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Increasing Evidence Informed Decision Making Practices Among Senior Non-Clinical NHS Managers.

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Content

List of Tables and Figures

Glossary of Terms / Abbreviations

EBP	Evidence-Based Practice
NHS	National Health Service
LIS	Library and Information Sciences
IL	Information Literacy
KT	Knowledge Translation
EIDM	Evidence Informed Decision Making

Acknowledgements

Abstract

There is limited engagement with research based evidence among senior managers within the NHS, and a failure to consistently integrate research findings into the decision making process. While much is known about the decision making and information behaviour of clinical staff and policy makers, there is little knowledge of this for senior non-clinical managers within the NHS. There is also a lack of clarity on how best to facilitate and integrate research evidence into the decision making process and a lack of research regarding the context of non-clinical healthcare managers working in the NHS.

This study addresses these shortcomings through in-depth analysis in a case study approach. Data was collected through semi-structured interview, questionnaire and observed scenario work. This data was analysed to increase knowledge and understanding of the current information behaviour and decision making practices of non-medical senior management staff working within the NHS in England. Several key barriers to research utilisation were identified in the analysis of the data. These barriers included insufficient information literacy skills in the cohort, shortcomings with the published research papers, a culture which was focused on achieving politically set targets, and a lack of defined processes to decision making.

To address these barriers an embedded librarian and a SharePoint based knowledge management system were implemented and evaluated. Evaluation of these interventions concluded that an embedded librarian was effective in increasing and supporting evidence informed decision making. This provides a practical example of an effective service development which should be considered for implementation across the NHS and wider healthcare community.

The study also recommends that, to increase use of their output, researchers need to include more explicit information on the implementation and financial elements of their findings rather than a narrow focus on the intervention outcome. In addition, findings showed the target driven culture of the NHS create an environment that stifles evidence informed decision making. To address this barrier the study recommends that the NHS adopts methods of quality assurance and metrics which place an emphasis on measures of process.

This study contributes to theory by exploring the information behaviour of a specific group which have been overlooked in previous research, and contributes new understanding of mechanisms for knowledge translation and interactions between the research based evidence and decision making processes in the context of NHS non-clinical management.

Chapter 1: Introduction

This introductory section of the thesis sets out the context, pertinent issues and concepts within which the research is placed. It also discusses the development of the research question and the value and originality of the research documented in this thesis.

This research study investigated the information behaviour of senior managers within the National Health Service (NHS) in England, specifically those managers who do not have a traditional medical background. The study investigated how the cohort utilised information, specifically during complex decision making processes. It examines the underlying approaches of this cohort to decision making, and investigates theoretical and empirical connections between knowledge translation (KT), information behaviour, cognitive processing, and the impact of these on research utilisation and evidence informed decision making.

1.1 Research problem and rationale

Effective information use has become important in the contemporary workplace (Sabherwal, 2011) and significant resources and time are invested in the production of research and evidence. Evidence-Based Practice (EBP) transformed clinical health care practices throughout the1990s. It made the explicit use of research to inform decision making a standard accepted practice in clinical and medical practices (Gray, 2008). The adoption of EBP in the clinical sphere prompted many to expect the same level of information and evidence use within the non-medical management areas of healthcare (Walshe and Rundall, 2001; Marr 2010). However, the expected praxis shift to evidence informed decision making in the NHS has not been universally adopted and decisions are not consistently incorporating best evidence within the decision making process. (Shortell *et al.* 2007; Walshe , 2009; Wright et *al.* 2015). This leads to outcomes which are not optimal and do not make best use of the available resources.

The NHS is facing an increasing demand for its services which are having adverse impacts on finances. The percentage of English NHS trusts and foundation trusts in deficit increased from 10% in 2012 to 26% in 2014 (UK Parliament, 2015). The number of acute hospital services which reported a financial deficit by the second quarter of 2014–15 was 80%. (UK Parliament, 2015). It is clear that current practices are unsustainable. There are several ways

this could be addressed, such as through increased taxation, however the preferred approach is to increase the effectiveness of services. A key way to increase effectiveness is to ensure that best practices, which are based on robust science, are disseminated and adopted throughout the organisation so that productivity gains may be achieved. This will only be done if greater use and engagement with research is achieved in senior NHS management staff.

Lavis *et al* (2005) found that "*the research evidence about decision-making by health care managers and policy makers is not that plentiful, rigorous or consistent*" and a recent review of the literature by Oliver *et al* (2014) indicated that there is still a lack of clarity and an absence of consistent robust evidence.

The existing research in the healthcare sector utilisation of research based evidence has primarily focused on either clinical staff who deliver medical/therapeutic interventions or civil servants who produce national policy. There is an absence of research which has explicitly involved senior managers and other decision makers who do not fit into either of these categories (Bowen, 2009). In order to ensure that best use is made of existing research and evidence, it is first necessary to understand how this group makes decisions and what role evidence plays in the process. Therefore, work is required to establish current information behaviour and decision making practices within this group in the NHS context, and to examine the impact of research utilisation on decision making.

It is also unclear how knowledge and information services can best support and facilitate the dissemination and adoption of best evidence in this context. There is currently a multitude of theoretical approaches to knowledge transfer, but insufficient robust empirical evidence and a paucity of proven best practice (Mitten at al. 2007).

Initial research was needed to establish the prominent information behaviours and levels of information literacy of non-clinical management staff working within the NHS in England. Research was also required to identify what processes are employed to reach decisions and how information and knowledge products interact and influence these processes.

Once an understanding of the decision making and information behaviour were established these findings were applied to identify methods to facilitate the adoption of evidence informed decision making practices. Currently the research which exists around encouraging and supporting Evidence Informed Decision Making (EIDM) is diverse and highly theoretical. This study applied theory to the workplace to establish pragmatic, transferable methods that were shown to be successful in the NHS environment.

1.1.1 The NHS in England

Context has been identified as a key variable in information behaviour (Wilson, 2000; Cole, 2011) and knowledge translation (Widen-Wulff, 2007) practices. In order to establish the effectiveness of the current theoretical approaches it is necessary to apply these approaches in a working environment to establish their practical uses and impact. Reviewing the knowledge translation literature, Pentland *et al* (2011) recommended that ongoing research in the area should investigate the efficacy of knowledge translation activities within specific professions in specific contexts. This research follows that recommendation and has focused on non-clinical managers working in the English National Health Service, a specific workplace professional cohort, which has been largely absent from the knowledge translation literature.

This research was carried out in the NHS in England. This is one of the largest organisations in the UK, providing healthcare to the population of England. The NHS consists of several discreet components, sub-organisations and internal relationships between groups and professions. It is a complex and constantly changing organisation.

As an organisation, formal 'general management' as a distinct profession began following the recommendations from the Griffiths Report (NHS Management Inquiry 1983) in the mid nineteen eighties. This introduced a more business orientated approach to the NHS culture. Several changes to structure and culture have continued to happen in the NHS and the role of general management has become entrenched and a vital component in the running and management of the organisation. Management as a distinct profession and function continues to be integral and essential to the daily function of the NHS (Kings Fund, 2011). Defining who is a manager is not a straightforward task. Management as a specific occupation and career within the NHS is now well established and there are now around 42,500 'senior managers' employed by the NHS in England, representing approximately 3.6% of the total NHS (England) workforce (Kings Fund, 2011). However a plethora of different taxonomies exist to define what a manager does and defining a 'manager' is a subjective task (Mintzberg, 2013). Job titles and hierarchical position are poor indicators of the tasks carried out by those employees. For example, the NHS Careers (2014) website lists 78 different example categories of management role. In addition, establishing which activities are exclusively "managerial" and distinct from behaviour which may be carried out by non-managers is a subjective and difficult distinction to make. As Hales (2001) points out, '*the question "what do managers do that no-one else does?" remains unanswered*'.

For the purposes of this thesis senior managers are defined as staff employed at an Agenda for Change (Department for Health, 2004) banding of 8a and above. Agenda for Change was

introduced by the Department of Health to add transparency and to ensure equality to pay in the NHS. The Agenda for Change job evaluation scoring system indicated that staff employed at level 8 and above are expected (and paid) to routinely be involved in complex decision making at a strategic level. They are also expected to have authority for resources such as budgets and staff.

While many management staff within the NHS have clinical backgrounds and training there are many senior managers who have backgrounds in business, accounting and other non-medical areas (NHS Leadership Academy, 2015). This study is focused on this non-clinical group of senior managers. It also makes a distinction between managerial decision making and clinical decision making and focuses on the non-clinical decisions being made. In the context of this study clinical decisions concern healthcare related aspects of a specific *patient* while managerial decisions concern aspects of specific *services* within the wider healthcare economy.

Management staff working in the NHS are operating in a unique environment. It is one which includes elements of traditional commercial business operations, non-profit public services, and generic healthcare practices. This happens within an atmosphere that includes much direct and indirect political direction. Roy Lilly (2014), a popular commentator on the NHS in England illustrates the way in which executives within the NHS differ in their options when compared to individuals in similar roles based in commercial healthcare or traditional business environments:

"*NHS CEOs have no control over wages and salaries, their major cost centre. Targets are dumped on them at the whim of a Secretary of State with the wind-up about a headline in the Daily Mail. They have no method of controlling demand, neither can they control prices*".

Due to the unique nature of the operating environment it is difficult to generalise findings from commercial enterprises and the wider management literature to the context of the NHS. This research was specifically carried out in an NHS environment to address this uniqueness and generate findings which are applicable and generalisable to the NHS context.

Healthcare organisations tend to work on a rigid hierarchy and this may act as a barrier to implementing evidence-based skills. For example a departmental manager may find it difficult to put forward an alternative opinion to that of the senior consultant. It has also been noted in previous research (James *et al*, 2008) that team members may perceive new knowledge from a co-worker as a threat, causing staff to ignore or withhold evidence for fear of 'rocking the boat'. This absence of a psychologically safe environment to express different opinions and ways of working has the potential to be a major barrier to decision making

(James *et al*, 2008) and limits decision makers' willingness to take actions which are seen to conflict with current practice. Radical change is seen as high risk and to be avoided in favour of 'tweaking' and modifying current practices rather than introducing completely new processes and working practices.

During the period that data was gathered for this research there was a period of considerable change in the structure of the NHS in England. A new government was elected that instigated wide sweeping changes, primarily through the introduction of the Health and Social Care Act 2012 (Department of Health, 2012). In addition to these structural and legislative changes the NHS in England was also implementing the "Nicholson Challenge" (NHS, 2008) which required financial savings of £20 billion to be made across services by the end of 2015.

The QIPP (Quality , Improvement, Productivity and Prevention) agenda (Department of Health, 2010) was a high profile work-stream promoted by the Department of Health during the period of this research which was instigated to assist the workforce meet the Nicholson Challenge. QIPP is an illustrative example of the NHS culture and environment at this period. The focus of QIPP was primarily on internal NHS generated case studies and documentation. QIPP promoted a desire for quick change based on small scale internally generated evidence. This approach does not encourage critical analysis of the information, and promotes a do once and copy approach which propagates mimetic pressure.

1.2 Aim and Objectives

The aim of this research was to develop and evaluate an effective knowledge translation mechanism that facilitates and encourages consistent engagement with research evidence resulting in evidence informed decision processes.

The specific objectives of this research are:

1. To analyse and evaluate current information behaviour, decision making processes, and knowledge utilisation in non-clinical senior healthcare management staff within the NHS in England.
2. To examine the information behaviour and decision making behaviour of this cohort to identify any prominent heuristics and cognitive bias which influenced information behaviour and affected how information is used.

3. To explore the relationships between workplace information behaviours and the successful implementation of evidence informed decision making.
4. To apply knowledge translation theories to implement practical examples of mechanisms which support and encourage evidence-informed practices within the NHS.

1.3 Research contributions

By combining observational and interview based methods the research adopted an approach which was unique in the Library and Information and Science field. This combined method has been effective in capturing explicit and implicit data. The methods used provide a new approach to research that can be adopted and adapted by others who are researching information behaviour and decision making.

The research advances what is known about non-clinical NHS management staff and their information behaviour relating to decision making. It contributes new knowledge in relation to the understanding of the barriers and opportunities facing evidence informed decision makers, and contextual contributions relating to the particular issues surrounding non-clinical managers working in the NHS in England.

1.4 Contributions to professional practice

The research advances the current evidence base by taking current theory and applying it to a practical workplace setting to produce evidence of effectiveness. The results of the research make a valuable contribution to original information and have the potential to directly influence future interventions and innovations in this area. By developing, implementing, and evaluating two interventions to facilitate evidence-informed decision making, this research provides a practical intervention which has the potential to be replicated and implemented across the NHS. By adopting the embedded librarian approach recommended in this thesis other NHS trusts and healthcare organisations may increase the utilisation and application of evidence informed decision making by senior non-clinical management staff.

1.5 Impact and novelty of the thesis

This thesis studied a cohort of managers working in non-clinical areas of the NHS in England. The cohort all held senior positions with corporate decision making responsibility. This is a group which has been neglected from the previous research evidence base.

The study applied what were largely theoretical models to a working environment which provided pragmatic and practical evidence from the specific context of the NHS in England.

The study provided new evidence of how decisions are made and the associated information behaviour displayed by non-clinical managers working in the NHS.

The trial of the embedded librarian resulted in senior non-clinical mangers increasing their use and engagement with research based evidence during decision making. By implementing the recommendations of this thesis, NHS and other healthcare organisations may increase the robustness of their decision making and decision outcomes. This has the potential to increase effectiveness and efficiency in processes and services leading to optimal care for patients and optimal use of resources.

1.6 Structure of the thesis

This thesis is structured in seven chapters. Chapter 1 contains an introduction and includes the aims and purpose of the thesis.

Chapter 2 presents a review of the academic literature and situates the study within the context. Analysis of the literature highlights relevant research concerning information literacy, information behaviour, decision making, evidence-based practice, and knowledge translation. It also highlights gaps in knowledge and provides an indication of the importance of the research question 'what can be done to increase the utilisation of research findings during non-clinical decision making?' This chapter also highlights issues relating to the diversity of approaches to knowledge translation and commonly encountered barriers to evidence informed practice.

Chapter 3 gives details of the research design, methodology and methods employed. This chapter sets out the advantages and justification for using a case study based approach which is interpretive and follows the constructivist philosophical tradition. Following this the chapter provides details of the study cohort and recruitment method used. The methods of data collection are then set out. These were questionnaire, semi-structured interview, group observation, and participant feedback. The reasons for employing these qualitative methods

are given and advantages and justification for their use is discussed. Details of each data collection method are detailed to enable a clear understanding of the study process and method. The chapter also discusses the concept of triangulation and sets out how this is achieved in this study. Finally a summary of the research methods and methodology are presented.

Chapter 4 of this thesis presents the findings from the research. This chapter provides details of the barriers which limit evidence informed decision making in this cohort. The results from the data are shown. These provide details of the cohort's perception of commonly encountered barriers to evidence informed decision making within the NHS context. Subsequently, the findings of the interviews and observations are presented together. These findings demonstrate prominent issues and barriers to evidence informed decision making and provide clarity and new information about the information behaviours, decision making practices and context of non-clinical managers working within the NHS in England. The chapter presents several themes which were identified through analysis of the data. It also presents findings on the views and opinions about library services within the NHS. Following on from the discussion of the individual themes the chapter concludes with a summary of the findings and presents a thematic matrix to display a synthesis of the themes.

Having established the information behaviour, decision making behaviour, and probable barriers to evidence-informed decision-making chapter 5 examines how this information was applied to inform the development of two workplace interventions. The chapter revisits the typical approaches to knowledge translation and provides reasons and justification for the selection of the two chosen approaches. Following on from this the chapter provides details of the embedded librarian intervention and the SharePoint-based knowledge management intervention. It then presents the research findings from the evaluation of these two interventions, and concludes with a summary of the findings and their implications.

Chapter 6 discusses the findings which were presented in chapter 5. This chapter adds greater depth of understanding to the implication and meaning of the findings. Following a brief overview and discussion of the results, the chapter discusses the context of the NHS and the impact and influence of cultural elements on the behaviour of senior management staff. Issues with research literature are discussed, specifically the lack of financial details and other shortcomings which limit implementation. The information literacy of non-clinical managers is discussed and reasons why this cohort may perceive less value in scientific research compared to staff from clinical backgrounds. The chapter concludes by evaluating the two interventions implemented during the study, including the feasibility of wider implementation.

Chapter 7 concludes this thesis with a reiteration of the contribution to knowledge made by this study and recommendations for future research, policy, service development and practice. The chapter begins with a brief synopsis of the overall research conclusion before discussing each key theme in greater depth and making recommendations for future practice and policy. Conclusions drawn from the findings of this study are given firstly on the theme of information behaviour and then decision making behaviour. This is followed by conclusions which relate to the NHS organisational context, and then aspects of the content and format of research publications . Key recommendations for future practice in each of these themes are made, and the chapter concludes by highlighting the limitations of the study and making recommendations for future research, followed by a final brief summary of the implications of the findings from this study.

This chapter has given a brief introduction to the context of this research, established the remit and need for the study, as well as highlighting the contribution it makes to knowledge and practice. The next chapter provides an in depth discussion of the existing literature which is relevant to the research.

Chapter 2: Literature Review

2.1 Introduction

This chapter examines previous research and summarises findings and theories relevant to the thesis. The main topics addressed by this research (decision making, cognitive information processing, information behaviour, and knowledge translation) are multi-disciplinary in nature and draw on a wide range of disciplines and studies. The purpose of this review is not to provide a comprehensive understanding of each area but to highlight the specific elements of these areas which are relevant to the specific aim and objectives of the research.

A comprehensive and on-going systematic review was undertaken. A range of bibliographic databases which covered the healthcare/medicine/psychology/business/management/library and information disciplines were searched. The search used a comprehensive range of terminologies and synonyms. Alternative spellings and suffix variations were included in the search. Additional hand searching was done in journal titles which have been identified as particularly relevant to the research topic.

The initial literature search was limited to papers published after 1990. Material prior to this was excluded as evidence-based practice only started to become a dominant praxis during the early nineties and will have made a major impact on how research based information is viewed by decision makers. In addition, the early nineties also saw the beginning of the widespread adoption of the internet and electronic information formats which changed the ways people disseminate and use information.

The NHS has political, financial, and organisational structures which make it unique and different from other healthcare organisations. It could be argued that research carried out in non-NHS organisations has limited relevance and transferability to the NHS. However, this literature search has taken an approach which is sensitive rather than specific, and includes literature from other healthcare organisations. This approach was taken to allow a holistic view of decision making in healthcare in the last decade.

2.2 Information, Information Behaviour and Information Literacy

Defining what individuals mean by 'information' is not a straightforward task. Dictionary definitions of information include: "*knowledge received concerning a particular fact or circumstance*"; "*knowledge gained through study, communication, research, etc.*" These definitions appear to use the terms knowledge and information interchangeably, yet within the library and information sciences (LIS) there are clear distinctions between the meanings of data, information and knowledge. Rowley (2007), characterised data "*as being discrete, objective facts or observations, which are unorganised and unprocessed and therefore have no meaning or value because of lack of context and interpretation.*" In Henry's (1974) early formulation of the hierarchy, data was simply defined as "*merely raw facts*". Rowley (2007), describes information as "*organised or structured data, which has been processed in such a way that the information has been given relevance for a specific purpose or context, and is therefore meaningful, valuable, useful and relevant.*" Rowley (2007) describes knowledge as a "*synthesis of multiple sources of information over time organised and processed to convey understanding, experience and accumulated learning*" highlighting that it is "*a mix of contextual information, values, personal experience and rules*".

However, in practice differentiating between information, data and knowledge is ultimately subjective, and varies according to the values and views of the information-user (Dalkir, 2013; Nutley *et al* 2007).

2.21 Information Behaviour

Information behaviour refers to several aspects of an individual's needs and uses of information from awareness of the need for new information, through to the activities of searching, accessing, evaluating, and using information (Ford, 2015). Understanding the information behaviour of NHS staff is a key component to identifying how better to transfer research and have it incorporated into decision making. This study is primarily concerned with the information behaviour of individuals.

This thesis adopts the view that there are three core elements of information behaviour (Wilson, 1999); information needs, information seeking, and information use. The term 'information behaviour' will be used when referring to any of these three functions. The concept of information behaviour adopted by this thesis is best illustrated by Wilson's general model of information behaviour (1996).

Several information behaviour models exist explaining how information needs arise and how we seek, search for and use information (Fisher, 2005). Prominent models include Wilson (1996), Kuhlthau (2008), and Ingwersen (2006). These existing models vary in their scope, with some focusing on the entire sequence of information use and associated behaviours, while others are concerned with only a specific stage, such as information acquisition.

The models approach information behaviour from different perspectives. For example Kuhlthau's (2008) cognitive perspective proposes that uncertainty reduction is the prime motivation for information searching. Kuhlthau emphasises emotional states, such as anxiety, drive the need to find and use new information. The social perspective takes the view that the role a user occupies in an organisation is a crucial factor in influencing how well informed the individual is, what information resources are available to the individual, and how the individual exhibits information behaviour (Widen and Holmberg, 2012). Given that the NHS is a highly structured hierarchical organisation, this was an important factor to consider.

This study uses Wilson's Information Behaviour Model (1996) as a framework for the investigation of information needs, information seeking, and information use. The model was chosen because of its holistic nature, which includes the contextual and cognitive influences which this study is interested in. The model (Figure 2.1) has also been extensively used in other studies (Case 2012; O'Leary 2011), showing an acceptance and usefulness of the model in the wider LIS community.
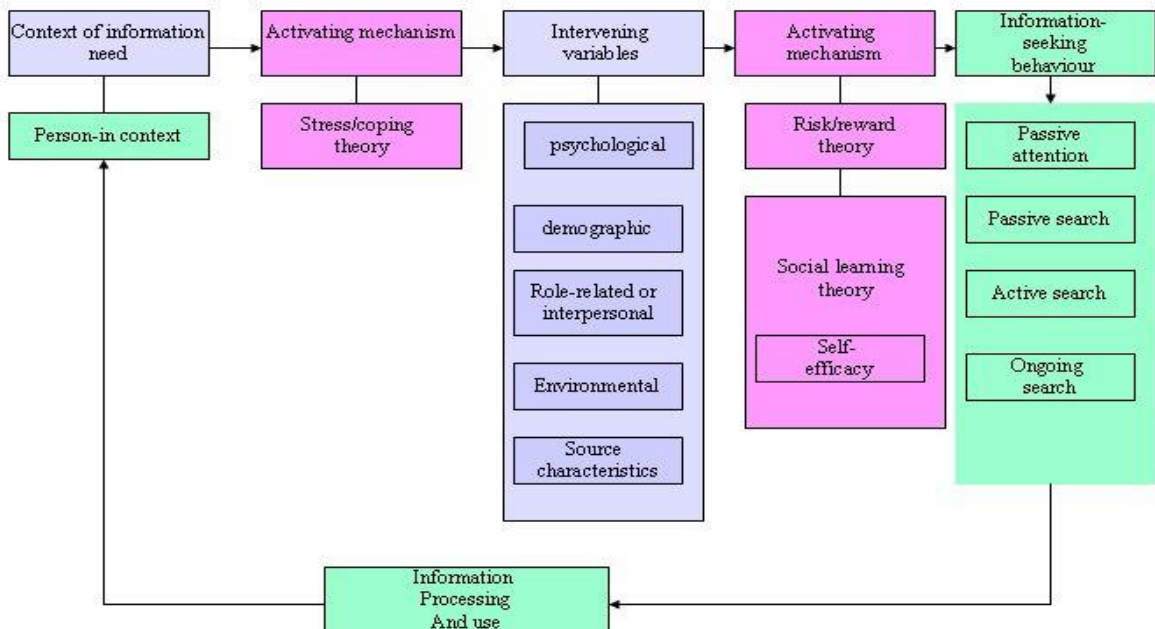
Figure 2.1: Wilson's general model of information behaviour (Wilson,1996)

Wilson's Information Behaviour Model proposes multiple dimensions of information activities, starting from the initial information need to the phase when information is being used. The model then sets out the variables which have a significant influence on information behaviour, including the underlying cognitive mechanisms, which activate that behaviour. These influences are categorised as: psychological, demographic, environmental, and information source. Each of these variables may either hinder or facilitate information seeking.

Wilson's model brings together research from various fields such as psychology and sociology. The model highlights that numerous factors influence the information behaviour of the individual, including the personality and experience of the individual, the organisational culture and the role of the individual. Among the psychological variables are values, political orientation, emotional state, prejudices, self-perception, and personal interests.

According to Wilson's theory, information behaviour is a secondary action motivated by cognitive factors. This implies that not all information needs result in action. For example, an individual may decide not to seek new information to fill a knowledge gap if they can simply delegate the decision making to another member of the organisation. Wilson proposes that behaviour is driven by risk and reward, and the bigger the risk the bigger is the motivation to look for information. Similarly, wanting a reward may motivate the individual. Wilson's model also highlights the importance of self-efficacy (Bandura, 1977). For example an individual may not look for information because they believe they do not have the capability to find the information they want. Self-efficacy in this context does not indicate a lack of ability or skills but purely an absence of the self-belief required to initiate action. Wilson's model also illustrates that information behaviour is not a simple linear process, but a complex multi-dimensional construct that differs between individuals and groups.

2.2.2 Information Literacy

Information literacy is the skills and ability an individual has to recognise and satisfy an information need. Having the competence to use information effectively has long been highlighted in the business literature as essential to increase organisational competitiveness and profitability (Drucker, 2006; Daft *et al*,2015; Doherty *et al,* 2014; Marr 2010). If individuals are to successfully apply the principles of evidence informed decision making they must have the ability to recognise when there is a need for information. They must also have the skills and resources to locate, access, interpret, and critically assess the validity and applicability of information. Information literacy is consistently viewed as a key component to successful implementation of evidence-based practice (Malloch, 2010; Cheeseman, 2013; Dalheim *et al*, 2012) and the level of information literacy found in a cohort will have a direct and important influence on the methods used to encourage and facilitate increased use of research based information.

The ability of managers to assess the quality and applicability of research has been questioned, and a body of literature indicates that decision makers do not have sufficient levels of expertise in these essential information literacy skills (Hanney *et al*, 2003; Hovenga, 2013; Fischoff, 2014) and that decision makers may misinterpret and ignore relevant data (Weiss, 1980; Rhodes, 1992; Mårtensson, 2012; Fischoff, 2014).

There are several models of information literacy (Bruce, 2011; Martin, 2013), such as the Society of College, National and University Libraries (SCONUL) (2011) seven pillars model, and ANCIL (A New Curriculum for Information Literacy) Model (Secker and Coonan, 2012). Information literacy is not only an important aspect of evidence informed decision making but also a standard problem solving skill set in decision making. For example, Edmund (2006) sets out 9 stages to problem solving in decision making: For each of these stages we can see that one or more of the SCONUL (2011) information literacy pillars is required to effectively support and implement the problem solving actions.

Table 2.1 shows how information literacy, EBP, and the decision making process contain highly similar process stages and how the synergy of these three elements provides, what could be argued to be, the basic content of an overarching model of evidence informed decision making.

Stage	Stage in Decision Making Process (Edmund, 2006)	Stage in Evidence-Based Practice (Strauss *et al*, 2010)	Information Literacy Need (SCONUL, 2011)
1	**Is there a Problem**: Define the decision carefully, present the problem as a question that can be answered.	**Ask: Formulate an Answerable Question.** Identify the gap in knowledge, and formulate a structured question (using a format such as PICO) to ensure high quality answers are found.	**Identify & Scope**: Realise there is a gap in current knowledge and an information need.
2	**Goals & Planning**: Set goals and identify stages to plan how to achieve these goals.		**Plan**: construct a strategy for locating relevant information
3	**Search and Gather Evidence**: What information and data exist that can help answer the decision	**Acquire the best available evidence.** Systematically and thoroughly gather the best evidence available to answer the question.	**Gather**: Locate and access the relevant information, data, and knowledge. .
4	**Generate creative and logical alternative solutions**: Search for ideas, consult others		
5	**Evaluate the evidence**: Compare the alternatives, what are the outcomes, benefits, negatives, etc.	**Appraise: Critically Appraise the Evidence.** Assess the evidence to identify those studies which are robust, valid and applicable.	**Evaluate & Manage**: Synthesis and organize the information and review the findings to evaluate potential solutions and useful information
6	**Reach a conclusion**: communicate your decision, do others agree, why is this solution rather than others preferred?	**Apply:** Use the evidence to guide decision making in order to reach optimal solutions.	**Present**: Present and disseminate the information findings.
7	**Suspend Judgment**: keep an open mind, be accepting of new evidence	**Appraise: Critically Appraise the Evidence.** Assess the evidence to identify those studies which are robust, valid and applicable.	**Evaluate**: Review new information and compare to existing knowledge.
8	**Take Action**: implement your decision	**Apply:** Use the evidence to guide decision making in order to reach optimal solutions.	**Manage**: Implement and use the findings from the information.
9	**Evaluate and Monitor**: Is your decision having the impact and results you expected?	**Analyze and Adjust:** Assess the outcomes, review and disseminate results, restart the EBP process if further action is required.	**Gather**: Collect new data and information to evaluate impact.

Table 2.1 – Synergy between information literacy, EBP and problem solving.

While the generic concept of information literacy is valid to workplace application, the definitions have been mainly derived from academic and LIS practices. There is some criticism of information literacy definitions and O'Farrill (2011) states that these are too narrow in focus, and do not adequately define the behaviours, or skill sets they intend to. Some authors propose that definitions of information literacy need to be more contextualised to reflect aspects of the workplace environment (Lloyd, 2011). These include the more tacit and political aspects of information in the workplace. In reviewing the literature three main themes are highlighted which apply specifically to workplace information literacy and are considered to be lacking from the generic information literacy models:

- The specific organisational cultural, political and interpersonal aspect of workplace information behaviour.
- The key mechanisms that transfer information to actionable knowledge.
- Specifics of workplace information dissemination mechanisms.

There is one other aspect of information literacy where workplace differs from generic or academic settings. Traditionally all aspects of information literacy have been viewed as equally important for all individuals. However in the workplace there is a far greater amount of specialisation. For example, many organisations employ data analysts, librarians, and statisticians. This means that senior managers may not need all of the traditional information literacy skills. It may be that delegation skills, or interpersonal relationship skills are required to enable them to access the person who carries out the information literacy function within their organisation.

These are key areas which need to be understood and defined to enable greater uptake of workplace evidence-informed practices. This thesis increases the understanding of these specific information behaviours within the context of the senior non-clinical managers working in the NHS in England. It also examines the potential mechanisms for dissemination within that context.

2.3 Decision Making

In the course of a day an individual will make a multitude of decisions. Many of these decisions are simple, procedural and may be of limited consequence. However, a small number of decisions are complex and will have outcomes that are important enough to warrant careful examination of the available evidence before a decision may be made. It is these complex decisions that this thesis is concerned with. For example – deciding to build a new ward will require estates, Human Resources (HR), Information Technology (IT), quality

improvement, business development, and finance management to assess the viability and delivery of the development. The impact of their decision will have a direct effect on the services available to patients and how/where these serves are delivered. A recent example of a minor change which can create a complex situation is the decision by central government to stop provision of education grants to student nurses (Cumming, 2015). It is unclear what the impact of this decision will have on future student numbers and subsequent qualified nursing staff numbers. This requires HR staff to assess the potential impact on their ability to recruit staff to jobs in the future and the makeup of the future workforce, the short term impact on student nurse numbers and duties and what impact this will have on patient care. Education staff need to assess the impact on their function and delivery of training not only to nursing but if there will be a need for additional Health Care Assistants or other new roles which require training to counter a shortfall in student nurses. Finance staff will need to understand the impact on funding and decide if there are new opportunities for revenue generation, or what actions to take if funding shortfalls are anticipated. In addition, this change is not likely to be looked at in isolation but will be part of a larger decision incorporating other similar changes such as the large scale introduction of apprenticeships which the government also announced.

The current focus on inter-agency working and accountable care organisation as detailed in the Five Years Forward View (NHS England, 2014) will result in complex interactions between organisation which require non-clinical managers to make decisions about integrated models of care and the associated decisions about staffing levels, IT systems, governance, finance, organisational development, education, infrastructure, and patient care.

There is a broad range of theoretical views on the decision making process. A fundamental differentiation between the theories of decision making is the rational/normative difference. Rational models view decision making as an orderly, linear process where all information relevant to a decision is gathered, systematically considered, and the best option selected based on a common singular goal (Betsch, 2012; Basel, 2013). Naturalistic decision making is a non-linear process characterised by time pressures, uncertainty, ill-defined goals, and, focuses on using experience and expertise rather than utilising research based information (Vera, 2014; Hardman, 2009)

Observations and research indicate that individuals are seldom free from influences and biases, are information illiterate and incapable of accurately analysing information (Fox,

2005; Gigerenzer and Gaissmaier, 2011; Johnson *et al*, 2013; Hardman, 2009). There is a growing body of research which shows the rational view to be based on an unrealistic view of decision making and that healthcare managers decisions in real world settings follow a naturalistic decision making approach (Berryman, 2008). The concept of EIDM assumes a high degree of individual rationality on the part of the decision makers (Hanney *et al*, 2002; Hunink *et al*, 2014) and critics of EIDM state that it is a flawed approach as it rests too much on the rational view of decision making (Black, 2001; Reay, 2009; Morrell and Learmonth, 2015). This is a valid criticism. However the same criticism has been made against EBP in the medical disciplines, yet despite this EBP continues to be a successful and prominent underlying model of decision making taken in medicine (Brown, 2015; Friesen-Storms *et al,* 2015; Spruce, 2015).

2.3.1 Decision Making: Cognitive Information Processing

Decision making is a cognitive process and as such it is important to understand the cognitive aspects of how people make decisions and how information influences this process. While many forces influence information use and decision making, research has identified cognitive information processing as a key factor. (Simon *et al*, 2004; Hardman, 2008; Dewberry *et al*, 2013).

