

The Effectiveness of a Care Transitions and Rapid Response Nurse Intervention at Reducing Readmissions and Emergency Department Use for High Risk Patients: A Mixed Methods Study

by

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ABSTRACT

The transition from hospital to home is a vulnerable period for the elderly patient with complex conditions, who are often frail, at risk for adverse events and unable to navigate a system of poorly coordinated care in the post-discharge period. Achieving seamless transitions between care settings is viewed as crucial to high-quality care for frail older persons. Care transitions interventions are seen as effective care coordinating mechanisms for reducing avoidable adverse events associated with the transition of the patient from the hospital to the home.

This mixed methods study evaluates the effectiveness of a care transitions and rapid response nurse intervention at lengthening the time to first readmission and reducing total readmissions, emergency department use and total hospital bed days during the 30-day, 60-day and 90-day post-discharge periods for patients at high risk of readmission. The intervening impact of social isolation and patient frailty is evaluated.

A randomized control trial was undertaken to evaluate the effectiveness of the intervention. Analysis was completed using the intention-to-treat principle. The primary end-point - the time to first readmission - was analyzed using the Kaplan-Meier survival analysis. The Fisher's exact test compared differences in the post-discharge period, on the number of readmissions and emergency department visits and the Mann-Whitney-U test for hospital bed-days used. The intervening impacts of frailty and social isolation were evaluated using the independent t-test, Pearson correlation and two-way analysis of variance. Patient satisfaction with transition was evaluated using the Care Transitions Measure. Factors associated with inpatient and emergency department use were analyzed using a linear mixed model approach.

No statistically significant differences were found between the intervention and control groups on the time to first readmission or in the post-discharge emergency department or inpatient bed use. Social isolation and frailty were not shown to significantly influence these outcomes but frailty was shown to be significantly associated with death. Men living alone were found to be more socially isolated. Linear mixed model analysis demonstrated that gender and previous emergency department and inpatient bed use to be significant predictors of future emergency department, readmission and inpatient bed use. No differences in patient satisfaction with the transitions were found between the intervention and control groups.

A qualitative analysis was undertaken using focus groups and individual interviews, involving providers, to identify the factors that facilitated or were barriers to the implementation of this care transitions intervention. Using thematic content analysis, it was found that the effectiveness of transitional coordination efforts was thwarted by ineffective communication which affected the quality of the underlying relationships between the two teams. Other barriers to achieving the desired outcomes included: issues of role clarity, role awareness and acceptance of the positions within the respective organizations, the adequacy and reinforcement of coordinating mechanisms, and the effectiveness of the information exchange protocols. The combination of these factors limited the ability of the professionals to work effectively together to achieve the patient outcomes desired. Several improvement opportunities were identified. The activities of the individual professionals delivering care were patient focused.

Keywords: Care transitions, Rapid Response, Frailty, Integration, Readmissions

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CHAPTER 1

INTRODUCTION

Aging of the population combined with increased prevalence of chronic diseases is an important health and fiscal policy issue that is receiving increased national attention (Carstairs & Keon, 2009). According to the 2006 population census, Canada's seniors' population over the age of 65 years reached 14%. Those over the age of 65 years are projected to increase to 25% by 2041 (Dandy & Bollman, 2008; Health Canada, 2002). According to the Canadian Institute for Health Information, health system costs increase as people age and rise dramatically over the age of 70 years (Canadian Institute for Health Information, 2009). Seniors with three or more chronic conditions represent 24% of all seniors, but consume 40% of health care resources used by seniors; a rate three times that of seniors who reported only one chronic condition (Canadian Institute for Health Information, 2011). During the next 30 years, health care related costs are expected to increase by 3% of the gross domestic product (GDP), with at least half of this being attributable to aging and the other portions to health technology and demand for more services (Ragan, 2010).

The health system continues to rely heavily upon hospitals as a location of care (Beland et al., 2006; Canadian Institute for Health Information, 2013b). As the population ages and the prevalence of chronic illness increases, the demand for hospitalization of the elderly will increase (Canadian Institute for Health Information, 2011). Hospitals account for 37% of all health care public sector expenditures in Canada. The risk of hospitalization and emergency department use increases as people age, with those 65 years and older accounting for 40 % of all hospital admissions (Canadian Institute for Health Information, 2011). Compared to the population under 65 years, seniors use acute inpatient hospital services at a rate of 4.9 times that of those under 65

years (Canadian Institute for Health Information, 2011). Those over 65 years utilize complex continuing care at a rate of 23 times the rate of those less than 65 years and use rehabilitation care at a rate of 12 times those under 65 years (Canadian Institute for Health Information, 2011).

Risks of Hospitalization for Older Adults

Hospitalization represents a critical and often life altering event for the older adult patient. Older hospitalized adults experience a higher proportion of adverse events including higher complication rates and more geriatric syndromes such as: falls, delirium, pain, dehydration, functional decline and frailty (Foreman, Theis, & Anderson, 1993; Thornlow, Anderson, & Oddone, 2009). In a cross-sectional, hospital wide review of 455 patients aged 65 and over with geriatric syndromes, Chen, Yen, Dai, Wang & Huang (2011) found that half experienced visual impairment, chewing difficulty, polypharmacy, anemia and sleep disturbance. A further 40% experienced functional dependence, 33% malnutrition and one-third suffered from depression (Chen et al., 2011). Adverse events related to hospitalization occur at a greater rate with increasing age (Brennan, Leape, & Laird, 1991; Romano et al., 2003) and hospitalization of older adults increases the risk that pre-frail and non-frail patients will develop a frailty condition (Gill, Gahbauer, Han, & Allore, 2011). Older patients suffering an adverse event during hospitalization have poorer outcomes in the post-discharge period, with one-third experiencing functional decline and an increased risk of falls, readmission, institutionalization and death (Sutton, Grimmer-Somers, & Jeffries, 2008; Thornlow et al., 2009; Wong & Miller, 2008).

Pressure for Early Discharge

After decades of growth, health care expenditures in Canada are decreasing when measured as a percentage of the nation's gross domestic product. In 2009 and 2010, Canada spent 11.6% of its GDP on health care, an all-time high (Canadian Institute for Health

Information, 2013b). It has since declined to 11.2% of GDP in 2013 (Canadian Institute for Health Information, 2013b). In terms of its share of expenditures, the amount being spent on hospitals has remained relatively stable in the last decade at 30% of total health care expenditures. The public private share of health expenditures remains unchanged with 70% of all health care costs covered by the public health system and 30% covered by the private health system (Canadian Institute for Health Information, 2013b).

The rate of hospitalization has declined by 31 % over the last two decades. Hospitalization rates as a share of the population have declined from 11,131/ 100,000 population to the current 7,672/100,000 population. In the same period, length of stay per hospital admission in Canada has also declined by 4% from 7.5 days to 7.2 days with the shortest length of stay in Ontario at 6.4 days (Canadian Institute for Health Information, 2013b).

Increasing inpatient acuity and a higher cost per episode of care, as result of technology and wage pressures, are driving per episode of hospital care cost increases (Canadian Institute for Health Information, 2011). Reimbursement systems have not kept pace with these cost pressures. This has resulted in hospital providers looking for ways to contain costs (Anthony & Hudson-Barr, 2004; Kaboli et al., 2012). One of the means that hospitals have used to reduce cost is to reduce inpatient length of stay (Carey & Lin, 2014; Kaboli et al., 2012). There is a developing body of literature exploring the relationship between reduced length of stay and potential adverse outcomes on the older adult patient (Carey & Lin, 2014; Dagani et al., 2013; Kaboli et al., 2012). The evidenced is mixed in terms of the cut-off point at which the reduction in length of stay has on adverse effect on outcomes after discharge.

Poorly Coordinated Discharge

Patients are being discharged more quickly providing less time for providers to prepare patients and their families for discharge (Anthony & Hudson-Barr, 2004; Bowles, Naylor, & Foust, 2002; Chapin, Chandran, Sergeant, & Koenig, 2014; McMurray, Johnson, Wallis, Patterson, & Griffiths, 2007). Patients are more medically complex (Chapin et al., 2014) and are discharged before they have completely recovered or are fully prepared to take care of themselves emotionally, mentally and physically (Bull & Jervis, 1997; Coleman, 2003; Laugaland, Aase, & Barach, 2012). In many cases patients are discharged without fully understanding their illness, the use of their medications and their side effects and the activities they are to undertake in the post-discharge period (Bull, Hansen, & Gross, 2000a). At their worst, discharges are hastily organized, uncoordinated processes that result in an overwhelming amount of information being provided to patients just prior to leaving the hospital setting (Bauer, Fitzgerald, Haesler, & Manfrin, 2009; Chapin et al., 2014; Miller, Piacentine, & Weiss, 2008), the outcome of which is that little of the important information provided is retained (Anthony & Hudson-Barr, 2004; Enderlin et al., 2013).

Patients are often unprepared for their next care setting, or to take on their self-management role (Coleman, 2003; Maloney & Weiss, 2008; McMurray et al., 2007). In the case of the discharged older adult with complex health and social deficits, it is the patient's family who carries a significant portion of the responsibility for post-discharge aftercare and they are often left on their own to coordinate post-discharge services (Grimmer, Moss, & Falco, 2004; McMurray et al., 2007). Patients and their care givers often do not have the information or self-management skills to appropriately manage their post-discharge course of recovery (Bull et al., 2000a; Kelly, 2011). The information they receive is often conflicting and the patients

themselves have limited input into the development of their plan of care (Chapin et al., 2014; Coleman, Parry, Chalmers, & Min, 2006).

