Developing a Standardized Electronic Reporting System for Visiting Nurses

by

Nicole Michaud-Hamilton
BSCN, Ryerson University, 2010

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Supervisory Committee

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Abstract

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Handover from one healthcare professional is an essential component of patient care. This can be a challenge in community care where staff provide interventions in the patient's home and do not have the benefit of face-to-face interactions with colleagues. The purpose of this quantitative study was to explore the perceptions of nurses working in community care about handover and their views on using an electronic handover tool as opposed to their current email system. The goal of the study, to assess whether nurses would have a greater understanding of their patients' needs through standardized reporting as opposed to emailed narratives of time and tasks was studied. Nurses completed a pre, post likert-type survey, and reviewed an electronic handover tool. Both surveys were analyzed by nursing professional designation and age to explore whether either factor influenced opinions. Nurses reported that handover was important and they supported a standardized communication tool as opposed to relying on an email system without structure.

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Acknowledgments

I would like to thank Dr. Frisch and Dr. Roudsari for their time and patience over the past three years. They are wonderful mentors and motivators, always inspiring others to stay the course.

Dedication

I would like to dedicate this thesis to my family for appreciating that this journey was important to me. I would also like to dedicate this to my dad who just recently passed away. My father said ever so gently, "You can do this…." Thank you, Dad.

Chapter 1

"In the last 25 years, homecare has grown like Jack's beanstalk. Government spending on homecare is growing much faster than other healthcare expenditures…It is predicted that homecare expenditures will jump almost 80 percent between 1999 and 2026. Despite its growth, homecare still accounts for only one out of every twenty dollars governments spend on health" (Romanow, 1992 p.2). Knowing that community based healthcare has been growing since Roy Romanow wrote his report on the state of Canada's healthcare system in 1992, it bodes well for researchers to explore ways to contain expenditures while promoting patient safety. Participating in strategies that improve communication among the healthcare team may be one means to make patient care safer and control costs associated with the delivery of healthcare. Organizations can make healthcare safer by advocating for strategies that ensure that all members of the healthcare team understand the plan of care. In an effort to reduce costs while at the same time, continuing to meet the needs of patients, healthcare providers have an obligation to identify strategies that will reduce the duplication of medical tests and control the excessive waste of medical supplies. These simple concepts can make a difference in the successful delivery of healthcare and improve the lives of the patients.

The development of standardized processes to communicate with the healthcare team are one approach to creating a safer and efficient system. This paper outlines the findings of piloting an electronic handover tool with a small group of visiting nurses in a community setting. It includes a review of the literature, study methods, findings from the project, discussion of the results, and potential future directions.

Background

Visiting nurses or community healthcare nurses practice in remote conditions without the benefits of team supports and the structures associated with working within the walls of a hospital or similar setting. They provide care in the community to a growing number of patients with complex wounds and therapies, or in need of palliative care as they approach the end of life. Faced with budget constraints and growing demand for limited resources, hospitals discharge patients into the community earlier than ever before placing significant burden on this workforce to deliver quality care (Duncan & Reutter, 2006). The Hamilton Niagara Haldimand Community Care Access Centre (HNHB CCAC) 2011/2012 annual report supports the magnitude of this issue recording 4.25 million visits to 72951 clients for the region for the year. The service delivery has grown steadily with the number of high needs clients per month rising from 403 in 2009/2010 to 794 in 2011/2012. The high needs client caseload includes seniors waiting placement in long-term care, medically fragile children, palliative patients, acute wound services, and individuals requiring support services to remain in their homes (HNHB CCAC, 2012).

Adding to the complexity of this growing problem, visiting nurses work without the benefit of colleagues in the same physical location moving the collaborative practice environment to a mobile device for team communication throughout the patient journey. Service providers equip staff with cellular devices that provide access to phone service, short message services, email, as well as maps and Global positioning satellite (GPS) capabilities in an effort to be more efficient and support quality healthcare. While out in the field, the device not only links nurses with other members of the team, but also gives access to documentation, administrative support from office teams and partner organizations, and instances of patient contact. The

growing dependence on delivery of services in the patient's home as opposed to receiving care in the structured hospital setting makes such cellular devices integral service delivery tool to this growing population.

Although mobile devices enhance clinical practice in the community, there may still be significant issues that impede the delivery of quality healthcare (Pare & Sicotte, 2011). Research suggests that the use of electronic devices improve communication among the team in the field, but the use of any device and the information received from it is only as good as the data itself (Buck, 2005). A brief environmental scan of the current practices at a community-nursing provider, a number of issues were apparent to this author. Firstly, nurses work with a hybrid documentation system consisting of a paper chart in the patient's home and other sources of information received through their mobile device. Secondly, patient handover occurs over a mobile device with email to transfer authority to the next member of the nursing team. Oftentimes, nursing teams may only have a vague sense of what colleagues are doing with the same patient. Comments from internal communications from the current nursing team members that support this perspective include, "I have never seen him before. What is his routine? I am seeing this patient tomorrow. Can I have report please? I cannot find the dressing procedure. Who last saw him? Did anyone order supplies for this patient? (Community Provider electronic Report, 2013)." Finally, there is no consistency in the handover process to describe the patient and details including relevant information such as demographic data, reason for being in need of service, plan of care, and description of the service delivered. These are significant communication issues that can affect patient outcomes and best practice in patient care and may contribute to nurses feeling isolated and unsupported in their practice due to the lack the information required to enact their role effectively.

Handover is defined as "a transfer of acceptance of patient care responsibility achieved through effective communication. It is a real-time process of passing patient specific information from one caregiver to another… for the purpose of ensuring the continuity and safety of the patient's care (Joint Commission Center for Transforming Healthcare, nd)." Coupled with the concept of handover is accountability, which is the essence of professional nursing practice. Savage and Moore (2002) defined two elements that describe accountability ability and competence. Nurses must have structure in place that creates a community of practice, which is transparent, consistent, and demonstrates good judgment, while also performing skills in a reasonable time and according to specific standards to be acting as truly accountable practitioners.

In the community practice milieu, handover processes lack structure, are difficult to access, and may not provide the information required to provide consistent and quality care. Without the ability to communicate in a face-to-face forum, electronic report offers the opportunity to improve this process by adding structure to the content and standardizing the overall process. A structured electronic report may ensure that the same information is passed on from one nurse to the next and increase the knowledge of the visiting team creating a community of practice based on transparency and consistency, while at the same time providing empirical information.

The purpose of this study was to explore the current practices of community nurses in the context of patient handover and understand their perceptions of an electronic handover tool. The responses from this research may contribute to the development of a standardized electronic nursing handover tool for use in community settings. Using a convenience sampling method,

community nurses in the HNHB region working with a single provider organization were surveyed. The research questions are:

- What is the degree to which community nurses were satisfied with the current email handover report?
- What is the depth of nursing knowledge related to their patients from their current reporting structure?
- What is the perceived usefulness of the electronic handover tool use in the study?
- What is the extent to which an electronic handover tool would affect communication between members of the team?
- What are the range of elements that should be included to future electronic forms based on the current version?

Chapter 2 - Review of the Literature

Introduction

Clinical handover has become the focus of study and identified as a top priority with the World Health Organization (2007), and yet, in many healthcare settings the practice does not follow any type of formalized structure to convey important patient information. Community nursing is a particularly challenging environment where patient data are stored in a number of locations, including charts in the home, the corporate office, and in electronic platforms that may lead to fragmented knowledge of patient status and potentially affect the quality of patient care. Current research on handover practices in the community setting is limited and furthermore, there is a paucity of literature regarding practices in community nursing and the implications on patient safety and clinical outcomes. In this chapter, a summary of the concepts of nursing handover will be discussed. The discussion will focus on four issues related to handover or the "transfer of authority" in healthcare: transition points and safety, the negative impacts of adverse events, handover practices from other industries, and a comparison of nursing handover techniques. Finally, this chapter will summarize some factors of note when designing tools to improve and standardize nursing handover.

A comprehensive literature review was conducted using a number of databases including CINAHL, PubMed, Academic Search Complete, and Medline. Additionally, a search of grey literature from governmental organizations such as the Joint Commission for Improving Healthcare and Health Canada was performed. Search parameters included all English language materials published after 2005. The keyword search strategy included the terms nursing OR nurs* OR healthcare AND handover OR electronic handover OR report OR standardization AND communication. This yielded hundreds of selections and choices narrowed down to fit into the conceptual framework identified supporting the design of the electronic handover tool. That

is, content that supported safety, standardization, handover tool development, and the implications of inadequate patient handover.

Clinical handover in patient care has been a focus of study for a number of reasons. Firstly, transition points are a time of risk for patients and safety initiatives focus on mitigating those risks are important to any healthcare professional. Secondly, many industries such as F1 racing teams, aviation and nuclear industries have well-defined protocols for the transfer of responsibility that healthcare organizations might adopt to enhance patient safety. Finally, information technology has a growing importance in the provision of healthcare. With that in mind, the adoption of a consistent electronic handover tool is a forward-thinking approach, which could potentially improve patient safety by improving access to information that is accurate and organized in a consistent approach. Therefore, a review of handover methodologies used by healthcare providers highlights the benefits and drawbacks associated with the array of approaches used to share patient information and contributes to the knowledge base, which may lead to the development of new tools.

Transition Points and Safety

Transition points, as during handover to a member of the healthcare teams, are a time of risk for patients because of handover of authority from one provider to another. "In the 24-h context of hospitals, cooperation and collaboration are essential for maintaining continuity of care across time and space (Meum & Ellingsen, 2010)." The concept of time and space is an important consideration in community nursing given the isolation of workers due to a mobile workforce where care is delivered in a home environment and not an institutional setting. Furthermore, collaboration between team members is reliant on a reporting mechanism and in the community nursing; it is through an email reporting system via a handheld device. The

handover of responsibility to the next member of the team can be fraught with problems related to inconsistent or missing data. Without a clear reporting framework, nurses may omit information that could contribute to errors or affect outcomes. Specific examples of this issue include communication issues that alter wound care practices or associated with medication management and this can lead to delays in wound healing or medication administration errors.

Patients are exposed to adverse events when vital information is omitted or not clearly understood by incoming providers (WHO Collaborating Centre for Patient Safety Solutions, 2007). An Australian study, as well as numerous other reports, suggest that 19.6% of patients had adverse events during a stay as short as 24 hours and communication issues were to blame in 11% of the time, and in some instances resulted in morbidity or even mortality (Chaboyer, 2011; McMurray et al, 2010; Meum & Ellingsen, 2010; Staggers, Clark, Blaz & Kapsandoy, 2012). Similarly, Strople & Ottani (2006) outlined a number of problems associated with inadequately structured handovers using the example of an increase in the number of fatal falls resulting from communication gaps among the interprofessional team. Inadequately monitored patients were at risk because of a failure to communicate. With community-based patients, the risks of insufficient handover may be more significant than in hospital settings since there is little opportunity to interact with other clinicians because care occurs in the patient's home and not in the structured setting of a hospital. Furthermore, there is not the same level of patient monitoring in the community since encounters with healthcare providers are brief. By extension, the reliance on adequate and consistent communication may be even more significant than in other settings. "The goal of this nursing surveillance or vigilance function is the early detection of a downturn in a patient's health status or the advent of an adverse event, and the initiation of activities to "rescue" the patient and restore health. When this does not happen, "failure to rescue" is said to

occur (Page, 2004 pg. 35)." Recognizing that improper patient handover is a cause of significant errors in patient care globally, the World Health Organization has made this a focus of discussion (Safety Solutions, 2007). The significance of the problems associated with inadequate patient handover is concerning to the World Alliance for Patient Safety, of which Canada is a member, and they advocate for improved processes during the patient handover to mitigate risks and improve care.

Negative Impacts of Adverse Events

Poor communication contributes to adverse events and is associated with cost to patients and the healthcare system. It can contribute to errors in the delivery of healthcare, inadequate monitoring, and a need for additional services to correct or support a patient's health status. There are both direct and indirect costs associated with any of these issues, and all affect quality of life, the success of healthcare interventions, or a patient's need for higher acuity healthcare service including emergency room visits or even in-patient admission. Some of the direct costs being the financial burden associated with duplication of investigations or interventions, and indirect costs being the effects of extended illness or sequelae related to human error, all falling under the category of an adverse event.

An adverse event as defined by the Institute of Medicine (1999) is an event where there is "unintended harm to the patient by an act of commission or omission rather than by the underlying disease or condition of the patient." Adverse events contributed an increase in direct costs totaling 2 billion dollars in Australian hospitals (Chaboyer, 2011) and similarly, $17 to $29 billion annually in the United States (Institute of Medicine 1999). One study suggested that "preventable safety incidents" in Canadian acute care settings cost 397 million in 2009 alone. (Accreditation Canada, 2012) and while there is less research in the community setting, Doran et

al. (2009) found that medication mismanagement in homecare contributed significantly to safety issues. The challenge of medication management leading to errors was a problem not only related to the actions of healthcare providers, but also from family members and the patient. Therefore, standardized communication practices that list patient medications and support medication reconciliation may contribute to safer practices among the nursing team by raising awareness of patients on "high alert medications" that contribute to physiological problems such as falls, cognitive impairment, and immobility (Institute for Safe Medication Practices, n.d.).

