

DETAILED PROJECT DESCRIPTION:

NHS TOP MANAGERS, KNOWLEDGE EXCHANGE AND LEADERSHIP:

THE EARLY DEVELOPMENT OF ACADEMIC HEALTH SCIENCES NETWORKS

Summary of research

The project will explore the engagement of NHS top managers (as defined below) in knowledge exchange activities of regional Academic Health Science Networks and the national AHSN Forum. We will study a group of senior managers who appear as highly engaged with these activities, exploring their motivations, biography and influence mechanisms. We will focus on their knowledge mobilisation activity as a core tracer issue. We will track how these top managers use 'knowledge about knowledge mobilisation' within their core networks and how they act as knowledge leaders. We will plot knowledge mobilisation networks using SNA and also through semi structured interviews. We will finally generate comparative cases plotting the early development of five AHSNs and their knowledge mobilisation strategies in real time. We here respond to a call for more understanding of NHS based knowledge linkage and exchange efforts by NIHR HS and DR. The proposal adds to the currently small scale literature on NHS knowledge leadership. AHSNs will be a significant feature of the future NHS landscape and we need to track their early development now, before the opportunity is lost.

Background and Rationale

This bid presents an opportunity for a collaborative study of a cohort of NHS Very Senior Managers (VSMs) (i.e. CEOs or very senior level managers at Board level, or designated senior AHSN leaders; both general managers and clinical managerial hybrids) that positively engage with 'knowledge about knowledge mobilisation'. This engagement will be examined at regional and national levels – within their AHSN and with events and exchange activities of the AHSN Forum – a partnership between Universities UK, the NHS Confederation and the Young Foundation with ABPI, ABHI and Intellect to support emergent AHSNs. AHSNs are to be licensed by May 2013 and will be a significant feature of the future NHS landscape so research tracking early development and their knowledge mobilisation strategies is timely. The project aims to assess the impact of AHSN specific knowledge exchange efforts and explore VSMs' knowledge leadership strategies, specifically in relation to 'knowledge about knowledge mobilisation'. We will track the early development of five AHSNs, tracing their espoused knowledge mobilisation strategies and practices in use. The focus on experience of knowledge exchange events and knowledge orientations of VSMs who may act as knowledge leaders is distinctive.

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The research uses two complementary methods: Social Network Analysis (SNA) to track the evolving structure and composition of VSM networks and qualitative interviewing to explore the situated experiences and motivations of engaged VSMs. Such techniques can illuminate the number of non NHS partners in the network, such as biotechnology firms and venture capitalists. The combined analytic focus on the qualitative experience of knowledge exchange events by VSMs alongside network metrics on knowledge diffusion is additive. An innovative design addresses the following overall aims:

- To shed light on the dynamics of knowledge circulation, sharing and exchange which take place within and around newly formed AHSNs.
- To deepen understanding of the role of VSMs in triggering and instigating the knowledge mobilisation activities that are the core of the remit of the AHSNs.
- To deepen understanding of how and why certain VSMs develop a strong engagement with knowledge exchange events and mobilisation strategies and how they become ‘knowledge leaders’ within the research utilization network instituted by the AHSN.

Evidence Explaining Why This Research Is Needed Now

From EBM Implementation to Knowledge Mobilisation

Health policy literature has broadened from an early focus on evidence-based medicine (EBM) implementation in the 1990s to a system level interest in translating new scientific knowledge from ‘bench to bedside’ (HM Treasury, 2006) and identifying helpful knowledge transfer and exchange models. The rapidly growing literature on health care knowledge mobilisation reviewed by Ferlie et al. (2010, 2012) found different approaches and explanatory prisms in use. So ‘translational research’ has been an important policy theme, underpinned by growing awareness of the importance of NHS R and D both clinically and economically (Dept of Health, 2011). An important issue is how open/closed NHS knowledge networks are: previous research (eg. McGivern and Dopson, 2001 on Genetics Knowledge Parks) found they remained closed to non traditional and non NHS actors (such as venture capitalists).

NHS Top Managers and Knowledge Diffusion: A Neglected Field

The role of senior health care managers (as opposed to clinicians, scientists, and policy makers) in knowledge mobilisation efforts has been little explored, with limited empirical data about whether NHS top managers are promoting a ‘research-friendly culture’ and one that adopts ‘a more systematic approach to the adoption of new technologies and ideas’ (HM Treasury, 2006; Dept of Health, 2011).

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NHS Chief Executives are a minority yet influential segment of the NHS workforce. It appears there are currently 709 Chief Executives in the NHS (Binley's Database of NHS Management, 61st edition), many of them (about 250) leading complex organizations such as Acute, Mental health and Ambulance Trusts. Despite high public accountability and visibility, there are few recent studies of their daily work practices and decision making strategies, or of public sector Chief Executives in general (Macfarlane et al., 2011; Dargie, 1998, 2000). Such work appears to have declined over the last decade, perhaps reflecting the growth of interest in clinical managerial hybrids instead (e.g. Clinical Directors).

A major current study (Nicolini et al, 2010) of the knowledge mobilisation practices undertaken by NHS Chief Executives represents a recent exception. The study aims to explore how evidence and knowledge are utilised in practice by the top managers of NHS trusts. Building on previous work which suggests that knowledge utilisation is part of everyday practice (Gabbay and le May, 2010), this study includes the intensive and protracted shadowing of a small cohort of managers. While the study promises to shed light on how knowledge and information enter the managers' 'mind-lines', by its nature the project offers limited evidence on how such information and evidence are shared more widely. The current study will integrate and complement the existing project by examining the 'follower' behaviour of the core knowledge utilization contacts of VSMs. We will also examine how and why some VSMs become informal as well as formal knowledge leaders. This is important as Greenhalgh et al. (2004) found a dearth of empirical studies on the roles of 'executive champions' in their review of the diffusion of innovations in health care, in spite of evidence that senior support was critical.

