Nursing's Voice in Healthcare IT Acquisition Decisions

by

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BSN, University of British Columbia, 2011
AAS, New York University, 1996

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Supervisory Committee

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Abstract

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The participation of senior nursing healthcare executives in the acquisition of electronic healthcare information system is not well understood. This is an important issue because nurses make up the majority of care-providers within the Canadian healthcare system, and thus the majority of the information systems end-users. End-user involvement in the selection and evaluation of a healthcare information system is vital to implementation success; it is very important we understand the participation of the nursing leadership making these important decisions. The purpose of this quantitative study was to explore this gap in our understanding, to find '*Nursing's Voice*' in this process. The soft-systems methodology theoretical perspective was used to understand how this process might be improved. Senior healthcare executives with a background in nursing from each of the Health Authorities across British Columbia were recruited to participate in an online survey questionnaire. An N=11 of senior executives were invited to participate, and a response rate of 82% was achieved. The results showed that despite a lack of formal training in information technology subjects, the majority of these nursing leaders do take an active role in electronic healthcare information systems acquisition and upgrading projects along-side their health informatics colleagues; '*Nursing's Voice*' is clearly heard.

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Acknowledgments

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Dedication

Karen, Jasmine, Frankie and Mom.

Chapter 1 - Introduction

"Software innovation, like almost every other kind of innovation, requires the ability to collaborate and share ideas with other people, and to sit down and talk with customers and get their feedback and understand their needs." – *Bill Gates*. (1)

The construction of any software system is an innovative endeavour, and an electronic information system is often a complex software system innovation. The Canadian healthcare system is vastly complicated at any level. Placing a complex software system into a complex healthcare system is rife with the possibility for failure. Senior healthcare executives have an invaluable role to play in maximizing the potential for successful implementation.

The process of acquiring or upgrading an electronic information systems includes an initial investigation, systems analysis, iterations of design, system implementation, and finally, on-going maintenance. This process is often referred to as the 'Systems Development Life-Cycle' (SDLC). User involvement in the SDLC process is an accepted, usually preferred method when planning for the installation of a new or upgraded information system. (2) The Canadian healthcare system should be no exception.

Background

Nurses are the largest group of regulated health professionals in Canada. As of 2011, there were 268,512 registered nurses (RNs), 81,224 licensed practical nurses (LPNs), and 5,174 registered psychiatric nurses (RPNs) working in Canada. In all, there are 354,910 regulated nurses working as nurses in Canada. (3) To put this in perspective, in 2010 just over 1,000,000 individuals worked directly in healthcare occupations in Canada. For every 100,000 Canadians,

there were 780 registered nurses, 190 physicians, 58 dentists, 49 physiotherapists, and 2 midwives, (4) and most all are at some stage in transitioning to electronic record-keeping.

Electronic healthcare information systems of all types are becoming more and more prevalent in the Canadian healthcare system, and in a wide variety of practice settings. (5) One research study, published in 2011, showed that 92% of the recent articles on health information technology reached conclusions that were positive overall. This suggests their adoption will only accelerate in the future. In this same study, researchers also found that the benefits of the technology are beginning to emerge in smaller practices and organizations, benefits already seen in large organizations that were early adopters. (6) A second paper, published in 2013, was commissioned by Canada Health Infoway, a government-funded organization charged with monitoring and improving the use of information technology (IT) in Canada's healthcare system. It concluded that the increased use of electronic health record systems helped reduce costs in Canada's healthcare system by about 1.3 billion Canadian dollars over six years. (7)

The movement away from paper-based systems to electronic ones is an accelerating and permanent shift in the way we manage information in the Canadian healthcare system. Because nurses are such an integral part of the Canadian healthcare system, and because all signs demonstrate that the Canadian healthcare system is adopting electronic healthcare information systems, it is logical to conclude that Canadian nurses should play a role in the initial evaluation and acquisition of new or upgraded EHI systems in their workplaces.

The University of Victoria has recognized the importance of nursing's role in health informatics. Respected and well-known faculty from the schools of nursing and health information science have developed a novel, first of its kind double-degree Master's program in Nursing and Health Informatics. (8) "Such competencies are essential for professionals working

in the rapidly expanding fields of nursing and health informatics. There is an immediate and longer-term need for clinical professionals with such expertise in Canada. Furthermore, a program was needed to provide graduate level credentialing in nursing and health informatics so graduate students could develop needed workplace competencies at the intersection of nursing and health informatics in the international move towards electronic health records." (8) Well-respected experts in the USA have made similar recommendations, including Dr. William Hersh, a leader in health informatics teaching and research from the Oregon Health & Science University, (9) and Dr. Suzanne Bakken, RN, a leader in nursing informatics research and education with Columbia University. (10) But *why* should nursing programs include training in information technology (IT), and *why* should senior nurse executives and leaders develop expertise in IT acquisition, upgrading and evaluation?

Nurse executives and leaders are responsible for a workforce that must provide safe and efficient care in a complex sociotechnical environment. Quality measures at the provincial and national level rely on information technologies to provide data collection, shared information, and analytic capabilities to inform approaches to care that have the potential to achieve better outcomes. (11) As a key member of the quality assurance team, the senior nurse executives and leaders must provide the infrastructure to build and manage nursing knowledge and instill accountability for following evidence-based practices. Providing this infrastructure will contribute to the so-called 'learning health system', where new knowledge is captured as a by-product of care delivery, enabled by knowledge-based electronic systems. (11) The learning health system also relies on rigorous scientific evidence embedded into practice at the point of care. The nurse executive must have the knowledge to be able to optimize the use of knowledge and information-based technologies, integrated throughout the organization. (11)

Some might argue that the acquisition and evaluation of electronic healthcare information systems is outside the scope of a nurse's professional practice, and that these decisions are best left to the Information and Communications Technology (ICT) experts employed in most Canadian healthcare institutions. At first glance, this position does seem to make sense; allow the clinicians to do their clinical work, and allow the healthcare ICT experts to support that work with appropriate and well-designed electronic information systems.

However, as previously mentioned there is growing acceptance that end-users should be involved in the information systems development life-cycle if successful implementation is to be optimized. User involvement offers many benefits; the development of a rich and grounded understanding of the issues, an opportunity to build community capacity, the fostering of stakeholder cooperation, facilitated data collection, the increased likelihood of project success, reduced costs to the system, and empowering community self-guidance, to name only a few. (12) Further, the American Organization of Nurse Executives (AONE) have published several guidelines stressing the importance of nursing leadership involvement in electronic healthcare information systems acquisition and evaluation decisions. (13-15)

Nurses make up the majority of healthcare professionals in the Canadian healthcare system. As such, nurses are also the largest group of electronic information systems users, and it would therefore seem appropriate and logical that nurses, or at a minimum their leaders, would have a voice in the selection and implementation of new or upgraded electronic healthcare information (EHI) systems. Decisions concerning the acquisition or upgrading of an EHI system take place at the highest levels of healthcare administration, usually involving a provincial government and the senior executive team in each health region or authority. Generally speaking, these teams include individuals with a nursing background, however little is known about the

participation of senior Canadian nursing executives and leaders when a decision is made to acquire or upgrade an EHI system. Where is '*Nursing's Voice*' in EHI systems acquisition? The purpose of this research study is to explore this gap in our understanding at a regional level.

Nurses should be involved in EHI acquisition decisions; the many benefits as already discussed far outweigh any potential extra costs a Health Authority might incur by inviting nurses to the table when EHI acquisition projects are planned. But are they? Subsequent chapters will explore this question with a literature review and survey questionnaire study of senior healthcare executives with nursing backgrounds within British Columbia.

Chapter 2 - Literature Review

Introduction

The search of relevant literature is divided into 2 main sections; literature that directly addresses the research question, and background literature that broadly touches on the general area of the problem to be explored. This background literature on the subject of nursing executives involvement in health informatics generally falls into 2 categories; recommendations concerning the development of needed health IT competencies amongst nurses, and recommendations concerning the roles nurses should embrace within health IT.

Specific Literature

No published research in respected peer-reviewed journals directly addressing the question of senior nursing executives' participation in electronic healthcare information systems acquisitions could be found in the literature. A systematic search of the CINAHL, IEEE Xplore, PubMed, Scopus, Web of Science, the University of Victoria Library, CRNBC library, INFOMINE, and Google Scholar databases was completed during 2014. This search was completed in the English language, and extended back through the year 2004. The initial search included the years 1994 to present, but the material before 2004 was non-specific and deemed of limited value for the purposes of this research.

Specifically, no qualitative or quantitative research study could be found addressing the specific questions addressed in this paper. All databases were systematically searched using the following search terms: nurse OR nurses OR nursing AND administration OR leaders OR executives OR administrators AND participation OR involvement AND acquisition OR upgrading OR evaluation OR procurement AND electronic AND healthcare OR hospital AND information systems OR computers OR information technology. These terms were used

individually and in combination. No directly relevant citations were returned. There is a gap in our understanding here this research will address.

Background Literature

Despite this lack of published research directly addressing the key questions, there are many professional guidelines and opinion pieces (grey literature) written on the importance of nurses' involvement in electronic healthcare information systems. There are also some research articles on the topic of nurse executives and informatics. These citations resulted from the search as described in the previous section. Literature was selected for presentation in this paper based on a combination of the quality of the literature, the authors affiliated institution, the reputation of the publishing source, and an assessment by the author of this paper as to the literatures fit with the topic of this research.

As previously mentioned, this background literature fell into 2 categories; recommendations concerning the roles and responsibilities nurse executives should embrace within healthcare IT, and recommendations concerning the development of needed health IT competencies amongst nurse executives.

Roles and Responsibilities

As mentioned, the American Organization of Nurse Executives (AONE) have published several guidelines stressing the importance of nursing leadership involvement in electronic healthcare information systems acquisition and evaluation decisions, and were in fact one of the first organizations to publish such guidelines. (13) "*For the Chief Nurse Executive, Chief Information Officer and Industry Partners to work together to Leverage Technology to enhance Clinical Outcomes*", (13) are a set of guidelines stressing the importance of interdisciplinary cooperation when acquiring an EHI system. The AONE recognized that technology would be

crucial to the health care environment of the future, and that successful implementation would be determined by positive collaborations between the departments of clinical information technology and nursing. (13)

The AONE argues that each stakeholder has a perspective on how they perform their work; however, they don't always share these perspectives. One recommended starting point is to clearly articulate their varied perspectives in an effort to increase mutual understanding and appreciation of their differing goals and challenges. (13) The AONE developed four principles to ultimately enhance clinical outcomes. (13) These principles include:

- Establishing a culture of collaboration between the three groups,
- Build relationships and trust,
- Create strategic and operational alignment,
- And establish a culture of collaboration for innovation and transformation.

One purpose of the research explored in this paper is to establish the importance of these types of collaborations through the literature review, and then to determine if they currently exist among our study respondents, the senior nursing executives and those health information science professionals working in British Columbia Health Authorities they interact with.

The next set of guidelines entitled "*For the Nurse Executive to enhance Clinical Outcomes by Leveraging technology*", (14) outlines key priorities for nurse executives' involvement in healthcare IT projects:

- "Assure that there is a defined governance model that oversees technology initiatives,
- Define roles, accountabilities and outcomes to achieve the strategic vision,
- Align the overall technology and patient care strategic plans,
- Define criteria for acceptance, initiation, correction and termination of the initiative,

- Define the communication and decision-making processes,
- Define the rules of engagement for all participants,
- Engage the entire C-suite in the initiative,
- Define clear, measurable, clinical outcomes for each technology initiative/project,
- Drive performance measurement based on evidence based best practices,
- Clearly link outcomes to the strategic plan,
- Clearly communicate outcomes to all working teams,
- Define a scalable and repeatable methodology to measure outcomes,
- Assure and advocate for adequate resources for data support and analytics,
- Align and integrate clinical outcomes with the quality improvement plan,
- Assume ownership of the process roadmap for future work redesign,
- Articulate and define a transformational vision and a strategy to achieve the vision,
- Create an effective communication plan,
- Identify, name and empower a multidisciplinary team to drive the process,
- Support and champion cultural transformation as the foundation for change." (14)

Initially it was hoped that the survey questionnaire designed for this project would incorporate many of the above subjects into the questions asked. However, it was later felt that the questionnaire would receive a much better response if the questions, and the time taken to answer them, were reasonable and limited. Still, some of the general themes were addressed.

Finally, "*For defining the role of the Nurse Executive in Technology Acquisition and Implementation*", (15) are perhaps the most relevant guidelines to consider in this research. The AONE firmly believes that the chief nurse executive (CNE) should play a critical role in the selection and implementation of information systems. (15) Acquiring new systems is a

complicated process that impacts the entire facility. Although some tasks *may* be delegated, the chief nursing officer must remain actively involved in the overall decision-making and implementation process, (15) views shared by this researcher as critical for project success.

1. "Pre-Acquisition.

   The CNE focuses on understanding and framing the institutions' needs, and gaining necessary knowledge about the information technology (IT) industry.

2. Acquisition: Before selection of vendor.

   The work that occurs prior to the actual selection of a vendor lays a critical foundation for success. It is helpful for the selection committee to develop a standard set of questions to be used in the selection/rejection process and for site visits. Clinicians should be leaders of clinical implementations. Although operational responsibility can be delegated, the CNE remains accountable for this process.

3. Contract and Negotiations.

   Although the CNE may not be the executive who manages the contracting process, once there is a contract, he/she should review the entire contract paying special attention to the parts of the contract that refer to clinical practice, phasing, resources and expectations for the CNE.

4. Implementation: Managing the process.

   The CNE plays a critical role in managing the process of implementation that should be congruent with his/her vision for the future. He/she should review the project timeline and budget to assure that it covers necessary activities and resources anticipated.

5. The Return on Investment (ROI): Benefit management and value.

The CNE should work with other members of the senior leadership team to determine the value proposition beyond the usual proposed saving of FTEs. Integrate patient safety and quality into the ROI analysis/processes, regardless of where they are conducted. Base benefits on sound evidence whenever possible.

6. Post-Implementation.

   The CNE should be involved in the executive leadership meetings regarding all stages of IT acquisition and assure nursing representation on user group meetings. He/she should proactively evaluate current and new technology to know how these can serve the organization.

7. Understanding the overall policy issues related to IT.

   Policy depends on data, leading to information that leads to knowledge. In addition to the CNEs local responsibility for the acquisition and implementation of IT systems in the organization, he/she should maintain a global perspective on information technology and its impact on policy.

8. Survival tips for the CNE new to the organization: Stop. Look. Listen.

   If the CNE is hired by an organization that has recently made an IT decision, learn the IT strategic plan for the facility and how it fits with nursing's strategic plan and priorities. It will be critical for the CNE to establish a collaborative and sustainable working relationship with the CIO and IT department.

9. Directives from the CEO/Board.

   When information system selection is a decision made at the CEO or board level, there may not be an opportunity to go through the full vetting process for selection as described in these guiding principles.

10. Legal Aspects.

> The CNE should be familiar with legal issues specific to the acquisition and implementation of IT systems." (15)

These guidelines did form the basis for many of the questions in the survey questionnaire designed for this project, subject to the reasonable time and length restrictions mentioned previously.

These three guidelines from the AONE reflect a strong belief in the nurse executives' involvement in the entire SDLC when acquiring or upgrading an EHI system, a position shared by the researchers in this study. So it must be asked, do we share similar beliefs and guidelines here in Canada? The Academy of Canadian Executive Nurses (ACEN) has published some guidelines on this subject, but they are quite broad and do not specifically go into the level of detail the AONE has in their three guidelines. (16)

Related literature focuses on the importance of strong relationships between clinical and technical hospital staff. In an interesting piece, written from a different perspective by an experienced Chief Nursing Officer (CNO) titled "*The CNO and "techies": A dynamic duo*", (17) this CNO argued that clinical nursing staff often undervalue the role of the IT department. This is not uncommon in healthcare, where clinical staff are often held in higher esteem. The author argues that nurses should be encouraged to approach information technology staff members with an attitude that recognizes the important skills they bring to the organization. Health informatics professionals are an integral part of each healthcare facility and without their skills modern healthcare could not function. Health information science professionals frequently accomplish tasks that are invisible to the majority of us, but have a constant impact on the delivery of care. (17) This opinion is well argued, and strengthens the view that healthcare IT projects succeed

based partly on strong multi-disciplinary cooperation and involvement, a key theme of this research. Additionally, nurses have played an in increasingly important role in the SDLC, though typically as employees within the various medical software vendors, usually in sales and training. (18)

Additionally, there is a relatively small body of literature addressing the nurse executives' various roles in healthcare IT, some of which are included in this paper. The most relevant were selected based on the criteria described previously; a combination of the quality of the literature, the authors affiliated institution, the reputation of the publishing source, and an assessment by the author of this paper as to the literatures fit with the topic of this research. Much of this literature is very similar in nature, and reflect many of the guidelines established by the AONE. (19-23)

Brokel (19) argues for a nursing informatics specialist role leaning more towards a more technical understanding of EHI systems; the specialist who understands the use of data, information, knowledge, and decision support systems. Pitcher (20) focuses on the role of the nurse executive when implementing a new electronic healthcare record (EHR) system; she believes that senior nursing executives play a critical role in the successful implementation of an EHR because of the scope of accountability and responsibility and the belief that the senior nursing administration is the chief sponsor of this type of comprehensive project that changes the daily operations of the clinical staff. Simpson (21) focuses on the nurse executives' role in patient safety with regards to EHI systems; for nursing administrators, successful IT implementations depend on the careful management of people, processes and computer programs. Englebright and Perlin (22) argue that the increasingly complex role of the Chief Nurse Executive requires a fundamental understanding of electronic healthcare information

systems. And finally, an analysis by the Economist (23) magazine discussed the changing role of the senior healthcare executive (including nurses), focusing on their need to manage perceptions, bring clinical staff on-board, drive integration, and satisfy future compliance issues.