Canadian statistics indicate that adverse event rates are 13.2 per hundred patients in community based patients (Sears, 2008). Falls, skin ulcers, weight loss, and dehydration are some of the most common adverse events in patients over the age of 65 (Doran et al, 2009). Since this group is the biggest consumer of homecare services (Doran et al., 2009), strategies that monitor and document changes around these high-risk issues may lead to a reduction in their occurrence or severity. To improve communication during patient handover, a standardized electronic format describing skin conditions, size of pressure sores and their percentage of healing, signs of dehydration, or effects of medication regimens may assist on-coming nurses to identify changes sooner and monitor the efficacy of interventions and response to therapy among the team.

Unintended visits to the emergency room and admissions to hospital create unnecessary expenses for taxpayers and may be a result of community practice gaps. A study published in the Canadian Medical Association Journal (2004), by Forster et al. examined the outcomes of 328 patients discharged from hospital and found that 23% of the participants experienced an adverse event, some of which were preventable. These led to readmission to hospital, visits to the emergency room, or even death. Examples cited in the article included: hypoglycemia in a

patient given oral hypoglycemics, congestive heart failure, and transient ischemic attack in a patient receiving anticoagulant therapy, and hyperkalemia and acute renal failure (Forster et al, 2004). All of the situations described resulted from a lack of patient monitoring and an electronic handover report could improve communication on the team to ensure proactive intervention as required. Given the expense associated with hospital care, standardization of communication in community-based healthcare teams may reduce these events and allow for seniors to age in place rather than move to alternatives that are more expensive.

An additional risk associated with community-based healthcare is the rise in the acuity of patients with treatments such as intravenous therapy, peritoneal dialysis, and other technologically dependent therapies, which can potentially put patients in harm's way (Lang, 2009). The Community Care Access Center Hamilton Niagara Haldimand Brant quality report (2012) indicates that there is a steady rise in the number of high needs clients in the community using support of healthcare agencies to remain in their homes. Indirect costs to the patient may be impacted through handover communications that describe these high-tech interventions to support the safe transition of care from one healthcare provider to the next assisting these vulnerable populations to remain in the community versus an institutional care setting.

Learning from Other Industries

Healthcare can adopt the lessons of other industries using their experiences and knowledge to build safer processes that may improve patient care. Over the years, strategies have been borrowed from the aviation and nuclear industries, as well as the processes used in F1 racing teams. These high-risk activities expose individuals to potential injury or death and taking steps to mitigate the breakdown of either individuals or technology can reduce these risks. There is considerable discussion in the literature to describe some of the steps used to reduce system

failure such as communication tools, checklists, and standardizing language as a means to reduce errors.

The handover of authority from one clinician to the next in healthcare has been analyzed from the perspective of other high stakes industries such as motorcar racing because of the role of communication gaps play in significant and even sometimes fatal sentinel events (Catchpole, Sellers, Goldman, McCulloch & Hignett, 2010). In a study by Catchpole et al., researchers compared handover of paediatric patients undergoing cardiac surgery with F1 racing teams to understand the strategies used by the racing teams versus how handover was done in a major UK hospital. The F1 teams used a combination of communications monitoring, regular debriefings, checklists, and structured handover, allowing time to transfer tasks and information. This study found that healthcare handover had little quality control and a lack of recognition around the implications of non-structured handover in the context of risk to patients. In general, healthcare workers had no standardized way of communicating essential information to colleagues in the circle of care.

Healthcare has few of the safeguards in place found in motorcar racing or other high-risk industries. The aviation industry uses many techniques to ensure the safety of their passengers and mirroring their processes may be beneficial to the healthcare industry. The literature describes a number of approaches that improve communication and safety including creating a common language and order to reporting off and adopting the use of checklists. Donahue et al. described how the aviation industry manages communications with "Crew Resource Management Techniques" which included a tool to share information called SBAR- situation, background, assessment, recommendations. They recognized that this approach standardized the way individuals shared information and fostered an atmosphere of equality, which improved the

transfer of information. The importance of using standardized communications with this structure is to align healthcare practitioners with a common language creating a certainty in the messaging so that all healthcare providers understand the plan of care (Fuchshuber & Grief, 2012). Certainly, standardizing the way individuals communicate is essential to improve understanding among the team and this may contribute to better patient outcomes. Finally, a second opportunity to improve patient safety with checklists, a common protocol in the aviation industry, lends itself to the development of an electronic handover system (Singh, 2009). These tools may promote greater understanding among healthcare teams leading to a decrease in adverse events.

Comparing Handover Methodologies

The literature describing handover activities in patient care suggests a reliance on a variety of approaches with a lack of standardization across healthcare settings. Methods for conducting handover included face-to-face verbal, telephone recorded, accessing an electronic record, and written (Nelson & Massey, 2010; Strople & Ottani, 2006). Reviewing current approaches to nursing handover may assist researchers to contribute to this work by ensuring that any electronic application is structured to account for nursing workflow and patient assessment. Finally, as with the development of all processes in healthcare, it is important to review feedback from end-users, which can assist researchers in building more effective, and relevant tools patient care tools. Research that considers nursing feedback may uncover insights and the usability of tools in the future.

There are many approaches to doing handover including verbal, written, electronic, and a combination of one or more of the studies found that healthcare providers who relied strictly on a verbal method to handover to on-coming team members was inadequate and was by far the worst

approach to transferring authority to oncoming staff (Bhabra, Mackeith, Monteiro & Pothier, 2007). Researchers reported that while electronic handover is effective, it must have structure and conform to a standardized format (Johnson, Jeffries & Nicholls, 2011; McMurray, Chaboyer, Nelson & Massey, 2010; Sarcevic & Burd, 2009). Studies of nursing teams compared the use of verbal to written handover or combinations of both and found that information from a strictly verbal format only communicated 3% of the essential information within 5 cycles of the report, while a combination of written and verbal handover led to greater reliability and accuracy in the data (Bhabra, Mackeith, Monteiro, & Pothier, 2007). This research suggests that the development and implementation of tools that ensure the accuracy of handover in members of the healthcare team is critical to successful transitions of care.

There is considerable literature on the handover process in healthcare settings because of the risk associated with poor practice in this area. Fuchshuber and Greif (2012) cited five factors that promoted situations leading to adverse outcomes. These included a lack of knowledge, inadequate communication, poor performance, and a breakdown in procedure. Community nurses are at risk of experiencing many of these factors given they practice in geographically isolated locations and as evidenced in one service provider, rely on communicating through electronic methods. Handover processes that break down barriers to eliminate these factors may improve patient outcomes.

Some of the barriers to nursing handover outlined in the literature include unclear communication, inaccurate data, a poor understanding of how to accomplish handover, and a lack of time to complete the task (Chaboyer, 2011; Fuschshuber & Grief, 2012). Frequently, healthcare providers do not communicate in a way that conveys the important aspects about the plan of care. For example, there may be a lack of clarity related to interventions provided by

members of the team such as methodology for a dressing change or the locations of tunneling in a complex wound requiring negative pressure wound therapy. Additionally, failures in handover result in poor patient care because of an unclear plan, repetition of procedures and tests leading to an increase in costs, and potentially significant adverse events (Manser & Foster, 2011). There may be laboratory or diagnostic tests repeated due to a lack of information.

To develop a handover founded on communications that reduce the risk of patient events and promote quality care, the Joint Commission Center for Transforming Healthcare (2012) suggested five essential elements to achieve this goal. They included developing a standardized approach focused on essential patient data, electronic forms formatted and standardized to describe the patient population, providing time for face-to-face communications, measuring outcomes post-implementation, and providing support and mentorship for individuals around handover. Community nurses work in a team structure, with more than one individual responsible for a patient's care and handover directed at the incoming nurse responsible for delivering the next episode of patient contact and treatment. Therefore, community nurses are at risk of knowledge gaps putting patients at risk for adverse events because the information they require is time sensitive and context specific. Johnson, Jeffries & Nicholls (2011) studied minimum data sets for nursing handover within an Australian healthcare organization and found that data sets were a valuable tool in the handover process but the essential elements varied according to the practice setting and patient population. For example, a long-term care patient report varied differently from a medical surgical population in the type of information required to provide and transition patient care. With that in mind, an electronic handover must be comprehensive and well organized to convey information in a consistent and meaningful way and include data elements relevant to the community of practice.

New Tools

Lang et al. (2009) suggested that information technology could contribute to improved outcomes for patients by minimizing risks and "improve communication and collaboration among clients, families and health providers thus enabling a transition to state of the art health care delivery (p.44)." Stakeholders, including visiting nurses who use report to understand the plan of care and the patient's progress towards mutually defined goals can provide valuable information about the design and quality of an electronic handover tool. While electronic tools are endemic in healthcare settings such as hospitals and long-term care facilities, the application of such tools require adaptation to the community practice milieu and reflect the variances in these environments. Evidence suggests that nurses who trialed an electronic reporting system found it beneficial in that it organized information in "one spot" (Staggers, Clark, Blaz & Kapsandoy, 2012). This researcher believes that to adapt to the community setting, the application must be easily accessible to the nursing team, present patient report in a standardized approach, document the plan of care, and explain where nurses need to focus efforts to achieve the nursing outcomes outlined for the patient. It should always include what the nurses identify as valuable information to provide quality patient care and streamline their work processes assisting them to work more efficiently and safely.

Safety is always a concern in healthcare. Systems that standardize the way staff approach patient care and prompt them to review key issues that lead to sentinel events can be part of an electronic handover tool. A research project conducted at the Seattle Children's Hospital, Klee et al. demonstrated that systems focused on continuous quality improvement made a difference to both patients and nurses in the delivery of care by reducing the time to perform handover and

identifying errors in equipment usage. This was realized by embedding safety checks in the context of intravenous infusion pump flow rates and incorrect monitor settings into the handover process. Similarly, there is the potential to have the narcotic infusion pump settings in the handover reporting tool to ensure that nurses review the ordered settings and perform independent checks at the bedside. Recognizing that 72% of all adverse events of community patients were medication related, there is value in analyzing the root causes of such events and develop system content to prevent the occurrence of this type of error (Forster et al, 2004).

Given that handover guides the work of healthcare teams, feedback from end-users is essential in the testing, development, and usability of an electronic form. Nelson and Massey (2010) identified a number of benefits of using key stakeholders in the development phase of the project during their implementation of an electronic handover system in a large UK hospital. These include less time spent preparing report, higher quality information provided to team members, decreased costs associated with this aspect of patient care, and contributing to a sense of teamwork among the participants. Additionally, the literature has shown that the quality of handover was intertwined with outcomes achieved through different approaches (Manser & Foster, 2011; O-Connell, MacDonald, & Kelly, 2008). Some standardized handovers used checklists while others focused more on the topic; each equally effective, but structured to meet the nature of the practice environment instead of focused on the content. This met the needs of the end-users and shaped the content according to program and population requisites rather than having teams adapt their practice to the form and its content. Similarly, community nursing has unique needs, and like other practice specialties, any electronic communication should reflect their practice requirements and workflow. Therefore, community nurses working in a palliative stream may have a different vision of their reporting needs than nurses working in a generalist

stream with a medical/surgical patient population and must be considered by developers to provide the appropriate tool.

A second point to consider when involving end-users in the development of any electronic tool in healthcare settings is that staff engagement creates momentum for the project and may assist in gaining traction with point of care providers. McMurray et al. (2009) researched the use of "standard operating protocols" for clinical handover, which involved using verbal handover at the bedside with an electronic handover sheet. They found that engaging staff in the project improved their outlook and perception of the project and became active participants reporting patient perceptions and sharing how they viewed the methodology used in this particular study.

From this type of research stems the opportunity to influence the development of electronic handover applications in the community setting by creating tools in the future that might incorporate multimedia components with text. Embedded audio files and links that allow staff access to video communications may also enhance the nursing report process. Furthermore, from the perspective of wound healing, it may also provide a better understanding of whether current interventions are improving outcomes by capitalizing on such capabilities as jpeg or bit files to provide a visual representation to members of the team. Active engagement of point of care providers and utilizing technology to inform practice are essential elements require to improve patient outcomes and make practice safer.

Conclusion

In summary, handover is a time of risk for patients, regardless of the practice setting. The literature demonstrates that inadequate handover is an issue that all healthcare providers

should take seriously. The themes in the literature include the risks associated with inadequate or inconsistent information, sentinel events leading to morbidity and in some instances, mortality, and the personal and economic burdens associated with poor handover processes. Studies clearly demonstrated that the application of standardized processes led to a reduction in information loss, which contributed to better patient care. Based on these findings, I explored the opinions of a group of nurses employed in community practice on an electronic handover tool developed to communicate the health status and the plan of care associated with a medical/surgical patient population. The information gathered will inform the creation of an electronic handover tool for the community setting.