Recent NIHR-funded projects explored managers' use of evidence and the dynamics of the executive role in health care knowledge transfer processes, involving current applicants (Dopson et al., 2012, Nicolini et al., 2010; Gkeredakis et al., 2011). Dopson et al. (2012) identified opportunities for knowledge leadership within NHS organisations despite the typically low uptake of formal, published research-based evidence: knowledge 'leaders' carved out a knowledge mobilisation role in some sites studied. So the concept of a 'knowledge leader' is an important one (Dopson et al. 2012). We will explore the observation that one important aspect of credible 'knowledge leaders' is brokering the movement of knowledge across distinct knowledge domains, epistemic boundaries and different institutions, helping to facilitate its absorption across more than one organization or profession. This finding is relevant for emergent AHSNs as they bring together multiple partners and different specialities requiring leaders that can effectively speak to different sectors in a wider knowledge economy (i.e. industry R&D, health care organisations).

There remains the question of what type of knowledge is valued within the NHS management community (the 'research pull' perspective) and whether tacit and experiential knowledge is preferred to abstract research based knowledge. The literature to date paints a picture of a managerial epistemic community

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which typically values internally generated and experiential knowledge and lacks the research base of medically-trained colleagues (Walshe and Rundall, 2001; Cascio, 2007; Pfeffer and Sutton, 2006, Dopson et al, 2012). Some small-scale studies have shown that senior NHS managers rely on ‘rich social networks comprising other NHS managers on whom they could call for information, support and ideas’ and ‘a wealth of practical, tacit knowledge’ accumulated from experience (MacFarlane et al., 2011).

While social science based translational research literature often focuses on the interactions of academic scientists and clinical practitioners (e.g. Wainwright et al., 2006), the potential role of top managers in setting an organisational architecture and climate favourable to translational research has not been well explored. AHSN leaders are encouraged to alight on clinical/scientific innovations where there is evidence of potential high impact and seek to spread them rapidly and regionally: but how will they seek to do this? There is an important gap in the existing translational research literature in terms of senior management involvement and of rapid spread across complex regional health care systems.

From AHSCs to AHSNs

As far as we know, there is no national research study or evaluation of the five initial AHSCs, although there are local studies and PhD based projects, including on King’s Health Partners in London, in which Ferlie has been involved (Fischer et al., 2011). Given the strategic importance of the AHSCs, this narrow evaluative base is disappointing. There is now an opportunity to examine the early experience of the AHSNs as they form. We will produce case studies on the formation and early development of five AHSNs, including their knowledge mobilisation strategies and networks. We are very much interested in the ‘wealth creation’ as well as the ‘health improvement’ aspects of these AHSNs and wish to study how or indeed whether economically facing actors are drawn into these networks as well as the conventional health care orientated ones. Department of Health (2011) provides a national policy framework to assist the diffusion of high impact and evidence based innovations across the NHS and to contribute to productivity and economic growth. Department of Health (2012) proposes a country wide set of AHSNs across England. Designation and licensing processes are underway with final decisions due by February 2013. If research is not commissioned soon, this opportunity to track the early development of AHSNs will be lost.

AHSC status indicates research excellence. AHSNs by contrast are universal and inclusive. Membership (although not high levels of engagement) is effectively mandatory¹ for all NHS organizations,

¹ For providers, CQUIN payments are likely to be conditional on membership of their regional AHSN. Membership will be part of CCG reporting. The one year update to *Innovation, Health and Wealth* states that commissioners and providers will need to work together from January 2013 to assess compliance.

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commissioners and providers, unlike voluntary AHSCs. Their task is to spread research and innovation quickly and extensively across a complex regional system. They are licensed as networks rather than vertically integrated 'Centres'. They have a dual agenda of wealth creation and a health improvement agenda: they are expected to bring in more non NHS players into knowledge networks (but see McGivern and Dopson, 2010). There is very brief mention in the text (Department of Health, 2012) of health care organisational knowledges (such as Improvement Science and the NHS Commissioning Board change model) that may inform AHSN development, but other literatures such the diffusion of innovations in health care (Greenhalgh et al., 2005) could support 'spread' activity (Buchanan et al., 2007).

The research outputs will support AHSNs and the AHSN Forum in designing relevant knowledge exchange events. The research team will work with these partners to turn findings into actionable recommendations. This will develop a closer dialogue between the academic research community, NHS managers and policy orientated partners, focussed on producing timely, useful findings.

AHSNs and the AHSN Forum

As outlined recently (Dept of Health, 2011; 2012), AHSNs should be a systematic delivery mechanism for the spread of innovation at ambitious pace and scale throughout the NHS. The networks are aimed to foster collaborations between academia, industry and health services to achieve strategic ambitions such as: improved patient & population health outcomes, increased efficiency in the delivery of health care and wealth creation, regionally and nationally, given the agenda for growth. The AHSN Forum is based on a partnership between Universities UK, the NHS Confederation and the Young Foundation, with ABPI, ABHI and Intellect. The partnership objective is to support fifteen regionally based AHSNs across England, to establish and sustain an appropriate national function. This national function will: 1. support Networks' organisational development. 2. map and share skills 3. support strategic themes as they emerge and 4. manage national/international relationships as required.

Like the AHSNs, the national AHSN Forum is still to be formally established but events are moving rapidly. HEFCE have recently confirmed pump priming funding for the Forum; an application is in process to the TSB (Technology Strategy Board) to match this. Our particular interest is in knowledge mobilisation strategies and activities, here taken as a core tracer issue. In their prospecti, AHSNs are indicating intention to set up knowledge mobilisation structures and strategies building upon existing translational networks (such as CLAHRCs), training knowledge agents and constructing knowledge academies. So we expect similar fora at the ASHN level as at the national level. These knowledge exchange arenas may well take the form of thematic conversations (where we have a particular interest in

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the knowledge mobilisation conversation as a core strategic activity) within key groupings rather than academic/didactic presentations or seminars.

Research Questions

Given our overall aims, the specific research questions are as follows:

Firstly, what role does 'knowledge networking' play (both formally in national and regional AHSN knowledge exchange fora) and informally (i.e. in VSMs' professional and local networks) within knowledge mobilisation strategies and practices in AHSNs?

Secondly, how is 'knowledge' (in particular about knowledge mobilisation strategies and practices) discussed at these fora diffused by a group of engaged VSMs in their AHSNs?

