organisational) interests and institutional logics being served (Carlile , 2004). This work focussed on strengthening expertise in both sides of the research/clinical practice boundary as well as the emerging joint field of practice between the domains.

7.1.2 Summary

In summary this section has analysed the role of boundary spanners in the tracer cases operating across the boundary between the domains of research and clinical practice. Their motivations for doing so are complex but broadly driven (to a greater or lesser extent) by interest in the scientific puzzle and a desire to improve care for patients. The challenging yet rewarding nature of boundary spanning roles, together with their high status ensures that often highly skilled and driven individuals are attracted to them (Wiesenfeld & Hewlin, 2003).

The findings further support those outlined in Chapter 6 and indicate that the various elements of the research/clinical practice boundary have different characteristics and therefore require different, though generally complementary work. The epistemic boundary work is largely the driver behind individual motivations whereas the professional and certainly organisational work are viewed as barriers which need to be overcome and therefore the work is more pragmatic in nature. Individuals who can navigate all three boundaries and also liaise with the wider AHSC are critical to the process.

I have presented findings which suggest that clinician scientists (as boundary spanners in practice) are developing a joint field of practice which provides a

jurisdiction of expertise on the links between relevant scientific research and patient physiology. The Unite department, where many individuals operate in this space, developed a large joint field of practice which also has the power to ensure organisational elements of the boundary as also successfully bridged through workarounds, but despite this work the boundaries remain. The Connect project was a different model where the project team has a wider variety of boundaries to span. They however had developed expertise in the joint field which links mental and physical health. They therefore had multiple joint fields of practice which are smaller and rely on an underpinning organisational infrastructure to support the work.

The role of boundary spanners is however intertwined with the motivations and objects which drive boundary work. The next section outlines the role of objects and the different nature and trajectories that these have taken in both cases.

7.2 Boundary objects

The key feature of a boundary object is that it is flexible and can be interpreted differently by groups on either side of the boundary, yet their structure is such that they provide a common frame of reference for both (Bijker et al., 1987; Star & Griesemer, 1989). They enable co-ordination across boundaries without the need for consensus or shared goals as they allow individuals' local understanding to be reframed to form part of wider activities (Bechky, 2003). Recapping briefly the literature outlined in Chapter 2, Nicolini et al. (2012) advocate a pluralist approach to examine the different roles objects can play when facilitating cross disciplinary work. They suggest that objects can hold primary (objects which support infrastructure), secondary (objects which function as a translation artefact) and tertiary (objects which drive and motivate) features and that objects may adapt and change meaning and roles throughout cross disciplinary collaboration. They call for further research to examine what objects work in cross disciplinary collaboration and when, and what is the meaning of the objects and for whom.

Boundary objects can also have both instrumental and symbolic characteristics – Bechky (2003) demonstrated how objects can be used to signify status as well as share understanding, and Swan et al. (2007) show how when objects are symbolically associated with positive ideology and values, it is this that facilitates interaction across boundaries, rather than the instruments themselves.

There were many examples of objects in action which both drove and facilitated knowledge mobilisation efforts across the research/clinical practice boundary in both tracer cases, some of which could have been anticipated in advance and others which arose inductively from the (particularly observational) data. As noted above, one of the key motivators for clinician scientists to work in the joint field of practice was an interest and motivation in both improving patient care and understanding the 'scientific puzzle', and specifically how scientific research combines with patient data. These epistemic objects which drive boundary work and can also cause conflict have been highlighted in the literature (e.g. Swan et al. (2007) and Lander (2016)) and this section will consider how both types of objects were used in knowledge mobilisation in the tracer cases.

As noted in Chapter 5 the research based knowledge to be 'mobilised' was different in both cases. The epistemic objects driving knowledge mobilisation in the Unite department can be characterised as the scientific puzzle, the 'unknown' with boundary spanners often motivated to improve patient care. The epistemic object in the Connect project was the combining of mental and physical health data which provided potential both for further research and improving patient care. Both represented 'new knowledge' developed in the joint fields of practice. As I shall explore, both also displayed the classic features of a boundary object in that they were meaningful to those in both domains, but for different reasons.

More 'technical' objects used in day to day practice emerged from the observational data collection and analysis in both cases. These included shared documents, such as spreadsheets to capture information on clinical trials, or pathology slides which were used to determine the best course of treatment by the multi-disciplinary team involving doctors from different disciplines, researchers and nursing staff. The use of one object (the 'iPad') in the Connect project emerged inductively from the data. Its use changed over time, and as such proved a good example to empirically test Nicolini's (2012) framework. It had both instrumental and symbolic characteristics which developed over time and enabled it to facilitate boundary work across epistemic, professional and organisational boundaries. I will therefore present the findings on this particular boundary object in this section.

7.2.1 Epistemic objects: the scientific puzzle and patient data

The main feature of epistemic (or primary objects (Nicolini et al 2012)) are that they drive and motivate boundary work. They also require negotiation and can cause

conflict, and it is this that drives innovation in a joint field of practice space. Both cases had identifiable epistemic objects which acted in different ways.

In the Unite department, boundary work was well established. As identified in previous chapters, the joint field of practice where clinical care and research came together was large and pre-existing. However, objects in this space still needed to function for both the research and clinical practice domains in order to drive knowledge mobilisation between the two. As the purpose of 'translational' research is to make the link between basic science research and patient physiologies, it followed that this 'joint knowledge-as object', or even the 'unknown-as-object' became the driver for epistemic boundary work. This linked data became more than the sum of its parts, becoming 'new' knowledge.

The scientific puzzle (or linked data) appeared to be the primary driver for the non-clinical scientists within the department who were less engaged with the joint field of practice and whose primary role was to undertake basic science research. I observed how this 'object' was used, primarily at the fortnightly research meetings in the department, and asked participants to reflect on this meeting in interviews:

> *"I was asked by [Head of Department] to give a research meeting on our project, and [clinical colleague] seemed really interested and then he brought the aspect that maybe this is also a also a marker in [specialty carcinoma cells] and maybe you can, because it had this molecular soluble forms, maybe it could detect it and use it as a biomarker. And so that came after I gave the talk to the clinicians, or to the whole section and the clinical stuff that arose basically as a consequence of me giving a seminar in front of the whole section.*
>
> *So we have a joint project this year for the BSc students, actually it's his project, but it was based on the work I had on this new molecule we found on [specialty carcinoma cells] and he was interested in kind of using it as a biomarker and in his study of carcinomas." [Gamma AHSC, Unite case, Basic Scientist, Interview 47]*

Similar patterns were identified in the Connect project. The main driver for collaboration between the Connect project team and the clinical teams taking forward the project in the acute trusts was the potential for collating patient reported outcome data (on their mental health) with their individual (physical health) clinical record. This collated data, collected through an agreed set of questionnaires, acted as an epistemic object which was co-created by the project and clinical teams. I observed the development and use of this collated data in 17 meetings between the Connect project teams and clinical teams (see appendix F).

Both domains had different purposes for the collated data and as such it displayed the classic features of a boundary object (Star & Griesemer, 1989). Primarily the clinical teams wished to use the data to improve care for individual patients. Members of the research team were motivated by a large, rich dataset linking patient reported outcomes to their physical health record.

The 'data-as-object' consisted of a number of questionnaires, to be completed by patients. The decisions about which questionnaires to include and what patients to target was an early piece of boundary work between the Connect project team and clinical teams and was bespoke to each clinical setting. In the meetings I observed, the project team provided a menu of validated questions, on conditions such as depression and anxiety, from which the clinical teams could select which they felt were most relevant for their patient group. Clinical teams could then request any condition specific validated questions be added to the screening tool and the project team accommodated these where possible, whilst negotiating with the clinical teams to keep the overall questionnaire a reasonable length to encourage patients to complete it. This process is summarised in the following quote:

> *"I think that different clinics have had different perspectives on this, depending on what they already do, or whether they do anything anyway. So there's some clinics which had certain measures which they wanted to include. They seemed relevant, and they weren't competing with the kind of measures we were having, using for mental health and it was easy enough to put them all together. There have been other cases where the clinic has been using a sort of rival measure, which potentially competes with the depression measure we use, and I've got some sympathy for having a degree of flexibility to it. But, on the other hand, one does want to have consistency of measures across the board. So we've tried, wherever possible, to keep with our PHQ9 and GAD7 but sometimes we duplicate." [Delta AHSC, Connect case, Clinician Scientist, Interview 3]*

I observed that the questionnaires were 'co-created' by both the project and clinical teams using knowledge from both domains. The Connect project team brought expert knowledge on mental health questionnaires and how the questionnaires had been used practically in other settings. They were also keen to ensure that there was as much consistency as possible between settings so the dataset could be used for research across a number of clinical specialties. The clinical teams brought expert knowledge on their patient cohort, speciality specific knowledge and knowledge of the practical/organisational environment in which they were working. Combining these different knowledges to create a set of questionnaires (the

epistemic object) agreeable to all parties required boundary work and negotiation. The following quote was typical of a clinical teams' involvement:

> *"CF: So the different scales that the Connect project used, did you have discussions about which ones would be suitable for [specialty]?*
>
> *Yes we did. Although I very much depended on their knowledge in terms of which were the most appropriate and what the guidance had recommended. But yes, one of the nice things about this sort of collaboration is that you learn about new tools [..], I'd heard of a PHQ-9 but had I looked at it, no. [..]*
>
> *CF Okay. And have some of those been specifically [clinical specialty] related?*
>
> *Well they had selected the PHQ-9 and the GAD-7, and we had already specified a health assessment questionnaire and the [specific disease] measurements, and then there's the EQ-5D that we still haven't quite got up and running .. but that was the other generic one that we wanted to include.*
>
> *CF: And are there plans to do that?*
>
> *Yes. We're trying to develop that at the moment. It wasn't very difficult to choose which [specialty] specific ones [..] you only have to read a few journals and you can see which ones are always reported and they're the ones you need to be gathering. What was slightly more difficult was working out which patients should be asked which questionnaires, and how to make sure that a patient turning up would be given the appropriate questionnaires to answer. And that required patients to be on a database with a diagnosis so that they were presented with the right questionnaires electronically. And then we had some questions around, 'Well, you know, if you've got someone coming with [chronic disease] do you want to ask them about extensive disabilities? Are you then suggesting to them that they should not be able to do those things?' We did have some debate about what we should be doing, but we got there in the end.*
>
> *CF And how was that decision made?*
>
> *It was a kind of clinical consensus between both teams really." [Delta AHSC, Connect case, Medical Doctor, Interview 17]*

The above quotation demonstrates the negotiation process contained both epistemic and practical elements. Interestingly, as the project developed and the project team became more experienced, they were guiding the clinical teams with regard practical issues in the clinics (work in the 'other' domain). I observed this in a number of meetings and one participant reflected on this process:

> *"I think one of the things that tends to come up is overburdening patients, and not wanting to put too many questions in. Conversely, it can be us, as the researchers that are saying, well actually, just hold back a little bit ... Because some of the teams are so enthusiastic, they want to include a lot of questions and we have to say to them, look we know that there will be*

attrition, and you will lose out on the follow-up. And so it's getting that balance between collecting enough rich data and also not tiring the patients out, or making them not want complete another one the next time they attend." [Delta AHSC, Connect case, Non-Clinical Researcher, Interview 6]

The combined data (as an epistemic object and set within the wider context of the whole Connect 'package') brought 'added' value to both the research and clinical practice domains. The clinicians described three main benefits (two clinical, one more corporate). Clinically, the data was primarily used to improve the care of patients – this was enacted in two main ways. Firstly, as the data generated by the questionnaires was available immediately after completion in the patients' electronic record, patients could be identified as 'at risk' and referred appropriately using a care pathway devised by the project and clinical teams. I observed that this was particularly important for teams who have identified mental health as an important factor in the treatment of their patients. For example, the first roll out team treated a chronic long term condition with no known cure, known to have high prevalence rates. Another team had recently experienced a challenging time:

"And that was something that was very much felt in the team, actually it seems in a very personal way … So to be honest what can happen around suicide is maybe a bit of defensiveness, but there's not that feel at all, it's more, "Well, these were guys who we looked after with over time and what went wrong and what we are we going to do about it?" So there's definitely something in that narrative about that, but also more generally about seeing their patients through a really difficult time in their lives." [Delta AHSC, Connect case, Clinician, Interview 11]

Secondly, the data collated by the questionnaires could be used to estimate the prevalence of mental illness within their patient cohort. This could be used to develop business cases to increase the capacity of mental health provision for their patients:

"So I think in time we'll very quickly be able to show data and ability to highlight the extent of psychological morbidity within services and then the extent to which proper grounded liaison psychiatry can deal with that, I think that will be a strength, clearly it's not a strength yet, but it would be a strength very quickly. So I think it's got a lot going for it, so a very exciting project." [Delta AHSC, Connect case, Clinician Scientist, Interview 31]

The dual purpose of the data-as-object was also highlighted by members of the Connect project team:

"And I think clinicians are interested because, without having to ask the difficult questions themselves, there's a tool that they can use, and it doesn't take any extra time, and yet it flags up very useful information for them. And

they can see the potential for it – it's not esoteric, it's quite practical – and they can see that it could lead to service development, it could lead to better links with liaison psychiatry and link to dedicated clinics for their patients. So I think it's the potential that people see, because it's so clearly visible." [Delta AHSC, Connect case, Clinician Scientist, Interview 18]

I observed that the third driver for clinical teams was more corporate. As well as perceived clinical benefits of the project, clinicians were also attracted by the research benefits. By taking part in this project, clinicians who had previously little academic/research involvement could report AHSC research activity to senior managers. As the research in this project had immediate and direct applied clinical value, it appealed to clinicians who may not have otherwise engaged with more basic research in their specialty. This is summarised in the following example when I asked the clinical team participant whether they were going to be involved in the research outputs of the collaboration:

"Well I hope so. Most of it is just providing the patients rather than doing any other bit. But I would hope that we would be involved in anything that is published. .. I suppose we expect the researchers and the writers to write it up at some point, but to hopefully make sure that we're, at least, acknowledged or our names on the paper. And that's not a huge thing for me but just with revalidation and all that sort of stuff it is useful to have that and obviously the feedback and everything else and what we've done. But it is an aspect of [clinical specialty] often ignored and needs to be addressed." [Delta AHSC, Connect case, Medical Doctor, Interview 20]

This demonstrates that engaging with boundary work through an epistemic object enabled those in one domain to become familiar with work in the other. The same was true of the Connect project team researchers, who as their skills as boundary spanners developed became more adept at engaging clinical teams:

"It's not that we're coming in to do research, it's very much at the service development phase at the moment, and it's to help with their clinical work ... and to help with collecting of measures. So we want them to feel as though what we're doing is assisting them to do something useful. So it's very clear that we're not coming in from outside to foist upon the teams our ideas." [Delta AHSC, Connect case, Clinician Scientist, Interview 18]

Participants reflected that the main benefit of the co-created epistemic object in the research domain was the large, rich dataset linking patient reported outcomes to their physical health record, which could be used for a variety of research purposes and publications. This is summarised by one team member:

"I do think that the kind of the combination of research and clinical service development and happening at the same time is a really interesting

phenomenon. I think being able to put a research project on the back of a clinical service development is useful. But I think the really exciting driver is the idea of a systematic collection of outcome data in large numbers of patients. That's what we do. .. I don't think people have quite understood the potential benefits of that. .. And we can be five years ahead of the curve, ten years ahead of the curve by doing this now and using it as a means of collecting very large amounts of data for research purposes. So, I think that's been one of my motivations, really." [Delta AHSC, Connect case, Clinician Scientist, Interview 3]

In summary therefore the questionnaires/data featured as an epistemic object across a professional (researcher/clinician) and epistemic (mental/physical health) boundary, and had the potential to cause conflict (if the project team and clinical teams had different views about which questions to use) but also provided a platform for negotiation through innovation (in the form of a unique dataset). In this sense it fit Nicolini et al's (2012) view of a primary object. It also had the classic features of a boundary object in that it had a defined structure which maintained its integrity whilst at the same time was highly flexible and had direct benefits to both disciplines – this enabled pragmatic co-ordination (Carlile, 2004). Furthermore, the object held both features at the same time – it did not necessarily move up and down Nicolini et al's (2012) framework.

Developing the questionnaires and collecting the dataset drove the work taking place in the joint field of practice and the interactions between boundary spanners-in-practice and boundary objects-in-practice were vital to this process. I will return to this in Chapter 8. The role of epistemic objects drove work across epistemic, professional and organisational boundaries. However, in order to maintain the projects and to support ongoing collaboration and boundary work, other objects were important. These 'boring' objects (Star, 1999) were as important to boundary work as the exciting epistemic work and the next section will consider the importance of boundary work using organisational objects, (in this case IT) in driving work across the research/clinical practice domain. As previous chapters have highlighted, organisational boundaries often manifest as barriers to research/clinical practice boundary work – the next section demonstrates how work on this can also be epistemic in nature and is vital for ongoing boundary collaboration.

7.2.2 The importance of 'boring' objects: the case of IT and the iPad

The role of IT as a facilitator and enabler of boundary work has been well documented (e.g. Pawlowski and Robey (2004)) and was critical in the Connect project case. Following the initial boundary work of the Connect project to roll out

data collection in the first clinical setting, the appropriate IT infrastructure needed to be established to continue to implement the project in other clinical settings across the AHSC. Participants reflected that an electronic method of capturing the data was essential as this would enable the patients' questionnaire answers to be automatically matched to their individual electronic patient record (EPR), which was vital for both research and clinical purposes:

> *"if it didn't drop into EPR, if it was paper based and you had to look at this and then that went into the notes ... I have to say I think it going into EPR is easier because bits of paper get lost. And .. it's a visual thing. You know ... the fact that you don't have to read all of it. But if you can see the red bits then you know to look a bit closer. So I think it being on EPR, as well as being able to look at it, is, is actually much better that a paper thing". [Delta AHSC, Connect case, Medical Doctor, Interview 20]*

I observed the project team and IT department representatives discussed this work in team, oversight and ad hoc meetings [e.g. observation 28:25/10/12]. This IT boundary work included two main components – firstly devising a system to enable data to be captured, held in a research database within the school of psychiatry and then 'dropped' in to the EPR system in acute trust settings, and secondly selecting and implementing an appropriate tool for patients to use when completing the questionnaires in the clinical settings. Therefore it required organisational boundary work between the Connect project team and the IT departments of the two acute trusts. As noted in the previous section, the closer links between the Connect project team and Beta Trust meant that this was chosen as the first trust roll out site.

The first aspect of the work, setting up the software to enable the patient data to be collected within a research database and transferred in real time to patients' individual EPR record, was undertaken by an outside contractor, who had started similar work in the clinical specialty where the Connect project began. This part of the project was relatively straightforward and was not too lengthy a process.