The involvement of patients and families in the discharge process is seen as one aspect of effective discharge planning and transitions (Huber & McClelland, 2003). However, the outcomes achieved through involvement are mixed, with some showing improved self reported health, shorter lengths of stay, fewer readmissions, improved patient and care giver satisfaction, improved readiness to discharge and capacity to solve problems once discharged (Bull, Hansen, & Gross, 2000b; Clark et al., 2005; Haddock, 1994; Jackson, 1994; Parkes & Shepperd, 2000). Other studies have demonstrated no effect (Arnetz et al., 2010; Lockery, Dunkle, Kart, & Coulton, 1994). Additionally, the interventions that health care professionals can implement to effectively incorporate patient preferences into the discharge planning process have not been fully researched (Huber & McClelland, 2003). However, it is generally recognized that more formalized arrangements to engage patients and families in the discharge process will result in greater levels of patient satisfaction.

While the benefits of patient and family engagement may be debated, it has been recognized as the standard of practice for some time, yet there is strong evidence that patients and families are not effectively engaged (Bauer, 2009). The barriers to the effective engagement include lack of prioritization by health care professionals, particularly nurses, given time pressures and other competing obligations (Carman et al., 2013). Approaches to family engagement typically involve instructing rather than engaging patients and families, leaving patients feeling unprepared with post-discharge aftercare and care that is not tailored to meet their specific needs. Resource constraints of inpatient beds and community resources create pressure on staff to move patients through the system (Hesselink et al., 2012b). Efraimsson,

Sandman, Hyden, & Rasmussen (2004) found a disenfranchisement that occurred in the discharge planning conferences, where patients, families and health care professionals meet to discuss the process and plan for discharge. The focus was often telling patients the plan for discharge, with healthcare professionals justifying their actions due to the underlying policies of efficiency and rationalization, creating conflicting paradigms of involvement and efficiency.

While patient complexity places an increased burden on the family, it also increases dependency on post discharge services, including community support services, home care, primary care and emergency room visits to manage the patient's aftercare needs (Coffey & McCarthy, 2013). The required services of multiple professionals and provider organizations create care coordination challenges with service delivery organized according to the convenience of the care providers and not according to the patient's or family's care needs (Coleman, 2003; Rooney & Arbaje, 2012). In the transition from the hospital to the home, patient experience literature reveals a high frequency of service failures in the post-discharge period. These include: missed visits, untrained care providers, care provider turnover, unmet patient needs and family expectations and failures to deliver what was discussed or planned during the discharge process (Alstveit, Aase, & Barach, 2011). These failures lead to discontinuities, otherwise known as fragmentation in care in the post-discharge period (Marengoni et al., 2013; C. Moore, Wisnivesky, Williams, & McGinn, 2003). The combined effects of the patient's fragile health status, care giver burden, poor patient and family preparation and lack of support once back home result in poor patient outcomes including prolonged recovery and failure to achieve optimal health and other adverse events. (Bauer et al., 2009; Forster, Clark, Menard, Dupuis, & et al, 2004; Huber & McClelland, 2003). Moore et al. (2003) identified significant continuity of care issues related to follow-up testing and work-up errors and found that 49% of patients

experienced at least one medication error. Several studies reveal high rates of medication errors, the frequency of which increases with the increasing age of the patient and where information is not appropriately communicated to the primary care provider in the post discharge period (Bell et al., 2009; A. McMillan, Trompeter, Havrida, & Fox, 2013; T. E. McMillan, Allan, & Black, 2006). Where patients experienced a work-up error, they were 6.2 times more likely to be readmitted to the hospital within three months (C. Moore et al., 2003).

System Fragmentation

Achieving seamless transitions and coordination of post discharge care is challenging in jurisdictions such as Canada that are characterized by a high degree of system fragmentation (MacAdam, 2008). Medical specialization and organizational separation between community, hospitals and physician services creates a degree of system complexity that increases the probability of failed communication and discontinuity in care (Chapin et al., 2014; Geary & Schumacher, 2012). The result is that patient care is provided by multiple providers that operate in silos with poorly defined communication mechanisms (Coleman, 2003). The information transition from one provider to another is often incomplete or not useful, as the patient moves from one care setting to another (Coleman, 2003). Often, critical components of the patient's care plan are not well communicated making it difficult for patients and caregivers when problems do arise (Chapin et al., 2014; Rooney & Arbaje, 2012).

Increasingly, inpatient care is more likely to rely on the care provided by specialists and hospitalists (A. McMillan et al., 2013). This has raised concern around further discontinuities of care when patients cared for by hospitalists are transitioned back into the community to be cared for by their primary care providers. Evidence shows that fewer than 20% of hospitalists have direct communication with the patient's primary care provider during their inpatient stay

(Kripalani et al., 2007) and in only 42% of cases is the discharge summary received by the primary care provider within two days of discharge, and in many cases not received before the first follow-up visit (Bell et al., 2009). Similar concerns have been identified related to the information transfer where hospital care is provided by specialists (Buyuktur & Ackerman, 2015; Kirpalani et al., 2007). Boling (2009) describes instances, where weeks after the patient is discharged from hospital, a primary care physician receives home care orders and it may be the first time that they become aware that the patient was hospitalized.

Adverse Events at the Point of Transition

The Institute of Medicine defines an adverse event as “*a failure of a planned action to be completed as intended*” (Kohn, Corrigan, & Donaldson, 2000). While achieving seamless transitions between care settings is viewed as crucial to high-quality care for the frail older persons, adverse events, at the point of transition occur with regular frequency (Boling, 2009; Forster et al., 2004). However, unlike adverse events that occur within the hospital or other institutional setting, data are not as readily available to quantify the extent of adverse events and harm that occurs at the point of transition (Tsilimingras & Bates, 2008). Approximately one in five internal medicine discharges or transitions from hospital suffer a post-discharge adverse event (Forster, Murff, Peterson, Gandhi, & Bates, 2003; Tsilimingras & Bates, 2008). In another study, adverse events were found in as many as 23% of discharged patients with 72% of these related to medication errors (Forster et al., 2004). The most common types of adverse events which occur in the transition from the hospital to the home include: medication errors, communication breakdowns between providers, incomplete and inaccurate transfer of information, inadequate patient and caregiver education, complex and poorly understood discharge instructions, errors in follow-up of diagnostic tests, infections, falls and complications

related to procedures and limited access to services (Darwin & Parrish, 2008; Forster et al., 2004; C. Moore MD, Wisnivesky, Williams, & McGinn, 2003; Soares, Jacobs, Laugaland, Aase, & Barach, 2012).

Communication Breakdowns. Patients with complex conditions require continuous management, often from different providers who may be employed in different health care practices. The hand-offs of care, between providers often working in different settings are critical to the achievement of ideal patient outcomes (Coleman, 2003). However, poor and inadequate communication at the point of hand-off from one provider to another is a common theme that creates a gap in care and leads to adverse events (Alstveit et al., 2011; C. Moore MD et al., 2003). This communication gap is often the result of poor documentation of the patient's follow-up requirements. Vital patient information such as: diagnostic tests, complications of treatment, changes in medications, follow-up appointments, pending test results, and follow-up diagnostic and therapeutic interventions are frequently not well communicated (Roy et al., 2005). In many cases, there is poor communication of the plan of care to the primary care provider or a complete failure to communicate to the primary care provider (Coleman & Boulton, 2003; Coleman, 2003).

In a longitudinal qualitative analysis, Dossa, Bokhour, Hoenig (2012) identified that communication breakdowns between patients, home care and hospital providers contributed to poor care and potential adverse outcomes for patients with mobility impairments. Kripalani et al. (2007) found deficits in the information transfer between hospitalists and primary care providers at discharge. The availability of discharge summaries at the patient's first post-discharge visit to the primary care provider ranged from 12% to 34%, affecting the quality of care in 25% of patients. Direct communication between hospital physicians and primary care physicians

occurred only 3% of the time at discharge, with only 17% to 20% of primary care physicians being notified of the discharge (Kripalani et al., 2007). Letters or discharge summaries were the most common form of communication with a median of 53% of letters hand delivered by the patient (Kripalani et al., 2007). In 14.5% of the cases, the discharge summaries were received by the primary care provider one week post-discharge. Audits revealed that the information relevant to the primary care providers was not provided. The authors indicated some promising results with standardized computer generated discharges. Similarly, Witherington, Pirzada, & Avert (2008) found that discharge summaries were deficient, lacking information related to diagnostics, hospital treatment course, discharge medications, follow-up tests and patient or family care; reinforcing a consistent theme of communication failure.

The information exchange between health care organizations during the patient transfer from hospital to home has been described as inaccurate and incomplete, particularly in the areas of medication, activities of daily living, cognitive status, depression status, communication ability and psychosocial status (Coleman et al., 2004). Communication failures are associated with: time pressures, poor role clarity, discharge planning not prioritized and a failure to fully assess the family's care giving abilities (Ashbrook, Mourad, & Sehgal, 2013; Block, Morgan-Gouveia, Levine, & Cayea, 2014; Hesselink et al., 2012b)

Olsen, Ostnor, Enmarker, & Hellzen (2003) conducted a qualitative, descriptive exploratory study evaluating nurses' experiences related to barriers that influence the exchange of information between the hospital and home care. Their findings demonstrated a number of barriers that negatively impacted the information exchange that the authors describe as complicated and problematic. They included barriers associated with the nurse, interpersonal processes and the organization. Barriers associated with the nurse included motivation,

workload or control over work and lack of knowledge. Barriers associated with interpersonal processes included lack of accessibility to other organization contacts, different views between providers leading to an “*us and them*” relationship, and lack of confidence in the information received from other providers. Organizational barriers included lack of resources such as time and staff resources, unclear responsibilities, and lack of staff continuity interrupting information flow (Olsen et al., 2013).