Many would agree that the AONE is the largest and most influential organization for nursing executives and they have provided a consensus of nursing thought on this issue. The author of this paper accepts the AONE's guidelines as the current nursing 'standard', and will accept the roles described in these guidelines as appropriate when considering questions to be included in the survey questionnaire.

Informatics Competencies

The development of informatics competencies among nurse executives is the second substantive area within the background literature search. To begin, this paper titled, '*Innovation in transformative nursing leadership: Nursing informatics competencies and roles*' focuses on an emerging "avant-garde executive leadership competency", recommended for today's health leaders in guiding health system transformations. Specifically, this competency is articulated as "state of the art communication and technology savvy," (24) and it implies linkages between nursing informatics competencies and transformational leadership roles for nurse executives. The authors of this powerful paper, nursing informatics experts Remus and Kennedy argue that "distinct nursing informatics competencies are required to augment traditional executive skills to support transformational outcomes of safe, integrated, high-quality care delivery through knowledge-driven care. International trends involving nursing informatics competencies and the evolution of new corporate informatics roles, such as chief nursing informatics officers (CNIOs), are demonstrating value and advanced transformational leadership as nursing executive roles that are informed by clinical data." (24)

Many leading healthcare organizations within and outside Canada have also contributed their ideas regarding nursing competencies in health informatics; these include the Canadian Association of Schools of Nursing (CASN), COACH, the Health Information Management and Systems Society (HIMSS), and the Canadian Nurses Association (CNA), to name only a few; (25-28) all stress the importance of both involvement and education.

There is much literature similar to that just described, primarily focused on nursing informatics competencies, informatics competencies in general, the nurse executives various roles in electronic healthcare IT, and some recommendations for future action in education and leadership. Much of this literature is repetitive, with minor changes but consistent themes. The most relevant were selected based on the criteria described previously; a combination of the quality of the literature, the authors affiliated institution, the reputation of the publishing source, and an assessment by the author of this paper as to the literatures fit with the topic of this research. (29-33)

Mays, Kelly and Sanford (29) suggest nursing leadership 'attend training', 'read informatics journals', 'take a course', 'join a user group', 'join an organization', 'meet with IT staff', and 'attend a conferences' as ways to develop competencies. Sensmeier (30) focuses on the role HIMSS has to play in encouraging the development of nurse informatics competencies. Simpson (31) argues for nursing executives competencies to include: an understanding of the system, an ability to navigate the political environment, a willingness to think outside the organizational chart, financial insight, a commitment to education, and a clear vision of the future, to name a few. Scott and Van Norman (32) take an interesting approach to the adoption of technology in healthcare. They believe nurse executives might benefit by developing competencies in complexity theory and systems science, particularly when applied to the

adoption of EHR systems. And finally, Simpson (33) believes informed nurse executives who acquire the knowledge and competencies through the development of a universal, single nursing taxonomy and nomenclature, will transform nursing practice: "their understanding must extend beyond a laundry-list of capabilities, to a true comprehension of technology-enabled capabilities related to predictive data modelling, enterprise abstraction, vision theories and business acumen, as well as the science and art of nursing practice."

These guidelines and recommendations all share many common recommendations, and all encourage nurse executives' participation in healthcare IT projects. But guidelines and recommendations only go so far; this research project will attempt to determine whether or not senior healthcare executives with nursing backgrounds in British Columbia really do participate in healthcare IT projects, specifically in the acquisition or upgrading of EHI systems.

Summary

On a final note, a 2013 paper in the journal 'Nursing Management', (34) titled "*Encouraging nurses to take the lead on the information agenda*" summed up nicely why it is important that nursing leaders embrace informatics, and the pivotal role(s) they might occupy within this still emerging discipline. Authors from nursing and health informatics backgrounds, Procter, Hayward, Hayes, and Owen worked collaboratively in publishing this paper. (34) They argue that "information and communication technologies are increasing the availability of health care, and improving the management, sharing and understanding of health care, at a local and national level. Senior nurse leaders are in a prime position to interpret data held by healthcare organisations, and act on it to plan, deliver and evaluate service provision to support patient-centred care. Nursing is at the centre of patient-centred care and, as such, draws together

effective care across many domains, thereby making nurses ideally equipped for fulfilling the role of Chief Clinical Information Officer (CCIO)." (34)

The CCIO should:

- "Promote and support the role of informatics in health care to enable, promote and support the effective use of data, information, knowledge and technology in the support and improvement of health and healthcare delivery,
- Ensure that an organisation has the required cost-effective systems, information and technology services to provide excellent clinical care to patients, in conjunction with other healthcare providers in the wider health community,
- Provide leadership and management of information and communication technologies and information development activity to support the safe and efficient design, implementation and use of informatics solutions in delivering improvements to the quality and outcomes of care,
- Provide expert clinical informatics advice and guidance, working collaboratively with key stakeholders to ensure patient and clinical involvement in planning, developing, delivering and evaluating systems and services,
- And will also promote innovation, and champion the development of a clinically appropriate information culture across the organisation." (34)

The focus on tying clinical care and outcomes, with the provision of healthcare IT services is fundamental to nursing informatics, and a strong reason to support the presence of '*Nursing's Voice*' in healthcare IT projects.

The literature review, while adding significantly to our understanding of the broader issue of nurse executives and information technology, did not answer the specific research question,

where do we truly find '*Nursing's Voice*' in the acquisition decisions of healthcare IT and EHI systems projects. Financial decisions, selection decisions, and evaluation decisions are only a few of the recommended areas where senior nurse executives should be involved. The research conducted for this thesis will attempt to add a piece of understanding to this puzzling gap in our understanding.

Chapter 3 - Theoretical Perspective

Many important reasons have already been discussed to justify nurse executives' involvement in the evaluation and acquisition of a new or upgraded healthcare information system. However, it is also important to include a theoretical perspective as a foundation for this research, and as a foundation to interpret current senior nurse executives' participation in the acquisition process.

The theoretical perspective presented in this paper is an idealized lens through which we might view the participation and actions of the nursing leadership who volunteered their time for this study. By comparing their existing practices with this perspective, we may gain insights into 'how things are done' vs 'how they might be done better', giving us the ability to offer positive recommendations for future practice.

It is well recognized that IT projects have high failure rates, especially as the projects grow in size and complexity. (35) Public healthcare can ill afford these costly failures. Every dollar lost in a failed healthcare IT project, is a dollar that could have supported 'bed-side' care. And because the healthcare environment has at its core, significant *moral and ethical* aspects that must be recognized and considered, it naturally follows that healthcare IT projects also have unique and significant moral and ethical aspects attributed to them. Senior healthcare executives must take all measures to ensure successful implementations, including active personal participation in the acquisition decisions.

Healthcare organizations are very complicated systems with multi-layered social structures, operating in complex internal and external environments. Many sub-systems exist in the Canadian healthcare system, both seen and unseen. Therefore, we can assume that healthcare organizations are particularly susceptible to these types of project failures. Many information

system development methods exist, however, the success and realization of computer-based information systems in real-world situations remains problematic; stories of failures abound in the literature (35), with many examples in Canada and around the world identified in our literature search, with only a few cited as necessary. (35-37)

As mentioned, it is well recognized and accepted that end-user involvement in the SDLC often reduces the occurrence, or at least can mitigate the potential for failure. One established and respected theory that promotes end-user involvement in the SDLC is systems thinking, and more specifically, soft-systems methodology (SSM). (38) These concepts offer a unique and non-traditional theoretical perspective for examining and justifying senior nurse executive and nurse leaders' involvement in the evaluation and acquisition of electronic healthcare information systems.

While not the direct question of this research, the questions asked will indirectly question current information systems development and implementation methodologies used in Canadian healthcare organizations, particularly in the senior executive suite; that is, do the methodologies actually include the end-users or the leaders of those end-users? Of course, the nursing executives participating in this research may not realize they are incorporating these informatics methodologies into their work. However, we may be able to make logical inferences based on their responses. The following practical considerations will be used to compare 'how things are done' vs 'how they might be done better'.

The sequence of considerations in an SSM-based approach to working information systems is as follows, each point below being contingent on the preceding ones (38):

- Meanings attributed to their world by the people concerned;
- Purposeful activity, purposeful in the light of those meanings;

- Information support which is relevant to the people carrying out the activities;
- Data structured in ways to yield appropriate and meaningful information.

The SSM approach places computer-based information systems as systems which serve purposeful human action. SSM necessarily defines an information system as two systems, a 'serving' system (the information system) and a 'served' system (the end users), through purposeful action. (38)

Soft systems methodology is a process methodology which may assist individuals working through situations which often have organic, loosely defined, or no clearly defined procedure at all. (39) *These situations are often difficult or complex, and have steps which are heavily influenced by things such as opinion, culture, knowledge of the situation, psychology, cultural identity, or the environment*. SSM lays out a set of guidelines designed to define the process, and begin working towards goals. In most cases, the SSM methods rely on individuals to define the problems and find suitable solutions, rather than mathematical or scientific answers. (39)

A key component of the SSM approach is *perception*; essentially, the way participants view the problem defines the way in which they approach it. For example, two people working on the same project will define the project as they work on it, meaning that those two people viewing an issue from different viewpoints, may be unable to complete the project simply for lack of a common understanding. (39) This research will explore this idea in some depth.

Examining the issue through this lens, the research will assume end-user involvement is of significant importance, and using this theoretical perspective, survey questions will be developed to answer the research questions asked. This theoretical perspective will influence

both the questions asked and the interpretation of the data; *the belief that senior nursing leadership involvement in healthcare IT decision-making is vital for successful implementation*.

In summary, the tenants of SSM are fundamental in this research, and will be used to guide the development of the survey questionnaire; specifically the questions concerning participants' attitudes and perceptions when working with their IT team on healthcare EHI system acquisitions. The use of SSM is also an admission of this author's bias toward inclusive decision-making processes, and the hope this approach will be adopted in electronic healthcare systems adoption projects. The inclusion of this theoretical perspective will become clearer in the analysis and discussion section of this paper.

Chapter 4 - Methodology

Introduction

What is the level of participation or involvement of senior Canadian nursing executives and leaders in the evaluation and acquisition of new or upgraded electronic healthcare information systems? To address this question, and several other related questions, a survey methodology has been chosen as the best option among several; all designed to address the key issue, 'where is nursing's voice in healthcare IT acquisition decisions?'

Study Method

Both the survey and interview method were considered as the best options for this project, and both could have been used to address the problem statement and research questions. The survey method was selected because nurse leaders are typically very busy, and a survey taken at their own convenience should encourage and increase participation; an interview could be seen as too much of a commitment, leading to inadequate participation, resulting in meaningless or non-generalizable results. (40) A survey methodology can provide needed structure to the research process, and ensures a consistent approach. Further, survey research is very suited to gathering information efficiently and cost-effectively (40), a real consideration as this project was not externally funded. Lastly, survey research falls under the category of quantitative research, meaning that the responses offer the opportunity to perform some basic, descriptive statistical analysis when viewed together.

Survey research is a non-experimental research approach used to gather information about the incidence and distribution of, and the relationships that exist between, variables in a predetermined population. (41) Its uses include the gathering of data related to attitudes, behaviours and the incidence of events. Sample surveys are more cost effective and easier to

undertake than population surveys when gathering information; however, this increases the risk of both representation and measurement errors. (41)

This research was approved by the University of Victoria; human research ethics 'Certificate of Approval' was granted on 16 July 2014, please see Appendix A. A 'Modification of an Approved Protocol' was granted on 11 August 2014, please see Appendix B. The modification was a change to the recruitment method of the senior nurse executive group, Group 2 described in the 'Study Sample' section of this paper to follow. Appendix C lists the original survey questions.

Study Objectives

1. To address the problem statement posed at the beginning of this paper; 'where do we find nursing's voice in the acquisition of healthcare IT projects', specifically 'what is the participation of senior Canadian nursing executives and leaders in the evaluation and acquisition of electronic healthcare information systems' in their practice settings. The problem statement will be addressed with carefully developed research questions and a survey methodology.
2. To produce an *original* piece of research work. An original contribution defined as offering a novel or new perspective, something that has not been done, found, proved, or seen before. It is publishable because it adds to knowledge, changes the way people think, informs policy, moves the field forward, or advances the state of the art. (42)
3. To produce a *significant* contribution; significant defined as something that is useful and will have an impact, and is therefore publishable because it offers nontrivial results and/or answers at the empirical, conceptual, theoretical, or policy level, is

> useful and will have an impact, causes those inside, and possibly those outside, the stakeholder community to see things differently, influences the conversation, research, and teaching, and has implications for, and advances the field, the discipline, and potentially other disciplines, or society. (42)

Development of Study Instrument and Pilot Testing

The initial survey was developed by the primary investigator (PI) and both co-supervisors as no existing survey could be found addressing the main research questions. Whatever the approach to data gathering, it is imperative that the items on the research instrument are developed carefully. (41) Researchers have the choice of selecting an instrument that has been previously designed and tested or constructing a new instrument for their study. Developing a new instrument that is valid and reliable can be both a time-consuming and costly undertaking; it is worthwhile undertaking an in-depth review of the literature to identify if a suitable tool is available. (41) A suitable survey questionnaire could not be found and therefore a unique instrument was developed. The survey questionnaire looked at the participants demographics (nursing background, years of experience, education attained), their informatics experiences (participation in selection, evaluation, and financial decisions), and their attitudes towards informatics (involvement, feelings of acceptance on the IT team, desire to be involved in the future). The questions asked were chosen based on the recommendations of nursing informatics experts, the literature review, and practical time constraints.

Pilot-testing with expert informatics nurses should ensure the instrument is both valid (that it measures what it is designed to measure) and reliable (that it is consistent in that measurement). (43) Failure to achieve validity and reliability can lead to measurement errors where the participant responses do not relate to the research question, are open to

misinterpretation, or there is no homogeneity when compared to other participants responses. (43) To reduce the risk of measurement errors it is important, as stated previously, to clearly identify the research problem to be investigated, and ensure the instrument measures this. It is then necessary to ensure that questions are unambiguous and that they measure all the appropriate attributes of the phenomenon being studied. (43)

Before administering a data gathering instrument it is important to evaluate its internal validity and reliability. This is particularly the case when it is a newly developed questionnaire or where a previously tested questionnaire is to be used with a different cultural group or environment. (41) Experts recommend submitting the questionnaire to both subject area experts and to experts on survey design to test both content and design validity. Practical constraints limit our pre-testing solely to subject matter experts.

This research did pilot-study the questionnaire with subject matter experts, all of whom offered useful insights into potential difficulties encountered by respondents and their views on the format and language of the instrument. As well as internal validity, external validity also needs to be considered. External validity is a measure of the degree to which the findings of a study can be generalized to similar populations or settings. (43) Threats to this type of validity are related to how participants are selected to participate in the survey, and the size of the sample population.

This initial survey questionnaire was validated with a group of test subjects, nurse experts in the field of nursing informatics who provided feedback, which was then anonymized for incorporation into the final survey questionnaire with the goal of improving the content and format of the initial questionnaire. The survey questionnaire was also designed to maximize *face*

validity. This combination should have yielded appropriate questions, and a valid survey instrument. (44)

Admittedly, face validity is often considered the least sophisticated measure of validity by experts, but when combined with expert pre-testing, should result in meaningful results. Face validity is simply defined as whether the test appears (at face value) to measure what it claims to. Surveys developed with a clear purpose, even to naïve respondents, are said to have high face validity. (44) The survey, and survey questions developed for this research are clear, logical, unambiguous, and should provide a high degree of face validity.