However, participants reported that the second key part of the process, selecting and implementing a collection tool for patients to use in the waiting area, was more problematic. In the first case, to get the project underway, a 'laptop on wheels' was the agreed solution. However, the project team felt that this was quite cumbersome, and not particularly user friendly in some waiting room environments. Therefore, the project team were keen to use a tablet style device as this would provide a more intuitive interface and would be portable, enabling patients to move to a more private part of the waiting area to complete the questionnaire. At the time, they felt that an

Apple iPad was the best tablet available on the market and that its use would be critical to the success of the project. However, Apple products were not supported by the IT departments of either trust for security reasons. The project team reflected that they were adamant that the iPads would need to be used, and were persistent and determined in their approach with the IT departments. After several months, a compromise solution was eventually found with Beta Trust. The issue was summarised by a member of the IT team:

> *"..they'd been on at us for quite a while, "We'd really like to use the iPads", [but] my colleagues were very anti-iPads.*
>
> *CF: Why was that?*
>
> *Effectively it's a very Windows orientated infrastructure here.. the infrastructure's been built on Microsoft platforms and the whole security aspects of other devices coming in, particularly those not running on a Windows platform.. are scaring the hell out of people in terms of [being] assured that you're not storing patient identifiable information on those devices.*
>
> *.. give her her due, [project team member] was very persistent.. ..the breakthrough, I guess, was, you know what, we've got to do something about this. We'll look at some mobile management device software which will allow us to manage those Apple devices within our Windows environment. In the end we came to the compromise that we said to [project team member], "We'll let you use iPads as long as when we've tested out this software, it will become adopted under that scheme". So that was the chink of light that let iPads in" [Delta AHSC, Connect case, Non-Clinical Manager, Interview 37]*

This quote demonstrates that organisational boundaries were also spanned by epistemic objects, in this case the 'puzzle' of how to make the iPad work in an NHS setting. It further demonstrates the importance of the interaction between competent boundary spanners (both the Connect project team member and the IT specialist) in each group with enough power to make decisions. In this case, the project team member pursuing the iPad solution was very persistent, and also found an individual within the IT department who had an attitude to try to make things happen, rather than find barriers. This individual also had a background in research, and appeared genuinely interested in the 'puzzle' of making the iPad work in an NHS setting.

Similar conditions were not in place in Alpha Trust. Following the roll out of the iPad in Beta Trust, participants reported that positive early discussions took place with Alpha Trust, through individual meetings with senior staff and a Connect cross

AHSC IT working group. However, despite the support from senior staff, it took a further year to successfully roll out the project. I observed the negotiation process in team meetings and also observed meetings between the Connect project team and Alpha trust IT department [e.g. observation 33:28/11/12]. The project team found that the culture and set up of the IT departments to be different as summarised by one team member:

> *In Alpha Trust, what you go through is … very complex … you find that there's a kind of production line, so you don't deal with one person who project manages the whole thing." [Delta AHSC, Connect case, Non-Clinical Researcher, Interview 6]*

This lack of one main project manager contact, and furthermore one main champion within the trust, meant that similar conditions were not in place 'on the other side' of the organisational boundary to the Connect project team. In part perhaps because it was already rolled out in Beta Trust, and because no one individual was interested in the innovative element of the project, the use of iPads in the NHS, the iPad as an epistemic object did not have the same effect. It was, however, as I observed in discussions between the project lead and AHSC executives [observation 3:22/03/12], a key requirement for the Connect project to be an AHSC wide project, as it was funded by the AHSC. Therefore, it was essential that they found a solution to the IT issues in Alpha Trust. They had to find alternative ways to span the organisational boundary. In the end, the project team perceived that two key factors enabled roll out in Alpha Trust. Firstly, they worked to engage the IT team and identify a champion for the project:

> *"building a strong relationship with our IT project manager at Alpha Trust has helped, and she's come round from being a little bit wary of the project and the work it would involve to really championing it for us." [Delta AHSC, Connect case, Non-Clinical Researcher, Interview 6]*

In this way, the team attempted to replicate the boundary conditions which had enabled a successful resolution in Beta Trust. In addition, the project team approached senior staff and the AHSC Executive for support. The Executive, keen that the project was an AHSC wide initiative rolled out at both acute trusts, helped to ensure that the IT issues at Alpha Trust were resolved.

In this scenario the iPad acted as an epistemic (primary) object in driving collaboration across organisational and professional boundaries (the project team and IT departments). In both trusts, the iPad started out as a source of conflict and

frustration; yet in Beta Trust, it became a puzzle, or an epistemic object, around which both groups worked. The willingness of the IT department in Beta Trust to find a solution to this puzzle drove an innovation (the development of the software) which enabled the iPad to be used in clinical settings, without risking patient identifiable information.

Once an IT solution was found and the iPads began to be used in clinical settings, I observed that their object status began to change, and their role moved from one of conflict and innovation to one of facilitation (moving from primary object to secondary object in Nicolini et al's (2012) framework). The iPad proved to be a crucial tool, both instrumentally and symbolically (Bechky, 2003; Swan et al., 2007), for the project team in facilitating the package in clinical settings and engaging clinical teams. As one Connect project team member commented:

> *"iPads are fantastic and easy to use and exciting and have a novelty value to start with" [Delta AHSC, Connect case, Clinician Scientist, Interview 31]*

For example, as I observed, in the initial meetings between the project and clinical teams, the iPad was seen as innovative and a sophisticated technology product which wasn't commonly found in the NHS. It was often used as an icebreaker around which teams would joke, with comments such as '*I like the fancy iPad'*. The fact that the clinical data would be transferred safely directly into the patients' electronic clinical record was also a major benefit for clinicians. However, as the meetings progressed, I observed that clinicians started to envisage how the iPad would fit into their clinical environments, and began thinking through practicalities such as who would be responsible for it and where it would be stored. This caused some to voice concerns:

> *"I'm concerned about ..the idea of iPads .. I'm not suggesting it should be otherwise, I'm just seeing potential problems there .. I must admit an iPad being stolen has crossed my mind." [Delta AHSC, Connect case, Medical Doctor, Interview 24]*

The project team were able to address security issues by giving examples of what had worked elsewhere. For example, they suggested that the iPads could be attached to a cord to prevent them being stolen, but this would mean that patients would have to sit in a certain part of the waiting area to use it, which was not practical in some clinical settings. This was one example I observed of how the project team were well prepared and had anticipated many of the problems raised

by clinical teams. In this way, I observed that the iPads facilitate a shared understanding of how the project would be implemented in each clinical setting.

Akin to the findings of Swan et al. (2007), the iPad appeared to develop a symbolic value as well as this instrumental one. It came to symbolise the quality of the complete package on offer, and therefore one with which clinicians would engage. If the project team could make iPads work in an NHS setting, and also enable direct transfer of the patient data into EPR, then it was likely that they would be competent to deliver on the project and it would be a positive initiative to be involved with. Furthermore, although the iPad was primarily an object used to span organisational elements of the research/clinical practice boundary, its symbolic power and the fact that represented the 'competence' of the project also enabled epistemic and professional boundary work. This finding was summarised by a project team member:

> *"Well I think IT is seductive. And, you know, the interface is quite cool. It looks good, and it talks to the EPR [electronic patient record], and all that I think works quite well. So, I think that also breaks down some of the barriers with some colleagues who may be a bit sceptical about mental health, and it being terribly vague, and woolly, and subjective, and that actually we're giving them something which, you know, has a ring of objectivity to it. Of course, you know, they're only questionnaires, but ...having something which is a bit techy I think helps a lot." [Delta AHSC, Connect case, Clinician Scientist, Interview 43]*

As the project was rolled out in clinical teams, I observed that the iPad became less important as a cross boundary facilitator, and started to become part of the everyday infrastructure of the project, simply a tool by which the data was collected, crossing organisational IT boundaries as it did so. In this way, it shifted from a secondary object to a tertiary object in Nicolini et al's (2012) framework. However, if issues with IT had developed, the iPad would have been foregrounded and discussed once again.

In summary this section has presented how certain objects have driven, motivated and supported boundary work in the tracer cases. It has highlighted two examples of epistemic and boring objects which have demonstrated changing trajectories and both symbolic and instrumental characteristics. Nicolini et al's (2012) framework provided a useful tool to analyse how these objects take different trajectories over time, using the analogy of 'actors on a stage'. This analogy is useful in the Connect project case which was initialising boundary work between the project team and

many different clinical teams. The data-as-object was an epistemic (primary) object, initially foregrounded to trigger, drive and motivate collaboration. Once agreement to collaborate was established, this primary object was set to one side, and the practical considerations of how the collaboration would occur were brought to the forefront, bringing IT and specifically the iPad to centre stage. The iPad moved from a primary object driving innovation across organisational boundaries (through IT) to a secondary object facilitating collaboration across epistemic and professional boundaries (between mental health researchers and physical health clinicians) and fading into the background as a tertiary infrastructure object (across organisational boundaries) when collaboration was established.

7.3 Conclusion

The purpose of this chapter was to present findings from the tracer cases which contributed to answering the research question:

What boundary mechanisms facilitate knowledge mobilisation within AHSCs and how are they used?

It found that, although the two tracer cases have different organisational contexts, there were theoretical commonalities between the two types of boundary work.

Both cases demonstrated that the roles of individuals as boundary spanners were vital to the boundary work in the joint fields of practice established in the teams. They demonstrated that highly effective boundary spanners such as the leaders of both cases were competent at working across epistemic, professional and organisational boundaries when pursuing the 'bench to bedside' agenda. The fact these individuals held important organisational roles whilst also maintaining a foot in both epistemic and professional domains was essential in their knowledge mobilisation work. The organisational roles enabled them to negotiate with the wider AHSC structures and ensured as far as possible that organisational issues did not hinder knowledge mobilisation work within their teams.

The roles of these individuals appeared to support the thesis that the joint field of practice was underpinned by expertise in drawing together different knowledges from different domains thus creating new 'hybrid' knowledges (sometimes known as translational research). This required the ability to value tacit and explicit knowledge from a variety of professional groups, including organisational know how.

Both epistemic and boring objects were important in motivating and facilitating knowledge mobilisation within the tracer cases and boundary spanners used these effectively to promote knowledge mobilisation work. The different use of objects reflected the maturity of the cases – the Unite department was well established with a strong joint field of practice. The Connect project was just beginning and therefore required both spanners and objects to motivate and drive collaboration. My findings demonstrated how the 'scientific puzzle' or 'combined data' acted as motivations to boundary work in the joint fields. Further, the case of the iPad in the Connect project also demonstrated how objects can take on both instrumental and symbolic characteristics (Swan et al., 2007) and that this symbolism can facilitate work across the three aspects of the research/clinical practice boundary.

The findings in this chapter contribute empirically to the literature on boundary spanners by demonstrating how clinician scientists (and liaison psychiatrists), as professional hybrids, cross the boundary between the research and clinical practice (and management) domains through establishing jurisdiction over a new body of knowledge created in a joint field of practice. Further it contributes to the boundary objects literature by building on Nicolini et al (2012) to examine the changing instrumental and symbolic roles (Swan et al., 2007) of (epistemic and boring) objects across the different boundary conceptualisations.

This chapter contributes theoretically to the boundary literature by focussing on boundary work and demonstrating how it may be useful (akin to Star and Griesemer (1989)) to consider the boundary as a 'space' for hybridisation (a joint field of practice) rather than demarcation between different communities (as is the case in much of the professions literature). My findings also further demonstrate the importance of considering the role of organisation in studying knowledge mobilisation processes, by recognising that these processes are framed by the institutions in which they operate (such as how the dynamics of IT work was affected by organisational issues in the Connect case).

I consider these empirical and theoretical contributions, and those from previous findings chapters, in more detail in the next and final chapter.

Chapter 8 Discussion

The purpose of this final chapter is to outline the main empirical and theoretical contributions that this study makes to the wider literature by drawing together and discussing the findings presented in the previous four chapters. It also reflects on the study design and presents some areas for further research, and highlights implications for policy makers and practitioners.

This is a study of the emerging organisational form of Academic Health Science Centres as vehicles of knowledge mobilisation. It uses the lens of boundary theory to explore how two English cases work towards their missions of mobilising research based knowledge into clinical practice. The overall research question was:

What boundary processes mobilise knowledge within Academic Health Science Centres?

The literature review in Chapter 2 highlighted three major gaps in the literature requiring further enquiry which this thesis aimed to address. Firstly, AHSCs as organisations are under-researched (French et al., 2014) and the knowledge mobilisation literature is short on work on organisational form (Crilly et al., 2013) - enquiry into AHSCs as emerging organisational forms may contribute to addressing this. The first sub research question was:

How does organisational form impact on boundaries and boundary work within AHSC partnerships?

The second gap, within the healthcare (and other) knowledge mobilisation literature, was that although the concept of boundaries is often referred to, it rarely takes centre stage as the focus of analysis. Further, the literature on boundaries is diverse and there is little integration between the streams (Lamont & Molnár, 2002). Therefore the second research question was:

What are the properties of the research/clinical practice boundary and how do they manifest in AHSCs?

The third gap highlighted that the literature on boundary mechanisms is quite well developed theoretically but that it requires further empirical cases to analyse the roles of spanners and objects, their instrumental, symbolic and political

characteristics and interactions between the two (Swan et al., 2007). This resulted in the third sub research question:

What boundary mechanisms facilitate knowledge mobilisation within AHSCs and how are they used?

The findings to respond to these research questions were outlined in Chapters 4 to 7. In summary, the key findings were that a variety of interacting boundary processes mobilised (research based) knowledge within AHSCs. These included formally establishing meso level governance arrangements at both board level and middle management level (outlined in Chapter 4) and informal, day to day linkages between individuals in front line teams (presented through the tracer cases in Chapters 5 to 7). Although there were some examples of a changing organisational form (through meso level structures) positively impacting on 'front line' knowledge mobilisation (such as the mental health CRCs and the interactions between the governance level and Connect project enabling knowledge spread) they were often seen as not relevant to day to day work.

Epistemic, professional and organisational framings were all important conceptualisations of the research/clinical practice boundary which manifest within the AHSC partnerships (outlined in Chapter 6). Although epistemic elements were found to dominate the AHSC narrative (bench to bedside) and motivate knowledge mobilisation, professional and organisational elements were also present, with organisational boundaries often proving least permeable. Key boundary spanning mechanisms included boundary spanners (particularly clinician scientists), and objects (outlined in Chapter 7). The most effective boundary work was that which encompassed epistemic, professional and organisational aspects, and this was sometimes through unexpected objects, such as the iPad in the Connect case. The 'bench to bedside' heuristic also operated as an overarching boundary concept, vague enough to bring together diverse groups. These main findings make empirical and theoretical contributions to the three broad literatures on AHSCs, knowledge mobilisation and boundaries as outlined in Chapters 1 and 2.

The study makes four main empirical contributions. Firstly it contributes to the knowledge mobilisation in healthcare literature, and also the normative AHSC literature, by presenting and investigating the AHSC as an organisational response to the broad health policy imperative of mobilising research into practice. The study

of AHSCs builds on studies of other translational research initiatives (Oborn et al., 2013a; Rycroft-Malone et al., 2016), and reflects similar themes and challenges as identified in the normative AHSC literature (Barrett, 2008; French et al., 2014). It broadly supports the assertion that 'relationships trump design' (Crilly et al., 2013) – that the interactions and linkages between individuals are more important to knowledge mobilisation than organisational governance structures – but that networked approaches can provide a supportive environment for cross boundary work.

Secondly, it responds to calls by Lamont and Molnár (2002) to examine the properties and mechanisms of boundaries and for the fragmented boundary literatures to learn from one another, as well as Oborn et al.'s (2013b) call to unpack the different aspects of the research/clinical practice boundary. It does this by examining the properties of the research/clinical practice boundary construct in AHSCs through epistemic, professional and organisational framings. It finds that epistemic boundaries can be crossed using boundary spanners and objects which motivate and drive the creation of new knowledge. I argue that professional elements of such a boundary can slow the mobilisation of knowledge (Ferlie et al., 2005) but professional hybrids (such as clinician scientists) can counteract such forces and enable the development of a joint field of practice between the two domains. Organisational elements of the boundary remain salient and the least permeable, and require substantial work to ensure the appropriate infrastructure support for knowledge mobilisation exists. In my cases, this required workarounds to be enacted by senior clinician scientists who moved into 'three way' hybrid roles spanning research, clinical practice and management.

The third and related empirical contribution of this study is responding to the second of Lamont and Molnár's (2002) calls by examining the mechanisms of boundary work (the role of boundary spanners and objects) across the research/clinical practice boundary. Specifically I contribute to the boundary spanning literature building on the work of Lander (2016), Mørk et al. (2008) and Wilson-Kovacs and Hauskeller (2012) by analysing how professional hybrids (clinician scientists) operating across research, clinical practice and management domains can create joint fields of practice and establish authority over a new jurisdiction of knowledge. Building on Levina and Vaast (2005), I demonstrate how boundary spanners cannot

operate in isolation and need the support of a wider team (and organisation) to function in these roles.

The fourth empirical contribution is to the concept of boundary objects where I build on recent work by Nicolini et al. (2012) by examining how the role of objects can drive and facilitate boundary work and how their roles can change over time. I find that epistemic objects, such as the 'scientific puzzle' are motivators and enablers of knowledge mobilisation, but the process also requires the 'boring' organisational conditions to be in place (either through workarounds or objects such as the iPad). My findings also indicate that the introduction of 'boring' objects or new organisational boundary work can often be challenging, but if successful, the consequences go beyond the instrumental and they can have powerful unintended symbolic implications in enabling epistemic and professional boundary work.

This thesis makes three main (related) theoretical contributions. Firstly it contributes to the boundary literature by demonstrating how using different framings (epistemic/knowledge communities, sociology of the professions and organisations) of the boundary concept to analyse one 'meta' boundary enables learning across the fields (Lamont & Molnár, 2002). Conceptualising 'boundary' as a space for hybridisation (borrowing from STS) rather than demarcation (akin to much of the professions and organisational literature) enables further analysis of how boundary spanners and objects can act and mobilise knowledge across different domains.

The second related theoretical contribution (responding to Oborn et al. (2013b)) involves applying this boundary analysis to the knowledge mobilisation in healthcare literature. In doing so, it has identified that organisational boundaries can prevent and slow knowledge mobilisation, but given the right organisational conditions, developing joint fields of practice conducive to knowledge mobilisation is possible at a local level. These conditions include an overarching boundary 'concept', epistemic objects acting as drivers, and boundary spanners able to operate across multiple domains.

Thirdly, drawing on these contributions, I make the wider point that 'bringing the organisation in' further to both the boundary and knowledge mobilisation literature is important to understand institutionalised practices in healthcare and other fields.

Table 7 Summary of empirical and theoretical contributions

	Normative AHSC literature	Knowledge mobilisation in healthcare literature	Boundaries literature
Empirical contribution	• Presents a detailed study of empirical case AHSCs outside North America. • Supports Barratt's (2008) assertion that AHSCs move up and down an integration continuum (here less integrated models prevailed).	• AHSCs are a new empirical case of an organisational response to 'research to practice' policy problem. • Broadly supports Crilly et al's (2013) assertion that 'relationships trump organisational design' and that network models prevailed over hierarchical forms. • Clinician scientists have pivotal (under-researched) roles as boundary spanners in the knowledge mobilisation process. • Both epistemic and 'boring' objects can have symbolic and instrumental value in the knowledge mobilisation process and may act in unexpected ways (Swan et al., 2007).	• Responds to Lamont and Molnár's (2002) call for further work into the properties and mechanisms of boundaries and for the fragmented boundary literatures to learn from one another by analysing epistemic, professional and organisational framings of the research/clinical practice boundary. • Epistemic boundary work motivates, organisational boundaries are the least permeable. • The professional hybrids of clinician scientists work as boundary spanners integrating across the domains of research, clinical practice and management. • The creation of 'new knowledge' by integrating knowledge contributions from two domains in a joint field of practice acts as a boundary object.
Theoretical contribution	• Using a social science perspective contributes to a more nuanced understanding of AHSCs as an organisational form (French et al., 2014).	• Our understanding of knowledge mobilisation processes benefit from bringing the concept of boundary and its different forms to the centre of the analysis (responding to Oborn et al. (2013b)). • Analysing the role of organisational form is important to gain a better understanding of knowledge mobilisation processes (responding to Ferlie et al., (2012)).	• Boundaries are more usefully conceptualised as space for action (joint fields of practice) rather than demarcation. • Bringing the organisation in to boundary analysis contributes to our understanding of boundary processes as institutionalised practices.