Chapter 3 - Methodology

Introduction

This chapter will outline the methodological approaches used to answer the following research questions:

- What is the degree to which community nurses were satisfied with the current email handover report?
- What is the depth of nursing knowledge related to their patients from their current reporting structure?
- What is the perceived usefulness of the electronic handover tool use in the study?
- What is the extent to which an electronic handover tool would affect communication between members of the team?
- What are the range of elements that should be included to future electronic forms based on the current version?

Given the nature of the research questions, perceptions of community nurses that might contribute to the standardization of report in an electronic platform a quantitative survey research design was selected. Two descriptive likert-scale survey tools and structured questions as a vehicle to collate results and identify themes formed the basis of the research project. The electronic handover tool based on current terminology and paper documentation used in the community, built on a common language that nurses used to share patient information. In addition, the study participants provided feedback via open-ended questions on the quality of the form, elements that were missing to inform their practice, and expectations for future versions.

Design

The research project consisted of three parts:

- Completion of an initial survey to assess the current state of handover practices among community nurses
- Nurses' review of the electronic handover tool devised by the researcher to introduce a standard reporting template
- Completion of a second survey to assess nurses' opinions regarding the efficacy of the standard reporting tool provided

The aim of the study was to gain insight into the perceptions of nurses who had never used a standardized methodology for nursing handover in a community setting. Survey research is particularly helpful to extract information efficiently and in a cost-effective means, a consideration for this research project (Vogt, Gardner, & Haeffele, 2012). Participants answered questions and rated responses using a likert scale. The community nurses also provided short answers to a series of structured questions to explore themes related to their preferences towards the design and structure of an electronic reporting system. Data gathering using likert-scale data provided the opportunity to compare the results by aggregating the data and scoring it to identify common likes and dislikes related to handover and the particular tool provided to facilitate handover communication regarding client care.

The goal of the study, to explore the opinions of community nurses about handover, falls within the domain of quantitative research. The rationale for having face-to-face contact to administer the surveys related to the complexity of the research methodology. Participants were required to complete an initial survey, view the tool, and complete a second survey. In the researcher's opinion, it was not conducive to an online approach. Having the researcher present the study materials validated that the participants ensured that the tasks were completed in the

required order and gave the participants time to ask questions about the content. This stepped approach permitted the researcher to compare their feedback before and after viewing the tool. It provided the necessary control to ensure that the process followed a sequential order. Furthermore, this encounter was a way to provide a description of the clinical workflow when using an electronic handover tool. This is an essential consideration in nursing practice, especially with a remote workforce. Lastly, the survey tool gave structure to the research process to ensure that there was a consistent approach to the research while at the same time affording participants the option to provide additional feedback towards future enhancements and considerations.

Procedure

- The Researcher provided a brief introduction that described nursing handover and how it relates to practice.
- Nurses complete Survey I, the 12-question likert-scale that also included demographic section. The survey related to the research questions concerned with overall satisfaction with the current email handover and the depth of their knowledge about their patients from the information that they received.
- Participants received a description of the newly developed handover tool and an explanation of the nature of the project explicitly outlining that the system was purely for research purposes and not part of future work process with the organization. The following other points were outlined during the description of the tool. The system would be hosted and accessible to each nurse on the team through any electronic device. The database was searchable by patient name or other unique identifier and text fields recorded unlimited data and stored a nurse's information in chronological format. The

form had “compressibility” where if, a section was empty, it only appeared as a heading in the form and the fields were hidden.

- Nurses viewed the “Systems” electronic handover form with a standard case embedded in the record. The “Systems” form focused the presentation of data elements by body system such as respiratory, cardiovascular, gastrointestinal, genitourinary, hematological, and endocrine.
- Nurses viewed the “Wound Care Pathway” electronic handover form with the information from a typical wound care patient embedded in the record. The electronic handover tool structured to follow the paper-based wound care pathway currently in use by the provider.
- Nurses completed Survey II, a 12-question likert-scale with some structured short-answer questions at the end. This survey asked questions related to the research questions of perceived usefulness, the extent to which an electronic handover tool would affect communication, and the type of elements needed for future electronic forms.

Sample

The research took place in 2013 and focused on nurses working with one community healthcare agency located in Southern Ontario. The nurses worked in both rural and urban settings. A convenience sampling method was used targeting visiting nurses, managers, and wound care consultants providing care for a medical/surgical patient population. The researcher obtained consent to participate at the time of interaction. There was a total potential sample size of 65 participants with 22 actual participants yielding a 34% response rate for the study.

Exclusion Criteria

While the organization employs over one hundred and twenty-five nurses, the researcher chose to narrow the focus of the study, excluding some of the nursing teams, and develop only two electronic handover tools aligned with the medical/surgical patient population. Therefore, there were two exclusion criteria for the study. The first exclusion criteria was nursing staff working in the palliative or shift nursing streams because they often work with a single client in their home for 8 or 12 hours. Their primary focus is generally the pediatric or the palliative population. A medical/surgical pathway would not align with the information requirements for the nursing team focused on these patients and would require specific elements not found in a medical surgical population receiving wound care. Had pediatric or palliative nurses been included in the research project, additional handover tools equipped with the elements required to describe these specific populations would have been necessary. These groups were outside of the scope of the project and to control this issue and prevent scope creep in the context of the tool development, these populations were excluded. Finally, the second exclusion criterion was individuals employed at the organization less than three months. The researcher felt that they would not have enough exposure and experience with the reporting mechanisms to describe their perspective in a meaningful way.

Enrollment of Participants

Initial participant contact was through organizational email by means of a standardized communication (Appendix A). The email stated that the researcher was looking for volunteers to participate in a research study to assess their opinions of current handover reporting mechanisms as well as assess the usefulness of a new electronic handover tool. The researcher had approval

from the employer to contact field staff to participate in the research study. Participants had time to review the consent and a letter of permission provided by the employer (Appendix A & B).

Estimated time commitment for participants was approximately 45 minutes. Since community nurses work remotely and rarely have contact with the office or other team members except through electronic communication, there was no attempt to recruit participants through posters or similar means.

Participants met with the researcher in a mutually agreed upon location which was typically either in the field or in the office. Chosen field locations had internet access to allow participants to view the tool on a laptop computer making the application and its review realistic with nursing practice in the field.

Ethics

The University of Victoria Human Research Ethics Board approved the study. Additionally, the area director and director of operations granted approval to conduct research at the community-nursing agency. All participants signed consent at the time of the face-to-face meeting. This was a low risk study with no data in the project that could identify participants. . All records were stored on a secure computer and consents destroyed after completion of the data analysis. Given the nature of the participation in this research project, there was no risk to participants. The focus of the questions related to nursing practice and contained no subject matter that could be sensitive to participants.

Electronic Handover Tool Development

The researcher built the forms on free open source software. The software was a "what you see is what you get" (WYSIWYG) program that allows a developer to build a form with text boxes, check boxes, calendars, radio buttons, drop down menus and other electronic conventions

by dragging and dropping onto the page. Given that the aim of this study was to provide the nurses an opportunity to review and electronic handover tool, the programming aspect of the design was not part of the scope of this project. Therefore, the form did not have supporting tables to enable data analysis. WYSIWYG programming allows individuals access to interface design without extensive knowledge of programming languages.

The structure and content of the electronic tools built for this study was based upon the concepts outlined in the literature review. Secondly, processes founded on this type of checklist and information sharing system where content follow a standardized format, aided in the transmittal and comprehension of information. The first electronic handover tool provided patient information based on a "body systems" approach describing information relevant to caring for the client e.g. respiratory, gastrointestinal (Appendix D). This highlighted abnormal findings for nurses identifying them visually through the selections made on the form. The second electronic handover tool provided patient information in a pathway format describing a wound care issue that the nurse would typically encounter in their practice e.g. acute surgical, chronic wound (Appendix E). The overarching principle guiding the system was charting by exception. Therefore, nurses only document in an area when there was a deviation from normal findings and omit descriptions of elements that would be within normal limits.

The Surveys

The researcher conducted an online search for validated published survey tools to use as data collection instruments. The researcher was not able to identify any usual tools that would explore the opinions of community nursing towards nursing handover or using an electronic handover tool. As a result, the researcher developed Survey II and I based on nursing knowledge of community healthcare practices, survey design and piloting strategies from (Openheim, p. 49,

1992), and analysis of a survey published on the Canada Health Infoway site used to assess the opinions of clinicians using a health information system (Canada Health Infoway, nd). The information from Canada Health Infoway focused on assessing the efficacy of health information systems implementations, determining future directions post-implementation, identification of potential system improvements, and finally, evaluating training and communication strategies.

Both Survey I and Survey II (Appendix F & G) were piloted to determine face validity with a representative sample of nurses from the organization. Four nurses reviewed the study tools for readability and statement clarity prior to enrolling participants in the study. They reported that they survey tools were easy to understand and they did not request changes to the content. There were no concerns on the layout of questionnaire related to it readability.

Data Analysis

The demographic data were analyzed using descriptive statistics. Responses were analyzed according to their positive ("strongly agree, agree") or negative ("strongly disagree, disagree") to express the degree to which participants aligned with a statement on a 5-point rating scale. Additionally, responses to Survey II and I were analyzed by creating satisfaction survey tables in Microsoft Excel 2010. Data analysis focused on reviewing the responses for nurses in the 20-35 year old age group and compared their responses on both surveys with the 52-67 year old age group to determine if age was a factor affecting responses to the survey questions. Given that, the sample size for the 52-67 year old group was small, no statistical analysis including a calculation of the mean responses for each question and comparing results for the groups using a t-test calculation of unequal variance. The findings would be questionable. Instead, the researcher reviewed responses for obvious themes in the data.

A second comparison of the RN group versus the RPN to explore whether professional status influenced the responses to survey questions. The means for each group were compared using a t-test for equal variance at a 0.05 confidence level. Finally, a summary of themes from the structured short answer questions was reported in a narrative format.

Chapter 4 - Results

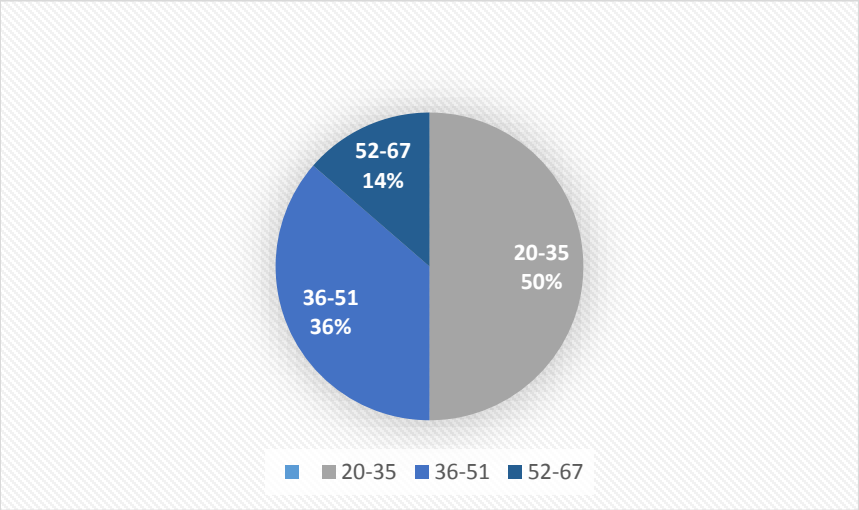
Introduction

This chapter will outline the results of the data analysis including a discussion of the participant demographic data and findings from the survey analysis on two specific parameters. The first analysis focused on the opinions of nurses according in two specific demographic groups: age 20 to 35 years and ages 52 to 67 years. The second analysis focused on the opinions of participants based on their professional status comparing registered nurses to registered practical nurses. Finally, a summary of the comments from the short answer questions where nurses were asked to give their opinions on how to improve the system either from either a content or a layout perspective is provided. The responses to Survey I indicated that most nurses found the handover process valuable to their professional practice and that gaps in the current system had affected their ability to provide care. The responses to Survey II were favorable towards the usability of an electronic handover tool by the nursing participants. Indications from the findings suggest that they say a benefit to conducting handover in this manner and would have more information available to them at the point of care.

Demographic Data

In the sample of nurses working with this community organization, there were nurses in three age groups. The total number of participants was 22 with 50% (n=11) in the 20-35 year old age group, 36% (n=8) in the 36-51 year old age group, and the remaining 14% (n=3) in the 52-67 year old age group. There was no gender delineation in the survey. See Figure 1.

Figure 1- Age Groups of Participants



Statistical Analysis

Survey analysis can be challenging because many in the research community consider likert scale responses ordinal level data. However, there are times when survey results can be treated as interval level data and the use of parametric testing is appropriate. In fact, Norman suggests that examining the differences in means does not require a normal distribution. He also stated that "It is completely analogous to the everyday, and perfectly defensible, practice of treating the sum of correct answers on a multiple choice test, each of which is binary, as an interval scale" (Norman, 2010 p.5). Other researchers have suggested that to analyze likert data using mean, standard deviation, and a t-test; it is necessary conduct an analysis of the mean of all the items in the survey creating a "composite score." This provides the latitude to treat the data as interval scale items (Boone, H., Boone, D., 2012).