A basic model of cognitive information processing that is well recognised was proposed by Wyer and Srull (1996) (Figure 2.2). This model highlights the various internal cognitive processes and stages influencing how individuals process and comprehend information.
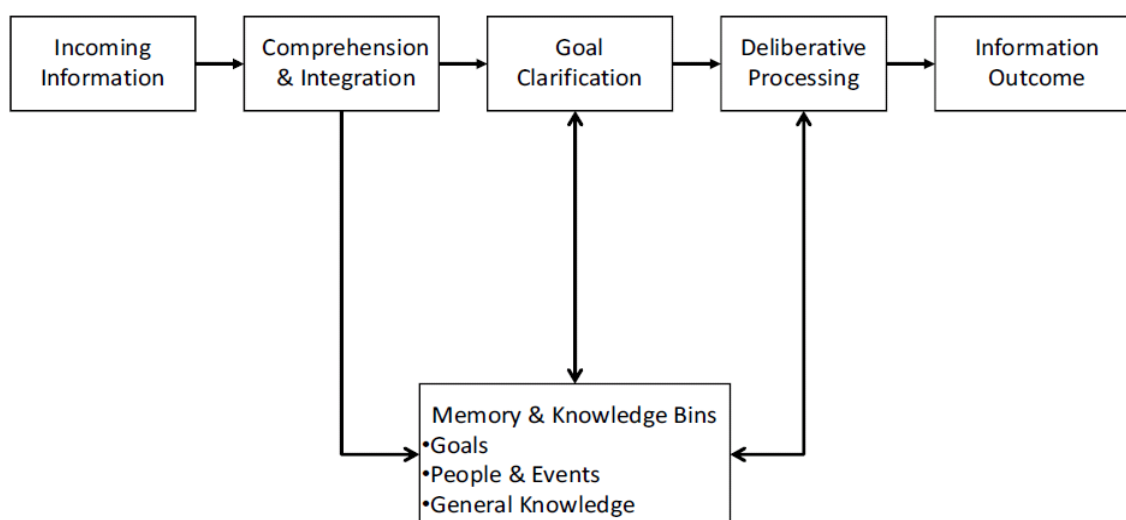
Figure 2.2- Wyer and Srull (1996) model of information processing.

This model illustrates that information interpretation is not a simplistic linear process of becoming aware of information and then applying it to a rational objective. The comprehension of information is subjective, complex, and influenced by previous experiences, personal goals and general knowledge of a subject. In effect different individuals will interpret the same piece of information in different ways and may reach different outcomes due to their prior knowledge and experiences.

Within this model, consideration needs to be given to the prominent theory of dual thinking (Stanovich, 1999; Evans & Stanovich 2013). Dual thinking theory proposes distinct cognitive mechanisms underlying implicit and explicit thinking. These are often referred to as 'System 1' thinking (implicit) and 'System 2' thinking (explicit). Implicit thinking is characterised by quick automatic processing which tends to rely on previous experiences and beliefs. Explicit thinking is characterised by slower logical, reasoned processes which tend to rely on sequential working memory. These two thinking systems are mirrored in the rational/naturalistic decision making approaches.

There is an assumption that decision makers will have the required knowledge and cognitive ability to process and understand research-based evidence (Kothari and Wathen, 2013). However, managers tend to be naturalistic rather than rational in their approach and a body of research shows that they may not engage with information in a rational or unbiased fashion (Neth and Gigerenzer,2015, Nemeth, 2011; Mishra, 2015).

One of the factors which facilitates reliance on System 1 implicit /naturalistic thinking is limited availability of time in which to make decisions. Decision makers have finite resources or time to devote to gathering and analysing information. This time limitation causes individuals to employ heuristics. Heuristics create a response based on representations from previous experiences rather than a judgment based on the evidence of the current situation (Hardman, 2009; Glöckner and Hochman 2011). Information behaviour is highly influenced by heuristics and information use is often biased in important regards. For example: Individuals pay more attention to information that is easily available (availability bias), information that supports an already established point of view (the confirmation bias); and information that is encountered early in the process has a greater influence than subsequent information (anchoring bias). There is a multitude of potential different heuristics identified in the literature (Hardman,2009; Shah & Oppenheimer, 2008); and while they are often useful and allow decision makers to operate in suboptimal and pressurised environments, they also lead to some significant biases and failures in complex decision making. The specific

cognitive biases and heuristics that are commonly employed by NHS non-clinical management staff are not well understood or documented. This research study examined the information behaviour and decision making behaviour of this cohort to identify the heuristics and cognitive bias which influenced information behaviour and affect how information is used.

Loss aversion and framing are good examples of cognitive bias which have been shown to have a considerable effect on healthcare decision making (Lehrer, 2009; Wang *et al* 2012; Perneger & Agoritsas, 2011). How a problem is framed and documented, and the way information is presented, may have a significant effect on decision processes and outcomes. For example, twice as many patients opt for surgery when told there is an 80% chance of survival in comparison with patients who are told they have a 20% chance of death (Marteau, 1989). Evidence on human risk preferences suggests that individuals are risk averse when considering potential gains, but will often take significant risks to avoid losses. The NHS as an organisation is, rightly, risk averse, but this may be creating a barrier to research use as there is a desire to maintain the status quo and an aversion to implementing anything new or radically different (Department of Health, 2014). This framing and loss aversion also illustrates that the way in which information is framed and presented may have an impact on the decision process that is independent of the information content.

An important decision making behaviour commonly shown by managers is satisficing (MacDonald, 2011; Schwartz and Ben Haim, 2011). Satisficing is a heuristic that occurs when decision makers choose the first alternative that satisfies their minimum requirements, rather than continuing to search for information that may provide an optimal solution (Berryman, 2008; Davies & Nutley, 2000; Caplin *et al*, 2011). This indicates that information which is most easily accessed has a greater chance of influencing the decision outcome. Satisficing leads to a self-limiting and an incomplete view of available information and knowledge. The search for information is carried out only until the first viable solution presents. This is not systematic and could lead to suboptimal decisions based on inferior and incomplete information and knowledge.

Mental models provide a context for the interpretation of objects and events; they not only organise existing information but influence the acquisition of new knowledge (Johnson-Laird, 1983; Van Dijk, 2014) They act as a source of previous personal experience and tend to guide decision making in healthcare environments (Walshe and Rundall, 2001). The key implication for information use is that each individual has the potential to interpret that information differently relative to their previous experiences. What might be an acceptable

and useful document for one person may be dismissed as inappropriate by another. This could be influenced by that person's current knowledge of a topic, or their personal goals at that specific moment. An important aspect of mental model theory is the singularity principle (Hardman, 2009), which states that people can only consider a single hypothetical possibility at one time. This is specifically relevant to information use as individuals will adopt a single hypothesis which is consistent with the initial information presented to them. From an information science perspective this manifests itself in behaviour where only those sources that confirm the original viewpoint are accepted as true and conflicting information is disregarded or ignored. This is known as confirmation bias (Klayman, 1995; Montibeller and Winterfeldt, 2015). Confirmation bias occurs regularly with regard to information use in decision making. Individuals seek information that tends to confirm rather than refute their initial judgment (Hammond *et al*, 2006; Witte and Davis, 2014; Gulati, 2013).

From an information behaviour perspective these heuristics and cognitive biases are highly relevant. They indicate some of the ways in which information is translated into knowledge by the recipients of information and also suggest why some information is not accessed or incorporated into decision making processes. Not only is it important to understand where and how decision makers access information, but also to understand how the specific method and mechanism through which information is discovered may alter how it is received and processed.

There is a large body of work which details heuristics in some detail; however there is no current research which has identified to what extent these potential biases are encountered in the cohort under investigation in this study, or which of the many heuristics and biases are most prominent and common in the cohort. This thesis increases the understanding of the specific cognitive biases which are prevalent among senior non-clinical managers working in the NHS in England.

2.4 Evidence, Evidence-Based Practice & Evidence Informed Decision Making

The concept of what constitutes 'evidence' is subjective (Koufogiannakis, 2011). Individual professions and cultures will define the concept of evidence in different ways. For example, the legal profession has a very different interpretation of evidence from healthcare scientists. This thesis is primarily concerned with evidence that has been produced through a process of scientific investigation. This usually takes the form of published journal articles or government reports. There are four important points to consider when referring to evidence:

1. Each individual always defines their own meaning and interpretation of 'evidence'.

2. Evidence is dependent upon context. The situation, culture and environment that information is applied to will influence what is seen as 'evidence'

3. Evidence may be conflicting and contradictory. Evidence is not didactic in nature. It can be open to interpretation, may have unclear conclusions, and may present conflicting recommendations.

4. Evidence is fluid. What is considered evidence today may not be valid tomorrow because context changes, sciences progresses, changes to the environment, and new ideas and theories are being formed.

2.4.1 Evidence-Based Practice

Evidence-Based Practice (EBP) aims to ensure that current research is included in the healthcare decision making process. The objective of an evidence-based approach to decision making is to ensure that quality is improved, and effectiveness increased through application of high quality research based evidence (Gray, 2008).

The idea of using research findings to guide practice is not a new concept (Grahame-Smith, 1995), but during the early 1990s there was a shift in attitudes and evidence-based practice became established as the dominant paradigm across health care. EBP is a philosophy that is, as McKenna *et al* (2004) suggested, '*one of the most important underlying principles in modern health care'*.

There are several models for evidence-based practice. While there is some subtle variation between these there is broad consensus that there are five distinct steps to the process (Dawes, *et al* 2005; Straus, *et al* 2010; Hoffman *et al*, 2013):

1. Construct an answerable question.
2. Identify the evidence to answer the question. (This should be done in a systematic way which is free from bias.)
3. Critically appraise the evidence to assess its validity, impact, and applicability in relation to the initial question.
4. Integrate the evidence with clinical expertise and patient preferences to identify an optimal course of action.
5. Evaluate the impact and effect of those actions.

Two key points to this approach should be highlighted. Firstly, a systematic approach to information gathering should take place. This ensures that all valid research and other information/knowledge is taken into account during the decision making process. Secondly, the information does not have equal weight. Through critical analysis of the research and information the decision maker identifies the information which is most robust, appropriate for their needs and likely to provide the largest effect.

While there has been a significant amount of current healthcare that is evidence-based (Greenhalgh, 2014) there is still a minority of healthcare professionals who have not adopted EBP (Lilienfield *et al*, 2013). The critics of evidence-based practice identify two main limitations. Firstly, criticism of the existing evidence, i.e. that there is a shortage of high quality coherent scientific evidence and that there are difficulties in applying the evidence to individual patient's care. The critics propose that if the evidence is absent or of poor quality then the evidence-based approach cannot be applied.

The second group of criticisms include accusations that evidence-based practice is so focused on the research evidence it devalues the tacit knowledge that comes from clinical expertise. Many of these criticisms are based on misrepresentations of EBP (Mullen & Streiner 2005). The five steps previously stated explicitly highlight the need for patient values and clinical expertise to be integrated into the process.

2.4.2 Evidence Informed Decision Making (EIDM) and Healthcare Management Staff

Given the success of EBP it is not surprising to find that the principles of evidence informed practice have spread out-with the clinical arena and been adapted to several other disciplines. One prominent branch of this is evidence-based management (EBM) and evidence informed decision making (EIDM).

There is no single, definitive definition of EIDM and differentiation between EBP, EBM, and EIDM is largely a semantic one (Woodbury & Kuhnke, 2014; Rousseau, 2012), the choice of which term is used generally depends on whether the principles are applied in a clinical setting (EBP) or in a managerial/administrative setting (EIDM). Both concepts promote decision making that is informed by the best available evidence combined with stakeholder preferences and personal expertise. Some individuals have differentiated between the two terms by stating that EIDM implies a broader definition of evidence (Nevo & Slonim, 2011) but this is not a universal definition.

One prominent definition of EBM comes from Rousseau (2012) who states: '*Evidence-based management is the systematic, evidence informed practice of management, incorporating scientific knowledge in the context and process of making decisions*'. The focus of this research is on the information behaviour of senior NHS managers, specifically their engagement in EIDM and Rousseaus (2012) definition will be adopted when referring to EBM, EIDM and EBP in the context of this study.

There is an underlying drive to adopt evidence-based decision making in healthcare management due to such factors as cost considerations and the need to ensure appropriate usage of resources (Nutley *et al*, 2007; Ham and Murray, 2015). However, evidence indicates that EIDM has not been universally adopted. Rousseau (2012) for example states: "*Great disappointment has been that research findings don't appear to have transferred well to the workplace. Instead of a scientific understanding of human behaviour and organisations, managers, including those with MBAs, continue to rely largely on personal experience, to the exclusion of more systematic knowledge*"

In particular, staff from non-medical backgrounds have often failed to embrace evidence informed practices and evidence shows that contemporary managers make limited use of the research that is available to them (Rousseau, 2012; Pfeffer & Sutton, 2006; Arndt, 2009; Ross 2015; Aron 2015). Decisions are often made without consulting the current relevant research evidence and EIDM it is not common practice (Innvaer *et al*, 2002; Francis-Smythe, 2013; Oxman, 2007). For example, an analysis of English public health policy carried out by

Katikireddi *et al*. (2011) concluded that while some policies were evidence-informed, the majority of public health decisions lacked a robust evidence base which could demonstrate effectiveness, and Staus *et al*. (2009) concluded that "*Failure to use research to inform decision making is apparent across all key decision-making groups, including health care providers, managers, and policy-makers*"

While the concept of EIDM has largely been accepted as a valid and useful basis on which to base decision making there are some who question its validity and impact. For example, Arndt and Bigelow (2009) state that there is little empirical evidence that EIDM actually improves practice or outcomes. This criticism is valid and during the review of the literature there was a dearth of high quality, methodologically sound research or evaluation to provide evidence of the effectiveness of EIDM.

Similar to the criticism of EBP, EIDM has also been criticised for assuming that decisions are solely determined by the research evidence (Aron, 2015; Head, 2010; Clarence, 2002). While this viewpoint can be sympathised with, it is largely a misperception of what has been advocated. Indeed this is one of the reasons for referring to the nomenclature of using evidence-*informed* rather than evidence-*based* Decision Making. There are many factors that influence decision makers (McCaughey & Bruning, 2010; Morrell, 2008; Rousseau, 2012) with evidence forming just one component of the influences leading to the final decision. What is unclear is which factors are prominent in influencing decision making and to what extent does evidence feature in the decision making process.

2.5 Context

Decision makers do not work in isolation and are subject to working within social and organisational rules. Lewin's (1951) equation is still true today (The Health Foundation, 2014; King and Lawley, 2016): *B=f (P,E)* – Behaviour is a function of the person *and* the environment.

It is essential to consider the impact of specific environmental factors on the decision making process and practices. When people assume organisational positions their goals and values adapt to be more in line with their organisational responsibility and the culture of the workplace. This inevitably leads to various contextual and organisational factors having an influence in the decision making process. In a large organisation, such as the NHS in England, there are three prominent manifestations of this contextual influence (Bhakoo, 2013; Klocker *et al*, 2015; Currie, 2006) :

1. **Coercive pressures** come from social sanctions that ensure decisions are made in a culturally acceptable way. Legislation is one source of coercive pressure, as is the knowledge that financial reward or increased status will result from decision outcomes that fit the accepted ways of doing things within a specific workplace. An example of this in the NHS is the various performance targets set by central government.

2. **Mimetic pressures** come from the pressure to imitate what others do. One way of dealing with complex decisions is to copy others. Mimetic pressure often manifests as a tendency to follow current trends which are prominent at the immediate point in time, or to adopt unproven practices simply because several other NHS organisations are implementing them.

3. **Normative pressures** these concern values and culture. Some workplaces make explicit attempts to foster specific organisational cultures (for example the NHS constitution sets forth the standards of care it expects its employees to adopt). Normative pressures may also come from sources external to the organisation, such as a particular professional or religious affiliation.

A wide range of environmental factors has been identified in the literature as having an impact on the decision making process. These include economic factors (Williams, 2008; Bazzoli *et al* 2007), political regulation (Shepard & Rudd, 2013), and the amount of resource made available to decision makers (Berta, *et al*, 2010).

2.6 Barriers to Research Utilisation and Evidence Use

The barriers to research use in decision making are well documented in the clinical disciplines. Commonly encountered barriers include limited time to read research, poor information literacy skills, the low priority of research use in relation to other pressures, that research is of little value at either an organisational or individual level, and that other sources of information have greater influence (Bowen, 2009; Orton *et al*, 2011). In addition to these, limited support among colleagues, organisational resistance to change and personal lack of interest have been highlighted as potential barriers (Salbach *et al*, 2007; Pearson *et al*, 2005; Craig & Smith, 2011; Dobbins et.al. 2007).

A key influence in the use of research based evidence is that the evidence is just one source of information. It must compete with all other types of information a decision-maker may consider relevant, such as common sense, personal beliefs, previous experience, marketing campaigns from other organisations and businesses, social networks and expert opinions (Atkins *et al*, 2005; Kajermo *et al* 2009; Oliver *et al*, 2015).

When looking at non-clinical roles, the majority of research has been carried out on civil servants such as policy-makers. We can imply from these findings that non-clinical managers working within the NHS will encounter many of the same barriers to evidence use. However there is a paucity of research about non-clinical managers and it is difficult to know what the key barriers are or to quantify the impact or importance of each.

One of the differences between clinical and non-clinical management adoption of evidence-based principles is culture (Walshe, 2009). Evidence-based practice is a core topic on most clinical educational programmes and the scientific process and research are highly valued. Managerial staff, in contrast, do not have the same professionalised training programme and lack a standardised body of formal professional knowledge. While evidence-based management and research methods are taught to students of management there is not the same value and consistency given to evidence-based approaches. One example of these differences is in on-going research activities; there is an expectation that clinical staff will publish research throughout their career and ensure their practices remain based on current best evidence. Indeed the primary function of organisations such as NICE[1] (2014) and SIGN[2] (2014) is to ensure that clinical staff have access to current best evidence. In contrast there are few senior managers in the NHS who carry out research in the way that is routine for many senior clinicians, and there is no government funded organisation which provides evidence-based guidelines and evidence to managerial staff in the way that NICE and SIGN do for clinical staff. This cultural difference results in different understanding of what research is. Walshe (2009) states "*Clinicians and managers come from different research traditions which might broadly be characterised as biomedical sciences versus social sciences, and this affects the way they engage with and use research*". Given that much healthcare research is biomedical and experimental in nature (such as randomised control trials, quantitative data from longitudinal cohort studies, etc.) there may be a limited skills or familiarity among managers with this type of research. There may also be a preference

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[1] The National Institute for Health and Care Excellence (NICE) provides national evidence-based guidance and advice to improve health and social care in England.
[2] The Scottish Intercollegiate Guidelines Network (SIGN) develops evidence based clinical practice guidelines for the National Health Service (NHS) in Scotland.

among managers for research based on the social sciences approaches (such as observational data, qualitative interviews, surveys, etc.).

2.6.1 Defining Research Use

There is little consensus on what research 'use' refers to in the context of decision making. There is general agreement that there are three main overarching types of evidence utilisation: (1) instrumental use, (2) conceptual use, and (3) symbolic use (Newman *et al*, 2014, Zardo, 2015). As described by Beyer (1997), *instrumental use* involves applying research results in specific and direct ways; *conceptual use* involves using research results for general enlightenment; and *symbolic use* involves using research results to legitimatise and sustain predetermined positions. These overarching types of research use are not exclusive and may occur simultaneously or at different times by the same individual (Amara *et al*, 2004; Newman *et al*, 2015).

The impact of research evidence is thought, generally, to be indirect and incremental and social science research is more often used conceptually than instrumentally (Amara *et al*, 2004; Newman *et al*, 2015). In this process, research use manifests as a gradual shift in mental models over time, giving decision-makers "*a background of ideas, concepts and information that increase their understanding*" (Weiss, 1995).

Weiss (1979) described seven types of research utilisation in policy-making. These types have subsequently been widely used and adapted by others (Hanney *et al*, 2003; Mitton, 2007; Liverani, 2013):

1. **The knowledge-driven model** follows a linear sequence of events from research publication to application and action, where the sheer fact that knowledge exists results in its adoption and use.

2. **The problem-solving model** involves the direct application of the results of a study to an outstanding decision. The process is linear and begins with the definition of the problem by an individual who then accesses relevant research to identify and assess potential solutions, the results are then interpreted in the decision context, and a choice is made.

3. **The interactive model** is a disorderly set of interconnections. Research is just one source of information among many, in a complicated process that also uses experience, political pressure, social influences and individual judgment.

4. **The enlightenment model** states that the influence of research is indirect and tacit rather than having an explicit and direct impact. This model indicates that the influence of research happens over a lengthy timeframe and is not consigned to a single linear instance.

5. **The political model applies research** as political ammunition, to support a predetermined position or neutralise opponents.

6. **The tactical model** sees research used as a tactic when there is pressure for action to be taken. It may be used as a delay tactic or to avoid responsibility for unpopular decision outcomes.

7. **Research as part of the intellectual enterprise of the society** is when research production and the decision interact, influencing each other and being influenced by the larger fashions of social thought.

Understanding the motivation behind the engagement with evidence sources, and the way(s) in which evidence is pragmatically used, will allow informed development of interventions to encourage and facilitate further engagement and use of research and knowledge products.

Clearly, achieving a culture of evidence informed decision making is not only about making research and evidence available and accessible. There is also a need to understand how and why research is applied in practice. While some of these uses of research may appear to be a corruption or unethical it is not possible to validate or evaluate this without contextual knowledge of the research use. One approach to facilitating and managing the optimal utilisation of research is through knowledge management. Knowledge management is frequently used as an organisational component used to support evidence use in healthcare organisations (Fahey and Burbridge, 2008; Kothari *et al* ,2011). The World Health Organisation (2005) recommends that knowledge management is '*used to help bridge the "know-do gap" in global health by fostering an environment that encourages the creation, sharing, and effective application of knowledge to improve health*.'

2.7 Knowledge Management

The importance of knowledge and information for organisational level decision making is rarely questioned and there is a large body of research around knowledge management and its use. Knowledge management is regarded as collection, distribution and efficient use of knowledge resources. It is a systematic process of coordinating organisation wide activities; acquiring, creating, storing, sharing, disseminating and translating knowledge to individuals and groups, in pursuit of organisational goals (Saeed, 2010).

Current approaches to knowledge management acknowledge that information is plentiful and that 'information overload' is now a common issue for decision makers. The resource that is in short supply now is managerial engagement and time, and the objective is to identify the key information and knowledge needed by a specific individual for a specific decision. O'Dell and Grayson (2012) succinctly define Knowledge Management as "*a conscious strategy for moving the right knowledge to the right people at the right time to assist sharing and enabling the information to be translated into action to improve the organisational performance*".

2.7.1 Knowledge Management in the Healthcare Sector

Knowledge is not easily transferred to others. It relies on individuals to interpret concepts and reconstruct information to fit their personal understanding. Within the literature one of the prominent themes was the highly fragmented and distributed nature of healthcare knowledge and the need for collaboration across organisation and professional groups (Ferlie *et al*, 2012; Sheffield, 2008). Nicolini *et al* (2008) carried out a review of knowledge management practices within the healthcare sector. The review concluded that "*information is held in a number of locations, managed by a variety of people and agencies, and stored in every imaginable format*". Clearly, this creates barriers to utilising the data and quick easy access to the relevant body of knowledge and information within healthcare is not a straightforward task. The role of knowledge management here is to manage and coordinate the disparate data that exists into accessible and relevant information and knowledge which NHS staff can easily utilise.

The healthcare sector is particularly challenged by the volume of information and research being produced. As an illustration of the volume of information created in the biomedical sector the PubMed (U.S. Library for Medicine, 2014) database held 20,695,240 separate citations at the end of 2013, with approximately 730,000 additional citations being added annually.

2.7.2 Knowledge Translation

It is increasingly being recognised that simply improving the availability and access to the research evidence base is not sufficient to ensure changes. Explicit and active mechanisms are required to ensure that research has a real impact on workplace practices. Knowledge Translation is seen as one solution to the underutilisation of research (Davies *et al.*, 2003; Lockett *et al*, 2014; South, 2014)

Many terms have been used to describe the process of implementing research findings in the workplace. Terms such as diffusion, research use, research utilisation, and knowledge transfer are used to describe the same concept. The underlying concept in all of these terms is a desire to move beyond simple *dissemination* of knowledge towards actual *use* of knowledge. For the purposes of this thesis the term knowledge translation (KT) will be used to indicate any action or intervention which leads to the effective use of research based knowledge.

Research relating to KT has produced a multitude of theoretical models and frameworks (Straus *et al* , 2011; Straus *et al*, 2013; Mitton *et al.*, 2007). This diversity in approaches has been criticised and there is a lack of consensus to indicate which of the many approaches to KT delivers optimal results. The quality of the research is highly variable and the current literature base lacks robust specific evidence of effectiveness (Nutley *et al*, 2003, Estabrooks *et al*, 2006; Graham *et al*, 2006; Conklin *et al,* 2008; McKibbon, 2010; Greenhalgh & Wieringa, 2011, Pentland, 2011). Perrier *et.al* (2011) concluded there was limited empirical data and a weak evidence base available to guide practice.

There is some consensus that passive approaches to knowledge dissemination are ineffective and unlikely to result in behaviour change (Grimshaw *et al.*2012; Thomas, 2013; Gray *et al*, 2015). As Landry *et al* (2003) stated "*The mere reception of knowledge by the potential user does not imply its use*". Landry *et al* (2003) identified over 200 approaches to knowledge translation, and Similarly Nutley *et al* (2007) showed several distinct approaches under the umbrella term of KT. It is useful to look at the summary of mechanisms identified in the literature to illustrate the main approaches taken in KT initiatives. These approaches could be broadly fitted to seven categories of approach (Mitton *et al*, 2007):

> • *Dissemination*: Dissemination comprises interventions which involve presenting or circulating research findings in more tailored formats. This includes both written materials, such as summaries or guidelines, and oral presentations.

• *Education*: Education interventions include traditional lectures, to more interactive training sessions. The underlying mechanism is learning: increasing knowledge and understanding of research findings.

• *Social influence*: These mechanisms focus on using the influence of others, such as colleagues and role models, to promote research and to persuade others of its value.

• *Collaboration* (between researchers and users): These aim to enhance research impact by strengthening the links and joint-working between practitioners, policy makers and researchers. This includes direct commissioning of researchers by the end users of the product.

• I*ncentives:* These interventions provide some form of encouragement or reward to promote research use. Rewards may be financial, or may take the form of some other benefit such as an increase in professional status.

• *Reinforcement:* These interventions aim to encourage research use by presenting information about behaviours to individuals or groups, before, during or after an event. Audit and feedback are typical approaches in this category.

• *Facilitation*: These interventions provide support mechanisms to facilitate research utilisation. They provide support through financial, technical, or organisational resources to help implement research and develop evidence informed practice.

There are various stages of information behaviour during which a knowledge translation intervention may be applied. Again, there is a multitude of models indicating that one or several of these stages may be engaged but there is a lack of consensus at to when the best point for knowledge translation occurs. In their book Enterprise Knowledge Infrastructure Maier *et al* (2009) provide a framework based on a large empirical study to assist knowledge managers. This identifies five distinct points at which a knowledge translation intervention may be implemented. This is a useful framework as it identifies relevant cognitive motivations that are associated with the individual knowledge stages. The model (Figure 2.3) also complements and reflects the model of information behaviour by Wilson which was discussed in section 2.21 of this thesis.
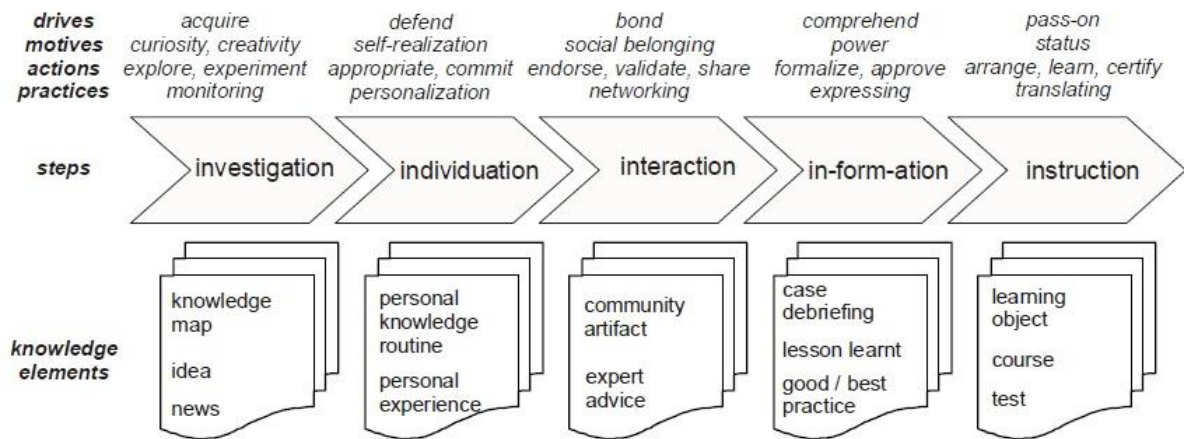
Figure 2.3 – Maier et al (2009): Knowledge Maturing Model

The Knowledge Maturing Model (Figure 2.3) illustrates that there are various points during the process of acquiring new knowledge where an intervention could be targeted. For example, tailoring an evidence synopsis to match the personal knowledge and experience of an individual at the individuation phase may help to encourage the uptake and use of that evidence; a critical appraisal workshop applied at the instruction phase could increase future engagement with research evidence. However, there is criticism that while the existing models reflect the core characteristics of knowledge translation, they are based on linear frameworks which fail to incorporate the full impact of contextual variables or the complexity of contemporary health services decision making (Kitson, 2009). There is also a lack of empirical research to provide evidence of validity in these models and frameworks. One of the key outcomes from this thesis is to identify where the theoretical models can have practical pragmatic uses and to provide robust evidence for the effectiveness of knowledge translation interventions through implementing and evaluating some of these concepts in the workplace environment.

2.8 Summary of Literature Review

This review established that evidence-based practices may be applied to produce optimal outcomes from decision making. However, while senior managers agree with the principle of evidence informed practice there is considerable evidence to indicate that they do not routinely engage with the research that is available to them. The literature establishes several possible factors which may be responsible for this limited engagement. However the literature does not establish to what extent these factors contribute to the lack of evidence

informed decision making within this cohort, or how these factors interact with each other. It is possible that inadequate levels of information literacy in the workforce, the information behaviour of individuals, cognitive bias and heuristics, suboptimal decision making processes, personal motivation, characteristics of the research, or elements of the workplace environment are all factors which inhibit utilisation of research based evidence. However, evidence is required to establish the magnitude or impact of these influences and other factors, particularly with regard to the non-clinical NHS managers represented in this study.

In addition this literature review has shown there to be a multitude of possible approaches to knowledge translation and increasing the use of research in decision making, but that there is no clarity on which approach produces optimal results, or which approach is best suited to the context of the NHS.

This review has established that there was little evidence of widespread adoption of EIDM within the non-medical NHS management workforce at the time of this study, and there is insufficient evidence which details the information behaviour of this group. Indeed this is shown in a review of management texts found in English healthcare organisations (Ferlie *et al*, 2015) which detected few evidence-based management texts among the literature that were made available to managers. The reasons for this limited adoption are unclear and the complexity of decision making within the NHS means that a multitude of possible and potential barriers may exist for non-clinical managers.

The importance of context and specific knowledge of the cohort points to the importance of developing a bottom up, inductive understanding of these processes.

2.8.1 Key Research Questions

There is a clear need to have a more detailed understanding of the information behaviours and decision making processes employed by non-clinical senior NHS managers. There is also a need for greater understanding of context and what unique factors and influences on decision making and research utilisation are associated with working in the NHS environment.

The evidence of effective knowledge translation strategies is broad and lacks a unified or prominent single model. There is limited empirical evidence which provides evidence of the effects of the various KT mechanisms, particularly in defined contexts.

This study addressed this knowledge gap and increases what is known about the decision making practices and information behaviours of non-clinical senior NHS managers.

Pentland *et al* (2011) recommended that a key area for on-going research should investigate the efficacy of knowledge translation methods within specific professions in specific contexts. This research follows that recommendation and has focused on a specific workplace professional cohort which has been largely absent from the knowledge translation literature (Bowen, 2009).

Previous research in the healthcare sector has primarily focused on either clinical staff who deliver medical/therapeutic interventions or civil servants who produce national policy. There was an absence of research which had explicitly involved senior managers and other decision makers who did not fit into either of these categories. This research advances the current evidence base by providing a greater understanding of how this cohort makes decisions with a specific focus on their information behaviour.

The following chapter of this thesis sets out the details of the methodology and methods used in the research.

Chapter 3: Research Methodology and Methods

The review of the literature has shown that there is a paucity of research which investigates evidence informed decision making by non-clinical NHS managers, and primary research is required to fully understand this area. Primary research was required to establish the information behaviour and decision making practices of this cohort, and investigate appropriate knowledge translation mechanisms to increase research utilisation and evidence informed decision making.

This chapter details the methodological approach adopted for this research. The choice of specific methods and the manner in which they were implemented are explained and justified. The chapter starts by presenting the conceptual and philosophical framework used in the research. It then provides details of the cohort recruited to the study, details and discusses the research methodology adopted and the methods utilised to gather and analyse data.

A case study methodology is applied and data was collected using multiple methods including interview, questionnaire and direct observation.

3.1 Research Design

The philosophical approach adopted in this research is from the constructivist tradition. It adopts the subjective epistemology that reality is socially constructed. Constructivism proposes that concepts exist in the mind of individuals and that individuals construct their own specific meaning and interpretation of the events and concepts. Because individuals can construct meaning in different ways even when encountering the same concept the role of the researcher in constructivist based research is to analyse, critique and interpret participants' views in a way that leads to meaningful outcomes and understanding of the concept under investigation (Saunders *et al*, 2009). The researcher aimed to understand individuals' beliefs, meaning and behaviours, trying to interpret these to reach a common consensus.

The methods employed in constructivist research can be broadly categorised as positivist, or interpretive (Myers, 2013). Positivism attempts to determine the validity of knowledge through empirical evidence. The aim of the positivist approach is to understand the research

topic by relying on known and observable facts (Densombe, 2014). This approach assumes that there is independence between observed actions and the social context in which they happen. While this approach may give a robust formal understanding of how decision makers function it was felt to be inadequate for interpreting and understanding tacit mechanisms and contextual influences on decision making.