This chapter is structured as follows. Firstly, it presents each of the empirical and theoretical contributions outlined above and summarised in Table 7. I then outline some reflections on the whole research process and study design, including its potential limitations, highlight areas for further research and make some suggestions for policy makers and practitioners.

8.1 Empirical contributions

8.1.1 The AHSC as an emerging organisational form designed to mobilise knowledge in healthcare

The first empirical contribution of this thesis is to the current literature on AHSCs, which is largely normative, focussed on narrative descriptions and broadly not informed by social science (as outlined in Chapter 1). The literature does however present several common themes (French et al., 2014) which were supported by the findings in this study. This suggests that, although the national policy contexts differ between countries, AHSCs as knowledge mobilisation partnerships internationally face similar issues. I will discuss two of these themes briefly here.

Firstly, although there are narrative accounts of interpersonal relationships (such as Kastor's (2004) tale of the 'turmoil at Penn and Hopkins') much of the AHSC literature focusses on organisational structures. This literature argues that AHSCs operate on a continuum of integration, that no one organisational form fits all, they are path dependent and partnerships can move up and down this continuum over time (Barrett, 2008). This supports Crilly et al.'s (2013) assertion that knowledge mobilisation organisations need to be adaptable and able to respond to change.

The two AHSC partnership cases in this study broadly support these findings from the wider literature. Although both organisational forms ultimately reflected a networked approach, they took different, path dependent journeys to that end. Along the way, both partnerships made some attempt to move up or down the continuum described by Weiner et al. (2001). Gamma AHSC began as an integrated model but despite the potential benefits of this, participants reflected that the tensions inherent in its combined NHS management and research leadership role were too demanding. As such Gamma AHSC then adopted a network model, by splitting leadership responsibilities and establishing an AHSC directorate which reported to the separate organisational boards.

In the meantime, Delta AHSC pursued a looser, confederate model owing to the fact it had three NHS Foundation trusts (with one university) as founding partners. However it then also started to pursue a 'merger' model which was halted, participants implied, due to the competitive relationship between the two acute trusts, as well as regulatory issues around the size and monopolistic power a merged trust would have in the local health economy.

Therefore, at the time data collection was completed, both AHSC partnerships were pursing 'managed network' models that looked similar. This supports Ferlie et al.'s (2012b) view that networked models of governance are the 'least worst' modes of governance to facilitate knowledge mobilisation processes.

The second major theme of the AHSC literature referred to the 'mission tensions' of combining research, education and clinical care. These competing institutional logics (Lander, 2016) which delineated the research and clinical practice domains were evident in the two cases presented here and manifested at all levels in the partnerships, but primarily at the middle management and board levels. The board level of each constituent organisation was dealing with the competing logics to ensure that the very different organisations of universities and NHS trusts were able to maintain strength in delivering their core mission whilst also attending to the policy imperatives of the AHSC designation.

Interestingly, although the competing logics were still visible, there was some evidence that motivated teams at the middle management and front line levels could negotiate them and provide workarounds where there was drive and incentive to undertake cross boundary work. For example, the mental health CRCs (middle management level) in Delta AHSC had devolved virtual budgets and decision making in both the academic and clinical constituent parts and as such were able to make strategic decisions regarding knowledge mobilisation work in their specialities.

Further, the two positive frontline team cases were largely able to (eventually) negotiate or create workarounds for many manifestations of the organisational boundary. The key factor in this work was the skill of senior clinician scientists who were able to manage organisational processes, particularly around finance and geography and relationships with the AHSC executive, thus reducing the barriers to creating a joint field of practice in their chosen fields. The two cases had differing structural relationships with the AHSC executive but both were exemplar cases

which fulfilled the tripartite mission and were therefore largely left alone from interference at the executive level. Therefore, in positive cases, the competing institutional logics, although having impact on front line teams, were easier to manage at the micro level. This supports Crilly et al.'s (2013) view that relationships trump organisational design and that the connective ability of individuals is more important than organisational structure in facilitating knowledge mobilisation.

However, the cases also demonstrate that a supportive organisational context can facilitate cross boundary work and the establishment of joint fields of practice at the local levels. For example, in the Connect project case, the synergy between the early local boundary work and the overarching goals of the newly developed AHSC created the opportunity for wider roll out of the project across the AHSC. This connection between the micro and meso levels within the AHSC ensured that when the project team needed senior support (for example in the development of the IT infrastructure to aid data collection) the AHSC executive were able to help put pressure on individual organisations' IT departments.

This appeared to be an unusual case however, as the project was not seen as particularly threatening to the sovereignty or core business of individual organisations. Participants implied that the competing nature of the NHS trusts in Delta AHSC greatly impeded the development of the acute trust CRCs and as such other boundary work between organisations. Therefore although relationships appear to trump organisational design (Crilly et al., 2013) in the positive cases, organisational structures and their competing logics within AHSC partnerships may impede and prevent cross boundary work.

The cases also demonstrated the power of the partnership wide 'bench to bedside' heuristic as a driver for cross boundary work. This operated as a boundary concept (Löwy, 1992) which was a motivator for staff and also enabled them to start questioning particular organisational blockages to knowledge mobilisation. I heard staff in both cases make comments such as 'x should happen, as we are meant to be an AHSC'. The power of the heuristic is further evidenced by the clinical teams in the Connect project wanting to participate in the project in order to be able to report AHSC and research activity. Therefore a supportive organisational environment can facilitate boundary work across the research/clinical practice boundary when combined with skilled boundary spanners and flexible objects driving collaborations at the local level.

In addition to providing empirical cases of AHSCs outside North America, this study contributes to the literature on organisational form in knowledge mobilisation in healthcare. This builds on work on knowledge mobilisation as a micro process within teams (e.g. Ward et al. (2012)) and at a public policy level (Davies et al., 2015), as well as more recent studies which have taken an organisational approach to studying translational research initiatives such as the NIHR CLAHRCs (e.g. Fitzgerald and Harvey (2015); Rycroft-Malone et al. (2016)), clinical networks (Ferlie et al., 2012b) and Genetics Knowledge Parks (McGivern & Dopson, 2010; Swan et al., 2007). These studies mainly examine organisational responses to the second translational gap whereas AHSCs make an interesting empirical case as they were primarily designated to focus on the first translational gap ('bench to bedside').

Further, AHSCs represent a distinct organisational form which remains different from other translational research models. Generally, as the organisations are more tightly coupled, relationships may be more intense and constituent partners may have older, historical ties (perhaps through shared histories of delivering medical education) (Ovseiko et al., 2010). It may be that this tighter (managed network) arrangement enables more successful cross boundary work which may be more challenging in looser, con-federated models, such as CLAHRCs.

However, the findings on the organisational form of AHSCs support the emerging lessons from studies of the CLAHRC networks. In particular, they correlate with the findings of Fitzgerald and Harvey (2015) and Rycroft-Malone et al. (2016) who found that establishing governance structures alone will not facilitate mobilisation – the 'lateral' systems are also needed. There was also some evidence to suggest that attempts to formalise relationships with long standing histories could actually re-emphasise their differences. Rycroft-Malone et al. (2016) demonstrate that these attempts to formalise relationships can reinforce epistemic and professional boundaries. My findings support this and show that the organisational boundaries can also become strengthened (less permeable) in this process. Comparative studies examining the effects of these different organisational forms may be an interesting area of further research.

8.1.2 Analysing the properties of the research/clinical practice boundary using epistemic, professional and organisational framings

The second empirical contribution of this study is to address the gaps in the knowledge mobilisation and boundary literatures, by using epistemic, professional

and organisational framings to analyse the research/clinical practice boundary in AHSCs. These different framings (which emerged from the literature and early informal discussions within the AHSCs) each contributed to analysing boundaries and boundary work in the research/healthcare setting. Using different framings can be conceptualised as a composite approach, similar to the framework used to examine mental, social and physical elements of organisational boundaries by Hernes (2004). A composite approach ensured that the less researched but potentially important aspects of the research/clinical practice boundary construct, such as the organisational elements (Oborn et al., 2013b), could be brought to the forefront of analysis. This framework proved useful to analyse the key drivers and motivations behind knowledge mobilisation and translating research into practice. Viewing the boundary through epistemic, professional and organisational lenses has begun to unpack the key drivers and motivations behind, as well as barriers to, knowledge mobilisation in a translational research setting. This approach also supports Lamont and Molnár's (2002) call for the fragmented areas of boundary literature to learn from one another.

Using the three lenses as a starting point to develop a more nuanced understanding of the research/clinical practice boundary construct led to the overall finding that while epistemic boundaries can motivate knowledge mobilisation, professional and organisational boundaries are less permeable and require further work to enable boundary crossing. In both cases, organisational boundaries were the most salient, durable and visible. They were perceived as barriers rather than enablers, and required workarounds, such as joint contracts, and using two computers and two telephones, one for university and one for trust work. The epistemic and professional elements of the research/clinical practice boundary, while often visible, tended to be crossed through work by boundary spanners, specific interactions (such as research meetings) and objects which acted as both motivator and enabler.

8.1.2.1 Epistemic boundaries

Epistemic boundaries are those between groups who 'think differently' – they have different ways of knowing. For example, the research community may view knowledge as that which is derived from scientific experiments, the clinical community draw on a more varied range of knowledges, including personal experience, to inform their practice. The cases presented here represent an empirical contribution to this literature as most studies examine boundaries between

different scientific disciplines, such as biology and physics (Knorr Cetina, 1999) or between science and non-science (Gieryn, 1983). There are fewer studies which examine the epistemic nature of the research and clinical practice boundary.

The epistemic elements of the research/clinical practice boundary were most visible at the tracer case level, as this is where the specific knowledge mobilisation in relation to a particular scientific puzzle or clinical problem took place. In the positive tracer cases presented here, epistemic boundaries were most usefully framed as a space, a joint field of practice (Levina & Vaast, 2005), in which to develop 'new knowledge' (or 'translational research') through combining mobilised knowledge from both research and clinical practice domains.

In the tracer cases, examples of this 'new knowledge' involved combining basic science data with patient physiology, or mental health and physical health data, or clinical data with social data to inform whether patients are likely to complete clinical trials. The composite knowledges mobilised were established in different domains, such as through basic science, clinical interactions with patients, epidemiological work or clinical service developments.

Despite these epistemic differences and the boundaries between them there was little evidence of differing contributions being considered less important to the knowledge mobilisation process by 'the other side', or of conflict caused by pragmatic work (Carlile, 2004; Swan et al., 2007). This finding was consistent across both tracer cases despite the different epistemological and ontological underpinnings of the communities and therefore the knowledges to be mobilised. Further, these knowledges did not just consist of 'science' or 'clinical practice' but also tacit organisational knowledge such as who to speak to in order to facilitate finances.

This lack of conflict was largely due to the effective boundary mechanisms in place in each of the tracer cases, such as competent boundary spanners who had an understanding of multiple (research, clinical practice, management) domains and were motivated to pursue boundary work, as well as multiple epistemic objects which drove collaboration, and the overarching 'boundary concept' (Löwy, 1992) of the AHSC 'bench to bedside' heuristic. In short, epistemic differences between communities did not prevent knowledge mobilisation across boundaries – in fact, the

boundaries were seen more as a motivator and an area for potential work rather than active maintenance or blocking.

8.1.2.2 Professional boundaries

Professional boundaries are delineated by the jurisdictional battles between groups over a particular set of work and knowledge practices (Abbott, 1988; Freidson, 1970). This boundary has both formal (professional qualifications and requirements to practice certain tasks) and informal elements (the power dynamics between doctors and nurses for example). The empirical contribution of this study to the professional boundaries literature is an analysis of the role of those working across the 'professions' of research and clinical practice. Further, this study also contributes an analysis of the hybrid role of senior clinician scientists operating across the three domains of research, clinical practice and management within the AHSCs and their constituent organisations. This specific contribution will be outlined in the next section.

Professional boundaries were visible at the meso level within the AHSC partnerships. They were also visible in the tracer cases due to the demarcation of tasks, but less so through the monopolisation of different knowledges (perhaps unlike other professional boundaries in healthcare). In the tracer cases, many individuals were able to 'speak both languages' regardless of their professional domain (be that basic science research, nursing, medicine) and were interested in developing their knowledge further in the 'other' domain. This was particularly true where a large joint field of practice had been established, such as the Unite department, but was also evident in 'new' boundary work such as in the Connect project case as the project team became more experienced with how to best facilitate the project into clinical practice.

The professional boundary between research and clinical practice appeared more permeable than that of different healthcare groups such as doctors and nurses, for example. This is in contrast to the findings of Wainwright et al. (2006) who highlight that translational research efforts are frequently limited due to a lack of understanding of the 'other' domain, where clinicians don't understand science and biomedical scientists lack an appreciation of the social and organisational issues associated with clinical research.

Further, the professions literature includes the study of organisations, such as professional bureaucracies, but this largely focusses on the relationship between professional groups and managers. This study contributes to this literature by also examining the role of processes within organisations which influence inter and intra professional boundaries and boundary work – in so doing it shows how 'examining the workplace provides us with a fuller picture of how occupational conflict is enacted in practice' (Bechky, 2003, p. 747). In contrast to Kitchener's (2002) case which studied the failed merger of UCSF and Stanford in California, both case AHSCs in this study demonstrated how engaging powerful professional groups such as clinician scientists early in the process of organisational change was important thus demonstrating their continued importance. In my study, the 'merger myth' was mooted (and tested) in both cases yet less closely coupled models finally emerged.

8.1.2.3 Organisational boundaries

Organisational boundaries are traditionally seen as firm, formal and delineating the 'edges' of organisations (Heracleous, 2004; Paulsen & Hernes, 2003). This study took organisational boundaries to be those which distinguished the sovereign organisations which constituted each AHSC partnership. The empirical contribution of this study is the finding that organisational boundaries not only delineate sovereign organisations in partnerships which are required to collaborate, they can actively block those who may be motivated to work across them. Front line teams, when motivated to do so, may develop workarounds where they can, but organisational boundaries are actively maintained at the middle and board management levels within partnerships. This concurs with the literature on partnership working and collaborative advantage (Carlile, 2004) and also provides a counter argument to Crilly et al's (2013) notion (outlined above) that 'relationships trump organisational design'.

This is further supported by the fact that local knowledge mobilisation innovations struggled to spread across the AHSCs. The Unite department was a best practice exemplar yet it was also seen as a small island which was effective at insulating itself against wider organisational issues, and it was therefore hard to spread the learning. The Connect project did gradually spread across the AHSC but only after high level intervention to enable the IT platform roll out. This spread required a clear connection between the project goals and AHSC overall goals as well as effective relationship management between the project lead and AHSC executive.

Despite the designation of AHSC partnerships as a policy mechanism designed to reduce barriers between partner organisations (as outlined in the Cooksey report (2006)), organisational boundaries will always remain salient and durable. Universities and healthcare providers in England are very different organisations, established with different funding arrangements, monitored by different government departments and with different goals.

As noted above, this study builds on Hernes' (2004) work by developing a composite approach to a 'meta' boundary concept (in this case that of research/clinical practice). However this empirical study did not appear to support his theory that boundaries were continually reshaped and reframed in organisations. In this case, boundaries appeared quite stable and durable, only being (eventually) reframed through years of developing joint fields of practice within localised areas (such as the Unite department). This reflects the continued dominance of professions within managed professional organisations (Greenwood et al., 2002) or networks (Addicott et al., 2006) and their ability to maintain the status quo only adapting where necessary and when in their best interests to do so.

Therefore each of the three chosen boundary literatures highlighted different aspects of the 'meta' research/clinical practice boundary. This empirical contribution supports the theoretical contributions to the boundary and knowledge mobilisation literature outlined below.

8.1.3 Clinician Scientists: the hybridisation of professional roles as boundary spanners creating a new joint field of practice?

My third empirical contribution is to the literature on boundary work, boundary spanning roles, and the professions. Specifically, my findings demonstrate how hybrid professionals (clinician scientists in this case) through training, interest and ambition are able to span multiple domains (research, education, clinical practice and management) and drive boundary work by creating joint fields of practice for which they obtain organisational support. In other words, they are able to span the research/clinical practice boundary *because* they can enable work across epistemic, professional and organisational elements of this boundary.

Both AHSC cases demonstrated the importance of hybrid clinician scientist/manager roles at all levels within the partnerships. The term 'hybridisation' when linked to professions is normally related to the practice of professionals assuming managerial

roles whether 'incidential' or 'willing' (McGivern et al., 2015). In this study, there was evidence of hybridisation of a clinician role when assuming research responsibilities. Although boundaries were visible ('scientists dislike clinicians'), these individuals 'worked hard' at spanning epistemic (training and work in both knowledge domains), professional (work practices and formal role designation) and organisational (hold contracts and management positions in multiple organisations) elements of the research/clinical practice boundary. Therefore the role can be seen as a developing hybrid crossing inter and intra professional boundaries within medicine and its related sciences. In so doing, clinician scientists acted as both nominated and boundary spanners-in-practice and created joint fields of practice between the research and clinical practice domains by drawing knowledge from both fields together and creating 'new' knowledge from them.

The literature on boundary spanning has developed from how individuals build competencies within particular domains of expertise, often characterised as communities of practice (Brown & Duguid, 1991), through to how individuals can span multiple boundaries in practice (Bechky, 2003; Carlile, 2004; Orlikowski, 2002). The joint fields of practice are required as the arena in which boundary work takes place and Levina and Vaast (2005) specifically call for further work to understand the processes through which boundary spanners develop these joint fields. This study responds to this call by analysing the joint field of 'translational research' developed within both tracer cases.

The joint field in the Unite department case was well established by clinician scientists who, over time, were able to build up sufficient expertise in both basic science research, high quality clinical practice with good access to clinical trials for patients, and the drive to integrate knowledge from both domains. They 'worked hard' at this integration and recognised the need for all members of the team to be able to be aware of the 'other' domain, if not all specialist in it.

In the Connect project, the establishment of several joint fields of practice was driven by boundary spanners from research and clinical practice who both had something to gain from the collaboration – primarily the development of objects which met both research and clinical practice, as well as organisational, requirements. Levina and Vaast (2005) further argue that in order to become a boundary spanner-in-practice (and thus help create a joint field), individuals need the ability to be happy acting as an outsider in an unfamiliar field. This is a particular

feature of liaison psychiatry, a specialty which is based on the ability of practitioners to apply specialist knowledge in mental health in a physical health environment and to patients often with complex physical and mental health interactions.