A direct measurement of face validity was obtained by asking respondents to rate the validity of the survey questionnaire, as it appeared to them. This question used a Likert scale to assess face validity. For example:

1. - the test is extremely suitable for a given purpose
2. - the test is very suitable for that purpose
3. - the test is adequate
4. - the test is inadequate
5. - the test is irrelevant and therefore unsuitable

It is important to select suitable people to rate a survey questionnaire; and individuals who actually take the survey are well placed to judge its face validity. However, the face validity of a test can be considered a robust construct only if a reasonable level of agreement exists among respondents. (44)

Having face validity does not always mean that a test really measures what the researcher intends to measure, but only in the judgment of respondents that it appears to do so. Consequently, it is a crude and basic measure of validity; the implications of items on tests with

clear face validity is that they are more vulnerable to social desirability bias, that is, individuals may manipulate their response to deny or hide problems, or exaggerate behaviors to present a positive images of themselves. (44) This is not expected to be an issue in this research study because the data collection will be anonymized when presented.

This combination of pilot-testing and clear purpose will result in a meaningful and original survey instrument. The survey questionnaire was developed in such a way as to maximize its suitability through expert feedback and high face validity, while still exploring the research problem with sufficient depth. A direct measure of face validity was incorporated into the survey questionnaire.

Study Design

The study design was divided into two main steps; first the development and validation of the study instrument with nursing informatics experts (asking for feedback on the initial survey questionnaire), and then second, the invitation to participate in the study sent to senior nursing executives. These steps were sequential with no chronological over-lap.

Study Sample

The evaluation and acquisition of electronic healthcare information systems is very complex, and typically very expensive. These types of decisions are made at the highest levels of administration, usually between senior executives in provincial governments and regional health authorities.

The research consisted of two groups; respected and established nursing informatics experts from across Canada (NIEs), and senior nurse executives and leaders employed at the highest levels of management in Health Authorities within British Columbia (SNEs). Both of these samples can be considered convenience samples, (46) but because of the common

characteristics shared by individuals working in nursing informatics research (NIEs), and nurses working within senior leadership teams (SNEs), population representativeness should be maintained. (46)

NIEs: There are only a handful of nursing informatics experts in Canada, typically employed within universities and colleges, or provincial and national organizations. Five responses were considered adequate by the research team to satisfy the requirements of the first stage of this project, and this number was confirmed in the literature. (46) The nursing informatics experts were selected based on their reputation and current activity within the nursing informatics community. Each expert invited to participate in this study was employed in a Canadian university or college, has an active teaching role, has recent publications in nursing informatics, and are members of nursing informatics associations in some capacity. A total of 5 nursing informatics were contacted and invited to participate, and all agreed:

- 2 from the University of Victoria,
- 1 from the University of British Columbia,
- 1 from Kwantlen Polytechnic University,
- 1 from the University of Toronto.

Correspondence between the NIEs and the PI was entirely through email. All correspondence and feedback has been kept anonymous.

SNEs: There are 7 Health Authorities across British Columbia; Northern Health, Interior Health, Vancouver Island Health, Vancouver Coastal Health (including Providence Healthcare), Fraser Health, First Nations Health, and the Provincial Health Services Authority. Each of these health authorities has a senior executive leadership team. The following procedures were used to

recruit senior nurse executives for this study, approved by the University of Victoria; see Appendix B.

1. The PI will use commonly used internet search engines such as Google or Bing to identify members of senior leadership/executive teams at Health Authorities across British Columbia.

2. Once found, the PI will search through provided biographies to identify members of these teams with a nursing background (defined as education and/or work experience described). If no biographies provided, the PI will not attempt to search further into the backgrounds of those individuals listed at each health authority. The PI will only seek out information that is easily accessible by anyone in the public, using readily available search techniques.

3. Once suitable potential subjects are identified, the PI will determine if an email contact has been openly provided on the same web-page with the individual's name and biography. If not, the PI will not attempt further contact with that individual.

4. The PI will then email, from the PI's University of Victoria email account, the 'Participant Invitation' once the on-line survey has gone live.

A total of 14 senior executives were identified with this algorithm across British Columbia:

- 4 from Northern Health,
- 1 with Interior Health,
- 1 with the Vancouver Island Health Authority,
- 3 from Vancouver Coastal Health,
- 1 with Providence Healthcare,
- 2 with Fraser Health,

- 0 with First Nations Health,
- 2 from the Provincial Health Services Authority.

Correspondence between SNE respondents and the PI, if any, was entirely through email. All correspondence and survey questionnaire data has been kept anonymous.

Non-probability samples, such as convenience or quota samples, are much easier to obtain than random samples; however, from a statistical perspective, they are regarded as having a lower probability of population representativeness. (46) On the other hand, even probability samples are at risk of sampling error; although the researcher can reduce this risk by having an adequate sample size. (46)

Sample Size

This study is limited in this regard, the sample population of interest in both groups is very small. As might be expected, the number of senior healthcare executives in British Columbia is already a small group, and adding the requirement of a nursing background further limited the potential sample size. There are very few individuals meeting the inclusion criteria for this project, from both groups.

When thinking of generalizability, in this context we are asking if the results can be extrapolated to senior nursing executives in other provinces, and this often depends on whether participants were selected for the study by means of random sampling techniques. (46) Study results based on random samples are considered generalizable, if adequate responses were received, while study results based on other methods of identifying patients are not. This study did not use random sampling techniques, it would have been unfeasible considering the very small number of individuals meeting the inclusion criteria. If the targeted population is a small subpopulation within a larger population, the results may not be generalizable to the larger

population because it may not be adequately represented in the random sample. (46) Other information is needed to establish generalizability. In the methods section, inclusion and exclusion criteria help identify the population to which the results might apply. By carefully examining the characteristics of the study participants, readers can make their own judgements as to the similarities to their own populations of interest. (46)

Regardless, this project could only work with the sample available, and the investigators will hope readers will consider the project as a whole when determining generalizability of the data.

Data Collection

Self-administered questionnaires allow large numbers of individuals from widespread geographical locations to be sampled cost effectively. However, the major limitation to this approach has always been poor response rates, which can restrict researchers in their quest to generalize findings to the population. (43) A 50% response rate is generally regarded as acceptable, 60% is regarded as good, and a 70% response rate is usually regarded as very good. (43) It is also important to note that in an era where the demand for generalizable survey generated data is increasing, the response rates in many western countries are continuing to fall, 'survey fatigue' is particularly common in the health sciences and potentially limiting our expected response rate. (45)

Attempting generalizations in the face of low response rates can lead to non-response errors. Individual non-response errors occur when insufficient numbers of the sample respond, and a probable non-representativeness of the population results. Item non-response errors occur when respondents do not answer one or more questions. (46) Researchers attempts to overcome the problem of low response fall into two categories; the first involves the use of techniques to

persuade more sample members to respond (including prizes, rewards, or other incentives), and the second entails weighting the survey for non-responses. (46) The use of incentives was considered, but deemed unnecessary.

Other limitations that are associated with self-administered questionnaires are the possibility that the respondent either did not complete the questionnaire him or herself, or sought help to do so. (45) This may interfere with the representativeness of the sample, particularly if it happened frequently within a study. The difficulty is that it is not possible to know if it happens. (45) It is not expected that either of the sample groups of interest would experience either of these difficulties given their professional experience and educational backgrounds.

The use of computers and the internet for data gathering is still relatively new within the field of research. However, with more individuals becoming computer literate and gaining broadband access to the internet, it is progressively becoming the more popular method of choice. (45) The biggest advantage of electronic questionnaires is cheap access to a large sample and ease of data management. Electronic questionnaires incur no costs for stationary, printing or postage; although some initial cost may be incurred setting up a website. (45)

This research incurred no such costs as an account on the FluidSurveys (47) website was generously loaned to the PI by the leadership team at InspireNet. (48) Data received was loaded directly to spread sheets reducing both time and the risk of error. Traditional questionnaires can take days to arrive at their destination, with the same return time. With electronic questionnaires, arrival is practically instantaneous and on completion, the return time is similar. (40)

After considering the advantages and disadvantages inherent to this data collection methodology, it was decided that this research will use direct email invitations sent to both groups. The NIEs received an invitation (Appendix D) to provide survey questionnaire feedback

on the original survey questions. Questions, feedback, and recommendations were exchanged between the nursing informatics experts using the PIs secure University of Victoria email address. The SNEs received an invitation to participate (Appendix E) which included a link to the online, self-administered survey questionnaire. This link connected the senior nurse executive to a FluidSurveys website, and the survey questionnaire. All data was removed from the website after the survey was closed and is held on a secure PC with the PI. The data will be permanently destroyed after successful defence of this thesis per instructions in the University of Victoria Human Research Ethics Board 'Certificate of Approval'.

Data Analysis

A survey questionnaire easily permits the reporting of descriptive statistics. Further, the demographic data collected allows for the comparison of experiences across Health Authorities, practice settings, and other variables. Demographic data was compared, as well as information derived from the questions asked in the survey questionnaire. Finally, a summary of themes from the structured short answer questions was reported in a narrative format.

The purpose of data analysis is to present a large quantity of gathered data in a summarized way that is comprehensible to the reader. (48) In survey research, data are presented through statistics. There are two types of statistics: descriptive and inferential. Because this research is in the exploratory stage, and the design simple, basic descriptive statistics will be used to report and interpret results. Tests of significance are not appropriately applied in this research study. Tests of significance are not appropriate when:

1. Total populations are studied,
2. Non-probability sampling procedures are employed,
3. There may be a substantial non-participation rate,

4. Relationships that were not formulated as hypothesis prior to data collection. (45)

At the very least, this research violates the first and second conditions listed above.

Ethical Considerations

Issues of privacy, confidentially, the proper recruitment of participants, and data integrity are taken very seriously by this researcher and his advisors. Researchers have an obligation to uphold the ethical rights of the participants in their study. (40) Two important ethical considerations of particular relevance in this study relate to informed consent and confidentiality. Before asking subjects to participate in this research study, the researcher informed them of the purpose of the study, their right to refuse to participate and, their ability to withdraw from the study at any time with no consequences.

Potential participants should also be informed whether their identities are anonymous or how the researcher will ensure confidentially. Participants are usually asked for written consent in the case of face-to-face interviews or observations, whereas in the case of questionnaires consent is usually regarded as implicit in the completion and return of the questionnaire, (40) as in this study.

The University of Victoria Human Research Ethics Board approved the study. Informed consent was established at the time of participation. This was a low risk study with no data in the project that could identify participants. All records were stored on a secure computer; the PIs and the FluidSurveys database. The focus of the questions related to nursing practice, previous experiences, and current employment and IT project experiences contained no subject matter that were potentially sensitive to participants.

Chapter 5 - Results

Introduction

The goal of this study was to determine the level of participation of senior nursing executives and leaders in the acquisition of new or upgraded electronic healthcare information systems. Broadly speaking, this project was seeking '*Nursing's Voice*' in this process. The research was accomplished in two main steps, the first being the development of an appropriate survey questionnaire with the assistance of nursing informatics experts from across Canada.

Survey Pilot-Testing

The feedback from the survey questionnaire pilot-testing with the nursing informatics subject matter experts are shown in Appendix F. As can be seen, there are substantial differences in both the breadth and depth of the recommendations between the various experts. The PI, and author of this paper incorporated much of the feedback when developing the final version of the survey questionnaire, but not all the recommendations could be practically accommodated. For example, suggestions to consult an instrument psychometrician/statistician, or to pilot-test the survey questionnaire with 30 subject matter experts may be considered ideal, but well outside the scope of this project.

Regardless, as mentioned previously almost all of the feedback was adopted, and the contributions of the nurse informatics experts who selflessly volunteered their valuable time is greatly appreciated by the PI and supervisors. The results of this first step can be seen in Appendix G, and the associated discussion can be found in the results section of this paper.

Research Study

The second being the recruitment of senior nursing executives from Health Authorities across British Columbia, and their participation in this work by generously donating their time

and completing the modified and improved survey questionnaire. These results are discussed throughout the remainder of this section.

Response Rate

The final version of the survey questionnaire can be viewed in Appendix G. The survey questionnaire was open on the FluidSurveys website between September 1 and 15 inclusive, judged a reasonable amount of time based on the opinions of the two co-supervisors and the literature. (42) Based on the search algorithm described in the study sample section, and the fact all Health Authorities in British Columbia provide detailed information on their senior executive teams online, the PI was able to quickly and easily identify all the senior healthcare executives in BC health regions with an appropriate nursing background. An N=14 was established, and invitations were sent to the 14 qualifying senior healthcare executives with nursing backgrounds as described in the study sample inclusion criteria. Of those 14, 1 was excluded immediately because she had retired one month before the invitation to participate was sent out. From this group of 13, the PI received 2 'out-of-office' automated email responses confirming that these 2 executives would be away during the time the survey was live, and referring urgent requests to an associate. The study PI did not contact either associate. These 2 executives were then also excluded from the sample of interest leaving a total of 11 potential respondents.

FluidSurveys received a total of 11 replies to our study survey, which initially appeared to be a 100% response rate! However, after investigating 2 responses which were not fully completed, identical answers to several of the initial questions were noted, and based on their common IP addresses (meaning a single computer was used), it was determined by the PI that a single individual had simply started the survey several times before being able to complete. It must be noted here that the participant who began the survey and abandoned twice only

answered the first few demographic questions (identically), so there was no real data of value provided (other than to confirm it was highly likely the same respondent had attempted these tries). The PI made the decision to delete these partially completed surveys leaving a total of 9 completed survey questionnaires, a respectable 82% response and 100% completion rate. The results of the survey questionnaire can be seen in Appendix H.

Recruitment

The first three questions were designed to ensure that individual answering the survey met the recruiting criteria. All 9 respondents replied to all three questions leading the investigators to believe all 9 respondents did indeed meet the recruiting criteria. Interestingly, the third question which asked respondents to identify their individual job titles was quite heterogeneous, demonstrating the wide variety of titles a nurse might have at the senior executive level. Researchers should be careful to take this into account when attempting to identify individuals with a particular background or set of experiences.

The results of the first three questions gave the PI confidence that the recruiting strategy had been successful and that the survey results would reflect high levels of confidence.

Demographics

The next 6 questions in the survey, questions 4 through 9, were designed to solicit basic demographic data and useful information comparable across respondents. The first question in this category asked how many years' experience each participant had in clinical nursing (in any practice setting) before they transitioned into a management role. All 9 respondents answered this question, and all 9 would be considered experienced clinical nurses by any standard; the minimum number of years of clinical nursing practice was reported by one respondent at 7 years, but the majority, 6, reported over 20 years. This relatively homogeneous response was to be

expected as senior healthcare executives, particularly those from a clinical background, only arrive in these positions after many years' experience.

The next question asked how many total years' experience each respondent has in their current or similar position/role as a healthcare executive. Again, all 9 participants answered this question, but with more evenly dispersed replies. This more heterogeneous set of replies provides an interesting opportunity to consider the possibility our sample of respondents may come from different age cohorts. Failing to ask the ages of the respondents, was perhaps a weakness of this survey questionnaire. However, another explanation for the wide range of replies could relate to the job titles mentioned previously. Our respondent group ranged from Presidents and CEOs through VPs and COOs and then Directors. Each of these positions is typically filled by an individual with certain similar characteristics, including experience, which is often directly related to the number of years employed in a position.

The responses to the third question in this series clearly shows our respondents are a very well educated group. All 9 respondents answered this question, with 6 of the 9 individuals stating a university degree at the Master's level. Again, not too surprising as senior healthcare executives typically arrive in these positions with many years' of education.

The next question, question 7 in this series, asked how long ago the respondents graduated from their most recently completed nursing program. This question was designed to get a sense of how likely it was these nurses were exposed to informatics concepts and training in school, specifically the farther back a nurse graduated, the less likely they were exposed to this subject area. All 9 respondents replied to this question, with 5 stating they had graduated more than 20 years ago, and 3 more reporting graduation between 10 and 19 years previously. The

researcher concluded that it was unlikely these 8 senior nurse executives had formal informatics education in their nursing degree programs.

Next, this survey asked if any of the respondents had earned an advanced certificate/diploma/degree from a field outside nursing. Multiple options were presented, and 7 individuals responded. The replies were quite heterogeneous, but 5 of the responses had elements of 'administration studies' within their titles, not surprising considering the roles these nurses are employed in. Failing to provide a 'not applicable' option may have accounted for the missing two responses, and was perhaps a weakness of this survey questionnaire.

The final question in this series asked about these nurses primary area of clinical nursing practice before they accepted an executive/leadership position. This question was placed in the survey looking for a source of potential bias. Potentially, if all respondents came from an identical, or very similar clinical background, these results could not be considered generalizable. All 9 respondents answered this question, and interestingly, all 9 responses were different. This heterogeneous set of replies means we can assume greater confidence in our findings and greater external validity.

Demographics Summary

In summary, the demographics section of the survey questionnaire demonstrates our respondents are very experienced nurses, very well educated within traditional nursing programs, though often many years ago. Many are also well educated in graduate level business programs, come from a wide variety of clinical backgrounds, but demonstrate some significant differences when it comes to years of experience in their executive positions.