Medication Problems. It is estimated that one-third to two-thirds of patients admitted to the hospital experience a significant medication history error that follows the patient through the course of their hospitalization (Sen, Siemianowski, Murphy, & McAllister, 2014; Tam, Knowles, Cornish, Fine, & et al, 2005). These errors follow the patient through their transition from the hospital to the home. Witherington et al. (2008) found that in two-thirds of the patients discharged from the hospital to home there was incomplete documentation related to medication, that three-quarters had medication problems at discharge and of the patients readmitted, half were related to a medication issue (Witherington et al., 2008). Even when the information was correct, patients were often confused about their medications (Ornstein, Smith, Foer, Lopez-Cantor, & Soriano, 2011).

In a secondary analysis of data of care transitions interventions for heart failure patients, Foust, Naylor, Bixby & Ratcliffe (2012) compared hospital discharge summaries with the patients’ discharge instructions and found on average 1.3 unintended medication discrepancies. Patients in the study were prescribed a variable number of medications in the post-discharge period. In total, 71.2% of hospital discharges had a medication discrepancy with 77% of these involving a high risk medication.

“Medication reconciliation is a formal process in which healthcare providers work together with patients, families and care providers to ensure accurate and comprehensive medication information is communicated consistently across transitions of care and at the point of discharge” (Institute for Safe Medication Practices Canada, 2015). Medication reconciliation is recommended as a strategy to avoid unintentional discrepancies in medications, as patients transition from one care setting to another. A recent systematic review of evidence regarding the effectiveness of medication reconciliation at the point of transitions identified several important conclusions. First, that clinically significant discrepancies only affect a few patients and that few patients had unintentional discrepancies (Kwan, Lo, Sampson, & Shojania, 2013). Secondly, that focusing on high risk patients did not consistently improve the effectiveness of medication reconciliation and that medication reconciliation alone did not reduce post discharge hospital utilization within 30 days (Kwan et al., 2013). Finally, medication reconciliation demonstrated most benefit when combined with other interventions and where a pharmacist was an integral part of the process (Kwan et al., 2013). The authors emphasized that the benefit of medication reconciliation in reducing post discharge utilization was driven by the results of a single trial which combined medication reconciliation with other discharge coordination interventions (B. W. Jack, Chetty, & Anthony, 2009; Kwan et al., 2013). This being said, there is consensus in the literature that medication reconciliation and medication management at the point of transition from the hospital to home is a best practice which holds significant potential to improving quality of life and patient health outcomes (van, Mamdani, Fang, & Austin, 2004).

Readmissions. Care coordination challenges at the point of transition from the hospital to the home have been associated with increased readmissions to the hospital (R. F. Burke, Kripalani, & Vasilevskis, 2013). In Canada, hospital readmissions within thirty (30) days are

estimated to account for \$1.8 billion of acute care expenditures (Canadian Institute for Health Information, 2012). This excludes physician and emergency room costs. It is estimated that 9% to 59% of readmissions are avoidable, although there is considerable debate regarding how to define avoidable readmission (R. F. Burke et al., 2013). Factors which affect hospital readmission rates are generally attributed to the characteristics of the patient and system factors (Dombrowski, Yoos, Neufeld, & Tarshish, 2012; Giusti et al., 2008; Laugaland et al., 2012). Patient factors include: comorbidities, functional deficits, cognitive impairments, emotional problems and poor general health behaviours. System factors include communication breakdowns, inadequate patient and caregiver education, poor continuity of care and limited access to post-discharge services and community social support (Dombrowski et al., 2012; Giusti et al., 2008; Hudson, Comer, & Whichello, 2014; Koehler et al., 2009; Lasher, Mamais, Qasim, Lin, & Teitel, 2011; Laugaland et al., 2012).

In terms of patient factors, the disease process or general health condition of the patient may be the predominate predisposing factor to readmission. For example, Callahan et al. (2012) found that patients with dementia discharged from the hospital to home had higher 30-day rehospitalisation rate compared to patients without dementia. Those with dementia had a 23% rehospitalisation rate compared to the Medicare beneficiary's population in the United States that had a 19.6% rehospitalisation rate (Callahan et al., 2012). Patients with dementia generate more transitions in care, "*moving in a complex and interdependent way*" between home, with or without community home care support, nursing facilities and hospital (Callahan et al., 2012). These individuals, given their impairment in their self-care capacity and reliance on informal caregiver support, are particularly at risk for adverse outcomes related to their transitions.

It is the processes of care which are amenable to improvement (Canadian Institute for Health Information, 2012). Hesselink, Schoonhoven, Plas, Wollersheim & Vernooij-Dassen (2013) identified three factors amenable to improvement and often associated with readmission events. They included: the quality of the information exchange; coordination of care problems; and communication between hospital and community providers.

Hesselink et al. (2013) conducted a prospective qualitative study of patient handovers at hospital discharge to primary care. They found the information exchange from the hospital to the general practitioner was poor, particularly in relation to information about medications, follow-up treatment after discharge and the treatment received in the hospital. The timing of the information was not appropriate and often received too late to be meaningful. Further, community-based nurses caring for the patient received no updated information from the hospital and it was often left to the patient to explain the changes which occurred while hospitalized. The patients themselves were not clear as to what was to happen in the post-discharge period (Hesselink et al., 2013). The challenge with the information exchange has been identified by several authors (Bull & Roberts, 2001; Coleman, Smith, Raha, & Min, 2005; Kripalani et al., 2007). McDonald et al. (2007) identifies the lack of appropriate communication protocols and processes as a barrier to achieving the important exchange of information that must occur between providers as patients move from one care provider to another. The absence of these well-defined processes is poor communication which has been demonstrated to result in adverse patient outcomes (McDonald et al., 2007).

In terms of care coordination, the most important finding, in the view of Hesselink et al., (2013) is that hospital staff are unacquainted with the care in the community and do not anticipate fully the needs of the patient or those providing care. The study revealed poor

collaboration between community and hospital providers resulting in a lack of clarity in terms of accountability for follow-up. Further, the ability for community providers to contact hospital staff or physicians is often frustrated by indirect lines of communication. The absence of basic coordinating mechanisms, while essential, is not all that is required to achieve effective collaboration. The effectiveness of coordination is determined by the effectiveness of the underlying communication mechanisms which are dependent on the quality of the underlying relationships (Gittell, Godfrey, & Thistlethwaite, 2013; Hartgerink et al., 2014). The quality of the relationships reinforces the quality of the communication.

Tsilimingras & Bates (2008) summarized the key areas requiring attention to improve the quality of the patient experience as they move from the hospital to the home. They include improving: 1) transitional care; 2) information transfer through the strategic use of electronic records; 3) medication reconciliation; 4) follow-up test results; 5) screening to identify patients who experience an adverse event.

Purpose of Research

The focus of the current research is to test an intervention aimed at improving the transition of patients discharged from the hospital to the home. Achieving seamless transitions between care settings is viewed as crucial to high-quality care for the frail older person; however, adverse events, at the point of transition, continue to occur with regular frequency (Boling, 2009). These include: readmissions, adverse drug events, errors in follow-up of diagnostic tests, infections, falls and complications related to procedures (Soares et al., 2012). Care transition interventions are seen as one of the key care coordinating mechanisms that may be effective in reducing avoidable adverse events associated with the transition of the patient from the hospital to the home (Soares et al., 2012). According to Boling (2009), the requirements of a successful

care transition intervention are that it be appropriately designed, targets the appropriate patient population for which the intervention is intended and be executed by a well prepared team. It is Boling's (2009) view that while many interventions may be effective, it is essential that the intervention be adapted to the context of the local environment. Models and approaches, which appear to work well in one jurisdiction, may not always work well in others. Differences in funding, regulatory frameworks, available resources, service infrastructure and professional roles, local norms, family structures and living arrangements and individual choice influence the design and approaches used (Williams et al., 2009). Northeastern Ontario has many unique attributes including geography, isolation, distance, limited health infrastructure, scarcity in human and fiscal resources that may affect transitions in care. There are no studies evaluating the effectiveness of a care transitions intervention in Northeastern Ontario.

This mixed method study evaluates the effectiveness of a care transitions and rapid response nurse intervention at lengthening the time to first readmission and reducing total readmissions, emergency department use and total hospital bed days, during the 30-day, 60-day and 90-day post-discharge period, for high risk patients. The intervening impact of social isolation and patient frailty on the outcomes are evaluated.

This research was conducted at an academic health science centre, Health Sciences North, located in Sudbury, Ontario, Canada and involved patients at high risk of adverse events in their transition to home or home-like setting, with discharge aftercare coordination being provided by the Northeast Community Care Access Centre, also located in Northeastern Ontario, whose head offices are located in Sudbury, Ontario.

Research Questions

The following are the research questions which this study is proposed to answer.

Primary Question

1. Does the implementation of an in-hospital care transitions nurse and community-based rapid response nurse intervention increase the time to first readmission for high risk frail patients?

Secondary Questions

2. Does the implementation of an in-hospital care transitions nurse and community-based rapid response nurse intervention reduce the 30-day, 60-day and 90-day readmission rates, emergency department use and total bed days used and does frailty and social isolation have an intervening effect?