A viable alternative to the positivist approach is the interpretative/phenomenological view (Schwartz-Shea, 2012). The aim of an interpretive approach is to focus more on understanding subjective experience and to understand the meaning behind actions in a social context through consideration of a person's unique point of view (Silverman, 2010). The perceived facts in the positivist observational method may take on an entirely new meaning from the perspectives of different individuals. The epistemological stance of an interpretative approach is that knowledge is formed through social constructions such as language and shared meanings. The focus of this approach is on sense-making through interpretation of complex situations (Tracy, 2012). In an interpretative stance it is advantageous if the researcher can interpret and understand the topic under investigation within the social context in which the phenomenon is constructed.

When deciding which methodological approach to take it is generally recommended that qualitative data sources are better suited to the interpretive approach (Ritchie, 2013). Quantitative measures are useful for estimating probabilities, indicating ratios and other aspects of statistical inference. Qualitative measures are more effective in describing experiences, particularly from the point of view of the cohort being studied. Qualitative data are appropriate for this thesis as they allow a greater understanding of the realities and experiences of senior decision makers within the NHS and allow some insight into the information behaviour, motivation and preferences of the cohort.

In addition to qualitative measures this study also utilised a structured questionnaire (section 3.4.3). This was carried out to establish the current baseline engagement of participants with research and to identify existing perceptions of barriers to research use. Quantitative data is more appropriate for establishing the probability of an existing hypothesis occurring. In this instance, research from clinical professions have identified possible barriers to engagement with research based evidence, and the structured questionnaire was used to identify the likelihood of these barriers being present within the study cohort. This quantitative approach is useful as it can indicate where barriers to research utilisation may be present, however this data cannot tell us why these barriers exist or suggest ways to minimise their impact, It is therefore useful to establish the current context and conditions within the cohort using

quantitative methods before beginning the more in-depth investigation of the phenomenon using qualitative methods.

Research is commonly categorised between inductive or deductive approaches. The deductive approach aims to test existing theory or hypothesis. Research starts with a theory and constructs the research to establish if the theory is true. The inductive approach aims to build new theory or insight: Research starts with a knowledge gap and the research is designed to gather data which informs and builds new insight on the topic. This thesis takes an inductive approach. There is currently a gap in knowledge. The way senior NHS managers engage with and use research based information is unclear. The research does not put forward an existing hypothesis about the information behaviour of this group and seeks to gather data which will enlighten and provide new insight to the topic.

3.2 Research Methodology: Case Study

The research methodology is the underpinning plan of action, process and design upon which the research is based. This study has taken an approach which is based on case study methodology. Case studies focus on instances of a particular phenomenon with a view to providing an in-depth account of events, relationships, experiences or processes. Yin (2015) defined case study as an "*empirical inquiry which investigates a contemporary phenomenon in depth and within its real-life context where the boundaries between phenomenon and context are not clearly evident*".

This definition is useful as it highlights the importance placed on 'real-life' experience, and the idea that a division between setting and phenomenon is difficult to draw; to research one without the other would be to produce only a partial account of what is happening.

A similar definition is offered by Robson (2011) who describes case study as 'a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence'. This definition highlights an additional aspect of case study methodology: The need for multiple sources of data to fully understand a phenomenon in depth (Gerrish, 2015).

Case study research is about treating the phenomenon being researched as a distinct entity and exploring it in the context in which it occurs. The "case" in case study is a phenomenon which is situated in a particular context and time, a thing that can be experienced. As Yin

(2015) stresses, the case is a 'naturally occurring' phenomenon. It exists prior to the research project and, continues to exist once the research has finished. The case may centre on an individual person, a group or community, an organisation or multiple groups that share a common feature such as experience of a certain event. (Stake, 2006; Yin, 2015). Case study research therefor offers an appropriate means of exploring a phenomenon in its context and assumes that the context is a significance component to understanding the phenomenon.

Case study research is concerned with practical day-to-day actions and experiences rather than abstracts or metaphysical notions (Nayar & Stanley, 2015). The focus on real-life action and experience of individuals in a specific context suggests the methodology is well suited for increasing knowledge about individual behaviours in the workplace and can make sense of the multiple and complex interactions between people, their behaviours, and their environments (Nayar & Stanley, 2015; Cutchin & Dickie, 2013).

To understand the information behaviour of individuals in the workplace it is necessary to understand many aspects and influences on the behaviour and how the various parts are linked. The case study approach works well in the NHS context because it offers the chance of going into sufficient detail to unravel the complexities of a given situation. '*It can deal with the case as a whole, in its entirety, and thus have some chance of being able to discover how the many parts affect one another*' (Denshome, 2010). In case studies there is a tendency to emphasise the relationships and social processes, rather than restrict attention to the outcomes from these. '*The real value of a case study is that it offers the opportunity to explain why certain outcomes might happen rather than just find out what those outcomes are.*' (Densholme, 2010).

Case studies may be used for a multitude of uses including discovery-led (descriptive exploration of what is occurring), theory-led (illustrates how a particular theory applies in a real-life setting), and experimental-led (tests new ideas in a specific setting or context) (Densholme, 2010; Merriam, 2015) research. This study has two distinct phases. The first takes a discovery-led approach to establish the current information behaviour and decision making processes occurring in the workplace. The second phase is theory-led, and applies current theory within the context of the case studies to illustrate its application to the workplace setting.

Within case study methodology, research questions perform an important role (Yin 2009). The research questions for this study arose from literature, and observations and experience from the NHS workplace which showed that decisions were not routinely based on the best available evidence. It is good practice when utilising a case study methodology to build on the research questions and draw on researcher experience and theoretical understandings to develop issue statements (Simons, 2009; Yin, 2015). Issue statements bring prior assumptions to the fore, suggest likely areas of concern, and provide a conceptual base on which the next stages of the study are built. Synthesis of the research literature influenced and refined the research question as gaps in current understanding and theoretical models were identified. The issue statement made in this study was: "Social, cultural, cognitive and organisational influences on information behaviour will be perceived by stakeholders to be either facilitators or barriers to engagement and use of relevant research findings during the decision making process"

The use of a case study approach assumes that the researcher is able to separate a distinct phenomenon that has clear boundaries and that it is distinct from other things. The phenomenon examined in this study was defined as complex decisions undertaken by a group of senior (Agenda for Change Grade 8 and above) non-clinical management staff employed by the NHS in England.

An additional variable in case studies is whether a sample should be homogenous or heterogeneous. A case study can gather data from a range of phenomena in order to broaden the understanding of difference, or select similar examples to increase the amount of data available over a narrower range. This choice is dependent on the study aims. In this study the context and phenomenon were narrowly defined and the decision was taken to focus data gathering on a homogenous series of cases to obtain an in depth understanding of a single phenomenon.

The logic behind concentrating efforts on a small number of cases rather than many is that insights and understanding can be gained from looking in depth at the individual cases that would not have come to light through the use of a research strategy that tried to cover a large number of instances such as using a survey approach. This strength in the case study approach however leads to the main difficulties of case study research as there is a risk of limited relevance and generalisability in the cases studied. There is a question about how the phenomenon observed in one case may have any relevance to other cases. However, a well-constructed case study will focus "not on the uniqueness of a special case but on what

can be taken away from it and cases are selected for this purpose. Analysis of case studies goes beyond the specific case to examine an underlying issue or research question (Gerrish, 2015).

To increase the generalisability of the results of this study the 'scenarios' studied were selected not only because they provided relevant sources of data on the phenomena, but also because they reflected typical and generic occurrences of the phenomenon. The case selection and data gathering methods are discussed in the sections 3.3 and 3.4.

3.3 Sampling & Study Cohort

The case study approach requires the researcher to decide from a range of examples of the phenomenon that is being investigated. The extent to which findings from the case study may be generalised to other examples of the phenomena depends on to what extent the case study example is similar to others of its type (Densholme, 2010). Therefore, it is important to make explicit the criteria used for the selection of cases. This involves identifying the key features of the case and providing relevant information so that the choice of cases can be shown as a suitable example of the broader category of the phenomena being studied and that generalisations can be validly made from the study findings.

All cases and participants were chosen on the basis of their relevance to the practical problems being researched. Selection was also based on achieving commonality which reflected a typical and commonplace decision making context throughout the NHS in England. Densholme (2010) states that '*faced with alternatives which are equally suitable, it is reasonable for the researcher to select the one which involves the least travel, the least expense and the least difficulty when it comes to gaining access*'. For logistical reasons the participants of this study were all recruited from multiple NHS trust within a single region of England. The case criteria which were used to select the participants were geographical location (Yorkshire), Organisation type (NHS in England), Level of Decision Making (Regularly making strategic decisions about complex issues), Organisational Role (Non-clinical, senior management), Decision type (complex healthcare related decision which benefits from utilisation of research literature and available evidence, decision made as part of a collaborative group activity), Context (NHS culture, Finite and restricted budget, timescale and resources).

Having established the case inclusion criteria, an initial email was sent to senior managers (Agenda for Change grade 8a and above) explaining the aims of the study, briefly describing the aims of the research, and specifying the estimated time commitments that would be expected of participants. From 82 potential participants 21 individuals responded with an expression of interest.

The researcher spoke to each of these individuals by telephone to explain the process and background in more detail, give details of ethical considerations and confidentiality, and answer any questions potential participants had. Of the 21 initial expressions of interest 15 individuals met the inclusion criteria (band 8a and above from a non-clinical background) and agreed to take part in the research.

As it would be difficult to record and observe larger groups effectively individuals were assigned into 2 separate cohorts. Random number tables were used to avoid any selection bias, and the two groups were similar in demographic. From the initial 15 participants three dropped out during the pilot study due to changes in job role following major restructuring of the NHS in England. One participant retired and two individuals were employed in new job roles which meant they could no longer commit the required time to the study.

The remaining 12 individuals formed two cohorts of six which were stratified to minimise any differences between groups. Details of the participants are given in Table 3.1. Some additional details such as job title/role were gathered but these are not included as there was a concern that individuals could be easily identified if this level of detail was included. The participants were recruited from a wide range of corporate organisational functions such as Human Resources, Information Technology, Business Development Finance, and executive functions such as Director and Executive level posts. All participants were performing senior roles within their organisation and responsiblity for complex decision making.

Participant number and cohort group.	Age	Highest level of Education	Length of time Employed in NHS	Gender	Ethnicity
1 (cohort 1)	51	Chartered Accountant	>10 years	Male	All participants were: White British
2 (cohort 1)	49	MSc (Health Service Management)	5 -10 Years	Female	
3 (cohort 1)	55	BSc (Industrial Relations & Personnel Management)	>10 Years	Male	
4 (cohort 1)	42	MBA	>10 Years	Male	
5 (cohort 1)	58	HND (Marketing)	>10 Years	Male	
16 (cohort 1)	47	MA (Management and Leadership)	5 -10 Years	Male	
7 (cohort 2)	50	BA (Healthcare Management)	5 -10 Years	Male	
8 (cohort 2)	49	MA (Medical Education)	>10 Years	Male	
9 (cohort 2)	52	Chartered Accountant	>10 Years	Male	
10 (cohort 2)	51	MBA	>10 Years	Male	
11 (cohort 2)	57	BA (Economics)	>10 Years	Male	
12 (cohort 2)	44	MA (Management and Leadership)	>2 Years	Male	

Table 3.1 – *Participant characteristics by cohort group*

There were two limitations with the recruitment. There was an insufficient number of female participants. Only one female participant was recruited (cohort 1). This reflects a wider NHS organisational structure which is predominantly male dominated in senior non-clinical management (Kings Fund, 2013). Similarly, the average age of participants reflects those in senior NHS positions (Kline, 2014). All participants were white UK nationals. This lack of ethnic diversity is also a reflection of the generic NHS structure and this predominance of the white male in senior NHS management is often referred to as the 'snowy white peaks' of the NHS (Kline, 2014).

3.4 Research Methods: Approaches to Data Gathering

Research methods are the techniques used to gather and analyse the data related to the research questions. Studies of information use in decision making most frequently use methods from the qualitative tradition: documentary analysis and in-depth interviews, often in combination (Hanney *et al*, 2003). Three main methods of enquiry are commonly used within the library and information science area; naturalistic observation, document analysis, and interviews. Both retrospective and prospective approaches are used and are valid, acceptable methods of research in this field (Hanney *et al*, 2003; Case, 2012).

When deciding upon the best approach for this research it is useful to appreciate that experienced decision makers tend to work using tacit knowledge. Much of expertise operates without conscious effort, and the processes used are not easily articulated (Crandall, *et al* 2006). It is therefore difficult for the experienced decision maker to explain how and what they are doing. Because of the often subconscious nature of tacit knowledge, document analysis is likely to reveal a narrow explicit view of research utilisation which fails to capture details of implicit influences. Similarly, interviews and questionnaires tend to identify explicit, demonstrable uses of research which participants can verbally express and communicate. This study collected both tacit and explicit data to investigate the information behaviour of participants. It therefore employed multiple approaches to data collection rather than rely solely on a single method.

3.4.1 Multiple sources of data and triangulation

In social research the term triangulation is used to refer to the observation of the research issue from multiple different points. This is most often achieved by means of applying different methodological approaches as a strategy for increasing validation (Flint, 2004). Triangulation can be achieved through several different approaches such as data collected at different times, data collected using different methodologies and methods, data collected from different cohorts, and data collected using different observers or interviewers, etc.

One of the strengths of the case study approach is that it allows the researcher to use a variety of sources, a variety of types of data and a variety of research methods as part of the investigation (Densholme, 2010). This use of multiple data sources provides depth of understanding and different perspectives about phenomena, and through triangulation also increases the validity of the study findings (Simons, 2009; Yin, 2015).

Data was gathered through three methods for this study: a standardised questionnaire was completed by all participants; scenario based group observations during which the participants were observed and events of interest recorded; and semi-structured interviews with study participants. By using this approach the study gathered data that is explicit (interview and questionnaire) and tacit (observation). Using these methods also allowed expression of group dynamics and individual thinking, and allowed comparison and triangulation between the data sets. The interview allowed individuals to express their views confidentially to the researcher and in a way that was not possible during the group observation. Data was also obtained from the participant reflection and feedback. This reflective feedback encouraged the participants to examine and comment on the process and outcomes/findings of the study. The reflective feedback allowed the opportunity to check the researcher's interpretation of meaning and events with those of the participants and validates findings where there is agreement on interpretation. Figure 3.4.1 illustrates the sequence of data collection
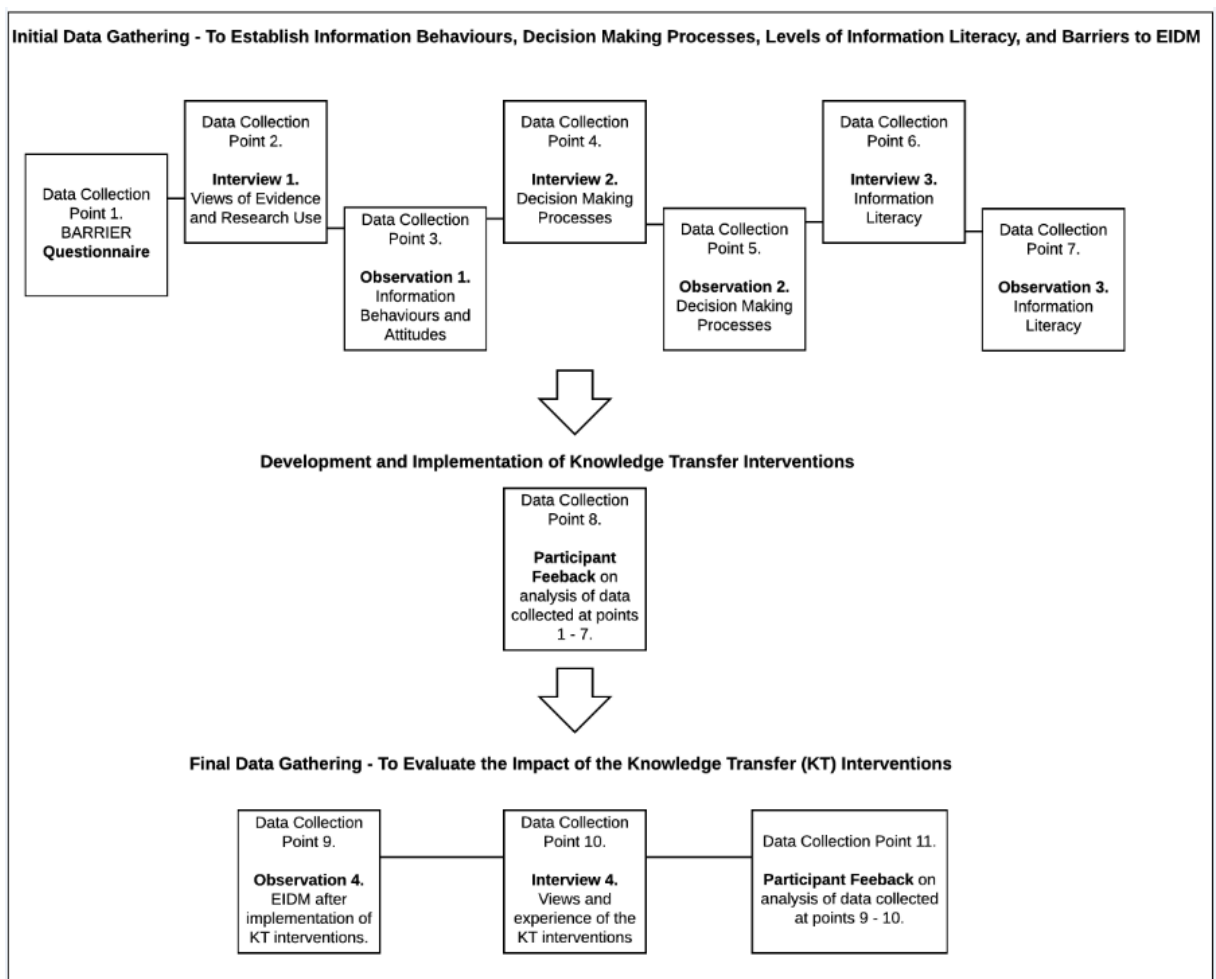
Figure 3.4.1 – Sequence of Data Collection

There is a wealth of literature (including Hastie & Sunstein, 2014; Thompson, 2014) which shows working methods may be influenced simply by being part of a group; such things as risk shift and social norming. The methods chosen allow comparison and contrast between the behaviours exhibited during group-based working and the individual views expressed during interview. The strength of triangulation is that each source used will contribute its own distinct interpretation of the phenomena which leads to more robust and complete conclusions (Denzin and Lincoln, 2011). When analysing the respondent narratives and actions it was equally important to interpret why information and research were *not* used as well as those incidences when research was used. It was also important to be alert to those aspects of the topic which were absent from the behaviour and narratives (such as a lack of explicit formal decision processes, or not mentioning relevant high profile information sources), as these may provide insight to the phenomena under investigation.

3.4.2 Critical Incident Reflective Diary

The use of critical incident diaries to collect details of where and when information had an impact on the decision process was considered as a method for data collection. However a short pilot study found that this method was difficult for the senior decision makers to complete. They felt that when a critical incident arose they were busy using the information and implementing actions; completing the diary was viewed as a low priority task at the time of an event and there was little time made available subsequently for completing entries. Often uses of information were not logged, and when entries were completed these were felt (by the participants) to be incomplete reflections that did not accurately record or represent their 'real world' use of research information. Senior decision makers did not feel engaged in data collection using the critical incidence methods and a decision was made not to pursue this in the study.

3.4.3 Baseline BARRIERS assessment

Initial data collection was carried out to establish the current baseline engagement of participants with research and to identify existing barriers to research use. A commonly recommended strategy for increasing research use is to identify barriers to research utilisation and then develop interventions to overcome the barriers (Wensing, 2010). The BARRIERS scale (Funk *et al.* 1991) is a questionnaire-based tool for identifying general

barriers to research use. While the BARRIERS scale does not offer any solutions to insufficient engagement with research it does have proven reliability and internal consistency, and has been used extensively to identify barriers to research use.

The BARRIERS questionnaire (see Appendix 5) assesses four factors which affect the integration of research evidence into practice: characteristics of the person, organisational factors, characteristics or the research itself, and communication factors. These are the same factors highlighted in Rogers's (2003) theory of innovation diffusion. The questionnaire was emailed to all participants, who were given two weeks to complete and return it. Respondents were given the option to reply by email or by post. Two weeks after the initial email a follow up reminder was sent to 5 participants who had not returned a completed questionnaire. All 12 participants completed the questionnaire and returned it within three weeks of receiving the original email.

Each question was given a score ranging from one to four as indicated on the questionnaire, with one indicating that the topic was not considered a barrier and four indicating it was considered a barrier to a great extent. Where a participant had indicated 'No Opinion' this was given a score of zero. Scores from all respondents were added together to give a combined score. Any result of 25 or greater was considered an area of concern that was likely to be a consistent barrier to research use. The results from the BARRIER questionnaire identified several prominent issues which the cohort identified as barriers. The results are discussed in in Chapter 4.

3.4.4 Semi-Structured Interview

In depth qualitative interviews are seen as the most appropriate method of data collection when investigating a concept with diverse layers and differing individual experiences (Mack, 2005). According to Rossi *et al* (2003) interviews are advantageous as they provide "*flexibility to tailor the line of discussion to the expertise of the individual, probe and explore issues in depth, and engage the informant in careful reflection*. This flexibility of the interview method is important as it allows the interviewer to be able to respond to emerging and new concepts which arise during the course of the interview and fully capture the views and experiences of participants.

When identifying questions for a qualitative interview it is essential to have a precise focus and scope. If a study tries to encompass experiences from too wide a set of contexts the

findings are likely to produce a collection of unrelated snapshots from which it is impossible to draw a conclusion (King & Horrocks, 2010). This study focused questions on the information behaviour aspect of NHS decision makers. This ensured that all interview questions were within a narrow scope and allowed in-depth data to be collected in a concise, focused manner.

The semi-structured question format (see Appendix 6 for details of interview schedule), while employing a framework of initial questions, does allow scope for new ideas to be introduced as the interview develops and allows a greater level or rapport and interaction between the interviewee and the researcher (Brinkmann, 2014). This approach was seen as appropriate as it allowed greater levels of depth to be gained from interview and allowed the researcher to adapt the interview in light of new information/answers. While being flexible the semi-structured approach allowed the researcher to focus the interview to the topics of interest and maintain a level of consistency across interviews. An unstructured interview approach was avoided as it risked producing a data set which contained disparate concepts which were too broad and unfocused in scope to allow clear conclusions to be deduced.

Three meetings were scheduled with each participant over a 6 month period. The analysis of data collected during these interviews informed the development of two KT interventions which aimed to address some of the barriers to EIDM experienced by the cohort. A fourth interview took place following the one month trial of these KT interventions. These interviews took place in the individuals' workplace, or other private location which was convenient and chosen by the participant. Each interview was scheduled to take place between the observed group work. Interview one took place after observation one but before observation two, interview two took place after observation two but before observation three, and interview three occurred after observation three had taken place. Interview topics focused on three broad themes: Views on research and evidence use, the decision making process, and information literacy. Boyce and Neale (2006) state that an interview schedule facilitates a degree of consistency between interviews and contributes to the validity of the qualitative research. The final version of the interview schedule, which is shown in appendix 6, was developed to address the study's research questions and objectives while allowing flexibility to explore respondents' views in depth. The researcher had knowledge from reviewing the literature which also informed the choice of questions. The researcher employed interview techniques recommended by Kvale and Brinkmann (2009) to achieve optimal value and responses from each interview. This included being empathic to the respondents' accounts by using non-verbal communication such as nodding, clarifying responses and prompting

respondents to elaborate when brief answers were provided. Individual interviews were recorded in mp3 audio format. The recordings were then transcribed and analysed (see section 3.7 for details of the analysis process).

All of the interviews were transcribed by the researcher within three days of the interview occurring. The interviews were transcribed verbatim. Non-verbal sounds and pauses/silences were transcribed in parentheses. Where a reference was made to specific individuals their name was replaced with an identifying label (for example M1) to facilitate anonymity. On completion the researcher checked all transcriptions against the original MP3 file to assess the accuracy of the transcription, and made subsequent revisions if required.

One consideration with data collected through interview is that it often reflects what individuals would like to be perceived as doing rather than what they actually do, sometimes referred to as social desirability bias(Nederhof, 2006; Bowling, 2014).

3.4.5 Observational Data Collection

To militate against and minimise the bias caused by a solely interview based method of data collection this study applied a mixed methods approach to data collection and used participant observation as well as interview methods. Participant observation allowed data to be gathered which provided insight to the workplace context and facilitated identification of more implicit uses of research within the decision making processes. A key benefit to participant observation is that it is believed to minimise the problems of social desirability and recall bias that are prevalent in other social science methodologies (Chung & Monroe, 2003, Hall, 2008; Gerrish, 2015). While the focus of the semi-structured interview is, to some extent, dictated by the researcher, group observation encourages the participants themselves to direct the focus and the importance of the various aspects of the process. Views may often be amplified, expanded upon, and reassessed in a short period of time when expressed as part of a group interactions (King & Horrocks, 2010) and observing these interactions can provide highly informative data to the researcher.

There are different approaches to observational data interpretation (Yoder, 2010; Hall, 2008) with some arguing that the externally observable action is all that can be truly captured. For this study it was argued that observed behaviour can be attributed to underlying drives and

social motivations. This fits with Wilson's model of information behaviour (section 2.2) which highlights the underlying social and cognitive influences which motivate information behaviour. Therefore this thesis goes beyond factual description of observed behaviour, and provides an interpretation of the underlying causes and motivations which result in the behaviour. It is only by understanding these tacit motivating factors that ways to alter the behaviour and actions can be formulated.

There are two distinct roles for the researcher in participant observation (Neale, 2008): 'inquiry from the outside' where the observer is detached and separate from the organisation, and 'inquiry from within' where the observer is embedded and involved in the organisation. In the latter approach there is an implicit indication that the observer will have prior knowledge which enables understanding of cultural references, practices, language and customs of the group being observed. This study was undertaken from an 'enquiry from within' viewpoint. The researcher has had experience working within various areas of the NHS in England since 2004 and had detailed knowledge of the organisational cultures and practices.

A potential criticism levelled at participant observation is that there may be an absence of objectivity (Bryman, 2015; Mitchell, 2012) due to the researcher lacking complete independence from the cohort or organisation being studied. In this study the cohort was recruited from several different NHS organisations. A decision was made not to recruit participants from the NHS organisation in which the researcher was employed. This was done to minimise this potential for bias.

Three meetings were scheduled over a 6 month period for each of the two cohorts to participate in the scenario work (giving six meetings in total). The meetings took place in a private room in a central public library. This offered a location that was neutral to all participants and provided them with anonymity as the meetings took place outside the workplace. The location was also near a main railway station and was easily accessible to all participants. The meeting room was isolated and away from the main public library area. This ensured privacy and ensured that confidentiality was in place for the participants. All meetings took place between 13:00 and 17:00 hours. The observation/scenario meetings lasted between two hours and four hours depending on how long it took to reach saturation point (the point when no new data was emerging from the group).

The observational data collection meetings used an ongoing scenario (Appendix 8) for details of the scenario). The scenario was based on a fictitious setting but closely reflected real working practice. It required the participants to make decisions relating to the introduction of telehealth services across the healthcare community. Increased use of

telehealth technologies was a topic which was appearing on the national agenda (Cruickshank, 2012) and was something that would typically fall within the participants job role. It was important to avoid areas where only those with highly specialised knowledge or experience would fully understand the topic and be able to contribute. This scenario was felt to be inclusive and allow the entire cohort to contribute to decision making. It also reflected a decision which could be encountered by the cohort, and in an area that would have involved participants from different areas of healthcare such as primary care, secondary care, local government, etc. Another reason for selecting this topic was that it was a new development which the decision makers would not have developed entrenched views about. The scenario topic was sent by email to the participants two weeks before the meeting.

Participants were instructed to conduct the meeting as if it was a regular event and behave in the same manner they would in any other decision making situation. The researcher took a non-participant/observer role and this was made explicit to the study cohort.

The focus of the observation was on aspects of the group interaction; information behaviour and decision making behaviour. In addition the three observational meetings focused on specific aspects of the research topic.

1. *Information Behaviour & Attitudes*– In what way was information being used? For example were any of the categories identified by Weiss (1979) prominent and what attitudes and information behaviours do individuals and groups exhibit? What information seeking took place during the decision making process etc. What did the cohort understand by 'evidence'?

2. *Impact of Transmission Format and the Decision Making Process on Use of Research* – Did framing and other psychological aspects of information presentation have any impact on the cohort? What sources, format and access methods were preferred? How were library and knowledge services viewed by the cohort? What was the decision making process and how did it affect evidence use?

3. *Information Literacy* – Could the cohort find and understand relevant research and information? Were common statistical methods understood; could the cohort identify and access the information they need to make informed/ evidence-based decisions

The researcher initially intended to provide the decision makers with no evidence or research during the observed scenario work as this may bias the participants and not give a true reflection of their normal information and decision making behaviours. However on reflection, there was a need to provide some limited research to enable dialog and to ensure that the decision makers had some basic shared understanding of the topic they were basing their decisions on. However, the information provided was minimal during the first two observation sessions with an expectation that decision makers would behave naturalistically and as they normally would in obtaining (or not obtaining) additional information and evidence to inform their decision.. On the third observation a single folder was supplied which contained a range of different information based on a Kings Fund (2010) reading list of Telehealth evidence. This included reports, primary research , commentary pieces and other forms of evidence and information. The Kings Fund was one of the sources mentioned by participants and was considered to be an appropriate and likely source of information that the decision makers would have access to. The cohorts were contacted by email two weeks before the third observed scenario session with a copy of the Kings Fund reading list. The researcher did not provide any additional instruction or information and participants were simply informed that a folder of information and evidence was available for them to use during the observed scenario. Supplying this folder of evidence increased the opportunity for the researcher to observe the decision makers behaviours and preferences regarding use of available evidence, and avoided the third observation session simply repeating what had occurred in the earlier observations. The reading list had direct links to several reports and research articles, some of which required NHS Athens authentication (which is available to all NHS staff in England) others were open access, and some required subscription.

To minimise any bias or influence the researcher did not give the participants any specific directions other than to supply the initial scenario information and objective (Appendix 8).

These observed scenarios were originally to be recorded on video and then transcribed. This was not done for three reasons. Firstly, the participants stated they had a preference for the meetings not to be recorded. It was felt that by removing the recording aspect to the observation that participants would be more natural and open in their behaviour. Secondly, as multiple participants were often acting simultaneously, transcribing and interpreting video is a time intensive activity and the researcher did not think the time was available to carry out a detailed analysis of the resulting video data. The third aspect was one of confidentiality. The only access the researcher had to facilities with video transcribing software was in a public access area of the local university, and files would have to be transferred and located

on portable USB memory sticks. It was felt that using this was a risk to data protection and data confidentiality.

All data was taken in note format during the event. The researcher was in the room during the discussions, taking notes as the discussion developed but did not interject or take part in the discussions. This was felt to be unobtrusive as it resembled the administrative minute taking role which the managers were used to having in their workplace settings. By adopting this 'low key' approach the decision makers were less conscious of the research element of the scenario and more naturalistic in their behaviours. This approach did not record the entirety of all actions and discussions, and practicalities resulted in the researcher only documenting those interactions and behaviours that were of particular interest to the study aims. To some extent, this required the researcher to carry out the first stage of data coding as the conversation was happening.

A risk to this approach is that the researcher may introduce confirmation bias and focus only on the elements of the observation which confirm preconceived expectations. To address this and minimise the bias the researcher used a thematic guide (Appendix 9) to standardise the approach taken. The guide was informed by the research aims and initial themes which developed from the interview data. This was used to prompt the researcher to record any phenomenon which occurred relating to the headings in the guide, and provided an initial coding structure which could later be refined and reflected upon as alternative themes emerged from the data. An advantage to this method of data collection was that the researcher could capture meaning and tacit behaviours as they were unfolding. This avoided an element of recall bias which may have occurred if audio or video recording had been used and interpreted later.

The analysis from each observed scenario meeting was also presented back to the cohort for comment. This gave the cohort an opportunity to highlight any additional information they felt had been missed or to comment if they felt the analysis did not reflect what had occurred, or did not match their interpretation of events. This was an additional dimension which ensured the integrity and validity of the data and findings.

Following the one month implementation period a final group observation took place to evaluate if there was any behavioural change or changes in information behaviour following introduction of the two interventions. This was carried out in the same location and used an

identical process as the previous observations. The only difference was that the embedded librarian attended the group scenario and was available to contribute to the decision making process. This reflected how the embedded librarian would work in practice, with the post holder attending meetings to provide information and provide support to the decision makers. At this point two individuals indicated that they no longer wished to take part in the study and withdrew (subject 1 and subject 11). Both stated their reason for withdrawal was due to work pressures which had restricted their engagement and interaction with the interventions. They both also confirmed that they wanted to be informed of any outcomes and findings of the research. Consent was given to the researcher for all data gathered up to this point to be used in the study.

3.4.6 Participant Feedback

The analysis resulting from the interview and observation data was presented back to participants in a group setting. This allowed participants to discuss the results and reflect and debate their accuracy. These participant feedback sessions took the form of informal group discussions with the researcher acting as facilitator. The content of these group discussions was led by the participants and discussion focused on the topics they identified as important. Justification for the use of group feedback was to provide triangulation as the additional data gathered during group feedback provided new information and insight about specific phenomena and experiences.

The findings from the initial phase of interviews and observations were presented to the two cohort groups and the validity and implications of the results were discussed. Following this discussion session a second discussion took place which gathered data to inform the development of two knowledge translation interventions. These participant group discussions were conducted in an informal manner while the researcher acted as a facilitator. During the process the participants decided on the structure and direction of the discussions. The data from these reflective feedback sessions was recorded in note format by the researcher.

