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Networked innovation in the health sector: comparative evaluation of the role of CLAHRCs

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Networked Innovation In The Health Sector: Comparative Evaluation Of The Role Of CLAHRCS

This project is funded by the Service Delivery Organisation (SDO) to evaluate the role played by the Collaborations for Leadership in Applied Health Research and Care (CLAHRCS), which were established in October 2008. It has a lead time of 36 months, and commenced in January 2010.

Project Team
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Study overview

The overall aim of the project is to collect information on the role played by CLAHRCs in promoting the translation of research into practice within the UK health sector. CLAHRCs represent an important attempt to bridge the gap between research, development and practice in the NHS, enabling improved treatments for patients and better informed clinicians. The aim of this project is to examine how these new bodies are carrying out this role. It will do so by exploring their ability to build networks and to find new ways of translating the ideas of scientists into new ways of treating patients. Their role will also be compared with equivalent bodies in Canada and the USA - specifically a Canadian Institute for Health Research (CIHR) and an institute in the Boston area of the USA engaged in applied and translational health research. This comparison will enable lessons to be learned from international experience.

Background to the CLAHRCs
The National Institute of Health Research (NIHR) was launched in April 2006, with the remit of providing support and infrastructure to enable first-class research funded by the UK Government and partners to be conducted. From this report, a 5-year research and development strategy for the NHS has been developed, with details provided in various Implementation Plans. One of the key components of this strategy was the creation of Collaborations for Leadership in Applied Health Research and Care (CLAHRCs).

Sir David Cooksey's Review of Health Research Funding in 2006 identified two crucial stages where gaps existed with the translation of health research:

- Translating ideas from basic and clinical research into the development of new products and approaches to treatment of disease and illness.
- Implementing those new products and approaches into clinical practice.

CLAHRCs are aimed to concentrate on the conduct and application of applied health research in the context of the UK's National Health Service (NHS), and specifically focus on this 'second gap in translation'. Nine pilot CLAHRCs were established in October 2008 which comprised of a partnership between academia (i.e. one University) and surrounding NHS organisations and related (acute Trusts,

primary care Trusts, Mental Health Trusts etc.) across the widest possible local geographic area. Specifically, the CLAHRCs aimed to:

- Develop an **innovative model for conducting** applied health research and **translating** research findings into improved outcomes for patients.
- Create a new, **distributed model** for the conduct and application of applied health research that links those who conduct applied health research with all those who use it in practice **across the health community** covered by the Collaboration.
- Create and embed approaches to research and its dissemination that are specifically designed to take account of the way that health care is increasingly delivered **across sectors** and across a **wide geographical area.**
- Increase the **UK's capacity** to conduct **high quality applied health research** focused on the needs of patients, and particularly research targeted at **chronic disease and public health interventions**.
- **Improve patient outcomes** across the geographic area covered by the Collaboration.

Study Aims

This study will focus on evaluating three of the CLAHRC collaborations:

- Birmingham & Black Country CLAHRC (BBC)
- Nottinghamshire, Derbyshire & Lincolnshire CLAHRC (NDL)
- South Yorkshire CLAHRC (SY)

It is important to note that each CLAHRC has been developed upon different underlying objectives and principles, and are run using different strategies. Therefore, the management, structure and overall objectives of the nine CLAHRCs can differ considerably. The experiences of international groups were used by many of the CLAHRCs to develop their specific collaborative approach, and in particular, the CIHR model was specifically considered. For example, the Nottinghamshire, Derbyshire & Lincolnshire CLAHRC have centred their institute around the use of 'diffusion fellows', which was explicitly based on the CIHR model of supporting knowledge brokering roles to support the translation of research into action (Lomas, 2007).

The scope of the study will range from identifying the influence of the policy environment and governance arrangements through to the study of the micro-level relationships formed within specific CLAHRC projects. The aim of this comparative evaluation is to highlight the development of the CLAHRCs' role in relation to supporting innovation and knowledge translation. This will also include a comparison of the activities of UK CLAHRCs with equivalent, but more established bodies in Canada and the USA, thus enabling lessons to be learned from international experience.