Informatics Knowledge

The next 4 questions in the survey, questions 10 through 13 focus on the respondents' education and training in informatics. The first question in this series starts by asking if the respondent has formal training in informatics; informatics broadly defined using terms including, but not limited to computer science, health informatics, and information sciences. All 9 nurse executives answered this question with the results showing 8 respondents with no formal education in informatics, one with some training, and zero with formal training in informatics, broadly defined. This question was placed in the survey to establish a baseline of understanding, and so later responses can be considered in their proper context.

The next question asked respondents what is their highest level of formal informatics education earned. This question was poorly designed by the PI, and unsurprisingly only received 4 replies. The problem with this question was that it did not offer a 'not applicable' option, particularly important considering the responses to the previous survey question. One study participant indicated she had earned a diploma in informatics, and three replied "not applicable" or similar phrasing in the 'Other' text entry area. The missing 5 responses would likely also have replied 'not applicable' if the option had existed in the menu. Failing to provide this option was clearly a weakness of this survey questionnaire.

Question 12 asked if the respondents had gained informal knowledge of informatics, health informatics or computer systems informally, on-the-job. All 9 respondents replied to this question; 4 said 'yes', 5 responded 'some', and zero replied 'no'. All the nurse executives participating in this project have had at least some on-the-job training in informatics, an encouraging finding though it would have been interesting to explore these responses in more depth, perhaps another notable weakness of this survey questionnaire.

Of course, people are educated in many ways, and the next and final question in this series explored other possibilities when asking if they had gained informal knowledge of informatics, health informatics or computer systems through personal interest or study. Once again all 9 respondents answered this question; 4 replied 'yes', 4 replied 'some', and 1 replied 'no'. An interesting and positive finding, that 8 of 9 senior nurse executives responding to this survey have taken it upon themselves to educate themselves in the broad area of informatics on their own time. This is particularly encouraging considering the limited amount of free time an individual in an executive healthcare position would have available.

Informatics Knowledge Summary

In summary, even though only one respondent indicated formal education in informatics, all other respondents indicated at least some on-the-job training in informatics, and 8 of 9 even went so far as educating themselves on their own time on informatics subjects. This is a very positive and encouraging finding considering the importance of nursing involvement in the acquisition or upgrading of an EHI system, the theme of this research. Additionally, these responses reflect positively when compared to the ideal of the SSM perspective. These respondents have indicated this work has real meaning for themselves, and the additional informatics knowledge each sought is purposeful activity, purposeful in the light of those meanings. The majority of these nurses are trying to improve the system, a hallmark of SSM.

Informatics Experiences

This section of the survey questionnaire, 10 questions numbered between 14 and 20, ask questions related to the respondents experiences with informatics projects in their current or past leadership positions. The first question was very straight-forward, and asked if the respondents were currently, or have been in the past, involved to any degree in any informatics systems

acquisition or upgrading projects in their current or previous Health Authority. All 9 nurse executives answered this question, 7 replying 'yes', and 2 replying 'no', clearly indicating that almost all respondents at this level of management are involved with informatics projects to some extent.

The next question was a sub-question of the previous and asked, if they had replied 'yes', how would they describe their degree of involvement on the project(s) they had the most involvement with. Oddly, even though 7 respondents indicated involvement in informatics projects in the previous question, the survey recorded 8 responses to this follow-up question. There are several possible answers to this disparity, but without more information the PI would simply be guessing, and therefore the data will be analyzed as is. Regardless, the responses ranged from 'somewhat involved with limited contributions', up to 'routinely involved with important contributions'. This is an encouraging finding as no respondent indicated either 'almost no involvement with no contributions' or 'very little involvement with negligible contributions'. And 4 of the respondents, 50%, selected the second highest option on the scale, 'routinely involved with important contributions'. Admittedly, none of the nurses answered 'greatly involved with significant contributions', but on balance, the replies to this question indicate these nurse executives appear to be making important contributions in their Health Authorities informatics projects.

Question 15 asked how the respondents' participation was solicited in any informatics acquisition or upgrading projects in their current or previous Health Authority. Specifically, were they invited to participate in that project, assigned to that project, or did they ask to be involved. The respondents were given the option to select all options that applied, though this did make understanding and interpreting the responses a bit more difficult, another possible weakness of

the survey questionnaire design. This question received 14 replies from 8 respondents. 6 responses indicated an invitation to participate, 5 responses indicated being assigned to a project, and finally 3 responses indicated they took the initiative and asked to join the project team. It is very likely an executive would be assigned to a project team of this scope and those 5 responses simply indicate that reality. Of much more interest is the fact that 75% of respondents were asked to join a project team, and 38% of respondents went out of their way to request inclusion in at least one IT project. We might conclude from these findings that the members of these project teams valued and encouraged participation from individuals with a clinical background and invited them to the table, and encouragingly, many of these nurse executives were interested enough in informatics that they requested to join these teams, *to have 'Nursing's Voice' heard*.

The next question was a follow-up to question 15 and asked, if the respondents were (a) either assigned to or (b) asked to join a project team (aka not invited), did they feel welcomed by the IT group assigned to that project? Of course, this question will yield very subjective replies, but was deemed interesting and important because it attempts to gain some insight into how these nurses feel valued in these settings. It would be ideal if we could hear from members of the IT departments, but those answers are well outside the scope of this research, though could be an interesting subject of another proposal. Regardless, 8 unique replies were entered into the provided text field. 7 of the 8 responses indicated they did feel welcomed, though two of those 7 replies came with a qualifier; one added that "yes, *but I did not believe my involvement was seen as important*" and the other added "yes, *but it was not an easy relationship, there were challenges in coming to agreements around priorities and language; however, with time we developed an effective working relationship*". The remaining participant replied with "varied". It is encouraging that the clear majority of these respondents felt welcomed by the IT team and

none felt this was a hostile environment to clinical staff, though admittedly these nurses may have been welcomed simply because of the senior executive position they hold. Regardless, it would be very unlikely nurses could be encouraged to participate in EHI systems projects without positive relationships with their individual IT departments.

Question 16 asked if any of the respondents had been involved in any of the financial negotiations or decisions concerning the acquisition of an electronic healthcare information system. All 9 participants replied to this question; 4 replied 'yes', 3 replied 'somewhat', and 2 replied 'no'. Having a role in the financial decisions of a Health Authority is extremely significant, and this question was added to the survey as a means to judge the level of authority these nurse executives exert. 7 respondents indicated at least some involvement in the financial decisions surrounding their IT projects, indicating their involvement in IT or EHI systems projects was far more than superficial or trivial.

The next question in this series asked who or what else these nurse executives rely on for additional information when a decision is required that involves informatics in some way. All 9 respondents replied to this question providing a total of 41 responses. Interestingly, the two responses that 100% of respondents indicated they rely on were 'IT staff' and 'site visits to other facilities'. Next were 'vendors' at 89% and 'clinical staff' at 78%. Online information sources and various other options were also mentioned at 44% each. These replies are also encouraging because they indicate a willingness on the part of the respondents to seek out information as needed, a sign of interest and involvement in IT and EHI systems projects.

Question 18 in the survey asked the respondents whether they are directly involved in IT projects in their Health Authority, or do these nurses executives transfer these duties and responsibilities to a trusted colleague(s). This question yielded unexpected and contradictory

responses, especially considering the responses to the first question in this series, question 14. The question was purposely placed into the survey at this point as a means to re-confirm replies in the previous questions. Up to this point it seemed the study participants indicated active participation in IT projects in their Health Authorities. However, with all 9 respondents answered this question, only 4 of the 9 indicating a direct involvement in projects, 5 of 9 indicating they transfer their duties and responsibilities to trusted colleagues. This is puzzling and difficult to explain. It could be the question was poorly designed, or poorly understood. However, there was a follow-up question added to elicit a more detailed response.

This next question in the series was a follow-up to question 18 and asked, if the respondent answered that they transfer these responsibilities to a colleague(s), did they make this decision because they felt they lacked the background and experience to make a meaningful contribution to an informatics project. 6 responses were recorded, even though only 5 respondents had answered they transferred responsibilities to colleagues in question 18. Three replied 'yes' and 3 replied 'no'. Of course, senior nurse executives could have many reasons for transferring responsibilities for an IT project to another trusted individual, and it may have been advantageous to explore the meaning of 'transferring responsibilities' in more depth. However, in the opinion of the PI, the significant responses were from the 50% of respondents that answered 'yes', those who felt they lacked the background and experience to make a positive contribution. This indicates 1/3 of respondents to this survey feel they are lacking informatics training and experiences in some way, which actually does match up well with the responses to previous questions. Frustratingly, questions concerning the disparities mentioned previously in question 18 cannot be answered with the limited data and information available.

Thankfully question 19 was easier to interpret. The survey question asked if the respondent has ever been involved in the evaluation of a new, or upgraded electronic healthcare information system after the system went live in their Health Authority. All 9 participants responded with a diverse and heterogeneous set of replies. All stated at least some participation at this later point in the SDLC, 3 even reported a significant level of involvement in post-installation evaluation. It was encouraging to see that 6 of 9 replies indicated at least some degree of involvement above 'none' or 'very little' in the survey questionnaire.

The final question in this series was another somewhat subjective one as it asked if the respondent felt as though they had personally influenced the procurement of electronic healthcare information systems in their Health Authority. This question was included in the survey questionnaire to broadly explore the respondents' feelings of their contribution and their personal value in these projects. It is reasonable to expect that if an individual feels they have made little or no positive contributions, they are far less likely to participate in such a project again in the future. All 9 respondents answered this question with 4 responding 'quite a bit' and 2 responding 'somewhat'. It is encouraging that 6 of 9 nurse executives in group 2 feel they have personally had influence at the table, and we can hope they would therefore likely participate again in the future.

Informatics Experiences Summary

In summary, the informatics experiences section of the survey questionnaire yielded some contradictory information, but generally quite consistent findings. The majority (78%) of the senior healthcare executives in our study group have had experience in informatics project teams and most respondents indicated both non-trivial involvement and contributions. Many of our respondents have been invited to join IT project groups, and almost 40% were so interested they even asked to be included; a good example of purposeful activity and interdisciplinary teamwork, fundamentals of SSM. All our nurse executives reported feeling welcomed by the IT staff, with a very few comments

indicating some initial resistance that was later over-come as the teams began to work together as the project progressed. We also learned that nurse executives in our study were involved in some of the key financial decisions (78%) surrounding IT projects in their Health Authorities, and are open to input from a wide variety of sources when it came to improving their knowledge and understanding of informatics. Finally, we discovered that many of our respondents are involved in the evaluation stage of these projects, and many feel they have personally influenced the acquisition and upgrading projects decision-making process in their respective Health Authorities.

Informatics Attitudes

The final series of questions explored our respondents' attitudes and opinions towards informatics, and nursing's place in that world. While questions 21 through 24 attempt to elicit feelings more than facts, they nevertheless provide valuable insight (recall the discussion of Soft-Systems Modeling) into why these nurses may, or may not participate in IT projects in their respective Health Authorities.

Question 21 is considered by the PI to be one of the most important of the entire survey questionnaire. It asked the respondents to provide an opinion, regardless of their background, interest, or knowledge of information technologies; do they feel decisions concerning informatics projects are best left to the IT department. This question is a gauge of our respondents' feelings concerning their conception of where nursing's voice should or should not be heard. All 9 participants answered this question and all had strong feelings on this subject. 7 replied in the response category 'no, healthcare IT projects must have equal input from IT and clinical users', and the other two replied with even stronger support for clinical users under the response category 'no, healthcare IT projects should be guided by clinical users with IT support. These replies are very encouraging coming from this level of management, and support the idea that

clinical users must play a significant role in healthcare IT projects and that nursing's voice should be heard, in the opinion of our study participants.

Question 22 has a complicated design, but is important and very interesting because it asks our nurse executives to tell us who they believe should be involved in EHI systems acquisitions and how much influence each of these groups, or individuals should have in these decisions. Based on the response data, the PI developed an 'Influence Score', the percentage of recommended involvement as judged by the nurse executives, divided by the number of responses. This simple descriptive statistic means nothing in isolation, but provides interesting information when compared against each other. Of importance, even though the respondents were asked to ensure their percentages added up to 100%, they did not in several cases, confirming individual values are of less importance than the comparison of those values together.

Teams, Departments & Users	Influence Score
IT (Information Technology) Department	**33%** (ranging from 10 to 50%) 9 responses
Health Authority Executive Team	**19%** (ranging from 10 to 30%) 7 responses
Health Authority Finance Executive	**15%** (ranging from 5 to 30%) 6 responses
Health Authority Clinical Executive	**18%** (ranging from 10 to 30%) 7 responses
Hospital Executive Team	**13%** (ranging from 10 to 20%) 4 responses

Hospital Departments	**16%** (ranging from 5 to 20%) 7 responses
RN (Clinical end-user)	**17%** (ranging from 10 to 30%) 8 responses
Other	Unusable text comments. 4 responses

Table 1- Influence Scores

The most significant finding from this analysis is that all our respondents believe the healthcare IT department should have the greatest influence in EHI systems acquisitions in their Health Authority. All other influence scores turned out quite similar, meaning our nurse executives placed relatively the same value on the remaining teams, department, and users.

Question 23 asked for another opinion of the respondents, in their view, do members of the IT team feel clinical staff have the knowledge necessary to make informed decisions when considering the acquisition of new or an upgraded electronic information system. All 9 executives answered this question, three replied 'yes' and 6 replied 'no'. This result is not unexpected, and may simply reflect the education and experiences of the different groups. This researcher has never expected that nurses would match IT specialists in informatics knowledge, just as it would be very unlikely to find many IT staff with strong clinical understanding. Perhaps this question should have incorporated more nuance and asked instead, "do members of the IT team feel clinical staff have *an acceptable* level of knowledge necessary to make informed decisions when considering the acquisition of new or an upgraded electronic information system".

The next question, number 24 asked if our respondents personally feel it is important for "Nursing's voice" to be heard when IT projects are planned, should nurses be "invited to the table". All 9 participants replied, 8 voting 'yes' and a single vote for 'no'. An encouraging reply to be sure; these responses imply to this researcher both a strong acceptance for the idea we include nursing's voice at the table in IT projects, and a hope these executives will encourage and enable other nurses involvement in the future.

A follow-up question to number 24 delved deeper into the previous responses by asking if it is very important that "Nursing's voice" be heard when a Health Authority is planning the acquisition or upgrading of an electronic healthcare information system. 8 of the participants replied, 6 'strongly agreed', one 'agreed', and one 'disagreed'. Again, an encouraging and positive group of responses from our participants.

Informatics Attitudes Summary

In summary, this section of the survey questionnaire succeeded in collecting many opinions and feelings from the nurse executive respondents in this study. Though most of the responses were subjective, they still offer interesting and important insights into how nurse leaders in British Columbia are thinking. We learned our participants feel very strongly that clinical users should guide informatics projects in their Health Authorities (another positive sign that SSM is incorporated even at a subconscious level), but with significant support from their expert IT colleagues. Most respondents also felt that the IT staff do not believe clinical staff have enough knowledge to make informed decisions within EHI systems projects; regardless, these same executives also strongly believe that '*Nursing's Voice*' must be heard in these projects.

Survey Validity

The final question was designed and added to the survey questionnaire for the purpose of assisting the researchers in determining whether or not the questionnaire itself seemed relevant, clear, readable and logical considering the research question. Question 25 was used as a measure of face validity. Face validity is simply defined as whether the test appears (at face value) to measure what it claims to. This question is a direct measurement of face validity, and was obtained by asking respondents to rate the validity of the survey questionnaire.

It is important to select suitable people to rate a survey questionnaire; and individuals who actually take the survey are well placed to judge its face validity. However, the face validity of a test can be considered a robust construct only if a reasonable level of agreement exists among respondents. All 9 respondents answered this question with all replies rating the survey as adequate or better (very suitable and extremely suitable). This result demonstrates a reasonable level of agreement amongst the respondents and we may therefore conclude a reasonable level of face validity exists with the survey questionnaire design. This finding, combined with the survey questionnaire pre-testing, implies a reasonable level of confidence in the survey questions.

Participant Comments

Study respondents were given the optional opportunity to provide additional feedback in the form of free-text entry areas, and 7 respondents provided a total of 15 comments to the 5 open-ended questions.

The question, "please describe an example of how your participation in the process made a difference in the final decision" had three unique replies and suggested several of our respondents insisted on changes which seemed to result in non-trivial improvements to the final products delivered. The question, "please describe how acquisition decisions are typically made in your authority" had 5 unique replies, three stating that these decisions are made in multi-

disciplinary teams, often with clinical user input, an encouraging finding. The remaining comments stand alone, but are interesting in their context. Please see the end of Appendix H.