Further, boundary spanners in both cases were able to ‘manage upwards’ and negotiate organisational support, or be insulated from wider organisational disruption, as appropriate for the needs of the joint field.

This study largely supports other analyses of the role of clinician scientists but has some differences. For example, Wilson-Kovacs and Hauskeller (2012) find that that stem cell randomised controlled trials (which could be characterised as a joint field of practice) are conducted by a distinct type of medical professional who devotes time to biomedical research and clinical practice, has knowledge of basic science and its applications and possesses the right skills to translate the knowledge into potential therapies. They find, in common with other studies on role hybridity, that clinician scientists carve out a niche for themselves by delineating their positions as clinician scientists against the ‘others’ in the profession.

In my study however, the team and wider organisational context proved important to knowledge mobilisation. Rather than carve out a niche, clinician scientists operating in joint fields of practice sought to continue to develop their knowledge in both fields, and delineated their expertise through being able to draw together knowledges from either field to create ‘new knowledge’ in the joint arena. This did not happen in isolation. The joint fields of practice were developed in arenas (boundary interactions, such as research meetings and education sessions), supported by senior clinician scientists and the wider organisational context, where individuals from both domains could come together. Individuals had enough knowledge of the ‘other side’ of the boundary and were willing to share that with others readily. In common with the literature on role hybrids across the medical and managerial fields, clinician scientists show no sign of becoming 'de-professionalised' (Kitchener, 2000) but embrace the benefits of belonging to two different fields.

Levina and Vaast’s (2005) analysis does not take full account of the organisational contexts in which boundary spanning work is taking place. This study demonstrates that organisational context and the ability of boundary spanners to manage, influence and align with it is critical in the development and maintenance of joint fields of practice. Clinician scientists operating in a generally supportive

organisational environment can overcome the challenges associated with translational research efforts described by Wainwright et al. (2006).

The positive cases presented here were both situated in an organisational environment (an AHSC partnership) that was (relatively) conducive to the boundary work they were undertaking. The 'bench to bedside' rhetoric of the AHSC partnerships ensured that the established and new joint fields of practice which the cases were developing were largely aligned with organisational priorities and importantly did not clash with those of the constituent organisations. Within the established joint fields of practice (the Unite department) clinician scientists held management roles in both the university and NHS trust and were therefore able to manage HR issues and financial flows, and also insulate the department from other organisational issues. Although the wider AHSC did not overtly enable, it did not impede. The 'arms length' approach taken by the university and NHS structures enabled the continued maintenance of the local joint field. This probably occurred because the department was a 'positive case', meeting university objectives by generating appropriate funding and publications, and meeting NHS financial and operational targets. If there had been (organisational) cause for concern in any area, 'insulation' techniques may have been harder to achieve.

Further, with the newly developing joint fields of the Connect project, the support of the AHSC was required to enable work across stubborn and durable organisational boundaries by unblocking some key organisational issues (such as those around IT) and this was enacted by the skills of the project lead (supported by the project team members). The aim of the project, to integrate mental and physical healthcare, sat well with one of the core AHSC objectives and organisational strengths.

Looking beyond the tracer cases, clinician scientists were in leadership positions at all levels within the AHSCs. This was due to both the drive and ambition of the individuals in question, who essentially were pursuing two full time demanding careers, and the organisational design of the AHSC partnerships. This is in contrast to Wilson-Kovacs and Hauskeller's (2012) description of clinician scientists pursuing an 'epic sense of solitary battle to convince other actors and agencies of one's group position and point of view' (p. 508). Although my findings demonstrated similar organisational difficulties with processing research administration and establishing trials, these issues were not seen as insurmountable barriers within the AHSCs. It may be that the ethos of the AHSC – the idea that 'we are an AHSC, this

should just happen', enabled organisational boundaries to be slightly more permeable in some cases.

The fact that clinician scientists occupied leadership positions within the AHSCs meant that a struggle for recognition of their areas of expertise (at the intersection between research, clinical care and academic medicine) had perhaps already happened. The development of policy streams encouraging clinicians to undertake research could be interpreted as a medical 'takeover' of biology (there are few basic scientists who go onto become clinicians – which emphasises the importance of medical training and the strength of medicine as a profession). Freidson (1994) suggests that, in light of organisational and policy developments such as the managed care era, there is a functional restructuring of the profession of medicine. He notes that the traditional divisions based on clinical specialties are becoming less important than a new 'tripartite distinction' between those physicians who deliver clinical care (the producers), those who conduct research and medical education (the knowledge elite) and those who take on managerial positions to oversee co-ordination and planning of healthcare (the administrative elite) (Freidson, 1994).

My findings on clinician scientists challenge this thesis. In AHSCs (which are admittedly already elite institutions) clinician scientists often perform all three roles simultaneously at all levels within the partnership organisations and have been the key group of individuals to drive and shape the development of this new organisational form. By holding this elite position, clinician scientists are in a strong place from which to shape organisational change to support boundary work across the research/clinical practice boundary. However, as my findings also outline, the organisational elements of this boundary remain visible, salient and stubborn and more often require workarounds (for example two computers – one university and one trust) rather than long term solutions (for example an integrated IT system). The restrictions generated by the history, funding arrangements, reporting bodies and aims and objectives of these organisations ensure that organisational boundaries remain in place.

8.1.4 The changing nature of objects in boundary work

The fourth empirical contribution of this study is to the literature on boundary objects. My findings illustrate how, within an AHSC context, different objects can perform a vital role enabling work across epistemic, professional and organisational boundaries through both their instrumental and symbolic characteristics (Bechky,

2003; Swan et al., 2007). They also demonstrate how a single object (such as an iPad) can perform different roles depending on the context, boundaries and teams in question. These objects take on different trajectories and roles over time. Nicolini et al. (2012) provide a useful framework to analyse these changes, and the main contribution of this study's findings on objects is to their call that we should consider what objects are useful and when, and what is the meaning of the objects and for whom.

My findings demonstrate that although different boundaries generate and require different objects to facilitate them, some objects can perform multiple roles across multiple boundaries at the same time. In order to activate boundary work and knowledge mobilisation across the research/clinical practice boundary, an epistemic object is often either the catalyst for boundary work or is needed early on in the collaboration to sustain interest in boundary work (McGivern & Dopson, 2010). For example, in the Unite department, the joint field of practice mobilising knowledge was driven by the epistemic object of the 'scientific puzzle'.

In both cases knowledge mobilisation between research and clinical practice were characterised as bringing together specialist knowledge from each domain to create 'new knowledge' which then contributed to further activity in both specialist knowledge domains (in that it improved patient care whilst also developing further learning in the research sphere). This process was in turn motivated, facilitated and supported by boundary objects. These objects were many and varied, both exciting, motivating and conflict creating, and also boring (Star, 1999) and supporting.

The scientific puzzle, or motivator to create the new knowledge was a driver in both cases. The potential power shared data had for 'new' knowledge motivated those in both domains. However my findings also showed that *how* the new data was captured was also important for collaboration. The role of the iPad in the Connect project case demonstrated this. The iPad became an important object when cross boundary work had been agreed in principle between the Connect project and the clinical teams rolling out the project (driven by the joint research and clinical motivators). The iPad became an object of collaboration largely because of its initial novelty value. It, as Nicolini et al. (2012) infer, developed into a boundary object because of its relationships with boundary spanning individuals (the project team members) and the wider context in which it operated. For example, if touch screen devices were widely used in the NHS, and information transfers between different IT

systems within the AHSC were not problematic, the iPad may not have taken on such practical, and particularly symbolic, significance.

Furthermore the case demonstrated that when the primary object's importance is asymmetrical, in that it is important to one group but less important to the other, then the interaction with the boundary spanning individuals and their motivations shape the use of the object. For example, when the Connect project team and IT departments were collaborating around the iPad, it was of vital importance to the project team, but more of a minor irritant to certain groups within the IT department. However, the persistence of the project team, together with an interest in the puzzle and the end goal from key boundary spanning individuals in the IT team, ensured that the object remained foregrounded and stubborn. This stubbornness drove the innovation of developing appropriate software for the iPad to be used in the NHS setting.

The iPad as a secondary object remained important as a collaborative tool until the project was implemented in clinical settings. Once this occurred, the object became a tertiary object and part of the infrastructure. At this stage, the epistemic object and the initial motivator for the project, the data, regained the centre stage. Collaborations between the project and clinical teams then became around the data collected and how this could be used clinically and for research purposes. Boundary work again became epistemically driven as negotiations started to take place about what research to conduct on the data and what publication would take priority.

The iPad case, as well as highlighting how objects can change over time, also demonstrated the importance of organisational elements of the research/clinical practice boundary to the process of knowledge mobilisation.

My findings therefore concur with Nicolini et al.'s (2012) analysis that the trajectory of an object over the course of collaboration can change, with different objects taking centre stage at differing times. Developing this further however, analysing the nature of the boundary, in this case be it epistemic, professional or organisational, can provide further understanding of how and why objects move and become important. Furthermore, the interaction between object and boundary spanner, becomes important when there is asymmetry in the perception of the importance of an object at a particular point in time.

The cases and object examples highlighted here demonstrate the importance of the relationship between boundary spanners, objects and interactions (Wenger, 1998). Epistemic objects can be created by boundary spanners already operating in joint fields of practice and they can drive the creation of those joint fields by acting as a motivator to boundary work. 'Boring' organisational objects can then continue to support and facilitate this work. Objects can reinforce the asymmetrical relationships across boundaries (Bechky, 2003) or they can level those relationships through enabling both domains to contribute equally. Further research is needed into the nature of the relationship between spanners, objects and interactions in boundary work.

Perhaps the most interesting finding, supporting that of Swan et al. (2007), was that objects can have both symbolic and instrumental characteristics and may work in unexpected ways. Specifically, using the composite approach outlined above, highlighted how organisational objects (such IT systems) can not only support epistemic work but also demonstrate the 'competence' of the boundary spanner in negotiating stubborn organisational boundaries. This in turn can lead to further boundary work as confidence in boundary spanning individuals to create meaningful collaborations is increased.

8.2 Theoretical contributions

The main purpose of this study was to explore knowledge mobilisation in the emerging organisational form of AHSCs. I was keen to bring in broader social science literature as well as the more normative AHSC literature in order to make a wider theoretical contribution. This study makes three related theoretical contributions.

8.2.1 Boundaries as spaces for joint practice

Firstly, in response to Lamont and Molnár's (2002) call, this thesis makes a theoretical contribution to the boundary literature by integrating different framings of the concept to see if they can learn from one another. By focussing on a particular 'meta' boundary (in this case that between research and clinical practice) and applying different conceptions of boundary (drawn from the body of work on epistemic/knowledge communities, sociology of the professions and organisations) to it, I have enabled some tentative lessons to be drawn across diverse literatures. I

suggest that boundaries are most usefully conceptualised as ‘spaces’ and areas for joint activity, rather than as barriers delineating difference.

As outlined in Chapter 2 and in the second empirical contribution above, different literatures view the concept of boundary in different ways. A key distinction is whether the boundary is characterised as defining difference or a space for hybridisation. Much of the literature on epistemic and professional boundaries tends to focus on difference and how groups define themselves against each other and lay people (Abbott, 1988; Lamont & Molnár, 2002; Morgan & Burrell, 1979). In these accounts, boundary work tends to refer to boundary maintenance rather than boundary dissolution (Lamont & Molnár, 2002). In a similar fashion, organisational boundaries are traditionally analysed as external, firm, impermeable entities delineating organisations from the external world, or as internal ‘problems’ which are best eliminated.

In contrast, building on the work of Star and Griesemer (1989) and other anthropological work, this study demonstrates that considering the boundary as a ‘space’ for collaboration rather than a barrier can be constructive. Borrowing from human geography, using Massey’s (2005) conceptualisation, ‘space’ can be physical, temporal or social, and not static, but constantly changing. The physical attributes of space are constructed in places and practices, which have material consequences for framing interactions (Renedo & Marston, 2015). Social elements comprise networks of interactions and practices which are influenced by participants’ difference, power and resistance. Both material and social aspects shape future events and therefore also influence the temporal elements of space (Massey, 2005).

In the tracer cases presented here, physical space (such as the co-location of research and clinical practice in the Unite case) was an important facilitator to the development of a joint field of practice. Further the networks within the teams valued the knowledge developed in the joint fields and therefore prioritised the creation of (temporal and social) space to facilitate its creation. In other words, boundary spaces for joint practice do not just appear, but are actively encouraged by boundary spanning individuals and appropriate organisational contexts.

Boundary work may be usefully framed as *how* joint fields of practice (Levina & Vaast, 2005) between different groups are developed in spaces. In my cases, these

joint fields of practice (across boundaries) were the loci of processes which 'merged' knowledge from both domains to create 'new knowledge', which acted as a boundary object and motivated boundary spanners to continue to work in the space. This conceptualisation as space rather than difference helped to contribute to analysis of the conditions under which boundaries 'generate differentiation or dissolve to produce hybridity or new forms of categorization' (Lamont & Molnár, 2002, p. 187). In the findings presented here, the concept of 'translational research' emerged as a new form of categorisation and clinician scientists as the primary custodians of knowledge in that space.

8.2.2 Using boundaries to analyse knowledge mobilisation processes

The second theoretical contribution of this thesis is concerned with applying the concept of boundary to analyse 'research based' knowledge mobilisation within the emerging organisational form of AHSCs. This study has framed the knowledge mobilisation process as a continuous activity taking place in (relatively small) joint fields of practice in the boundaries between the 'research' and 'clinical practice' domains, which contain many elements (the three explored here are epistemic, professional and organisational) . This framing is non-linear – knowledge is not 'translated' from research to practice in a uni-directional fashion – rather 'new' knowledge is created in a joint field by boundary spanners, and this new knowledge, and the potential for it, acts as an epistemic object which contributes to both domains. This framing sits broadly within relational approaches to knowledge mobilisation, building on linkage and exchange models. As outlined in Chapter 2, relational approaches have been critiqued for failing to take full account of political dynamics and power relations in knowledge mobilisation processes. This thesis partially addresses this by bringing the organisational boundary into the analysis, alongside the professions, which helps to highlight some of these issues.

In particular, my findings suggest that, even in a conducive organisational environment (one which supports the goals of the collaboration), while epistemic boundaries (as spaces for action) can drive knowledge mobilisation, professional and/or organisational boundaries can slow and prevent boundary work. Professional boundaries can act as a facilitator (for example when a joint field of practice becomes a comfortable location for hybrids, such as clinician scientists in translational research), if this work benefits, and does not threaten, the original professional domains. Organisational boundaries can also facilitate, but they rarely

motivate and can often slow and prevent knowledge mobilisation. However, as in the Connect project presented here, when the goals of the local collaboration are closely aligned with those of the organisation, the two can work together to spread innovation faster than they may have done otherwise. A core component of this process is key individuals acting as both nominated and in practice boundary spanners (Levina & Vaast, 2005) being connected to 'front line' work and with the organisational level, advocating for it.

The linear framing of 'bench to bedside', while less useful as a model for knowledge mobilisation processes, cannot be dismissed, as it functions as a motivational heuristic, a boundary concept (Löwy, 1992) which is rhetorically powerful yet vague enough to encourage collaboration and communication between different domains. This heuristic links drivers for knowledge mobilisation in small joint fields at the micro level to overarching organisational and policy 'missions' at the meso and macro levels. It is firmly embedded in the policy lexicon and now in funding structures (such as the NIHR). However, this motivational heuristic does not necessarily apply to all boundaries, particularly those between competing organisations (in this case the two acute trusts in Delta AHSC).

8.2.3 'Bringing the organisation in' to the boundaries and knowledge mobilisation fields

My third theoretical contribution is a call to 'bring the organisation in' to both the boundary and knowledge mobilisation literatures.

A more thorough analysis of 'boundary as space' (as called for above) requires contributions from different framings depending on the main 'boundary' under analysis. For example, conceptualisations of boundary in science are often situated at the macro, societal level (Lamont & Molnár, 2002), or at the micro level analysed using ethnographic data drawn from laboratory studies (e.g. Knorr Cetina (1999)). Organisational aspects of boundary are often overlooked and under-researched, and it is important, when the 'boundary space' in question is located in an institutional setting, then the organisational context should be brought into the analysis. In doing so, this study demonstrates that analysing interactions at the meso (organisational) level, or using an overt framing of 'organisation' informed by the literature at the micro level, can contribute to our wider understanding of knowledge mobilisation across boundaries in science (and the professions).

Drawing together various relevant framings of 'boundary' can also enable a better understanding of the required boundary work to mobilise knowledge, which, as noted above, is most effective when spanners and objects account for all elements of the boundary within a joint field of practice. This can be intended (for example in this case clinician scientists in management positions having organisational as well as epistemic and professional skills) or unintended artefacts of the collaboration which take on symbolic as well as instrumental roles (such as the iPad example noted above) (Swan et al., 2007).

The case for 'bringing the organisation in' is further supported by two main findings from this study, which, taken together, also demonstrate the complexity of the role of the organisation in the knowledge mobilisation process. Firstly, the case studies have shown that organisational boundaries (such as those between universities and healthcare providers, and between separate healthcare providers) can prevent knowledge mobilisation and spread and therefore reduce opportunities to develop joint fields of practice, even if individuals in both domains are willing and motivated to undertake boundary work.

Secondly, however, while organisations can provide the most impermeable barriers, they can also act as enablers of knowledge mobilisation. Knowledge mobilisation can be supported or facilitated through organisational machinery which can manifest in several forms. These include 'boring' infrastructure objects (in this case from basic spreadsheets to more complex undertakings such as integrating IT systems as in the Connect project); promoting and reinforcing overarching 'vague' boundary concepts (in this case the bench to bedside heuristic), creating appropriate governance machinery (such as the mental health CRCs which brought together decisions and budgets from both university and trust); and by placing 'nominated' boundary spanners in key leadership roles throughout organisations. Further, the creation of joint fields of practice by boundary spanners (professional hybrids such as clinician scientists) appears to be accelerated when organisational conditions are supportive (such as the Connect project receiving AHSC board support when needed).

These findings also demonstrate that a focus on organisational context when considering knowledge mobilisation processes is important and often overlooked. While this is not new (Ferlie et al., 2012a) my findings show that analysis of organisational issues (framed in this case through a boundary lens) alongside

professional and epistemic issues can improve our understanding of the institutional level. This is important, as my findings have demonstrated, due to the role of the organisation and its boundaries in knowledge mobilisation and the spread of innovation. Bringing in an awareness of this institutionally embodied and meso level of analysis is an important contribution to studies which have emphasised the role of professional fields at the micro and macro level.

Further, 'bringing the organisation in' to studies of knowledge mobilisation contributes to developing a more complete understanding of the processes which motivate and slow knowledge mobilisation, and the context in which they operate. It further develops our understanding of the different types of knowledge created and used in healthcare. As outlined in Chapter 2, conceptions of knowledge as 'research' are common, particularly in the EBM literature. However, as my findings demonstrate, organisational tacit knowledge is as crucial to knowledge mobilisation processes as the research based knowledge itself.

8.3 Reflections on study design and limitations

This study on the emerging organisational form of AHSCs was underpinned by a critical realist approach, which informed the study design.