Specifically, this project aims to:

- Identify the micro-level relationships which enable the translation of knowledge from research into practical settings.
- Map the evolving networks that underpin CLAHRCs, including the emergence of boundary-spanning groups and gatekeeper individuals, and brokering across 'structural holes' between communities.
- Examine the impact of policy and governance arrangements within which such networks are situated on translations of knowledge between research and practice.
- Compare the UK CLAHRC initiative with initiatives in the US and Canada, recognising their distinctive institutional contexts.

Networked Innovation

This project seeks to evaluate the CLAHRCs initiative through the lens of 'networked innovation'. This perspective reflects the development of new collaborative, inter-organisational approaches to innovation (Swan et al, 2007). By emphasising the interplay between the innovation process, knowledge flows, and evolving social and organisational networks, this project is equipped to analyse and highlight the links (or lack or links) between the creation, diffusion and implementation of new research ideas and practices within these university & healthcare collaborations. The scope of the study will range from identifying the influence of the policy environment and governance arrangements on the development of CLAHRCs, through to the study of the micro-level relationships formed within specific CLAHRC projects. This will also include a comparison of the activities of UK CLAHRCs with equivalent, but more established bodies in Canada and the USA, thus enabling lessons to be learned from international experience.

By using this approach, this study will address the following questions:

- To what extent and how do CLAHRCs enable and promote networked innovation?
- How do the following influence the process of networked innovation by CLAHRCs?
  - National institutional context
  - Social and inter-organisational networks
  - Management and governance
  - Knowledge translation tools and processes
- What capabilities for networked innovation have been developed by the CLAHRCs?

Overall, this study aims to:

- Provide an independent and theory-based evaluation of CLAHRCs as a new form of networked innovation in the health sector.
- Support the organisational learning and improvement of CLAHRCs by providing comparative evidence and insights on their innovation capabilities within both a national and international context.
- Support improved patient outcomes by adding to the evidence base on networked innovation within the UK health sector, especially with respect to management and governance mechanisms.
- Make recommendations on improving the evaluation of knowledge translation through greater appreciation of the role of networks.
- Contribute to the international knowledge base on research use through cross-national comparisons, and the cross-fertilisation of academic literatures.