Study Limitations

The researcher acknowledges there are limitations to this study. First, it must be recognized that because this was a self-administered on-line questionnaire, the researchers have no way to fully verify the responses as entirely true, but we have assumed they are. Second, the survey questionnaire design itself is lacking in some important areas that were discovered after responses were analyzed; a reflection of the inexperience of the PI. These short-comings were noted throughout the discussion section of the paper where appropriate. Third, the study sample size was small, and two potential respondents were away during the time the survey questionnaire was live; this leads to legitimate questions of external validity (generalizability) and the ability to extend the results obtained for the given sample to another population (our recruiting criteria necessitated a small cohort).

Overall then, the short-comings of this study within investigator control can be linked to the inexperience of the principal investigator. Specifically, the questions in the survey questionnaire could have probed for a deeper understanding of several of the responses, resulting in a better understanding of the concept being questioned. In an effort to keep the length of the survey manageable, the researcher may have missed important information, a lesson that will not be dismissed in future work.

Chapter 6 - Discussion

This research study and thesis represent the combined efforts of many individuals and organizations. Before we delve into the conclusions, the principal investigator, and author of this thesis wishes to sincerely thank all those involved in this project, and acknowledge their selfless contributions, thank you.

Soft-Systems Methodology

In considering the interpretation of the results, the SSM theory described in Chapter 3 will be the theoretical lens we examine this research question through. Recall, the research assumed end-user involvement is of significant importance, and using this theoretical perspective has influenced both the questions asked, and the interpretation of the data; *the belief that senior nursing leadership involvement in healthcare IT acquisition decision-making is vital for successful implementation*.

The following discussion will focus on comparing the survey results, 'how things are done' vs key elements of SSM, 'how they might be done better'. Recall, these key elements include:

- Meanings attributed to their world by the people concerned;
- Purposeful activity, purposeful in the light of those meanings;
- Information support which is relevant to the people carrying out the activities;
- Data structured in ways to yield appropriate and meaningful information;
- The idea of the 'serving' system and the 'served' system;
- Relying on individuals to define problems and seek solutions;
- The perception of the system and activities by each individual;
- The definition of a successful implementation by each individual.

Literature Review

Unfortunately, questions directly related to the AONE guidelines were not included in the final survey questionnaire, a result of the inexperience of the PI. If this study was to be done again, we would surely ask participants if they knew of the AONE guidelines, and if they included those guidelines in their practice. This research might, in a small way be the basis for the development of Canadian guidelines. However, it is not clear that the experiences of Canadian and American nurse executives is substantially different; different enough to warrant a separate set of guidelines.

Implications

Positive and encouraging are two words that first come to mind when reviewing the responses to the survey questionnaire. This author was pleasantly surprised with both the high response rate, and the content of the replies themselves. Clearly, our senior nursing executives in British Columbia felt they had something important to contribute to this discussion, as many not only answered the survey questions, but also added optional comments. Further, the responses indicate a real interest and participation in healthcare IT, both elements of the SSM theoretical perspective. Interest and participation in electronic healthcare acquisition projects certainly speak to the meaning and purposeful activity these nurse executives ascribe to these activities. Additionally, it would not be too difficult to assume the nurse executives in this study perceived this was work of some importance as they define it, another key element of SSM.

It was particularly encouraging to learn the majority of our respondents use personal time to increase their knowledge of health and nursing informatics. Equally impressive was learning the majority of our respondents also learned a great deal on-the-job. This speaks volumes about the willingness of the health informatics professionals and IT staff to include clinical staff in

healthcare IT projects in a substantive way. This is also an element of SSM theory; collaborative efforts, relying on groups of individuals, defining problems and seeking solutions together. It can be concluded that, maybe even on a subconscious level, our nurse executives and health informatics professionals are practicing SSM in an effort to improve their systems.

The nursing informatics experts recruited to participate in the pre-testing of the survey questionnaire were also all keen to be involved in this work, a clear and positive message that many of our top people in Canada feel this was a project of interest and value. All accepted their invitation to review, and their contributions were often substantial, as is obvious when viewing their detailed responses. Their actions are reflected in several key elements of the SSM perspective; namely purposeful activity, and information support which is relevant to the people carrying out the activities. Again, people working to make the system better.

This research project was an attempt to expand our understanding of where nursing leadership fits into the process of acquiring a new or upgraded electronic healthcare information system. However, this study only examined nurses' roles at the senior executive level in the province of British Columbia. Clearly there are opportunities to explore '*Nursing's Voice*' at other levels of clinical care, and in other provinces. It would be of real interest to also now consider these research questions at the level of middle management, and then perhaps the view from the bedside. It would be equally interesting to hear from the 'other side', the IT departments and health informatics professionals.

What might these finding mean to those in the nursing profession? These results are excellent news. The use of information technology in healthcare is only going to expand in the future, and nursing will need to embrace these changes. It would have been particularly concerning if the survey responses had indicated disinterest, or worse, hostility toward the

adoption of EHI systems; even more concerning if coming from our nursing leadership. However, the responses did not indicate any such feelings, instead active involvement and interest, feelings it is hoped are passed down through the Health Authorities nursing staff. When viewed through the lens of SSM, the positive active interest and participation of our respondents indicate they are interested in *making the system better*.

What might these finding mean to health information science professionals? Again, excellent news. Individuals working on the non-clinical side of healthcare IT must be encouraged by these findings, to know that senior leadership in their Health Authority is keenly interested in the work they do and the contributions they make. Unfortunately, all too often non-clinical staff are made to feel somehow less important in the care team, largely because the work they do is "invisible" to patients and medical staff. These professionals provide key support in the form of information support which is relevant to the people carrying out the activities, the clinical staff, and a great example of SSM in practice. Perhaps knowing that our senior executive nurses share a strong interest in healthcare IT might be a small step in closing this divide.

What might these findings mean to educators in nursing and health information sciences? These findings may indicate a need for professional development courses, courses designed to be easily accessible to busy nursing executives. The survey questionnaire should have added a question concerning access to relevant health or nursing informatics education; this added layer of depth could have proved valuable, particularly to the co-supervisors on this project. Educators may also want to review current curricula in their baccalaureate and masters programs. This survey clearly showed that formal informatics training was not a part of our respondents' education, though for a variety of well understandable reasons. It is also well known that schools of nursing incorporate very little informatics training into their curricula, at any level. However,

our leaders of the future need this education now if they are to be prepared for their future roles. And this training can come from within nursing schools or from educators in other appropriate departments, such as health informatics. Regardless, advances in healthcare IT will not be waiting, curriculum changes need to be made sooner rather than later.

What are the implications for executives and leaders? The participants of this study have all been promised copies of the results and it would be very interesting to see how they interpret the findings. But the more interesting implications may lie with our *future* executives and leaders, both in nursing and health information sciences. As mentioned, formal education in healthcare and nursing informatics is lacking in Canada. Perhaps this is an area senior nursing leadership could address. These results may also bring awareness to the increasingly important role IT plays in healthcare, and the increasingly important role clinical staff should play in healthcare IT projects as well. Future nurse executives would be well served if they understood now, the roles they may take on and the healthcare informatics training they will need in the future.

Conclusion

The purpose of this research was to develop a better understanding of senior nurse executives' participation in the acquisition of a new or upgraded electronic healthcare information system; does nursing have a voice at this table? Based on these results it appears nursing does contribute at this level, and these results are very positive and encouraging. The philosophy and practice of involving the end-users, or the leaders of those end-users, in large information technology projects has grown in acceptance; grown to the point it is now seen as a vital component in optimal software systems design. It is heartening to see that, at least among

our small group of respondents, this practice has seen some adoption. Nursing does indeed have a voice in healthcare it adoption.

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Appendix A - Certificate of Approval

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Certificate of Approval

PRINCIPAL INVESTIGATOR:	**John Allen McLean**	**ETHICS PROTOCOL NUMBER** Minimal Risk - Delegated	**14-185**
UVic STATUS:	**Master's Student**	ORIGINAL APPROVAL DATE:	16-Jul-14
UVic DEPARTMENT:	**NURS/HEIS**	APPROVED ON:	16-Jul-14
SUPERVISOR:	**Dr. Noreen Frisch; Dr. Abdul Roudsari**	APPROVAL EXPIRY DATE:	15-Jul-15

PROJECT TITLE: **Nursing's Voice in Healthcare IT Acquisition Decision**

RESEARCH TEAM MEMBER Supervisors: Dr. Noreen Frisch (UVic), Dr. Abdul Roudsari (UVic)

DECLARED PROJECT FUNDING: **None**

CONDITIONS OF APPROVAL

This Certificate of Approval is valid for the above term provided there is no change in the protocol.

Modifications
To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol.

Renewals
Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date.

Project Closures
When you have completed all data collection activities and will have no further contact with participants, please notify the Human Research Ethics Board by submitting a "Notice of Project Completion" form.

Certification

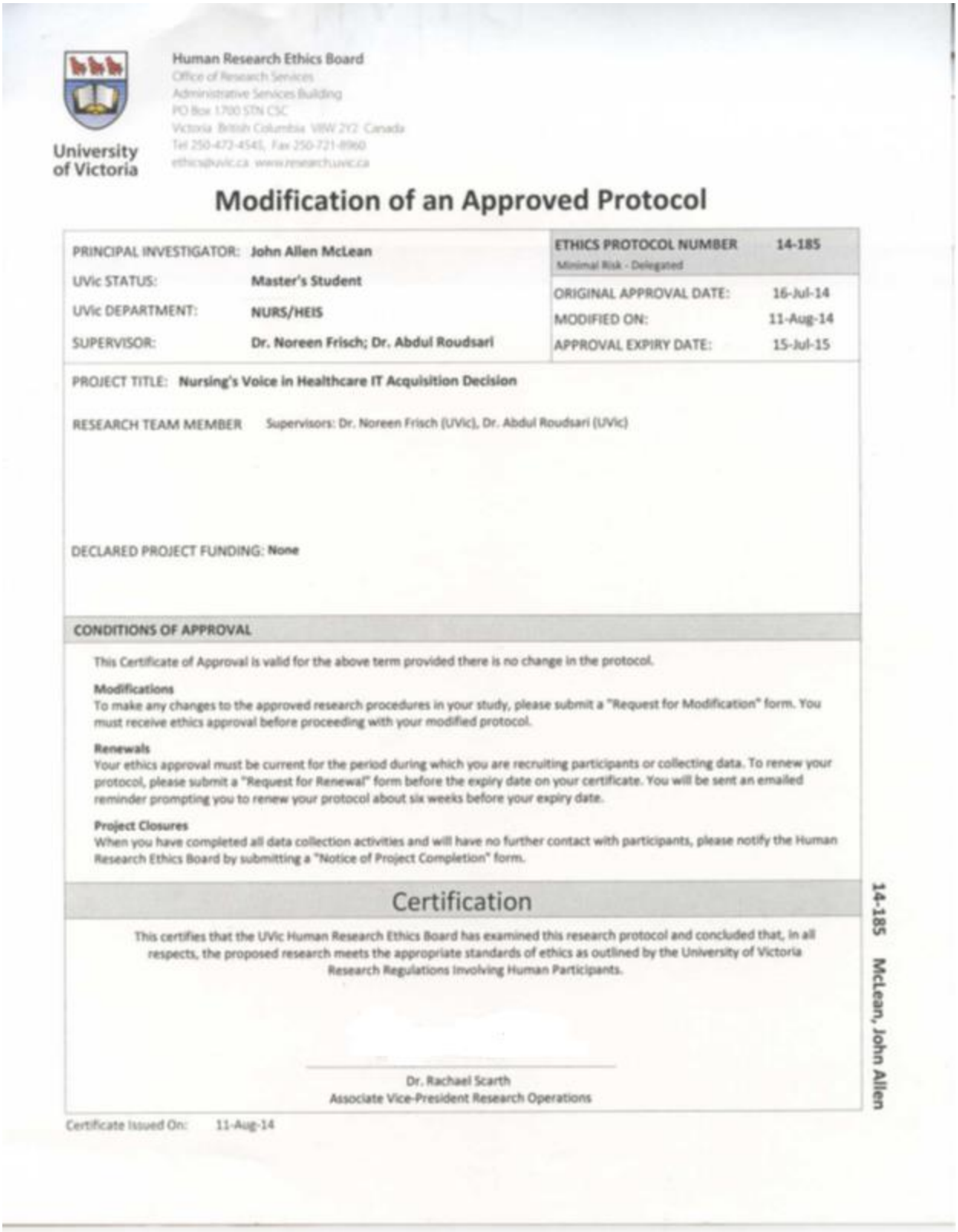
This certifies that the UVic Human Research Ethics Board has examined this research protocol and concluded that, in all respects, the proposed research meets the appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Participants.

Dr. Rachael Scarth
Associate Vice-President Research Operations

Certificate Issued On: 06-Aug-14

14-185 McLean, John Allen

Appendix B - Modification of an Approved Protocol



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Modification of an Approved Protocol

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UVic DEPARTMENT:	**NURS/HEIS**	MODIFIED ON:	11-Aug-14
SUPERVISOR:	**Dr. Noreen Frisch; Dr. Abdul Roudsari**	APPROVAL EXPIRY DATE:	15-Jul-15

PROJECT TITLE: **Nursing's Voice in Healthcare IT Acquisition Decision**

RESEARCH TEAM MEMBER Supervisors: Dr. Noreen Frisch (UVic), Dr. Abdul Roudsari (UVic)

DECLARED PROJECT FUNDING: **None**

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Dr. Rachael Scarth
Associate Vice-President Research Operations

Certificate Issued On: 11-Aug-14

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Appendix C - Original Survey Questionnaire

Part A: Demographics

1. Are you currently a registered nurse? (Y/N)

   If yes, continue.
   If no, and you were asked to complete this questionnaire by a nurse executive in your Health Authority, please select which title best describes your current position, then exit questionnaire, thank you.

   a. Chief Information Officer
   b. VP Information Systems
   c. Director IT Services
   d. Associate Director IT Services
   e. Other _____

2. Are you currently practicing in a Health Authority in Canada? (Y/N)

   If yes, continue.
   If no, please exit questionnaire.

3. What province do you currently practice in? (Select One)

   a. British Columbia
   b. Alberta
   c. Saskatchewan
   d. Manitoba
   e. Ontario
   f. Quebec
   g. New Brunswick
   h. Nova Scotia
   i. Prince Edward Island
   j. Newfoundland
   k. Yukon
   l. Nunavut
   m. NWT

4. What title best describes your current position? (Select One)

   a. Chief Nursing Officer (CNO)
   b. VP Nursing Administration
   c. Chief Nursing Information Officer (CNIO)
   d. Chief Executive Officer (CEO)
   e. Chief Quality Officer

f. Chief Operating Officer
g. Chief Financial Officer
h. President
i. Vice-President
j. Director
k. Associate Director
l. Other _____

5. How many years of total experience do you have in your current and similar position(s)? (Select One)

   a. < 1 year
   b. 1-2 years
   c. 3-5 years
   d. 6-9 years
   e. >10 years

6. What is your highest level of formal nursing education earned? (Select One)

   a. Diploma
   b. Associate Degree
   c. Bachelor Degree
   d. Master's Degree
   e. Doctorate
   f. Other _____

7. How long ago did you graduate from your most recent nursing program? (Select One)

   a. < 1 year
   b. 1-2 years
   c. 3-5 years
   d. 6-9 years
   e. >10 years

8. Did you earn an advanced degree from a field outside nursing? (Select Any)

   a. MBA
   b. MA
   c. MEng
   d. MSc
   e. PhD
   f. Other _____

9. What was your main area of clinical nursing practice before you accepted an executive position? (Select One)

a. Community Health
b. Adult Acute Care
c. Adult Critical Care
d. Ambulatory Care
e. Advanced Practice Nursing
f. Behavioral Health Nursing
g. Nurse Practitioner
h. Medical/Surgical
i. OB/GYN
j. Pediatrics
k. Perioperative
l. ER
m. Special Procedures
n. Informatics
o. Human Resources
p. Research
q. Education
r. Other _____

Part B: Informatics Background

10. Do you have formal training in informatics or computer science? (Y/N)

11. If yes, what is your highest level of education completed? (Select One)

    a. Diploma
    b. Associate Degree
    c. Bachelor Degree
    d. Master's Degree
    e. Doctorate
    f. Other _____
    g. Not Applicable

12. Have you gained informal knowledge of health informatics or computer systems (such as electronic health records), either on-the-job or through personal interest in the subject? (Select One)

    a. None
    b. Very little
    c. Some
    d. Quite a bit
    e. A great deal

13. Are you currently, or have you been involved (to any degree) in any informatics acquisition or upgrading projects in your health authority (such as electronic health records)? (Y/N)

14. How would you describe your degree of involvement on the project you had the most involvement in? (Select One)

    a. None
    b. Very little
    c. Somewhat involved
    d. Quite a bit
    e. A great deal

15. Were you invited to participate in that project, or did you ask to be involved? (Select One)

    a. I was invited to participate
    b. I asked to participate

16. Did you feel comfortable (that is, did you feel you had sufficient background knowledge and/or experience to make a positive contribution to the outcome) in that project environment? (Select One)

    a. Not comfortable
    b. Somewhat nervous
    c. Fairly comfortable
    d. Completely at ease