3. Can a model of prediction be developed for the dependent variables of 30-day, 60-day and 90-day hospital readmissions, total inpatient bed utilization for the study period and total emergency department visits for the same periods?

4. Is there a difference in patient's satisfaction with the transition between the intervention and control groups?

5. What are the factors that facilitated or were barriers to the implementation of this care transitional intervention from the perspective of the care providers involved in its implementation and what are the opportunities for improvement?

CHAPTER 2

CONCEPTUAL FRAMEWORK

Overview

This chapter begins with a brief overview of the main concepts of integration, positioning care coordination as an integrating mechanism and care transition interventions as care coordination activities. It concludes with a discussion of the Organizational Design Framework of Care Coordination (MacDonald et al., 2007).

Health Service Integration

The delivery of health care in Canada is characterized by a division of function, decentralization and specialization, with health service providers working in separate, but interdependent, organizations or practices, often with a silo mindset (MacAdam, 2008). This separation of function creates fragmentation and coordination challenges that interfere with efficiency and quality goals (Curry & Ham, 2010). Integrating care is viewed as an opportunity to address many of the system challenges of: poor coordination, timeliness of access, quality, patient safety and patient-centeredness, particularly for individuals with complex medical conditions or disabilities like the frail elderly (MacAdam, 2008).

Integrated care is a concept that can mean many things and can occur in several forms. The term is frequently associated with managed care, continuity of care, case management, coordinated care and transitional care. Kodner (2009) describes this lack of clarity in definition as a *“hodgepodge of meanings”* that creates difficulty in understanding how to develop policy, and how to plan, implement and evaluate interventions aimed at reducing fragmentation and improving the patient experience. Stein and Reider (2009) conceptualize integration as an umbrella term that *“includes a variety of interventions through a process of bringing*

organizations and professionals together to achieve improved patient outcomes”. It is within this conceptualization of integrated care, that the care transitions intervention of interest, for this particular study, is situated.

Conceptualization of Integration

Integration is a nested concept and can be describe by its type, level, breadth and degree (Kodner, 2009; MacAdam, 2008). See table 2.1 below.

Table 2.1: Integration Dimensions and Description

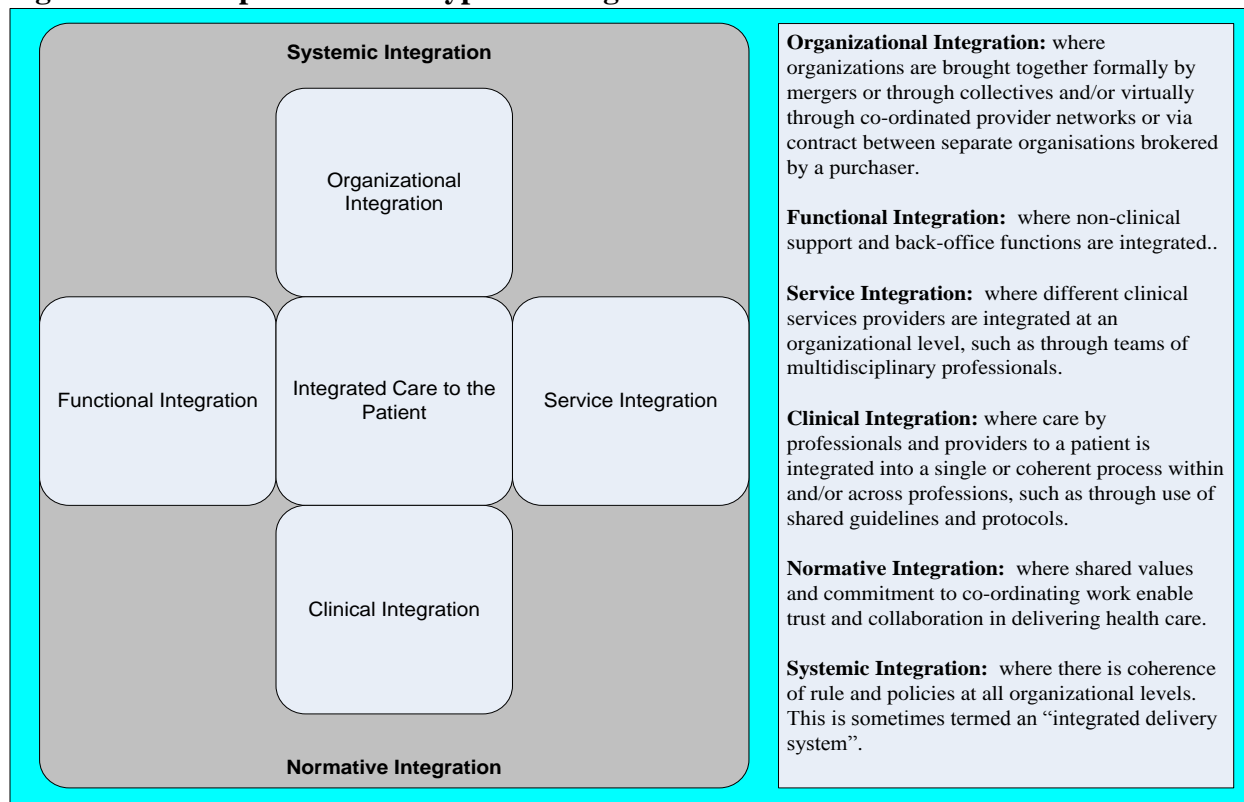
Dimension	Description
Focus	Entire communities or rostered populations Vulnerable populations (i.e. frail or disabled) Complex Illnesses (chronic diseases, cancers)
Type	Functional Organizational Professional Clinical / Service Normative Systemic
Level	Macro Meso Micro
Breadth	Horizontal Vertical
Degree	Linkage Collaborative Mechanisms Full Integration

Adapted: (Curry & Ham, 2010; Kodner, 2009)

Types of Integration. Fulop, Mowlen & Edwards (2005) identified several typologies of integration. These include: organizational, functional, service, clinical, normative and systemic integration. *Organizational Integration* is where organizations are brought together, formally by mergers or through collectives and/or virtually through co-ordinated provider networks or, via contract, between separate organizations, brokered by a purchaser. *Functional Integration* is where non-clinical support and back-office functions are integrated, such as electronic patient records. *Service Integration* is where different clinical service providers are integrated at an

organizational level, such as through teams of multidisciplinary professionals. *Clinical Integration* involves aligning care delivered by professionals and provider organizations into an integrated single coherent process, within and/or across professions and organizations, through mechanisms such as shared guidelines and protocols. *Normative Integration* is where there is a commitment to shared goals and values and there is a commitment to co-ordinating work enabled by trust and collaboration. *Systemic Integration* is where there is coherence of rules and policies at all organizational levels and this is sometimes termed, “an integrated delivery system” (Fulop et al., 2005). These concepts are detailed more completely in the model below in Figure 2.1.

Figure 2.1 Conceptual Model: Types of Integration



Source: Adapted from (Fulop et al., 2005)

Level of Integration. There are three levels of integration activities. These include macro, meso and mirco level of integration activities (Curry & Ham, 2010). *Macro* level integration involves the integration of providers into a system of care and may involve creating

new organizations or contracted arrangements (Curry & Ham, 2010). The best examples of such systems are integrated provider networks such as Kaiser Permanente in the United States. *Meso* level integration is where providers integrate care for a particular patient group based on disease or a specific feature of the population such as age (Curry & Ham, 2010). Examples include disease management programs or care for older people, such as the health and social care systems to care for elderly patients. *Micro* level integration involves providers coordinating care around individual users of the system and involves such efforts as care planning, care coordination, use of technology and other approaches (Curry & Ham, 2010). Determining the appropriate level of integration depends on the complexity of patient needs and the patient's ability for self-care. Those who have highly complex needs, with limited ability for self-care, require greater degrees of formality of integration (Kodner, 2009; Leutz, 1999; MacAdam, 2008; McDonald et al., 2007).

Breadth of Integration. Breadth of integration refers to the degree to which organizations link functionally, or clinically, to better align activities (Kodner, 2009). Horizontal integration occurs between two or more organizations or services at a similar level such as acute care hospital mergers. Vertical integration involves combining organizations at different levels as what might occur in mergers between hospital and community health service providers (Curry & Ham, 2010).

Degree of Integration. Integration may range in formality. In health care, the simplest form of integration is a *linkage*, which is generally aimed at serving large populations with relatively straight forward care needs and occurs where organizations agree to collaborate to improve the processes and outcomes of care (Fulop et al., 2005; Leutz, 1999).

Coordination is a more formal integration activity, where existing organizational arrangements are generally retained, but explicit structures, protocols, or individuals and other resources are applied to manage the care needs of specific patient populations, such as the elderly or patients with a particular diagnosis (MacAdam, 2008). Coordination is accomplished through one of several common coordinating mechanisms, which may include care plans, information sharing arrangements and shared electronic records (Fluery, 2006).

The main advantage of care coordination as an integration activity is that there are significantly fewer barriers to its implementation as compared to organizational or system integration. Its strategic advantage is that existing organizational structures are retained (McDonald et al., 2007). Significant improvements in the care and outcomes of patients can be achieved without having to manage the complex financial and human resource challenges associated with organizational integration (Curry & Ham, 2010; Peikes, Chen, Schore, & Brown, 2009). Care coordination uses several mechanisms including: tools to identify high risk patients, standardized care plans tailored to specific patient needs, management of patient subgroups such as the elderly, management of patients with specific diseases, managing transitions across settings, common information gathering and sharing mechanisms, case management and coordination of financial and benefit arrangements (Leutz, 1999).