Thirdly, is there a subgroup of VSMs emerging who are highly engaged with such knowledge mobilisation events AND who appear to act as knowledge leaders in their AHSNs?

Fourthly, if so, what explains such knowledge leadership behaviours?

An important additional output will be a set of five case studies of the early development of the AHSNs, with a particular focus on their knowledge mobilisation strategies and practices.

Conceptual framework

We here outline initial ideas for emplacing the empirical study within relevant academic literature(s); they may evolve further during the literature review. The study will build upon relevant organizational literatures on innovation, knowledge diffusion and mobilisation, particularly within health care and cognate settings, additively focussing on the agency that may be exercised by senior knowledge leaders in knowledge mobilisation (rather than taking a structural perspective).

The Potential Agency of Early Adopters and Knowledge Leaders

We will build firstly on the longstanding diffusion of innovations literature (Rogers, 2003; Greenhalgh et al., 2004) and also our own work (Dopson et al., 2012, Nicolini et al., 2010, Gkeredakis et al., 2011), on the role of 'knowledge leaders' in health care. According to Rogers (2003), 'early adopters' are individuals well integrated into a local social system and the first port of call for 'advice and information about innovation'. They expedite the diffusion of innovation and 'serve as a role model' for others, alleviating uncertainty when a new innovation is tried. 'Early adopters' draw upon interpersonal networks and demonstrate specific characteristics - such as favourable attitudes toward science – when compared to 'late adopters'. 'Engaged' Very Senior Managers may fit Roger's description of 'early adopters' and this is one worthwhile starting point for questions in in-depth interviews. Dopson et al.'s (2012) study of

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knowledge utilization in health care highlighted some ‘knowledge leaders’ deeply committed to particular approaches (perhaps acquiring a PhD or writing a book) who seek to enrol others in their knowledge project. The implication is that a ‘whole biography’ approach may be useful in interviews.

Goodall (2009, 2011) explores expert-based leadership and high performance in hospital and university settings. She reports a possible relationship between the inherent knowledge of a leader and organizational performance; so top research universities are likely to be led by top scholars. One implication is VSMs with prior career experience in relevant knowledge domains (or prolonged exposure to them) will have access to ‘inherent knowledge’ and be more effective as knowledge mobilisers.

Absorptive Capacity and The Potential Role of Agency

We will secondly review literature on ‘absorptive capacity’ (Cohen and Levinthal, 1990) and examine implications for explaining the movement of new, external knowledge into health care organizations. We will examine key texts (Cohen and Levinthal, 1990; Zahra and George, 2002; Bierly et al., 2009) for their account of ‘high absorptive capacity’ conditions and in particular the role played by individuals as opposed to collective forces (such as culture).

Originating in private sector based strategic management, absorptive capacity theory proposes that for a ‘firm’ to recognize and exploit the value of external knowledge (such as research) it must first possess some ‘prior related knowledge’ or familiarity with such knowledge; the presence of in-house experts would be one example. One argument is that developing organizational absorptive capacity requires active, long-term investment and well positioned individuals who ‘*stand at the interface of either the firm and the external environment or at the interface between subunits within the firm*’ (Cohen and Levinthal, 1990: 132). We will explore accounts of senior level knowledge agency in key absorptive capacity texts.

Anand et al. (2002) suggest organizations maintain internal expertise in areas where they wish to exploit knowledge, instil in employees the importance of external knowledge and establish routines that facilitate the storage and use of knowledge from outside the firm. These can be interpreted as non leadership based mechanisms to stimulate an outward-facing or ‘pro-research’ culture, so we will remain attentive to the organizational dimensions of absorptive capacity as well as our leadership focus. We will examine the small literature on absorptive (non) capacity in health care organisations (Harvey et al., 2010).

Knowledge Networks

Thirdly, less formal, interactive and interpersonal networks may be important for knowledge sharing and exchange as are newer, network-based forms of organisation. The generic management literature suggests that social networks are significant for acquiring and sharing knowledge within organisations and across firms (Borgatti and Foster, 2003; Borgatti and Cross, 2003; Brown and Duguid, 2001). Dense networks

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build group consensus and focus and can enhance performance and competitive advantage (Rodan and Galunic, 2004; Gulati et al., 2000; Argote and Ingram, 2000). However, dense networks can also create closed cliques that stifle the inflow of new ideas, so heterogeneous networks and weak ties may be required to help creativity and innovation (Granovetter, 1973; Burt, 2001, 2004; Zaheer & Bell, 2005.) Personal networks provide individuals with a social environment through which they might access resources and the combination of different types of networks builds variances of ‘social capital’ (Lin, 2001). We seek to map the knowledge networks of individual VSMs and aggregate these to ascertain the influence of different network types upon AHSN knowledge mobilisation capability over time.

AHSNs are geographically dispersed networks and not vertically integrated organizations so we need to bring in the organizational literature on knowledge flows within network based forms (e.g. Owen-Smith and Powell, 2004; Reinholt et al., 2011) and spatial regions. Some of this literature is on the biotechnology sector (Owen-Smith and Powell, 2004), of intense interest in this context.

There is a sectoral literature on health care networks and knowledge flows. The structures of medical professionals’ networks reveal the centrality of clinicians who function as advice persons or ‘go betweens’ necessary for the translation of new knowledge and medical innovations (Coleman et al. 1966). Reinholt et al. (2011) recently found that central network positions were most conducive to knowledge sharing for individuals with high levels of ability and motivation, reinforcing our interest in a highly engaged VSM sample. Other recent literature examines knowledge flows in health care managed networks (where AHSNs are a further example) and the barriers to such flows (Ferlie et al., 2011) between different health care organisations, professions and epistemic cultures (e.g. acute sector and the mental health sector). Lateral leadership within knowledge orientated networks may require a softer, influential and sapiential style rather than direct command associated with large vertically integrated organisations.

We will draw upon organizational literature on knowledge flows within network based forms and spatial regions (e.g. Owen-Smith and Powell, 2004 on the biotechnology sector) to study how VSM networks, at the micro-level, contribute to a macro-level AHSN capability to mobilise and translate knowledge across geographic, epistemic and institutional boundaries. A recent application of SNA to public health concluded: *‘informal relationships underlie formal organisational structure, forming a social network within which public health policy is made. Structural reorganisations are unlikely to be effective unless they take these into account, as it appears that people find evidence, and perceive influence and power to flow through personal ties rather than governance structures.’* (Oliver et al., 2012: 4) We will remain mindful of the potential power effects of such social network structures.