17. Regardless of your background, interest, or knowledge of information technologies, do you feel these types of decisions (such as the acquisition of a new electronic health record system) are best left to the IT department? (Y/N)

18. Have you been involved in any financial decisions concerning the acquisition of an electronic healthcare information system? (Y/N)

19. In your opinion, do other members of the IT team feel you have the knowledge necessary to make informed decisions in the acquisition of new or upgraded electronic information systems? (Y/N)

20. Who else do you rely on for information? (Select One)

    a. Subordinates
    b. Vendors
    c. IT staff

21. If there are IT acquisition or upgrading projects within your health authority, generally speaking, are you involved directly or do you transfer these duties and responsibilities to a subordinate? (Select One)

a. Involved directly
b. Transfer to subordinate

22. Are you the subordinate answering this questionnaire? (Y/N)

23. If yes, do you have a nursing background? (Y/N)

If yes, continue.
If no, and you were asked to complete this questionnaire by a nurse executive in your Health Authority, please select which title best describes your current position, then exit questionnaire, thank you.

a. Chief Information Officer
b. VP Information Systems
c. Director IT Services
d. Associate Director IT Services
e. Other _____

24. How familiar are you with the Systems Development Life Cycle (SDLC)? (Select One)

a. Not at all
b. Somewhat
c. Knowledgeable
d. Expert

Typically, what has been your level of participation? (Select One)

a. Not involved
b. Little participation
c. Active involvement
d. Key member of the team

25. To what extent has your health authority converted to an electronic health information or management system? (Select One)

a. Fully electronic systems
b. Mixed electronic/paper based systems
c. Paper based systems

26. Do you feel as though you have personally influenced the procurement of electronic healthcare information systems (such as electronic health records) in your Health Authority? (Select One)

a. Not at all
b. Very little
c. Somewhat

d. Quite a bit
e. Significantly

27. Do you personally feel it is important for "Nursing's voice" to be heard when projects of this type are planned? (Y/N)

28. Have you ever been involved in the evaluation of a new or upgraded electronic healthcare information system after the system went live in your health authority? (Select One)

    a. Not at all
    b. Very little
    c. Somewhat
    d. Quite a bit
    e. Significantly

Part C: Validity

29. Thank you for completing this questionnaire. This final question assists the researchers in determining whether or not this questionnaire was relevant to the subject in question. How would you rate the validity of this questionnaire?

    a. the test is extremely suitable for a given purpose
    b. the test is very suitable for that purpose
    c. the test is adequate
    d. the test is inadequate
    e. the test is irrelevant and therefore unsuitable

Appendix D - Request & Consent to Pre-Test Survey

Request to Review Survey Questionnaire and Consent: Email to Nursing Informatics Subject Matter Experts

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Greetings, my name is Allen McLean and I am a graduate student in both the departments of Nursing and Health Information Science at the University of Victoria. I am currently conducting thesis research for a study titled "Nursing's Voice in Healthcare IT Acquisition Decisions". I am supervised by Dr. Noreen Frisch and Dr. Abdul Roudsari.

I am writing to discuss the possibility of you reviewing my survey questionnaire. The survey questionnaire is designed to address the thesis question described above. If you agree to pre-test my survey questionnaire I will forward to an email of your choice. As experts in the field of nursing informatics, I feel you could offer invaluable advice and assistance. The purpose of requesting your feedback is to assist in developing a novel survey questionnaire which adequately addresses the research question. Of course your participation is entirely voluntary and your feedback will be kept confidential, only reviewed by myself and my advisors.

Purpose(s) and Objective(s) of the Research:

- Even though nurses make up the majority of healthcare professionals in the Canadian healthcare system, little is known about the participation of Canadian nursing executives and leaders when a decision is made to acquire or upgrade an electronic healthcare information system. The purpose of this research is to explore this gap in our understanding.

This Research is Important because:

- Nurses are the largest group of regulated health professionals in Canada. Electronic healthcare information systems of all types are becoming more and more prevalent in the Canadian healthcare system. The movement away from paper-based systems to electronic ones is an accelerating and permanent shift in the way we manage information in the Canadian healthcare system.
- Because nurses are such an integral part of the Canadian healthcare system, and because all signs demonstrate that the Canadian healthcare system is adopting electronic healthcare information systems at an ever increasing pace, it is logical to conclude that nurses should play a role in the initial evaluation and acquisition of electronic healthcare information systems.

Participation:

- The evaluation and acquisition of electronic healthcare information systems is very complex, and often very expensive. These types of decisions are typically made at the upper levels of administration, usually between executives in provincial governments and health authorities.

- The participant sample includes nurse executives and leaders employed at the highest levels of management in health authorities across Canada, and nurse leaders in nursing informatics who may be delegated to make evaluation and acquisition decisions.
- Participation in this project is entirely voluntary.
- Whether you choose to participate or not will have no effect on your position [e.g. employment, class standing] or how you will be treated.

Procedures:

- This pre-testing will collect feedback after nursing informatics experts review the survey questionnaire provided. The nursing informatics expert will choose a convenient time and location to review the document and provide feedback via email to the PI.
- **Duration:** Should require between 30 and 45 minutes of your time.
- **Location:** A location of your choosing.
- **Inconvenience:** Minimal inconvenience is expected.

Compensation:

- The results of this research will be made available to the participants and public through UVicSpace, a research and learning repository.
- It is unethical to provide undue compensation or inducements to research participants.

If you would not participate if the compensation was not offered, then you should decline.

Benefits:

- This research has the potential to add original and significant knowledge to the fields of both Nursing and Health Information Science.
- Knowledge gained from participation in this research is expected to inform healthcare leaders in both Nursing and Health Information Science, resulting in better IT implementation decisions.

Risks:

- There are no known or anticipated risks to you by participating in this research**.**

Withdrawal of Participation:

- You may withdraw (not provide feedback) at any time without explanation or consequence.
- A withdraw is not a withdrawal from the study in the traditional sense, that is, in this case your feedback will simply not be included in the survey questionnaire revisions.

Anonymity and Confidentiality:

- Participant anonymity will be protected throughout this research project, in data collection, data analysis, and in publication. The online survey requests only general demographic information and at no time requests participants personal information.
- Participant confidentiality will be protected throughout this research project. Data will be stored securely in Canada and will only be accessible by the Principal Investigator and study supervisors.

Research Results will [may] be Used/Disseminated in the Following Ways:

- Thesis
- Published article
- Presentation at Scholarly Meeting

Questions or Concerns:

- Contact the researcher(s) using the information at the bottom of this document;
- Contact the Human Research Ethics Office, University of Victoria, (250) 472-4545 ethics@uvic.ca

Consent:

By providing feedback, **your free and informed consent is implied** and indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers, and that you consent to participate in this research project.

Thank you!

If you have any questions about this research, please contact Mr. McLean at mcleanja@uvic.ca. My supervisors can be reached at; Dr. Frisch at nfrisch@uvic.ca, or Dr. Roudsari at abdul@uvic.ca.

All procedures and protocols have been approved by the Human Research Ethics Board at the University of Victoria. If you have any questions or concerns about your treatment or rights as a research subject, you may contact the Human Research Ethics Office at the University of Victoria at 250-472-4545 or ethics@uvic.ca.

Appendix E - Study Information & Consent

Participant Invitation & Consent Form

University of Victoria

Project Title: **Nursing's Voice in Healthcare IT Acquisition Decisions**

Researcher: Mr. Allen McLean, Graduate Student, Departments of both Nursing and Health Information Science, University of Victoria.

Supervisor(s): Dr. Noreen Frisch, School of Nursing, University of Victoria & Dr. Abdul Roudsari, School of Health Information Science, University of Victoria.

As a graduate student, I am required to conduct research as part of the requirements for a degree in both Nursing (MN) and Health Information Science (MSc). This research is being conducted under the co-supervision of Dr. Noreen Frisch and Dr. Abdul Roudsari.

Purpose(s) and Objective(s) of the Research:

- Even though nurses make up the majority of healthcare professionals in the Canadian healthcare system, little is known about the participation of Canadian nursing executives and leaders when a decision is made to acquire or upgrade an electronic healthcare information system. The purpose of this research is to explore this gap in our understanding.

This Research is Important because:

- Nurses are the largest group of regulated health professionals in Canada. Electronic healthcare information systems of all types are becoming more and more prevalent in the Canadian healthcare system. The movement away from paper-based systems to electronic ones is an accelerating and permanent shift in the way we manage information in the Canadian healthcare system.

- Because nurses are such an integral part of the Canadian healthcare system, and because all signs demonstrate that the Canadian healthcare system is adopting electronic healthcare information systems at an ever increasing pace, it is logical to conclude that nurses should play a role in the initial evaluation and acquisition of electronic healthcare information systems.

Participation:

- The evaluation and acquisition of electronic healthcare information systems is very complex, and often very expensive. These types of decisions are typically made at the upper levels of administration, usually between executives in provincial governments and health authorities.

- The participant sample includes nurse executives and leaders employed at the highest levels of management in health authorities across Canada, and nurse leaders in nursing informatics who may be delegated to make evaluation and acquisition decisions.
- Participation in this project is entirely voluntary.
- Whether you choose to participate or not will have no effect on your position [e.g. employment, class standing] or how you will be treated.

Procedures:

- This research will collect data using a self-administered, anonymous, web-based survey questionnaire. The participant will require access to a computer with internet service. The participant will choose a convenient time and location to complete the questionnaire. By clicking on a supplied link, the participant will be taken to the survey.
- **Duration:** Should require between 15 and 20 minutes of your time.
- **Location:** A location of your choosing.
- **Inconvenience:** Minimal inconvenience is expected.

Compensation:

- The results of this research will be made available to the participants and public through UVicSpace, a research and learning repository.
- It is unethical to provide undue compensation or inducements to research participants.

  If you would not participate if the compensation was not offered, then you should decline.

Benefits:

- This research has the potential to add original and significant knowledge to the fields of both Nursing and Health Information Science.
- Knowledge gained from participation in this research is expected to inform healthcare leaders in both Nursing and Health Information Science, resulting in better IT implementation decisions.

Risks:

- There are no known or anticipated risks to you by participating in this research**.**

Withdrawal of Participation:

- You may withdraw at any time without explanation or consequence.
- Should you withdraw, your data will not be used, and will be destroyed.
- You may withdraw by not completing the survey/closing the survey window at any time.
- Due to the anonymous nature of the survey, once a completed survey has been submitted the data cannot be removed until such time as all data is destroyed.

Anonymity and Confidentiality:

- Participant anonymity will be protected throughout this research project, in data collection, data analysis, and in publication. The online survey requests only general demographic information and at no time requests participants personal information.
- Participant confidentiality will be protected throughout this research project. Data will be stored securely in Canada and will only be accessible by the Principal Investigator and study supervisors.

Research Results will [may] be Used/Disseminated in the Following Ways:

- Thesis
- Published article
- Presentation at Scholarly Meeting

Questions or Concerns:

- Contact the researcher(s) using the information at the top of page 1;
- Contact the Human Research Ethics Office, University of Victoria, (250) 472-4545 ethics@uvic.ca

Consent:

By completing and submitting the questionnaire, **YOUR FREE AND INFORMED CONSENT IS IMPLIED** and indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers, and that you consent to participate in this research project. **PLEASE FOLLOW THIS LINK TO COMPLETE THE SURVEY**.

http://fluidsurveys.com/surveys/inspirenet/thesis-mclean-frisch-roudsari/

Thank you!

Appendix F - Nursing Informatics Experts Feedback

1. *Nursing informatics expert #1.*

	The questions are clear and make sense to me.

2. *Nursing informatics expert #2.*

Question #9	Add Palliative Care?
Question #20	I wonder about the term Subordinates (I guess it is a common term in leadership roles), but seems a little hegemonic to me.
Question #21	Is a little long-winded; I would tighten it up a bit (and again, subordinates are used).
Question #27	I really like Question 27 and would expand this more to get data beyond Yes or No.

3. *Nursing informatics expert #3.*

Question #1	Unclear why you have the subordinate question later on when you ask this delegation question here up front.
Question #2	So you are uninterested in IT acquisition in other settings such as community health agencies, ambulatory primary or specialty care? What about nurse consultants who have been hired to help with a purchasing or implementation decisions?
Question #3	Provinces/Territories.
Question #9	What do you mean by "Special Procedures"?
Question #10	Are these two disciplines interchangeable? You seem to suggest it here – I'd break it into 2 questions – also is this being asked because you want to look at the influence of informatics or computer science training on comfort, participation or other opinions? Especially if you're asking about other people's opinions – you'd also want to know if those other people knew about this additional background – otherwise you really can't claim a relationship b/w of this background and outsider opinions.

Question #11	In anything or in informatics or computer science? How would you want someone to count a pre- or post- doctoral fellowship? Ex. I have a PhD in nursing but I held a pre-doctoral informatics research fellowship from the National Library of Medicine at the same time and my coursework and dissertation covered both disciplines?
Question #13	Again, do you want this limit (Health Authorities)? A dichotomous answer here doesn't give you much, what about how many times they've done this? You're making an assumption that RN execs stay with 1 ha – I'd ask about experience over their career. Example – when I was interviewed for a urology nurse position the clinic exec asked me – did I have experience in catheterization of patients (I was coming from primary care) y/n – I could honestly say "yes", I had done 3 at that point in my career. A better question would have been – how many male/female/pediatric patients have you catheterized – the answer would have been 1/2/0. Luckily for me they didn't ask and I got the job and became incredibly proficient in catheterization.
Question #16	Could be problematic in interpreting the answers – do you mean background in informatics or clinical background or prior acquisition/implementation experience? You can't know from this question what any particular participant is interpreting this as.
Question #17	The wording is a problem – how many RNs do you think will say that nursing shouldn't be involved at all? I don't think you'll get a lot from this question the way it's worded – a much more interesting question would be to ask them to assign a level of responsibility to various disciplines. This leaves the 0% option open to RNs who think they shouldn't be involved at all. Much more difficult to analyze but more informative, you could also do it as a ranking question. How much influence in health IT acquisition decisions do you, believe is ideal for the following disciplines (percentages should add up to 100%)? a. Information management/ information technology department b. Health authority finance exec c. Health authority clinical exec d. CMO facility level e. CNO facility level f. End user RN

Question #19	Bad question – asking someone to speculate on the opinions or feelings of someone else – Ask about specific behaviors which might be + or – indicators of respect/trust How often did you colleagues seek out your opinion when discussing…. Did your colleagues delay or wait to make a decision until your opinion was known…
Question #20	Implies an earlier question about other people – awkward wording. Why one? Unlikely to be just one – you could reframe this as a ranking question. Otherwise it's a garbage answer. I'd be more specific here – are they asking nurse managers or end user RNs, do they talk to NAs?
Question #21	But what if you do both? What if sometimes you're directly involved and sometimes you delegate? You've asked about multiple projects but want a dichotomous answer. Awkward – do you mean most of the time? Again – which subordinate?
Question #22	I really think this word is not working the way you want it to.
Question #23	Do you think the CIO would be a subordinate of the CNO or the VP of nursing? The word choice here is problematic – I think you really need to find a different word than subordinate, especially in this case.
Question #24	A basic definition is probably needed, they may be doing it without knowing a formal name for it, or they may have a different name for the same thing.
Question #27	See comment 5 – this is a throwaway question – unlikely to generate new knowledge and it's biased in the way it's written.
Question #29	You are asking your participants to rate face validity after they've taken it? What if they all say "e"? Validity and reliability testing should be done prior to implementing the survey – without a reliable and valid instrument you're wasting your participants' time. Also not clear from just the survey itself what the research question was. A participant would need to refer back to the consent form. An intro paragraph at the start would be good. Just needs 2-3 sentences.

	This is a really basic survey, which currently is designed to only give basic quantitative descriptors of RN exec participation in these decisions. I think you're missing an opportunity here. It will be difficult to recruit, so you might as well maximize the answers you get back. I'd put in a few open ended questions to give a rich description of what that participation actually entails. Ex. Please give examples of how you participated in an acquisition decision. Ex. Please describe an example of how your participation in the process made a difference in the final decision. Ex. Please describe how acquisition decisions are typically made in your authority. Ex. Please describe your best/worst experience in participating in an acquisition decision. Ex. Is there anything else about the acquisition process from a RN exec perspective that you think we should know?

4. *Nursing informatics expert #4.*

Question #1	Not all provinces have Health Authorities – e.g. ON has Local Health Integration Networks. You may want to use "health region".
Question #4	Some nurse execs have combo titles e.g., VP Patient Services and CNO. What about CIO? There are several nurse CIO's in the country. I was one! Might be useful to also know what type of setting they work in e.g., Acute, LTC, Home Care...
Question #5	Do you care about how long someone has been in practice in total? E.g. How many years have you been a registered nurse?
Question #8	Do you care what field?
Question #11	Some may have completed a certificate in HI.
Question #19	What about other technologies e.g., Smart Pumps, integrated monitoring systems? These technologies are increasing fully integrated with EHRs.