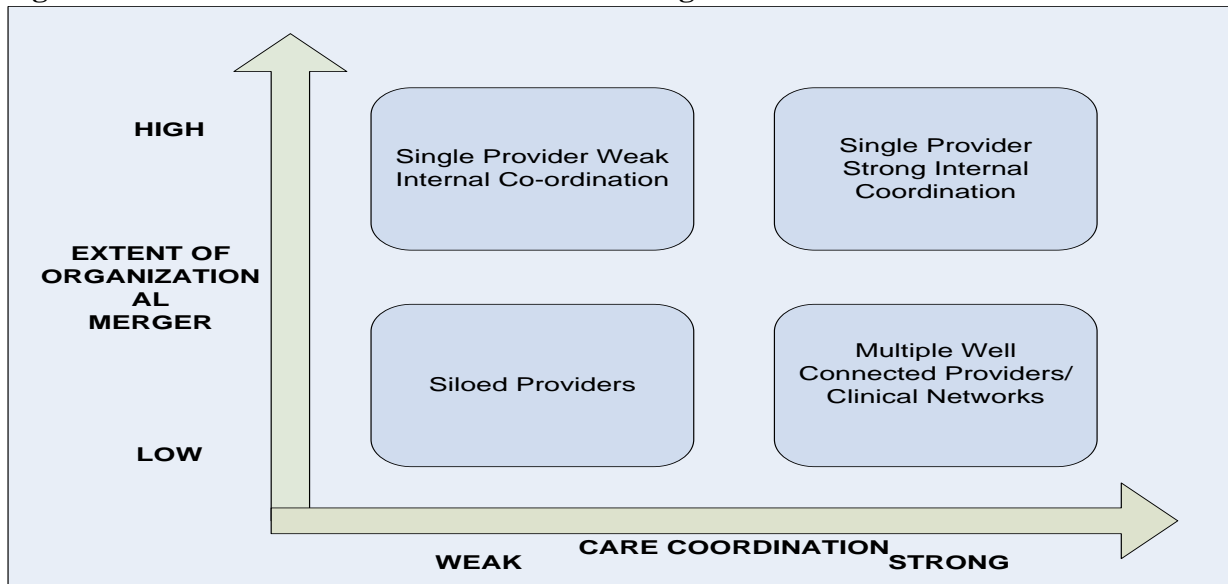
The next level of formality involves the consolidation of services into one *organization* serving a particular patient population like the elderly or those with a specific disease or a population in a contained geographic area (Fulop et al., 2005; Kodner, 2009; Leutz, 1999). In the last couple of decades, attention in health care has been dedicated towards *organizational and systemic integration* of health services. Systemic and organizational integration of providers across the continuum of health care services has been proposed as a solution to managing the

complexities of care for populations vulnerable to care coordination challenges. In the United States, this has been achieved to some extent through managed care networks such as Kaiser Permanente. Today, about 72% of American hospitals belong to a health-network (Fluery, 2006). In Canada, various forms of integration have been tried with the development of regional structures in most provinces, with the exception of Ontario and Alberta. In most jurisdictions in Canada, hospitals and many community care service agencies have undergone some form of consolidation, a form of integration referred to as horizontal integration.

According to Singer et al. (2010), study results have been mixed and limited in terms of the effectiveness of integration models involving organizations and health systems. In health systems research, the integration focus is on the integration of organizations or organizational activities as the “*objects*” of integration (Singer et al., 2010). They argue that there is an implicit assumption that these activities will lead to better coordination and patient care outcomes. Ramsey & Fulop (2008), caution against concluding that full organizational integration as the optimal solution or as the goal of integration activities. In fact, the evidence from the United States indicates that organizational integration does not necessarily result in clinical integration, improved care coordination or the way professionals work together (Burns & Pauly, 2002).

Figure 2.2 below illustrates the concept of how, in the absence of coordination, integration activities alone will not generate improved patient outcomes. That is, one can have a single organizational entity, but poor internal coordination, which is no more patient-centred than providers in different organizations working in silos. Well connected coordination around the patient in either single or multiple provider arrangements will lead to better outcomes. Where these connections are poor, the outcomes will be similar in either single or multiple provider arrangements (Curry and Ham, 2010).

Figure 2.2: Care Coordination and Extent of Merger



Adapted: (Curry & Ham, 2010)

Fluery (2006) argues that integration efforts that are more focused around targeted, patient-specific groups are more effective. These integration efforts represent an intensive focus that can only be achieved with specific patient groups such as the elderly, patients with severe mental health disorders or health issues such as cancer, diabetes and palliative care (Fluery, 2006). This approach to integration is more clinical in nature and patient-centred. The mechanisms of integration may vary, but include such activities as common care pathways, or common patient assessments, monitoring and feedback (Leutz, 1999). Integration activities at this level are particularly amenable to empirical evidenced-based approaches to testing health service interventions (Fluery, 2006; Shaw, Rosen, & Rumbold, 2011). They enable health service and health policy decisions to be systematically analyzed (Niessen, Grijseels, & Rutten, 2000). Curry & Ham (2010), in their policy review of integration options for the National Health Service in the United Kingdom, do not advocate for further structural changes, but rather, based on the evidence, argue for clinical and service integration to be at the heart of moves to improve

system and patient outcomes. Shaw (2011) emphasizes, that integrated care, is best understood as a strategy for improving patient care through better coordination.

There is no single model of integrated care that will work in all contexts and settings. Factors which will influence interventions include goals, the needs of the users, stakeholders involved and existing service availability (Shaw et al., 2011). Essential to the success of any integration activity is a requirement that the goals of integration be clearly articulated and that the problem the proposed integration intervention is intended to address, be understood (Shaw et al., 2011). Rosen and Ham (2008) identify that this clarity will ensure the establishment of shared objectives and result in ongoing momentum and will drive its intensity in terms of the level of integration sought.

Care Transitions

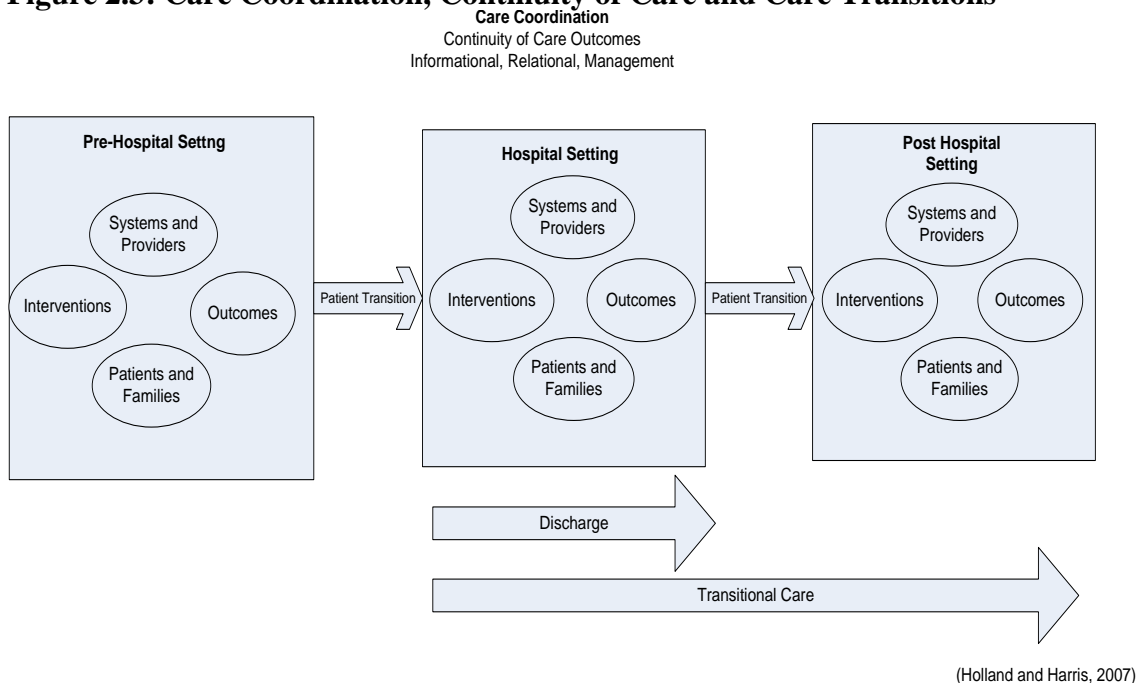
Holland & Harris (2007) completed a review of definitions and conceptual relationships between the terms coordination of care, continuity of care, discharge planning and care transitions. According to these authors, the poor and inconsistent use of definitions creates a barrier to the scientific process. They proposed a model to facilitate a clearer understanding of the concepts.

Based on their review of the literature, *hospital discharge* is a process of planning the disposition from an inpatient bed to another setting (Shepperd, 2004). Similar to hospital discharge, *transitional care* is a process of care that includes interventions or services which may be provided along the continuum, from pre-hospital to post-hospital care. *Coordination of care* is not an intervention in and of itself, but relates to the organization of care into a coherent scheme of management and is an attribute of both discharge and transitional care (Holland & Harris, 2007). Finally, *continuity of care* focuses on the outcomes, relatedness and interactions

among care delivery mechanisms and providers (Holland and Harris, 2007). Continuity of care relates more to the patient experience, that is, was their experience cohesive (Kodner, 2009). As discussed above, the types of continuity described in the literature are related to informational, relational or interpersonal and management continuity. Holland and Harris (2007) proposed a model conceptualizing the distinctions and overlap between discharge, care coordination, continuity of care and care transitions. This is illustrated in Figure 2.3 below.