As outlined in Chapter 3, theory is an integral part of the critical realist research process and theory choice normally comes before empirical examination (Danermark et al., 2002), and is followed by cyclical development between data collection and theory. The mechanisms identified in this study were of epistemic, professional and organisational boundaries and boundary work (informed by the literature), proxies of which were observed in the 'empirical' domain through data collection and analysis and presented in the findings chapters. This conceptualisation was helpful throughout the study as it enabled constant refinement of the theoretical framework throughout data collection, which iteratively informed future areas of interest.

This section briefly reflects on the study design and its limitations by drawing on three areas informed by the cyclical relationship between theory and data in critical realism. Firstly, it considers the intensive case study design. Secondly it looks at the role of retroduction as a data analysis method and thirdly it reflects on the nature of qualitative enquiry and the validation techniques which were used to ensure the 'critical' in critical realism.

8.3.1 Case Study Design

Critical realism, although accepting methodological pluralism, also advocates 'intensive' study design to explore context specific phenomena in depth, thus enabling the generation of causal explanation which can be tested using theory (Reed, 2009). This study used a case study design to explore the emerging organisational forms of AHSCs and the context specific 'what' and 'how' questions. This case study design enabled analysis at both meso and micro levels within two AHSCs with similar overall aims (translating research into practice) but differing organisational structures, strengths and approaches, using qualitative data collected through semi structured interviews (48), formal and informal observation (130+ hours) and documentary analysis (22 documents).

A key limitation of case study research is the extent to which generalisations can be drawn from a small number of cases (Eisenhardt & Graebner, 2007). However, the scope of this study did not allow for more cases to be examined, and did include two out of the five designated in England. The selection of tracer cases within them enabled me to examine 'frontline' departments/projects and it was beyond the scope of this thesis to study more than one case in each. As such, the study concentrated on exploring selective boundary processes in depth, which was appropriate for the research questions.

The micro level cases selected were deliberately positive cases as identified by senior individuals within the AHSCs. There were two main benefits to this approach. Firstly, the 'positive' nature of the cases enabled easier access. Despite my insider status, identifying and gaining access to a case at Gamma AHSC proved challenging and time consuming. A department or project that was not working well towards AHSC goals would have proved even more difficult to access than one which saw itself as a positive example and was therefore 'confident' enough to welcome in an outside observer.

Secondly, selecting positive cases enabled me to gain an understanding of what boundary mechanisms 'worked'. The challenges that both cases faced on a day to day basis (and my interviews and observations with senior individuals within the AHSC Executives) enabled me to develop enough of an understanding of the main tensions and barriers present within the AHSCs. Choosing positive cases also allowed me to develop an understanding of the key boundary mechanisms associated with knowledge mobilisation – those frontline services which did not have

this (for example those not having a research portfolio alongside their clinical practice work) would not have given me the same insight.

There were a number of limitations associated with the use of (almost extreme) positive cases, however. For example, there is real potential for positive cases to skew the analysis and outcomes (Yin, 2009). Analysis of both cases found that epistemic and professional boundaries, although visible, were not major barriers to knowledge mobilisation in these settings. These findings cannot be extrapolated directly to other settings, or even the wider AHSC. Indeed, other studies have demonstrated how both epistemic and professional elements have slowed the spread of knowledge and innovation (e.g. Ferlie et al. (2005); Lander, 2016)). Therefore, as noted above, future research should examine more moderate, or negative cases, as well. However, by seeking out these positive cases, I have taken our understanding of professional and epistemic boundaries a little further by demonstrating how particular types of boundary work can facilitate knowledge mobilisation across these domains (even if that is not common).

8.3.2 Retroduction as a data analysis method

Retroduction is the analytical approach often used in critical realism to ensure the relationship between data and theory as described above. It is a cyclical process moving from theory to data and back again, in order to determine how the phenomena emerge and develop (Blaikie, 2007). In this study, using a broadly retroductive approach (as outlined in Chapter 3), I developed a theoretical explanation of the research/clinical practice boundary and boundary work across it in the context of the emergent organisational form of AHSCs and, refined this theory through further analysis of the empirical cases (Tsoukas, 2009). This process was shaped by my background and theory-laden assumptions of the world and consequently one *representation* of the truth, albeit one which uses tools and techniques to ensure it is as accurate as possible.

I describe the detailed methods of analysis in Chapter 3. In summary, I approached the field with the potentially useful theoretical framework of boundaries and boundary work, which was also informed by early scoping interviews and observations I conducted with both senior members of the AHSC Executive and former clinician scientist colleagues. The theoretical framework adapted and developed throughout data collection, for example as I identified epistemic, professional and organisational boundaries as key groupings. This further informed

the data collection process throughout the year of fieldwork, and I developed a system of analysing my observations using a template which related them to a boundary framework.

The limitations of this approach, entering the field with a (loose) theoretical framing, meant that I potentially missed other interesting perspectives arising from the data. I mitigated against this by also undertaking an inductive process of analysis of the data, trying to capture any useful themes I may have missed. This process (which was ongoing throughout data collection) identified physical/mental health as a potential boundary of interest. I outlined this in my findings, but, as noted above, it is a potentially interesting area of further research.

8.3.3 Qualitative Enquiry and Validation

The 'critical' in critical realism, and in qualitative enquiry more generally, requires extensive validation of assumptions throughout the research process. I describe these in some detail in Chapter 3. The key part of this process for this study was ensuring constant reflexivity on my 'dual' role as a manager and researcher, and the tensions between my insider/outsider status, throughout the research process.

My experience across the whole research process supported the critique of the 'insider/outsider' dichotomy (Mercer, 2007) of the qualitative researcher. At the start of the study, having very recently left practice within one of the case AHSCs, I still felt I had strong 'insider' status. For the first year, during my literature review and study set up phase, I retained up to date knowledge of the workings of the organisations and continued to maintain contacts with former colleagues in the organisations. However, as time went on, I became more detached from my old identity as a manager and more invested in my identity as a researcher. Interestingly, part of the effect of this was to lose more contact with the setting which sparked interest in the whole research topic to begin with. As a manager, I was constantly grappling with the challenges of managing NHS services and trying to establish systems and processes to ensure robust clinical research was part of this. As I moved more into a research world, the day to day sparks and interactions gradually faded. This was replaced by a more in depth awareness and understanding of the relevant literatures relating to the problems I was facing. Therefore, by the time I entered the field, and over the course of the data collection process, I felt more and more an outsider to practice.

This was helped by the fact that I chose tracer cases I was unfamiliar with, so in these settings I was an outsider. However, as I outlined in Chapter 3, this status was constantly challenged by both encountering people I had worked with previously, and being aware of (my view of) the wider organisational context in which the tracer cases were operating.

Overall I feel that that my insider/outsider status has been of benefit to this study. It is however, in line with critical realism, just one perspective on the 'reality' of knowledge mobilisation processes in AHSCs, and there are many others.

8.4 Areas for further research

This early study of AHSCs as an emerging organisational form has highlighted several areas for further research. I will briefly consider four areas in this section.

Firstly, this study has argued that organisational form and consideration of organisational factors more generally needs to be brought into discussions of knowledge mobilisation in healthcare. This study has considered one emerging example, the Academic Health Science Centre and has found that organisational factors play an important and complex role in both slowing knowledge mobilisation yet also facilitating it when organisational barriers are removed, reformed or reduced. Further empirical work is needed to develop a better understanding of organisational factors. Since this study commenced, similar work is being undertaken in Canada (Lander, 2016) and Australia on these organisational forms and it would be interesting to explore whether similar factors are at work in other national settings.

In addition, work on organisational form in knowledge mobilisation could benefit from more empirical cases, at both the 'first translational' and 'second translational' gaps. At the 'first' gap, empirical cases could include, for example, Biomedical Research Centres and Biomedical Research Units in England, which are funded through the NIHR and sit within existing organisations. At the 'second gap', CLAHRCs and AHSNs could act as empirical cases to explore whether organisational form and organisational boundaries play a similar role in these initiatives, and how this differs to findings on initiatives such as AHSCs which look at the first translational gap. Most approaches are networked, yet have varying degrees of coupling to other organisations and an exploration of different organisational forms would be interesting and useful.

In so doing, a public policy question into the value of funding (or not) of various types of translational research initiative could be explored. As outlined in Chapter 1, the designation of AHSCs came with no direct funding attached, unlike AHSNs, CLAHRCs and BRCs and BRUs which were funded to undertake specific programmes of research and/or implementation. Yet, despite the problems outlined in this thesis, AHSCs have arguably achieved some success without additional direct public funding. Despite the path dependent nature of the pre-existing partnerships, the AHSCs, with the overarching 'bench to bedside' heuristic have facilitated and motivated work, such as the Connect project, which may not have happened otherwise. Further, as noted in Chapter 1, AHSCs were 'reaccredited' by the Department of Health, for a further five years in 2014 and continue as an organisational form. A comparative study, between those accredited and those not, and their levels of translational research activity may be informative for public policy.

The second potential area for further research is further empirical testing of combining epistemic, professional and organisational framings of the research/practice boundary. This 'composite approach' (Hernes, 2004) appeared useful in the AHSC empirical cases presented here and may help analysis in other potential knowledge mobilisation settings, not just in healthcare but in other fields as well. It may be particularly interesting to explore areas which have different characteristics – for example where different professional groups are involved, or where professions may not be as powerful or entrenched. Further empirical testing may contribute to Lamont and Molnár's (2002) call to establish further the properties and mechanisms of boundaries in different situations. Do organisational boundaries always slow the spread of knowledge and innovation? Do epistemic and professional boundaries play a stronger part in other settings? How does the concept of boundary as space rather than demarcation influence this?

Thirdly, further research is needed into the role of individuals, both clinician scientists and others as boundary spanners-in-practice (Levina & Vaast, 2005) in the knowledge mobilisation process. This study demonstrated how these roles were very important to the development of a joint field of practice between the research and clinical domains. Further enquiry could consider the characteristics of boundary spanning individuals and whether, in order to be effective, they need to have organisationally important 'nominated' roles. Another, related question is whether the clinician scientist is developing a new hybrid profession, with jurisdiction over a

body of knowledge known as 'translational research' with a specific skill set of being able to understand the links between basic science and the physiology of individual patients. If this is the case, what impact does that have on the profession of medicine and the position of basic scientists? If they are effective at mobilising knowledge between the two domains, how do these roles develop and how important is organisational context to this process? This would be particularly interesting to test in less 'positive' cases, and for example in settings which have not been allocated AHSC status, but still operate in a translational research space.

Fourthly, an interesting area for further research emerging inductively from the data is exploring the boundary between mental and physical health. Although not the central subject of analysis in this thesis, and presented as an epistemic boundary in my research, there were many findings which warranted further explanation. For example, the roles of liaison psychiatry, and clinical/health psychology, in boundary spanning processes were particularly interesting. Liaison psychiatrists were individuals who appeared to feel most comfortable in being based in another domain (such as those who knew about treating the mental health related aspects of a person's physical health condition) and appeared naturally 'competent' boundary spanners (Williams, 2002). It would be interesting to gather further empirical data on these individuals and their motivations, which could contribute to the wider literature on boundary work. Interesting questions to explore may involve the extent to which the ontological and epistemological underpinnings of a professional group influence how effective they are at knowledge mobilisation. For example, does the fact that psychiatry/psychology are based less on 'physical' data but on things which are not easily seen or demonstrated have an impact on their boundary work?

All of the above areas may contribute to further to our understanding of how organisational form, professional practice and status and epistemological underpinnings impact on knowledge mobilisation processes in healthcare and other fields.

8.5 Policy and practice implications

This study has identified several implications for policy makers and practitioners working in AHSCs. These are summarised as follows:

- There are limits to the extent to which the functions of universities and NHS trusts can be combined, due to the inherent differences in their regulatory

environments, financial flows and purposes. Consequently, a 'managed network' approach to governance structures, which encourages relationship building and collaboration between individuals, teams and organisations appears to be more sustainable than a hierarchical model where the competing tensions are more difficult to manage through a single structure.

- There are challenges when competing NHS services/organisations are part of the same AHSC (or any translational research network). NHS financial balance will take priority over collaborative working.
- Organisations can play an important role in supporting knowledge mobilisation within an AHSC setting. In particular, IT appeared to be a great enabler when functioning effectively, to ensure sharing of anonymised research data between different constituent organisations. Further, organisations play a crucial role in the spread of innovations where local projects align with organisational priorities.
- The role of individuals who are trained in and undertake both research and clinical practice are critical to the knowledge mobilisation process. These individuals and the teams around them should be supported through organisational processes such as contracts with all constituent organisations and appropriate time to undertake both activities. Having these individuals (or those who understand requirements in both research and clinical practice) in leadership positions is crucially important, as is enabling them to be able to design team interactions and geographical layouts of their departments.
- Motivating the mobilisation of research based knowledge can be achieved in a number of ways. This study demonstrated that the overarching concept of 'bench to bedside' often galvanised staff. Also important is the ability for both groups (in this case, researchers and clinicians) to get something from the collaboration, be it improved clinical data and potential treatments, or new data to support basic research. Sometimes motivators and enablers can be straightforward, such as shared data sets or IT equipment.

8.6 Conclusion

Mobilising research based knowledge from 'bench to bedside' is increasingly a public policy priority globally. This study has examined one response to this problem, the emerging organisational form of Academic Health Science Centres in England, using a boundary approach. It has found that epistemic, professional and

organisational boundary lenses are useful in analysing how knowledge is mobilised from research to practice in healthcare.

Spanning boundaries between research and clinical practice domains is a complex process and involves boundary spanners, objects, interactions, concepts and a supportive organisational context. Epistemic, professional and organisational elements all need to be considered for effective knowledge mobilisation. The ‘bench to bedside’ heuristic, despite its limited theoretical use, emerged as a powerful motivator of boundary work.

References

Abbott, A. (1988). *The system of professions: An essay on the division of expert labor*. Chicago: University of Chicago Press.

Abbott, A. (1995). Things of boundaries. *Social Research, 62*(4), 857-882.

Ackoff, R. L. (1989). From data to wisdom. *Journal of Applied Systems Analysis, 16*(1), 3-9.

Addicott, R., McGivern, G., & Ferlie, E. (2006). Networks, organizational learning and knowledge management: NHS cancer networks. *Public Money and Management, 26*(2), 87-94.

Addicott, R., McGivern, G., & Ferlie, E. (2007). The distortion of a managerial technique? The case of clinical networks in UK health care. *British Journal of Management, 18*(1), 93-105.

Adler, P. A., & Adler, P. N. (1987). *Membership roles in field research*. Thousand Oaks: SAGE Publications.

Ahern, K. J. (1999). Ten tips for reflexive bracketing. *Qualitative Health Research, 9*(3), 407-411.

Aldrich, H., & Herker, D. (1977). Boundary spanning roles and organization structure. *Academy of Management Review, 2*(2), 217-230.

Allen, D. (2009). From boundary concept to boundary object: The practice and politics of care pathway development. *Social Science & Medicine, 69*(3), 354-361.

Allen, T. J., & Cohen, S. I. (1969). Information flow in research and development laboratories. *Administrative Science Quarterly*, *14*(1) 12-19.

Alpert, J. S., Flanagan, D. M., & Botsford, N. A. (2001). The future of academic medical centers in the United States passing through the valley of the shadow of death. *Archives of Internal Medicine, 161*(8), 1047-1050.

Alvesson, M., & Kärreman, D. (2001). Odd couple: Making sense of the curious concept of knowledge management. *Journal of Management Studies, 38*(7), 995-1018.

Amin, A., & Roberts, J. (2008). Knowing in action: Beyond communities of practice. *Research Policy, 37*(2), 353-369.

Ancona, D. G., & Caldwell, D. F. (1992). Bridging the boundary: External activity and performance in organizational teams. *Administrative Science Quarterly*, *37,* 634-665.

Archer, M., Bhaskar, R., Collier, A., Lawson, T., & Norrie, A. (Eds.). (1998). *Critical realism: Essential readings*. Abingdon: Routledge.

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology, 8*(1), 19-32.

Ashkenas, R., Ulrich, D., Jick, T., & Kerr, S. (1995). *The boundaryless organization: Breaking the chains of organizational structure*. San Francisco: Jossey Bass.

Balconi, M., Brusoni, S., & Orsenigo, L. (2010). In defence of the linear model: An essay. *Research Policy, 39*(1), 1-13.

Barrett, D. J. (2008). The evolving organizational structure of academic health centers: The case of the University of Florida. *Academic Medicine, 83*(9), 804-808.

Barrett, M., & Oborn, E. (2010). Boundary object use in cross-cultural software development teams. *Human Relations, 63*(8), 1199-1221.

Barth, F. (Ed.) (1969). *Ethnic groups and boundaries: The social organization of culture difference*. Illinois: Waveland Press Inc.

Bate, S. P., & Robert, G. (2002). Knowledge management and communities of practice in the private sector: Lessons for modernizing the National Health Service in England and Wales. *Public Administration, 80*(4), 643-663.

Baumbusch, J. L., Kirkham, S. R., Khan, K. B., McDonald, H., Semeniuk, P., Tan, E., & Anderson, J. M. (2008). Pursuing common agendas: A collaborative model for knowledge translation between research and practice in clinical settings. *Research in Nursing & Health, 31*(2), 130-140.

Bechky, B. A. (2003). Sharing meaning across occupational communities: The transformation of understanding on a production floor. *Organization Science, 14*(3), 312-330.

Best, A., & Holmes, B. (2010). Systems thinking, knowledge and action: Towards better models and methods. *Evidence & Policy: A Journal of Research, Debate and Practice, 6*(2), 145-159.

Bhaskar, R. (1986). *Scientific realism and human emancipation*. London: Verso.

Bhaskar, R. (1998a). Philosophy and scientific realism. In M. Archer, R. Bhaskar, A. Collier, T. Lawson, & A. Norrier (Eds.), *Critical realism: Essential readings* (pp. 16-47). London: Routledge.

Bhaskar, R. (1998b). *The possibility of naturalism: A philosophical critique of the contemporary human sciences* (3rd ed.). London: Routledge.

Bijker, W. E., Hughes, T. P., & Pinch, T. J. (Eds.). (1987). *The social construction of technological systems: New directions in the sociology and history of technology*. Massachusetts: Massachusetts Institute of Technology.

Blaikie, N. (2007). *Approaches to social enquiry*. Cambridge: Polity Press.

Bloor, M. (1978). On the analysis of observational data: A discussion on the worth and uses of inductive techniques and respondent validation. *Sociology, 12*(3), 545-552.

Blumenthal, D. (2005). Academic health centers: Current status, future challenges. In D. Detmer & E. Steen (Eds.), *The academic health center: Leadership and performance*. Cambridge: Cambridge University Press.

Blumenthal, D., Campbell, E. G., & Weissman, J. S. (1997). The social missions of academic health centers. *New England Journal of Medicine, 337*(21), 1550-1555.

Blumenthal, D., & Edwards, N. (2000). A tale of two systems: The changing academic health center. *Health Affairs, 19*(3), 86-101.

Blumenthal, D., & Meyer, G. (1996). Academic health centers in a changing environment. *Health Affairs, 15*(2), 200-215.

Bourdieu, P. (1977). *Outline of a theory of practice* (Vol. 16). Cambridge: Cambridge University Press.

Bowen, S., & Zwi, A. B. (2005). Pathways to “evidence-informed” policy and practice: A framework for action. *PLoS Med, 2*(7), e166.