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Our initial conceptual framework will bring together these multiple strands (early adopters/knowledge leaders, including CEOs/VSMs in public and private sectors; absorptive capacity; knowledge networks). The conceptual framework may evolve during the literature review which will end with a research agenda paper to inform later empirical work.

Research Design and Methods

To address our research questions, we propose a mixed methods study with the following six linked work packages. We are proposing a substantial 30 month study, given that AHSNs are large and complex, that they are still developing and may take some time to get up and running:

Work package 1: Exploratory and Selection Phase (Month 1 to 6)

Firstly, we will undertake an initial exploratory phase which will involve: reading the prospecti, the existing proposal documentation that the 15 AHSNs have produced; observation of some key national Forum meetings with a focus on knowledge mobilisation events and a small number of exploratory national policy level interviews (6 to 8) to understand the policy context (e.g. from NHS Confederation; Universities UK; Dept of Health; leading players in the AHSNs with a national role). We will explore their perceptions of variable trajectories at AHSN level and the extent to which active AHSN knowledge mobilisation strategies are emerging locally. We will agree our sample of 5 AHSNs towards the end of this stage, informed by the decision rules outlined below.

Selection Rules: We will seek to recruit a mix of London, Southern, Midlands and Northern based AHSNs and a mix of sites that previously hosted an AHSC and those not. Should VSMs from the Eastern region be assessed as engaging highly, we would be interested in that site as a strategic case (given the cluster of biotech firms in ‘Silicon Fen’), other conditions being favourable. We would be informed by work in the exploratory stage about engagement with the national thematic groups of the AHSN Forum and where there is concrete knowledge mobilisation activity at AHSN level to study.

We propose to limit our cohort to acute, mental health and community Trust based VSMs. PCTs have now disbanded and we do not propose to recruit CCG chairs as they are a different (and more clinically-based group). We are aware that a proposed CCG study led by Prof Graeme Currie has been recommended for funding and we are happy to collaborate, should both studies be funded.

Work package 2: Literature Review (months 1 to 6)

The literature search will be conducted in four stages, each building on the results of the previous one:

1. In stage one, with the assistance of an expert librarian, we will identify a set of paired keyword search terms to be used to scan the literature. We will validate this search string through an expert consultation process: 10 experts in the field will be contacted and asked to comment on the combination of search terms and whether they think this appropriate to capture the relevant literature. We will also ask them if they know of any sources that we should consult. We have already informally consulted some colleagues and they have agreed in principle to offer their assistance.

2. In stage two, we will conduct a targeted search using four search engines: Web of Science, ABI inform, Medline and Google Scholar. The combination of search engines will allow us to reach beyond the managerial literature. The inclusion of Google Scholar, which is increasingly used also by academics and academic institutions, will enable us to capture book chapters and some grey literature products.

3. In stage three, we will work in collaboration with the librarian to select among the abstracts and identify a workable number of publications. Each of the four members of the team will work separately and score each of the abstracts according to criteria to be decided during the project. We will then devote one entire project meeting to compare score and finalise the sample of papers to be considered.

4. We will then conduct our literature review as planned.

This scan and selection strategy is that of casting our initial net wider so that we can capture important documents that may have not found their way into the academic literature (for example, reports and toolkits produced by organisations such as NHS England or the Canadian CIHR). We think it is worth commenting on and also discussing highly cited outputs (we might point out in critique that a paper has been highly cited but on reading it, its methods and theoretical base seem limited). In the absorptive capacity field, for example, there are a few very well cited and enduring articles (e.g. Cohen and Levindhal; Zahra and George) that are foundational texts. Where these articles take the form of theory development or a critical synthesis, the conventional HSR notion of making a judgement about 'high quality evidence' becomes problematic.

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We will review alternative theoretical perspectives and debates as well as empirical evidence. We are also cognisant of the importance of arguments in the literature concerning the “dark side” of networks: groupthink, cliques, their closed nature in respect of new partners (the self reproduction of the NHS Clan) and the concentration of power in the hands of those at the centre of networks.

During this period we will also finalise ethical approval and review the AHSNs’ policy literature to ensure we are up to date. It will be interesting to compare the very emergent literature on AHSNs as sites with literature coming out from earlier work on CLAHRCs and AHSCs (to the extent that there is any work published) as they can be seen as iterations of the same overall policy thrust since Cooksey.

Finally, we will produce a literature review paper at the end of this work package.

Work package 3: Time 1 Interviews and Social Network Analysis (month 7 to month 18)

Time 1 Interviews

Thirdly, we will recruit a sample of 20 VSMs from these 5 AHSNs who appear highly engaged with knowledge mobilisation strategies at regional or national level. We will come to judgements about engagement both by our early observation work which will establish who is attending regularly and active in discussion in networking/exchange events, documentary analysis (i.e. attendance registers; minutes) and in conversation with AHSN Forum. We will try to recruit a mixed sample (e.g. different work backgrounds, age and gender) if possible. We will interview these 20 VSMs (Time 1) using a semi structured pro forma (a knowledge leadership schedule) informed by our literature review, exploring their approaches to research, knowledge, knowledge leadership and shared innovation and their key knowledge contacts within the AHSN. We will then conduct snowball interviews with the ‘top five’ knowledge contacts nominated by each VSM to explore perceptions of how these VSMs act (if they do) as knowledge leaders and the nature of knowledge activities, leadership and flows in AHSNs locally (100 interviews). So there will be 120 semi structured interviews in total in this major work package.

Time 1 Social Network Analysis (SNA)

We will also conduct an SNA of knowledge networks at individual VSM (20 ego-networks in Time 1 interview).. We will also invite these VSMs to take part in an SNA questionnaire to nominate up to 15 key knowledge exchange contacts within their AHSN (‘alters’), and also to pick out the top five for interview (see above). We will sample the wider group through an on line survey.