The model presented by Holland and Harris (2007) provides a simple conceptualization of terms encompassing the entire journey of the patient. As a tool for research, it requires further development. Therefore, the model will be supported by other conceptualizations of care coordination and transitional care discussed above and more fully below.

Figure 2.3: Care Coordination, Continuity of Care and Care Transitions



(Holland & Harris, 2007)

Conceptual Framework

Conceptual models are useful guides to decision making, aiding in the process of identifying potential care coordination interventions that might work in practice, for evaluation

and research, and as tools to guide improvement work (McDonald et al., 2007). The theoretical model used to frame this intervention is the Organizational Design Framework of Care Coordination. The model presents several key care coordination concepts that can be used by care coordination decision-makers within organizations, to identify potential solutions and opportunities for improving structures or care processes and to address particular care coordination challenges (McDonald et al., 2007). At a policy level, it describes where particular failures may occur and the system requirements to achieve desired care coordination outcomes.

The Organizational Design Framework of Care Coordination is based on the work of Nadler and Tushman (1988), who first proposed the model of “*Organizations as Information Processing Entities*”, as a concrete way of thinking about organizational design. It is grounded in systems and organizational contingency theory and espouses a balanced approach to organizational design (Nadler & Tushman, 1988). The task in organizational design is to balance how the structure will enable the execution of strategy and work that must be accomplished against the considerations of the individual, social and cultural factors that impact individuals within the organization and informal behaviors (Nadler and Tushman, 1988).

The model recognizes that all organizations function within a context of environment, resources and history, which cannot be changed in the short run and are as Nadler and Tushman (1988) describe “*the givens*” within which organizational strategy is developed. The organizational components through which strategy is achieved are the tasks, individuals, formal organizational arrangements and informal organization. The quintessence is not the function of the individual components, but the nature of their interaction and how they combine to produce their desired output (Nadler and Tushman, 1988). Nadler and Tushman (1988) proposes that the greater degree of fit amongst the components, the more effective the organization. By extension

of Nadler's and Tushman's (1988) work, similar to organizations, the components involved in care coordination activities can either fit well together and perform effectively, or fit poorly together and lead to problems, dysfunction and performance below potential .

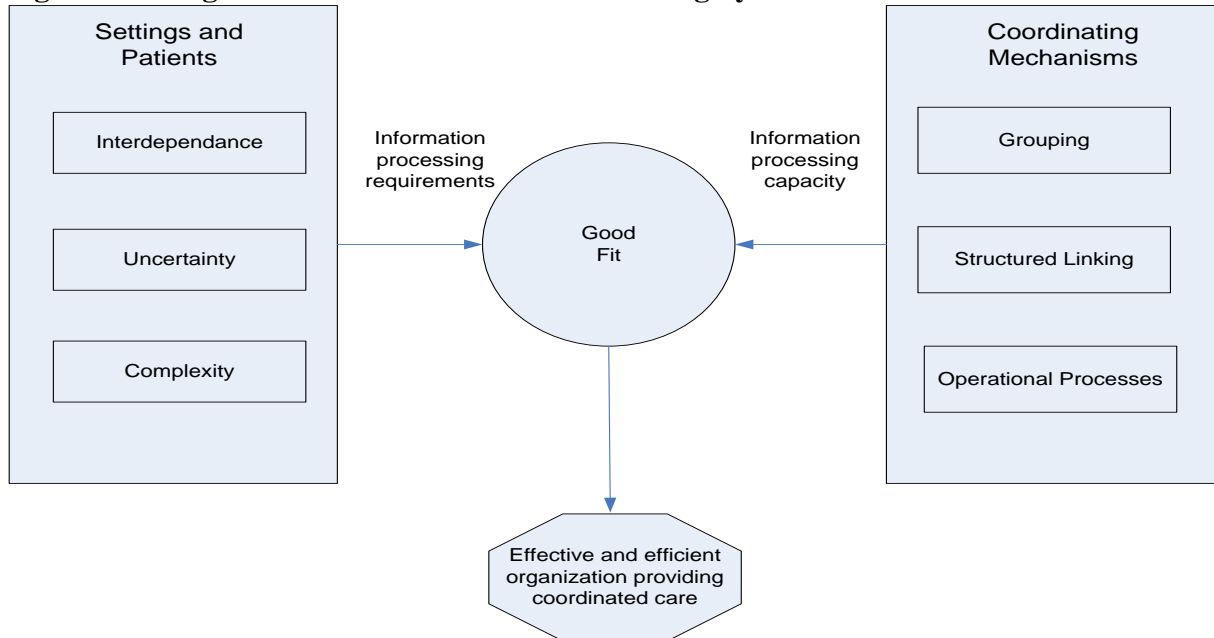
The framework, shown below in Figure 2.4, is based on three conceptual foundations of organizational design that can be applied to clinical integration activities. They include: 1) different (integration) tasks have different information processing requirements; 2) different organizational/ integration designs provide different types of information processing capability; 3) organizational effectiveness will be greatest when the information processing capacities of the structure match, or fit, the information processing requirements of the task (McDonald et al., 2007).

Different situations produce different information requirements that are influenced by the degree of interdependence between providers, the uncertainty of the patient's outcomes, and the complexity of the patient's condition (McDonald et al., 2007). Increases in the patient's complexity and/ or increases in uncertainty related to the patient's outcomes, results in higher degrees of interdependence amongst providers and between the providers and the patient. The higher the degree of interdependence, the more intensive the coordinating mechanisms required to coordinate care. In the case of complex, multimorbid patients, single disease specific guidelines will not be effective.

Coordinating mechanisms available to organizations to facilitate information flow and care coordination include grouping, structural linking, and organizational processes (McDonald et al., 2007). The model underlies the idea, that different or specific patient care activities require different care coordinating mechanisms.

An illustration of the model is provided below in Figure 2.4 and the elements are more fully explained in the section which follows.

Figure 2.4: Organization as Information Processing System



Adapted: McDonald et al., 2007

Settings and Patients. The left side of the model identifies the components of the care setting and the characteristics of the patient that drive the demand for information based on the interdependence, uncertainty and complexity of the care coordination task (McDonald et al., 2007).

Interdependence: is a measure of the degree to which individuals accountable for care coordination have a reciprocal relationship; each requiring information and actions from the other. Higher degrees of interdependence impose a greater need for the timely flow of information between organizations or organizational components (McDonald et al., 2007).

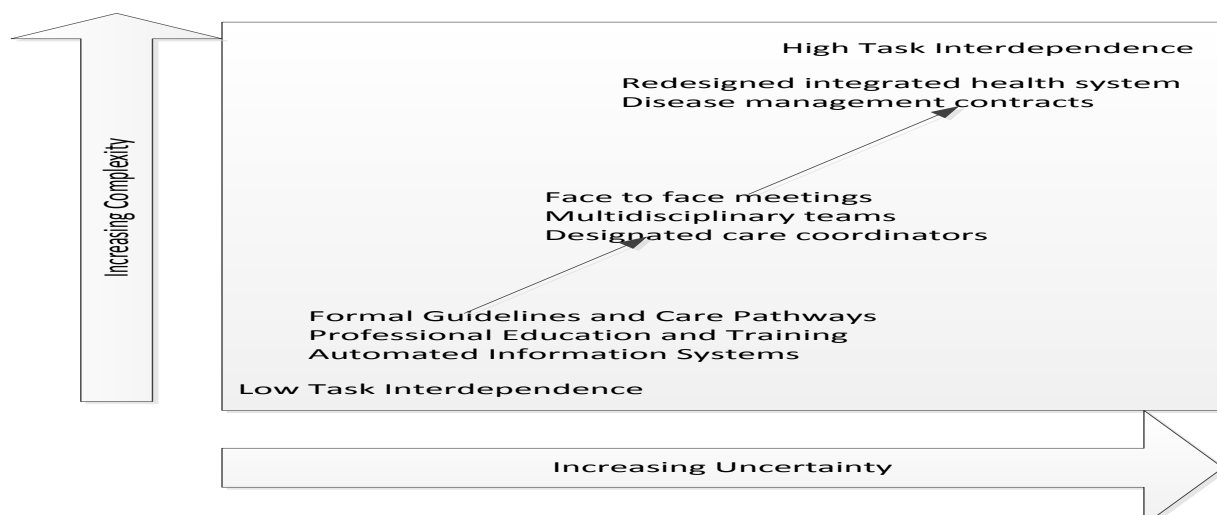
Uncertainty: refers to the unpredictability of the patient's outcomes. In situations of greater uncertainty, the requirement for the exchange of information increases as the patient's plan of care may need frequent adjustments (McDonald et al., 2007).

Complexity: refers to the amount of information required to manage the patient or group of patients. Patients with multiple problems are more complex. Complexity can also increase as the number of individuals from different provider organizations, which become involved in the patient’s care, increases (McDonald et al., 2007).

Coordinating Mechanisms. The second concept speaks to the ability of the organization(s) to actually provide the information that is required to care for the patient. There must be a fit between the demands for information and the ability to provide the information that must be embedded within the care and information sharing processes, between participants, to actually carry out their care coordination activities. The mechanism to enable information sharing can range from standardization of processes and pathways, forms and electronic linkages (McDonald et al., 2007).