Brannan, M. J., & Oultram, T. (2012). Participant observation. In G. Symon & C. Cassell (Eds.), *Qualitative organizational research: Core methods and current challenges*. London: SAGE Publications.

Brannigan, A. (1981). *The social basis of scientific discoveries*. Cambridge: Cambridge University Press.

Broom, A., Adams, J., & Tovey, P. (2009). Evidence-based healthcare in practice: A study of clinician resistance, professional de-skilling, and inter-specialty differentiation in oncology. *Social Science & Medicine, 68*(1), 192-200.

Brown, J. S., & Duguid, P. (1991). Organizational learning and communities of practice: Towards a unified view of working, learning and innovation. *Organization Science, 2*(1), 40-57.

Brown, J. S., & Duguid, P. (1998). Organizing knowledge. *California Management Review, 40*(3), 90-111.

Brown, J. S., & Duguid, P. (2001). Knowledge and organization: A social-practice perspective. *Organization Science, 12*(2), 198-213.

Buchanan, D. A. (2012). Case studies in organizational research. In G. Symon & C. Cassell (Eds.), *Qualitative organizational research: Core methods and current challenges*. London: SAGE Publications.

Burrow, G. N. (1993). Tensions within the academic health-center. *Academic Medicine, 68*(8), 585-587.

Bush, V. (1945). Science: The endless frontier. *Transactions of the Kansas Academy of Science (1903-), 48*(3), 231-264.

Caldwell, D. F., & O'Reilly, C. A. (1982). Boundary spanning and individual performance: The impact of self-monitoring. *Journal of Applied Psychology, 67*(1), 124-127.

Caplan, N. (1979). The two-communities theory and knowledge utilization. *The American Behavioral Scientist, 22*(3), 459-470.

Carlile, P. R. (2002). A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organization Science, 13*(4), 442-455.

Carlile, P. R. (2004). Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries. *Organization Science, 15*(5), 555-568.

Chalmers, A. F. (1999). *What is this thing called science?* Maidenhead: Open University Press.

Choi, S., & Brommels, M. (2009). Logics of pre-merger decision-making processes: The case of Karolinska University Hospital. *Journal of Health Organization and Management, 23*(2), 240-254.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly, 35*(1), 128-152.

Constantinides, P., & Barrett, M. (2006). Negotiating ICT development and use: The case of a telemedicine system in the healthcare region of Crete. *Information and Organization, 16*(1), 27-55.

Contandriopoulos, D., Lemire, M., Denis, J. L., & Tremblay, É. (2010). Knowledge exchange processes in organizations and policy arenas: A narrative systematic review of the literature. *Milbank Quarterly, 88*(4), 444-483.

Cooksey, D. (2006). *A review of UK health research funding*. London: The Stationery Office.

Cooper, D. J., Hinings, B., Greenwood, R., & Brown, J. L. (1996). Sedimentation and transformation in organizational change: The case of Canadian law firms. *Organization Studies, 17*(4), 623-647.

Cooper, R. (2011). In praise of the prescription: The symbolic and boundary object value of the traditional prescription in the electronic age. *Health Sociology Review, 20*(4), 462-474.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative and mixed methods approaches* (2nd ed.). London: SAGE Publications.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice, 39*(3), 124-130.

Crilly, T., Jashapara, A., & Ferlie, E. (2010). Research utilisation & knowledge mobilisation: A scoping review of the literature. *NIHR Health Services and Delivery Research programme*.

Crilly, T., Jashapara, A., Trenholm, S., Peckham, A., Currie, G., & Ferlie, E. (2013). Knowledge mobilisation in healthcare organisations: Synthesising evidence and theory using perspectives of organisational form, resource based view of the firm and critical theory. *NIHR Health Services and Delivery Research programme*.

Cripe, T. P., Thomson, B., Boat, T. F., & Williams, D. A. (2005). Promoting translational research in academic health centers: Navigating the "roadmap". *Academic Medicine, 80*(11), 1012-1018.

Cross, R. L., & Parker, A. (2004). *The hidden power of social networks: Understanding how work really gets done in organizations*. Boston: Harvard Business School Publishing.

Culbertson, R., Goode, L., & Dickler, R. (1996). Organizational models of medical school relationships to the clinical enterprise. *Academic Medicine, 71*(11), 1258-1274.

Currie, G., & Suhomlinova, O. (2006). The impact of institutional forces upon knowledge sharing in the UK NHS: The triumph of professional power and the inconsistency of policy. *Public Administration, 84*(1), 1-30.

Danermark, B., Ekström, M., Jakobsen, L., & Karlsson, J. C. (2002). *Explaining society: Critical realism in the social sciences*. Oxon: Routledge.

Davies, H. T. O., & Nutley, S. M. (1999). The rise and rise of evidence in health care. *Public Money & Management, 19*(1), 9-16.

Davies, H. T. O., Powell, A. E., & Nutley, S. M. (2015). Mobilising knowledge to improve UK health care: Learning from other countries and other sectors – a multimethod mapping study. *NIHR Health Services and Delivery Research programme, 3*(27).

Davies, S. (2002). *Identity and ideology*. London: The Nuffield Trust.

Davies, S., Tawfik-Shukor, A., & De Jonge, B. (2010). Structure, governance, and organizational dynamics of university medical centers in the Netherlands. *Academic Medicine, 85*(6), 1091-1097.

Denzin, N. K. (1970). *The research act: A theoretical introduction to sociological methods.* Chicago: Aldine.

Denzin, N. K., & Lincoln, Y. S. (1994). *Handbook of qualitative research*. London: SAGE Publications.

Department of Health. (2006). *Best research for best health. A new national health research strategy*. London: Department of Health.

Department of Health. (2007). *Report of the high level group on clinical effectiveness*. London: Department of Health.

Department of Health. (2008). *High quality care for all*. London: The Stationery Office.

Department of Health. (2011). *Innovation health and wealth: accelerating adoption and diffusion in the NHS*. London: Department of Health.

Detsky, A. S. (2010). How to be a good academic leader. *Journal of General Internal Medicine, 26*(1), 88-90.

Devanna, M. A., & Tichy, N. (1990). Creating the competitive organization of the 21st century: The boundaryless corporation. *Human Resource Management, 29*(4), 455.

Dolowitz, D., & Marsh, D. (2000). Learning from abroad: The role of policy transfer in contemporary policy-making. *Governance: An International Journal of Policy and Administration, 13*(1), 5-24.

Dopson, S., & Fitzgerald, L. (2005). *Knowledge to action? Evidence-based health care in context*. Oxford: Oxford University Press.

Douglas, M. (1966). *Purity and danger: An analysis of concepts of pollution and taboo*. London: Routledge.

Dubinsky, A. J., Michaels, R. E., Kotabe, M., Lim, C. U., & Moon, H.-C. (1992). Influence of role stress on industrial salespeople's work outcomes in the

United States, Japan, and Korea. *Journal of International Business Studies, 23*(1), 77-99.

Dzau, V. J., Ackerly, D. C., Sutton-Wallace, P., Merson, M. H., Williams, R. S., Krishnan, K. R., Taber, R. C., & Califf, R. M. (2010). The role of academic health science systems in the transformation of medicine. *The Lancet, 375*(9718), 949-953.

Eccles, M. P., & Mittman, B. S. (2006). Welcome to implementation science. *Implementation Science, 1*(1), 1-3.

Eisenhardt, K. M. (1989). Building theories from case study research. *The Academy of Management Review, 14*(4), 532-550.

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy Of Management Journal, 50*(1), 25-32.

Ferlie, E., Crilly, T., Jashapara, A., & Peckham, A. (2012a). Knowledge mobilisation in healthcare: A critical review of health sector and generic management literature. *Social Science & Medicine, 74*(8), 1297-1304.

Ferlie, E., Fitzgerald, L., Wood, M., & Hawkins, C. (2005). The nonspread of innovations: The mediating role of professionals. *Academy Of Management Journal, 48*(1), 117-134.

Ferlie, E., McGivern, G., & Fitzgerald, L. (2012b). A new mode of organizing in health care? Governmentality and managed networks in cancer services in England. *Social Science & Medicine, 74*(3), 340-347.

Ferlie, E., McGivern, G., Fitzgerald, L., Dopson, S., & Bennett, C. (2013). *Making wicked problems governable? The case of managed networks in health care*. Oxford: Oxford University Press.

Fischer, M. D., Ferlie, E., French, C., Fulop, N., & Wolfe, C. (2013). The creation and survival of an academic health science organization: Counter-colonization through a new organizational form? *University of Oxford-Said Business School Working Paper* (2013-26).

Fisk, N. M., Wesselingh, S. L., Beilby, J. J., Glasgow, N. J., Puddey, I. B., Robinson, B. G., Angus, J. A., & Smith, P. J. (2011). Academic health science centres in Australia: Let's get competitive. *Medical Journal of Australia, 194*(2), 59-60.

Fitzgerald, L., & Dopson, S. (2009). Comparative case study designs: Their utility and development in organizational research. In D. Buchanan & A. Bryman

(Eds.), *The SAGE handbook of organizational research methods* (pp. 465-483). London: SAGE Publications.

Fitzgerald, L., & Harvey, G. (2015). Translational networks in healthcare? Evidence on the design and initiation of organizational networks for knowledge mobilization. *Social Science & Medicine, 138*, 192-200.

Fleetwood, S., & Ackroyd, S. (2004). *Critical realist applications in organisation and management studies*. London: Routledge.

Freidson, E. (1970). *Profession of medicine*. London: University of Chicago Press.

Freidson, E. (1994). *Professionalism reborn: Theory, prophecy and policy*. Chicago: University of Chicago Press.

French, C. E., Ferlie, E., & Fulop, N. J. (2014). The international spread of academic health science centres: A scoping review and the case of policy transfer to England. *Health Policy, 117*(3), 382-391.

Friedman, R. A., & Podolny, J. (1992). Differentiation of boundary spanning roles: Labor negotiations and implications for role conflict. *Administrative Science Quarterly*, 28-47.

Fuchs, V. (1982). The battle for control of health care. *Health Affairs, 1*(3), 5-13.

Fujimura, J. H. (1996). *Crafting science: A sociohistory of the quest for the genetics of cancer*. Cambridge: Harvard University Press.

Fulop, N., Protopsaltis, G., King, A., Allen, P., Hutchings, A., & Normand, C. (2005). Changing organisations: A study of the context and processes of mergers of health care providers in England. *Social Science & Medicine, 60*(1), 119-130.

Fulop, N. J., Allen, P., Clarke, A., & Black, N. (Eds.). (2001). *Studying the organisation and delivery of health services: Research methods*. London: Routledge.

Gabbay, J., & le May, A. (2004). Evidence based guidelines or collectively constructed “mindlines?” Ethnographic study of knowledge management in primary care. *British Medical Journal, 329*(7473), 1013.

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994). *The new production of knowledge: The dynamics of science and research in contemporary societies.* London: SAGE Publications.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. California: University of California Press.

Gieryn, T. F. (1983). Boundary-work and the demarcation of science from non-science: Strains and interests in professional ideologies of scientists. *American Sociological Review, 48*(6), 781-795.

Gieryn, T. F. (1999). *Cultural boundaries of science: Credibility on the line*. Chicago: University of Chicago Press.

Glaser, B. G., & Strauss, A. L. (2009). *The discovery of grounded theory: Strategies for qualitative research*. New Brunswick: Transaction Publishers.

Gough, D., Thomas, J., & Oliver, S. (2012). Clarifying differences between review designs and methods. *Systematic Reviews, 1*(1), 28.

Gourlay, S. (2006). Towards conceptual clarity for 'tacit knowledge': A review of empirical studies. *Knowledge Management Research & Practice, 4*(1), 60-69.

Graham, I. D., Logan, J., Harrison, M. B., Straus, S. E., Tetroe, J., Caswell, W., & Robinson, N. (2006). Lost in knowledge translation: Time for a map? *Journal of Continuing Education in the Health Professions, 26*(1), 13-24.

Green, J., & Thorogood, T. (2009). *Qualitative research methods for health research*. Thousand Oaks: SAGE Publications.

Greenhalgh, T., & Wieringa, S. (2011). Is it time to drop the 'knowledge translation' metaphor? A critical literature review. *Journal of the Royal Society of Medicine, 104*(12), 501-509.

Greenwood, R., Suddaby, R., & Hinings, C. R. (2002). Theorizing change: The role of professional associations in the transformation of institutionalized fields. *Academy Of Management Journal, 45*(1), 58-80.

Grigsby, R. K., & Kirch, D. G. (2006). Faculty and staff teams: A tool for unifying the academic health center and improving mission performance. *Academic Medicine, 81*(8), 688-695.

Griner, P. F., & Blumenthal, D. (1998). Reforming the structure and management of academic medical centers: Case studies of ten institutions. *Academic Medicine, 73*(7), 818-825.

Guo, K. L. (2002). Roles of managers in academic health centers: Strategies for the managed care environment. *Health Care Manager, 20*(3), 43-58.

Hammersley, M. (1992). *What's wrong with ethnography?* London: Routledge.

Hammersley, M., & Atkinson, P. (1995). *Ethnography: Principles in practice*. London: Routledge.

Hands, D. W. (2001). *Reflection without rules: Economic methodology and contemporary science theory*. Cambridge: Cambridge University Press.

Harré, R. (2002). *Cognitive science: A philosophical introduction*. London: SAGE Publications.

Harvey, G., Fitzgerald, L., Fielden, S., McBride, A., Waterman, H., Bamford, D., Kislov, R., & Boaden, R. (2011). The NIHR Collaboration for Leadership in Applied Health Research and Care (CLAHRC) for Greater Manchester: Combining empirical, theoretical and experiential evidence to design and evaluate a large-scale implementation strategy. *Implementation Science, 6*(96).

Harvey, W. S. (2011). Strategies for conducting elite interviews. *Qualitative Research, 11*(4), 431-441.

Heracleous, L. (2004). Boundaries in the study of organization. *Human Relations, 57*(1), 95-103.

Hernes, T. (2004). Studying composite boundaries: A framework of analysis. *Human Relations, 57*(1), 9-29.

Higher Education Funding Council for England. (2016). Ref 2014: Key facts. Retrieved from http://www.ref.ac.uk/media/ref/content/pub/REF%20Brief%20Guide%202014.pdf

Hirschhorn, L., & Gilmore, T. (1992). The new boundaries of the “boundaryless” company. *Harvard Business Review, 70*(3), 104-115.

House, R., Rousseau, D. M., & Thomas-Hunt, M. (1995). The meso paradigm: A framework for integration of micro and macro organizational behavior. In L. L. Cummings & B. Staw (Eds.), *Research in organizational behavior* (Vol. 17, pp. 71-114). Greenwich: JAI.

Howard, R. B. (1970). The academic health center-on the rocks with a twist of dilemma. *Journal of Medical Education, 45*(11), 839-846.

Iglehart, J. (1994). Rapid changes for academic medical centers. *The New England Journal of Medicine, 331*(20), 1391-1395.

Iglehart, J. (1995). Rapid changes for academic health centers 2. *The New England Journal of Medicine, 332*(6), 407-411.

Isett, K. R., Mergel, I. A., LeRoux, K., Mischen, P. A., & Rethemeyer, R. K. (2011). Networks in public administration scholarship: Understanding where we are

and where we need to go. *Journal of Public Administration Research and Theory, 21*(suppl 1), i157-i173.

Kassirer, J. P. (1994). Academic medical-centers under siege. *New England Journal of Medicine, 331*(20), 1370-1371.

Kastor, J. (2001). *Mergers of teaching hospitals in Boston, New York, and Northern California*. Michigan: University of Michigan Press.

Kastor, J. (2004). *Governance of teaching hospitals: Turmoil at Penn and Hopkins*. Baltimore: The Johns Hopkins University Press.

Kislov, R. (2012). *Multiprofessional communities of practice in a large scale healthcare knowledge mobilisation initiative: A qualitative case study of boundary, identity and knowledge sharing*. PhD Thesis. University of Manchester: Manchester Business School.

Kislov, R. (2014). Boundary discontinuity in a constellation of interconnected practices. *Public Administration, 92*(2), 307-323.

Kislov, R., Harvey, G., & Walshe, K. (2011). Collaborations for Leadership in Applied Health Research and Care: Lessons from the theory of communities of practice. *Implementation Science, 6*(1), 64.

Kislov, R., Walshe, K., & Harvey, G. (2012). Managing boundaries in primary care service improvement: A developmental approach to communities of practice. *Implementation Science, 7*(1), 97.

Kitchener, M. (2000). The `bureaucratization' of professional roles: The case of clinical directors in UK hospitals. *Organization, 7*(1), 129-154.

Kitchener, M. (2002). Mobilizing the logic of managerialism in professional fields: The case of academic health centre mergers. *Organization Studies, 23*(3), 391-420.

Klein, J. T. (1996). *Crossing boundaries: Knowledge, disciplinarities, and interdisciplinarities*. Charlottesville: University of Virginia Press.

Klijn, E.-H., Steijn, B., & Edelenbos, J. (2010). The impact of network management on outcomes in governance networks. *Public Administration, 88*(4), 1063-1082.

Knorr Cetina, K. (1999). *Epistemic cultures: How the sciences make knowledge*. Cambridge, Massachusetts: Harvard University Press.

Kuhn, T. S. (1962). *The structure of scientific revolutions*. Chicago: University of Chicago Press.

Lam, A. (2000). Tacit knowledge, organizational learning and societal institutions: An integrated framework. *Organization Studies, 21*(3), 487-513.

Lambert, H. (2006). Accounting for EBM: Notions of evidence in medicine. *Social Science & Medicine, 62*(11), 2633-2645.

Lamont, M., & Molnár, V. (2002). The study of boundaries in the social sciences. *Annual Review of Sociology, 28*, 167-195.

Lander, B. (2016). Boundary-spanning in academic healthcare organisations. *Research Policy, 45*(8), 1524-1533.

Lander, B., & Atkinson-Grosjean, J. (2011). Translational science and the hidden research system in universities and academic hospitals: A case study. *Social Science & Medicine, 72*(4), 537-544.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation* Cambridge: Cambridge University Press.

Lee, B. (2012). Using documents in qualitative research. In G. Symon & C. Cassell (Eds.), *Qualitative organizational research: Core methods and current challenges*. London: SAGE Publications.

Leifer, R., & Delbecq, A. (1978). Organizational/environmental interchange: A model of boundary spanning activity. *Academy of Management Review, 3*(1), 40-50.

Levina, N., & Vaast, E. (2005). The emergence of boundary spanning competence in practice: Implications for implementation and use of information systems. *MIS Quarterly, 29*(2), 335-363.

Levine, A. S., Detre, T. P., McDonald, M. C., Roth, L. H., Huber, G. A., Brignano, M. G., Danoff, S. N., Farner, D. M., Masnick, J. L., & Romoff, J. A. (2008). The relationship between the University of Pittsburgh School of Medicine and the University of Pittsburgh Medical Center - a profile in synergy. *Academic Medicine, 83*(9), 816-826.

Lewis, I. J., & Sheps, C. G. (1983). *The sick citadel: The American medical center and the public interest*. Cambridge: Oelgeschlager, Gunn & Hain Publishers, Inc.

Lin, J. H. (1996). Academic medical center mergers. *JAMA, 276*(21), 1768.