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3.a. Qualitative ego-networks by interview: Firstly, we will recruit our sample of 20 VSMs and map their wider knowledge networks using qualitative interviews and a structured pre-interview SNA questionnaire. This data will form a set of in depth ego-networks for comparative analysis at the individual level, to be further ‘unpacked’ alongside qualitative data. We here aim to gain a richer, in-depth understanding of knowledge sharing activities and perceptions across VSM networks, including contextual constraints to knowledge sharing that cannot be revealed by SNA techniques alone.

We will explore perceptions of VSM effectiveness as a knowledge leader and explore contextual data about other knowledge leaders and influences. We will explore with these ‘alters’ who they consider important for knowledge dissemination and exchange and track if espoused knowledge mobilisation strategies are being widely disseminated. We are interested in plotting partners in AHSN knowledge networks, the extent to which they go beyond the old NHS ‘clan’ (McGivern and Dopson, 2010, suggest it may be resilient) and whether this pattern varies by region. We are interested if certain individuals are perceived to have power or centrality in local knowledge utilization networks and why others (e.g. NHS ‘outsiders’, certain professional groups) may be excluded or seen as less relevant. We will explore attitudes towards knowledge and innovation in health care and managerial ‘research-mindedness’.

3.b. Quantitative SNA by snowball survey: Secondly, we will create AHSN level networks by snowballing from our first wave sample of VSM ego-networks. This methodology can research hidden populations where random sampling cannot be used as the population distribution is unknown (Heckathorn, 1997; Salganmik, 2004) i.e. epidemiology (Klov Dahl, 1985; Klov Dahl et al, 1992; Laumann et al, 1989) and where the boundary of a network is unclear (Laumann et al, 1992). From the 20 VSM ego-networks we will ask each VSM to nominate up to 15 top knowledge contacts within the AHSN then snowball sample from these seed networks and continue until we are satisfied that the network has been exhausted (Frank, 1979). This method will produce a snowball sample of knowledge exchange networks in five case-study AHSNs as well as a set of 20 depth qualitative ego-networks. We will examine these maps comparatively in terms of network structure and composition (i.e. explore how open/closed they appear to be) and apply QAP network regression analyses (i.e. to discover if formal ties lead to informal knowledge dissemination). We may find overlap in these networks if VSMs name each other and/or VSMs across AHSNs share knowledge ties. If so, our data may be conducive to a whole network SNA used successfully in an earlier CLAHRC study (Scarborough et al., 2010) by a current applicant.

We will provide brief SNA feedback reports for participating AHSNs, protecting participants’ anonymity.

Work Package 4: Time 2 interviews and SNA (month 20 to month 24)

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Fourthly, and at Time 2, we will repeat the SNA with the cohort of 20 Time 1 VSMs on line to see how their networks have evolved (for example, including new non NHS contacts). At T2 participants will be sent an e-mail copy of their original nominated contact list to which they can add or remove knowledge contacts. This will significantly reduce respondent burden and should increase response rates.

We will also undertake 25 Time 2 interviews with individuals who stand out as potentially prominent AHSN 'knowledge leaders', as revealed in the SNA, wider Time 1 interviews or case study work (who may or may not be the same as Time 1 VSMs). We will explore their motivation, biography, influence mechanisms and personal strategies of knowledge mobilisation.

Work package 5: Case Studies of 5 AHSNs (Month 6 to Month 24)

Fifthly, we plan five comparative case studies of emergent AHSNs, tracing both their early history in general and a focus on their espoused knowledge mobilisation strategies and practices as a tracer issue. We regard five cases as a good trade off between reasonable internal and external validity and as achievable within the likely research envelop. The case study work will be informed by the Time 1 and Time 2 interviews with VSMs and their network contacts, where we would include questions which relate to this work package. We will also attend a contained number of key meetings relating to knowledge mobilisation strategies in these AHSNs and continue to collect documentation. We will also do a small number of national level policy interviews (5) towards the end of the study to bring the story up to date. The individual cases will be written up to the same broad format (months 24 to 27) and early comparisons made. These case studies should be a valuable resource and a 'baseline' in any future AHSN evaluations.

Workpackage 6: Dissemination and engagement (Month 12 to 30)

We have identified various opportunities to present emergent and final results to stakeholders across the 15 national AHSNs, with more detailed feedback being provided to the five local case study sites. We aim to ensure a wide reach by engaging in several knowledge exchange activities planned for AHSN networks as well as channels within existent HS&DR infrastructure. The academic team and UUK partner will work collaboratively to deliver the following:

1) **Annual feedback to case study sites and interim reporting:** We will provide short reports and early formative feedback to the five sites (in a manner that ensure subjects' confidentiality). Initially, this will be based on Time 1 analysis and early interviews; later, social network and Time 2 analysis. We anticipate key stakeholders to be VSMs, programme leaders and external partners within the local AHSN. We have budgeted for two members to meet face-to-face with network VSMs on an annual basis and see this as valuable for maintaining relationships throughout the course of the project.

2) Engagement with AHSN Forum (Knowledge Management Group): The project will be presented to stakeholders interested in Knowledge Management and engaged in the AHSN Forum. The team will lead a discussion with this group based on our emergent findings (at months 12 and 24) attending to the different knowledge mobilisation strategies apparent in evolving AHSNs. We will organise an end of project event (seminar and sponsored dinner) to present final results and obtain feedback.

3) Engagement with HS&DR I&KT projects as cluster: We will engage with other projects commissioned to the HS&DR I & KT call to explore common themes, dissemination and impact strategy. This will be a maximum of 3 face to face meetings and online and email/telephone engagements.

4) Expo and HSRN Symposium (2015): To reach a wider audience, both NHS and non NHS, we have identified two larger national events to explore implications of the project for innovation and research in health care (we anticipate this being at months 24 to 30, with final dates to be confirmed). We have budgeted for two research team members to give presentations at the Expo 2015 and Health Service Research Network's Symposium 2015, with a small amount for supportive materials. The focus will be on knowledge flows and transfer across innovation networks, using our empirical findings.