Question #20	What about online reviews, KLAS reports, other organizations, site visits?
Question #23	This is confusing as you already set out in question #1 that if the respondent is not a nurse, they should not proceed.
Question #25	Not at all?
Question #26	Suggest you keep these scales consistent. See question #14.
Question #28	Do you want your respondents to have an opportunity to make comments?
Question #29	Are you asking about Face Validity here? You might want to restate the purpose here…"given purpose" and "that purpose" are confusing. What about questions of clarity, readability, applicability? Also do you want additional suggestions from your test group? Perhaps provide them with a space to offer comments.

5. *Nursing informatics expert #5.*

	I worry about the formatting of the survey and the assumption of psychometrics have you had any input from an instrument psychometrician/statistician? If not, I strongly suggest that you look at some resources on instrument development best practices. There are a lot of questions in this survey (need to watch out for the potential to abandon).
	There are gaps in logic in many of the questions - even dichotomous questions need to have an 'other' so that people can answer ('some') - and for this type of survey I recommend a comment box for each of those (currently) dichotomous questions.
	You should consider aggregating the questions that are about: i) Attitudes (feel); ii) Knowledge (e.g., SDLC); and iii) skills (your phrasing as 'comfortable'). This is commonly referred to as 'knowledge, attitudes and skills' (KAS) and is often used to measure competency. A survey that has these into groups makes more sense to the end-user and then you can put them into a table with only one heading).
	Your main goal is to measure 'how much does nursing leadership contribute to decisions about HIT?" with sub questions: "how comfortable are nursing leadership with these decisions?" and "how

	involved do they want to be?" -- It would be best if you came up with an actual list of questions that are your research questions, this will help you organize the instrument better.
	I'm attaching the components of informatics competencies for nursing leadership that were identified by Bonnie Westra and Connie Delaney in Minnesota. I suggest that you look at these to ensure that you're not missing anything important.
	You have a lot of assumptions in the wording: i) Do all regions in Canada use the term 'health authority' (i don't think so); ii) SDLC - they may not know this term, but they may have been part of the process. You may need to provide a definition.
	You should plan to pilot this with at least 5 leaders before you send out across Canada. A 'pilot' with at least 10 people (usually 30) is best to make sure it's a good tool.
	In your ethics statement, you indicate that it's unethical to incentivize people. It is actually OK to provide a small compensation for time spent. You should change that phrasing when you send this out. And you should consider giving people a small enticement (I ALWAYS give at least a $3 Tim Horton's card for survey respondents.) and for something like this, I ALWAYS give at least $25 for people's time (usually $50 if I have a grant).
Question #1	Put demographics last. Where did you get this list? It seems odd. You might consider just leaving it blank.
Question #4	You should let them type in their exact title.
Question #5	It's good to ask 3 questions: 1) how many years in this job 2) how many years in a similar job 3) how many years in nursing
Question #6	Nurse practitioner (yes, I know it's a masters in our province now, but some people may have a post-masters NP from the US or elsewhere in Canada from before).
Question #7	You will miss out on people who did a masters'. You MUST find out how many years since their FIRST degree. Remember, most of the people in leadership roles in nursing graduated from nursing schools in the 70's or 80's.

	MANY have a diploma, then a BSN, then a master's in something else.
Question #8	Spell out in full (MBA) – these may change across the country. Master's in health administration. Doctorate in other field (DSW – doctor in social work, JD – law).
Question #9	This presumes that they are no longer clinical. I don't think that this question is really relevant – how will you analyse this?
Question #10	What about 'some'? You MUST have an option for 'please describe' – this is a HUGE piece of missing information internationally. PLEASE make sure you get 'some'.
Question #11	I think you should just let them type this in. It will be VERY varied.
Question #12	This question is awkward and has two questions. I think you should separate them out. 'how much have your learned 'on the job' 'how much have you learned through informal education"
Question #15	Other????_____ (someone else 'assigned me')
Question #16	I think you need to look at 'self-efficacy' questionnaires. They may provide some phrasing that will get at this better. This is WAY TOO BROAD.
Question #17	Awkward and wordy. I think you need to revise this to get at beliefs. Again, look at self-efficacy tools in other domains.
Question #18	ADD "SOME "(AND 'PLEASE DESCRIBE" FOR ALL CHOICES).
Question #19	SOME.
Question #21	THIS WILL ONLY HAPPEN SOMETIMES.
Question #22	HORRIBLE WORD.
Question #23	THIS SHOULD HAPPEN EARLIER- THEY SHOULD NOT PROCEED IF THEY ARE NOT A NURSE.

Question #24	WHAT DOES THIS MEAN? THEY MAY HAVE NEVER HEARD THE WORD, BUT THEY MAY HAVE BEEN INVOLVED – TRY TO FIND ANOTHER WAY TO ANSWER THIS.
Question #25	Other: _____
Question #26	I like this question!
Question #27	HOW important is nursing voice: not important … very important? Or 'nursing voice is very important' – strongly disagree…..strongly agree.
Question #29	This is wacky. Sure, it's a measure of 'face validity' but the only true way to measure this is by doing reliability and validity statistics.

Appendix G - Modified Survey Questions

Nursing's "Voice" in Healthcare IT Decisions

Welcome

Thank you for accepting our invitation to participate in this survey. We know your time is very valuable. We have made every effort to minimize the number of questions asked, while still ensuring your responses yield important insights. The survey should take no longer than 15 - 20 minutes. Thank you again for your participation!

Ethics

All procedures and protocols have been approved by the Human Research Ethics Board at the University of Victoria. This study has been assigned ethics protocol # 14-185, and is valid until 15 July 2015. If you have any questions or concerns about your treatment or rights as a research subject, you may contact the Human Research Ethics Office at the University of Victoria at 250-472-4545 or ethics@uvic.ca.

Background

Even though nurses make up the majority of healthcare professionals in the Canadian healthcare system, little is known about the participation of senior Canadian nursing executives and leaders when a decision is made to acquire or upgrade an electronic healthcare information system. The purpose of this research is to explore this gap in our understanding. Research of this type is important because nurses are the largest group of regulated health professionals in Canada, and electronic healthcare information systems of all types are becoming more and more prevalent in the Canadian healthcare system. Because nurses are such an integral part of the Canadian healthcare system, and because all signs demonstrate that the Canadian healthcare system is adopting electronic healthcare information systems at an increasing pace, it is logical to conclude that nurses should play a role in the initial evaluation and acquisition of electronic healthcare information systems.

Recruitment

This study is recruiting senior healthcare executives and leaders with an education and clinical background in nursing. Do you feel you meet the study recruiting criteria as described?

- ○ Yes
- ○ No

Recruitment

If you answered 'Yes' to the previous question, please continue with the survey. If you answered 'No' to the previous question, please skip ahead to the end of the survey and submit, thank you. This study is recruiting senior healthcare executives and leaders working and/or practicing in British Columbia. Are you currently working and/or practicing in a Health Authority in British Columbia?

- ○ Yes
- ○ No

Recruitment

If you answered 'Yes' to the previous question, please continue. If you answered 'No' to the previous question, please skip ahead to the end of the survey and submit, thank you. Senior healthcare executives and leaders may be identified with many possible titles, even a combination of titles, to describe their position within a Health Authority. Some examples include: Chief Nursing Officer (CNO), VP Nursing Administration, Chief Nursing Information Officer (CNIO), Chief Executive Officer (CEO), Chief Information Officer (CIO), Chief Quality Officer, Chief Operating Officer (COO), Chief Financial Officer (CFO), President, Vice-President, Director, and Associate Director. What is your current title, or the title that best describes your current position or role within the Health Authority?

[ ]

Demographics

Please tell us how many years' experience you have in clinical nursing (in any practice setting)?

- ○ 0
- ○ 1 - 3 years
- ○ 4 - 6 years
- ○ 7 - 9 years
- ○ 10 - 14 years
- ○ 15 - 19 years
- ○ > 20 years

Demographics

Please tell us how many total years' experience you have in your current or similar position/role (in a healthcare executive/leadership role)?

- ○ 0
- ○ 1 - 3 years
- ○ 4 - 6 years
- ○ 7 - 9 years
- ○ 10 - 14 years
- ○ 15 - 19 years
- ○ > 20 years

Demographics

What is your highest level of formal nursing education earned?

- ○ Certificate
- ○ Diploma
- ○ Associate Degree
- ○ Baccalaureate Degree
- ○ Post-Baccalaureate Certificate
- ○ Post-Baccalaureate Diploma
- ○ Master's Degree
- ○ Nurse-Practitioner Designation
- ○ Advanced Practice Nurse Designation
- ○ Doctorate
- ○ Other _____

Demographics

How long ago did you graduate from your most recent completed nursing program?

- ○ 0
- ○ 1 - 3 years
- ○ 4 - 6 years
- ○ 7 - 9 years
- ○ 10 - 14 years
- ○ 15 - 19 years
- ○ > 20 years

Demographics

Have you earned an advanced certificate/diploma/degree from a field outside nursing? Please select all that apply.

- ☐ Masters of Arts
- ☐ Masters of Science
- ☐ Masters of Business Administration
- ☐ Masters of Engineering
- ☐ Masters of Healthcare Administration
- ☐ Doctorate
- ☐ Doctorate of Business Administration
- ☐ Other _____

Demographics

What was your main area of clinical nursing practice before you accepted an executive/leadership position?

Informatics Knowledge

Do you have formal training in informatics? Informatics may be broadly defined using terms including (but not limited to) computer science, health informatics, and information sciences.

- ○ Yes
- ○ Some
- ○ No

Informatics Knowledge

What is your highest level of formal informatics education earned?

- ○ Certificate
- ○ Diploma
- ○ Associate Degree
- ○ Baccalaureate Degree
- ○ Post-Baccalaureate Certificate
- ○ Post-Baccalaureate Diploma
- ○ Master's Degree
- ○ Doctorate
- ○ Other _____

Informatics Knowledge

Have you gained informal knowledge of informatics, health informatics or computer systems (such as electronic health records) on-the-job?

- ○ Yes
- ○ Some
- ○ No

Informatics Knowledge

Have you gained informal knowledge of informatics, health informatics or computer systems (such as electronic health records) through personal interest or study?

- ○ Yes
- ○ Some

- ○ No

Informatics Experiences

Are you currently, or have you been in the past, involved (to any degree) in any informatics (computer systems) acquisition or upgrading projects in your current (or previous) health authority (such as an electronic health records project)?

- ○ Yes
- ○ No

Informatics Experiences - Details

If yes, how would you describe your degree of involvement on the project you had the most involvement in?

- ○ Almost no involvement with no contributions
- ○ Very little involvement with negligible contributions
- ○ Somewhat involved with limited contributions
- ○ Regularly involved with some meaningful contributions
- ○ Routinely involved with important contributions
- ○ Greatly involved with significant contributions

Informatics Experiences

How was your participation solicited in any informatics (computer systems) acquisition or upgrading projects in your current (or previous) health authority (such as an electronic health records project)? Were you invited to participate in that project, assigned to that project, or did you ask to be involved? Please select all that apply.

- ☐ Invited to join project team
- ☐ Assigned to project team
- ☐ Asked to join project team

Informatics Experiences - Details

If you were either assigned to, or asked to, join the project team (not invited), did you feel welcomed by the IT (Information Technology) group assigned to that project?

Informatics Experiences

Have you been involved in any of the financial negotiations or decisions concerning the acquisition of an electronic healthcare information system?

- ○ Yes
- ○ Somewhat

- ○ No

Informatics Experiences

Who (or what) else do you rely on for additional information when a decision is required that involves an IT (Information Technology) component? Please check all that apply.

- ☐ IT (Information Technology) Staff
- ☐ Vendors
- ☐ Clinical Staff
- ☐ Online Information Sources
- ☐ Site Visits to Other Facilities
- ☐ Other _____

Informatics Experiences

If there are IT (Information Technology) acquisition or upgrading projects within your health authority, generally speaking, are you involved directly, or do you transfer these duties and responsibilities to a trusted colleague(s)?

- ○ Directly involved
- ○ Transfer to colleague(s)

Informatics Experiences - Details

If you answered that you transfer these responsibilities to a colleague(s), did you make this decision because you feel you lack the background and experience to make a meaningful contribution to a project of this nature?

- ○ Yes
- ○ No

Informatics Experiences

Have you ever been involved in the evaluation of a new, or upgraded electronic healthcare information system (such as an electronic health records system) after the system went live in your health authority?

- ○ Not at all
- ○ Very little
- ○ Somewhat
- ○ Quite a bit
- ○ Significantly

Informatics Experiences

Do you feel as though you have personally influenced the procurement of electronic healthcare information systems (such as electronic health records) in your Health Authority?

- ○ Not at all
- ○ Very little
- ○ Somewhat
- ○ Quite a bit
- ○ Significantly

Informatics Attitudes

Regardless of your background, interest, or knowledge of information technologies, do you feel these types of decisions (such as the acquisition of a new electronic health record system) are best left to the IT (Information Technology) department?

- ○ Yes, the IT people are the experts in this area
- ○ Yes, but with some input from the clinical users, especially nurses
- ○ Yes, but with some input from the clinical users
- ○ No, healthcare IT projects must have equal input from IT and clinical users
- ○ No, healthcare IT projects should be guided by clinical users with IT support

Informatics Attitudes

How much influence in healthcare IT (Information Technology) acquisition decisions do you believe is ideal for the following disciplines (percentages should add up to 100%)? Please check all that apply and enter % in text box next to each group.

- ☐ IT (Information Technology) Department _____
- ☐ Health Authority Executive Team _____
- ☐ Health Authority Finance Executive _____
- ☐ Health Authority Clinical Executive _____
- ☐ Hospital Executive Team _____
- ☐ Hospital Departments _____
- ☐ RN (Clinical end-user) _____
- ☐ Other _____

Informatics Attitudes

In your opinion, do members of the IT (Information Technology) team feel clinical staff have the knowledge necessary to make informed decisions in the acquisition of new or upgraded electronic information systems?

- ○ Yes
- ○ No

Informatics Attitudes

Do you personally feel it is important for "Nursing's voice" to be heard when IT (Information Technology) projects are planned? Should nurses be "invited to the table"?

- ○ Yes
- ○ No

Informatics Attitudes - Details

It is very important that "Nursing's voice" be heard when a Health Authority is planning the acquisition or upgrading of an electronic healthcare information system.

- ○ Strongly Agree
- ○ Agree
- ○ Somewhat Agree
- ○ Somewhat Disagree
- ○ Disagree
- ○ Strongly Disagree
- ○ No Opinion

Survey Validity

Thank you for completing this questionnaire. This final question assists the researchers in determining whether or not this questionnaire seemed relevant, clear, readable and logical considering the research question. How would you rate the validity of this questionnaire?

- ○ the questionnaire is extremely suitable for the given purpose
- ○ the questionnaire is very suitable for this purpose
- ○ the questionnaire is adequate
- ○ the questionnaire is inadequate
- ○ the questionnaire is irrelevant and therefore unsuitable

Further Comments (Optional)

Please give examples of how you participated in an acquisition decision.

Please describe an example of how your participation in the process made a difference in the final decision.

Please describe how acquisition decisions are typically made in your authority.

Please describe your best/worst experience in participating in an acquisition decision.

Is there anything else about the acquisition process from a RN executive perspective that you think we should know?

Thank you!

All procedures and protocols have been approved by the Human Research Ethics Board at the University of Victoria. If you have any questions or concerns about your treatment or rights as a research subject, you may contact the Human Research Ethics Office at the University of Victoria at 250-472-4545 or ethics@uvic.ca.

Appendix H - Survey Results

Question #1

This study is recruiting senior healthcare executives and leaders with an education and clinical background in nursing. Do you feel you meet the study recruiting criteria as described?

Recruitment

Response	Chart	Percentage	Count
Yes		100.0%	9
No		0.0%	0
		Total Responses	**9**

Figure 1- Verification of Recruiting Criteria

Question #2

If you answered 'YES' to the previous question, please continue with the survey. If you answered 'NO' to the previous question, please skip ahead to the end of the survey and submit, thank you. This study is recruiting senior healthcare executives and leaders working and/or practicing in British Columbia. Are you currently working and/or practicing in a Health Authority in British Columbia?

Recruitment

Response	Chart	Percentage	Count
Yes		100.0%	9
No		0.0%	0
		Total Responses	**9**

Figure 2- Verification of Employment in BC

Question #3

If you answered 'YES' to the previous question, please continue. If you answered 'NO' to the previous question, please skip ahead to the end of the survey and submit, thank you. Senior healthcare executives and leaders may be identified with many possible titles, even a combination of titles, to describe their position within a Health Authority. Some examples include: Chief Nursing Officer (CNO), VP Nursing Administration, Chief Nursing Information Officer (CNIO), Chief Executive Officer (CEO), Chief Information Officer (CIO), Chief Quality Officer, Chief Operating Officer (COO), Chief Financial Officer (CFO), President, Vice-President, Director, and Associate Director. What is your current title, or the title that best describes your current position or role within the Health Authority?