Figure 2.5 below illustrates that as the task complexity and uncertainty increase; the mechanisms of coordination also increase. In situations of high uncertainty and high complexity, the need for more formal mechanisms of coordination must exist (McDonald et al., 2007).

Figure 2.5: Task Complexity and Uncertainty and Intensity of Intervention



(McDonald et al., 2007)

How information flows is a function of the design and structure of the organization. The three main elements of organizational design which require consideration are: the grouping of participants, structural linking between participants and operational processes. These three areas of concern facilitate the information exchange and coordinating mechanisms.

Grouping: involves putting the care providers together such as might occur in a disease management clinic, or aligning work to perform a specific function where different professionals work together to provide care to a particular patient population or to undertake a specific function (McDonald et al., 2007).

Structural Linking: is a formal mechanism used to coordinate care across organizational boundaries. In practice, it can involve: forming a committee involving representation from different groups, a role such as a case manager or navigator responsible for coordinating and guiding the patient, a disease management clinic, or the development of a management structure, where professionals are accountable to more than one group (McDonald et al., 2007).

Operational Processes: include mechanisms of standardization such as: practice guidelines, care maps, protocols, clinical pathways, checklists, adjustments including individual feedback, team meetings, consultation and multidisciplinary rounds, automated relay of information, and organizational supports which may include colocation, information systems and staffing decisions (McDonald et al., 2007) .

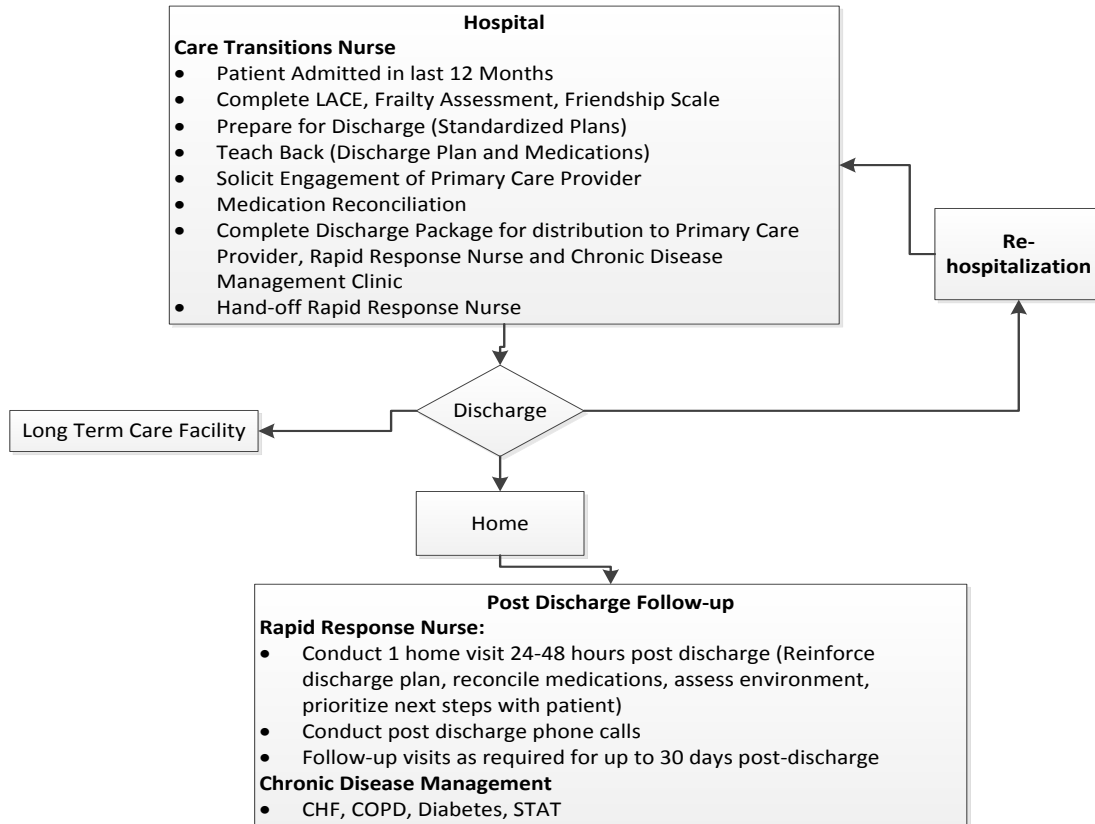
Application to Current Research

The focus of the current research is to determine the effectiveness of a care coordination intervention aimed at improving the outcomes of a high risk patient population discharged from the hospital to home and at high-risk for readmission. The intervention involves the preparation of the patient for discharge and transition by a dedicated hospital based, care transitions nurse,

with a hand-off of care to a dedicated, community-based rapid response nurse, who follows the patient in the community for a period of 30 days in the post-discharge period. This intervention applies the principles and concepts of care transition interventions through the creation of care transitions nurse positions at the hospital and leveraging existing investments in rapid response nurses working for the local Community Care Access Centre (CCAC). The overall goal of the intervention is to reduce the time to first readmission and the 30-day, 60-day and 90-day readmission rate and the 30-day, 60-day and 90-day post-discharge utilization of the emergency department.

This can be classified as a micro-level clinical integration intervention aimed at improving the care coordination and continuity of care to high-risk patients discharged from the hospital to home. Figure 2.6 below provides an overview of the intervention.

Figure 2.6: Overview of Care Transition and Rapid Response Nurse Intervention



CHAPTER 3

MODELS AND INTERVENTIONS

Literature Review Search Process

The bibliographic data bases used for the literature search included: the Cumulative Index for Nursing and Allied Health (CINAHL), Cochrane Evidence Based Medicine Reviews and Medical Analysis and Retrieval System Online (Medline), PubMed and Ageline.

The key search terms used were: transitional care, discharge, coordinated care, continuity of care, integration, integrated care systems and crossed with the terms elderly, frailty and chronic disease management and social isolation. Additionally, hand searches of key articles for references and related links were conducted. Google Scholar was used to search the grey literature. The search was limited to articles in English. The search was not limited by date, however, given the growth in literature on this topic over the last five years, generally, more recent literature has been utilized to form the basis of the intervention implemented and to understand the state of knowledge as it relates to the concepts and interventions of transitional care. No literature was available to date that evaluated the current transitional intervention of interest in the research.

Care Transitions Interventions

The purpose of the discharge process is to facilitate the transition from one health care provider to another, for example, from the hospital to the home (Huber & McClelland, 2003). Typically, the discharge process for patients is comprised of two phases. The first, discharge preparation, occurs when the patient is in the hospital. The second, discharge support, includes the activities and actions taken after the patient has been discharged from the hospital (Laugaland

et al., 2012). Discharges are often complex, particularly those involving older adults with multiple co-morbidities and at risk of potential adverse events in the post-discharge period.

Hospitals, traditionally have viewed discharge as a transaction signifying an end point, where they are done with the patient, letting others, whether it be the family or other community providers, deal with often unresolved or unplanned issues (Bauer et al., 2009; Block et al., 2014; Hesselink et al., 2012b; Lees, 2010). It is becoming the more accepted view that the process of discharge needs to be considered as a transitional process, rather than an end-point (Boutwell, 2011). The transition, Boutwell (2011) asserts, needs to engage the patient and family and other providers towards ensuring there is continuity in the processes of care, after the patient is done with their hospital phase of care. In recent years, significant interest has developed around the implementation of care transition interventions, as care coordinating mechanisms, to reduce avoidable readmissions and other adverse events in the post-discharge period (Coleman, 2003; Coleman & Boulton, 2003; Coleman et al., 2006; Naylor et al., 1999; Naylor et al., 2004; Rennke et al., 2013).

Care Transitions Definition. The American Geriatric Society defines transitional care as: *“a range of time-limited services and environments designed to ensure health care continuity and avoid preventable poor outcomes among at-risk populations, as they move from one level of care to another, among providers, and/or across settings”* (Coleman & Boulton, 2003). The process requires the implementation of a care plan based on the knowledge of the patient’s goals, preferences and clinical condition. Associated activities include: education of the patient and care giver, coordination of logistic arrangements between health care providers, multi-professional collaboration, documentation and sharing of information and communication (Aase, Laugaland, Dyrstad, & Storm, 2013; Coleman, 2003; Kirsebom, Wadensten, & Hedström, 2013).

Coleman (2003) asserts the availability of health care professionals competent in the management of acute and complex health conditions is an essential prerequisite.

Care Transition Models. According to Enderlin et al. (2013), the leading care transitions interventions include the Transitional Care Model developed by Naylor (1999), the Care Transitions Intervention developed by Coleman (2004), Better Outcome for Older Adults through Safe Transitions known as Project BOOST (Society of Hospital Medicine, 2014), Reengineer Discharge known as Project RED (Jack, Cherr, & Anthony, 2009), INTERACT - Interventions to Reduce Acute Care Transfers (Ouslander, Bonner, Herndon, & Shutes, 2014). Enderlin et al. (2013) and colleagues also referenced Wagner's Chronic Care Model as a systems approach to providing safe and effective care to older adults with chronic disease and fluctuating health status. These ambulatory based transitional interventions are important mechanisms for the monitoring of patients with chronic conditions amenable to regulation and management where frailty does not predominate the patient's condition (Enderlin et al.; R. E. Burke, Whitfield, & Prochazka, 2014; Theou, Rockwood, Mitnitski, & Rockwood, 2012). The various approaches are discussed more fully in the sections below.