5) Electronic alerts and online community of interest: The HSRN's digital fora will be used to communicate the research to fellow researchers and research-engaged service leaders. 'hsrlive.org' is an online platform where individuals and groups interested in innovation, evidence and improvement for health services can connect. Firstly, we will post a summary of the project using the news section of hsrlive. Secondly, we will create a closed 'community of interest' on this site for case study participants to post comments and links to relevant material (this can be done anonymously using pseudonyms to ensure privacy). Finally, we will share current information about the research using the hsrlive platform news and the HSRN 'e-alerts' sent to registered members periodically. We will not identify either our sites or persons involved in the research. The focus of news alerts will be on relevant themes to NHS managers: knowledge mobilisation and knowledge leadership strategies in AHSNs.

Using the mechanisms above, we aim to communicate our research findings in a timely and continuous manner, producing outputs to be taken forward in action. Once the project report is completed, we will prepare a final policy orientated output designed for VSMs and research policy makers in a short briefing document (2000 words) outlining main findings. This will be made available to research participants electronically. We further plan to communicate our outputs to NHS England, the life sciences industry trade associations (ABPI, ABHI) and the DH Team leading on NIHR. Finally, we will prepare draft articles for peer-reviewed academic journals.

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How do these six work packages address our core research questions outlined earlier?:

Firstly, what role does ‘knowledge networking’ play (both formally in national and AHSN level knowledge exchange fora) and informally (in VSMs’ personal networks) within knowledge mobilisation in AHSNs? (addressed in Time 1 and 2 SNAs and interviews).

Secondly, how is knowledge about knowledge mobilisation strategies and approaches discussed at the AHSN Forum and AHSN level equivalents and diffused by VSMs throughout AHSNs? (addressed by the observational work at AHSN level and interviews with VSMs and their core knowledge contacts).

Thirdly, is there a subgroup of VSMs in the AHSNs emerging who are highly engaged with knowledge mobilisation events AND who appear to act as knowledge leaders in their AHSNs? (addressed in the interviews and SNAs at Times 1 and 2).

Fourthly, if so, what explains such behaviours? (addressed in Work Package 4 interviews).

In addition, an important output of the project will be a set of five case studies of the early development of the AHSNs, with a particular focus on knowledge mobilisation strategies and practices. What are the KM strategies employed across five regional AHSNs and how do they compare? (addressed in Work Package 5).

Operational Methodological Issues

SNA Methods

The exploratory nature of the study necessitates a flexibility of research design at the early stage. Generally, for the SNA component, we are interested in the effects of social network characteristics on knowledge mobilisation in the networks of NHS top managers in the context of AHSNs.

The SNA methodology is based on tried and tested ego-network design (McCarty, 2002; Marsden, 2005; Wellman, 1982, 2007a, 2007b). We will ask VSMs to identify up to 15 key knowledge contacts (alters), collect data on the attributes of these contacts and then rate the relationships between each pair of contacts. We focus on the ego-networks of VSMs because we wish to explore if and how these formal leaders make a difference to knowledge mobilisation. We will also snowball the 5 most important VSM contacts.

From our comprehensive literature review we will derive a set of indicators and create a detailed survey to operationalize our areas of interest. The name generator questions we use will be very important in determining the network(s) generated. At this stage, we can confirm that we will use multiple name generators - a set of different questions to capture resource diversity across a range of knowledge types

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(Marin, A. & Hampton, 2007; Marsden, 2005; Straits, 2000). The SNA is intended to support our qualitative data and seeks to highlight both normative and innovative knowledge networking practices. We will use SNA to operationalize qualitative themes such as:

- the ‘dark side of networks’ (using structural and compositional indexes of closure, cliques, constraint and homophily) and the reverse ‘innovation capability’ (for example, by analysing structural holes, brokerage, compositional heterophily);
- ‘social influence’: by identifying the alter attributes and relationship characteristics associated with being influential (i.e. discipline - clinicians, managers, researchers; strength of tie, type of knowledge provided, formal or informal exchanges). We will also explore the variables associated with other knowledge roles..

We will finalise themes and design data collection instruments following a literature review.

This design is appropriate because the boundaries of the network and full set of actors is unknown (Laumann et al, 1992). Yet, if there is reasonable overlap between VSM contacts (if VSMs name each other or name the same contacts), we also highlight the possibility of being able to aggregate these networks into a picture of knowledge networks at AHSN level. This presents an exciting research opportunity to add-value by also addressing our research questions about the distribution of knowledge at the strategic policy level.

The social network analysis will map the knowledge sharing networks of VSMs highly engaged with AHSN Fora or AHSN level knowledge sharing events. This complements qualitative interviews in several respects: firstly, SNA techniques help researchers to visualize the social relations that connect individuals and are important for exchange (Balkundi and Kilduff, 2006). Secondly, SNA can reveal how particular persons are embedded in a wider system or social context and may accrue ‘social capital’ through valuable connections they have access to (Borgatti and Foster, 2003).

Mixed-method SNA captures the duality of networks through an exploration of structure from ‘outside-in’ combined with an awareness of context, content and meaning of ties from an ‘insider view’ (Wellman, 1982; Heath et al., 2009; Edwards, 2010; D’Andreta, 2011). SNA can therefore capture patterns of relations key to the development of knowledge mobilisation at macro and micro levels. Cross-checking SNA with qualitative data increases the validity of stories and images. SNA provides an overview of the structural systemic picture whilst qualitative narratives can unpack processes occurring within network structures from a ‘ground-level view’. Scott (2007: 3), for example, describes the utility of using qualitative ideational data alongside relational data to highlight ‘meanings, motives [and] definitions’ behind network structures and subsequent applicability to typological analysis. By studying network

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relations through a personal or ego-network lens (McCarty, 2002; Wellman, 2007) we can further elaborate the role of agency in knowledge networks (Emirbayer & Goodwin, 1994). Social network data will be collected using semi-structured network-focussed (qualitative) interviews which will include structured (quantitative) survey questions using participatory mapping techniques (Emmel, 2008, D'Andreta, 2011) and multiple name generators (Marin & Hampton, 2009; Marsden, 2011).