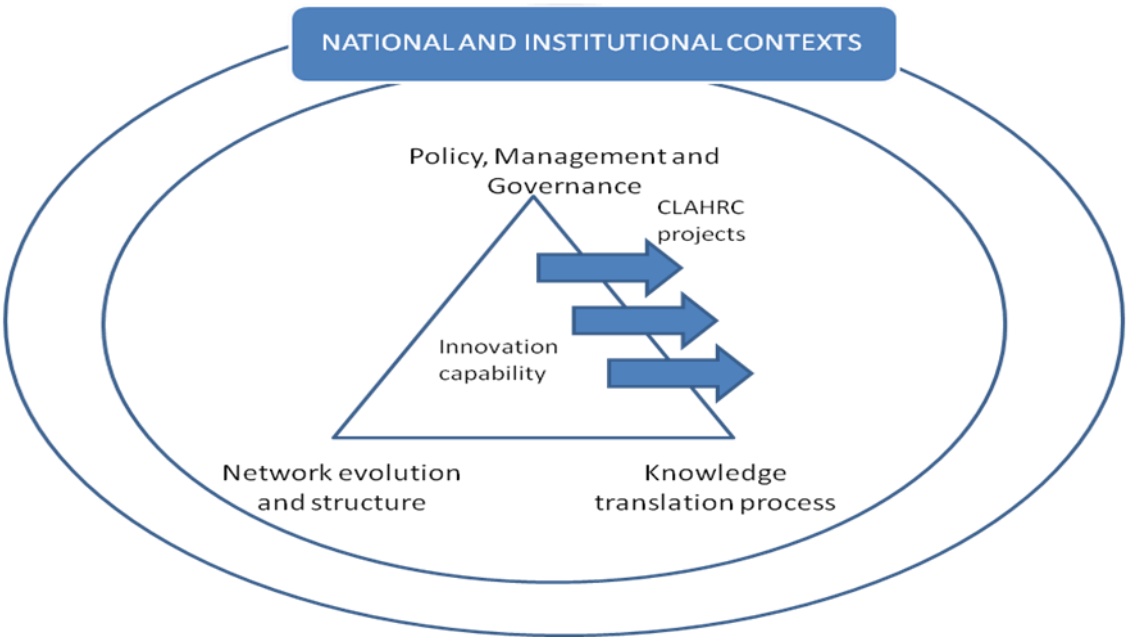
Analytical framework

The value of the networked innovation perspective is that it captures the highly interdependent and collaborative nature of innovation processes in the health sector. In particular, the analysis of CLAHRCs can usefully draw on two key insights from this perspective about the innovative capabilities that are being developed through the linkages created between different collaborative groups and organisations. The first is that because knowledge is increasingly dispersed across organisational boundaries (e.g. across professions, organisations, and specialised practices), innovation is actually more likely to occur 'at the interstices' of collaborating groups and

organisations (Powell et al., 1996). Second, and related to this, is the recognition that innovation capabilities are no longer owned by particular organisations but emerge over time from the scope and quality of interactions amongst a variety of groups, including intermediaries and end-users. Thus, this project has been designed to enable an evaluation of the development of innovative capabilities by the CLAHRCs, through studying how different groups are interacting and collaborating together, and the way in which this is supporting the translation of new types of knowledge and integration of research findings into local clinical practice.

Applying the networked innovation lens to previous work has allowed us to develop a propositional framework which guides the identification of appropriate research questions for our study. This framework identifies three key dimensions of networked innovation - social networks (i.e. the evolution and structure of formal and informal connections and collaborations between individuals and organisations), management & governance (e.g. CLAHRC management structures in the context of national and local policies and governance strategies), knowledge translation processes (i.e. the approach and strategies employed by CLAHRCs, and their national and localised contexts) - and highlights the links between those dimensions. This framework identifies the innovation capabilities of CLAHRCs as resulting from the co-evolution of these dimensions over time. It also provides a useful framework for the international comparison of networked innovation.

Figure 1: Analytical framework



Network evolution and structure

The success of innovation networks depends on their ability to identify and access sources of knowledge and expertise which are distributed across organisational and professional boundaries. Social and inter-organisational networks are crucial to this more distributed form of innovation. Such networks evolve in a multi-layered way, with interpersonal networks underpinning and interacting with more formal inter-organisational networks. Thus some aspects of CLAHRCs will have been built

upon pre-existing professional or personal relationships, which can support the development, whereas other aspects must rely upon the structure and management of the CLAHRC to develop new working relationships through which ideas and knowledge can be shared. Similarly, different forms of networks facilitate the sharing of different types of knowledge, with strong trust-based ties identified as more important in the exchange of tacit knowledge, while weak ties are associated with the sharing of information (Borgatti and Cross, 2003). Network structures are also important in shaping the flow of knowledge and information within and between organisations, and boundary-spanning groups and gatekeeper individuals can be crucial for enabling brokering across 'structural holes' (Burt, 2000).

Knowledge translation process

A vital dimension of networked innovation is the ability of the different groups involved to translate knowledge across institutional and organisational boundaries. This ability is closely linked to the structure and evolution of networks because of the advantages for innovation of network-based collaboration, as opposed to competitive, hierarchical or market-based arrangements (Alter & Hage, 1993; Hardy et al., 2003). Recent work has emphasised the 'knowledge boundaries' that constrain the flow of knowledge between different groups and communities. These boundaries have been analysed in terms of syntactic (shared or different language), semantic (shared or different meanings) and pragmatic (shared or different practices) dimensions (Carlile, 2002).

By applying a broader view of the challenges of translation, this highlights the extent to which the particular groups that interrelate within the CLAHRC collaborations, such as researchers, policy-makers and practitioners, are connected or divided by their respective contexts, language and practice These different groups can be viewed as 'epistemic communities' which are characterised by shared language, values and worldviews (Swan et al., 2007a).