In this project, the researcher sought to uncover the perceptions of nurses about handover in the context of professional practice. All questions in the survey tools were developed to identify a particular personality type that would either acknowledge the importance of handover or refute that it had any benefit towards improving the quality of care that a patient received.

Therefore, it was reasonable to perform a t-test on the data for this project given that results from the survey were treated as a composite score. With that in mind, the findings from this survey should be considered an opportunity to incite further research into the concept of electronic handover in community settings and not treated as scientific proof.

Length of Practice

Community health care agencies experience a high turnover of staff related to the nature of the work. Often nurses entering the work force will see opportunities with community agencies but find working remotely and in sometimes challenging conditions unpalatable. These conditions lead to employees seeking work in different venues such as healthcare facilities after a brief stay with a community agency. For these same reasons, other nurses are attracted to the community work and stay focused on this area of practice. They enjoy the autonomy of this practice environment and the opportunities it affords to manage patient care based on their nursing care plan. The participants in the study reflect this demographic with 14% being part of the agency for 3-6 months (n=3), 36% with the agency for 7-12 months (n=8), 9% with the agency for 13-24 months (n=2), and 41% (n=9) with the organization for more than 36 months. See Table 1.

Table 1 Length of Practice as a Registered Professional

Time with Organization (months)	Number	Percent
3-6	3	14%
7-12	8	36%
13-24	2	9%
25-35	0	0%
36+	9	41%

Survey I Results

The focus of the first survey was to determine how nurses felt about the current state in community nursing and how they felt about nursing report, in general. The questions asked about their views on using email as a reporting system, whether they read what their peers passed on to the nursing team, and whether a lack of information affected the way in which they cared for their patient. Table 2 represents the cumulative responses of all participants.

Table 2 Responses of All Participants

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
Nursing report is an essential part of nursing practice	9%	0%	0%	5%	86%
Nurses know the type of information they should include in a nursing report.	5%	18%	27%	27%	23%
Mobile devices play an important role in the handover process in community nursing at present.	0%	0%	5%	55%	41%
Email is a good alternative to provide nursing handover face-to-face.	0%	5%	23%	41%	32%
The current handover process meets my needs.	0%	27%	27%	32%	14%
Information I need is frequently missing from the current email handover.	5%	0%	41%	32%	23%
I rarely read report prior to providing care.	55%	18%	23%	0%	5%
Nursing handover is essential to performing my role as a community nurse.	0%	0%	9%	18%	73%
I present my nursing handover in a consistent and organized manner each time.	0%	0%	23%	50%	27%
The information shared by colleagues changes the way I practice and assists me with making decisions related to patient care.	0%	0%	18%	4.6%	36%
I believe that a lack of information about a client has affected my delivery of care.	0%	5%	14%	59%	23%
I feel frustrated searching for report on my patient.	0%	5%	14%	41%	40%

Survey I: Age as a Variable

Responses to survey I were analyzed according to age to determine if there was any perceived difference in the responses of nurses based on chronological age. Given the sample size of the 52-67 year old sample group, it was not feasible to conduct a statistical analysis comparing this group to the 20-35 year old group. One of the assumptions made was that there would be lower acceptance of an electronic tool by late career nurses than by those at the beginning of their career. All responses to the survey were analyzed and compared. Table 3 represents the responses of the 20-35 year old group and Table 4 the responses of the 52-67 year old group.

Table 3 Survey I Responses of Participants Ages 20-35 years

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
Nursing report is an essential part of nursing practice	9%	0%	0%	5%	86%
Nurses know the type of information they should include in a nursing report.	5%	18%	27%	27%	23%
Mobile devices play an important role in the handover process in community nursing at present.	0%	0%	5%	55%	40%
Email is a good alternative to provide nursing handover face-to-face.	0%	5%	23%	41%	32%
The current handover process meets my needs.	0%	27%	27%	32%	14%
Information I need is frequently missing from the current email handover.	5%	0%	41%	32%	23%
I rarely read report prior to providing care.	55%	18%	23%	0%	5%
Nursing handover is essential to performing my role as a community nurse.	0%	0%	9%	18%	73%
I present my nursing handover in a consistent and organized manner each time.	0%	0%	23%	50%	27%
The information shared by colleagues changes the way I practice and assists me with making decisions related to patient care.	0%	0%	18%	46%	36%
I believe that a lack of information about a client has affected my delivery of care.	0%	5%	14%	59%	23%
I feel frustrated searching for report on my patient.	0%	5%	14%	41%	40%

Table 4 Survey I Responses of Participants Ages 53-67 years

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
Nursing report is an essential part of nursing practice	0%	0%	0%	0%	100%
Nurses know the type of information they should include in a nursing report.	0%	0%	25	50%	25%
Mobile devices play an important role in the handover process in community nursing at present.	0%	0%	0%	50%	50%
Email is a good alternative to provide nursing handover face-to-face.	0%	0%	25%	0%	75%
The current handover process meets my needs.	0%	0%	50%	0%	50%
Information I need is frequently missing from the current email handover.	25%	0%	25%	25%	25%
I rarely read report prior to providing care.	75%	0%	25%	0%	0%
Nursing handover is essential to performing my role as a community nurse.	0%	0%	0%	25%	75%
I present my nursing handover in a consistent and organized manner each time.	0%	0%	0%	50%	50%
The information shared by colleagues changes the way I practice and assists me with making decisions related to patient care.	0%	0%	0%	75%	25%
I believe that a lack of information about a client has affected my delivery of care.	0%	0%	0%	75%	25%
I feel frustrated searching for report on my patient.	0%	0%	0%	75%	25%

From an observational perspective, there seems to be a strong similarity between the responses of the 20-35 year old and the 52-67 year old groups. The answers provided were similar and the findings suggest that both groups viewed report was an essential part of nursing practice and that mobile devices played an important role during the handover process. Furthermore, both groups reported that a lack of information had affected the way that they delivered patient care.

Professional Status Category

Responses to survey I were analyzed according to professional designation comparing registered nurses to registered practical nurses to determine if there was a statistical significance between the level of academic preparation to the use of electronic tools. One of the assumptions made was that there would be lower acceptance by registered practical nurses of an electronic tool because they might tend to be more task oriented than registered nurses were. The data were sorted according to professional status to assess whether level of education affected perceptions of nursing handover and the current email system hosted on a hand held device. The total number of participants in the registered nurse group (Table 5) was 11 and there were 11 in the registered practical nurse category (Table 6). The mean responses for each age group were calculated (Table 7) and a t-test based on equal variance performed (Table 8). The null hypothesis for this case is that there is no difference between the registered nurse group and the registered practical nurse group at a 0.05 confidence level.

Table 5 Survey I Responses of Participants by Professional Status RN Category

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
Nursing report is an essential part of nursing practice	17%	0%	0%	0%	83%
Nurses know the type of information they should include in a nursing report.	9%	18%	27%	27%	18%
Mobile devices play an important role in the handover process in community nursing at present.	0%	0%	10%	45%	45%
Email is a good alternative to provide nursing handover face-to-face.	0%	0%	18%	36%	45%
The current handover process meets my needs.	0%	18%	36%	27%	18%
Information I need is frequently missing from the current email handover.	10%	0%	36%	36%	18%
I rarely read report prior to providing care.	82%	9%	9%	0%	0%
Nursing handover is essential to performing my role as a community nurse.	0%	0%	0%	18%	82%
I present my nursing handover in a consistent and organized manner each time.	0%	0%	19%	45%	36%
The information shared by colleagues changes the way I practice and assists me with making decisions related to patient care.	0%	0%	9%	64%	27%
I believe that a lack of information about a client has affected my delivery of care.	0%	0%	18%	73%	9%
I feel frustrated searching for report on my patient.	0%	0%	18%	55%	27%

Table 6 Survey I Responses of Participants by Professional Status RPN Category

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
Nursing report is an essential part of nursing practice	0%	0%	0%	8%	92%
Nurses know the type of information they should include in a nursing report.	0%	17%	25%	25%	33%
Mobile devices play an important role in the handover process in community nursing at present.	0%	0%	0%	58%	42%
Email is a good alternative to provide nursing handover face-to-face.	0%	8%	17%	50%	25%
The current handover process meets my needs.	0%	25%	25%	42%	8%
Information I need is frequently missing from the current email handover.	0%	0%	50%	25%	25%
I rarely read report prior to providing care.	42%	25%	25%	0%	8%
Nursing handover is essential to performing my role as a community nurse.	0%	0%	18%	9%	73%
I present my nursing handover in a consistent and organized manner each time.	0%	0%	17%	8%	75%
The information shared by colleagues changes the way I practice and assists me with making decisions related to patient care.	0%	0%	17%	58%	25%
I believe that a lack of information about a client has affected my delivery of care.	0%	0%	25%	42%	33%
I feel frustrated searching for report on my patient.	0%	8%	8%	33%	50%

Table 7 Survey I Mean Values for Professional Status Category RN versus RPN

Question	RPN	RN
1	4.92	4.27
2	3.75	3.27
3	4.42	4.36
4	3.92	4.27
5	3.33	3.45
6	3.75	3.54
7	2.08	1.27
8	4.58	4.82
9	4.08	4.18
10	4.08	4.18
11	4.08	3.91
12	4.25	4.09

Table 8 t-Test: Two-Sample Assuming Equal Variances

	Variable 1	Variable 2
Mean	3.9375	3.803030303
Variance	0.512784091	0.821687954
Observations	12	12
Pooled Variance	0.667236022	
Hypothesized Mean Difference	0	
Df	22	
t Stat	0.403236939	
P(T<=t) one-tail	0.345333039	
t Critical one-tail	1.717144374	
P(T<=t) two-tail	0.690666078	
t Critical two-tail	2.073873068	

At a 0.05 significance level, the p value for the two-tailed t-test with equal variance was 2.07 and the t stat was 0.403. The t-stat was smaller than the critical value and therefore it is not possible to reject the null hypothesis. From a statistical perspective, there was no difference in the responses from nurses based on their professional designation with registered practical nurses responded in a similar manner to the survey as the registered nurses. It should be noted that question 7 which was worded in a negative format, contrary to the affirmative format used in the rest of the twelve survey questions for Survey I was not reverse coded prior to calculating the composite score and conducting the t-test. This calculation gap would not change the result of the statistical analysis and therefore, the recalculation was not performed.

Survey II Results

The focus of the second survey was to determine how nurses felt about the electronic handover tool, if they thought it would be useful and easy to use, and if it might have a positive effect on their practice. Table 9 represents the cumulative responses of all participants.

Table 9 Survey II Responses of All Participants

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
It would help me provide care to my patient.	0%	0%	0%	10%	90%
It would help me spend less time looking for report.	0%	0%	10%	33%	57%
It provides useful information to the care team that explains a patient's needs and current problems.	0%	0%	0%	43%	57%
It meets my needs in the role of visiting nurse.	0%	0%	0%	43%	57%
It is easy to use.	0%	0%	14%	43%	43%
Both occasional and regular users would like it.	0%	0%	10%	48%	43%
I could learn to use it quickly.	0%	0%	10%	45%	45%
I could quickly become skillful with it.	0%	0%	5%	33%	62%
I feel we need to adopt this electronic nursing report.	0%	0%	10%	33%	57%
It will help me understand the patient problems and interventions more than the current system.	0%	0%	10%	38%	52%
It would allow me to deliver more effective care by clearly showing the progression of wound healing and outline the supplies used in care.	0%	0%	4%	48%	48%
The electronic report tool will increase my knowledge of my colleague's care to the patient.	0%	0%	0%	43%	57%

Survey II Age as a Variable

Responses to survey II were analyzed to uncover themes in the responses of nurses based on chronological age. The assumption made for Survey II was that there would be less acceptance of an electronic tool by late career nurses than by those at the beginning of their career. Table 10 represents the responses of the 20-35 year old group and Table 11 the responses of the 52-67 year old group.