3.5 Outcome Measures

While some frameworks and scales exist for the measurement of research utilisation (Squires *et al*, 2011; Bick and Graham, 2010), these frameworks focus on instrumental use,

placing emphasis on participant perceptions at the expense of observable behaviour. Given the tacit nature of knowledge it was felt that this was not satisfactory and that an approach was required which included data analysis from both tacit and explicit processes to truly capture the extent of research use.

There may also be some debate as to what is a 'good decision'. This is because the desired outcome of a decision will be contextual and subjective, specific to the goals and personal agendas of individual decision makers rather than explicit organisational goals. In addition, by the very nature of complex decisions there are multiple factors which could influence an outcome and optimal decisions may not necessarily lead to the expected outcome. Changes to decision making processes may occur incrementally rather than as a defined single point (Kothari and Wathen, 2013; Walt, 2008). Leeuw (2014) highlights that defining discrete points where decisions are influenced by information can be difficult. Therefore, rather than attempt to assess the quality of the decisions made or the direct impact of information on that decision, this study focused on the specific aspect of how and when research evidence was being *applied* during the decision making process.

3.6 Ethical Issues

Ethics deal with the moral aspects of the study; concerning rights, dignity, accountability, transparency, governance and safety of the study. Good ethical practices ensure that the cohort being studied are aware of study purpose and processes and have given informed consent to be part of the study (Dawson, 2011; Yin, 2015). Minor ethical issues were predicted when evaluating the processes and impacts. Particular consideration was given to basic ethical considerations such as these highlighted by Oliver (2010). These include: Informed consent, transparency, confidentiality, the right to withdraw, and debriefing to inform participants of outcomes and publications from the study.

The principles used in assessing the ethical implications for this study are based on a utilitarian perspective. Utilitarian ethics propose that actions can be judged right or wrong based on the propensity to produce happiness/sadness. In other words, the consequences of the action determine if the action was ethical (rather than the action itself). The utilitarian ethical approach is commonly adopted in research as it fits well with the rational scientific 'cause and effect' mind set.

A difficulty with utilitarian ethics is in predicting the future consequences of an action (King & Horrocks, 2010). It was anticipated the process of self-reflection and answering questions

posed by the researcher could have an impact on the participants. The questioning process, which encourages individuals to reflect on their own actions and views, may stimulate individuals to question their own mental model of 'how things are'. This may be an unsettling or emotionally distressing experience. This potential for emotional distress, while small, was made explicit to the participants prior to consent and they were given details of occupational health services that would provide a professional and confidential level of service to address this. Services offered (at no cost to the participants) included counselling, general advice on maintaining good health, and a range of associated services.

All participants signed consent forms (See Appendix 3 for copy of consent form) stating they understood the purpose, process, implications, and expected commitment from being involved in the study. Participants were also told what to do if they wished to withdraw from the study at any point.

Confidentiality of participants was made explicit to all and a confidentiality form was signed by all participants. All data was stored electronically on a password protected folder on the NHS N3 secure network. Some interview transcripts were printed to facilitate the analysis. These transcripts identified participants only by a number to anonymise the data and ensure confidentiality. Printed transcripts were stored in a locked filing cabinet in a locked private study room which was solely used and accessed by the researcher.

The observed group scenario work was based on realistic but fictitious data. Avoiding the use of real patient or organisational data minimised data protection issues and issues of confidentiality. Because no patients or patient data were used in the research, a separate NHS ethics approval was not requited for this study. All data was anonymised and only accessible to the research student. There was agreement that all data would be destroyed within six months of the student researcher graduating.

3.7 Analysis Methods: Interview Data & Observational Data

The researcher took an inductive, constructionist approach to the analysis of data. To achieve this the researcher carried out a thematic analysis of the interview transcripts and observational notes to identify specific constructs which related to the participants use of information, decision making practices and engagement with EIDM.

Thematic analysis is the process of identifying pertinent themes and interpreting meaning from the qualitative data collected from participants. It relies on the researcher to interpret participant's words and actions; the researcher makes choices and decides what content is of interest and of relevance to the study. King and Horrocks (2010) define themes as '*recurrent and distinctive features of participants' accounts, characterising particular perceptions and/or experiences, which the researcher sees as relevant to the research question.*'

The process of identifying themes was cyclical and non-linear and the approach taken was informed by the six phases proposed by Braun and Clarke (2006) shown in table 3.2.

Table 1: Phases of Thematic Analysis

Phase	Description of the process
1. Familiarising yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells; generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Table 3.2 Stages of Qualitative Data Analysis (Braun and Clarke; 2006)

Three distinct steps took place during the thematic analysis process. Firstly, descriptive coding took place based on initial codes which emerged from the data. This focused on identifying meaning in the individual transcripts. After transcribing the data and reading the data to gain a sense of the content, the researcher began to generate initial descriptive codes from the data. This was done by placing the transcribed interview in a table with an

additional column for the initial coding. An example of the coding is presented in Appendix 7 of this document. The coding process avoided the anecdotal approach of focusing on a selective number of vivid examples and instead coded the entirety of the data to ensure an inclusive and comprehensive representation of participants experiences and actions. As part of this process unitisation of the data occurred which began to distinguish the text which was of interest from text which had low relevance.

Once the initial coding had been complete the researcher printed and cut the final document to produce a separate paper record of each data extract. Where multiple codes were attached to the same text paragraph multiple copies were made to allow a separate paper record for each distinct code. Working this way allowed the surrounding contextual text to be kept with the specific text of interest and allowed a clearer understanding of the participants meaning. These paper records were then manually moved to help visually identify themes within the data in an inductive way. Excerpts were moved together were similar concept were thought to be expressed. This process started to structure the data and reveal categories and themes within the data. Once the themes were identified the paper records were colour coded to their corresponding theme and clipped together. Further iterations of this process were carried out to identify connections between the themes, where themes could be combined, or act as sub categories of overarching themes, or where new themes may be required.

While this iterative thematic mapping process was carried out physically using paper records the process was recorded at key stages using mind mapping software. Illustration 1 shows the initial themes and illustration 2 shows a subsequent stage where the themes have been reviewed.
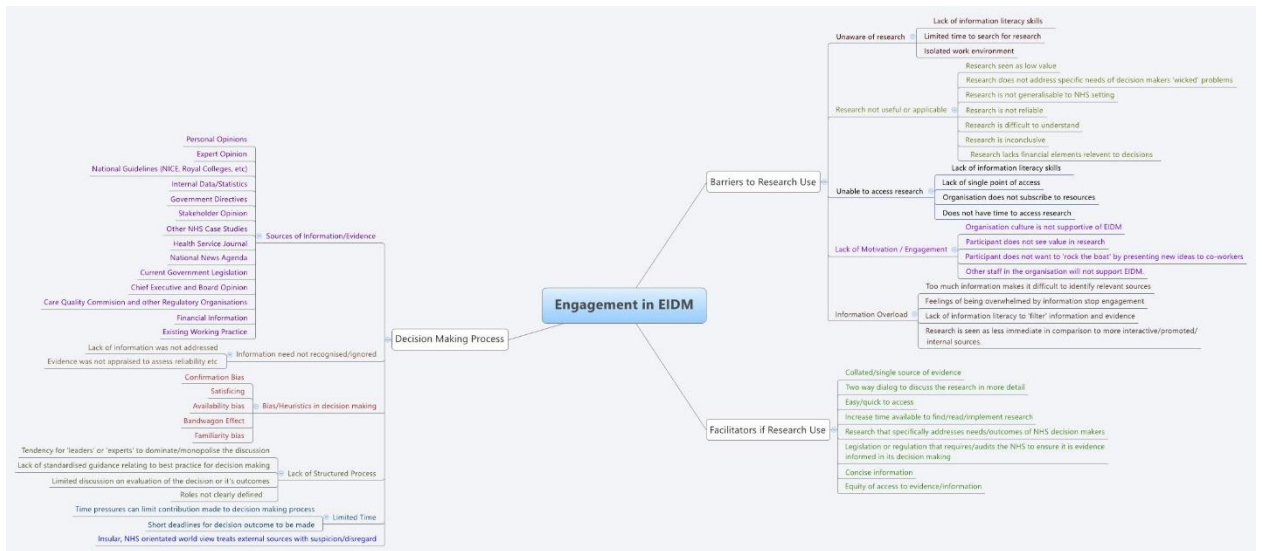
Illustration 1 – Initial thematic mapping
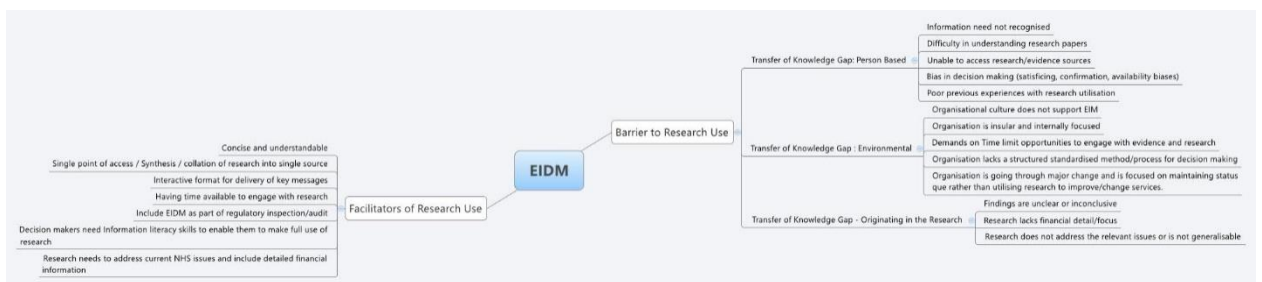
Illustration 2 – Subsequent thematic mapping stage

An example of this initial coding and thematic analysis from an interview is shown in Appendix 7 of this document.. In addition to this, further analysis was carried out to establish if any differences were apparent between data gathered from individual interviews and data gathered from participant group observation.

All codes and themes were the result of the researcher interpreting the participants meaning. An objective approach was taken and there was no expectation of a specific outcome from the research. However qualitative analysis relies on the researcher to find meaning from their data and it is inevitable that a researcher will have their own individual interpretation of the data. The researcher is employed within the NHS knowledge service. This will give an 'insider interpretation' of the data as the researcher has extensive experience of the organisation and its culture.

To avoid bias it is good practice to have multiple individuals code the data. This study was unable to utilise this approach as an additional coder was not available. As an alternative this study presented the final iteration of the thematic analysis back to the participants for their feedback.

3.8 Respondent Feedback

The completed thematic analysis was shared with the study participants. This gave participants an opportunity to review the themes identified by the researcher and comment on these. It allowed participants to reflect on the interpretation and how well it matched their own lived experience, and confirm if the researcher's interpretation of their behaviour was accurate.

Ashworth (2003) states that encouraging participant feedback at this stage may be problematic as individuals may refute accurate results due to concerns about how others may view them (social desirability bias). However this study did not consider this to be an issue, as this is only problematic if the participant feedback is viewed as a didactic confirm/disagree of the analysis. In this thesis the feedback is considered as a separate further stage in data collection which adds an additional interpretation and view of the phenomena, strengthening the quality of analysis (King and Horrocks, 2010) to increase the validity of the findings.

3.9 Summary

This research used a case study approach which utilised multiple data collection methods. The philosophical approach adopted is one of constructivism which proposes that individuals construct their own meaning and interpretation of events. The epistemological stance takes an interpretative approach proposing that knowledge is formed through social constructions such as language and shared meanings. In an interpretative stance, it is advantageous if the researcher can interpret and understand the topic under investigation within the social context in which the phenomenon is constructed. This study achieved this by recruiting a cohort of senior Non-clinical NHS management staff to gather their views and observe their

behaviours to identify how research based evidence was utilised during decision making processes. The use of interview, questionnaire and observational data provided a collective way of investigating a phenomena which allowed the researcher to capture explicit and implicit knowledge. Having multiple data sources strengthened the validity of the study findings. The data collection occurred over a six month period and explored the decision making and information behaviour of the cohort. Thematic analysis was used to create meaning and identify concepts from the data gathered. The themes and concepts identified showed how research evidence is used by this cohort, the potential barriers to knowledge translation and provides an understanding of the information behaviours and key influences which impact on the decision making process of senior NHS managers.

This chapter has discussed in detail the research design and the justification for the choice of methodology. The next chapter sets out the findings of the research produced from these methods and highlights prominent themes identified through the analysis of the data .

Chapter 4: Results

The purpose of this chapter is to report the results and findings from the primary data. The objective was to determine the actual evidence utilisation practices and information behaviour of this cohort during decision making. Initially the findings from the BARRIER questionnaire are presented and preliminarily interpreted. The findings from the individual interviews, and then group observations follow. The chapter then progresses to interpret and present the results from the synthesis of these individual elements, the key findings of which are summarised in a thematic conceptual matrix (Table 4.1) which identifies the key barriers to research utilisation in this cohort. Important general implications from this research are discussed in greater detail in the Discussion Chapter (Chapter 5).

4.1 BARRIER Questionnaire

The BARRIER questionnaire assessed four factors which affect the integration of evidence into practice: characteristics of the person, organisational factors, characteristics or the research itself, and communication factors.

Table 4.1 displays the scores each potential barrier received and the median score given from participants. Any total score above 25 was considered to be a significant barrier to utilisation of research. Results from the questionnaire revealed that the cohort perceived several prominent barriers.

Question	Total Score	Number of participants ranking barrier as moderate or greater. (max 12) (%)
The relevant literature is not compiled in one place	48	12 (100%)
Results are not generalisable to own setting	48	12 (100%)
Implications for practice are not made clear	39	10 (83%)
The individual is unaware of the research	38	12 (100%)
The amount of research information is overwhelming	38	12 (100%)
Does not have time to read research	37	11 (92%)
The research is not reported clearly and readably	36	11 (92%)
The research is not relevant to practice	34	9 (75%)
Does not see the value of research for practice	33	10 (83%)
There is insufficient time on the job to implement new ideas	33	10 (83%)
Statistical analyses are not understandable	33	9 (75%)
Uncertain whether to believe the results of the research	29	9 (75%)
Does not feel capable of evaluating the quality of the research	29	9 (75%)
Research reports/articles are not readily available	25	8 (67%)
Other staff are not supportive of implementation	25	8 (67%)
The literature reports conflicting results	25	7 (58%)
Isolated from knowledgeable colleagues with whom to discuss the research	24	8 (67%)
Physicians will not cooperate with implementation	23	7 (58%)
The benefits of changing practice will be minimal	21	6 (50%)
Not enough authority to change patient care procedures	20	6 (50%)
Research reports/articles are not published fast enough	18	6 (50%)
The research has methodological inadequacies	17	5 (42%)
The research has not been replicated	16	5 (42%)
The facilities are inadequate for implementation	15	4 (33%)
The individual sees little benefit for self	12	4 (33%)
Conclusions drawn from the research are not justified	12	4 (33%)
The individual is unwilling to change/try new ideas	12	4 (33%)
There is not a documented need to change practice	6	2 (16%)

Table 4.1 – Ranked results of BARRIER Questionnaire

There are three broad types of barrier; those that originate with the individual themselves, those arising due to limitations with the evidence and research publications, and barriers which originate from within the organisational context and environment.

4.1.1 Barriers originating in the individual.

The barriers questionnaire identifies that information literacy levels within the cohort are not developed to the level required. This is reflected in the high scores received for entries such as 'does not feel capable of evaluating the quality of research', 'uncertain whether to believe the results' and 'statistical analyses are not understandable' which 9 out of the 12 (75%) participants rated as a barrier. All participants identified being unaware of relevant research and being overwhelmed by the amount of research as barriers to research utilisation. These factors again reflect insufficiency of information literacy skills and the ability to easily identify relevant information. Further details of these barriers are discussed in section 4.21 of this thesis which presents similar findings from the interview and observational data.

4.1.2 Barriers originating from the evidence and research publications.

Several of the responses which received the higher scores related to aspects of the research publications. One of the highest scoring questions which all participants identified as a barrier was that results of research were not generalisable to their own setting. Similar issues were identified with a lack of clarity about the implications for practice, and research not being relevant. It is obvious from these findings that non-clinical senior managers working in the NHS find that research is not addressing the precise issues and contexts that they are encountering. This perception that research is not generalisable or applicable to their situation is shown in the high score given to the question 'does not see the value of research for practice' which 10 of the 12 (83%) respondents indicated was a barrier to research utilisation. The barriers which originate from the research based evidence are discussed further and in more depth in section 4.29 of this chapter where the qualitative data provide greater contextual information and knowledge of underlying motivation for this perception.

4.1.3 Barriers originating from the environment and organisational context.

The study identified three barriers which relate to the organisational context: competing demands made on limited time; insufficient support from colleagues; and a lack of infrastructure to compile all relevant literature in a single source.

The lack of time to read research and implement ideas was identified, with insufficient time to implement ideas rated as a barrier by 10 of the 12 (83%) participants and insufficient time to read research by 11 of the 12 participants (92%). Insufficient time was also identified in the analysis of the interview and observation data and is discussed more fully in section 4.22 of this chapter.

It is unclear from the BARRIERS responses why there is a limited support for evidence-based decision making among colleagues. This may be a reflection of a management culture which does not value research or empirical scientific method (Walshe, 2009). The reasons underlying this barrier are explored further in sections 4.2.4 and 4.2.7 of this chapter where the findings from the analysis of the interview and observation data provide some context, insight and knowledge on the issue.

The respondents all stated that the relevant literature not being compiled in one place was a barrier to their engagement with research. This was one of the highest scoring barriers and something that was clearly perceived by the cohort to be a significant issue. The disparate nature of knowledge storage and access was highlighted in the Hill Report (2008) on NHS knowledge management and library services. Hill found that information and knowledge frequently exists in silos and there is insufficient interoperability between NHS produced digital services. The findings from the BARRIERS questionnaire indicate that this is still a major issue within the NHS that is limiting senior managers' ability to implement evidence-based practices. This difficulty in accessing information is also shown in the high scores given to the question 'research reports/articles are not readily available' which was identified as a barrier by eight respondents.

While distinction has been made between these three barriers there is a certain amount of fluidity to these, and some barriers may originate from multiple sources. For example, the barrier 'relevant literature is not compiled in one place' could be due to insufficient information literacy which results in individuals lacking the necessary skills to locate the existing information: Alternatively, this may be an organisational barrier due to the disparate nature of where and how research is stored and accessed within the workplace, which in turn may reflect elements of the research publication such as proprietary licenses, digital rights

management and copyright legislation. While the BARRIERS questionnaire is a useful tool in identifying potential barriers to research utilisation, actually identifying the underlying causes of those barriers is a more complex and nuanced issue.

4.1.4 Other barriers

There were five participants who included details of additional barriers to research utilisation. However these reiterated or paraphrased the barriers already identified in the questionnaire. No additional barriers were identified through this question.

One question which did not score the 25 points to be categorised as a significant barrier, but was mentioned by a majority of respondents as a barrier was 'Isolated from knowledgeable colleagues with whom to discuss the research' This factor was identified by eight of the twelve (67%) of individuals to be a barrier to research utilisation.

4.1.5 Facilitators to evidence utilisation

There were seven (58%) participants who included details of factors which they perceived as facilitating evidence utilisation. These reflected the counterpoints to the barriers identified, such as a single source which compiles and summarises all the available evidence in one place; and research which is highly applicable and addresses the issues encountered by the management staff. There were clearly two barriers which the cohort viewed as effective facilitators of research utilisation: Firstly that the research itself needed to be more appropriate to their needs. This included the need for research which was easily understood and clear in its findings; research which addressed the specific issues the cohort encountered, and a desire for research that was applicable to the same context as that the cohort were working and delivering solutions in. Secondly, a mechanism to increase the accessibility and awareness of information was perceived to facilitate research utilisation. This highlighted a need for the individuals to be made more aware of relevant research publications and provide a single point of access which would contain all relevant evidence (including research along with other sources of information). The need for the information to be provided in short 'executive summary' format was mentioned by three respondents.

Kajermo *et al* (2010) carried out a systematic review of studies which used the BARRIERS scale. Sixty three studies were included in their review which determined the main barriers

identified in a range of clinical environments and professions. In addition Oliver *et al* (2014) reviewed the barriers for healthcare policy makers. There are similarities in the results of this study and the common barriers identified in the reviews. Barriers such as insufficient time to read research, difficulty in understanding the research and interpreting statistical analyses are common and universal barriers highlighted in most studies. One key difference shown is that nursing and clinical staff did not identify the generalisability and applicability of research as a barrier. This was a prominent barrier identified within this study cohort, and indicates that the published research may be more likely to be meeting the needs of clinical staff rather than management staff within the NHS. The reasons for this difference are discussed in more detail in the discussion chapter (Chapter 6).

It is clear from these results that decision makers struggle to find sufficient time to read research, and when research is read it is difficult to understand or not applicable to their specific needs. The conclusion to this is that non-clinical managers in the NHS do not routinely perceive research as a useful information source. However, the quantitative nature of the BARRIER questionnaire data does not indicate the exact reasons for this. By analysing the data collected from interviews and observation the remainder of this chapter analyses the reasons why non-clinical NHS managers fail to value or utilise research findings.

4.2 Interviews and Group Observation Results

The analysis process (Chapter 3.7) produced several codes which were identified in the data. Once all of the codes had been identified these were then interpreted by the researcher and similarities, differences and connections between the codes were identified to produce themes. Themes are a synthesis of the codes which produce meaning and understanding from the data relevant to the phenomena being investigated.

The themes which emerged from analysis of the interviews and group observations were highly similar to each other. To avoid duplication and to aid understanding the results of both data collection methods are synthesised and discussed together. The key themes identified in the data analysis are discussed in chapters 4.2.1 to 4.2.6 and summarised at the end of this chapter in Table 4.2

4.2.1 Information Literacy

Information literacy is an important concept in evidence-based practice. If information literacy skills are inadequate, individuals will not be able to find, access or understand the research evidence that is available to them (Hepworth, 2014; Chang 2015). There was limited understanding of the concept of 'information literacy' with most managers equating this to basic numeracy and interpretation skills. In practice the cohort displayed limited ability to find, access, and interpret the findings of research papers during the observed group work. There were several instances observed where relative risk and absolute risk figures were not distinguished. Validity of research was heavily correlated with the source of the information and there was little attempt made to assess the validity or robustness of evidence. For example information which came from an internal source was rarely questioned, while externally generated research was viewed critically and with suspicion. Similarly, most individuals did not seek external sources when searching for supporting evidence.

During the observed group work the cohort did not demonstrate use of advanced information literacy skills. When questions arose during the decision making process there was a clear need for additional information which went unmet. In the majority of observed behaviours information was only incorporated into the decision making process if it was instantly available. This resulted in much of the core discussion being based on personal opinion and perceived expert comments rather than scientific, researched based sources of information. There was a clear preference for information sources that were immediate and familiar. There was little evidence that the information used in decision making had been critically appraised and some pieces of information used during decision making were of poor methodological quality or based on ad hoc conversation and opinion. For example, during one observed discussion three figures given as percentages were mentioned which referred to reductions in in-patient hospital attendances. At no point were questions asked to clarify if the figures were relative or absolute reductions. In a separate discussion where participant 5 summarised some financial return on investment figures no one asked where the information was derived from or questioned its reliability/applicability. When individuals did question the quality or robustness of evidence this was often done in a highly superficial way with little real evaluation of the research under question

When asked about their views on information literacy responses given during interview also indicated that there was limited application of information literacy skills. Example comments included:

"I can't recall ever having someone critically appraise the evidence. But the process doesn't work like that. It tends to be that someone presents a viewpoint in the meeting and others either support or disagree with it, but it's based on experience and reaction. We have discussion and debate rather than analysis and critique."
Respondent 6

"I'd say that most of the time there isn't any critical analysis of the information, it's more about trust and knowing who's reliable and able to provide that expert opinion."
Respondent 1

"There's usually a couple of people who have quite advanced skills in interpreting the information and statistics. Most of us are happy to let them get on with looking at it [the information, data or research] and we trust their expertise to guide and inform us." Respondent 12

"I think an inability to easily find information makes us an organisation significantly less effective than we could be" Respondent 9

"I don't think we do have access to all the information we need. We have some evidence available and that's what we base our decision on." Respondent 10

"There is a huge gap here between the information we need and the information that we have at hand" Respondent 5

4.2.2 Time Constraints

This study has categorised time constraints as an organisational factor as its root cause is insufficient staffing/excessive workload or limited organisational infrastructure and support. However where staff lack appropriate information literacy skills, simple tasks may take a lengthy time due to insufficient knowledge. By increasing the information literacy of staff there is likely to be a productivity gain and information related tasks may take less time. Comments which illustrate this included:

"I think most people would like to be better informed before making decisions, but there's not the time available to do that." Respondent 11

"It's back to time constraints. There isn't the time available to critically look for information to that level of depth. We'd never get anything done. That's why

something like a Cochrane review is so useful. You know it's already been rigorously appraised and you can just read the summary and get on." Respondent 6

"*People don't have the time to read research, there are so many more immediate things competing for one's time*". Respondent 2

"*It's about return on investment. And the return from the time invested in looking through the evidence is often not worth it. If there's a systematic review or someone recommends a specific bit of research I'll look at it; and if I'm honest even then I tend to just skim through the abstract or summary of findings because I don't have the time to read the entire paper.*" Respondent 6

There was some limited indication of time pressures during the observed group work, with comments such as '*I think that's something to discuss at a later date as we don't have the time to explore that today*', but time constraints were not something which were observed as a primary or prevalent concern.

A related aspect, which was highlighted in the BARRIERS questionnaire, was the feeling of information overload. The volume of information and multitude of information sources available to decision makers was perceived as overwhelming and a barrier to published research use. It is undeniable that a large volume of information is produced for managers within the NHS. The Department of Health alone published over two thousand documents during the 2010-15 parliament (Department of Health, 2015) and the prominent MEDLINE database adds an average of 750,000 new research citations annually (US National Library of Medicine, 2015). It is unclear if this information overload is due to the volume of material which is made available to the cohort, or if insufficient information literacy skills prevented the cohort from distinguishing appropriate and useful information from the wider 'chaff'. Information overload and lack of time have previously been established as issues commonly encountered by NHS managers (MacDonald, 2011; Humphries, 2014). However, limitations of time may be interpreted as prioritising other aspects of the job above research use. This shifts the focus towards one of value. It would appear that research use is not valued within the organisation, and therefore it has a low priority in comparison to other job tasks and subsequently has little time allocated to it. Indeed, there was a general consensus that reading literature was viewed culturally as an unproductive use of time. Example comments which illustrate this include:

"*There's a culture within the organisation that if you've got time to read research then you're not busy enough. Reading research isn't viewed as a productive activity.*" Respondent 5

"*It's not perceived as real work though is it. Reading research is viewed as a 'nice to do' activity. It's not an essential part of the job.*" Respondent 10

"*Any research I do read is done on my own time, either at home on an evening or while I'm eating a sandwich at work. It's not something I'd feel comfortable doing during working hours.*" Respondent 6

4.2.3 Satisficing heuristic and availability bias

Data gathered during the observed group work showed the cohort to be consistently exhibiting confirmation and availability bias in the information they used, and satisficing was observed in every outcome in their decision making. The initial information behaviour exhibited during the decision making process showed a narrow range of information was engaged with. Participants had a considerable preference for accessing information that was readily/easily available and tended to conform to their current personal viewpoint and working practices. For example, during an observed decision making session participant 5 stated they had read something that morning in the Health Service Journal (HSJ) that would be useful. However they were unable to immediately connect to the online journal as they couldn't remember the wi-fi password. The lack of instant access resulted in the conversation moving on and the HSJ article was ignored/not considered in the decision making dialogue.

If information was deemed able to provide a solution then the dialogue quickly moved from the wider strategic approach to the operational aspects of how that solution would be implemented. For example, during an initial discussion about tele-health one individual gave their experience of using video-conferencing. This framed the whole discussion and the term telehealth became synonymous with video-conferencing. At no point did the conversation move to evaluate telephone based alternatives, or remote devices that could 'store and forward' automated data. An immediate and available information source (a member of the group) had presented information and a possible solution had been identified (video-conferencing). The decision was therefore framed within the narrow scope of this information and the wider alternatives were not considered. This approach of identifying a single viable option and then exploring the viability of this one option was the default approach adopted in

all of the observed decisions. The anchoring, availability and confirmation biases outlined in section 2.31 were all evident and common in the cohorts information use during decision making.

There was no systematic collection of evidence, and only in rare instances were several options analysed and compared to establish a 'best option'. Satisficing was the default approach of all the individuals in the study. This culture of satisficing is at odds with the framework used in EIDM and is a major barrier to implementing more evidence-informed practices.

The satisficing heuristic was not mentioned in the interview data. The failure for this to appear as a theme from the interview data was at odds with the prominence of the behaviour shown in the observational data. This illustrates that the cohort were not explicitly making an active choice to employ satisficing but that it was a subconscious cognitive process which they were not explicitly aware of. Kahneman (2002) and Tapscott and Cadsby (2014) proposed that cognitive heuristics happens without conscious awareness, while others propose that individuals make a conscious choice to employ satisficing (Schwartz and Ben Haim, 2010). These views are not exclusive and it may be that individuals are both consciously and unconsciously utilising satisficing. The results of this study indicate that in the case of non-clinical NHS managers the use of satisficing is mainly an unconscious process.

4.2.4 Silo Working & Internal Focus

An additional element which influenced the information used and valued by the cohort was that NHS organisations were distrustful of externally produced information and had a preference to use internally generated data and information. This was apparent in both the interview data and the observed behaviours of the cohort. Illustrative comments from interviews include:

> *"There's something of a distrust among my colleagues towards any external sources of information. Getting staff to accept that other organisations might be doing things better than them is difficult."* Respondent 3

> *"We have a 'not invented here' issue. If alternatives don't fit easily into the existing system there's no engagement."* Respondent 12

" I don't think we pay enough attention to what's happening outside of the NHS and DoH [Department of Health]. *Occasionally there might be something from one of the big US players like Keiser, but in general if it's not from the DoH or somewhere like NICE we don't pay it much attention.*" Respondent 6

"*Research isn't as useful as some of the other sources of data we have. We use benchmarking a lot. It's important to consider our performance against similar NHS organisations. And we have a lot of internal data that has a lot of bearing on what we do. When we're inspected by the CQC or whoever it's the internal data and statistics they look at and they're comparing that with other local and national NHS so it's important that we're doing that too.*" Respondent 11

During the observed group sessions, this preference for information originating from within the NHS was prevalent. The majority of the information mentioned during the group sessions originated within the individuals' organisation or was published by an organisation linked to the NHS. There was also a perception that if a solution was being implemented in another NHS organisation that this alone was validation of the solution. During most of the discussion there was always a need to anchor the dialogue to an NHS initiative that could be used as a reference point. Comments from the observed decision making sessions such as '*How does it fit with 'no decision about me without me' and Liberating the NHS*[3]' (Respondent 10), '*Are there any examples of this being done elsewhere in the NHS*' (Respondent 7), and ' *Does anyone know what other trusts are doing with telehealth?*' (Respondent 4) demonstrated this need to have a familiar NHS reference point to anchor the discussion. The conclusion is that NHS decision makers are internally focused, and this creates a substantial barrier to EIDM and the introduction of externally produced research into the decision making process.

An assessment of Australian healthcare managers information preference (Liang, 2011) found a similar theme and concluded that:
'*both qualitative and quantitative research evidence is rarely used.* In contrast*, 'internal data' generated within their organisation was the form of evidence most preferred by managers, followed by examples of external practice and personal experience.*'

Within the NHS, Evens (2013) found that healthcare commissioners also favoured internally generated information. The findings from this research support a growing body of evidence

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[3]*Equity and Excellence: Liberating the NHS* was the UK Government White Paper that set out Healthcare reform during the period this research took place. Available online from: www.gov.uk/government/publications/liberating-the-nhs-white-paper

which shows senior healthcare management staff have a preference for internal information, and the value and confidence they place in externally generated research findings is low.

4.2.5 Definition of Evidence

The preference for internally generated information raises the question of what do non-clinical managers regard as 'evidence'. What is defined as 'evidence' is subjective and what counts as "evidence" or "knowledge" is socially constructed (Nutley *et al* 2007). It was apparent from the observed group work that there was universal acceptance of evidence to be any form of external or internal data or information which informed the decision. The group did differentiate evidence from personal opinion and belief, however this was purely a categorical differentiation as evidence and personal opinion appeared to carry equal weight and value in the decision making process. The main influence on the value of information/knowledge/evidence/opinion was not its format or underlying methodology but the source which was important. Advice, opinion and the viewpoint of *perceived* experts was universally seen as highly valued evidence. There was greater emphasis on information sources such as NHS sources or sources which were familiar to the participants.