Personal or ego network analysis maps sets of relations between a focal individual (ego) and his/her alters, perceived from the subjective standpoint of ego. Personal networks are constructed upon cognitive perceptions (Krackhardt, 1988). Personal networks of individual residents are sampled independently of one another (though interdependence between connected individuals within a personal network is assumed). Analysis across the sample of personal networks helps identify network structures. Useful comparators are Oliver (2012) et al.'s study of the informal and personal networks of health policy-makers and West et al.'s (1999) study that mapped professional hospital hierarchies using egocentric network analysis. Personal network mapping was developed by Manchester School British anthropologists to understand how the form and composition of informal ties positively or negatively impacted upon individual and group outcomes.

Our research design combines semi-structured network-focussed (qualitative) interviews, structured (quantitative) survey questions for participatory mapping techniques (Emmel, 2008, D'Andreta, 2011) and multiple name generators (Marin & Hampton, 2009; Marsden, 2011). This allows us to elicit both VSM ego-networks and AHSN case-study networks and enables us to:

- (i) undertake a comparative analysis of 20 VSM ego-networks and a comparative analysis of 5 AHSN networks.
- (ii) use mix-methods to study network structure alongside qualitative process to understand how VSMs practice knowledge networking, exploring the network positions from which interpretations and experiences occur (identification of network roles, highlight different strategies and network frames).
- (iii) capture the 'doing' of AHSN knowledge work as it happens, from the early natural history, investigating the role of social influence on knowledge generation and translation.

We will repeat the SNA analysis at two points (Time 1 at month 7 and Time 2 at month 24) with this cohort to assess how they evolve. We will provide feedback reports from the Time 1 SNA analysis for each participating AHSN.

Semi-structured interviews

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Semi-structured interviews will be a major method of data collection. Time 1 interviews with 20 ‘highly engaged’ VSMs in the five selected AHSNs will establish career paths, research skill base, motivations for attending ASHN Forum and regional learning events with a focus on knowledge mobilisation, what material presented at these events they found most useful and if they used it more widely.

The pro forma will use the initial literature review paper so will be theoretically informed. It will act as a ‘knowledge leadership’ schedule. The interviews will probe into their biography, attitudes towards research and knowledge, different knowledge products and how they promote a knowledge-oriented culture in the AHSN, with a focus on knowledge mobilisation activity. Following these Time 1 SNA and cohort interviews, we will seek to interview the individuals identified by the NHS top managers as the core part of their AHSN knowledge network (about 5 per VSM or 100 in total).

With this second group of respondents we will develop a ‘knowledge influence’ schedule. We will explore concrete examples where knowledge (related to knowledge mobilisation) has been diffused within the AHSN by the initial top manager locally and their perceptions of that manager’s knowledge leadership role and respondents’ receptivity to it. We envisage that nominated respondents may be other senior figures within the Trust (such as board members) or drawn from outside (e.g. other NHS VSMs, AHSN partners or CEOs in biotech firms). It will be interesting to see who is nominated and how this relates to formal organisational roles. We will ask them to discuss other effective knowledge leaders in the ASHN. We will interview 25 such nominees in Time 2 interviews (who may be the same or different from the Time 1 interviewees) and explore motivations, biography and influence mechanisms.

Case Studies

We will produce five comparative cases, organised to the same format for comparison. We will plot the development of the ASHNs as a whole, but take their stream of work around knowledge mobilisation strategies and practices as a tracer. Early anecdotal reports suggest some shadow ASHNs are already active in this area (e.g. setting up knowledge academies); if we cannot recruit five AHSNs who are so active, we will use the nearest equivalent stream of activity (e.g. technology transfer strategy) as a tracer.

Data analysis

All interviews will (with respondents’ consent) be recorded, fully transcribed and analysed using content analysis techniques (Miles and Huberman, 1994). Each respondent will have a unique alpha-numeric identifier and their transcript and attributes (job role, gender, etc) added to NVivo 9 to aid analysis.

Social Network Analysis will be undertaken by Dr Daniela D’Andreta, an experienced Research Fellow at IKON at Warwick Business School, and member of the International Network for SNA. She will

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analyse the SNA networks using software packages including UCInet (Borgatti et al., 2002) and EgoNet (McCarty, 2006). The case study data will be analysed using narrative case study techniques (Riessman, 1993). We will employ comparative case study analysis to induce more generalisable findings (Fitzgerald and Dopson, 2009).

Preliminaries

Before the formal start of the project we will: (i) Form our Project Advisory Group, providing them with a detailed project description and plan. (ii) Confirm ethics processes with local leads (iii) Design consent forms and other documentation and (iv) Recruit a part-time project administrator at KCL.

Project management: The project will be managed through five main mechanisms:

1. Monthly progress reports and teleconferencing: Monthly conference calls will confirm the project is running to plan and on time. A summary of progress and next steps will be circulated by the KCL RA.

2. Team meetings (every three months): These will be held alternatively at WBS and KCL. The entire team will attend. At each meeting we will review progress, consider the project as a whole rather than single strands, address emerging issues, and later on discuss emerging findings.

3. Direct supervision: The PI will work in close contact with the RA at KCL and they will meet regularly. The RA at Warwick Business School (conducting the SNA) will benefit from interaction and informal support of IKON members, many working on similar research topics. Regular team meetings will ensure different strands of the project ‘mesh’ and explore opportunities for RA skill development in their methods portfolio (e.g. combining interviewing, case study and SNA work, under supervision).

4. Administrative support: The project budget includes some administrative support to organise fieldwork, team and researcher meetings, payments (e.g. travel and PPI), and formative and summative feedback at both King’s College London and Warwick Business School. Some administration has been included for planning dissemination and engagement activities through the AHSN Forum and HSRN.

5. Project Advisory Group Meetings. A PAG can provide valuable advice, not only on the project content, but also on maximising the relevance of the research. We suggest the following members: 2 NHS top managers; 2 patient/service users (recruited via UNTRAP membership); 1 NHS R&D director/senior clinical academic involved in AHSNs; 2 other academics, meeting three times throughout the course of the project.