Table 10 Survey II Responses of Participants Ages 20-35 years

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
It would help me provide care to my patient.	0%	0%	0%	18%	82%
It would help me spend less time looking for report.	0%	0%	9%	27%	64%
It provides useful information to the care team that explains a patient's needs and current problems.	0%	0%	0%	27%	73%
It meets my needs in the role of visiting nurse.	0%	0%	0%	275	73%
It is easy to use.	0%	0%	9%	36%	55%
Both occasional and regular users would like it.	0%	0%	9%	27%	64%
I could learn to use it quickly.	0%	0%	9%	18%	73%
I could quickly become skillful with it.	0%	0%	0%	27%	73%
I feel we need to adopt this electronic nursing report.	0%	0%	9%	27%	64%
It will help me understand the patient problems and interventions more than the current system.	0%	0%	9%	27%	64%
It would allow me to deliver more effective care by clearly showing the progression of wound healing and outline the supplies used in care.	0%	0%	4%	36%	55%
The electronic report tool will increase my knowledge of my colleague's care to the patient.	0%	0%	0%	55%	44%

Table 11 Survey II Responses of Participants Ages 52-67 years

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
It would help me provide care to my patient.	0%	0%	0%	33%	67%
It would help me spend less time looking for report.	0%	0%	0%	33%	67%
It provides useful information to the care team that explains a patient's needs and current problems.	0%	0%	0%	67%	33%
It meets my needs in the role of visiting nurse.	0%	0%	0%	33%	67%
It is easy to use.	0%	0%	0%	33%	67%
Both occasional and regular users would like it.	0%	0%	0%	67%	33%
I could learn to use it quickly.	0%	0%	0%	67%	33%
I could quickly become skillful with it.	0%	0%	0%	67%	33%
I feel we need to adopt this electronic nursing report.	0%	0%	0%	33%	67%
It will help me understand the patient problems and interventions more than the current system.	0%	0%	0%	33%	67%
It would allow me to deliver more effective care by clearly showing the progression of wound healing and outline the supplies used in care.	0%	0%	4%	33%	67%
The electronic report tool will increase my knowledge of my colleague's care to the patient.	0%	0%	0%	33%	67%

From an observational perspective, there seems to be a strong similarity between the responses of the 20-35 year old and the 52-67 year old groups. The answers provided were similar and the findings suggest that both groups found the tool valuable to their nursing practice and would contribute to their knowledge and ability to perform their role.

Professional Status Category

Responses to survey II were analyzed according to professional designation comparing registered nurses to registered practical nurses to determine if there was a statistical significance between the levels of academic preparation and overall acceptance to use of electronic tools. As previously outlined, the researcher made assumptions that there may be a lower rate of acceptance by registered practical nurses of an electronic tools.

The data were sorted according to professional status to assess whether level of education affected perceptions of nursing electronic handover tool. The total number of participants in the registered nurse group (Table 12) was three and there were 11 participants in the registered practical nurse category (Table 13). The mean scores of the two groups were calculated (Table 14) and a t-test based on equal variance performed (Table 15). The null hypothesis for this case is that there is no difference between the registered nurse group and the registered practical nurse group at a 0.05 confidence level.

Table 12 Survey II Responses of Participants by Professional Status RN Category

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
It would help me provide care to my patient.	0%	0%	0%	45%	55%
It would help me spend less time looking for report.	0%	0%	18%	36%	45%
It provides useful information to the care team that explains a patient's needs and current problems.	0%	0%	0%	64%	36%
It meets my needs in the role of visiting nurse.	0%	0%	0%	64%	36%
It is easy to use.	0%	0%	27%	45%	28%
Both occasional and regular users would like it.	0%	0%	18%	55%	27%
I could learn to use it quickly.	0%	0%	9%	45%	45%
I could quickly become skillful with it.	0%	0%	0%	55%	45%
I feel we need to adopt this electronic nursing report.	0%	0%	18%	27%	55%
It will help me understand the patient problems and interventions more than the current system.	0%	0%	18%	36%	46%
It would allow me to deliver more effective care by clearly showing the progression of wound healing and outline the supplies used in care.	0%	0%	4%	55%	36%
The electronic report tool will increase my knowledge of my colleague's care to the patient.	0%	0%	0%	36%	64%

Table 13 Survey II Responses of Participants by Professional Status RPN Category

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
It would help me provide care to my patient.	0%	0%	0%	9%	91%
It would help me spend less time looking for report.	0%	0%	0%	27%	73%
It provides useful information to the care team that explains a patient's needs and current problems.	0%	0%	0%	18%	82%
It meets my needs in the role of visiting nurse.	0%	0%	0%	18%	82%
It is easy to use.	0%	0%	0%	27%	73%
Both occasional and regular users would like it.	0%	0%	0%	36%	64%
I could learn to use it quickly.	0%	0%	0%	18%	82%
I could quickly become skillful with it.	0%	0%	0%	27%	73%
I feel we need to adopt this electronic nursing report.	0%	0%	0%	27%	73%
It will help me understand the patient problems and interventions more than the current system.	0%	0%	0%	27%	73%
It would allow me to deliver more effective care by clearly showing the progression of wound healing and outline the supplies used in care.	0%	0%	4%	36%	64%
The electronic report tool will increase my knowledge of my colleague's care to the patient.	0%	0%	0%	45%	55%

Table 14 Survey II Mean Values for Professional Status Category RN versus RPN

Question	RPN	RN
1	4.91	4.55
2	4.73	4.27
3	4.82	4.36
4	4.82	4.36
5	4.72	4.00
6	4.64	4.09
7	4.82	4.36
8	4.82	4.45
9	4.72	4.36
10	4.72	4.27
11	4.64	4.27
12	4.55	4.63

Table 15 t-Test: Two-Sample Assuming Equal Variances

	Variable 1	*Variable 2*
Mean	4.333333333	4.742424242
Variance	0.030553469	0.010267969
Observations	12	12
Pooled Variance	0.020410719	
Hypothesized Mean Difference	0	
Df	22	
t Stat	7.014008769	
P(T<=t) one-tail	2.43708E-07	
t Critical one-tail	1.717144374	
P(T<=t) two-tail	4.87417E-07	
t Critical two-tail	2.073873068	

The t stat at the 0.05 confidence level and 22 degrees of freedom is 2.074 and the value for the t-test comparing responses by professional designation is 7.01, which is larger than the calculated value. Therefore, the null hypothesis is rejected in this comparison and there is a difference between the responses based on professional designation accepting the use of an electronic handover tool. The RPNs had a higher level of acceptance for the electronic handover tool than the RNs in the study.

Limitations:

The researcher acknowledges that there are limitations to this study. Firstly, while the sample may be representative of nurses practicing in Southern Ontario and in fact, takes into account both rural and urban practice differences, the findings may not be generalizable to other areas of Ontario or Canada. This is due in part to regional differences in practice that may occur and are beyond the scope of this project.

Furthermore, the sample size for this project was small and could have influenced the results. Therefore, this work sought to highlight some of the research that would benefit patient care in the community setting.

Confining the study to a healthcare organization that was already using an electronic resource as a reporting mechanism may be another limitation for this study. The nursing team used email to report on patients in a non-structured way but it did give them a sense of the usefulness of an electronic report. This could create a bias towards electronic reporting systems and positively favor them over other types of handover. However, given that nurses practice as a remote workforce, there are few if any options to using handheld devices aside from a paper chart in the home or voicemail recordings for report.

Chapter 5 – Discussion of the Results

Introduction

The intent of this study was to learn more about the opinions of community nurses related to patient handover and if the use of a standardized electronic handover tool would be beneficial, enhancing their knowledge of the patients in their case load. Participants answered an initial survey to assess their feelings towards handover, viewed the electronic handover tool, and completed a second survey.

The study was conducted to answer the following research questions:

- What is the degree to which community nurses were satisfied with the current email handover report?
- What is the depth of nursing knowledge related to their patients from their current reporting structure?
- What is the perceived usefulness of the electronic handover tool use in the study?
- What is the extent to which an electronic handover tool would affect communication between members of the team?
- What are the range of elements that should be included to future electronic forms based on the current version?

Survey I Responses

Survey I responses reflect the opinions of participants about nursing handover in general and its relevance to the way in which they gather information about their patients. Participants responded to Survey I prior to reviewing the electronic handover tool.

- Nursing report is an essential part of nursing practice

Community nurses 91% (n=20) felt that handover was an important part of professional practice. Only 9% (n=2) disagreed with this statement.

- Nurses know the type of information they should include in a nursing report.

When asked if nurses knew what to include in a handover report there was no consensus among the participants with 23% (n=5) either strongly disagreeing or disagreeing, 27% (n=6) having a neutral stance, and 50% (n=11) either strongly agreeing or agreeing with the statement.

- Mobile devices play an important role in the handover process in community nursing at present.

As nurses who work in isolation in the community, 95% (n=21) of participants felt that mobile devices were an essential part of practice. In this agency, the mobile device was a platform to provide handover report, contact patients, other healthcare providers, and the office. Global positioning functions determined best route to patients in the community to optimize travel between patients and assist with workflow.

- Email is a good alternative to provide nursing handover face-to-face.

Nurses also reported 73% (n=16) that they found email reporting a viable method to handover to members of the team. The remaining participants either were neutral 23% (n=5) or disagreed 5% (n=1) that email was a viable method of reporting off to members of the team.

- The current handover process meets my needs.

While nurses felt that using a mobile device was essential to community nursing, 27% (n=6) disagreed with the statement that the current system met their needs. A further 27% (n=6) were neutral about the statement, 32% (n=7) agreed with the statement, 14% (n=3) strongly agreed. This may suggest that the way the material is presented in the current reporting or a lack of information negatively influenced their opinions.

- Information I need is frequently missing from the current email handover.

Respondents reported that there was information missing that the participants needed, 55% (n= 12) either strongly agreed or agreed with this statement while 27% (n=6) were neutral about the statement, and the remaining 27% (n=6) disagreed.

- I rarely read report prior to providing care.

To ensure that participants were actually reading the questions and providing a thoughtful response, the embedded a negative phrase in the question. The participants responded 73% (n=16) that they strongly disagreed or disagreed to the statement, with 23% (n=5) with a neutral response, and 5% (n=1) agreed with the statement.

- Nursing handover is essential to performing my role as a community nurse.

In the context of professional practice, nurses interviewed for the study indicated that nursing handover was essential to enacting their role as a visiting nurse with 91% (n=20) responding with strongly agree or agree and the remaining 9% (n=2) participants responded neutrally.

- I present my nursing handover in a consistent and organized manner each time.

Recognizing that nursing handover is not part of formal education, the personal perceptions of the participants were positive towards the way that they present information to their colleagues with 77% (n=17) responding with strongly agree or agree and the remaining 23% (n=5) choosing a neutral response.

- The information shared by colleagues changes the way I practice and assists me with making decisions related to patient care.

When asked if the information shared by colleagues changed the way they practiced and assisted with decisions related to patient care, 82% (n= 18) of nurses strongly agreed or agreed and 18% (n=4) were neutral on the subject. When asked if they felt that a lack of information about a client had affected the way they delivered care, nurses had mixed feelings but still had a large

affirmative response with 82% (n=18) strongly agreeing or agreeing, 14% (n=3) remaining neutral, and 5% (n=1) disagreeing with the question.

- I feel frustrated searching for report on my patient.

Nurses were asked if they were frustrated searching for report in the email system currently in use. Responses indicated that 81% (n=18) strongly agreed or agreed with the statement, 14% (n=3) were neutral on the question, and 5% (n=1) disagreed with the statement.

In summary, the responses to Survey I were favorable in the context of identifying that nursing handover is important in the provision of healthcare. Participants appeared to find some gaps in the current system with information missing from the content and the way that it was presented.

Survey II Responses

Survey II responses reflect the opinions of participants about nursing handover after reviewing the electronic handover tool. The survey questions focus on system usability and acceptance by end-users, important considerations when developing any user interface.

- It would help me provide care to my patient.

There was an overwhelming response to the first question. Participants unanimously agreed or strongly agreed that the electronic handover tool would assist them in providing direct patient care.

- It would help me spend less time looking for report.

Participants responded neutrally 10% (n=2), agreed 33% (n=7) strongly agreed 57% (n=12) that it would save them time when gathering information on their patients.

- It provides useful information to the care team that explains a patient's needs and current problems.

Participants agreed 43% (n=9) or strongly agreed 57% (n=12) that the system was beneficial and would provide them with useful information.

- It meets my needs in the role of visiting nurse.

The visiting nurses responded that they agreed 43% (n=9) or strongly agree 57% (n=12) that met their needs to enact their role in providing patient care. Having relied on email handover, this was a positive indication that nurses would find value in a more sophisticated information platform.

- It was easy to use.

There was strong consensus that the system was easy to use with participants responding neutrally 14% (n=3), agreeing 43% (n=9), or strongly agreeing 43% (n=9) with the statement. The purpose of the question was to determine if the system would be easy for nurses to use and if the design was logical to them.

- Both occasional and regular users would like it.

This question focuses on the system usability aspect and if members of a casual workforce would have difficulty maintaining their competency with the system. Respondents stated that they were neutral 10% (n=1), agreed 48% (n=10) or strongly agreed 43% (n=9) with the statement.

- I could learn to use it quickly

Participants responded favorably the electronic handover tool in the context of usability with neutral response 5% (n=1), agreed 33% (n=7), and strongly agreed 62% (n=13).

- I could quickly become skillful with it.

  System usability was reported as favorable with respondents agreeing 43% (n=9) and strongly agreeing 57% (n=12) that they would have no problem using the system.

- I feel we need to adopt this electronic nursing report.