Policy, management and governance

Policy, management and governance are frequently identified as important (and often negative) influences upon collaborative forms of innovation in the health sector and the UK public sector context more generally. Our previous study of the UK government's 'Genetics Knowledge Parks' initiative, for example, highlighted the unintended consequences of bureaucratic governance for attempts to develop more 'Mode 2' forms of knowledge production and translation (Robertson, 2007). The public sector emphasis on accountability and control (short-term focus and defined outputs) was found to be incompatible with the demands of Mode 2 science (long-term developments, emergent research agendas).

Management practices have a direct impact on networked innovation in terms of the management of people and the allocation of resources. As such they are crucial to resourcing, directing and legitimising the innovation process. However, such practices tend to be highly conservative, reflecting established organisational routines and industry norms rather than the requirements of a dynamic innovation process (Swan et al., 2002). The governance of networked forms of innovation is especially challenging because it involves the translation of knowledge at formative points where intellectual property protection is problematic, but where the trust-based relationships required may be highly vulnerable to formal contracting or the demands of performance regimes (Oxley, 1999). Knowledge also has to travel across organisational and institutional contexts which may be subject to different policy and governance arrangements. Our previous work on publicly funded innovation suggests that governance arrangements need to be flexible and dynamic to enable rather than constrain processes of networked innovation (Scarbrough and Amaeshi, 2008).

Innovation capabilities

The innovation capabilities of CLAHRCs can be expected to emerge from the co-evolution of the above features of the innovation network. Thus, internal network structure helps to define the 'absorptive capacity' (Cohen and Levinthal, 1990) of the CLAHRC - connections across specialised groups helping to define the forms of knowledge which can be acquired and applied. Similarly, management and governance help to shape the organisational routines (Nelson and Winter, 1982) which underpin such capabilities, and the repertoire of knowledge translation processes influences the micro-level flows of knowledge amongst and between groups.

Innovation capabilities can also be usefully differentiated between two major types; integrative capabilities (the ability to link basic science, and commercial and clinical activities) and relational capabilities (the ability to form and sustain the collaborative relationships required across the diverse organisations) (Swan et al., 2007b, Owen-Smith et al., 2002). Our previous work has highlighted distinctive differences between the UK and US institutional contexts in their support for integrative and relational capabilities in innovation (Swan et al., 2007b). Therefore, studying parallel initiative to CLAHRCs in the USA and Canada, can provide insight into the importance of the institutional context in the innovation capabilities that are developed by the CLAHRCs. Specifically:

- What influences the development of the internal (i.e. individual and organisational member) network structure of CLAHRCs over time?
- What influences the development of the external (i.e. relationships with policy makers, stakeholder and partner groups) network structure of CLAHRCs over time?
- What are the emerging features of these network structures in terms of structure, boundary-spanning functions, and the quality (e.g. trust-based etc.) of ties?
- How does the internal network of the CLAHRC influence its ability to access and mobilise wider external networks?

Research Questions

Knowledge translation

- What is the distribution of the knowledge boundaries across the innovation processes developed by CLAHRCs, and how do such boundaries manifest themselves?
- What knowledge translation processes have been developed by CLAHRCs to overcome such boundaries, and how effective are such processes in supporting networked innovation?
- What are the distinctive features (use of information systems, on-line interactions, boundary objects) of more and less successful knowledge translation processes as they apply to different groups?

Policy, management and governance

- What is the influence of policy, management and governance - including incentive structures and performance regimes - upon the development of CLAHRCs over time?
- What are effects of such arrangements upon the development of CLAHRCs' innovation capabilities?
- What does the experience of the CLAHRCs tell us about designing management and governance mechanisms to effectively support networked innovation?

Innovation capabilities

- How do the CLAHRCs' innovation capabilities evolve over time?
- What explains the variation in such capabilities across different CLAHRCs?