Approval by ethics committees

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We have sought advice from our local Trust R&D Department (Guy's and St. Thomas') and London South CLRN about research ethics and governance. We were informed that the university (KCL), as sponsor, will determine whether our project is research or service evaluation. It is likely our project will fall into the 'evaluation' category since we plan to interview NHS professionals and will not access patients or patient data. If funded, we will submit the proposal to the internal KCL research ethics committee (REC) which requires to see all KCL-led protocols involving interviews with human subjects. The KCL REC will advise as to whether the project is a service evaluation or required to go through research ethics review. If NHS ethical approval is required, we will approach the NIHR Coordinated System to confirm whether our study is eligible for the NIHR Portfolio and complete requisite documentation and SSIs. Alternatively, if our study is deemed a service evaluation, we will secure approval and a formal letter from the KCL REC and then write to lead Trust R&D departments in each case study site for management permission/R and D approval. We will explain the processes followed, citing Governance Arrangements for Research Ethics Committees (GAfREC). We will work to ethics guidelines from NHS, KCL and Warwick University RECs, ensuring anonymity of research participants, including Trusts. We will use separate consent forms to obtain respondents' permission for research interviews and participation in the research project. We will anonymise primary data to which only the research team will have access. Signed consent forms and sensitive documentation will be securely stored in the PI's office. All research outputs will be anonymised. The research team have experience of successfully applying for ethical approval and have factored in time required.

Patient and public involvement

The research team has obtained support from the NHS Confederation (see appendices for a letter from their Chief Executive, Mike Farrar). Consultation has taken place with the PPI group (UNTRAP) at the University of Warwick. We have invited two UNTRAP members to be involved and received a provisional positive response. We will seek to recruit two patients / service users to our Project Advisory Group to comment on: the value of this project to patients / service users of the NHS; how findings may best be communicated to patients / service users (i.e. use of language, key messages); whether emerging findings speak to their experience of the NHS; ideas to improve the overall impact of the project.

Expertise and justification of support required

This strong team combines relevant academic and policy level expertise. Together, they bring understanding of knowledge mobilisation in health care, CEO engagement with research, managed networks in health care and research experience with AHSCs and CLAHRCs. The KCL team (Ferlie, Ledger) has undertaken recent research across a broad spectrum of relevant topics (Ferlie et al., 2010;

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Ferlie et al, 2011; Fischer et al, 2011; Dopson et al., 2012), as have Nicolini and D'Andreta at Warwick (Nicolini et al., 2010; Scarborough et al., 2010). The partnership with de Pury links this strong academic component to senior policy level and managerial audiences. Team members are well linked to key health care institutions - such Warwick Medical School and King's College Hospital NHS Foundation Trust and AHSC – as well as international health researchers in Canada, the U.S. and Europe.

Professor Ewan Ferlie has thirty years' experience of health and social care organisational research and has published widely. Recently, he was PI on two NIHR funded literature reviews on knowledge mobilisation in health care, and joint investigator in a study of health care managers' access to and use of management research (Dopson et al. 2012). An AHSC was a site in this earlier study so he has research experience of similar settings to the AHSNs. As Principal Investigator, he will provide overall leadership; scientific supervision; oversee the design of research materials; assist with data analysis; conduct some fieldwork interviews and case study research; chair team and PAG meetings; supervise the KCL based RA; contribute to interim and final project reports; ensure compliance with ethical process and Data Protection; and co-design dissemination activities.

Professor Davide Nicolini is co-director of the IKON unit at WBS. The unit explores networked innovation and organisational knowledge with a strong focus on health care organizations. He is conducting a two year NIHR funded study of the Practice of Knowledge mobilisations by NHS Chief Executives, the results of which will feed into the proposed study. He will be Joint Investigator and lead the Warwick University end. He will contribute to methodological design; data analysis; theoretical framing; supervise the Warwick RA and supervise the SNA. He will contribute to writing the final report and co-designing dissemination activities.

Jean Ledger is a PhD student in KCL's Management Department and worked on a recent NIHR funded study of health care managers' access to and use of management research (Dopson et al. 2012). She will be a full-time RA, available to start immediately and with relevant academic background in knowledge mobilisation in health care. Her PhD explores management-based knowledge use in primary care trusts (PCTs) and emergent clinical commissioning groups (CCGs). She received her BA Honours in Social Sciences (First Class) from Durham University and her MPhil from Cambridge University (with commendation). Jean will be a full-time researcher with responsibility for recruitment; ethics submissions; conducting most of the qualitative interviewing and case study orientated field work; make a contribution to SNA; also data analysis and report writing. She will oversee the KCL administrator.

Daniela D'Andreta is a Research Fellow at IKON (Innovation, Knowledge and Organisational Networks Research Unit) at WBS. She is currently working on the NIHR funded project 'Networked innovation in

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the health sector: comparative evaluation of the role of collaborations for leadership in applied health research and care (CLAHRC)'. She will lead the social network analysis component, applying her expertise developed in this prior project. She will feed into methodological design (e.g. SNA questionnaires); conduct some semi-structured interviews and case study work in one locality; use SNA software to complete SNA analyses; and contribute to report writing and team presentations.

John de Pury is Senior Policy Adviser: Health Research & Innovation at Universities UK, with a background in developing multiagency networks in health and other sectors and a particular interest in knowledge exchange and intermediation in the UK and internationally. He has a MA from Oxford University and MSc from LSHTM. He will link the academic study into the AHSN Forum and assist with: top manager recruitment and site selection; analysis of AHSN meetings' content; and the project advisory group. He will advise on research design (e.g. protocols) and relevance of the study to NHS managers. He will review the final report and co design the collaborative dissemination strategy.

We have costed in part time admin support at KCL and WBS, but the budget will not bear a full time Project Manager. We need librarian support for the literature review, now increased given earlier comments from referees that the literature review needed development. We have increased the WBS RA time allocation given the larger study.

Response to The Panel's Comments

In response to the panel's comments, we have substantially redesigned the study. We are now focussing on AHSNs regionally and at national level via the AHSN Forum, given these are important forward looking sites with major policy implications and agree the previous proposal was too backward looking. The present proposal has been scaled up to meet this new challenge. We have explained how the present proposal builds on the previous NHS CEO orientated project led by Prof Nicolini. We have supplied more detail on the SNA, scaled it up and explained how it meshes with the qualitative work. We have refined our literature review strategy. Lastly, we have deleted the work initially proposed which was designed to explore performance effects. We agree this performance theme was overly complex and beyond the scope of the present study.