There were favorable responses to adopting an electronic handover tool or similar system with 10% neutral (n=2), 33% agreeing (n=7), and 57% (n=12) strongly agreeing. It will help me understand the patient problems and interventions more than the current system.

The participants responded 10% neutrally (n=2), 38% agreed (n=8), and 52% strongly agreed (n=11). There was agreement that there would be a benefit to using this type of information system to improve their knowledge of their patients.

- It would allow me to deliver more effective care by clearly showing the progression of wound healing and outlining the supplies used in care.

Respondents were neutral 4% (n=1), agreed 48% (n=10), and strongly agreed 48% (n=10) with the statement and saw benefits to having more information about a patient's wounds. They also stated that having greater access to supply tracking would be a better use of their time.

- The electronic report tool will increase my knowledge of my colleague's care to the patient.

There was a unanimous response to the concept that it would increase their knowledge of their colleagues' interventions with a patient with 43% (n=9) agreeing and 57% (n=12) strongly agreeing.

In summary, the responses to Survey II were favorable towards the usability of an electronic handover tool by the nursing participants. Indications from the findings suggest that they say a benefit to conducting handover in this manner and would have more information available to them at the point of care.

Age as a Variable

There is an aging workforce in Canada and nursing faces this same challenge. The Canadian Institute for Health Information (2012) reports that nurses over the age of 60 increased 3-percentage points to 14.1% in 2012. This is significant when organizations introduce

technology and they should consider what effect it would have on an aging demographic. While change is difficult at any age, it may be particularly challenging for older employees, especially with the use of technology. Unfortunately, there were only three participants in the 52-67 year old age group, which was not large enough to compare to the younger age demographic to be statistically meaningful. Their responses did not indicate that they held any particular bias against using technology in their practice. In fact, those interviewed supported the use of an electronic handover tool and indicated that they thought it would be beneficial to their practice.

Professional Status as a Variable

For Survey II, the data were sorted according to professional status to assess whether level of education affected acceptance of nursing electronic handover tool. The null hypothesis was rejected in this instance. RPNs had a greater acceptance of an electronic handover tool than the RN population. The researcher is unclear why there was greater acceptance among the RPN population, but it is possible that given most of the RPNs were relatively new to the profession and younger than the RN participants are, it may have affected the outcome.

Short Answer Responses of Participant Feedback

In addition to participants reviewing the electronic handover tool and providing survey responses on its usefulness to professional practice and patient care, they were asked to comment on what changes or suggestions they would request for future versions. The comments from the feedback included:

- Ensuring that nurses had opportunity to describe changes in a wound's status including diagrams and a way to capture the wound care products being used and their efficacy
- Embedding formulas to perform wound calculations, information that is submitted to external government agencies

- Wanting the functionality to be able to access information in the field at point of care
- Having access to a separate section for Medication Administration to improve communication on intravenous medications, a high risk task in community nursing
- Providing a space that allows nurses to communicate the special needs of patients ensuring that the focus is client-centered care. An example provided was the preferred time for visits.
- Developing electronic tools the incorporate all the clinical pathways used in the community and the ability to report electronically to external agencies
- Linking electronic handover with supply ordering to ensure that the process is electronicized reducing missing materials and excessive ordering

In summary, nurses wanted more information embedded in the tool to assist with meeting wound care outcomes. They suggested that an electronic handover tool would improve communication between team members, and by enhancing the capabilities of this type of system with automated reporting mechanisms; they could communicate more efficiently with government agencies. Finally, by adding supply ordering to the electronic tool, there is an opportunity to ensure that the correct medical supplies were present for the visit and reduce waste due to the over ordering of supplies. The nurses identified some opportunities to capitalize on an electronic reporting system to improve current system challenges that lead to poor communications with external agencies and financial waste associated with supply chain management.

Findings from this small study were similar to those cited in the literature where the research was conducted in acute care settings. Nelson and Massey (2010) noted that there were significant cost savings associated with moving towards a standardized reporting system that reduced overtime expenses, often associated with handover. Additionally, they commented on the

satisfaction of the participants who used the system and how they operationalized it with a scaled-down verbal report.

Reporting and its content was another focus of the research, including the use of Minimum Data sets. Johnson, Jefferies and Nicholls (2011) concluded that having structured report with specific content was important to staff and improved communication among team members. Similarly, the community nurses from this study suggested that the structured layout and content was beneficial to their knowledge of the patient and would improve their ability to provide care. Finally, the research findings suggested that while nurses were accepting of using an electronic handover system, they found that some type of oral or written handover was still necessary (Meum, Wangensteen, Soleng,, & Wynn, 2011). After completing Survey II, the researcher received feedback from the participants that this was a concern. Furthermore, the organization launched an electronic health record system six months after the research study and this was a concern from the field staff.

Future Directions

With the growing dependency on community healthcare, government agencies struggle with cost containment. This leads to high acuity patients cared for in their homes, placing a greater burden on those tasked with providing that care. The risks associated with community healthcare as evidenced in the literature are linked with safety and communication, two important mandates that should receive the attention of the nursing profession. To improve communication among the interprofessional team and government agencies, there is an opportunity to not only use electronic programs to share patient documentation which will lead to safer and improved care, but it also becomes an approach to harness other technologies that will enhance patient outcomes. Community healthcare providers could focus on embedding

telemedicine access into nursing tools, which would bring the physician into the patient's home. This is especially valuable for individuals who have difficulty accessing clinics as a result of physical limitations. This same approach could improve patient outcomes in the context of wound care by using the same telemedicine platform and model of interaction with the interprofessional team to review the plan of care and current interventions. Wound care consultants, a group with a highly specialized body of knowledge and an important professional resource to patients and field staff, could use the telemedicine platform to revolutionize the way they interact with patients and staff in a region. Creating an interface to permit consultation and interaction with specialists and the visiting nurse improve the turnaround on wound assessment and validate the efficacy of the current plan. This may improve outcomes as they relate to wound healing metrics.

The Canadian Nurses Association (CNA) national framework for Advanced Practice Nursing is an applicable tool to inform discussion on the importance of participating and guiding future research and practice changes in the area of community nursing to enhance the safety through innovative communication strategies. Two of the four areas that the CNA identifies as important competencies that the advanced practice nurses must develop as part of their body of knowledge during graduate studies. These include promoting excellence in clinical practice, and participating in and guiding nursing research. Those who choose to work in the field of health informatics have an opportunity to influence health information systems for the betterment of patients and the profession by creating systems that increase clinician knowledge, skills and judgment by building on current research and exploring new approaches to communicate and deliver care.

Clinical Competencies

While nurses focused on the development of health information systems and nursing informatics rarely participate in direct patient care, their input into system design and implementation have a significant effect on how a nurse embeds the tool in her practice and its efficacy with supporting staff to deliver safe and competent care. For example, nurses may develop different approaches to capturing information within an EHR to document their patient's problems, outcomes, and interventions, leaving that information open to misinterpretation, and exposing patients to new and previously unidentified risks. Part of the role of nurses working in the capacity of an informaticist in the community is to ensure that clinical information is easy to understand and shared across the electronic system in a uniform way. This includes the type and location of information within the system. For that reason, nurses working in the field of health informatics must be able to anticipate issues that will "guide decision-making" for their team to ensure that the system clarifies interventions (Canadian Nurses Association, 2008 p.23).

In addition to ensuring the standardization of materials within the system to prevent errors, future directions for this type of research in the community may also include increasing the robustness of the clinical evidence available to assist nurses in the provision of care based on best evidence. Embedding links within nursing interventions allows ease of access to research. Other approaches to support best practice might be including videos within evidence links to demonstrate interventions at the point of care. Nursing interventions coupled with peer-reviewed research to support the rationale for interventions ensure that nurses understand the need to adopt the practice change. It is no longer acceptable to practice based on "tribal knowledge."

Research Competencies

Future directions for community research focused health information systems could also include data mining a handover tool or other components of the EHR to identify gaps in care, opportunities to reduce emergency room visits, and ways to reduce supply expenditures. Nursing research focused on these areas may drive improvements and identify new ways to utilize staff and keep patients in their home as long as possible.

Conclusion

Although this research project is not generalizable to populations at large, it does incite discussion and the need for more community-based research. Some agencies are only beginning the electronic health record (EHR) journey in community healthcare. While an EHR is an important tool when providing patient care, without a guide to direct clinicians to utilize the content in a meaningful way and assure that there is standardization in the documentation within the system, we may sabotage quality and safety. The literature clearly supports this concept and during this time of system-wide change, healthcare leaders must remain open to supporting the use of handover and not view the electronic health record as a mechanism to replace this important process (Staggers, Clark, Blaz, & Kapsandoy, 2011). Researchers also indicated that while electronic health records are beneficial to patient care, they could not replace nursing handover. Handover is the way to ensure that all members of the healthcare are focusing on the relevant data components with attention to the important patient problems. It also affords field staff with a communication mechanism that promotes patient-centered care both from a physical perspective and from a holistic approach taking into consideration aspects related to the patient's psychosocial needs, home environment, visit preferences, and special requests. Handover, if performed in a comprehensive style supports holistic nursing, the grassroots of the discipline.

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Appendix A- Letter of Permission

Bayshore Home Health

May 6, 2013

University of Victoria

Dr. N. Frisch & Dr. A. Roudsari

Re: Nicole Michaud-Hamilton
This letter is written to confirm that, in my capacity as Director of Operations for Bayshore Home Health, I am aware of Nicole's thesis proposal. In addition, I support Nicole in her plan to conduct a research project and her need to engage with our staff in order to complete her work. Her work will contribute to our knowledge regarding best practices with respect to nursing shift transitions and assist community nursing by increasing safety and enhancing quality of care. Please do not hesitate to contact me with any questions or concerns.

Sincerely,

Kathy Brown, RN, BScN, MEd
Director of Operations

Bayshore Home Health
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Appendix B- Participant Consent Form

Participant Consent Form

Developing a Standardized Electronic Reporting System for Visiting Nurses

You are invited to participate in a study entitled: Developing a Standardized Electronic Reporting System for Visiting Nurses that is being conducted by Nicole Michaud-Hamilton RN BScN.
Nicole Michaud-Hamilton is a Graduate Student WITH THE UNIVERSITY in the department of Health Information Sciences/Nursing at the University of Victoria and you may contact HER if you have further questions by calling 519 495 7385.
As a Graduate student, I am required to conduct research as part of the requirements for a degree in Masters of Science Health Informatics/Masters of Nursing. It is being conducted under the supervision of Dr. Noreen Frisch and Dr. Abdul Roudsari. You may contact my supervisors: Dr. Roudsari @ 250-721-8578 or Dr. Frisch @ 250-721-7953

Purpose and Objectives

The purpose of this research project is to ask your opinions on current methods of nursing report in the community. The current system uses email via handheld device to deliver report to on-coming nurses. In this study, you will assess the usefulness of an electronic handover form.

Importance of this Research

Research of this type is important because sheds light on the practice of nursing report in a community setting. Secondly, it may make nurses aware of their current practices and alter their practices based on their critical reflection.

Participants Selection

You are being asked to participate in this study because of you are a member of a community nursing agency who cares for medical-surgical patients. As a researcher, I am interested in your opinions.

What is involved?

If you consent to voluntarily participate in this research, your participation will include answering a short survey, reviewing an electronic document, and answering a second short survey. It will take approximately 45 minutes.

Inconvenience

Participation in this study may cause some inconvenience to you, including taking your time to answer questions and review the tool.

Risks

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

Benefits

The potential benefits of your participation in this research include increasing your awareness of your nursing handover practices.

Voluntary Participation

Your participation in this research must be completely voluntary. If you do decide to participate, you may withdraw at any time without any consequences or any explanation. If you do withdraw from the study, your data will be destroyed.

Researcher's Relationship with Participants

The researcher may have a relationship to potential participants as being a direct manager in your area of employment. To help prevent this relationship from influencing your decision to participate, the following steps to prevent coercion have been taken. The researcher is not the direct manager of the participants and is requesting participation from the Hamilton Visiting Nurses as opposed to the Brantford area nurses.

Anonymity

In terms of protecting your anonymity, there will be no identifying information on the survey responses. The researcher is interested in your responses as a professional and not who specifically provided the response.

Confidentiality

Your confidentiality and the confidentiality of the data will be protected not including any identifying information on the survey responses and destroying the signed consents after completion of the study through a secure document management company.

Dissemination of Results

It is anticipated that the results of this study will be shared with others in the following ways: a thesis, the thesis defense process, and potentially a scholarly article.

Disposal of Data

Data from this study will be disposed of by shredding all electronic data and disposing of the consents through a secure document management company once the data has been analyzed and the results published. This period is approximately one year.

Contacts

Individuals that may be contacted regarding this study include Nicole Michaud-Hamilton, and either Dr. Noreen Frisch or Dr. Abdul Roudsari as outlined above.

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca).

Your signature below indicates that you understand the above conditions of participation in this study, that you have had the opportunity to have your questions answered by the researchers, and that you consent to participate in this research project.