In observing the group, the majority of information behaviour was based on a holistic viewpoint (evidence was any form of information, including personal experience, data spreadsheets, or media reports.). There was some evidence of a pragmatic viewpoint where information preference was driven by the timeliness and availability of sources. The empirical viewpoint (evidence is exclusively the product of empirical scientific method) was rarely expressed by the cohort. From the analysis of the interview data there was a clear indication that the cohort were more aware of the empirical view of evidence than their actions implied. It is unclear if greater representation of the empirical viewpoint is due to social desirability bias or if the cohort were unable to implement specific behaviour due to the various barriers already illustrated in this study. While the empirical view of evidence was a theme within the interview data there was more frequent and prominent representation of evidence from the holistic viewpoint. Example quotes from the interviews include:

> "*I think patient views, expert opinion, local data, one's own experience of the situation, and research findings as well as reports and guidelines are all evidence.*"
> Respondent 3

"*I'd class meta-analysis, RCTs, that kind of robust research as evidence. But, if you're asking what I use in my decision making then that's much wider. I'd include expert opinion, raw statistical data; I'd consider what's already in place and what resource there is. There's a multitude of information that's relevant to the decision, but it's not what one would traditionally define as evidence.*" Respondent 3

"*Evidence is anything that might guide ones judgment. It might not be good evidence or reliable evidence but its evidence none the less.*" Respondent 2

"*I'd define evidence as any published information that's resulted from an inquiry using scientific methodology. There's a hierarchy of evidence with RCTs and systematic reviews being the preferred methodology.* "Respondent 12

"*[the decision making group] have got different areas of expertise and each have a contribution to make to the evidence that's presented. Then it's a case of pooling that human judgement and weighing up the options we have. It's that collected expertise that's the main source of evidence.*" Respondent 7

"*Evidence in its strictest sense is the published research, but I would use something like NICE guidelines, local reports, directives from NHSE [NHS England] etc.*" Respondent 10

"*You've mentioned evidence informed decision making and I think that in the context of decision making it's whatever information we can get our hands on. That can be anything. Any relevant information that's presented or mentioned will have some impact on the process.*" Respondent 8

4.2.6 Decision Making Processes

When observing the group scenario work there was no explicit, formal discussion about the process and structure of decision making. This was surprising as although all of the participants were NHS employees, they worked in different NHS organisations. There are two possible reasons for this lack of explicit discussion. Firstly, that there is a shared culture which allows the participants to understand implicitly what process and structure would be. Secondly, that the approach taken to decision making is a dynamic non-linear process that does not have a predefined structure and the process evolves as part of the decision making. This evolving process was indeed what was observed, and debate and focus changed depending on who developed informal influence/leadership over the process/group. The analysis of the interview data also highlighted a lack of structured explicit process to the decision making, and illustrative comments included:

> *"I don't think there is a conscious process. It's more like a conversation where ideas are put forward and assessed. It's quite ad hoc."* Respondent 12

> *"There is a process there, but it's not explicit. I'm not sure you would understand it unless you've been acclimatised to the NHS culture.*" Respondent 3

> *"It's not as formal as that. We have policy documents and SOPs* [Standard Operating Processes] *for lots of things, but there's not one for decision making, there's no documented or approved process. But that's because each decision you make is different and needs a unique approach each time."* Respondent 9

> "*There isn't a set standard process that every decision goes through. Each decision is a unique entity so the decision making process changes depending on who's involved, what the scale of the issue is, what budget is available, etc. I don't think a standardised approach would be appropriate for the level of complexity we're dealing with in these situations.*" Respondent 1

> "*The focus is on reaching agreement; it's a social process where compromise is made to ensure that the majority are happy and supportive of the final decision. A ridged didactic right way/wrong way approach is of limited use in that setting. It needs to be fluid and adaptable.*" Respondent 8

> *"I think there are some people who don't like to commit to a decision and there are endless meetings because things are vague. There's a lot of back and forth and*

inertia, and that's the point when people might start asking for evidence." Respondent 2

Interestingly, none of the participants could identify an organisational policy or guidance document that detailed a standard decision making process. There was clearly a shared cultural expectation that decisions would be made in this ad hoc manner, and an understanding within the group which allowed it to work productively in this way. EIDM is based on an explicit cyclical process model of identifying, assessing and applying best evidence to a problem to reach a decision outcome. There is a conflict between the structured EIDM approach and the ad hoc dynamic nature of NHS decision makers which creates a barrier to implementing EIDM.

4.2.7 Relationships and interaction between Decision Makers

No formal roles were assigned to the participants during the observed group decision making. It was therefore surprising to see that a hierarchy of influence quickly developed in the group. Individuals who were perceived to be more knowledgeable or experienced were looked to for leadership. There was no attempt made to ensure that all views or opinions were given equal discussion time: Individuals who were more extrovert and opinionated had a tendency to dominate discussions. One incidence of particular interest which illustrates the impact of this behaviour on EIDM is illustrated below:

While the larger group was in discussion Participant A was reading a reference file provided to the group as part of the exercise. This file contained several research papers and reports on the topic being discussed. Participant A discovered research evidence within the file which showed the approach being discussed by the wider group had been unsuccessful when implemented previously. Initially participant A had to wait to interject into the discussion, and when the chance arose the conversation had moved on slightly. In response to the information some participants asked for more detail or to read the paper themselves: However there was no recess in the proceedings and those wanting to read the paper were faced with being excluded from the on-going discussion. There was a short discussion around the topic, mostly opinions were voiced by individuals who had not read the research. The majority of the conversation was defensive and focused on trying to devalue the research rather than critically evaluate it or incorporate the findings into the decision (again, there was a 'not done here' attitude displayed). As the decision making progressed the research was deemed to be interesting and '*something we need to look at once we've got*

more time' and the dialogue reverted back to its original focus. This illustrates the need to present and synthesise/summarise research to decision makers well in advance of the actual decision making process. Once the process has started there is no opportunity given to digest new research or complex new concepts. This was in contrast to information that was presented in a format where the data could be quickly understood and was then incorporated into the decision making.

When asked about the interaction between decision makers, the interviewees expressed a bias in influence resulting from an unequal distribution of power. Certain individuals would have more influence over the direction of the decision making than others. This is illustrated in the following quotes gathered during interview:

> *"It's often the case that the person who has the expertise is the one who leads the discussion and carries more influence in guiding the decision outcome."* Respondent 2

> *"I don't recall many instances where a decision has changed due to research. The process tends to be that people have prior views and opinions and the decision process is a negotiation to try and push individuals specific views, when research is used it's more likely to be to justify the views which are already held rather than as a neutral piece of literature to inform discussions."* Respondent 12

> *"There's a lot of strong, forceful personalities that tend to dominate these group decisions. I'd say that if there are eight people round the table probably three people will account for the majority of the influence on the direction of the discussion."* Respondent 8

> *"There is a hierarchy of opinion within the hospital. I'd say clinicians/consultants are at the top of it, then some of the execs; general managers like me who don't have a clinical background come quite low in that hierarchy."* Respondent 4

> *"The key thing is that usually one or two individuals will dominate the pace and direction of the meeting. When we make decisions there are usually one or two people who dominate and control the process while everyone else assumes a supporting position. The dominating influence can be anything from subject expertise, organisational position of power, or even being the only person in the room willing to make a decision.*" Respondent 10

In addition there was a distinct sub-theme of reluctance to disagree with the established norm and culture.

> *"Sometimes it's difficult to disagree with people. There's a culture of not challenging someone if they've made a suggestion. I was once taken aside and chastised by our Chair for being a negative influence when I pointed out why something wouldn't work."* Respondent 12

> *"It's very civil and professional, but I think that might lead to a little bit of ineffectiveness because there's a reluctance to challenge or voice anything that doesn't fit with the existing organisation viewpoint. So, if you have some research that shows something the organisation currently does and has invested heavily in doesn't actually work, or there are more effective cheaper alternatives, there's a real reluctance to bring that to the table… you know it's going to cause conflict with the people there who were responsible for that initial service investment."* Respondent 3

> **"***There are individuals who have particular interests which they protect or promote during the discussions regardless of what alternatives are or what research is presented."* Respondent 7

There were also some comments that suggested when EIDM is attempted this is motivated by self-interest or personal agendas rather than an altruistic way of achieving best outcomes. Comments included:

> *"Critical appraisal is a double edged sword. It is useful to be able to understand the findings of research papers and see how they can be applied locally, but it may also be used too easily to dismiss perfectly good research that's not gold standard. I know people who just reject anything that they don't agree with by clever use of critical appraisal and they rubbish what could be useful and important."* Respondent 6

> "*There is often calls for more evidence or for evidence that's of a higher standard. I think that is done as a delaying mechanism. Lack of evidence is used as an excuse so that a decision doesn't have to be made."* Respondent 2

When observing the use of evidence during group interactions there was clear prominence of conceptual (i.e. to change opinions) or political (i.e. to confirm or challenge practices or policies) use of evidence/information. Lorenc *et al* (2014) carried out a systematic review of policymakers and managers from non-health sectors and concluded '*that research evidence*

is often used to justify or defend decisions that have already been made, and to manage relations others in positions of power.' and proposed that local decision-makers largely use evidence '*to justify prior decisions and to help them make the case for political and financial support'*. The findings of this study confirm that this is a common occurrence and provides evidence to demonstrate that similar information behaviour is present in non-clinical healthcare managers. This illustrates that even where dissemination of research evidence has been successful, the way that research is subsequently used may become biased or corrupted and subject to personal motivations and agendas.

4.2.8 External Politics

The NHS is a public sector organisation which is subject to direction from central government. During the period when this research took place, a large scale restructure of the NHS was taking place. One aspect of the external politics and direction was an austerity drive known as the Nicholson Challenge (UK Parliament, 2010) which set a target for the NHS to save £20 billion over a five year period. Respondents indicated that this challenge had a detrimental effect on EIDM as they did not consider using the research evidence base because their focus was on finances and budget cuts rather than innovating practice and finding more effective working methods. There was also an indication that organisational focus on targets set by central government was encouraging satisficing because the decision makers' objective was then to reach a predefined target rather than provide an optimal service. Example comments include:

> *"There's always a danger when money is tight that you focus your energies on protecting and maintaining the current service, rather than looking at new ways of doing things. The amount we're being asked to save over the next few years is unprecedented and as a department we have no idea how those cost savings will impact on us. That uncertainty makes decisions difficult to make and there's a tendency to focus on just maintaining what's already in place."* Respondent 1

> "*Implementing Nicholson's Challenge has changed things. Inevitably with those levels of financial cuts we are going to have to stop doing things. Evidence-based practice is about refining practices and innovating services and those kind of things generally need some investment to instigate change; we're not in a position where we can afford to risk that initial set up stage of a new, potentially unproven, working method.*" Respondent 6

*"There's a lot of talk about QIPP [*Quality, Innovation, Productivity and Prevention*], using research to innovate services so they're more productive and cost effective. But in reality it's staff that are the main financial cost. In our organisation rather than innovating and trying to income generate it's easier to not replace people as they leave. We had a round of voluntary redundancies. One of the effects of that is the remaining staff are having to do the work their colleagues would have done. So they're busy and over stretched, they're too busy to contemplate changing things or looking at new research."* Respondent 9

"The focus is on hitting targets, not optimal care. Because finances are tight if an innovation results in a huge time saving or productivity increase the result is you lose staff or other resource because you can now achieve target with less. The objective is to reach targets with minimum resource, not provide the most efficient and effective service you can with the resource that you have." Respondent 11

When observing the group decision making there was certainly a strong emphasis on finances and costs. The information that the group requested and referred to most was financial in nature. An example occurred when participant 5 presented a report which advocated the use of video-conferencing to support forensic services. While the rest of the group were in agreement that this was an effective intervention it was viewed as unfeasable due to financial uncertainty with comments such as *"With the current expectation for cost savings I don't think we would be able to find the initial funding that this requires"* (participant 11), *"It's not clear what the long-term financial impact would be "*(participant 1), *We need to look for an application that makes use of the existing infrastructure and structures and doesn't require a significant level of investment."* (participant 9). The absence of costing and economic evaluation associated with research was something the group also highlighted as a weakness in the current evidence/research base. There was a clear desire to use research which had accurate UK based costs explicitly detailed, but insufficient details of this component in the current research was a significant barrier and is discussed within the following paragraphs detailing barriers originating from dissatisfaction with the research publications.

4.2.9 Evaluation of research publications

It was clear from the interview replies that the study cohort was not satisfied with the information currently being made available to them. Research was seen as something

carried out in the sanitised and controlled environment of the 'ivory towers of academia' but was expected to be implemented in 'the swampy lowlands' of professional practice to paraphrase Schön (1983). Interviewees complained that they could not utilise the research findings because the outcomes were not precise or complete enough, there was conflicting alternative research, or the method of intervention was not detailed enough to allow replication in the local population. A similar but distinct criticism was that that research findings focused on a single aspect of an issue rather than the holistic whole. The cohort highlighted that financial aspects were often insufficient in published research, and this had a direct impact on the usefulness of the research. These issues with the research manifest in a desire for information that was dynamic and interactive, with the participants indicating that they would consult with a subject expert rather than utilise research due to the ability to 'fill in the gaps', clarify and question the information they were being presented with. Example comments made during interview included:

> *"While a lot of information is produced and collected it is not necessarily at the right level to help inform intelligent decision making."* Respondent 7

> *"I personally find it difficult to understand how the results of research are meaningful to my specific question, the results aren't always clear, or there's ambiguity over how the results can be implemented or applied."* Respondent 4

> "*I would primarily consult the clinicians and other staff who have a good knowledge of the situation and subject. They're the people who know what's happening and have the expertise and breadth of knowledge…. It's immediate and it's two way communications I can clarify my understanding and ask questions, I can't do that with a book or a journal.* " Respondent 2

> "*I've read some papers which have looked really useful. But when you start to look in any detail at the intervention it's just not feasible. We don't have the infrastructure, resources, expertise. Historically, a lot of research that's looked promising on paper has failed to deliver any benefits in the field.'"* Respondent 6

> *"If you consider traditional evidence-based practice it's quite targeted, one identifies a specific problem, identifies the appropriate research to answer the question, and then implements and monitors that solution. Most of the decisions I'm involved in don't fit*

that model. There's considerably more variables at play, there's usually very little robust research available on the topic." Respondent 10

"A lot of the research is done in the US or Australia where there's completely different funding mechanism or there are economic benefits from the larger geographical area which means the cost/benefits just aren't applicable to a UK setting." Respondent 11

"As a manager rather than a researcher my priority is maintaining a service while my resources are decreasing. I've read a few more research papers since we started this study and none of them mention associated costs or return on investment. I know that we're not a business and it's about providing patients with the best possible care, but you can't get away from the fact we have finite resources to deliver the service, and unless the research you're giving us has details of costs it's fairly meaningless, I can't do anything with it." Respondent 2

These comments clearly show that there are two key distinct aspects to the research which reduce its ability to inform the decision makers. Firstly is the reductionist approach to publications. The decision makers want a single report that details all aspects of a problem. The current standard research paper will include only one aspect of an issue (Rightly done to minimise confounding factors and isolate a specific hypothesis for investigation.) Therefore the decision maker requires multiple sources and papers to ensure they have proof of treatment efficacy, comparative studies to indicate effectiveness of alternative treatments, an economic evaluation, guidance to implementation of an intervention, and performance indicators to monitor and evaluate the results of an intervention. This fragmentation of the information greatly increases the workload required to comply with EIDM principles and is a significant barrier to the application of research. The second element is the static nature of published research. The decision makers want to use dynamic and interactive sources of information. This preference explains the dominance of subject experts and personal opinion as information sources; they allow a level of interaction and dialogue that is not possible from the traditional research paper. If the levels of EIDM taking place within the NHS is to be increased there is a need to address this issue. It is clear from these findings that there is a need to provide non-clinical NHS managers with some form of 'knowledge mechanism' to act as a dynamic interface between the static research publication and the decision makers, allowing decision makers to access the research evidence base in a format that is closer to their preferences. This is discussed further in Chapter 5 of this thesis.

4.3 Use and experience of NHS library and knowledge services

Only 40% of the senior managers had used their local NHS library services, with approximately 10% saying they used it regularly. There was an apparent low level of engagement with library services. Analysis of the interview data highlighted that libraries were commonly viewed as primarily for individuals undertaking professional development or educational activities and were not viewed as places which supported business activity and decision making. Libraries were viewed as being of relevance for academic study and gaining background knowledge on a subject but of no real practical use or relevance to the issues senior managers were addressing. Example comments included:

> *"Our library is mainly for the junior docs and students. It's a place to study. It wouldn't occur to me to go there for information."* Respondent 1

> *"The kind of information I need isn't in the library. I need a lot of local level data and information about the local population, details about specific local practice and process; the material I'd get from the library wouldn't be relevant."* Respondent 4

> *"The library is there primarily for students and staff undertaking CPD."* Respondent 8

> *"Our library is fine if you want textbooks or academic journals, but it's not set up to deliver the kind of business intelligence that I need."* Respondent 11

In addition, managers felt they need to be seen as knowledgeable about a subject, and that there was a cultural taboo in consulting with others outside of their immediate peer groups for advice or assistance. This resulted in a perception that to utilise library services was perceived in some way as a display of weakness or incompetence.

 Example comments included:

> *"There's an expectation that one already has the knowledge one needs to adequately provide direction and the right answers in these situations. I expect that there's a reluctance to use library services or ask librarians for help because that would be an indication, an admittance that a person doesn't have the knowledge one was expected to possess." Respondent 5*

"There is a culture that as a senior manager you should lead and know all the answers. There's an implied admission that the person doesn't have that knowledge if they ask the library for information. That creates a level of risk and vulnerability in exposing a lack of knowledge or expertise. That's especially true at the moment where there are a lot of posts under threat of redundancy." Respondent 12

"The NHS has a hierarchical structure and one of the results of that is that there's a significant proportion of managers who only interact with other managers. There's very little engagement with staff outside their own coterie." Respondent 7

There was a general view that librarians were unable to provide the services that senior managers needed. This included an issue of timeliness and a view that library staff were likely to lack specificity in the information they supplied. Example comments included:

"The librarian is very approachable and keen, but if I get her to do a literature search I end up with a long list of references that might be of use. That's not appropriate for me, I need her to identify the exact papers what will be of use. I need succinct answers that will tell me what I need to know not a list of interesting articles."
Respondent 2

"The review they did for us was very good, but it took them three weeks to do it. So, by the time we had it things had moved on and plans were already starting to be implemented. By that point the content didn't have much influence. I don't even think some of the project board even read it. " Respondent 9

"Our library is very good at supporting students and CPD, but I don't think the library staff have the operational background or skills to be able to identify the information that's really appropriate or relevant for the level of work that the board do."
Respondent 8

"When I've asked the library for information in the past what they've sent me has been time consuming to digest and too vague in its content. I don't think they appreciate the difference between the information that's required for academic purposes and information that's required for workplace implementation." Respondent 4

Libraries are competing with alternative sources for information and one theme that was identified from the data was that these sources are often more immediate, easier to access and highly dynamic and responsive in nature:

> "*Why would I use the library when I can just email XXXX and get the answer? If there is an information gap then we would go straight to the person who has access to that information or is really knowledgeable about that topic and ask them what the answer is*" Respondent 12

> "*I think the days of library services within the NHS are numbered, we can access so much through Google and places like the Information Centre[4], the students get all their stuff electronically on their iPad apps direct from the universities*" Respondent 8

> "*I don't use the library services. There's so much information available now straight to the desk top that I don't need to go anywhere else for the information I need. We have dashboards that display the data we need so it's up-to-date I can get most of the information and journal articles I need through Google, all the guidelines and Cochrane reviews are online. It's very rare that I need to use the library.*"
> Respondent 3

These comments project a view that NHS library services are not meeting the needs of senior managers. In some cases undoubtedly there are preconceptions at play and local NHS services are able to provide some of the services which senior managers want, but the managers are unaware of this. However, there are clearly aspects of NHS library services which currently do not meet the needs of senior managers, and alternative sources of information are sometimes preferred and better able to meet the needs of the management staff.

Views on NHS library services were not all negative, and where management staff had used their local services there were several positive comments about the services libraries offered. A perception of neutrality and trustworthiness was a key differentiating element of library and knowledge services compared to other sources of information. Librarians and library services were viewed as impartial and trustworthy sources of information. Examples comments included:

> "*I think the main reason for using the library service to review the literature for us is that it's impartial. I know that there's no underlying agenda or biased viewpoint. That's different from most of the other sources we get our information from.*" *Respondent* 1

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[4]The Health and Social Care Information Centre: http://www.hscic.gov.uk/

"I trust the library, they're always thorough and give you a balanced view of the argument. That's sometimes frustrating when you're looking for a solution and you want a clear outcome to say this is the way to do things, but often it's really useful to get that more comprehensive, unbiased view that the library can provide."
Respondent 7

"The library is a neutral entity. I know that when they forward things on to me there's no hidden agenda or attempt to influence; it's purely that they think the information will be of interest or use to me or my staff." Respondent 10

"We've recently had a SIRI [serious incident report] that the library helped with, and they quickly identified best practice, what guidelines existed and what the evidence was around that issue. It was really useful to have that input because it was outside of the people who were involved in it and gave us an alternative perspective."
Respondent 6

Like all services, there will be variation in the quality and scope of services provided by libraries and library staff supporting NHS management staff. However there were some generalisations that can be extrapolated from the data.

The work that libraries do around literature searching and evidence reviews appears to have the *potential* to be highly valued and useful to senior decision makers. However, this is only true if the information supplied is done so in a timely manner (often to short timescales), and is provided in a concise fashion so that it is useable by individuals who are time-poor.

There does appear to be a cultural view that libraries and library services are exclusively relevant for academic use and that the more pragmatic business of organisational service development and delivery is beyond the scope of the library remit. This assumption, which many senior managers make, is unlikely to be true as all libraries in the NHS are expected to meet quality assurance standards (Health Education England Library and Knowledge Services Leads, 2015) which specify " *5.3h :library/knowledge services and staff will support clinical and management decision-making*". It may be that there is a need for libraries to be more proactive in the marketing and targeting specific marketing materials for senior management staff to highlight how services may be of assistance to them.

Librarians were regarded as a highly trusted and that the information they supplied would be free of personal influence and unbiased. While this is viewed as a positive trait this ethical stance to provide unbiased information can at times frustrate decision makers who are looking for definitive and singular, didactic answers. However, this perception of

trustworthiness is a prominent differentiation between library services and other information sources which could be used to promote a greater level of library service use by decision makers.

4.4 Impact of Information Format and Source on Decision Making Processes

The group decision making observations showed that there was a pronounced preference for short summary information (several individuals specifically asked for executive summaries of larger documents as they did not have the motivation/available time to read full documents). Decision makers showed a strong preference for formats that provide both a short synopsis of key points and concise reviews which allowed all relevant information to be synthesised and summarized in a single short document. There was a far greater engagement and use of information that originated from within the NHS and its associated organisations. There was also a consistent display of shared information bias. This is the tendency for group members to spend more time discussing information that participants are already familiar with and less time discussing information that only some members are aware of (Forsyth, 2013).`

When asked to comment on the influence of information format and source during interview, similar themes were shown in the analysis of the data. Namely that short easily comprehended information was preferred, and that information which was presented early in the decision making process tended to act as a focus and influence over the remaining process. Example comments included:

> *"It comes back to communication skills again. It's often more about the way information is presented than the actual content. You'll find that once an initial direction of thought or concept is investigated it often becomes the only thing that's looked at. So, the timing of the information is important; the first piece of plausible information has a greater impact and effect on the decision making."* Respondent 8

> "*There's little chance that any lengthy document will have an impact. No one has time to read it. We need information that's succinct and clear. If you think about all the management theories that are popular they're all simple to understand and usually the whole concept can be summarised into a neat graphic. That's what's effective."* Respondent 10

4.5 Feedback from Participant Consultation

The analysis of the data collected from participants was shared with them. A group meeting was held where the research findings were presented and summarised. The group were then

asked to discuss these findings and to express anything they considered missing, or erroneously represented.

The feedback from this group confirmed the results as accurately reflecting the behaviours and views of the group.

The group indicated that it was unusual for them to have time or opportunity to reflect on the underlying processes of how they work, and that while they agreed that the analysis was accurate, the group were surprised at the lack of process in their own decision making. The general feeling of the group can be illustrated by one of the comments; "*It's a little overwhelming to see it all broken down into categories like that. It's only when you stop and reflect that you realise there is an issue.*" [Respondent 5]

There was some concern that the results would reflect negatively on the group. To a large extent this was allayed by reminding the group that they were only part way through the process and that going forward they would be looking at ways to improve practice, and that the solutions piloted by the study would also be included in the finished work. It was also made explicit to the participants that they were normal in their behaviour and they were in no way deviating from the majority of the NHS workforce in their practice.

The group also questioned the researcher's focus on EIDM as an optimal basis for decision making. Several of the group stating that EIDM was not achievable or practical, and that the very things highlighted in the analysis of the data illustrated why it was impractical. For example there was a general indication that the time constraints under which decisions are made in the NHS would always restrict the information gathering element of EIDM and prevent individuals from adopting its principles. In defending their non-EIDM practices the group validated the results of the analysis by using the barriers highlighted in the analysis as reasons why EIDM had not been implemented by them or their organisations.

4.6 Summary of findings

There are clear barriers to consulting and using the research evidence during decision making. Several themes were prominent. These themes were identified across the questionnaire, interview and observational data.

- Limited resource was highlighted as a significant barrier. This could be insufficient time, insufficient infrastructure, or limited access to staff with appropriate skills and knowledge.

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- Research was viewed as vague or difficult to implement, or as not applicable to the actual decisions being made. The insufficient detail of financial implications within the research was highlighted as a key limitation.

- Research based information was not as highly valued as other information sources, such as internally generated information and dialogue with subject experts.

- There were low levels of information literacy skills within the cohort which reduced awareness and access to evidence, and the ability to assess the validity of information.

- Information use was subject to several biases, including confirmation bias, availability bias, shared information bias, and satisficing.

- There was no explicit process for decision-making. Decision-making was a socially and politically driven process rather than a rational analytically driven process.

- EIDM was not viewed as practical or achievable by the cohort.

- NHS Library services were not utilised due to inadequate timeliness and format of library resources.

The analysis of the data indicates there are two distinct mechanisms to explain the failure to incorporate evidence into the decision making of non-clinical NHS managers. These are production gap, and transfer gap. The first of these concerns the initial production of research. The failure here is that much of the research currently produced fails to meet the needs of non-clinical decision makers due to insufficient detail, or by not addressing the topics and specific areas which are needed. In addition the research is often lacking essential financial details to enable decision makers to implement findings in a 'real world' environment. The transfer gap concerns the failure to engage, learn and implement knowledge by decision makers when there is relevant and appropriate research available to them. The transfer failure mechanism originates from two underlying sources; the individual themselves, and the environment in which they exist. Examples of environmental factors include having limited access to journal content, limited access to synthesized information, organisational culture which does not value research, a need to adhere to government policy, and organisational resistance to change. Examples of personal factors include low personal motivation to use research, insufficient information literacy skills to identify and utilise research, a lack of structure decision making processes, and a preference for satisficing in decision making.

The main themes and related sub-themes identified through the analysis of the data are illustrated and summarised in the matrix shown in Table 4.2 which also shows where themes were demonstrated in observation, through interview, or both.

Themes	Representative Data - Interview	Representative Data - Observation	Represented in BARRIER questionnaire
Transfer Gap: Originating In the Individual			
Unable to identify initial information need	This theme was not expressed in the interview data.	During the group observations there were several instances where there was a gap in knowledge. In these instances decision makers did not seek additional information but moved their focus to aspects of the issue they were more familiar with.	This theme was not identified in the questionnaire.
Difficulty in interpreting and understanding research	"I do find that some of the statistics used in journal articles difficult to understand." *Respondent 8*	The group failed to differentiate between data presented in relative and absolute formats, and made no attempts to establish the validity of any data.	This was a prominent theme identified in the questionnaire
Unaware of what information is available or how to access it	"I think the inability to easily find information makes us an organisation significantly less effective than we could be"" *Respondent 5*	There were no observations which demonstrated this theme. There were also no observations to show that decision makers were comprehensively aware of information sources. Other than a few key sources, such as the Kings Fund, there was no indication that the wider literature was being accessed.	This was a prominent theme identified in the questionnaire
Prevalence of confirmation bias	This theme was not expressed in the interview data.	Decision making was observed as identifying a solution which was based on preconceived ideas and then only engaging with information which confirmed that thinking.	This theme was not identified in the questionnaire

Prevalence of satisficing in decision making	This theme was not expressed in the interview data.	While there was some preliminary discussion about possible actions this did not happen in any depth. Decision making was observed to focus on a single solution; often chosen due to ease of implementation, or decision maker's familiarity with the concept. There were no attempts made to compare multiple solutions to establish optimal outcomes.	This theme was not identified in the questionnaire
Previous experience of research use was poor	"I've read some papers which looked really useful. But when you start to look in any detail at the intervention it's just not feasible. We don't have the infrastructure, resources, expertise. Historically, a lot of research that's looked promising on paper has failed to deliver any benefits in the field" *Respondent 1*	There were no observations which showed this.	This theme was not identified in the questionnaire
Transfer Gap: Originating in the Environment			
Lack of organisational culture which supports the use of evidence	"It's not perceived as real work though is it. Reading research is viewed as a 'nice to do' activity. It's not an essential part of the job. *Respondent 1*	There was no observations which demonstrated this	This was a prominent theme identified in the questionnaire
Insular and Internal Focus	"There's something of a distrust among my colleagues towards any external sources of information. Getting staff to accept that other organisations might be doing things better than them is difficult" *Respondent 8*	The evidence that was utilised during decision making was predominantly produced internally or by NHS affiliated organisations.	This theme was not identified in the questionnaire

Limited access to journals & knowledge resources	"I find it difficult to access journal articles because my trust doesn't subscribe to the journal titles that are relevant to me." *Respondent 12*	There was no observations which demonstrated this	This was a prominent theme identified in the questionnaire
Limited time to find or read evidence	"People don't have time to read research, there are so many more immediate things competing for one's time" *Respondent 2*	During the decision making process participants were given little opportunity to read new information which was presented.	This was a prominent theme identified in the questionnaire
Lack of clearly defined process for decision making	"I don't think there is a conscious process. It's more like a conversation where ideas are put forward and assessed. It's quite ad-hoc." *Participant 5*	There was no explicit, formal discussion about the process or structure of decision making. Participants had an ad-hoc approach.	This theme was not identified in the questionnaire
Focus on achieving national government targets, policy & initiatives	"The focus is on hitting targets, not optimal care... The objective is to reach targets with minimum resources." *Participant 4*	Government targets and policy were one of the only sources of information to be consistently included in the evidence to support the decision making process.	This theme was not identified in the questionnaire
Imbalance of power and influence within decision making groups	"There's a lot of strong, forceful personalities that tend to dominate these group decisions. I'd say that if there are eight people round the table probably three people will account for the majority of the influence on the direction of the discussion" *Participant 4*	Perceived experts and those with more extrovert personalities were able to direct the discussion and agenda, and were more likely to achieve the decision they proposed.	This theme was not identified in the questionnaire
Production Gap			
Research findings are not applicable to local situation	"It's frustrating to spend time reading a paper and be not take away anything useful. A lot of research appears to be driven by academic agendas rather than the practical needs of the NHS"	When research was presented to the decision making group it was dismissed as inapplicable. Reasons given for this included the location where the original research had	This was a prominent theme identified in the questionnaire

		taken place (Non-UK) or that the population studied were not representative of the local population.	
Findings are unclear, inconclusive or ambiguous	"…the results aren't always clear, or there's ambiguity over how the results can be implemented." *Respondent 5*	There were no observed incidences of this theme.	This was a prominent theme identified in the questionnaire
Insufficient detail regarding implementation and financial elements	"I've read a few more research papers since we started this study and none of them mention associated costs or return on investment. I know that we're not a business and it's about providing patients with the best possible care, but you can't get away from the fact we have finite resources to deliver the service, and unless the research you're giving us has details of costs it's fairly meaningless, I can't do anything with it." *Respondent 2*	When research was presented to the decision making group it was dismissed as unhelpful because it lacked details of costs and financial elements to implementation, or had insufficient details of how to implement the intervention.	This was a prominent theme identified in the questionnaire
Format lacks dynamic interaction and does not have the succinctness needed for the required purpose	""I would primarily consult the clinicians and other staff who have a good knowledge of the situation and subject. They're the people who know what's happening and have the expertise and breadth of knowledge…. It's immediate and it's two way communications I can clarify my understanding and ask questions, I can't do that with a book or a journal. " *Respondent 10*	The decision process was highly iterative. The static nature of the published research article resulted in it being a less immediate and prominent than other sources of information such as expert knowledge and debate.	This theme was not identified in the questionnaire

Table 4.2 Matrix of identified themes

These findings indicate that the integration of evidence informed practices into decision making processes is not straightforward and there are many barriers to use and engagement.

The findings of this study show that the complex nature of the healthcare system can mean that applying research findings is difficult as the structure of the NHS often present barriers to implementing research. Decision makers find that research is lacking pragmatic elements such as details of associated costs and financial implications, and insufficient details on how the research may be implemented. A simple example of the difficulties in implementing research can be seen when trying to reduce the length of stay a patient has in hospital. Early discharge of patients frees beds so that more patients can be treated in a finite timeframe. There are several robust pieces of research which show how various aspects of hospital care may be changed to speed recovery and discharge. However, implementing the research would be pointless as even though the recovery times would be increased and the patients well enough to be discharged at an earlier point they remain in hospital beds until subsequent social care is arranged and available, there is limited social care availability which greatly increases the hospital length of stay. There are also research papers which show how the access to social care can be provided in a more timely fashion to prevent this 'bed blocking' but social services struggle to find the finances or recruit the staff needed to implement these findings. On top of this there are various government targets that organisations are expected to meet regarding discharge and re-admittance to acute care. This illustrates the points made by the cohort in this study; that the research, which is often robust and of high quality, is focused on a narrow aspect of care or a utopian setting which makes it difficult to generalise or implement in the swamps of the healthcare system where resources are stretched and political agendas restrict what can be done.

Despite these limitations and the difficulty in transferring research to practice there is still great value in using the right research as a component in the decision making process. The research provides valid, scientific evidence which will illustrate where potential areas of improvements to practice may be made. The research illustrates where new interventions have the potential to make effective improvements. If decision makers do not incorporate evidence into their decision making they risk wasting resources on actions which may provide sub-optimal results. For this reason it is important to examine the findings of the study and understand how decision makers can be supported to adopt evidence informed practices and encouraged to make better use of research evidence.

Having identified the potential barriers which limit non-clinical senior NHS managers engagement with evidence informed decision making, chapter 5 of this thesis discusses and identifies workplace based interventions to address these findings.

Chapter 5: Implementation and Evaluation of Trial Knowledge Transfer Interventions.

The findings of this research illustrated how senior non-clinical NHS managers use information in their decision making. This alone is useful information which allows a greater level of understanding of the information seeking skills, needs and behaviour of the cohort. However, the full value of knowledge is only achieved when it is applied. This chapter details the practical implementation of two approaches to addressing the barriers discovered in this research. The aim of these interventions was to increase the use of evidence during decision making by non-clinical NHS managers.

There are several approaches to knowledge translation and the previous research is not sufficiently robust to indicate what method is optimal. Grimshaw (2012) states:

> "*This profusion of approaches to improving knowledge translation to policy makers and senior healthcare managers highlights the increased recognition of the failure of traditional diffusion approaches to knowledge translation for this target group. Most of these approaches have a strong theoretical basis and face validity. However, it will be important to evaluate their benefits, harms and costs fully'*.