Lomas, J. (2007). The in-between world of knowledge brokering. *British Medical Journal, 334*(7585), 129-132.

Losch, A. (2009). On the origins of critical realism. *Theology and Science, 7*(1), 85-106.

Löwy, I. (1992). The strength of loose concepts: Boundary concepts, federal experimental strategies and disciplinary growth. The case of immunology. *History of Science, 30*, 373-396.

Löwy, I. (1996). *Between bench and bedside: Science, healing and interleukin-2 in a cancer ward*. Cambridge: Harvard University Press.

Lozon, J. C., & Fox, R. M. (2002). Academic health sciences centres laid bare. *Healthcare Papers, 2*(3), 10-36.

Ludmerer, K. M. (2002). The embattled academic health centre. *Healthcare Papers, 2*(3), 59-65.

Lysonski, S. (1985). A boundary theory investigation of the product manager's role. *The Journal of Marketing, 49*(1), 26-40.

Malterud, K. (2001). Qualitative research: Standards, challenges, and guidelines. *The Lancet, 358*(9280), 483-488.

March, J. G., & Simon, H. A. (1958). *Organizations*. New York: John Wiley & Sons.

Massey, D. (2005). *For space*. Thousand Oaks: SAGE publications.

Mays, N., & Pope, C. (2000). Assessing quality in qualitative research. *British Medical Journal, 320*(7226), 50-52.

McGivern, G., Currie, G., Ferlie, E., Fitzgerald, L., & Waring, J. (2015). Hybrid manager professionals' identity work: The maintenance and hybridization of medical professionalism in managerial contexts. *Public Administration, 93*(2), 412-432.

McGivern, G., & Dopson, S. (2010). Inter-epistemic power and transforming knowledge objects in a biomedical network. *Organization Studies, 31*(12), 1667-1686.

Mercer, J. (2007). The challenges of insider research in educational institutions: Wielding a double-edged sword and resolving delicate dilemmas. *Oxford Review of Education, 33*(1), 1-17.

Merton, R. (1972). Insiders and outsiders; a chapter in the sociology of knowledge. *American Journal of Sociology, 78*(July), 9-47.

Miller, E. J., & Rice, A. K. (1967). *Systems of organisation: The control of task and sentiment boundaries*. London: Tavistock.

Mintzberg, H. (1979). *The structuring of organizations: A synthesis of the research*. Englewood Cliffs: Prentice Hall.

Mitchell, P., Pirkis, J., Hall, J., & Haas, M. (2009). Partnerships for knowledge exchange in health services research, policy and practice. *Journal of Health Services Research & Policy, 14*(2), 104-111.

Mitton, C., Adair, C. E., McKenzie, E., Patten, S. B., & Perry, B. W. (2007). Knowledge transfer and exchange: Review and synthesis of the literature. *Milbank Quarterly, 85*(4), 729-768.

Morgan, G., & Burrell, G. (1979). *Sociological paradigms and organisational analysis: Elements of the sociology of corporate life*. London: Heinemann Educational Books.

Mørk, B. E., Aanestad, M., Hanseth, O., & Grisot, M. (2008). Conflicting epistemic cultures and obstacles for learning across communities of practice. *Knowledge and Process Management, 15*(1), 12-23.

Mørk, B. E., Hoholm, T., Ellingsen, G., Edwin, B., & Aanestad, M. (2010). Challenging expertise: On power relations within and across communities of practice in medical innovation. *Management Learning, 41*(5), 575-592.

Morlacchi, P., & Nelson, R. R. (2011). How medical practice evolves: Learning to treat failing hearts with an implantable device. *Research Policy, 40*(4), 511-525.

Murphy, E. (2001). Micro-level qualitative research. In N. Fulop, P. Allen, A. Clarke, & N. Black (Eds.), *Studying the organisation and delivery of health services* (pp. 40-55). Abingdon: Routledge.

Nadin, S., & Cassell, C. (2006). The use of a research diary as a tool for reflexive practice: Some reflections from management research. *Qualitative Research in Accounting & Management, 3*(3), 208-217.

Nelson, R. R., Buterbaugh, K., Perl, M., & Gelijns, A. (2011). How medical know-how progresses. *Research Policy, 40*(10), 1339-1344.

Nicolini, D. (2011). Practice as the site of knowing: Insights from the field of telemedicine. *Organization Science, 22*(3), 602-620.

Nicolini, D., Mengis, J., & Swan, J. (2012). Understanding the role of objects in cross-disciplinary collaboration. *Organization Science, 23*(3), 612-629.

Nochur, K. S., & Allen, T. J. (1992). Do nominated boundary spanners become effective technological gatekeepers? *IEEE Transactions on Engineering Management, 39*(3), 265-269.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science, 5*(1), 14-37.

Norlin, C., & Osborn, L. M. (1998). Organizational responses to managed care: Issues for academic health centers and implications for pediatric programs. *Pediatrics, 101*(4 II SUPPL.), 805-812.

Numerato, D., Salvatore, D., & Fattore, G. (2011). The impact of management on medical professionalism: A review. *Sociology of Health & Illness, 34*(4), 626-644.

Nutley, S., Walter, I., & Davies, H. T. O. (2003). From knowing to doing a framework for understanding the evidence-into-practice agenda. *Evaluation, 9*(2), 125-148.

Oborn, E., Barrett, M., Prince, K., & Racko, G. (2013a). Balancing exploration and exploitation in transferring research into practice: A comparison of five knowledge translation entity archetypes. *Implementation Science, 8*(104).

Oborn, E., Barrett, M., & Racko, G. (2013b). Knowledge translation in healthcare: Incorporating theories of learning and knowledge from the management literature. *Journal of health organization and management, 27*(4), 412-431.

Oborn, E., & Dawson, S. (2010). Learning across communities of practice: An examination of multidisciplinary work. *British Journal of Management, 21*(4), 843-858.

Orlikowski, W. J. (2002). Knowing in practice: Enacting a collective capability in distributed organizing. *Organization Science, 13*(3), 249-273.

Orr, J. E. (1996). *Talking about machines: An ethnography of a modern job*. Ithaca: Cornell University Press.

Orzano, A. J., McInerney, C. R., Scharf, D., Tallia, A. F., & Crabtree, B. F. (2008). A knowledge management model: Implications for enhancing quality in health care. *Journal of the American Society for Information Science and Technology, 59*(3), 489-505.

Ovseiko, P. V., Davies, S., & Buchan, A. M. (2010). Organizational models of emerging academic health science centers in England. *Academic Medicine, 85*(8), 1282-1289.

Patton, M. Q. (1990). *Qualitative evaluation and research methods*. Thousand Oaks: SAGE Publications.

Paulsen, N., & Hernes, T. (2003). *Managing boundaries in organizations*. London: Palgrave Macmillan.

Pawlowski, S. D., & Robey, D. (2004). Bridging user organizations: Knowledge brokering and the work of information technology professionals. *MIS Quarterly, 28*(4), 645-672.

Pawson, R., & Tilley, N. (1997). *Realistic evaluation*. London: SAGE Publications.

Peckham, M. (1991). Research and development for the National Health Service. *The Lancet, 338*, 367-371.

Pizzo, P. A. (2008). Case study: The Stanford University school of medicine and its teaching hospitals. *Academic Medicine, 83*(9), 867-872.

Pober, J. S., Neuhauser, C. S., & Pober, J. M. (2001). Obstacles facing translational research in academic medical centers. *The FASEB Journal, 15*(13), 2303-2313.

Polanyi, M. (1962). Tacit knowing: Its bearing on some problems of philosophy. *Reviews of Modern Physics, 34*(4), 601.

Pope, C., & Mays, N. (Eds.). (2006). *Qualitative research in health care*. Oxford: Blackwell Publishing.

Popper, K. R. (2002). *The logic of scientific discovery*. London: Routledge.

Powell, A. E., & Davies, H. T. O. (2012). The struggle to improve patient care in the face of professional boundaries. *Social Science & Medicine, 75*(5), 807-814.

Reed, M. I. (2009). Critical realism: Philosophy, method, or philosophy in search of a method? In D. Buchanan & A. Bryman (Eds.), *The SAGE handbook of organisational research methods* (pp. 430-448). London: SAGE Publications.

Reimer-Kirkham, S., Varcoe, C., Browne, A. J., Lynam, M. J., Khan, K. B., & McDonald, H. (2009). Critical inquiry and knowledge translation: Exploring compatibilities and tensions. *Nursing Philosophy, 10*(3), 152-166.

Renedo, A., & Marston, C. (2015). Spaces for citizen involvement in healthcare: An ethnographic study. *Sociology, 49*(3), 488-504.

Riley, B., Norman, C. D., & Best, A. (2012). Knowledge integration in public health: A rapid review using systems thinking. *Evidence & Policy: A Journal of Research, Debate and Practice, 8*(4), 417-431.

Rycroft-Malone, J., Burton, C. R., Wilkinson, J., Harvey, G., McCormack, B., Baker, R., Dopson, S., Graham, I. D., Staniszewska, S., & Thompson, C. (2016). Collective action for implementation: A realist evaluation of organisational collaboration in healthcare. *Implementation Science, 11*(1), 1.

Ryle, G. (1946). Knowing how and knowing that. *Proceedings of the Aristotelian Society, 46*, 1-16.

Sackett, D. L., Strauss, S. E., Richardson, W. S., Rosenberg, W., & Haynes, B. (2000). *Evidence-based medicine: How to practice and teach EBM* (2nd ed.). Edinburgh: Churchill Livingstone.

Sanfilippo, F. (2009). Academic health centers. *Information, Knowledge, Systems Management, 8*(1), 383-414.

Santos, F. M., & Eisenhardt, K. M. (2005). Organizational boundaries and theories of organization. *Organization Science, 16*(5), 491-508.

Saunders, M. N. (2012). Choosing research participants. In G. Symon & C. Cassell (Eds.), *Qualitative organizational research: Core methods and current challenges* (pp. 35-52). London: SAGE Publications.

Sayer, A. (1992). *Method in social science: A realist approach* (2nd ed.). London: Routledge.

Seale, C. (1999). Quality in qualitative research. *Qualitative inquiry, 5*(4), 465-478.

Shaw, S., Elston, J., & Abbott, S. (2004). Comparative analysis of health policy implementation: The use of documentary analysis. *Policy Studies, 25*(4), 259-266.

Silverman, D. (1987). *Communication and medical practice*. London: SAGE Publications.

Silverman, D. (Ed.) (2004). *Qualitative research: Theory, method and practice*. London: SAGE Publications.

Singh, J., Verbeke, W., & Rhoads, G. K. (1996). Do organizational practices matter in role stress processes? A study of direct and moderating effects for marketing-oriented boundary spanners. *The Journal of Marketing*, *60*(July) 69-86.

Smith, S., Ward, V., & House, A. (2011). 'Impact' in the proposals for the uk's research excellence framework: Shifting the boundaries of academic autonomy. *Research Policy, 40*(10), 1369-1379.

Souba, W. W., Mauger, D., & Day, D. V. (2007). Does agreement on institutional values and leadership issues between deans and surgery chairs predict their institutions' performance? *Academic Medicine, 82*(3), 272-280.

Star, S. L. (1999). The ethnography of infrastructure. *American Behavioral Scientist, 43*(3), 377-391.

Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, 'translations,' and boundary objects: Amateurs and professionals in Berkeley's museum of vertebrate zoology, 1907 – 1939. *Social Studies of Science, 19*, 387-420.

Starbuck, W. H. (1992). Learning by knowledge intensive firms. *Journal of Management Studies, 29*(6), 713-740.

Straus, S. E., Tetroe, J. M., & Graham, I. D. (2011). Knowledge translation is the use of knowledge in health care decision making. *Journal of Clinical Epidemiology, 64*(1), 6-10.

Sturdy, A., Clark, T., Fincham, R., & Handley, K. (2009). Between innovation and legitimation—boundaries and knowledge flow in management consultancy. *Organization, 16*(5), 627-653.

Swan, J., Bresnen, M., Newell, S., & Robertson, M. (2007). The object of knowledge: The role of objects in biomedical innovation. *Human Relations, 60*(12), 1809-1837.

Szulanski, G. (2000). The process of knowledge transfer: A diachronic analysis of stickiness. *Organizational behavior and human decision processes, 82*(1), 9-27.

Task Force on Academic Health Centers. (1999). *From bench to bedside: Preserving the research mission of academic health centers*. New York: Commonwealth Fund.

Task Force on Academic Health Centers. (2000). *Health care at the cutting edge: The role of academic health centers in the provision of specialty care*. New York: Commonwealth Fund.

Task Force on Academic Health Centers. (2002). *Training tomorrow's doctors: The medical education mission of academic health centers.* New York: Commonwealth Fund.

Thompson, G. F., Frances, R., Levacic, R., & Mitchell, J. (1991). *Market, hierarchies and network*. London: SAGE Publications.

Tietze, S. (2012). Researching your own organization. In G. Symon & C. Cassell (Eds.), *Qualitative organizational research: Core methods and current challenges*. London: SAGE Publications.

Topping, S., Hyde, J., Barker, J., & Woodrell, F. D. (1999). Academic health centers in turbulent times: Strategies for survival. *Health Care Management Review, 24*(2), 7-18.

Topping, S., & Malvey, D. (2002). Management of academic health centers: The past, present, and future. *Advances in Health Care Management, 3*, 267-297.

Trompette, P., & Vinck, D. (2009). Revisiting the notion of boundary object. *Revue d'anthropologie des connaissances, 3*(1), 3-25.

Tsoukas, H. (2009). Craving for generality and small-n studies: A Wittgensteinian approach towards the epistemology of the particular in organisation and management studies. In D. A. Buchanan & A. Bryman (Eds.), *The SAGE handbook of organisational research methods.* London: SAGE Publications.

Tsoukas, H., & Vladimirou, E. (2001). What is organizational knowledge? *Journal of Management Studies, 38*(7), 973-993.

Turrini, A., Cristofoli, D., Frosini, F., & Nasi, G. (2010). Networking literature about determinants of network effectiveness. *Public Administration, 88*(2), 528-550.

Tushman, M. L. (1977). Special boundary roles in the innovation process. *Administrative Science Quarterly*, 587-605.

Tushman, M. L., & Scanlan, T. J. (1981). Boundary spanning individuals: Their role in information transfer and their antecedents. *Academy Of Management Journal, 24*(2), 289-305.

Von Nordenflycht, A. (2010). What is a professional service firm? Toward a theory and taxonomy of knowledge-intensive firms. *Academy of Management Review, 35*(1), 155-174.

Wainwright, S. P., Williams, C., Michael, M., Farsides, B., & Cribb, A. (2006). From bench to bedside? Biomedical scientists' expectations of stem cell science as a future therapy for diabetes. *Social Science & Medicine, 63*(8), 2052-2064.

Walshe, K., & Davies, H. T. O. (2013). Health research, development and innovation in england from 1988 to 2013: From research production to knowledge mobilization. *Journal of Health Services Research & Policy, 18*(3 suppl), 1-12.

Walshe, K., & Rundall, T. G. (2001). Evidence-based management: From theory to practice in health care. *Milbank Quarterly, 79*(3), 429-457.

Ward, V., Smith, S., House, A., & Hamer, S. (2012). Exploring knowledge exchange: A useful framework for practice and policy. *Social Science & Medicine, 74*(3), 297-304.

Wartman, S. A. (2008). Toward a virtuous cycle: The changing face of academic health centers. *Academic Medicine, 83*(9), 797-799.

Weber, E. P., & Khademian, A. M. (2008). Wicked problems, knowledge challenges, and collaborative capacity builders in network settings. *Public Administration Review, 68*(2), 334-349.

Weick, K. E. (1979). Cognitive processes in organizations. *Research in Organizational Behavior, 1*(1), 41-74.

Weick, K. E. (1993). The collapse of sensemaking in organizations: The Mann Gulch disaster. *Administrative Science Quarterly, 38*(4), 628-652.

Weick, K. E. (1996). Prepare your organization to fight fires. *Harvard Business Review, 74*(3), 143-148.

Weiner, B., Culbertson, R., Jones, R., & Dickler, R. (2001). Organizational models for medical school-clinical enterprise relationships. *Academic Medicine, 76*(2), 113-124.

Weiss, C. H. (1979). The many meanings of research utilization. *Public Administration Review, 39*(5), 426-431.

Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. Cambridge: Cambridge University Press.

Weston, C. M., Bass, E. B., Ford, D. E., & Segal, J. B. (2010). Faculty involvement in translational research and interdisciplinary collaboration at a US academic medical center. *Journal of Investigative Medicine, 58*(6), 770-776.

Wiesenfeld, B., & Hewlin, P. (2003). Splintered identity and organizational change: The predicament of boundary spanning managers. *Research on Managing Groups and Teams, 5*, 27-52.

Williams, C., Wainwright, S. P., Ehrich, K., & Michael, M. (2008). Human embryos as boundary objects? Some reflections on the biomedical worlds of embryonic stem cells and pre-implantation genetic diagnosis. *New Genetics and Society, 27*(1), 7-18.

Williams, P. (2002). The competent boundary spanner. *Public Administration, 80*(1), 103-124.

Willis, C. D., Best, A., Riley, B., Herbert, C. P., Millar, J., & Howland, D. (2014). Systems thinking for transformational change in health. *Evidence & Policy: A Journal of Research, Debate and Practice, 10*(1), 113-126.

Wilson-Kovacs, D. M., & Hauskeller, C. (2012). The clinician-scientist: Professional dynamics in clinical stem cell research. *Sociology of Health & Illness, 34*(4), 497-512.

Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). London: SAGE Publications.

Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review, 27*(2), 185-203.

Zelman, W. N. B., D.; Gower, J. M.; Bumgarner, P. O.; Cancilla, L. M. (1999). Issues for academic health centers to consider before implementing a balanced-scorecard effort. *Academic Medicine, 74*(12), 1269-1277.

Appendix B Sample recruitment email

Project Title: Boundary spanning in Academic Health Science Centres: integrating research, education and patient care

Dear <participant>

I am writing to invite you to take part in a research study on Academic Health Science Centres (AHSCs). The aim of the research is to examine formal and informal processes in AHSCs to see how knowledge is translated across boundaries between groups with different cultures and organisational contexts. This will then be used to develop practical guidance for AHSCs and other organisations with similar goals, as well as developing theory in the organisational studies field.

I believe that in your current role at <AHSC> you will be able to help me to understand the formal and informal processes that exist to facilitate the transfer of knowledge across boundaries at AHSCs. The research is funded by the National Institute of Health Research through a Doctoral Research Fellowship and is being carried out through University College London.

The research involves an interview that will last up to one hour and will take place in a location convenient to you, such as your office or a private meeting room. Please find a research information sheet attached.

Sample questions you may be asked during the interview include:

1. What do the AHSC goals of integrating research, education and patient care mean to you in your day to day work?
2. Tell me about an area of work where you have to/ are trying to work across a traditional boundary/boundaries.

This study has been approved by the UCL Research Ethics Committee (Project ID Number: 3859/001) and has <site> NHS R&D approval.

If possible, I would like to record the interview for later transcription. All data obtained from the interview will be confidential and anonymised.

If you are interested in taking part in this research please reply to me at this email, or call me on 020 3108 3242.