_____	_____	_____
Name of Participant	*Signature*	*Date*

A copy of this consent will be left with you, and a copy will be taken by the researcher.

Appendix C- Survey I

Survey Part I

Assessment of Electronic Handover Tools Questionnaire

Nursing handover is part a way to communicate information to members of the care team. The purpose of this research is to determine how nurses feel about the current handover process and what their thoughts would be about a new method to perform this task. It will give you an opportunity to review an electronic nursing handover and provide your feelings towards this system.

Please answer the following questions about nursing report as it relates to being a visiting nurse in a community setting.

Please indicate your registered status:

RN **RPN**

Which age group best reflects you:

20-35 **36-51** **52-67**

How long have your practiced as a licensed practitioner?

0- 1 year **2-5 years** **6-10 years** **10+ years**

How many months have you been with the organization?

0-6 months **7-12 months** **13-24 months** **25-36 months** **36+ months**

Assessment of Electronic Handover Tools

Do you agree or disagree with the following statements.
Please check the appropriate box (1 through 5) for each item below.

		1	2	3	4	5
1	Nursing report is an essential part of nursing practice	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
2	Nurses know the type of information they should include in a nursing report.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
3	Mobile devices play an important role in the handover process in community nursing at present.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
4	Email is a good alternative to provide nursing handover face-to-face.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
5	The current handover process meets my needs.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
6	Information I need is frequently missing from the current email handover.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
7	I rarely read report prior to providing care.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
8	Nursing handover is essential to performing my role as a community nurse.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
9	I present my nursing handover in a consistent and organized manner each time.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
10	The information shared by colleagues changes the way I practice and assists me with making decisions related to patient care.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree
11	I believe that a lack of information about a client has affected my delivery of care.	☐ strongly disagree	☐ disagree	☐ neutral	☐ agree	☐ strongly agree

Assessment of Electronic Handover Tools						
Do you agree or disagree with the following statements. **Please check the appropriate box (1 through 5) for each item below.**						
		1	**2**	**3**	**4**	**5**
12	**I feel frustrated searching for report on my patient.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**

Appendix D- Survey II

Survey Part II

Assessment of Electronic Handover Tools Questionnaire

Now that you had an opportunity to review the electronic handover tool, please answer the following questions:

Assessment of Electronic Handover Tools						
Do you agree or disagree with the following statements. Please check the appropriate box (1 through 5) for each item below.						
		1	**2**	**3**	**4**	**5**
1	**It would help me provide care to my patient.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
2	**It would help me spend less time looking for report.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
3	**It provides useful information to the care team that explains a patient's needs and current problems.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
4	**It meets my needs in the role of visiting nurse.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
5	**It is easy to use.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
6	**Both occasional and regular users would like it.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
7	**I could learn to use it quickly.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
8	**I could quickly become skillful with it.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
9	**I feel we need to adopt this electronic nursing report.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
10	**It will help me understand the patient problems and interventions more than the current system.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**
11	**It would allow me to deliver more effective care by clearly showing the progression of wound healing and outline the supplies used in care.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**

Assessment of Electronic Handover Tools						
Do you agree or disagree with the following statements. Please check the appropriate box (1 through 5) for each item below.						
		1	**2**	**3**	**4**	**5**
12	**The electronic report tool will increase my knowledge of my colleague's care to the patient.**	☐ **strongly disagree**	☐ **disagree**	☐ **neutral**	☐ **agree**	☐ **strongly agree**

Please answer the following questions about the electronic handover form:

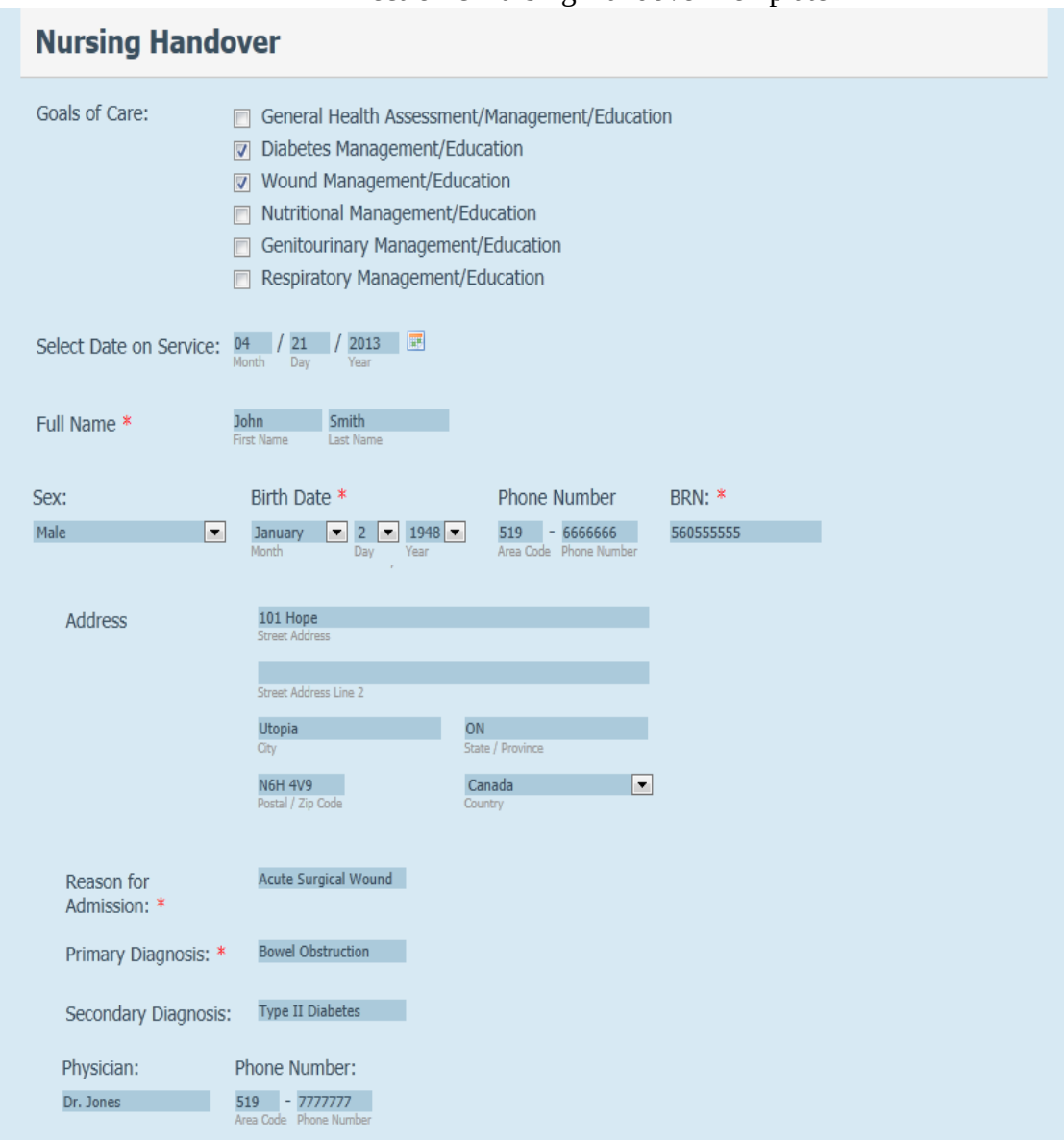
1) Was there any information missing from the form that you think needs to be included?

2) Were there any parts of the electronic handover form that you found confusing? If so, please identify and explain.

3) To improve future versions, what would you change about this electronic handover form?

Appendix E- Electronic Nursing Handover Tool

Electronic Nursing Handover Template



Nursing Handover

Goals of Care:
- [ ] General Health Assessment/Management/Education
- [x] Diabetes Management/Education
- [x] Wound Management/Education
- [ ] Nutritional Management/Education
- [ ] Genitourinary Management/Education
- [ ] Respiratory Management/Education

Select Date on Service: 04 (Month) / 21 (Day) / 2013 (Year)

Full Name *: John (First Name) Smith (Last Name)

Sex:	Birth Date *	Phone Number	BRN: *
Male	January (Month) 2 (Day) 1948 (Year)	519 (Area Code) - 6666666 (Phone Number)	560555555

Address:
101 Hope (Street Address)
(Street Address Line 2)
Utopia (City) ON (State / Province)
N6H 4V9 (Postal / Zip Code) Canada (Country)

Reason for Admission: * Acute Surgical Wound

Primary Diagnosis: * Bowel Obstruction

Secondary Diagnosis: Type II Diabetes

Physician:	Phone Number:
Dr. Jones	519 (Area Code) - 7777777 (Phone Number)

Cardiovascular System

Heart rate: 80

Blood Pressure: 120/80

Heart Sounds: S1/S2

Edema:

Syncopal Episodes: No

Previous Cardiac Event: Yes

DNR-C: No

Provincial Serial Number: ex: 23

Cardiovascular System Assessment: MI during the peroperative period requiring telemetry and medical management.

Cardiovascular System Interventions: Stable since hospital discharge.

Respiratory System

Breath Sounds: A/E equal bilaterally

Capillary Refill: less than 3 seconds

Oxygen therapy: No

Chest Tube(s): No

Smoker: Yes

Select all that apply:

- [ ] COPD
- [ ] Asthma
- [ ] Pneumonia
- [ ] Cystic Fibrosis
- [ ] Other

Dyspnea:

- ( ) At rest
- ( ) On exertion
- (•) Absent

Specify Other:

Respiratory System Assessment: Within normal limits

Respiratory Therapy Interventions:

Gastrointestinal System

Diet: Regular

Bowel Sounds: Present

Bowel Routine:

Ostomy: No

Feeding Tube: No

Gastrointestinal System Assessment: Abdomen soft/slightly tender peri-incisional region. Patient indicates that bowels moving.

Gastrointestinal System Interventions:

Genitourinary System

Foley Catheter: No

Ureterostomy: No

Renal Impairment: No

Dialysis: No

History of frequent UTI's

Genitourinary System Assessment: Within normal Limits

Genitourinary System Interventions:

Musculoskeletal/Integumentary (MS) System

Select all that apply:
- [ ] Osteoarthritis
- [x] Rheumatoid Arthritis
- [ ] Contractures
- [ ] Swelling
- [ ] Tenderness
- [ ] Deformaties
- [ ] Fractures
- [ ] Other

Other- Specify:

Check all that apply:
- [ ] Rashes
- [ ] Pressure sores
- [ ] Lesions
- [ ] Tenting of skin
- [ ] Dry mucous membranes
- [ ] Other

Other specify:

MS System Assessment: History of Rheumatoid arthritis not requiring medication. Pain control if required managed with over the counter tylenol and advil.

MS System Interventions:

Neurological System

Select all that apply:
- [ ] Altered Level of Consciousness
- [ ] Seizures
- [ ] Tremors
- [ ] Motor Impairment
- [ ] CVA
- [ ] Dementia
- [ ] Other

Specify Other:

Neurological System Assessment: Within Normal Limits.

Neurological System Interventions:

Hematology/Endocrine Systems

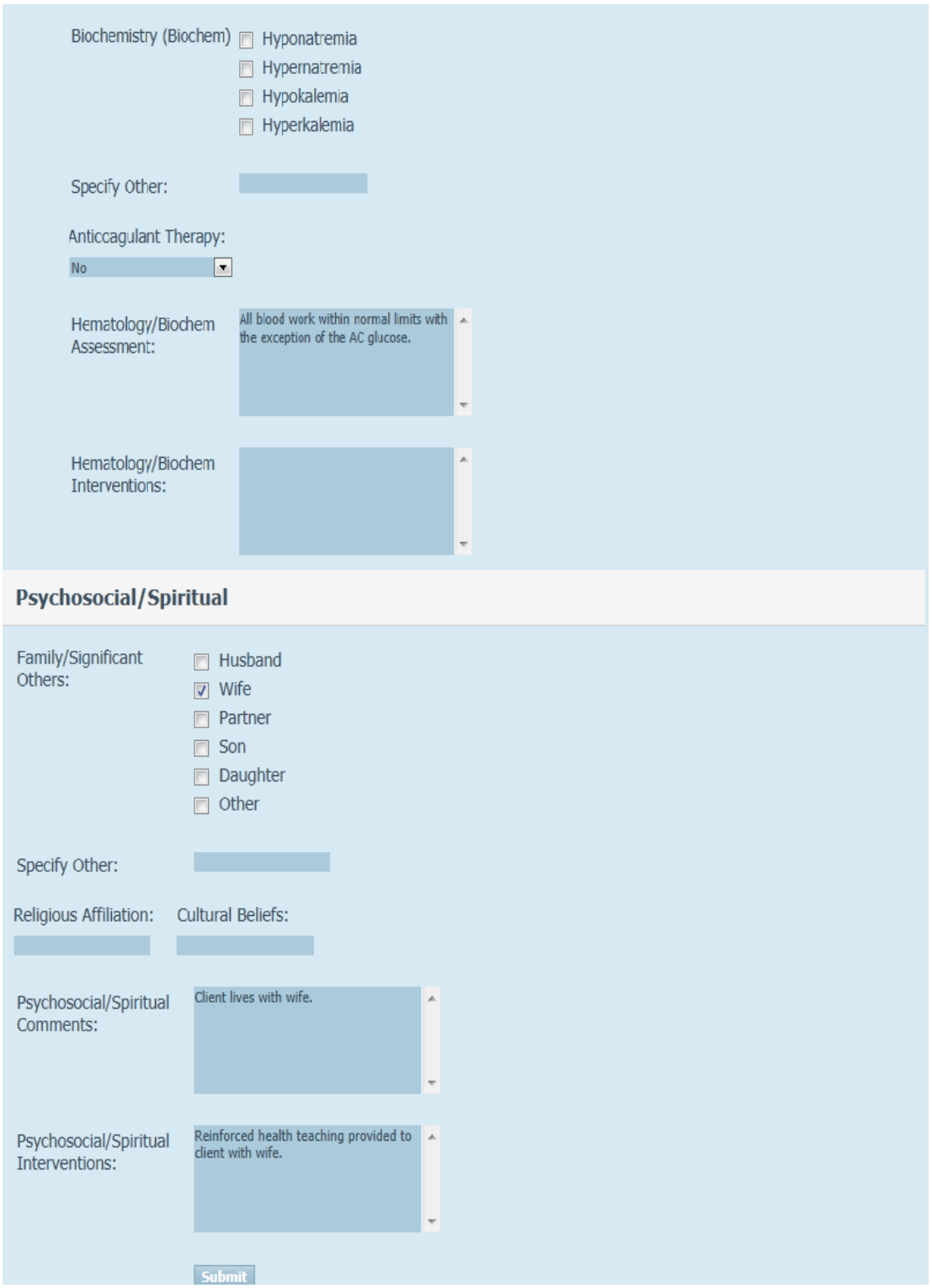
Diabetes: Type II

Diabetes Management Assessment: Client is a non-compliant diabetic who does not follow physician recommendations.

Diabetes Management Interventions: AC blood sugar on admission to service was 14.6 mmol/L. 10 units of insulin given. Health teaching done regarding proper diet and delayed wound healing related to diabetes. Client is on a renal dose of norvasc (2.5 mg po daily)

Hematology
- [ ] Anemia
- [ ] Elevated White Blood Cells
- [ ] Thrombocytopenia
- [ ] Neutropenia
- [ ] Other

Specify Other:



Electronic Wound Pathways

Wound Pathways

Supplies

Last supply order date:

04 / 21 / 2013 at 10 : 50 AM
Month Day Year Hour Minutes

Supplies ordered:

drain removal kit
mesorb pads
paper tape

Goals of Care:

Select All that Apply:

- [x] Optimize wound healing
- [x] Educate Client/Family on wound care needs and promote independence

Health Teaching with Client/Family

- [x] Signs and Symptoms of Infection
- [x] Drain Care
- [x] Dressing Protocol
- [x] Nutrition
- [x] Activity/Exercise
- [x] Pain Management

Acute Surgical Wound Pathway:

Wound Location(s): abdominal wound

Date on Service: 04 (Month) / 21 (Day) / 2013 (Year)

Blocked Book Visits *
- 1/3
- 2/3
- 3/3

Surgical Site/description: 10 cm abdominal incision post bowel resection.

MVP Report

Last CCAC update: 04 (Month) / 26 (Day) / 2013 (Year)

Report to CCAC/Company: CCAC case manager informed that wound is red and not healing. Drainage note on gauze on last vist (April 24). Reqesting addition blocked book visits to monitor wound. Client referred to physician for antibiotics.

NEXT VISIT DAY: 04 (Month) / 27 (Day) / 2013 (Year)

Provider End Date: 04 (Month) / 29 (Day) / 2013 (Year)

Measurement:

Visit Frequency:

Plan:

Wound Comments: Delayed wound healing and possible sepsis secondary to surgery and complications of diabetes. Drain removed on April 26/2013. No complications and drainage had been less than 30 mLs/24 hrs.

Wound Healed with current Plan: No

Additional Blocked Book Visits *
- 1/3
- 2/3
- 3/3

Chronic Surgical Wound Pathway

Date Moved to Chronic Pathway

04 / 14 / 2013
Month Day Year

MVP Report

Last CCAC update

/ /
Month Day Year

Report to CCAC/Company:

Provider End Date:

04 / 14 / 2013
Month Day Year

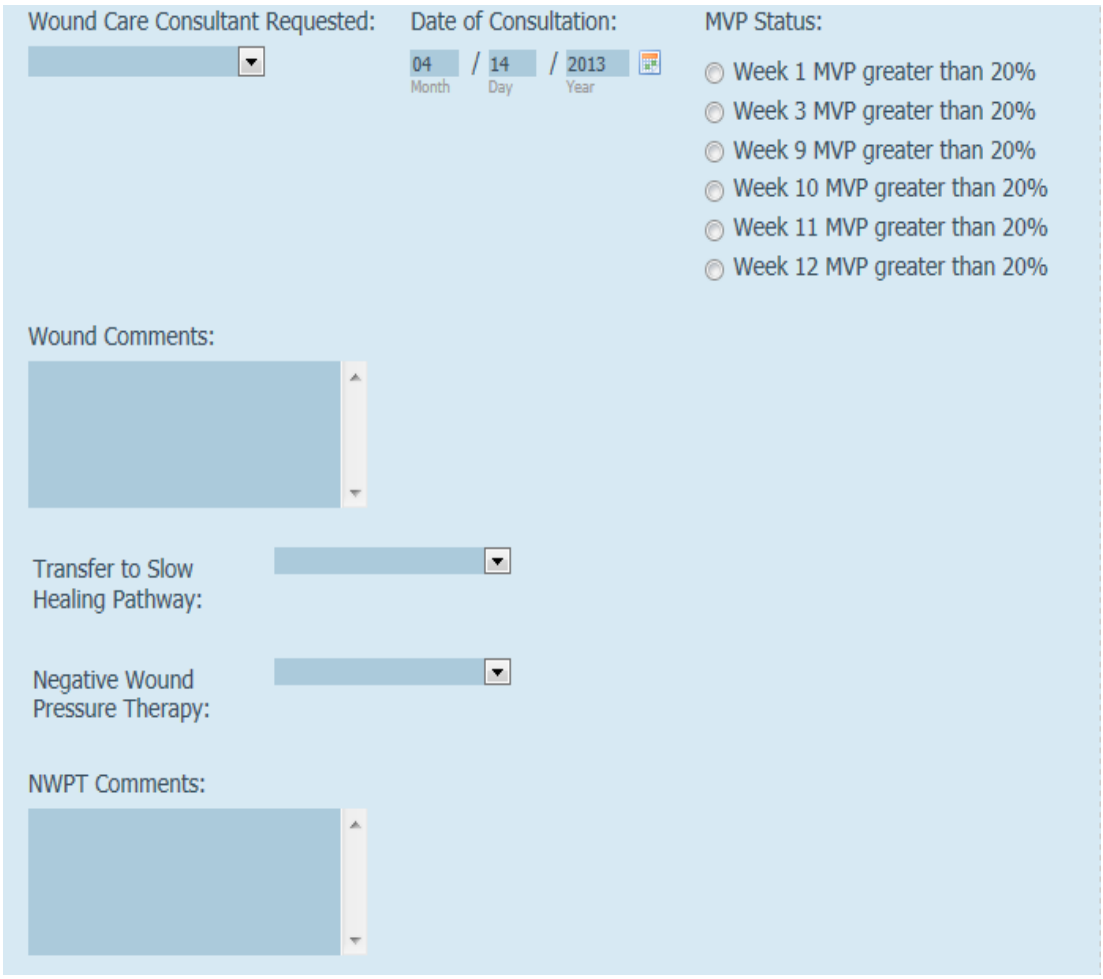
Percentage Healed:

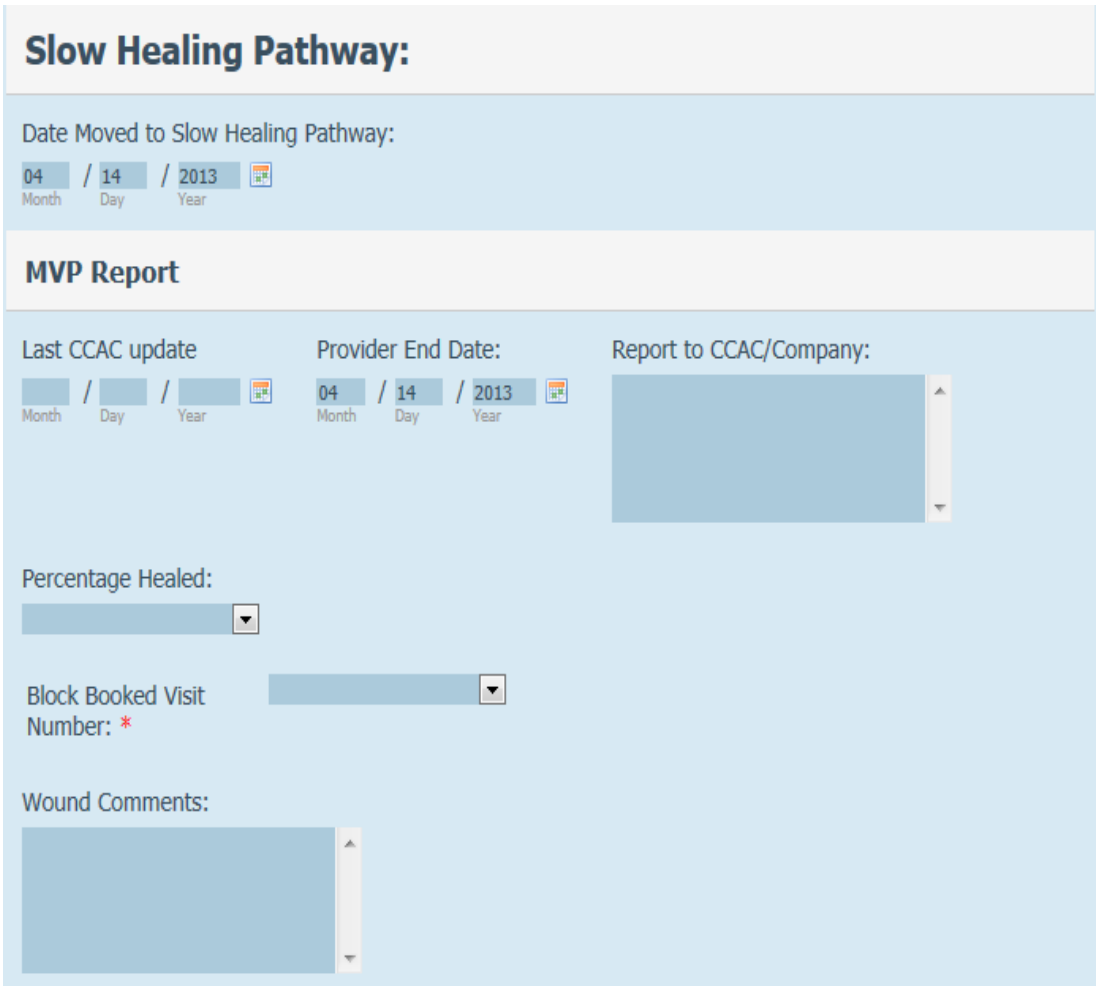
Block Booked Visit Number: *

Measurement:

Visit Frequency:

Plan:


Wound Care Consultant Requested:
Date of Consultation:
04 / 14 / 2013
Month Day Year
MVP Status:
Week 1 MVP greater than 20%
Week 3 MVP greater than 20%
Week 9 MVP greater than 20%
Week 10 MVP greater than 20%
Week 11 MVP greater than 20%
Week 12 MVP greater than 20%
Wound Comments:
Transfer to Slow Healing Pathway:
Negative Wound Pressure Therapy:
NWPT Comments:


Slow Healing Pathway:
Date Moved to Slow Healing Pathway:
04 / 14 / 2013
Month Day Year
MVP Report
Last CCAC update
Month Day Year
Provider End Date:
04 / 14 / 2013
Month Day Year
Report to CCAC/Company:
Percentage Healed:
Block Booked Visit Number: *
Wound Comments:

Measurement:

Visit Frequency:

Plan:

Wound Care Consultant Requested:

Date of Consultation: 04 / 14 / 2013
Month Day Year

Negative Wound Pressure Therapy:

NWPT Comments:

Maintenance Pathway:

Date Moved to Maintenance Pathway:
04 / 14 / 2013
Month Day Year

MVP Report

Last CCAC update
Month / Day / Year

Provider End Date: 04 / 14 / 2013
Month Day Year

Report to CCAC/Company:

Blocked Book Visits *
- 1/4
- 2/4
- 3/4
- 4/4

Percentage Healed:

Submit