There are five distinct categories of knowledge translation proposed by Nutley *(section 2.7.2)*. During the informal group feedback session (Section 3.4.7) the cohort were asked to discuss their perceptions of these five approaches and the expected success of these approaches. During the discussion the researcher took notes and captured the group opinion. This was summarised and later confirmed by the group as an accurate reflection of their collective opinion.

There was an indication that EIDM would be more likely if central government explicitly required NHS organisations to document the research which underpinned decisions. The cohort stated that while there was an expectation and requirement for clinical interventions to be based on a robust body of research based evidence there was no similar expectation for non-clinical decisions. The participants also stated that, where government monitoring did occur, it was focused on basic quantitative targets (such as the four hour accident and emergency waiting time target) or financial data. There was an agreement that if central government required non-clinical decisions to explicitly record the research evidence base

underpinning them this would motivate the senior managers to engage with EIDM. Although changing central government policy was not possible as a direct intervention within the scope of this research, it is evidence for supporting a recommendation for further research.

Of the remaining approaches to knowledge translation there was a lack of enthusiasm for the dissemination route. Senior managers felt that they already struggled to find time to read the information they were already receiving and did not want additional material presented to them. However there was interest in dissemination which moved beyond simply forwarding existing products, but could take the form of specific 'management summaries' highlighting the content that was specific to their current issues and needs. This was something the group regarded as having potential to facilitate greater EIDM practices. However, there were mixed opinions on how this pre-packaged information product should be presented. 9 of the 12 participants (75%) wanted the information presented to them in person. They felt that this would allow them to ask questions, and the opportunity to engage in two way dialogue was considered to be vital to their engagement with the product. 3 or the 12 participants (25%) stated that having the information in a document (for example as an email attachment) which they could access at any convenient time was preferred. There was agreement that this was an idea which should be explored further and that it was something that could support EIDM adoption.

There were also different opinions on having greater interaction with the research community. There was agreement that the cohort would benefit and engage with research which was commissioned and carried out specifically for them to meet their specified needs. However there was also a view that the time required to commission and conduct research was too long, and that the timeframe for many of the decisions precluded any opportunity for collaborative research. The participants indicated that, while there was some interest in engaging with this mechanism, it was not something they wished to pursue at this point. In addition it was felt that this approach is primarily focused on addressing the production gap and would not address the other barriers identified in this study.

The cohort recognised that their information literacy was insufficient, but the majority of the group had no desire to undertake education or training to facilitate improvements to their skills or knowledge. The reasons given for this were that they had little time available for training or education, and that they would prefer to have an 'information expert' to directly

support them so that relevant tasks such as finding and appraising information could be delegated.

In the observed group work it became apparent that information was regularly presented for the first time during the decision making discussion and that, at this point, there was little opportunity for the group members to read the new information. It was then either dismissed or the person presenting the information highlighted their specific view of the information to the rest of the group. Some members of the cohort identified this as an issue and stated they regularly failed to participate fully in decision making because they did not have sufficient prior knowledge or information of the topic to allow them to contribute. To address this, it was suggested that there was a role for some kind of infrastructure support which could be developed to inform and disseminate any relevant information to *all* members of the decision making group prior to the event(s). The objective of this mechanism would be to provide equitable access to all relevant information to enable all participants to make informed decisions and contribute fully in the decision making discussions.

The cohort also highlighted that a reduction in their workload and additional financial resources would help to create an environment where greater engagement with EIDM practices could occur. Reducing the senior management workload or implementing more efficient work processes would increase the time available to them to read research and consider multiple solutions rather than satisficing. The current financial environment resulted in the decision makers having limited scope to implement new and innovative approaches and it was implied that increasing the financial resources would encourage decision makers to engage with a wider range of solutions.

5.1 Trial of Knowledge Transfer Approaches

When attempting to increase dissemination of innovation and practice it is recommended that interventions are most effective when focusing on reducing barriers (Lewin, 1948; Rycroft-Malone *et al*, 2010; Grimshaw *et al*, 2012). Some common generic barriers to research use were shown in the literature search but these did not identify specific barriers which affected non-clinical managers in the NHS. The analysis of the data collected from observation, interview and the Barrier questionnaire highlighted aspects of information behaviour and decision making behaviour specifically exhibited by non-clinical NHS managers where interventions could be targeted to reduce barriers to EIDM. By

synthesizing these findings it was possible to identify potential solutions which could be applied in the context of the NHS.

Contemporary knowledge management approaches take the view that information is plentiful to the point that it may overwhelm the decision maker, and the resource that is in short supply is managerial time. Analysis of the data collected by this study clearly identified limitations of time as a barrier to engagement with research. In addition to this low levels of information literacy in the cohort resulted in difficulty accessing and interpreting research.

The research also shows that in order to achieve the most effective use of research evidence in senior management decision making there is a need to put support structures in place which facilitate 'translation' of published research findings into 'management summaries'. To be effective it is proposed that this is needed to distill and synthesise all available evidence and information into a single source which is dynamic in nature, highly relevant to the immediate issues, concise and provide pragmatic bottom line answers.

The underlying political and social structure for decision making was shown to be a barrier to evidence use. It is therefore appropriate to provide a means to increase the transparency of decisions and introduction of standardised processes to reduce unconscious bias and personal politics. This should manage the evidence base to enable equitable access to all participants to reduce imbalances of power caused by selective and restrictive access to information. In addition, organisational culture should be developed to promote the value of research based information to the organisation, creating an environment in which EIDM is standard and staff value time spent reading research.

Based on these requirements, two interventions were developed, trialed and evaluated to establish their impact on the use of research based evidence by the cohort. An embedded librarian, and a SharePoint based knowledge management portal were developed and implemented. These two methods allowed comparison between the machine based (SharePoint) and human (Librarian) based interventions.

5.1.1 Embedded Librarian

In the clinical domain, the use of 'clinical librarians' has been a method used to support the use and adoption of current research findings. In this case, a traditional librarian is embedded within a single or small number of clinical specialties. In effect the clinical librarian becomes part of the clinical team rather than part of a separate support team function. The clinical librarian is then able to develop their specialist knowledge of the subject, answering any information enquiries, and proactively highlighting research which is relevant to clinical issues. Carlson and Kneale (2011) state that the clinical librarian should "*move from a supporting role into partnerships with their clientele, to develop stronger connections and relationships.*" For example, a clinical librarian will be present on ward rounds and, as information gaps arise in patient treatment, the clinical librarian will provide answers at the point of care. There is some evidence that this has been an effective mechanism to support and encourage EIDM in clinical staff (Brettle *et al*, 2016; Perrier et al, 2014) however, Brettle and colleagues, (2011) highlight that the much of the evidence which is available lacks methodological robustness.

The embedded librarian model has also been used in business and management where there is a similar evidence base which implies this may be an effective strategy to increasing engagement with research and evidence (Schumaker, 2012; Vassilakaki, *et a*l, 2015).

One key issue with implementing an embedded librarian is the lack of a standard model and several different approaches which may be adopted (Conklin *et al*. 2008). The existing literature identifies a group of tasks which comprise an essential core of tasks (Ward, 2012): these include knowledge management (e.g. gathering, disseminating and summarising/packaging information), interaction (e.g. understanding individuals needs and objectives or facilitating dialogue), development (e.g. helping the team develop general knowledge and ability with information literacy skills.) and decision support (e.g. advising, facilitating, and providing input as a critical outside/neutral perspective). Among the essential knowledge-brokering characteristics that Jackson-Bowers (2006) identify as essential to success are trustworthiness, credibility, political neutrality and subject expertise.

Adapting this model to provide an information literacy support specialist who could perform much of the literature gathering and synthesis on behalf of the decision makers was seen

as a desirable proposition. This would lessen their workload and potentially create more time for value-adding decision-making. The findings from the BARRIERS questionnaire highlighted the cohort's perception that they were isolated from colleagues with whom they could discuss research, and a desire for more dynamic methods of interacting with the research evidence. The embedded librarian model addresses these barriers and adds a specific member of the management team who may be consulted on research findings.

In this case study a single librarian was made available to the cohort of decision makers on a 37 hours per week basis. As the study cohort were employed across a range of organisations it was not possible for the embedded librarian to be based geographically in the same building as the decision makers. The Embedded Librarian was based in a separate office area within the same organisation as the researcher and was an individual who had three years experience of working in an NHS library and knowledge service and was familiar with NHS culture.

This support was piloted for a period of one month during which time the decision makers were presented with a fictitious scenario (Appendix 8) on which to test the impact of the embedded librarian service. The embedded librarian contacted each participant by telephone and gave details of the role, stating that they would assist in identifying, synthesising and evaluating evidence and information. They responded to any direct requests for information, advice or support from the decision makers, but also pro-actively sought, appraised and synthesised evidence which they felt was relevant to any on-going decision or activity. The librarian arranged a meeting with each participant once every two weeks to discuss their information needs and answer questions about the evidence. The librarian was included in any group discussion and correspondence, and had access to the SharePoint knowledge management portal (5.1.2).

5.1.2 SharePoint Based Knowledge Management

There are several approaches and models of knowledge management systems (Shannak *et al,* 2012). Alavi and Leidner (2001) stated that knowledge management systems refers "*to a class of information systems applied to managing organisational knowledge. That is, they are IT-based systems developed to support and enhance the organisational processes of knowledge creation, storage/ retrieval, transfer, and application*" (p. 114).

Knowledge management tools have evolved from static repositories of information to become more dynamic and participatory in nature (Paroutis & Al Salah, 2009). The end users of modern systems are viewed as co-producers who contribute to the content of a site rather than merely consuming a predetermined set of documents (Pachler & Daley, 2009). In this context, knowledge management systems have three common applications that include: The coding and sharing of best practices; the creation of corporate knowledge directories; and the creation of knowledge networks. There is a growing body of evidence which shows knowledge management systems can support and increase evidence informed decision making (Karamitri, 2015). Key elements of success include provision of a single location for integrated access to content and resources; facilitating sharing and distribution of information, and providing a function which encourages people to share and exchange knowledge. (Quinn, *et al*,2014). The implementation of a knowledge management system was viewed as an intervention which had potential to facilitate EIDM within the context of non-clinical senior decision makers in the NHS.

During the observed scenario sessions it was noted that there was a tendency to introduce new information as part of the decision making process rather than prior to the decision making. The people who had not seen the information could not assess its validity or enter any meaningful discussion about the content of the research/information or how it could be applied to the decision. This led to imbalance of power and political and symbolic use of the research. Introducing a single shared knowledge system to support the decision making process allows equitable access to all relevant information. It was anticipated that there would be less political use of information, and that as everyone would have the opportunity to read the research it would have a greater chance of being applied and integrated into the decision making process (rather than dismissed due to its unfamiliarity). The BARRIER questionnaire identified that the cohort perceived the creation of a single point of access which compiled all the relevant literature to be major facilitator in research utilisation. By utilising knowledge management software (Microsoft SharePoint 2010) to provide this single access point, this study was able to investigate if any increases in research use and evidence-based decision making were achieved.

Microsoft SharePoint was used as the underlying platform as this was an existing platform that all participants were familiar with and could access over the NHS secure N3 network. Sharepoint is a prolific and well used knowledge management tool (Goodyear, 2013). Microsoft (2014) state Sharepoint

"*provides a single, integrated location where employees can efficiently collaborate with team members, find organisational resources, search for experts and corporate information, manage content and workflow, and leverage business insight to make better-informed decisions*".

The objective of this site was to encourage engagement and use of research and to disseminate evidence which the embedded librarian posted on site, but also to provide an infrastructure to facilitate discussion and highlight evidence. Security settings within SharePoint were set so that only authorised individuals could see and access the site. Key elements of the portal were a document management function which allowed the librarian and the decision makers to store and disseminate documents, and an online discussion forum which decision makers could use to contact each other and the librarian to discuss any matter relating to the scenario. An automated email was also sent to the participants whenever any new activity occurred to alert them to new material.

The two interventions were run simultaneously to establish if there were any preferences exhibited by the participants when both options were made available to them. Also, the two interventions are not viewed as exclusive and it would be likely that both could be deployed within an organisation, so would be running simultaneously.

5.2 Evaluation of interventions

The research was interested in the *impact* of the embedded librarian on the decision makers rather than the *experience* of the embedded librarian themselves. Therefore the embedded librarian was not asked to share their views of the experience, but a diary of events (Example diary entry shown in Appendix 10) was kept by the embedded librarian. The diary was completed by the librarian to document any activity which occurred over the one month period. Analysis of the diary showed that all of the participants had at least one face to face meeting with the librarian and that the librarian had completed two evidence synthesis summaries for the group, and answered 27 enquiries from 10 separate participants over the pilot period. The diary demonstrated that the majority of participants had utilised the embedded librarian to some extent during the pilot and that relevant information requests were being directed to the service

At the end of the one month pilot of the interventions a final set of semi-structured interviews took place with participants'. These were undertaken using the methods detailed in section 3.4.4. In addition to the interview, a fourth group observation took place. This was carried out in an identical way to the previous observational sessions detailed in section 3.4.5 but with the addition of the embedded librarian being present. The embedded librarian was there to offer support if asked, but did not proactively initiate any action or conversation.

The data collected from the final interview and observation was analysed according to the methods detailed in chapter 3.7. Once the analysis was completed the initial findings (sections 5.2.1 and 5.2.2) were summarised and presented to the participants for feedback and to ascertain if the findings were an accurate reflection of the participants' experience and understanding of the phenomenon.

The analysis of the data indicated that both interventions increased the EIDM practices of the participants, however EIDM was not universally adopted and some negative themes were also identified from the interview data and group discussion. Of the two interventions piloted the embedded librarian had a greater positive impact on EIDM than the SharePoint System. The evaluation of the two pilots is discussed in the following sections.

5.2.1 The Embedded Librarian

The embedded librarian service was seen as a useful mechanism to encourage EIDM. However there were operational limitations to the embedded librarian. The costs that would be associated with employing a full time librarian are a barrier to wider implementation of the intervention. Participants indicated that, especially in the current restrictive economic climate, they would not be able to develop the service (despite finding it useful) due to financial constraints within their organisations. Some example comments included:

> *"Regardless of how effective it [the embedded librarian] was we have a freeze on recruitment, so even if I wanted to employ a librarian I can't.*" Respondent 4

"I would struggle to get this [embedded librarian] through deployment. We can only appoint to essential role posts, and I'm afraid this post would not be viewed as an essential." Respondent 7

"It's been a really useful service, but we're only able to create new posts if they're front line, patient facing roles." Respondent 1

These comments illustrate two aspects of the NHS. Firstly, senior managers have limited autonomy. Despite their seniority, managers are limited in the actions they can take by wider organisational structures and the wider political agenda. Secondly, there is an apparent value structure being enacted: the librarian role (which has an indirect impact on patient care) is seen as being of less value than the clinical role (which has a direct impact on patient care).

At an operational level there were high levels of satisfaction with the embedded librarian. In the final group observation the embedded librarian was actively included in the decision making process and asked to comment, provide views on the validity of information and consider its applicability to the decision being made. There was also a reduction in single-source expertise leading the decision as knowledge was more diffuse and spread among participants due to the dissemination of information prior to the decision making event. One of the functions the decision makers highlighted as particularly useful was when the embedded librarian met with them to disseminate literature evidence summaries on the decision topic, and this aspect of the role was seen as key to its success. Similar findings were found in the analysis of the interview data, with decision makers highlighting an appreciation of the dynamic two-way interaction and implied this was key to successful implementation of the role. Example comments included:

"*Having a face to face meeting with [the embedded librarian] was an effective way of making me pay attention to the information. If I'd been sent the information I wouldn't have prioritised reading it and probably wouldn't have got round to doing so. But in the meeting it was unavoidable: I had to engage with the dialogue and take in the information."* Respondent 3

"Having the librarian was efficient. They were able to summarise the research and highlight the documents that were useful. It saved me time as I didn't have to bother looking for information it was there, given to me." Respondent 5

"Being able to discuss the research was a definite advantage to having the librarian. I was able to clarify things about the research and understand if it was going to be useful to me." Respondent 7

"I, like most people, prefer having a conversation to reading; so having the librarian talk me through the research made it more engaging. Which resulted in me being more aware of the research and more likely to use it when making decisions." Respondent 2

There was still a desire from the decision makers to have an 'expert' view, and there was an expectation that the embedded librarian would have knowledge and skills beyond those of information literacy. In particular the decision makers found it frustrating that the librarian presented synopsis or summary information but was unable to elaborate on specific elements of its contents to the same level of detail that an expert in that subject area would. Example comments included:

"I found it frustrating that I was being made aware of information, but the embedded librarian didn't have the expert experience to answer my subsequent questions." Respondent 6

"Because [the librarian] became our main source of information I found that I lost some of the communication and contact with other people with experience of the issue. You need to consider that because those relationships that develop are important, not just for the decision making, but also when it comes to implementing any action." Respondent 8

"There was a couple of times that [the librarian] didn't have the subject expertise that others in the team do, and we wasted a bit of time clarifying or explaining concepts that, really, I would have expected them to understand." Respondent 3

"The services was excellent at providing an initial overview of the evidence, but there was a level of expertise and depth of knowledge of a topic that was missing as the process developed. It was difficult to get direct answers to some of my specific questions." Respondent 11

It was clear from these comments that the limited subject knowledge and experience of the librarian, to some extent, limited the opportunity for dynamic two way interaction. This was a short -term intervention and the subject knowledge that can be gained by the

embedded librarian is limited given the timeframe of one month. It is highly probable that if the service was embedded within the department on a permanent basis the desired level of expertise and experience would develop over time.

Another negative theme which arose was that decision makers were frustrated by being provided with additional information, which often lacked a clear best option. The librarian was seen as providing additional options but unable to identify a single best course of action. This was not a direct criticism of the embedded librarian or the research provided through the librarian mechanism. The decision makers had an implied expectation that if they engaged with EIDM that the research would remove all aspects of uncertainty from the process and continually provide clear and unambiguous answers to their issues. This is a slightly utopian and unrealistic expectation. The research can inform and guide the decision but it is ultimately up to the senior managers to make a decision when multiple valid options are presented to them. Managing expectations may be something that future embedded librarians need to incorporate into their interaction with senior managers. Example comments which illustrate the views of the decision makers included:

> "*It [synopsis of research evidence] wasn't what I expected. Rather than clarify things and provide a single recommendation I was presented with several new options to consider. It didn't help. I was no closer to knowing what course of action to take.*" Respondent 8

> "*Sometimes the extra information was detrimental. It was just additional complexity in an already complicated decision.*" Respondent 6

> "*It wasn't clear what the [synopsis of research evidence] information added. It was well presented and summarised but when that summary is 'no conclusion can be drawn from the current evidence' or 'the current evidence is based on poor quality research' it's not useful."* Respondent 4

> "*It was frustrating to spend time with the librarian looking at the research only to conclude that there wasn't any research that addressed the exact issue we were dealing with."* Respondent 9

Despite these shortcomings the embedded librarian was viewed as a success by the participants and all of the cohort stated that their engagement with research based evidence had increased due to the intervention. All of the participants stated that the

embedded librarian had facilitated the integration of research into their decision making. Comments included:

> "*Absolutely I used the research the librarian supplied when making the decisions. It was useful information.*" Respondent 3

> "*The information [the librarian] supplied was used in the decision making process. It provided us with a solid evidence base to justify our chosen actions.*" Respondent 10

> "*It [information supplied through the embedded librarian] was useful and it did inform the decision.*" Respondent 7

However the way in which the evidence was used was not explicit and there was feedback to indicate that the research evidence was used as part of a wider more holistic set of sources used to understand an issue, reflecting the interactive model of utilisation proposed by Weiss (1979).

> "*The information the librarian gave us was useful and it confirmed the advice we were getting from [subject experts] was right.*" Respondent 9

> "*The information was used, but it wasn't the only influence. It was a part of the whole and we needed to look at all the information we had, not just the research. But yes it did feed into that process.*" Respondent 2

> "*The research was more prominent in my thinking. There are a lot of other sources of information I need when making a decision such as financial data and benchmarking figures, but because the librarian was there waving the research in my face it was difficult not to give it consideration along with the other sources I would regularly use.*" Respondent 5

5.2.2 The SharePoint Knowledge Management Site

The SharePoint site was viewed as having a positive but limited impact on EIDM. The group indicated that the mechanism was useful as a document management and administration tool, but while awareness of potentially useful research was raised it had made limited difference to their uptake of EIDM practices.

The cohort considered the system was too passive, and that it was easily ignored in favour of other more immediate workplace tasks. The system worked by placing information on a central repository that all decision makers could access, there were also facilities to post questions and discussion on a forum. Both of these required the participants to actively take the time to visit the site, something they struggled to prioritise. The other aspect of the system was utilising e-mail to alert participants of updates and new information. Participants indicated that they deferred reading these emails until a period where they had less demands on their time, resulting in the emails often being unread. Example comments which illustrate this include:

> *"I didn't have time to read everything that was posted on SharePoint or e-mailed to me. I was selective in what I read."* Respondent 3

> *"I think it worked as a central point to store and organise the evidence, but there wasn't anything about it that encouraged me to use the evidence. It helped highlight the evidence but it still required time and motivation to actually read what was there. You would still have situations during decision making where people hadn't read any of the evidence."* Respondent 6

> *"It didn't free up any time for me, in fact it increased my workload. I didn't have the capacity to read everything that was highlighted. I was in the same situation where other tasks took priority because they were more visible , immediate, or easy' quick wins'."* Respondent 7

> *"I don't think SharePoint was successful. The emails were just another thing to read among the hundreds of other emails I get every week and I didn't have time to give them my attention. The same is true of the website. It was difficult to find the time to log in and read what was on there or contribute anything."* Respondent 8

The SharePoint site did encourage some of the group to read more research papers, but this appears to be motivated by social expectation or peer pressure rather than any desire to be more evidence-based in their practices:

> *"I did read more research than before. It was difficult not to when you knew there was an expectation. I didn't want to attend the meeting and appear ignorant because I was the only one who hadn't read something that was on the SharePoint site."* Respondent 2

"There was a pressure to read the documents. I thought it was likely that the evidence would be discussed in the meeting so I needed to know what it contained." Respondent 4

There was some limited evidence that the SharePoint site had minimised the symbolic or political use of information by individuals but this was not a prominent theme from the interview data:

"It was really useful to have all the information in advance of the meeting and in one place, I felt more knowledgeable and able to contribute to the discussion." Respondent 3

"Having the evidence sent to everyone before the meeting certainly reduced certain individuals' ability to be selective in the information they gave to promote their own viewpoint. It was clear from the evidence that there were other interpretations that could give different conclusions." Respondent 10

There was some observational evidence that individuals adapted to the pilot SharePoint site and continued to 'game' by submitting material to the site within 48 hours of the meeting causing others to have limited time to read it prior to the meeting. So, while the system did lessen political uses of evidence there were still instances when this happened.

The discussion forum element of the SharePoint site was not well used and only two of the cohort (Participant 5 and Participant 8) initiated a forum discussion. The embedded librarian initiated three forum discussions. From these five discussion threads only four of the cohort contributed to these discussions (participant 3, participant 5, participant 6, and participant 8). Interview comments showed there was little value in providing the discussion forum.

"I'm not keen on the asynchronistic way on-line forums and stuff work. I don't want to wait a day for a reply to a question. I'd rather phone someone and speak to them that way to get an answer. It's more immediate." Respondent 2

"I didn't have the time to engage with the online discussion." Respondent 7

"The online discussion was tedious. It took too long for people to reply and there was an uncertainty about it: it was unclear if anyone was going to reply or what the timeframe to post replies was… I posted a question on there and I only got a reply from the librarian. The issue was that I didn't know if anyone else was going to

reply so I wasted time waiting to see if there was any additional correspondence."
Respondent 5

These findings reflect similar low levels of engagement with online discussion which have been shown in studies of university students (Mason, 2011).

5.2.3 Evaluation Summary

The existing research is not ideal for non-clinical senior managers' uses. An obvious element to a successful intervention is a mechanism to translate the research literature into a tailored product which meets the specific requirements of the target audience. In this instance the decision makers were more likely to utilise evidence which was presented in a concise summary format, and information that was presented in a way which allowed instant feedback and discussion.

The evaluation of the pilots indicates that the embedded librarian model can be a successful element in supporting non-clinical managers to achieve EIDM, and it is an intervention that could facilitate increased engagement with research and EIDM among senior non-clinical NHS managers.. However, any intervention, including the embedded librarian, will be operating within the NHS organisational culture and wider environment. The NHS culture creates barriers to EIDM and changes to this environment are also an important element in success. The implications of these findings and evaluation are discussed fully in the following chapter.

Providing a SharePoint platform or similar KMS into an organisation is, however, not enough for a successful knowledge management process. Knowledge management also involves the culture of an organisation and the attitudes of the employees. For a KMS to be successfully implemented, the employees need incentives to use it in the right way, including an understanding of the importance of sharing knowledge and the positive effects that may result from it.

There was an increase in engagement with research based evidence and EIDM practices following the introduction of the two interventions. There was a greater degree of engagement and success in the Embedded Librarian mechanism than in the internet based Knowledge Management SharePoint site. The results of the study indicate that a

key element in the success of an intervention is its ability to make the evidence immediate and interactive. When interventions present the evidence in a static fashion other priorities and more visible work demands will take priority leading to limited engagement.

Chapter 6: Conclusions

This research study set out to investigate how NHS managers access and apply research evidence and how that research is utilised in the decision making process. In this chapter, the ways in which the findings of this study inform existing understanding of evidence informed decision making and information behaviors are explored. In order to address the research objectives in section 1.2 of this document the chapter sythesises the findings from chapter 4, with the literature, theory and models highlighted in chapter 2, and the evaluation of the knowledge translation interventions detailed in chapter 5. This research has been beneficial in several respects:

1. The research has provided an increased understanding of the information behaviour and decision making behaviour of non-clinical NHS management staff, and established the significance of these behaviors on the extent of evidence and knowledge utilisation by non-clinical NHS senior managers.

2. The research identifies prevalent barriers to EIDM within the cohort. The research has provided an increased understanding of the context-dependent nature of decision making within the NHS and the complexities of evidence utilisation in relation to evidence informed decision making.

3. The research has applied theories of knowledge translation to the workplace environment to provide evidence and practical examples of mechanisms for successful knowledge transfer in the NHS context.

4. The research has shown how library and knowledge services can have an impact on research utilisation and evidence informed decision making practices through the medium of the embedded librarian service model.

The following paragraphs elaborate further on the implications for the primary aims of the research.

6.1 Information behaviours and knowledge utilisation in non-clinical NHS management staff:

Wilsons (1996) information behaviour model (Figure 2.1) proposes multiple factors which may influence the information behaviour of individuals. A key element of this model is that information behaviour is a secondary action motivated by cognitive factors. The model proposes that a multitude of cognitive, social and environmental factors may be supportive or preventative in their impact on information behaviour. There was an absence of research which identified what these factors were in relation to the information behaviours of non-clinical NHS senior managers. Objective one of this research (section 1.2) addressed this gap in current knowledge and identifies the prevalent behaviours of the cohort studied.

6.1.1 Information Behaviour

Wilson (1999) and Kulthau (2004) both highlight the importance of uncertainty reduction as a primary motivation in information behaviour. One finding from this study has been that even when non-clinical NHS decision makers have engaged with research it frequently failed to provide the information they require to give them certainty in the decision they made. If research is not reducing the uncertainty in decision making it is unlikely to be viewed as a solution to the individuals underlying cognitive state and other means will be utilised to reduce the feeling of anxiety associated with uncertainty. This motivation to reduce uncertainty may manifest in other information behaviours and adoption of cognitive behaviour patterns such as ignoring information that contradicts preconceived views, or reluctance to seek new information from outside of familiar cultures or environments (Hirsh *et al*, 2011). Indeed the findings in section 4.23 and 4.24 of this thesis showed this type of cognitive behaviour (such as confirmation bias and a focus on internal sources of

information) was prevalent in the both the observational data and interview data collected from the cohort. From this we may conclude that the models are valid, and reducing uncertainty is a prime information behaviour motive within this cohort. The reduction of uncertainty can be seen as being both supportive and preventative in effect. The desire to reduce uncertainty encourages individuals to seek and engage with research as a source of information. However, it also has a preventative effect as individuals adopt cognitive behaviours which reduce exposure to conflicting information which would increase uncertainty. The extent to which research evidence is perceived to reduce uncertainty will have a direct and important influence on whether it is utilised or not (Chowdhury, *et al*, 2014).

This study has found that research is perceived by the managerial decision maker as being of limited assistance with regard to the complex problems they are addressing. The findings from the BARRIERS questionnaire (see section 4.1) showed that 100% of the respondents agreed that 'Results are not generalisable to own setting', 83% identified that 'implications for practice are not made clear' and the respondent group 'does not see the value of research for practice'. These were significant barriers to utilisation of the research. If reducing uncertainty is a key reason for managers to seek new information then research evidence is failing them. The research publication itself is often ill suited for applied use and there needs to be change in the published research format to increase its value to management staff. Moher *et al* (2015) and a series of papers in the Lancet (2014) estimate that 85% of biomedical science is 'wasted' as the resources used in production and output from the research are not applied or utilised in any meaningful way. There are no similar estimates of health management research specifically but a similar level of 'waste' can be implied from the findings of this study. The inclusion of additional information and focus on costs and implementing the findings of the research would go some way towards increasing the utilisation of research amongst non-clinical NHS mangers. This was something that was regularly highlighted during this case study as an area where improvement would lead to greater utilisation of research.

Research evidence is only one of many sources of information and knowledge that were available to the cohort and sources such as internal data warehouses and subject experts are preferred because they were easily accessed and offered opportunities for more

dynamic interaction. Data from internal data warehouses could be adapted to specific local populations and manipulated to best fit the immediate need of the decision maker. Subject experts could be asked additional questions to make the information they gave more understandable, specific and targeted to the local population and immediate issues. This ability to dynamically interact with the information source allows the seeker of information to address their uncertainty and through an iterative process become more certain and confident in the information they receive. These findings were not unexpected and are in keeping with research findings from other disciplines such as healthcare policymakers (Innvaer *et al*, 2002 ; Oliver *et al*, 2014) and public health commissioners (Orton, 2011). One of the reasons for preferring alternative sources of information to research evidence was that the cohort found it difficult to interpret the results and content of research based information.

6.1.2 Information Literacy

If information literacy skills are inadequate, individuals will not be able to find, access or understand the research evidence that is available to them (Hepworth, 2014; Chang 2015).This study found that the managers did not have the required information literacy skills and proficiency to make good use of relevant research. The findings from the BARRIERS questionnaire (see section 4.1) showed that 100% of respondents identified being unaware of relevant research as a significant barrier to research utilisation. 75% of respondents did not feel capable of evaluating the quality or research, and that they perceived statistical analysis as not understandable. The findings from the observational sessions showed that the cohort seldom applied any level of critical assessment to the information that was presented. The cohort also lacked any systematic process for identifying information relying predominantly on information that was immediate and at hand, or organisationally high profile such as internal data and reports, and the opinions of those co-workers perceived as experts. The answers given during interview (Section 4.21) support this and comments such as '*an inability to easily find information makes us an organisation significantly less effective than we could be*" illustrate that the cohort have difficulty in accessing information.

These findings reflect what is already known about the behaviour of generic 'managers'. In his study of evidence informed management Barends (2015) identified that '*studies are*

selected based on individual preferences, and the research results are generally not subjected to a critical appraisal'

It was found that non-clinical managers to have a holistic conception of 'evidence' which gives traditional research less value than colleagues who are clinically trained (Section 4.2.5). Where previous research has been done in the NHS, this has focused on policymakers and commissioners (e.g. Orton *et al*, 2011; Wye *et al*, 2015) and has reached similar findings indicating that NHS senior managers are holistic in their definition of evidence and use a wide range of information sources and formats to inform their understanding. Walshe & Rundall (2001), in their work on evidence-based management, state that, compared to clinical staff: "*Personal experience and self-generated knowledge play a much larger part in determining how managers approach their jobs, and there is less reliance on a shared body of formal knowledge in decision making.*' It is clear from the findings of this study that the cohort consider evidence as incorporating a wide range of information sources.

The low levels of research use found in the cohort may therefore be due to the background of non-clinical senior NHS managers, who are less likely to have been trained in the scientific tradition than their clinical counterparts have. In reviews of Canadian and UK undergraduate programs of Management and Business critical appraisal of research was not found to be routinely included in the curriculum (Briner at al, 2014; Lapointe *et al* ,2015). Information literacy is becoming more valued and being integrated into MBAs and other degree programmes (Hesseldenz,, 2012), however it may be several years before the results of these changes reach the NHS due to the timescale for training and employing new staff.

This research (Section 2.2) identified that the prolific models of information literacy have viewed individuals as self-contained and requiring a range of information literacy skills. However in the NHS there is a high degree of specialization and individuals such as data analysts, librarians and statisticians are employed to carry out specific information functions within an organisation. The embedded librarian employed by this study provided information literacy support to the cohort and could be viewed (through delegation of tasks) as negating or reducing the need for individuals to have certain information literacy skills. The evidence from the findings of this study shows that, by delegating to an information specialist, individuals may be supported and assisted with various information

tasks such as literature searches, synthesis of information, and appraisal of information quality. However, there are some aspects of information literacy that cannot be delegated. Individuals need the skills to be able to identify when there is a gap in current knowledge, they need to be able to interpret the information in a way that makes it meaningful for their specific need and circumstance, and skills and knowledge are required to know how best to implement and use the knowledge to achieve optimal outcomes. There is little existing research which examines which elements of information literacy can be effectively delegated to others and which are an essential to the person themselves. This is an area which would future information literacy research could address.