Many thanks

Catherine French

NIHR Doctoral Research Fellow
Catherine.french@ucl.ac.uk

Appendix C Information sheet and consent form

UCL
DEPARTMENT OF APPLIED HEALTH RESEARCH

INFORMATION SHEET FOR PARTICIPANTS

This study has been approved by the UCL Research Ethics Committee (Project ID Number): 3859/001

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Boundary Spanning in Academic Health Science Centres: Integrating research, education and patient care

We would like to invite you to participate in this postgraduate research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what your participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

Why is the research being done?

Academic Health Science Centres (AHSCs) are partnerships consisting of a university with a medical school, and one or more NHS Trusts, and were established in the UK in March 2009 to improve the translation of research from 'bench to bedside'. Whereas the biomedical innovations developed in AHSCs are often widely known, less is known about what the organisational structures, cultures and governance arrangements may enable the improved translation of research.

What is the aim of the research?
The aim of this study is to examine processes within recently established Academic Health Science Centres in the UK to investigate how they are working towards their stated objectives of integrating research, education and patient care and improving the translation of research from 'bench to bedside'. In particular, it will look at how knowledge is translated across boundaries between traditionally separate groups (or communities of practice) in Academic Health Science Centres, and aim to develop practical guidance for AHSCs and other organisations with similar goals.

Why have you been chosen?
In order to address the aims of the research, I have selected two case studies to follow over the course of one year. You are linked in some way to at least one of these case studies and I believe that because of your experience and your role within the organisation, you will be able to help me understand what formal and informal processes exist to facilitate the transfer of knowledge between different groups in the case study, what problems are faced on a day to day basis and whether and how these are being overcome.

What is being asked of you?
You may be asked to participate in an interview, or to be observed in your day to day role (shadowed) or as part of a meeting for an agreed period of time. For interviews, you may be asked to participate in one or two interviews. If asked to participate in two interviews, the second interview will take place approximately 9 to 12 months after the first interview. The interviews will last up to one hour each and can be held at a time and at a place which is convenient for you. The interview will be held face to face with the researcher. If you do decide to take part in an interview or shadowing you will be given this information sheet to keep and asked to sign a consent form.

If you are asked to participate by being observed in a meeting, you will be given this information sheet in advance and asked at the start of the meeting for your verbal consent and this will be noted by the researcher.

Do you have to take part?
It is up to you to decide whether or not to take part in any part of the research. If you decide to take part you are still free to withdraw at any time and without giving a reason. In addition to withdrawing yourself from the study, you may also withdraw any data/information you have already provided up until 31st January 2013. Nobody else will know if you take part or not. If participation in this study has harmed you in any way you can contact University College London using the details below for further advice and information.

Will taking part in this study be kept confidential?
Yes. With your agreement an audio recording will be made of the interview. The recording will be transcribed (this may be by an external agency known to UCL) and all names or other aspects which may identify the people involved will be removed and replaced with a code. Your data will remain anonymous and only the researcher will have access to details of your identity. After the interview has been transcribed the recording will be destroyed. All personal data at every stage of the research process will be held securely in accordance with the Data Protection Act 1998.

Who has given ethics approval for the study?
The UCL Ethics Committee has reviewed the study and given it ethical approval (3859/001 on 30th March 2012). The study also has local NHS R&D approvals at all relevant study sites.

Who has funded the study?
The study is funded by the National Institute for Health Research (NIHR) through a personal Doctoral Research Fellowship award.

What will happen to the results of the research study?
The results will be published as part of my PhD thesis and in relevant academic and professional journals. Findings may also be reported in presentations given at conferences and locally within AHSC organisations. A copy of the research findings will be sent to you if you request it. You will not be identified in any report/publication.

THANK YOU VERY MUCH FOR READING THIS LEAFLET
AND FOR CONSIDERING TAKING PART IN MY RESEARCH

Catherine French
NIHR Doctoral Research Fellow

If this study has harmed you in any way you can contact UCL using the details below for further advice and information:

Researcher:	**Supervisor:**
Catherine French Email: catherine.french@ucl.ac.uk Department of Applied Health Research, UCL 1-19 Torrington Place, London WC1E 6BT Tel: 020 3108 3242	Professor Naomi Fulop Email: n.fulop@ucl.ac.uk Department of Applied Health Research, UCL 1-19 Torrington Place, London WC1E 6BT Tel: 020 3108 3267

UCL
DEPARTMENT OF APPLIED HEALTH RESEARCH

CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Study: Boundary Spanning in Academic Health Science Centres: Integrating research, education and patient care

This study has been approved by the UCL Research Ethics Committee (Project ID Number): 3859/001

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

	Please tick or initial
• I understand that if I decide at any time during the research that I no longer wish to participate in this project, I can notify the researchers involved and withdraw from it immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my data up to 30th April 2013.	☐
• I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the Data Protection Act 1998.	☐
• The information you have submitted will be published as a report and you will be sent a copy if you request it. Please note that confidentiality and anonymity will be maintained and it will not be possible to identify you from any publications.	☐
• If applicable, I consent to my interview being recorded.	☐

Participant's Statement:

I _____

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed **Date**

Appendix D Observation summary template

Observation summary notes

Meeting	
Date & Time	
Setting	
Attendees	
How consent obtained	
Purpose of meeting	
Any relevant documents	

Boundaries and domains of practice involved: professional, organisational etc

Main issues or themes arising during the meeting

Other salient observations

Any reflections on role as researcher

Any new or remaining questions around this meeting to reflect on going forward:

Any new meeting dates for diary or to be arranged

Appendix E Sample Interview topic guide for AHSC staff

Thanks for taking the time to meet with me today. I would like to talk to you about how boundaries between traditionally separate groups are overcome in Academic Health Science Centres.

The interview shouldn't take more than 40 minutes and with your consent I will tape the session so not to miss any comments.

I will make some notes as we go along as well. All responses will be kept confidential. A transcriber and my supervisors may see responses or parts of responses but these will be anonymised.

I will ensure that any information included in any reports or published material does not identify you as a respondent.

You may end the interview at any time or withdraw your data from the study at anytime up to 30th April 2013. Have you read the information sheet I sent through by email? [If not, give time to read it].

Are there any questions about what I have just explained? Are you willing to participate in this interview? Please could you sign the consent form.

[switch on tape recorder]

I would like to firstly ask some questions about the AHSC in general, then CRCs

General AHSC questions	Firstly, could you describe your current role or role in the AHSC. What do you see as the main goals of the AHSC? How do you work towards those in your day to day work? How are the goals different from the roles of the organisations prior to the development of the AHSC? How does the AHSC add value? How would you define success at the AHSC? And success at a CRC level?

	What makes CRC successful? Examples?
Boundaries	A large part of the role of the AHSC is to overcome traditional boundaries between organisations. Thinking about the two levels, what are the boundaries? How do these boundaries manifest themselves? Prompt – are they cultural, professional, geographical etc. Are there any organisational structures or processes in place to facilitate the transfer of knowledge across that boundary (or boundaries)? Prompt – e.g. meetings, networking events, joint protocols, etc. What specifically do you share across these boundaries? Prompt – information, data, results ask for examples How do you share it? What informal arrangements are in place to overcome boundaries? How do they work?
Conclusion	Is there anything else you would like to add?

Many thanks for your time. If possible, I would like to do a follow up interview with you in 10 to 12 months time. Would you be happy with that?

Appendix F Interview and observation data sources

Interviews

Interview reference	AHSC	Level	Role
1	Delta	AHSC	Non-clinical manager
2	Delta	AHSC	Clinician scientist
3	Delta	Tracer	Clinician scientist
4	Delta	AHSC	Clinician scientist
5	Delta	AHSC	Non-clinical manager
6	Delta	Tracer	Non-clinical researcher
7	Gamma	AHSC	Non-clinical manager
8	Delta	Tracer	Non-clinical researcher
9	Delta	AHSC	Clinician scientist
10	Gamma	AHSC	Non-clinical manager
11	Delta	Tracer	Clinician
12	Delta	AHSC	Non-clinical manager
13	Delta	AHSC	Clinician scientist
14	Gamma	AHSC	Clinician scientist
15	Delta	Tracer	Psychologist
16	Gamma	AHSC	Clinician scientist
17	Delta	Tracer	Medical doctor
18	Delta	Tracer	Clinician scientist
19	Delta	AHSC	Non-clinical manager
20	Delta	Tracer	Medical doctor
21	Delta	Tracer	Medical doctor
22	Gamma	Tracer	Clinician scientist
23	Gamma	Tracer	Clinician scientist
24	Delta	Tracer	Clinician scientist
25	Gamma	Tracer	Non-clinical manager
26	Gamma	Tracer	Nurse
27	Gamma	Tracer	Medical doctor
28	Gamma	Tracer	Nurse
29	Gamma	Tracer	Nurse
30	Gamma	Tracer	Medical doctor
31	Delta	Tracer	Clinician scientist
32	Gamma	AHSC	Clinician scientist
33	Gamma	Tracer	Medical doctor
34	Gamma	Tracer	Medical doctor
35	Delta	AHSC	Non-clinical manager
36	Gamma	Tracer	Medical doctor
37	Delta	Tracer	Non-clinical manager
38	Delta	Tracer	Clinician

39	Gamma	Tracer	Nurse
40	Gamma	AHSC	Non-clinical manager
41	Gamma	Tracer	Nurse
42	Delta	AHSC	Non-clinical manager
43	Delta	Tracer	Clinician scientist (same participant as interview 3)
44	Delta	Tracer	Non-clinical researcher (same participant as interview 4)
45	Delta	AHSC	Clinician scientist
46	Gamma	Tracer	Clinician scientist
47	Gamma	Tracer	Basic scientist
48	Delta	AHSC	Medical doctor

Observations

Observation Reference	Site	Level	Type of interaction	Date
1	Delta	Tracer	Public seminar	21/03/2012
2	Delta	Tracer	Project/acute trust team meeting	22/03/2012
3	Delta	Interface	Strategy meeting	22/03/2012
4	Delta	Tracer	Project and strategic partners	26/03/2012
5	Delta	Tracer	Project/acute trust team meeting	13/04/2012
6	Delta	AHSC	CRC leaders meeting	14/05/2012
7	Delta	Tracer	Project team meeting	14/05/2012
8	Delta	Tracer	Oversight meeting	17/05/2012
9	Delta	Tracer	Public seminar	12/06/2012
10	Delta	Tracer	Project/acute trust team meeting	13/06/2012
11	Delta	Tracer	Project/acute trust team meeting	29/06/2012
12	Delta	AHSC	Public seminar	03/07/2012
13	Delta	Tracer	Project team meeting	09/07/2012
14	Delta	Tracer	Project/acute trust team meeting	16/07/2012
15	Delta	Tracer	Project/acute trust team meeting	18/07/2012
16	Delta	Interface	CRC meeting	25/07/2012
17	Delta	Tracer	Project team meeting	20/08/2012
18	Delta	Interface	Strategy meeting	29/08/2012
19	Delta	Tracer	Project/acute trust team meeting	03/09/2012
20	Delta	Tracer	Project/acute trust team meeting	06/09/2012
21	Delta	AHSC	Public seminar	13/09/2012
22	Delta	Tracer	Project team meeting	08/10/2012
23	Delta	AHSC	Public seminar	11/10/2012
24	Delta	Tracer	Project/acute trust team meeting	15/10/2012
25	Delta	Tracer	Public seminar	18/10/2012
26	Delta	Tracer	Project/acute trust team meeting	19/10/2012
27	Delta	Tracer	Oversight meeting	25/10/2012
28	Delta	Tracer	Oversight meeting	25/10/2012

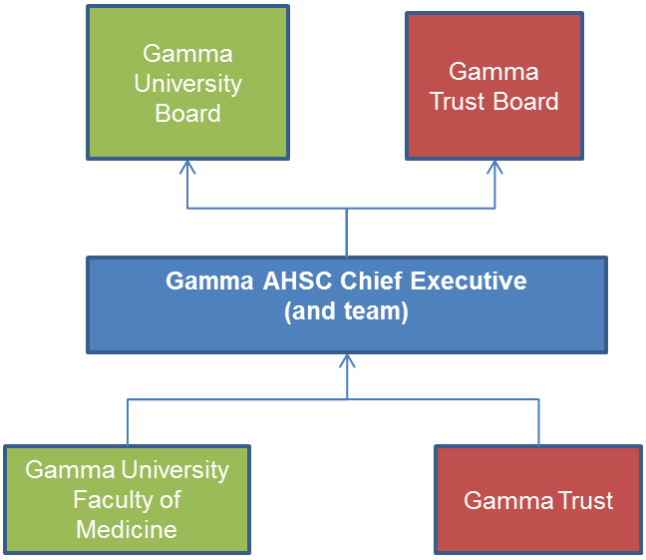
29	Delta	Tracer	Project/acute trust team meeting	25/10/2012
30	Delta	Tracer	Project and strategic partners	06/11/2012
31	Delta	Tracer	Public seminar	21/11/2012
32	Delta	Tracer	Project/acute trust team meeting	28/11/2012
33	Delta	Tracer	Project and strategic partners	28/11/2012
34	Delta	Tracer	Project/acute trust team meeting	30/11/2012
35	Delta	Tracer	Project team meeting	10/12/2012
36	Gamma	Tracer	Operational meeting	11/01/2013
37	Gamma	Tracer	Clinical meeting	14/01/2013
38	Gamma	Tracer	Operational meeting	14/01/2013
39	Delta	Tracer	Project team meeting	14/01/2013
40	Gamma	Tracer	Clinical meeting	18/01/2013
41	Gamma	Tracer	Research meeting	18/01/2013
42	Gamma	Tracer	Operational meeting	18/01/2013
43	Gamma	Tracer	Unstructured	24/01/2013
44	Gamma	Tracer	Unstructured	25/01/2013
45	Gamma	Tracer	Clinical meeting	28/01/2013
46	Delta	Tracer	Project/acute trust team meeting	29/01/2013
47	Delta	Tracer	Research meeting	30/01/2013
48	Gamma	Tracer	Clinical meeting	01/02/2013
49	Gamma	Tracer	Unstructured	01/02/2013
50	Gamma	Tracer	Research meeting	01/02/2013
51	Gamma	Tracer	Operational meeting	01/02/2013
52	Gamma	Tracer	Operational meeting	01/02/2013
53	Gamma	Interface	Strategy meeting	01/02/2013
54	Delta	Tracer	Project/acute trust team meeting	04/02/2013
55	Delta	Tracer	Project/acute trust team meeting	05/02/2013
56	Gamma	Tracer	Unstructured	06/02/2013
57	Gamma	Tracer	Unstructured	08/02/2013
58	Gamma	Tracer	Unstructured	08/02/2013
59	Gamma	Tracer	Research meeting	08/02/2013
60	Gamma	Tracer	Operational meeting	08/02/2013
61	Gamma	Tracer	Clinical meeting	11/02/2013
62	Gamma	Tracer	Unstructured	11/02/2013
63	Delta	Tracer	Project/acute trust team meeting	13/02/2013
64	Delta	Tracer	Project team meeting	13/02/2013
65	Gamma	Tracer	Clinical meeting	15/02/2013
66	Gamma	AHSC	DH & AHSC meeting	15/02/2013
67	Gamma	Tracer	Operational meeting	15/02/2013
68	Gamma	Tracer	Operational meeting	15/02/2013
69	Gamma	Tracer	Clinical meeting	18/02/2013
70	Gamma	Tracer	Clinical meeting	22/02/2013
71	Gamma	Tracer	Nursing policy seminar	22/02/2013

72	Gamma	Tracer	Operational meeting	22/02/2013
73	Gamma	Tracer	Clinical meeting	25/02/2013
74	Gamma	AHSC	Public seminar	28/02/2013
75	Gamma	Tracer	Clinical meeting	01/03/2013
76	Gamma	Tracer	Research meeting	01/03/2013
77	Gamma	Tracer	Operational meeting	01/03/2013
78	Gamma	Tracer	Operational meeting	01/03/2013
79	Delta	Tracer	Public seminar	04/03/2013
80	Gamma	Interface	Strategy meeting	06/03/2013
81	Gamma	Tracer	Research meeting	08/03/2013
82	Gamma	Tracer	Operational meeting	08/03/2013
83	Gamma	Tracer	Clinical meeting	11/03/2013
84	Gamma	Tracer	Clinical meeting	15/03/2013
85	Gamma	Tracer	Operational meeting	15/03/2013
86	Gamma	Tracer	Operational meeting	15/03/2013
87	Gamma	Tracer	Clinical meeting	21/03/2013
88	Gamma	Tracer	Research meeting	22/03/2013
89	Gamma	Tracer	Operational meeting	22/03/2013
90	Gamma	Tracer	Operational meeting	22/03/2013
91	Gamma	AHSC	AHSC research meeting	09/04/2013

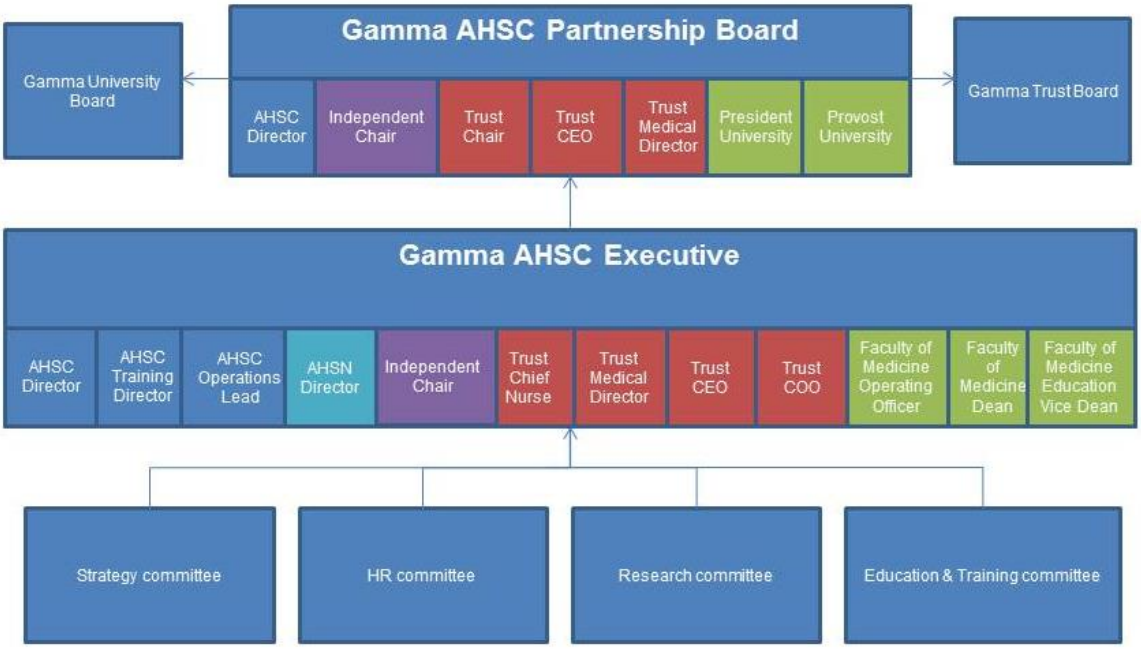
Appendix G Case AHSC governance structures

Gamma AHSC governance structure

Before restructure



After restructure



Delta AHSC governance structure