International comparison

- How do the above features of CLAHRCs compare with equivalent institutions in the USA and

Canada?

- What factors in the national and institutional context account for these differences in form and capabilities?

Methods & Plan of Investigation

The broad research plan is divided into two major, partially overlapping phases of work which will allow better comparison of the development of CLAHRCs over time. The methods deployed include the use of qualitative methods at organisation case-study and project levels, as well as the deployment of social network mapping and cognitive mapping methods. The UK study will involve 3 CLAHRCs, and data collection will take place over two phases. The fieldwork is planned to take place during Spring/ Summer/ Autumn 2010, and Summer/ Autumn / Winter 2011, but the exact timing will be dictated by the CLAHRCs. The study of two comparable international initiatives in the USA and Canada will take place during one phase which will overlap the UK study, and will commence in Winter 2010/ Spring 2011.

Information will be collected from participants through the following methods:

- Semi-structured interviews (~30-60 minutes per interviewee); topics for discussion will be guided through use of an interview schedule.
- Cognitive mapping exercises; this is a simple tool to obtain and structure information on peoples' attitudes towards their translational/ applied health research collaboration (~10 minutes per respondent).
- Social network mapping survey tool; this tool helps us to map the social networks of participants by providing a short questionnaire on which they identify their own role, those with whom they collaborate, and those on whom they depend in exchanging knowledge (~10-20 minutes per respondent). This tool could be administered on-line.

Phase 1 (0 - 20months) will explore and develop the analytical framework outlined above through the following research strands:
The development of rich case-studies on a sample of three CLAHRCs. The initial period of the study, however, will involve establishing the policy and organisational context for the CLAHRCs and their different strategies and mapping diversity in their clinical focus and strategies for knowledge translation. This will support the identification of suitable projects/ themes within CLAHRCs as cases for in-depth micro-level study (~3 per CLAHRC),
The initial mapping of the collaborative networks which support the CLAHRCs' work, including both the internal network of defined members and partners, and the wider network of external collaborators and users. In addition to focussing on key personnel, an additional basic survey may be administered across all members of a CLAHRC.
An initial cognitive mapping exercise with a cross-sectional sample of CLAHRC members, together with external collaborators and users. This will support the eliciting of individuals' existing constructs related to the innovation work of CLAHRCs, and when assessed collectively existing differences in belief systems and understandings across groups.

Phase 2 (16 - 36 months) will involve:
A further iteration of the case-study analysis of CLAHRCs to identify changes in their context and operation.
Detailed study in each CLAHRC following-up ~3 projects/ themes selected to provide complementary analysis across the 3 case-study CLAHRCs. This study will focus on the process of knowledge translation advanced by the project.
A follow-up cognitive mapping exercise with the same individuals to identify changes in constructs and understandings related to CLAHRC activity.

A second network mapping of the innovation networks developed by the CLAHRCs.
Case-studies of the US and Canadian institutions identified earlier to enable cross-case comparison with UK CLAHRCs, and highlighting the influence of national contexts.