6.1.3 Knowledge Utilisation

An outcome from this research was identifying how the cohort applied knowledge and information during the decision making process. Section 2.63 of this document outlined the seven research utilisation purposes proposed by Weiss (1979). Of these, the data (see section 4.25) showed that the Interactive Model of research use was the prominent preference in the decision making and information behaviours of the cohort. Research use was part of a larger system of information and evidence which Weiss (1979) described as "*a disorderly set of interconnections and back-and-forthness.*" Several different sources of information and knowledge influence the decision making including personal experiences, political influences, financial pressures, personal judgment, expert opinion, organisational data, and organisational culture. Comments from the interview data such as "*patient views, expert opinion, local data, one's own experience of the situation, and research findings as well as reports and guidelines are all evidence*" (respondent 3) and "*Any relevant information that's presented or mentioned will have some impact on the process*" (respondent 8) confirm that multiple sources of information and knowledge are used to reach decisions. This is not unexpected as the issues which NHS non-clinical decision makers are addressing are complex, often unique and do require this holistic range of information to be considered in order to reach optimal outcomes (Walshe, 2009). However, engagement with research evidence is often neglected in favour of more immediate knowledge and information such as the organisations internal data or subject expert.

The observational data also established that individuals regularly adopted the Political Model of research utilisation. This model implies that the decision makers are not receptive to new evidence if they have already formulated a course of action which they intend to pursue. Research is still utilised, but simply for self-serving purposes; to support and promote the course of action which the individual has previously decided upon. An example of this from the observations was when one of the participants presented and discussed one set of results from a set of data. There were six pieces of data and the individual chose to extract the only one which supported his viewpoint. The others, which did not support his views were ignored. This political use of research is not unusual and has been recorded in other studies of the evidence use of decision makers in other sectors (Head, 2013; Lorenc *et al*, 2014), and has been found to be the predominant approach to research use made by policymakers (Rissi and Sager, 2013). From these findings it is fair to state that political utilisation of research is a common occurrence that is a natural part of the decision making process. There was also some limited evidence of the Tactical model, where the process of utilising research is valued over the actual content of the research. This manifested as a political tactic to delay decision making. For example when the cohort were presented with a decision where the best option choice was unclear or unknown they would delay making the decision and request that more evidence was needed before they could act. These requests for further evidence was usually done with no clear idea of what that research would look like or detail any specific factors which the research should address. It is this lack of specificity which indicates that the tactical model is being employed and that the content of the research is less of a concern than the process of delaying the decision making.

The low levels of information literacy discussed in section 6.1.2 may be a contributing factor to the levels of political and tactical use of research. If the cohort had greater levels of information literacy they would be able to appraise the information presented with greater rigor and identify when information is being misrepresented for political ends. Currently the cohort have insufficient skills and knowledge to do this so are more accepting of misinterpretation and misrepresentation. By increasing the information literacy of the cohort there would be a greater ability to critically assess information and this would lessen the opportunities for political utilisation of research evidence during decision making.

In the study cohort there was a distrust of information that was produced externally to the NHS. There was a clear preference seen in section 4.24 that NHS produced information and reports were used to anchor discussions and held greater prominence than information which originated from out with the NHS. Comments from interview such as "*There is something of a distrust among my colleagues towards any external sources of information.*" (Respondent 3) illustrate a theme which emerged from the data of silo working and internal focus. This preference for internally generated material may occur for several reasons. Internal knowledge is often more transferable and relevant due to the understanding and compliance with organisational culture and infrastructure. The material may be viewed as 'psychologically safe' as it is unlikely to present new information that conflicts with the organisations current views. Internal information and knowledge can be accessed more readily and in a more timely way than some external sources, and there may be a prior relation with the producer which lends trust and value to the information.

In conclusion, while there is some use of research by this cohort it is not considered the major influence on the decision. The Interactive model of research utilisation applies to the NHS non-clinical managers' information behaviour and decision making. Research is just one of many sources of evidence which decision makers will utilise in reaching a decision, and there is a tendency to utilise those sources which are most immediate, familiar, and offer a high degree of interaction. When research utilisation occurs it tends to be a secondary action to give credibility to previously decided actions or views. The use of research is politicised and individuals will have difficulty engaging with information which conflicts with previously held views, or which conflicts with current political and organisational objectives.

This study shows that there is little theoretical difference between the concepts of evidence informed decision making (EIDM) and evidence based practice (EBP). Both concepts recommend that decisions are made based on a combination of the best available evidence and practitioner expertise. In addition to this the preferences of stakeholders must also be considered. In the case of EBP this is primarily focused on the patient, while in EIDM, in addition to patient, there can a wider range of stakeholders to consider such as political/government agendas and financial considerations of the organisation. It is difficult to differentiate between the theories which underlies these two

concepts. However, in practice the managerial decision making focus of EIDM tends to be applied to decisions which are less well defined than their clinical counterpart. There is also an absence of explicit hierarchy in the sources of evidence utilised in EIDM: EBP recommends that practitioners consider the hierarchy of evidence pyramid when evaluating the importance of evidence (Melnyk & Fineout, 2011). In practice EIDM values evidence on several factors beyond its methodological robustness. With EIDM There is a need for more operational evidence such as local demographic and service use data, and the practicalities of implementation (such as financial implications) are given greater consideration. In summary, while the theory and principles of EIDM and EBP are the same, in practice there are some subtle differences in implementation. Two key differences were observed in this study: Firstly, EIDM practitioners consider a wider range of information as 'evidence' which places less emphasis on methodological robustness (although this is still considered) than practitioners of EBP. The second difference is that EIDM practitioners tend to have a wider range of stakeholders to consider in their decision making, and the value of patient preferences, while still considered as important may not be given the same prominence in the decision making process as would be the case in EBP practitioners.

This study has shown that research utilisation by non-clinical NHS decision makers is not a clear, linear process, but a complex, iterative series of events influenced by personal, organisational and political contexts.

6.2 The decision making processes employed by senior non-clinical NHS managers:

Research from other sectors and healthcare managers (Berryman, 2008) have shown most decision making processes are based on pragmatic naturalistic approaches. There was insufficient evidence which identified the decision making behaviours of non-clinical NHs managers. Objective two of this research addressed this and examined the underpinning approaches and behaviours associated with the decision making behaviour of this specific cohort.

The findings of this research showed that there is no explicit or standard process to decision making by the cohort. This was apparent in the data from the observations and

the questionnaires. The research also confirmed that non-clinical managers have a naturalistic approach to decision making.

With regard to dual thinking (section 2.1.3.1) the cohort were predominantly reliant on System 1 (implicit) thinking which was characterized by the use of previous experiences and personal beliefs rather than the slower logical reasoning which characterizes System 2 (explicit) thinking. This use of system 1 thinking is a barrier to engagement with research as other sources of information which are more familiar, trusted, and quicker to access take preference (Neth and Gigernzer, 2015; Misha, 2015).

Time pressures have been identified as one of the factors which leads individuals to adopt naturalistic/System 1 approaches to decision making (Hardman, 2009; Zsambok and Klein, 2014). The findings from this study showed insufficient time to be a prominent limitation experienced by the cohort. 92% of respondents stated they did not have sufficient time to read research, and responses during interview such as "*I think most people would like to be better informed before making decisions, but there's not the time available to do that*" highlighted limited time as a key theme. The pressures of limited time can be detrimental to decision making (Betsch & Haberstroh, 2014) and create a barrier to research utilisation (Holder *et al,* 2013).

Satisficing (MacDonald, 2011) is one of the cognitive strategies employed by individuals during decision making when time is limited. The findings of this research found participants frequently utilised satisficing (Section 4.23) and that all decisions observed during this study had been subject to the satisficing heuristic. If the goal of EIDM is to achieve optimal outcomes, satisficing presents a major barrier to this with its contrasting approach: Rather than choosing what is best, the goal of satisficing is to choose what is merely satisfactory. This study addressed this issue by trialing two interventions which aimed to reduce the time required to identify relevant information. By pro-actively providing decision makers with a systematic synopsis of the available research these interventions reduced the time needed to access the information. Because the decision makers required less time to access and read the information, this reduced the need for satisficing. However, even with provision of systematic evidence summaries, there was still a significant level of satisficing evident in the cohort. This suggests that the cohort were not employing satisficing exclusively due to the limitations of restricted time. The findings of this research suggest that the political nature and culture of the NHS in England is responsible for the prevalence of satisficing which causes decision makers to 'make do'

with satisfactory but sub-optimal output. The following section (6.2.1) discusses this and the appropriateness of EIDM in the NHS in greater detail.

6.2 Research Approach versus Accountability Approach

The principles of evidence informed decision making are rooted in EBP which originated in the medical disciplines. The basic principles of EBP are comparable to common generic approaches to problem solving and evidently do translate to the non-medical managerial situation. However, the importance given to traditional research in evidence-based medicine may not be appropriate for EIDM. This is primarily due to the nature of problems being considered. NHS managerial and clinical practice are very different (Walshe, 2009). Clinicians encounter the same situation many times so adopt evidence into their standard practice, while managers often have complex problems which require a unique intervention. The traditional EBP approach is applied to biomedical problems where there is a good understanding of the system being investigated (such as the circulatory system), the variables involved are also well understood and easily measured and the outcome tends to be clear and well defined. If we compare this to the decision made by management staff we see that 'wicked problems' are a far more common issue. Wicked problems are defined as those which lack well defined outcomes and originate in unpredictable and constantly evolving systems (Head, 2008). In wicked problems, there are generally no right/wrong binary solutions, and outcomes cannot be checked by some standardized method or established criteria. This differentiation between the problems addressed by EBP and EIDM is highly significant as it leads to a different decision making approach.

There is an argument that heuristics allow for adaptive responses to the wicked problems and uncertain managerial environment and are a valid and effective approach to decision making (Baum & Wally, 2003; Neth & Gigerenzer, 2015): The satisficing heuristic observed in decision making may be an effective approach when optimal solutions cannot be determined or when time limits the period in which a decision is required (Neth & Gigerenzer, 2015; Artinger *et al*, 2015). There is an argument that heuristics allow for adaptive responses to the characteristics of an uncertain managerial environment (Baum & Wally, 2003; Neth & Gigerenzer, 2015) The heuristics which were observed may be

explained by experienced decision makers understanding their context and the limitations of what is practical and possible.

In contrast to the research based approach this study highlighted that non-clinical decision makers have a tendency to focus on achieving predefined targets as their primary aim. This is an accountability based decision making approach. An accountable approach starts with a focus on a specific measurable outcome or target. Key differences between this approach and the clinical research-based approaches are summarised in Table 6.1:

	Research (clinical)	Accountability (non-clinical)
Focus	Generalisable	Specific to individual process & location
Measure	Several precise and validated outcome measures taken through complex processes from external and independent sources.	Small selection of approximate measures which are easy/convenient to collect. Measures taken through simple processes from internal sources.
Confounders	Considered and where possible mitigated and accounted for. Usually controlled.	Considered but not accounted for or directly measured.
Timeframe	Time intensive and can take considerable time to produce results	Short time requirement. Results are produced quickly and focus on current period.

Table 6.1: Research Vs Accountability Decision Approaches

In practice this accountability approach to decision making focuses on benchmarks and predefined targets. This difference in decision making approach provides an explanation for the proliferation of satisficing that was observed. The decision makers do not seek

optimal solutions, they merely want 'something' that will allow the predefined target to be achieved. Based on this finding it is clear that if evidence informed decision making is to become the norm within the NHS there needs to be a reduction from central government in the importance and emphasis given to target driven objectives.

This study has focused on a cohort which is largely remote from the research literature, but which makes up an important section of the healthcare workforce. The non-clinical decisions made by this group will have an impact on patients, healthcare workers and social services in their area, yet little was known about how these individuals made decisions or what the underlying processes were. This study has established that there is a lack of structure or explicit process to non-clinical decision making, and that the participants are focused on achieving outcomes which will meet government led targets and metrics. The role of evidence informed decision making in this environment is limited.

6.3 An effective method for knowledge translation to facilitate greater engagement with evidence informed decision making practices

It is clear that evidence informed decision making is not the natural approach which is taken by non-clinical senior NHS mangers. This study has established that research evidence is not being applied routinely and that this has led to decision making which is satisfied with 'good enough' rather than maximizing resources and achieving optimal outcomes.

The complex decisions which the cohort are making require a multitude of information and knowledge sources to be applied. This includes organisational data, the opinions of subject experts and the decision makers own experience and knowledge of the issue. But there is also a need to integrate research evidence into this range of information and knowledge that informs decision making. However the study has identified several barriers which make the process of research utilisation difficult for the cohort. To facilitate the adoption of evidence informed decision making this study developed and implementing interventions which minimised these barriers and supported the cohort to use research.

The findings from the BARRIERS (section 4.1) questionnaire was useful in identifying the barriers which should be addressed by a knowledge translation intervention. 100% of respondents identified 'the relevant literature is not compiled in one place', 'the amount of information is overwhelming' and 'the individual is unaware of research' as universal

barriers to utilisation of research. In addition to this 92% stated they did not have time to read all the available research, and that research is not reported in a clear, readable way. The findings from this questionnaire indicate that a key element to any knowledge translation mechanism should be to develop a single, unified point of access to information. It also illustrates a need for the research to be synthesized, summarised and presented in a format that non-clinical senior managers will find readable and time efficient.

6.3.1 Embedded Librarian

The main reason for selecting the Embedded Librarian intervention was its ability to facilitate interaction and dialog. The BARRIER questionnaire (section 4.1) highlighted that 67% of the cohort felt isolated from knowledge colleagues with whom to discuss the research. In addition a theme from the literature indicating that a potentially effective method for bridging knowledge boundaries and facilitating research use was the use of a 'broker' role (Oborn *et al,* 2013).

The findings from section 5.21 of this study have shown that deploying a librarian to act as an interface between the decision makers and the research literature led to an increase in engagement with research evidence and EIDM practice. The embedded librarian was able to contextualize and interpret the decision makers' information/evidence need and provide concise summaries of information which could be applied to the problem. This was perceived by the cohort as being time efficient and assisting their decision making. The librarian was able to address the limited information literacy skills within the cohort by carrying out basic critical appraisals and systematic searches to providing a comprehensive, synthesised set of concise, applicable information which was quality assured. This significantly increased the amount of research which decision makers were aware of and led to a greater engagement with EIDM principles.

One aspect of the embedded librarian role that needs to be considered is the interpersonal dynamic between the decision makers and the embedded librarian. The notion of knowledge boundaries (Carlile, 2002) states that communities of practice develop specific meanings, values and tacit integration of knowledge; that knowledge is fundamentally intertwined with working practice. When new knowledge is introduced this may be seen as

a threat to these knowledge boundaries as there are costs to adopting new knowledge and individuals/communities will need to adjust. This can lead to disruption within the community as roles, distribution of power, and relationships adapt to the new knowledge (Harvey and Kitson, 2015). It is important that when presenting new knowledge and information to their team that the embedded librarian is aware of this and manages the process to minimise disruption. The need for trust and the ability to interact in an effective manner are vital skills in making this intervention work (Carlson, 2011; Trayner *et al*, 2014). It may be that it in some organisations the role would be better undertaken by individuals based outside of the library and knowledge service, such as organisational development, communications teams or business services. However it is unclear if those employed in these areas would have the necessary levels of specialist information literacy to perform the role.

 In theory the embedded librarian role would be an effective way of supporting EIDM and should lead to more effective and efficient decision making. Although most evidence related to embedded librarians in a healthcare context is anecdotal (Conklin *et al*, 2008; Trayner *et al*, 2014) the evidence from this study suggest that embedded librarians may be an effective way to improve the utilisation of research and increase evidence informed decision making practices employed in healthcare decision making.

 However, there were some limitations to this approach. By acting as an intermediary the embedded librarian at times reduced direct interaction between the decision maker and others in the organisation such as data analysts and subject experts. This may impact detrimentally on the working relations between the decision maker and other teams/individuals in the organisation, reducing opportunities for direct exchanges of knowledge.

There was also an expectation that the embedded librarian would have a high level of knowledge of the subject being examined, and that they would understand and conform to the culture of the individuals and teams they were working with. This level of understanding may develop with time, but there there may be some initial limitations to how well an embedded librarian may integrate with their team and meet expectations. This need for decision maker approval is essential to productive collaborative working. This study showed that decision makers frequently exhibited confirmation bias in their selection of evidence. They reduced their political use of evidence once the embedded librarian was in place. This is a good outcome, but one which may not be welcomed by all managers. It

may be that decision makers with pre-conceived views or agendas may prefer to dismiss or ignore evidence which is counter to their preferred world view. While not explicit from the study data it is not unreasonable to consider that these individuals may refuse to engage with the embedded librarian concept and prevent the development/implementation of the role in their organisation.

Another negative theme which arose was that decision makers were frustrated by being provided with additional information, which often lacked a clear best option. The librarian was seen as providing additional options but unable to identify a single best course of action. While the embedded librarian can increase decision makers' utilisation of evidence it does not address any shortcomings in the evidence base itself. Similarly, there was an expectation from some participants that employing n embedded librarian would remove any uncertainty in decision making by presenting a summary of evidence which included a single best option. The embedded librarian can present the evidence in more concise and usable formats, but they cannot make the decision regarding the best course of action, this is still the responsibility of the accountable decision making manager.

The lack of a standardised model of what an Embedded Librarian role entails may also restrict an organisation's ability to develop the role (Bombaum *et al*, 2015; Russel *at al*, 2010). Bombaum *et al (*2015) state that identifying "*specific [knowledge] brokering activities are often difficult to standardize or define because the role requires flexibility and responsiveness to a stakeholder's context and needs*". This may cause issues when trying to create job descriptions and identify suitable candidates for the role of Embedded Librarian. In addition to this, a multitude of skills are required to provide an effective embedded librarian service, for example table 6.2 shows a matrix of the skills required as proposed by Kislov *et al* (2016) .

	Information management	Linkage and exchange	Capacity building
Generic skills	• Understanding the cultures of both the research and decision-making environments • Ability to establish credibility • Ability to assess the context of implementation • Communication skills • Problem-solving skills • Project management skills		
Specific skills	• Searching and retrieving evidence • Appraising evidence • Synthesizing evidence • IT skills • Tailoring resources to local needs	• Mediation skills • Negotiation skills • Networking skills • Interpersonal skills • Stakeholder management and influencing skills	• Teaching skills • Mentoring skills • Facilitation skills • Change management skills • Improvement skills

Table 6.2: Aspects of knowledge brokering and skills required for their realisation

In reality, it is doubtful that the NHS workforce currently has sufficient numbers of employees with the appropriate skills mix in place to adopt this as a universal service, and in the current NHS climate of reducing income it is unlikely to have the resources to employ people to fill new embedded librarian roles. It is probable that in a similar way that clinical librarians became established in pockets of the NHS following the introduction of EBP that we will begin to see librarians beginning to be embedded within non-clinical senior management teams in a limited number of organisations as EIDM is adopted.

6.3.2 SharePoint Knowledge Portal

The findings from section 5.22 of this study show that when information was made available to study participants through electronic media such as email, SharePoint document repository, or online discussion forum there was limited evidence of effective transferal of the information. Participants indicated they did not engage with these dissemination methods. While there was an intention to access and use the information it was too easy to delay this and prioritise other tasks. This study found that when information was supplied on a central system individuals did not feel 'pulled' to access it. Direct 'push' methods such as individual emails and current awareness feeds had more impact but these also failed to fully engage staff. All electronic information delivery was found to be subject to delayed action as participants prioritised more immediate or visible aspects of their workload. This is not to say that electronic communications should be ignored when encouraging EIDM. The medium was found to be useful for governance issues such as archiving meeting notes and participants stated that having a single point where all relevant information was held to be advantageous and welcomed this functionality. The disadvantage of the electronic medium was one of timeliness as there was a tendency to view documents retrospectively after the event.

One apparent reason for the difference in results between the interpersonal approach and the electronic approach to dissemination and support was how the organisations viewed the activity of reading. There was an almost universal agreement from participants that their organisational culture did not see reading as a productive activity, while face to face

meetings were seen as core expected activity. There is a need for infrastructure and resources to provide senior managers with both electronic and human mechanisms to disseminate information. The human, face to face interaction is important in enabling timely and personalised information. The electronic systems are important to provide centralisation, equity of access, and governance of the information. Both aspects help to support and encourage senior management engagement in EIDM and research use.

6.4 The NHS Culture during the Period of this Research

An influence of NHS culture demonstrated in the findings was the influence of external politics. The NHS is directed by the government department of health. This introduces an element of politics that has considerable influence on organisation culture. Unfortunately, this is not a positive influence, but one which constrains decision making through regulation, monitoring and target setting. For example, the greater the level of external control in an organisation, the lower the degree of rationality adopted in decision making (Shepherd, 2013). In NHS organisations the sheer volume of external monitoring and regulation can reasonably be expected to both reduce rationality and increase risk aversion.

Recent government initiatives have focused on cost savings and reducing bureaucracy within the NHS. As a consequence there has been a 17% reduction in the number of 'managers' employed by the NHS in England over the past 5 years (Kings Fund, 2015) .In contrast all other NHS staff groups have increased in size (Health and Social Care Information Centre, 2015). This research has established that non-clinical mangers feel they do not have sufficient time to make evidence-informed decisions and resort to satisficing and 'quick win' solutions. By reducing the number of senior managers within the NHS there are increased demands on the time of those who remain, with the dwindling number of non-clinical senior managers having to make ever increasing numbers of decisions. Under these circumstances it will be difficult to encourage EIDM behaviors and it is likely that these staff will continue to use satisficing as a method of decision making in a bid to achieve their workload with the constraint of finite limited time availability. This

reduction in senior management indicates that the NHS environment will continue to be a challenging place to implement EIDM practices.

6.5 Conclusion

This study establishes that NHS managers want to make the best decisions that they can. They want to be informed by any relevant information from a range of sources and formats including published research findings. However, there are barriers which are limiting the cohort's engagement with published research literature. Firstly, the research output is not sufficiently high quality. The research regularly lacks sufficient details to be implemented or replicated, particularly regarding information around the financial aspect of the intervention. The information non-clinical NHS managers require is neglected and seldom addressed directly in the research literature. The evidence which is used to inform decision making comes from a wide range of sources. Dynamic, easily accessible sources such as the opinions of subject experts are preferred. There is also a preference for internally generated information such as NHS reports and organisational data.

The culture within the NHS also presents a barrier to evidence informed decision making by encouraging satisficing through a focus on target driven assurance processes. Ideally, decision makers would consider all potential information until the optimal solution is identified. However, this is a task which requires considerable time and effort to complete, and decision makers will weigh the likelihood that they will find relevant information against other priorities which their time and effort could be invested in. The findings of this research show that decision makers will employ satisficing heuristics to identify when an outcome is a 'good enough' rather than 'the best' outcome. In doing so they do not engage with research based evidence which would inform optimal decision outcomes. This research identified two key elements which contribute to the proliferation of satisficing. Firstly, decision makers' prior engagement with research has left them with an impression

that the research is not generalisable to their specific issues, or is lacking in key details such as financial considerations of implementation. Non-clinical decision makers also lack the information literacy skills necessary to interpret research statistics or critically evaluate the validity of research. This results in published research having a low value to the cohort. This low value assigned to published research means that during satisficing the decision makers will calculate engagement with published research as a low return on the time invested and seek alternative sources or 'make do' with their own prior experiences and knowledge. The second element is the target driven culture which is prevalent in the NHS. This culture leads decision makers to focus on achieving predefined (often arbitrary) targets as their primary aim which encourages satisficing to occur during decision making.

The result of these barriers leads to a situation where NHS management staff are at times eager for information to help them make sense of a complex situation, but research is being neglected in favour of other more immediate, dynamic, more easily understood and accessible sources of information.

It is important to acknowledge that research evidence alone is not enough to inform the complex, often system-level decision of non-clinical NHS senior managers. However research is currently being underutilised and there is a need to integrate research more fully into the larger holistic range of 'evidence' sources that decision makers utilise. If research evidence is to play a greater part in managers decision making it will be necessary to either improve the information literacy skills of managers or provide some mechanism through which managers may delegate information literacy related tasks. The embedded librarian is a good example of this type of intervention. By delegating certain tasks and responsibilities to the librarian the cohort were able to receive support which increased their awareness, understanding and access to relevant research. The embedded librarian was able to manage the research evidence, identifying, interpreting and presenting it in ways which were more appropriate and immediate to the decision makers. The embedded librarian also raised decision maker's awareness, acceptance and utilisation of research-based evidence.

The evaluation of the trials indicated that the embedded librarian model has potential to be a successful element in supporting non clinical managers to achieve EIDM. However bringing a knowledge translation service such as the embedded librarian into an organisation is not enough for a successful knowledge transfer process. Success also

involves the culture of an organisation and the attitudes of the employees. The NHS culture creates barriers to EIDM and changes to this environment are also an important element in success.

This chapter has added further detail and substance to the findings, developing the arguments from the initial findings discussed in chapters 4 and 5 and setting them in the wider context. Chapter 7 discusses the final recommendations based on the new knowledge and understanding gained from this study.

Chapter 7: Recommendations

This research project set out to establish a greater understanding of non-clinical decision makers working in the NHS with specific regard to the role of published research in the decision making process. The research also aimed to apply knowledge translation theory to the NHS workplace and develop an intervention that would be successful in supporting and facilitating increasing EIDM practices by non-clinical NHS senior managers. Both of these objectives have been achieved. In this chapter a number of possible implications for practice are suggested. In this final chapter the key findings of the study are reiterated and the implication for practice and future research are discussed. The chapter also reflects on the limitations of this study and highlights the originality and contribution to theory resulting from the research.

In exploring how non-clinical health managers interact and apply research to decision making processes this study has focused on three main aspects: the information and decision making behaviours of NHS managers, the impact of context and the NHS organisational culture, and the quality and applicability of the research publication. In this final chapter the main recommendations in each of these areas are put forward, followed by assessing the limitations and implications for future research, and finally, identifying how the study findings will be disseminated.

One of the features of the evidenced informed decision making literature is how little work there is which examines decision making as it actually happens in practice. This study has addressed that deficiency by focusing on the ways in which evidence is used during the decision making process. This has highlighted the nature of information behaviour and the practical ways in which evidence is used and applied within the context of the NHS in England. In addition, pragmatic mechanisms to increase research utilisation and evidence informed practices within this context, have been identified which go some way towards addressing the needs of non-clinical senior NHS managers.

It is now apparent that non-clinical managers do not value research-based evidence as highly as their clinical counterparts, and that research evidence is only one of several competing information sources that this cohort utilise and consult during decision making. It is now clearer that decision making is not a linear process and NHS non-clinical managers do not follow a standardised, explicit decision making process into which evidence can be inserted. It is also evident from the findings that this group are making decisions which often need to be informed by ethical, financial, political and pragmatic judgment as well as scientific knowledge. Within this context several shortcomings in the research were identified which minimised the decision makers use and implementation of the research based evidence. To address the multiple barriers that the cohort encountered the study piloted two interventions. Of these the embedded librarian model of service delivery was successful in increasing the uptake of evidence informed decision making, and has potential to produce similar results across the NHS if implemented more widely.

A number of key implications can be identified from the findings of this study. It is clear from this study that if decisions are to be informed by best evidence it is important to put some support process is put in place to ensure that research is presented to decision makers in a format that is timely, makes research understandable, and makes explicit the practical application of the research.

The political and organisational climate was shown to have an adverse impact on research utilisation. In particular, the target based performance monitoring which is prolific in the NHS encourages decision makers to satisficing behaviour which limit engagement with relevant research evidence.

Drawing out the implications of this work for practitioners and others, the remainder of this chapter sets out some of the most important recommendations as they apply to the different groups involved.

7.1 Recommendations for NHS Education and Professional Development

The study highlighted that non-clinical NHS managers lack sufficient information literacy to independently adopt evidence informed practices. These findings suggest that this has implications for the continued professional development and training needs for this cohort and recommends that NHS organisations provide opportunities for this training to be made available to senior non-clinical managers, and that managers should take this opportunity to develop their information literacy skills and knowledge. The range of information that informs decision making is wide. This study found that there was insufficient levels of information literacy among senior management. Research can only be utilised if it can be accessed and understood. Insufficient information literacy will prevent systematic and regular use of research information.

The NHS has invested considerable resources in providing their employees with access to leadership training opportunities and support. The findings of this research indicate that non-clinical senior managers would benefit if some of this resource was used to increase the knowledge support services available to them and increase the opportunities available to access information literacy training. For example, the NHS Leadership Academy receives approximately £73 million per annum (Leadership Academy, 2014) to develop leadership within the NHS workforce. A small percentage of this money could be used to develop and integrate an additional evidence informed decision making component to the professional development portfolio offered by the academy. In the two year period between 2013-2015, a total of 35,156 NHS staff had been part of one of the academies development programmes. These programmes are targeted at middle and senior management staff and specifically include the non-clinical decision makers which were the focus of this study. This existing infrastructure could be used to deliver educational interventions to increase information literacy. This would involve minimal costs and would have the potential to deliver significant return on the investment through an increase in optimal decision outcomes (Shortell *et al*, 2007).

Indeed the Leadership Model recommended by the NHS leadership academy includes the key dimension of evaluating information (see figure 7.1) which explicitly refers to 'evidence-based decisions'. This study recommends that this dimension is given greater prominence within the leadership academy programmes, and that the current emphasis on data is replaced by a view which encourages engagement with all forms of knowledge, evidence, information and data.

Evaluating information

What is it?
- Seeking out varied information
- using information to generate new ideas and make effective plans for improvement or change
- making evidence-based decisions that respect different perspectives and meet the needs of all service users

Why is it important?
Leaders are open and alert to information, investigating what is happening now so that they can think in an informed way about how to develop proposals for improvement

What is it not?
- Failing to look beyond the obvious
- Collecting data without using it
- Thinking only about your own measures or experience
- Reluctance to look for better ways of doing things
- Ignoring problems by ignoring data
- Using research as a weapon

Essential

Gathering data

Do I collect feedback from service users?

Do I collect and record the essential data for my area of work accurately and on time?

Am I regularly thinking about ways to do my job more effectively?

Can I see patterns that help me to do things better, more efficiently or with less waste?

Proficient

Scanning widely

Do I look outside my area of work for information and ideas that could bring about continuous improvement?

Do I establish ongoing methods for measuring performance to gain a detailed understanding of what is happening?

Do I spot future opportunities and risks, and test resulting plans with external stakeholders to improve them?

Strong

Thinking creatively

Do I conduct thorough analyses of data over time and compare outcomes and trends to relevant benchmarks?

Do I see the relevance of seemingly unrelated ideas which could be made useful in my area of work?

Do I creatively apply fresh approaches to improve current ways of working?

Exemplary

Developing new concepts

Do I develop strategies based on new concepts, insights, or perceptive analysis?

Do I create improved pathways, systems or processes through insights that are not obvious to others?

Do I carry out, or encourage, research to understand the root causes of issues?
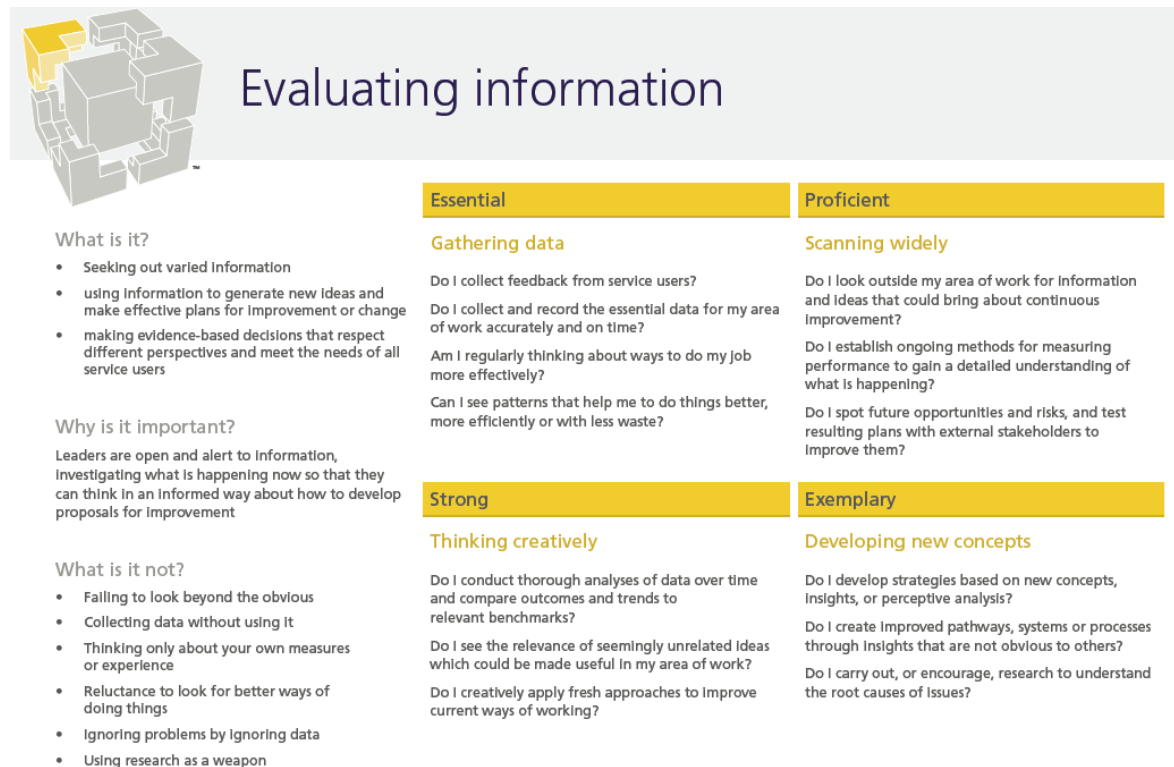
Figure 7.1: NHS Leadership Model: Evaluating information (Leadership Academy, 2014)

7.2 Recommendations for Publishers and Researchers

The IMRaD (introduction, methods, results, and discussion) format of research publication is the prominent norm for the structure of published scientific journal articles (Sollaci and Pereira, 2004; Bertin *et al*, 2013). However, it has shortcomings. In this study it was clear

that the published research has insufficient detail of how the findings could be applied or the costs associated with implementation. This is essential information which is required to ensure that the research has an impact on 'real world' activity. Inclusion of an additional implementation and costs section within the research publication would greatly assist in the translation of the findings from an academic viewpoint to one which is focused on the pragmatic practicalities of the workplace. In failing to include detailed financial analysis researchers substantially limit the impact and transferability of their research.