Recruitment

#	Response
1.	Chief Operating Officer
2.	President and CEO
3.	Executive VP and COO
4.	VP
5.	director, professional practice - clinical transformation
6.	Vice President
7.	Director
8.	Executive Vice President and Chief Operating Officer
9.	Chief Operating Officer and Chief Nursing Executive

Figure 3- Declared Job Titles

Question #4

Please tell us how many years' experience you have in clinical nursing (in any practice setting)?

Demographics

Response	Chart	Percentage	Count
< 1 year		0.0%	0
1 - 3 years		0.0%	0
4 - 6 years		0.0%	0
7 - 9 years		11.1%	1
10 - 14 years		11.1%	1
15 - 19 years		11.1%	1
> 20 years		66.7%	6
		Total Responses	**9**

Figure 4- Years of Clinical Nursing Experience

Question #5

Please tell us how many total years' experience you have in your current or similar position/role (in a healthcare executive/leadership role)?

Demographics

Response	Chart	Percentage	Count
< 1 year		0.0%	0

1 - 3 years	0.0%	0
4 - 6 years	22.2%	2
7 - 9 years	33.3%	3
10 - 14 years	22.2%	2
15 - 19 years	11.1%	1
> 20 years	11.1%	1
	Total Responses	**9**

Figure 5- Years of Executive Experience

Question #6

What is your highest level of formal nursing education earned?

Demographics

Response	Chart	Percentage	Count
Baccalaureate Degree		22.2%	2
Post-Baccalaureate Diploma		11.1%	1
Master's Degree		66.7%	6
		Total Responses	**9**

Figure 6- Highest Level of Nursing Education

Question #7

How long ago did you graduate from your most recent completed nursing program?

Demographics

Response	Chart	Percentage	Count
< 1 year		0.0%	0
1 - 3 years		0.0%	0
4 - 6 years		11.1%	1
7 - 9 years		0.0%	0
10 - 14 years		22.2%	2
15 - 19 years		11.1%	1
> 20 years		55.6%	5

Total Responses	**9**

Figure 7- Years Since Graduation from Nursing Education

Question #8

Have you earned an advanced certificate/diploma/degree from a field outside nursing? Please select all that apply.

Demographics

Response	Chart	Percentage	Count
Masters of Arts		0.0%	0
Masters of Science		0.0%	0
Masters of Business Administration		14.3%	1
Masters of Engineering		0.0%	0
Masters of Healthcare Administration		28.6%	2
Doctorate		0.0%	0
Doctorate of Business Administration		0.0%	0
Other		71.4%	5
		Total Responses	**7**

Figure 8- Education Outside Nursing

Demographics (Other)

#	Response
1.	fellowship in Canadian College of health leaders
2.	Masters of Education - Organizational studies
3.	Masters of Health Studies
4.	Certificate in Health Operations - Harvard University
5.	Graduate Diploma of Business Administration

Figure 9- Education Outside Nursing (Other Responses)

Question #9

What was your main area of clinical nursing practice before you accepted an executive/leadership position?

Demographics

#	Response
1.	General Rural Nursing
2.	critical care
3.	Med-Surgical, Renal
4.	clinical specialist
5.	pediatrics
6.	Emergency
7.	Public Health
8.	oncology
9.	rural and remote nursing in clinical and management roles, also worked in decision support in a larger organization for a few years

Figure 10- Clinical Nursing Background

Question #10

Do you have formal training in informatics? Informatics may be broadly defined using terms including (but not limited to) computer science, health informatics, and information sciences.

Informatics Knowledge

Response	Chart	Percentage	Count
Yes		0.0%	0
Some		11.1%	1
No		88.9%	8
		Total Responses	**9**

Figure 11- Formal Informatics Training

Question #11

What is your highest level of formal informatics education earned?

Informatics Knowledge

Response	Chart	Percentage	Count
Certificate		0.0%	0
Diploma		25.0%	1
Associate Degree		0.0%	0

Baccalaureate Degree		0.0%	0
Post-Baccalaureate Certificate		0.0%	0
Post-Baccalaureate Diploma		0.0%	0
Master's Degree		0.0%	0
Doctorate		0.0%	0
Other		75.0%	3
		Total Responses	**4**

Figure 12- Formal Informatics Education

Informatics Knowledge (Other)

#	Response
1.	none of the above...no formal education
2.	None
3.	not applicable

Figure 13- Formal Informatics Education (Other Responses)

Question #12

Have you gained informal knowledge of informatics, health informatics or computer systems (such as electronic health records) on-the-job?

Informatics Knowledge

Response	Chart	Percentage	Count
Yes		44.4%	4
Some		55.6%	5
No		0.0%	0
		Total Responses	**9**

Figure 14- Informal Informatics Training (On-the-Job)

Question #13

Have you gained informal knowledge of informatics, health informatics or computer systems (such as electronic health records) through personal interest or study?

Informatics Knowledge

Response	Chart	Percentage	Count
Yes		44.4%	4

Some		44.4%	4
No		11.1%	1
		Total Responses	**9**

Figure 15- Informal Informatics Training (Personal Interest)

Question #14

Are you currently, or have you been in the past, involved (to any degree) in any informatics (computer systems) acquisition or upgrading projects in your current (or previous) health authority (such as an electronic health records project)?

Informatics Experiences

Response	Chart	Percentage	Count
Yes		77.8%	7
No		22.2%	2
		Total Responses	**9**

Figure 16- IT Project Experiences

Question #14(a)

If yes, how would you describe your degree of involvement on the project you had the most involvement in?

Informatics Experiences - Details

Response	Chart	Percentage	Count
Almost no involvement with no contributions		0.0%	0
Very little involvement with negligible contributions		0.0%	0
Somewhat involved with limited contributions		25.0%	2
Regularly involved with some meaningful contributions		25.0%	2
Routinely involved with important contributions		50.0%	4
Greatly involved with significant contributions		0.0%	0
		Total Responses	**8**

Figure 17- Degree of Involvement

Question #15

How was your participation solicited in any informatics (computer systems) acquisition or upgrading projects in your current (or previous) health authority (such as an electronic health records project)? Were you invited to participate in that project, assigned to that project, or did you ask to be involved? Please select all that apply.

Informatics Experiences

Response	Chart	Percentage	Count
Invited to join project team		75.0%	6
Assigned to project team		62.5%	5
Asked to join project team		37.5%	3
		Total Responses	**8**

Figure 18- Invitation to Participate

Question #15(a)

If you were either assigned to, or asked to, join the project team (not invited), did you feel welcomed by the IT (Information Technology) group assigned to that project?

Informatics Experiences - Details |

#	Response
1.	as CEO I am on the Project Board(steering committee) Feel welcomed
2.	Welcomed but I did not believe my involvement was seen as important
3.	varied
4.	definitely
5.	Yes
6.	Yes but it was not an easy relationship. There were challenges in coming to agreements around priorities and language; however, with time we developed an effective working relationship.
7.	yes
8.	Yes. I was in my decision support role, so think they regularly forgot I had a clinical background (until I raised it...)

Figure 19- Feeling of Inclusion

Question #16

Have you been involved in any of the financial negotiations or decisions concerning the acquisition of an electronic healthcare information system?

Informatics Experiences

Response	Chart	Percentage	Count
Yes		44.4%	4
Somewhat		33.3%	3
No		22.2%	2
		Total Responses	**9**

Figure 20- Involvement in Financial Decisions

Question #17

Who (or what) else do you rely on for additional information when a decision is required that involves an IT (Information Technology) component? Please check all that apply.

Informatics Experiences

Response	Chart	Percentage	Count
IT (Information Technology) Staff		100.0%	9
Vendors		88.9%	8
Clinical Staff		77.8%	7
Online Information Sources		44.4%	4
Site Visits to Other Facilities		100.0%	9
Other		44.4%	4
		Total Responses	**9**

Figure 21- IT Project Assistance

Informatics Experiences (Other)

#	Response
1.	CIHI, HIMS staff, Cerner
2.	government expectations
3.	webinars
4.	Vender demos of key processes the software will need to do given the reason for acquiring

Figure 22- Project Assistance (Other Responses)

Question #18

If there are IT (Information Technology) acquisition or upgrading projects within your health authority, generally speaking, are you involved directly, or do you transfer these duties and responsibilities to a trusted colleague(s)?

Informatics Experiences

Response	Chart	Percentage	Count
Directly involved		44.4%	4
Transfer to colleague(s)		55.6%	5
		Total Responses	**9**

Figure 23- Degree of Involvement

Question #18(a)
If you answered that you transfer these responsibilities to a colleague(s), did you make this decision because you feel you lack the background and experience to make a meaningful contribution to a project of this nature?

Informatics Experiences - Details

Response	Chart	Percentage	Count
Yes		50.0%	3
No		50.0%	3
		Total Responses	**6**

Figure 24- Contributions

Question #19
Have you ever been involved in the evaluation of a new, or upgraded electronic healthcare information system (such as an electronic health records system) after the system went live in your health authority?

Informatics Experiences

Response	Chart	Percentage	Count
Not at all		0.0%	0
Very little		33.3%	3
Somewhat		22.2%	2
Quite a bit		11.1%	1
Significantly		33.3%	3
		Total Responses	**9**

Figure 25- Project Evaluation Experience

Question #20

Do you feel as though you have personally influenced the procurement of electronic healthcare information systems (such as electronic health records) in your Health Authority?

Informatics Experiences

Response	Chart	Percentage	Count
Not at all		11.1%	1
Very little		22.2%	2
Somewhat		22.2%	2
Quite a bit		44.4%	4
Significantly		0.0%	0
		Total Responses	**9**

Figure 26- Personal Influence

Question #21

Regardless of your background, interest, or knowledge of information technologies, do you feel these types of decisions (such as the acquisition of a new electronic health record system) are best left to the IT (Information Technology) department?

Informatics Attitudes

Response	Chart	Percentage	Count
Yes, the IT people are the experts in this area		0.0%	0
Yes, but with some input from the clinical users, especially nurses		0.0%	0
Yes, but with some input from the clinical users		0.0%	0
No, healthcare IT projects must have equal input from IT and clinical users		77.8%	7
No, healthcare IT projects should be guided by clinical users with IT support		22.2%	2
		Total Responses	**9**

Figure 27- Decision-Making Opinion

Question #22

How much influence in healthcare IT (Information Technology) acquisition decisions do you believe is ideal for the following disciplines (percentages should add up to 100%)? Please check all that apply and enter % in text box next to each group.

Informatics Attitudes

Response	Chart	Percentage	Count
IT (Information Technology) Department		100.0%	9
Health Authority Executive Team		77.8%	7
Health Authority Finance Executive		66.7%	6
Health Authority Clinical Executive		77.8%	7
Hospital Executive Team		44.4%	4
Hospital Departments		77.8%	7
RN (Clinical end-user)		88.9%	8
Other		44.4%	4
		Total Responses	**9**

Figure 28- Departmental Influence

Informatics Attitudes (IT (Information Technology) Department)

#	Response
1.	40
2.	35
3.	45
4.	10
5.	50
6.	30
7.	20
8.	
9.	30

Figure 29- Departmental Influence (Response)

Informatics Attitudes (Health Authority Executive Team)

#	Response
1.	10
2.	20
3.	30
4.	10
5.	15

6.	
7.	30

Figure 30- Departmental Influence (Response)

Informatics Attitudes (Health Authority Finance Executive)

#	Response
1.	10
2.	10
3.	30
4.	5
5.	20
6.	

Figure 31- Departmental Influence (Response)

Informatics Attitudes (Health Authority Clinical Executive)

#	Response
1.	10
2.	25
3.	15
4.	30
5.	10
6.	20
7.	

Figure 32- Departmental Influence (Response)

Informatics Attitudes (Hospital Executive Team)

#	Response
1.	10
2.	10
3.	20
4.	

Figure 33- Departmental Influence (Response)

Informatics Attitudes (Hospital Departments)

#	Response
1.	20
2.	15
3.	
4.	5
5.	20
6.	
7.	20

Figure 34- Departmental Influence (Response)

Informatics Attitudes (RN (Clinical end-user))

#	Response
1.	10
2.	10
3.	10
4.	20
5.	30
6.	20
7.	
8.	20

Figure 35- Departmental Influence (Response)

Informatics Attitudes (Other)

#	Response
1.	unsure
2.	Above category should include other disciplines
3.	20
4.	***I really can't assign a percentage. each group needs to be engaged, including physicians

Figure 36- Departmental Influence (Response)

Question #23

In your opinion, do members of the IT (Information Technology) team feel clinical staff have the knowledge necessary to make informed decisions in the acquisition of new or upgraded electronic information systems?

Informatics Attitudes

Response	Chart	Percentage	Count
Yes		33.3%	3
No		66.7%	6
		Total Responses	**9**

Figure 37- IT Department Opinion

Question #24

Do you personally feel it is important for "Nursing's voice" to be heard when IT (Information Technology) projects are planned? Should nurses be "invited to the table"?

Informatics Attitudes

Response	Chart	Percentage	Count
Yes		88.9%	8
No		11.1%	1
		Total Responses	**9**

Figure 38- Nursing's Voice Opinion

Question #24(a)

It is very important that "Nursing's voice" be heard when a Health Authority is planning the acquisition or upgrading of an electronic healthcare information system.

Informatics Attitudes - Details

Response	Chart	Percentage	Count
Strongly Agree		75.0%	6
Agree		12.5%	1
Somewhat Agree		0.0%	0
Somewhat Disagree		0.0%	0
Disagree		12.5%	1
Strongly Disagree		0.0%	0
No Opinion		0.0%	0
		Total Responses	**8**

Figure 39- Nursing's Voice Opinion (Ranking)

Question #25

Thank you for completing this questionnaire. This final question assists the researchers in determining whether or not this questionnaire seemed relevant, clear, readable and logical considering the research question. How would you rate the validity of this questionnaire?

Survey Validity

Response	Chart	Percentage	Count
the questionnaire is extremely suitable for the given purpose		11.1%	1
the questionnaire is very suitable for this purpose		33.3%	3
the questionnaire is adequate		55.6%	5
the questionnaire is inadequate		0.0%	0
the questionnaire is irrelevant and therefore unsuitable		0.0%	0
		Total Responses	**9**

Figure 40- Survey Face Validity

Question #26

(a) Further Comments (Optional) | Please give examples of how you participated in an acquisition decision.

1. "Was a member of an acquisition team for a new finance/HR system"
2. "3 meetings so far to discuss EHR upgrade project, and wireless capacity across all hospitals, and device purchases (tablets, workstation on wheels etc.)"

(b) Further Comments (Optional) | Please describe an example of how your participation in the process made a difference in the final decision.

1. "influenced the team to require vendors to demonstrate the processes required of the software - was very telling of functionality"
2. "I had awareness of, and communicated the unique regional challenges of accessing current health information in a timely way."
3. "nurses did not feel Workstations of wheels were reliable enough and much preferred the use of tablets or additional computer workstations on their units"

(c) Further Comments (Optional) | Please describe how acquisition decisions are typically made in your authority.

1. "I am relatively new to this HA, but suspect that they are too isolated to IT staff"
2. "Case for change submitted to exec for approval, Case for change done in partnership with nursing clinical and Health informatics"
3. "These decisions are typically done through the office of the Chief Information Officer."
4. "The Health Authority vetted the two main EMRs and involved Finance, Leadership and Clinical leads in the review and created positions for clinical staff to work along with the ITS staff in determining the project, implementation and maintenance"
5. "interdisciplinary team"

(d) Further Comments (Optional) | Please describe your best/worst experience in participating in an acquisition decision.

1. "my engagement was not active in this, but the general procurement process was not followed, ended up with a poor product and the area lost credibility with the clinicians"
2. "Well developed implementation plan as our site with the 12 of the 26 sites to go live so a number of the glitches had been resolved. Dedicated team but challenging to have champions on site in the smaller sites. Worst was day 1 an d the printers would not work and had to do a work around but the team was readily available to do so and resolve quickly"

(e) Further Comments (Optional) | Is there anything else about the acquisition process from a RN executive perspective that you think we should know?

1. "A key element is for the end users to be clear on the processes that need to be completed in the software, they need to ensure they are efficiently designed or they translate bad process into software which then doesn't work well....."
2. "No"

3. “needs to be user-friendly for all demographics; sign on and off needs to be less than 20 seconds or else users will leave the system open for everyone to use as a workaround to logging on and off, needs to support the practice i.e. flag high risk patients/alerts, not be a duplication of documentation, limited disruptions and be able to interface with other systems i.e. Public Health and Acute”