Figure 2: Timeline for the deployment of research methods

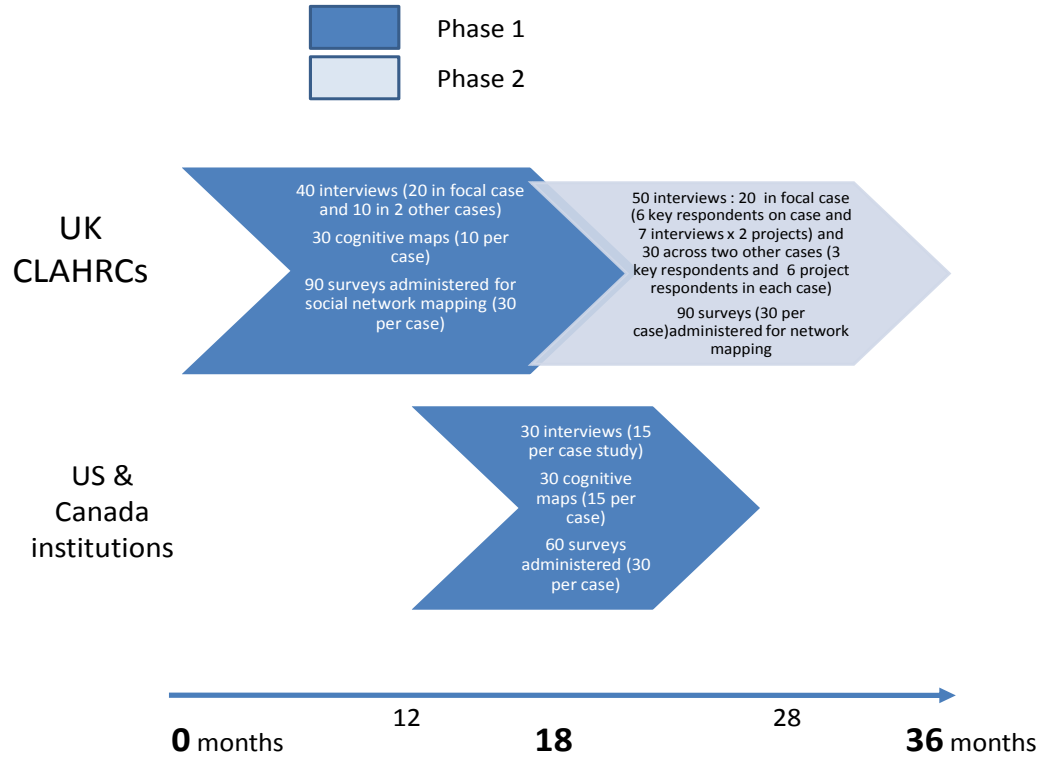


Table 1: Schedule of research methods across case sites

	CLAHRC 1	CLAHRC 2	CLARHC 3	Canadian 1	USA 1	TOTAL
Phase 1						
Interviews	20	10	10	15	15	70
Cognitive map	10	10	10	10	10	50
Social network mapping	30	30	30	30	30	150
Phase 2						
Interviews	20	15	15			50
Cognitive map	10	10	10			30
Social network mapping	30	30	30			90

Consideration of potential issues

The focus of the study is on the evaluation of three National Institute of Health Research (NIHR) Collaborations for Leadership in Applied Health Research and Care (CLAHRCs). The study was developed in response to a call by the Service Delivery Organisation (SDO) for external evaluations of the development of CLAHRCs, and thus the theoretical context, approach, aims, design and methodology of this study have been subject to review during this process. The participants of the study will be members of the CLAHRC collaborations, and will thus include clinical and management professionals from the NHS, and academics from universities. This study does not require any intervention or interaction with patients or patient data. The main ethical issues are related to ensuring that all research participants are appropriately aware of the evaluative nature of this study and that the findings will be used formatively to support the development of the CLAHRCs, protecting the confidentiality of the data, and ensuring that participants are appropriately informed about the measures taken to provide anonyminity of the data they provide.

Ethical issue: Security and confidentiality

To ensure that these risks associated with security and confidentiality are mitigated, there will be tight controls on the security and integrity of the data collected in the course of the project. All interviews will be anonymised during transcription, and personal and identification details removed from the survey data collected. Pseudonyms and codes will be used to prevent identification of people in the study. Computer files will be password protected and stored on the network drives (not local hard disks) of password protected computers. Hard-copy information will be stored in locked cabinets within the University of Warwick premises.

In the write-up of findings for publication, all descriptions of data will be anonymised or pesudomised, meaning no specific individual from CLAHRCs will be specifically identified. However, we recognise that due to the small numbers of CLAHRCs, that identification may be possible (particularly by the wider SDO CLAHRC community at internal events), and we explicitly highlight this issue to potential participants. To counter this issue, all such outputs will be carefully vetted by the PI, including through discussion with lead individuals from the CLAHRCs. We will also invite all interview participants to review their interview transcript in order to provide comments and clarification. For external dissemination where identification of the CLAHRC is not necessary (i.e. for non-SDO CLAHRC related activities), the specific CLAHRC worked with will not be named.