7.3 Recommendations for library services

The value of information and knowledge is greatest when practitioners apply it purposefully to solving their own specific problems. This means that library and information science practitioners need a greater awareness of the multiple contexts for evidence use and what gives certain sources of information more credence. Most senior NHS management tasks are complex; they entail multiple goals that require not only scientific thinking but also moral, political and pragmatic judgments to be considered. This means that when designing services library and information science practitioners need to be sensitive to the primary purpose and motivations which drives the need for new information and to source information that is fit for purpose.

The study found that non-clinical NHS managers do not find the research to be fit for purpose. They perceive it as lacking generalisability to their specific issues, have difficulty understanding and interpreting the findings, and do not have sufficient time and information literacy skills to locate and access the research which would be useful to them. Library and knowledge services can play an important role in addressing this barrier. This study has demonstrated that implementing an embedded librarian within senior NHS management teams has the potential to increase the utilisation of research and increase evidence informed decision making. This study recommends that an important service development for NHS library services is to move staff out of the traditional library setting and move towards the embedded librarian model used in this study to support senior management staff.

In addition, the assumption that research based information is the primary determinant of the decision outcome has been shown in this study to be somewhat unrealistic and misguided. If library services are to be viewed positively by senior management within their organisations it is important for library and knowledge services to view 'evidence' broadly when designing their services to include information sources such as subject experts and data analysts. Redefining their role as strategic 'information gatherers' rather than static repositories of academic learning.

The outcomes from the pilot interventions indicate that a dedicated information support function encourages decision makers to consider a wider range of options and increases engagement with the research literature base. A physical 'real person' allowed a greater ability to personalise and meet specific needs of individual decision makers. In contrast the virtual support system used in this study did not offer sufficient 'push' to engagement and although similar information was made available on this system it was often ignored. The cost of employing embedded librarian posts within non-clinical management structures would require investment from organisations, but this cost is may be balanced by the savings made and productivity increases associated with adoption of EIDM principle's and optimal decision outcomes. For example, a library service based literature review and subsequent adoption of research findings in anaesthesia service delivery led to an estimated cost saving of £140,000 p.a (Health Education England, 2015); Library staff at Morecambe Bay Hospital produced evidence summaries to underpin procurement decisions which contributed to the Trust Supplies Group saving £100,000 in a year(Health Education England, 2015. p28) Savings such as these are anticipated to produce a financially beneficial return on any investment in non-clinical embedded librarians.

7.4 Recommendations for the NHS.

It was clear from the observations of the group decision making that satisficing and immediacy biases were prevalent. Decisions were influenced by time-pressures and target driven objectives which encouraged satisficing. The first solution which indicated acceptable outcomes was taken forward without consideration of other alternatives. This in turn was directly influenced by what information was most readily at hand, with the most easily accessed and familiar information being considered first. There was also no standardised process underpinning the decision making process. Performance

management and reporting systems imposed by the NHS are target focused. The findings of this research showed that this is increasing the satisficing in decision making and leading to 'good enough' rather than 'best possible' being the objective of a decision outcome. This is making poor use of the resource available to the NHS. A key recommendation for the NHS as an organisation is to move to a process based assurance system rather than an outcome based one. A requirement for explicit evidence-based principles should be part of this assessment, and documenting the evidence on which a decision outcome is made should be a standard practice. In doing so the NHS will take a step towards creating a culture which supports evidence informed decision making rather than acting as a barrier to it.

7.5 Limitations of this Research Study

While every effort was made to minimise internal and external bias there are some potential areas which may limit the generalisability of this research. Participants were self-selecting which may mean this group of individuals may have had a greater level of interest and engagement with EIDM which motivated them to take part in the research.

A common concern with participant observation is that the act of researcher observation may elicit self-conscious modifications in their behaviour, the so-called "Hawthorne effect" (Mays and Pope, 1995). It is hoped that by ensuring anonymity and confidentiality along with the researchers 'insider' knowledge and understanding of the NHS that this effect was minimised. Due to the self-selecting nature of this study there is a chance that the actual rate of research use in clinical decision making may be lower than that observed in this study as the participants may be more engaged in EIDM activity than non-responders. However, the participant observation allowed the researcher to collect the tacit information which was not always consciously expressed by the participants. The observations also provided data on the group interactions, and dynamics which existed within the cohort during decision making. This provided unique information which increased the validity and robustness of the research findings and recommendations.

Several of the participants indicated that purely by being involved in the research process they had become more aware and engaged with evidence informed practices. It is possible that some of the benefits observed in the interventions could be due to simply taking part in the research process rather than the interventions which were deployed.

The researcher works in the NHS as a manager of library and knowledge services. The researcher has prior knowledge and experience of the phenomenon being investigated which may influence how the phenomenon is viewed. This prior experience may create a subjective bias which can influence the interpretation of the research. The methods utilised in this study took this into account and included elements which minimised bias, such as asking participants to reflect on findings and confirm if these were a true representation of their experiences. However, ideally a second independent researcher could have been involved in the study so that multiple-coding of the data could be carried out. Having multiple coders is a recognised method to reduce bias and minimise any subjective bias that an individual researcher may have (Saldana, 2015; Barbour, 2001). While multiple methods were utilised to minimise bias in the study there was no access/resources for multiple-coders. As this study was coded solely by a single researcher this may have an impact on the validity of the findings.

This research took place as the government white paper *Equity and Excellence: Liberating the NHS* (Department of Health, 2010) was being implemented. This created a period of uncertainty, with the organisation going through huge structural change. It made long term strategic plans difficult due to the lack of clarity on how the Bill would be implemented and how it would impact on individuals and their organisation. Therefore, managers' strategic decision making became a very reactive process due to the constantly changing political landscape and on-going speculation over changes to the white paper. The implication of this is that results of this research may be limited in generalisability, being specifically relevant when applied to organisations which are going through similar periods of change and may not reflect the actions and thoughts of individual managers during periods of stability.

This study has focused primarily on the initial decision making process, and supporting the implementation of evidence informed decision making. However, this is only one part of a larger on-going process and as one of the participants pointed out: "*Making the decision is one thing, but it's when you come to implement it becomes frustrating. All it takes is for someone to refuse to support the decision and everything stalls. Compromises are made and you end up with more or less the same situation you had to begin with*". While this research can demonstrate ways in which greater use of research can be facilitated and evidence informed decision making increased, it can only *imply* that these decisions actually lead to more effective and efficient long-term outcomes.

7.6 Recommendations for future research

While this study has addressed a major gap in current understanding of evidence utilisation in healthcare management decision making, there is a need for further research in several aspects of this topic. This study is based on a limited number of participants. While it has provided detailed accounts of behaviour and practice, any generalisations from the findings must be treated with caution, and further work is required in order to confirm these observations in the wider NHS and healthcare environment.

The study does provide valuable signposts that can guide future research priorities. An interesting aspect of the research which would warrant greater investigation is the difference in individual versus group decision making. Group decisions are argued to be superior to individual decision making in that they tap into a wider knowledge base. However, there have been many studies demonstrating group decision phenomena, such as groupthink and non-rational escalation of commitment, which show decision-making behaviours lead to suboptimal choices by groups (Lightle *et al*, 2009; Sunstein and Hastie, 2014).While this research did incorporate limited elements of individual and group decision making, because current NHS senior management decisions are primarily based on group decision making the focus was on providing solutions which were applicable to the group decision making environment. There is scope for additional research to examine solutions for the individual decision making model. It would also be interesting to compare the effectiveness of individual decision making compared to group decision making within the NHS to establish which of these modalities leads to the greatest adoption of EIDM.

The embedded librarian was a successful intervention, but one which would require investment if it were to be implemented across the NHS. A vital element to making the embedded librarian an attractive proposition for NHS organisations is establishing the return that organisations could expect from such an investment. It is a recommendation of this study that future research in this area focuses on the economic evaluation of this intervention. If the costs of hosting the embedded librarian within a department can be shown to be substantially less than the cost savings made through EIDM and optimal decision outcomes this will provide considerable evidence in favour of establishing the

embedded librarian as a standard team member within non-medical management functions.

The Embedded Librarian role created the opportunity for senior managers to delegate information related tasks to another person. There is little existing research which examines which elements of information literacy can be effectively delegated to others and which are an essential to the person themselves. This is an area which would future information literacy research could address.

7.7 Contributions to theory.

Previous research has focused largely on the use of research based evidence in decision makers with clinical backgrounds, or in government policy makers. Only very limited research has been conducted involving NHS managers whose background and role is non-clinical in nature. There is also a similar pattern and paucity of research regarding the information behaviours of this cohort. This study provides a significant contribution to knowledge, offering new insights to the information behaviour and decision behaviour of non-clinical NHS management staff. This study has increased the understanding of the specific cognitive biases which are prevalent among senior non-clinical managers working in the NHS in England.

Previous research on effective mechanisms to incorporate research findings into decision making processes has been largely theoretical in nature and lacks consensus about the optimal methods to transfer knowledge in a healthcare context. Oliver (2014) states that the evidence base around evidence-based management '*remains mainly theoretical* ' and '*there are few grounds by which to make firm recommendations or conclusions about the process, impact, or effectiveness of research transfer*'. This study addresses this knowledge gap and increases the understanding of how decision-makers interact with research, and provides evidence of an effective mechanism to increasing evidence informed decision making practices among non-clinical NHS managers.

By applying the theoretical models to a pragmatic, real world workplace environment this study provides a significant contribution to the existing work and demonstrates that the

embedded librarian which has been used in a limited capacity in clinical settings can be effectively translated to the non-clinical management context. This advances the understanding of the embedded librarian role and provides new evidence to support its implementation in the workplace.

Combined interview and observational data collection methods allowed this study to capture data which was explicit and implicit. This is an unusual approach, as Levin (2013) points out most of the research on this topic "*relies on asking people what they did and why, even though it is well known that self-reports, whether of belief or behaviour, are not reliable.*" This study advances theory by presenting a novel methodology with can be adopted to produce research outcomes which have a greater level or reliability and validity than is currently the case.

7.8 Contributions to Practice

This study has provided new understanding of the evidence informed decision practices of non-clinical NHS managers. It is clear from the findings that current engagement with research is limited and that there is a need to support and facilitate the use of evidence within this cohort. This study makes several practical recommendations which can be implemented within the NHS in England and in Healthcare library and knowledge services. By taking the clinical librarian model and applying it to the non-clinical management sector of the NHS this study provides guidance and evidence which shows the intervention has potential for success if it were to be implemented by other NHS organisations.

7.9 Dissemination of Findings.

To ensure that the findings of this research are disseminated the researcher intends to publish two papers in open access journal titles. One paper which details the barriers to evidence informed decision making in non-clinical NHS management, and a second paper which details the two interventions trialed in the study. The researcher also intends to

present the findings of this study at various conferences where the subject matter is appropriate and relevant to the conference themes.

In addition this study will inform a business case which is being submitted to Health Education England to secure funding for two Embedded Librarian posts. These will be 12 month appointments which will be used as long term pilots of the intervention where further evidence of the economic and financial impact of the role will be evaluated.

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Appendix 1 : Group Reflection: Introductory Statement (based on Krueger & Casey, 2000)

Good afternoon and welcome. Thanks for taking the time to contribute to our discussion on the use of research in decision making. My name is Paul and I will serve as the facilitator for today's group discussion. The purpose of today's discussion is to firstly feedback the results from the interviews and group work you have all taken part in over the last few months. This is an opportunity for you to give your views on these findings. We expect that you will have some different points of view and you are encouraged to voice these. Please feel free to share your point of view even if it differs from what others have said. If you wish to add to something, agree, disagree, or give examples feel free to do that. Don't feel obliged to answer or contribute to every aspect of the discussion. I am interested in hearing from each of you. So I may ask you to give others a chance to contribute. And if you haven't said anything I may ask you if there is anything you want to contribute. I just want to make sure that everyone has the opportunity to contribute.

I want to make sure you are comfortable. So, feel free to get up and get refreshments or have a comfort break whenever you feel you want to. I will be making notes during the discussion to help me remember what was said. You have all agreed as part of the research process to respect other's views and contributions and that you conform to Chatham house rule and I want to remind you all that no names or identifying information such as organisation names will be used in any reports or research output. Can I confirm that everyone is in agreement with these principles? Let's begin by looking at the summary of themes that emerged from the interviews.

Appendix 2: Information for Participants

I would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. If anything you read is not clear or you would like more information please get in touch with me using the contact details listed at the bottom of this document.

What is the purpose of the research.

This study is being undertaken to produce a thesis as part of a Professional Doctorate in Information Science.

The study aims to examine the decision making processes of senior non-clinical mangers working in the NHS, with a particular focus on research use and information behaviour.

Expected outcomes from the research :

- A better understanding of the information behaviours of NHS management and the use of information in complex decision making. This will be formally documented.
- The development and evaluation of one of more interventions to support and facilitate decision making which is evidence informed and makes greater use of the available evidence base.

Why have I been chosen?

The study is specifically interested in senior non-clinical managers working in the NHS. We are seeking participants from a wide range of NHS organisations who are willing to share their views and experiences. We are specifically interested in the views of NHS staff on grades 8a and above and consider you to be someone who has this experience and meets these inclusion criteria.

Do I have to take part

No, there is no obligation to take part. You can also withdraw from the study at any future point in the process and do not need to provide a reason or justification for doing so.

What do I have to do

Becoming involved in this study is a considerable commitment.

During this period you will be interviewed three times and be asked to take part in three group work pieces which will take the form of observed fictitious decision making

scenarios. It is anticipated that each interview will last between 30 minutes and one hour. Each group scenario work is estimated to last between 2 and 4 hours.

In addition to this you will be asked to actively engage in the research process and contribute ideas and feedback on data analysis at various points through the process.

What happens to the information I give at interview, scenario work, and as part of this research.

Interview tapes and transcripts will be held in confidence. They will not be used other than for the purposes described above and third parties will not be allowed access to them (except as may be required by the law). However, if you request it, you will be supplied with a copy of your interview transcript so that you can comment on and edit it as you see fit. Your data will be held in accordance with the Data Protection Act and destroyed within 5 years of the data being collected.

Anonymity

Interview data will be held and used on an anonymous basis, with no mention of your name, but we will refer to the group of which you are a member

What will happen to the results of the study

The results of the study will form part of a thesis submission for a Professional Doctorate in Information Science with the Robert Gordon University.

The study results will also be used in two papers which will be submitted for publication in prominent journals (For Example: The Health Information and Libraries Journal, or The Journal of Behavioural Decision Making).

What if there is a problem?

If you have a concern about any aspect of this study, you should speak to the researcher in the first instance who will do their best to answer your questions.

If you remain unhappy and wish to complain formally you can do this through the Robert Gordon University. Contact Prof.Peter Reid at peter.reid@rgu.ac.uk

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We cannot promise the study will help you directly, but the information we get from the study will help to increase the understanding of decision making in the NHS and contribute to the development of support services in the library and information science specialty.

Contact for further information

Paul Stevenson. – Senior Health Information Specialist, Airedale General Hospital.

Tel- 07779651501   email: paul@paulstevenson.info

Appendix 3 : Consent Form

Study: Investigating research use during decision making by senior non-clinical NHS management staff.

1. I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily	
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without any consequences for me.	
3. I have been informed that my actions and comments given during interview and group scenario work may be recorded and I give my consent for this.	
4. I understand that all information I provide will be treated as confidential and will be anonymised.	
5. I agree to the use of anonymised direct quotes from my interview and group scenario work being used in publication arising from this study.	
6. I agree to take part in the above study	
Name of Participant	Date

Signature of Participant
Name of Researcher: Paul Stevenson
Signature of Researcher

Based on an example consent form in: *Interviews in Qualitative Research* (King & Horrocks, 2010)

Appendix 4 – Confidentiality Agreement

This form is intended to ensure confidentiality of the data obtained during the course of this research study. All parties involved are asked to read the following statement and sign to indicate that they agree to comply. Only individuals who indicate they agree to comply with the statement below will be included in the study.

I hearby affirm that I will not communicate or in any manner disclose any information gained during the course of this research. I agree not to document or talk about material relating to this study with anyone outside my fellow study participant members and the researcher.

Name:_____

Signature _____

Date:_____

Barriers and Facilitators to Using Research in Practice

We would like to know the extent to which *you* think each of the following situations is a barrier to the use of research to inform/enhance decision making. For each item, circle the number of the response that best represents your view. Rating 1 as not a barrier, 2 a barrier to a small extent, 3 as a barrier to a moderate extent, 4 as a Thank you for sharing your views with us.

Barrier to a great extent, and 5 to indicate no opinion.

1. Research reports/articles are not readily available	1	2	3	4	5
2. Implications for practice are not made clear	1	2	3	4	5
3. Statistical analyses are not understandable	1	2	3	4	5
4. The research is not relevant to practice	1	2	3	4	5
5. Unaware of the research	1	2	3	4	5
6. The facilities are inadequate for implementation	1	2	3	4	5
7. Individual does not have time to read research	1	2	3	4	5
8. The research has not been replicated	1	2	3	4	5
9. The benefits of changing practice will be minimal	1	2	3	4	5
10. Uncertain whether to believe the results of the research	1	2	3	4	5
11. The research has methodological inadequacies	1	2	3	4	5
12. The relevant literature is not compiled in one place	1	2	3	4	5
13. The individual does not feel she/he has enough authority to change relevant procedures	1	2	3	4	5
14. Research results are not generalizable to own setting	1	2	3	4	5

15. The individual is isolated from knowledgeable colleagues with whom to discuss the research	1	2	3	4	5
16. Little benefit for self	1	2	3	4	5
17. Research reports/articles are not published fast enough	1	2	3	4	5
18. Physicians will not cooperate with implementation	1	2	3	4	5
19. Administration will not allow implementation	1	2	3	4	5
20. Does not see the value of research for practice	1	2	3	4	5
21. There is not a documented need to change practice	1	2	3	4	5

THIS IS A BARRIER

22. The conclusions drawn from the research are not justified	1	2	3	4	5
23. The literature reports conflicting results	1	2	3	4	5
24. The research is not reported clearly and readably	1	2	3	4	5
25. Other staff are not supportive of implementation	1	2	3	4	5
26. Individual is unwilling to change/try new ideas	1	2	3	4	5
27. The amount of research information is overwhelming	1	2	3	4	5
28. Does not feel capable of evaluating the quality of the research	1	2	3	4	5
29. There is insufficient time on the job to implement new ideas	1	2	3	4	5

Are there other things you think are barriers to research utilisation?

If so, please list and rate each on the scale:

30. _____	1	2	3	4	5
31. _____	1	2	3	4	5

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32. _____   1   2   3   4 | 5

33. _____   1   2   3   4 | 5

34. Which of the above items do you feel are the *three greatest barriers t*o your use of research ?

    Greatest Barrier .... Item #:

    Second Greatest Barrier .... Item #:

    Third Greatest Barrier .... Item #:

35. What are the things you think *facilitate* research utilisation?

_____

_____

_____

_____

Appendix 6- Interview Schedule

Thank interviewee for agreeing to the process. Explain timing and process, reiterate purpose of research, and confirm they are still happy to proceed with the interview. State they do not have to answer all (or any) question.

Screening Questions

1.   Can you give me a brief description of your role and responsibilities within your organisation?

2.   How often are you involved in making decision which will have organisation wide impact?

A-   Questions about Research and Evidence

1.   How would you define 'evidence'?

1.1 – What would you consider as the most reliable sources or types of 'evidence'?

1.2 - What does the phrase 'evidence informed decision making' mean to you?

2. Where would you normally go to obtain the knowledge and information you require for decision makings?

3. What types of information are most useful to you personally when making complex decisions?

  3.1 Why are those sources more useful than other alternative sources/ Why do you
  prefer to use those sources?

4. Do you have access to all of the evidence and information you need to make informed decisions?

  4.1 What additional information do you need that you currently cannot access?
  4.2 How is that gap in information addressed/dealt with ?

5. Do you consider your organisation to have a culture which supports the use of research based evidence?

B: Questions about Decision Making

1.Do you perceive a particular style or approach to the process of making complex decisions within your organisation?

    1.1 Does you organisation have any specific guidelines or written procedures for decision making?

2.When making decisions as part of a group, do you perceive influence and power in the group as being equal?

    2.1 Who or what do you consider to be the causes of that imbalance?

    2.2 Has there ever been a situation where you have been unable or prevented from contributing fully to a discussion during decision making?

3. Do you consider the general decision making processes in your organisation as effective?

    3.1 Why do you think it lacks effectiveness and what could be done to improve it?
    3.2 Why do you think it is effective and what can others learn from the process?

4. In your opinion, how important is research based evidence in the decision making process.

    4.1 What do you think prevents/facilitates the use of research based evidence in decision making?

    4.2. In what way could research based evidence be improved to be more useful to decision makers?

    4.3 In what way, if any, does research based evidence currently influence decision making?

5. What, do you consider, the things that have greatest influence on a group in making and reaching a decision?

6. Are you aware of any approaches or mechanisms that are used to evaluate or assess the reliability and validity of information and knowledge that is presented during the decision making process?

C: Questions about Information Literacy

1. What does the phrase 'information literacy' mean to you?

2. Are you able to interpret and understand published research?
> 2.1 What is it about the research that makes it difficult to interpret?

3. What sources of information do you personally find most understandable?
> 2.2 Why are they more understandable than alternative sources?

4. How do you assess the validity of information and evidence?

5 . Do you use your library and knowledge service?
5.1 – Can you tell me your reasons for not using the services?
5.2 Tell me your views on the service you received.

6. Is there anything you would like to mention or discuss that you consider relevant to this research which might not have been covered during the interviews?

General Prompts:
'Can you expand on that point?'
'You mentioned x, can you tell me more about that'
Additional questions and prompts were used to encourage elaboration or to clarify/confirm meaning.

Appendix 7 – Example Coding and Method Used for Qualitative Analysis of Data.

The analyses of the data was based on the methods proposed by Braun and Clarke (2006). This process is summarised in table 1.

Table 1: Phases of Thematic Analysis

Phase	Description of the process
1. Familiarising yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells; generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Table 1 – Stages of Thematic Analysis (Braun and Clarke, 2006)

After transcribing the data and reading the data to gain a sense of the content, the researcher began to generate initial codes from the data. This was done by placing the transcribed interview in a table with an additional column for the initial coding. As part of this process unitisation of the data occurred which began to distinguish the

text which was of interest from text which had low relevance. An example exert of this initial coding from an interview is shown in table 2.

Interview No.	Data Extract:	Coded For:
2	I – In your opinion, how important is research based evidence in the decision making process? **P – It's not the most important thing. I mean it is something we _should_ be considering, but the opinions and expertise around the table, and the interaction and dialog are the main things that steer a decision.**	**Information Source** –**Personal Opinions** (are viewed as valid and important) **Information Source -Expertise** (perceived as important and valid). **Decision Making Process – Dialog and Interaction** (is important mechanism) **EIDM – aware that research should be used.**
2	I – So, can you clarify for me, within that decision making process, what is the importance of research based evidence? **P – Not very. [pause] Well, that's not strictly true. There are things like NICE guidelines and guidance from professional bodies that we take account of, and activity data we use a lot. But if you're only interested in research from journals, then no it's not something we use much and it's not that important**.	**Importance of research** (low) **Information Source -Guidelines** (NICE and Professional Organisations are utilise)

		Information Source – Activity Data is mentioned as regularly used. **Information Source -Research Journals** (are not used regularly.)
2	I – What do you think prevents/facilitates the use of research based evidence in decision making? **P— Time. People don't have the time to read research, there are so many more immediate things competing for one's time.**	**Time as Barrier** to research use. **Barrier to use – more immediate demands take priority**.
2	I – Can you give me an example of what those competing demands can be? **P – It can be a multitude of different things that are happening simultaneously, er, other deadlines that need to be met, reports for board meetings, managing staff. The time demands to just to manage the day to day service. I think most of us are so busy just ensuring we deliver the regular day to day stuff there's little time left to consider new developments or have the luxury of time to read a research paper.**	**Time as Barrier** to research use. **Barrier to use – more immediate demands take priority** (Delivery of standard day-to-day work restricts time available to engage with research). **Time to read viewed as a luxury.**

2	I – Is there anything else that prevents or facilitates use of research to inform decision making? **P – It's not apparent what research there is or when it would be useful. Not being aware of what is available. I think this relates back to having a lot of demands on one's time; it's not practical to spend time looking for additional information when we are already pressured to meet deadlines and move things forward.**	**Barrier to Use – Lack of awareness** (of what research is available). **Decision Making Process – Short deadlines (**limits time available.) **Time as Barrier**
2	**P - The length of time it takes to do a piece of research would prevent me from doing it. The timeframe for decision making usually doesn't allow the kind of time needed to do a study. Even if it did I wouldn't be confident in my abilities to carry out research and the organisation doesn't have the capacity to support it**.	**Conducting New Research –lack of capacity and capability** prevent new internally produced research. (Is this relevant or is the thesis focus on previously produced research?) **Information Literacy –Skills to Conducting Research**
2	I – What about facilitators; is there anything that facilitates the use of research? **P – I don't think there is any specific thing that currently happens in my organisation to support the use of research.**	**Barrier to use -**

2			
			Lack of explicit support within organisation..
	I – OK, so there's nothing currently. Is there anything that could be done to facilitate research use during decision making in the future?		**Facilitator –** **Concise summary report** (Parliamentary briefing given as example).
	P – [pause] **Have you read the parliamentary briefings that government produce?**		**Information source – Data**
	I – Yes, I've seen a couple of them.		**Information Source-** stakeholder expectations
	P – Something like that would help. If I could go to a meeting and have a concise summary of the main points I need to know, what the research recommends, what the data shows, what stakeholders' expectations are, etc. If all that was in a single report I would use it. That's the kind of thing we need in the NHS.		**Facilitator – Single report / Collation.**

Table 2 – Excerpt illustrating coding

Appendix 8: Scenario - Introduction of Telehealth Services

One of the strategic issues facing the NHS is how we manage patients with long term conditions – such as chronic obstructive pulmonary disease and diabetes. The NHS spends 70% of its budget on the 15m people who have one or more of these conditions. With our ageing population, patient numbers are expected to grow by 23% over the next 20 years.

Elsewhere in the world, telehealth and related technologies are being used to support patients with long term conditions. Telehealth is not a unified, single intervention but a broad collection of technology based interventions which usually fit within three categories:

1. 'telehealth' - remote capture / relay of physiological measurements from the home for clinical review & early intervention;
2. 'telecare' – a range of alarms and sensors in the home to enable independent living, linked to a call centre;
3. 'teleconsultations' - video consultations and routine surveillance appointments between clinicians and patients

An overview of Telehealth can be found online at:

www.2020health.org/dms/2020health/downloads/reports/2020telehealthLOW.pdf

Central government are offering funding to support pilot schemes which will implement telehealth solutions to provide care and support to patients with long term conditions. Your Chief Executive has expressed an interest in this government funding, and has asked you to work collaboratively to identify an area where telehealth can be applied to benefit patient care and organisational finances.

Session 1 –

Participants were asked to : "identify which of the three models of telehealth you would incorporate into new service developments , discuss the advantages and disadvantages of telehealth and, if appropriate, identify a service that you anticipate would benefit from a telehealth focused service redesign."

Decisions:

1. Is telehealth a model that can be applied in the local healthcare community?
2. Identify service areas where implementing telehealth led solutions would benefit the service and delivery of patient care.

Session 2 –

Your chief executive has recently read some articles (copies attached in PDF format) which indicate the use of videoconferencing in mental health may be a potential area on which to focus the telehealth service redevelopment.

Participants were asked to :."Evaluate the feasibility of implementing a tele-psychiatry service for patients with long term mental health conditions"

Decisions:

1. Is a videoconferencing based mental health service something which is feasible and worth pursuing.
2. What benefits or harms do you anticipate would result from implementing a videoconferencing based mental health service.

Articles attached:

1. O'reillly, R *et al*. 2007. Is Telepsychiatry Equivalent to Face-to-Face Psychiatry? Results From a Randomised Controlled Equivalence Trial. *Psychiatric Services*, Vol 58 (6) pp 836-843.
2. Pesamaa, L *et al*. 2004.Videoconferencing in child and adolescent telepsychiatry: a systematic review of the literature. *J Telemed Telecare*, Vol. 10(4) pp 187-192
3. Rabinowitz, T *el al* 2010. Benefits of a Telepsychiatry Consultation Service for Rural Nursing Home Residents. *Telemedicine and e-Health*. Vol 16(1) pp 34-40.

Session 3 –

An acute trust in the region has implemented a videoconferencing link with 30 local nursing homes. They have not formally evaluated the service but have recorded data which indicates a reduction in ED admittance from these locations. Some examples of where emergency admissions have been prevented are given below:

Video Teleconsultation Case Studies

Case 1

Contact was made to the Telehealth Hub by carers stating that a patient had severe chest pain, was short of breath and looked grey. Immediate concern was the chest pain – suspected heart attack. However, after ABCDE assessment over the video link and some questioning about the nature of the pain, the patient described it as " Tummy ache". The Telehealth Hub Sister was able to see the patient rubbing their lower abdomen, and could see that their colour appeared quite normal. The patient was able to advise the shortness of breath was usual and that they had suffered from gallstones in the past.

Therefore what had initially appeared to be a suspected heart attack requiring emergency admission to A+E, transpired to be an episode of "trapped wind" resolved with some warm peppermint tea and some paracetamol. No other intervention required and the patient recovered in the care home.
Avoided 999/111 call

Case 2

Carers called the Telehealth Hub very concerned stating that they had found a patient slumped in their chair and the patient was very drowsy. The patient had suffered previous strokes and the carers were worried that this was a further stroke occurring. The Telehealth Hub Sister observed the staff approach the resident who began to rouse slightly. The carers were advised to sit the resident more comfortably in the chair, at which point the resident became more alert and began to speak to the nurse. Through assessment of movement it was clear the resident had usual power to their arms and legs and was gently walked back to their bedroom. The outcome was that the patient had fallen heavily asleep in the chair and was monitored overnight by the Telehealth Hub Team for any further similar episodes.
Avoided 999/111 call

Case 3

Nursing staff called from a care home after a resident had fallen and sustained a superficial laceration to the bridge of the nose and a second laceration from the base of the nose to the lip line. The Telehealth Hub Nurse was unsure whether steristrips would be sufficient as this was a deep laceration affecting the lip line. The Telehealth Hub Consultant reviewed the wound via video link and advised steristrips and provided comprehensive advice on post observation of the wound over the next few days providing guidance on possible complications. - **Avoided 999/111 call**

In addition to this information your local NHS library service has produced a review of the current literature on 'Telehealth'

The summary points from this review of the literature are:.

General

Existing sources of synthesised evidence provide limited guidance on either the effectiveness or cost-effectiveness of teleconsultation. This is true both for comparisons with usual care and for comparisons with other telehealth/telemedicine interventions and ways of providing services. An absence of evidence is not evidence of absence, but without evidence of benefit it is difficult to justify a wider deployment of a teleconsultation service.

Although not discussed in depth in this evidence briefing, the results of the Whole System Demonstrator trial have added to the uncertainty around the effectiveness of telehealth/ telemedicine.[20] In particular, as yet unpublished data from the trial are thought to show that the telehealth interventions used in the trial are unlikely to meet current thresholds for cost-effectiveness.[21]

Participants were asked : "In the light of this new evidence, reassess your earlier decision. You will soon be asked to deliver a business case as part of the application for government telehealth funding. Discuss and reach agreement on what your final recommendations will be regarding the telehealth funds ."

Decisions:

1. Do you recommend continuing with the bid for funding?

    If yes:

    a. What service area and telehealth initiative do you recommend for development?

    b. How will you evaluate the impact of the service change?

    If no:

    a. How will you justify withdrawing from the application process to your chief executive?

Scenario 4 – Expansion of Telehealth Video Conferencing (Used during pilot of interventions)

The tele-psychiatry service which was recently implemented based on the recommendations has been successful. Your executive team have decided to expand their use of tele-health and would like you and your colleagues to look at the use of other technologies such as remote monitoring devices.

Decisions:

1. Identify a technology and specific intervention that has the greatest potential to improve patient care.

2. What are the key benefits that you anticipate from implementing your recommended technology/intervention?

To assist you in this decision the organisation have provided you with a Knowledge Exchange Portal that can be used to share knowledge and discuss this issue with managers in other organisations who are working with you on this task. Your organisation has also employed an Embedded Librarian that can assist you with tasks such as locating relevant evidence, providing summary briefings of the evidence, and appraising the validity of research.

The embedded librarian will contact you soon to introduce themselves and give you further details of their role and how they can assist you

Details of the knowledge exchange portal can be downloaded from the portal here

.

Appendix 9: Thematic Guide for Observations:

Date & Time

Information/Evidence: What information is referenced (source, format, how is it utilised,etc.)

Context: Who is involved in the discussion: How formal/informal is the discussion: What relationships exist between participants.

Knowledge: What knowledge is required to participate; what sources of knowledge are used; Tacit/Explicit; Does a specific form of knowledge have greater impact/frequent use.

Power: Who is talking the most; is there a hierarchy/status/rank influence to the discussion; is everyone allowed/able to contribute; how is knowledge/evidence used; what/who influences the agenda.

Decision Making Is there an explicit process/approach to the decision making; is there a tacit understanding of how decisions are made; what impact does evidence have on the decision process; what outcomes are addressed.

Information Literacy: How are any knowledge gaps addressed; is information/evidence critically assessed and how is this done; are any cognitive biases present.

Other Phenomenon of Relevance and Interest: Is there any action or behaviour which is influencing decision making / engagement with research, or which is of importance to the cohort.

Appendix 10: Example of Embedded Librarian Activity Diary:

Date	Nature of Request	Participant/Contact	Output
	Requested overview of all telehealth technologies and their potential advantages/disadvantages.	Details which may identify participants in the study have been removed.	This links to documentation which the embedded librarian produced in response to the contact.
	Arranged meeting at XXX to discuss evidence summary		This was held on a secure folder on the NHS N3 network. Only accessible to the Embedded Librarian and the researcher.
	Requested full text of article - **Sarhan, F.** (2009) Telemedicine in healthcare 1: exploring its uses, benefits and disadvantages. *Nursing Times*		
	Requested evidence summary of cost/financial benefits associated with Remote Monitoring of Heart Failure Patients		
	Arranged telephone call to discuss evidence summary.		