Ethical issue: Informed consent

We recognise that it is important that the participants invited to take part in this study have an informed understanding about the nature of the 'evaluation' of the CLAHRCs that is taking place, and also have an appreciation of the potential outcomes of this study. The findings from the study will help to inform policy-makers and NHS managers on the role which CLAHRCs are playing in the translation of knowledge from research into practice. The focus of the study is upon the evaluation of three of the nine CLAHRCs. However, we stress that the study does not involve an evaluation of the performance or impact of the CLAHRCs initiative as a whole. Instead, the purpose is to undertake a formative evaluation, where the findings from the study can be used to support the organisational learning and development of CLAHRC, and the project team will work with the CLAHRC.

By highlighting the relative development of innovation capabilities by three of the CLAHRCs and comparing this with the experience of equivalent bodies internationally, it is possible that this study will highlight some areas where some CLAHRCs are less effective in fulfilling their remit. We are aware that this is potentially sensitive information, especially if taken out of context, as it might be used to justify negative performance evaluations of senior management teams and their organisations. Therefore, all such outputs will be carefully vetted by the PI of this study, and will also

include discussion with key individuals from the CLAHRC. The release of any information into a wider domain, be it within one of the collaborating CLAHRCs, the wider NHS or the public arena, will be carefully controlled by the PI. Participating organisations will be consulted on the content and timing of the dissemination of any findings, though editorial control of content will remain the prerogative of the PI and Co-Is on the project. Any interactions with the media, including press releases and briefings will be carefully managed to reduce the risk of distorted or partial representation of the study's aims and outputs.

All interviews will require written informed consent in advance. Prior to an interview, all participants will be sent written information about the project, and provided with the opportunity to discuss any concerns during an informed consent process prior to conducting the interview. All potential participants of the social network and cognitive network mapping tool will be provided with written information about the project prior to being invited to complete these surveys, and invited to discuss any concerns about participation with the project team. Consent for participating in the survey will be through a first page disclaimer, which will highlight the formative evaluative purpose of the study, and the potential risk of identification from participating in the study (particularly within the internal SDO CLAHRC community), and the measures taken to reduce this risk.

Therefore, for all data collection, the nature of the evaluation will be explicitly raised, and the potential risk of identification of the participant will be highlighted (particularly within the internal CLAHRC community), together with discussion about the measures taken to ensure confidentiality of personal information and attempts to maintain the anonymity of the participant.

Expected Outcomes & Benefits

By comparing the activities of the three UK CLAHRCs, and contrasting this with the experience of the equivalent bodies in the USA and Canada, we will be able to gain a clearer picture of how well the CLAHRCs have developed the capabilities needed to carry out their role. We should also be able to provide feedback on the major factors influencing the development of these capabilities, and identify the lessons to be learned for the CLAHRCs themselves and for similar initiatives in the future. In the long run, by learning what works and what does not work in this kind of initiative the NHS will be better placed to improve the quality of care for its patients.

The results of the study will be fed back to the participating organisations in the form of individual reports so as to improve their practices and organisational learning. In addition, the results will be disseminated more widely through a project- web-site, through national and regional dissemination events, and in the form of interim and final reports to the SDO and NIHR. The results will also be incorporated in academic publications.

For the NHS more generally, the study will provide evidence-based recommendations on improving the translation of research into practice, hence benefitting patients. The study will also enable theory and practice to move beyond existing approaches by analysing the co-evolution of networks with the process of innovation itself, thus addressing directly the theoretical needs and practical outcomes identified by SDO in relation to the translation of knowledge.

It is anticipated that the study will benefit CLAHRCs directly by providing feedback and a methodology on reviewing and developing their innovation capabilities. Members of participating CLAHRCS will be actively involved in interpretation and refinement of the data through the user engagement workshop and site visits. We also envisage opportunities to promote the sharing of good

practice between parallel institutions in the UK, USA and Canada - e.g. through study visits, and on-line discussion via the project's web portal.

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