Navigator Role. A common feature of these models is the role of a system navigator; that is, a dedicated individual accountable for guiding the patient's journey through the transition from one provider to another. System navigators serve a boundary spanning role, aimed at improving access to services by removing the barriers to care through the transition (Dohan & Schrag, 2005). The role is often focused on a targeted population, having a specific medical condition, which is persistent and requires continuous follow-up and monitoring to enable the optimization of health status. The role of the navigator is distinguished from the role of a hospital-based case manager or care coordinator, whose role it is to facilitate the movement of

the patient from the hospital, often through admission to discharge with the aim of reducing lengths of stay (Tringali, Murphy, & Osevala, 2008). While each performs a different function, a common purpose of the roles is the enabling of care coordination.

Manderson, McMurray, Piaraino & Stolee (2012) completed a systematic review of the literature to describe and evaluate the effectiveness of the various navigator roles. The authors reviewed 15 articles that described nine different randomized control trials in which the navigator role was utilized to assist patients as they transitioned across the continuum of health care providers (Manderson, McMurray, Piraino, & Stolee, 2012). The review aimed to understand the characteristics of the navigator's role which were most effective. Manderson et al. (2012) classified the outcomes of the studies into three categories: economic, that is, the impact on hospital or system costs; psychosocial, focused on improving the patient experience; and functional, that is, improving the patient's quality of life and activities of daily living. Based on the above criteria, the conclusion was that the literature was mixed in terms of the effectiveness of the navigator role (Manderson et al., 2012).

In Manderson's et al. (2012) review, five of the randomized trials reported positive economic outcomes, two reported higher satisfaction with care and five reported increased patient quality of life or functionality (Manderson et al., 2012). In seven (7) cases, the roles required the navigator to be qualified as a registered nurse, four (4) utilized an advanced practice nurse, one (1) required a masters in social work and the others; allied health professionals and other backgrounds (Manderson et al., 2012). All models included an element of advocacy with only two of the models including an aspect of direct patient care. The focus in the majority of the studies included discharge planning in combination with other care coordination interventions, including care planning, phone support, home visits, care giver education and liaison with a

primary care provider (Manderson et al., 2012). The involvement of an inter-professional team in the discharge process was seen as essential.

According to the (2012) review by Manderson et al. (2012), where the transition is from the hospital to the home, the intervention needs to start prior to discharge and as soon as possible after admission. Secondly, the navigator requires the needed clinical skills to accurately assess and recognize early signs of deterioration (Manderson et al., 2012). This is particularly true for patients whose conditions are tenuous and for whom ongoing clinical assessment and timely intervention are required (Boling, 2009; Naylor et al., 1999; Naylor, Aiken, Kurtzman, Olds, & Hirschman, 2011), however, this may not be the case where the interventions are aimed at coaching and reinforcing self-management behaviors (Coleman, 2003; Coleman et al., 2004; Parry, Coleman, Smith, Frank, & Kramer, 2003). Manderson et al. (2012) also describes what is identified as an investment effect, that is, the benefits of the interventions are not seen immediately but occur overtime and that time is required for the roles to be assimilated into the system of care. Similarly, Laugaland et al. (2012), in their review of interventions aimed at reducing the risk of readmission, identified those interventions that were provided both in the hospital and the post-discharge setting had the greatest effect. They also identified that positive but non-significant results were identified in patients, where the discharge support included home visits involving the primary care provider (Laugaland et al., 2012; Rytter et al., 2010).

Boling (2009) states that despite the heterogeneous mixture of negative and positive studies in the discharge planning literature, carefully designed and appropriately targeted interventions, performed by a well-prepared team are able to achieve impressive reductions in hospital admissions and total costs of care. Laugaland et al. (2012) and Manderson et al. (2012) summarize that those interventions which seem to produce lasting results are those which

employ multiple strategies including: 1) engagement of patients early in the hospitalization and the post-discharge periods; 2) oversight by a key health provider; 3) patient/ family involvement and education; 4) a multidisciplinary approach; 5) medication reconciliation; 6) standardized medication reports; and 7) transitional care programs.

Transitional Care Models

Several care transition interventions have been described in the literature, all aiming to improve the transition from the hospital to the home. The two foundational models are based on the works of Naylor et al. (1999) and Coleman (2003).

Naylor's Care Transitions Model. The Naylor Care Transitions Model (Naylor et al., 1999) is a model of care coordination that is interdisciplinary and focused on improving the outcomes of elderly patients discharged from the hospital to home. The patient's transition is managed by an advanced practice nurse who provides support to the patient through their hospitalization, prepares the patient for discharge, by educating the patient on their conditions and how to recognize and manage symptoms in the post-discharge period. Post discharge, the care transitions nurse follows the patient for up to eight weeks. The intervention is aimed at high-risk, high-cost patient groups with the goal of improving post-discharge outcomes and reducing rehospitalisations.

In a randomized clinical trial, Naylor et al. (1994) studied the effectiveness of the intervention on patients with the diagnoses of congestive heart failure, angina/myocardial infarction and surgical cardiac interventions, including coronary artery bypass graft and cardiac valve replacement surgery. The results demonstrated that, six weeks after discharge, patients in the intervention group had fewer admissions, fewer total days of hospitalization and lower total costs of care (Naylor et al., 1994). Patients in the study were cognitively intact with good

functional status and admitted from home at the time of admission. They were generally well educated with good support systems. The need to test the generalizability of the findings in other hospital and community contexts, involving elderly patients with different diagnoses and post-discharge supports was acknowledged by the authors (Naylor et al., 1994).

In a randomized control trial of elderly patients with a variety of medical and surgical diagnoses, Naylor et al. (1999) demonstrated a reduction of 16.8% in the probability of readmission for the intervention group, compared with the control group, at 24 weeks, with a statistically significant relative risk of 1.8 (95% CI, 1.3-2.6) for at least one readmission in the control, compared to the intervention group. The intervention resulted in fewer total hospital readmissions after the index admission (107 versus 49, rank sum test, $p < 0.001$) at 24 weeks. The intervention was significant both six weeks after discharge to the 24-week post discharge period (Naylor et al., 1999). The control group also used more hospital days in the post discharge period, using a total of 760 days in the 24-week post-discharge period, compared to the intervention group which used a total of 260 days ($p < 0.001$). Also, the mean length of stay for readmissions in the control group was higher at 11 days (± 10.6 days), compared to the intervention at 7.5 days ± 4.8 days; ($p < 0.001$). The time to first readmission was statistically significantly longer for the intervention group compared to the control group (log-rank $X^2_1 = 11.1$, $p < 0.001$). The groups had similar functional status, depression scores and both groups were highly satisfied with care at 24 weeks. The control group's post-discharge health care costs of \$6661 per patient were twice the intervention group's costs of \$3630 ($p < 0.001$) (Naylor et al., 1999).

Naylor et al. (1999) identified that one of the key factors in the success of this intervention may have been that one-third of the control group patients did not receive a visit

from a visiting nurse immediately after discharge, given that they did not limit their analysis only to patients who met Medicare home-care eligibility criteria. The authors also emphasized the importance of the clinical acumen of the nurses utilized as the care transition nurses, that is, nurses who were master's prepared and specialists in gerontological nursing who had particular expertise in coordinating care with physicians and other health care professionals (Naylor et al. 1999).

A randomized control trial conducted by Naylor et al. (2004), using the transitional care model with elderly patients with the diagnosis of congestive heart failure, demonstrated positive statistically significant results, for those patients randomized to the intervention group. Specifically, the study demonstrated that the time to death or rehospitalisation was longer in the intervention group (log rank $X^2 = 5.0$, $p = .026$). The intervention group had fewer readmissions at 52 weeks (104 versus 162, $p = 0.26$). The total costs in the intervention group were \$7,636, compared to the control group which had costs of \$12,481 over the 52-week period of the study, with a mean cost savings of \$4,845 per patient with a nonparametric bootstrapped 95% confidence interval difference in the mean total costs of \$8,975-\$1,301.02, $p = 0.02$ (Naylor et al., 2004). The intervention group demonstrated short-term improvements in overall quality of life and patient satisfaction (Naylor et al., 2004). Naylor's (2004) study confirmed earlier results regarding the short-term effectiveness of post-discharge disease-specific interventions at improving outcomes related to readmission and hospital utilization. The effectiveness of the intervention was greatest during the three month intervention period and persisted after the intervention period for another three months. In the six to 12- month post-intervention phase, no differences were noted (Naylor et al., 2004). Naylor et al. (2004) surmised that while the interventions demonstrated the ability for patients to improve their self-management capacity,

the ongoing progressive nature of the chronic condition, in this case heart failure and the increasing frailty of the elderly patient may necessitate some level of ongoing involvement of the care transitions nurse. They attributed their results to the improvement in the continuity and coordination of care provided by the care transitions nurse and the highly skilled nature of the nurses (Naylor et al., 2004). The Advance Practice Nurse provided a safety net designed to prevent medication errors and other adverse medical events and to ensure the accurate transfer of information (Laugaland et al., 2012; Naylor et al.; 2004). A common theme in care transitions literature is the need for an appropriately skilled and accountable clinician that bridges the gap between providers with the patient, allowing for a single point of contact that is able to facilitate care between settings.

Coleman's Care Transition Intervention. The Care Transitions Intervention is another transitional intervention developed by Coleman (2003) and colleagues. It focuses on four key areas identified by patients and caregivers, as fundamental requirements to a successful transition from the hospital to the home. These include: medication management, utilization of a patient-centred record to document important health information, patient empowerment to schedule follow-up care with primary care providers and ensuring the patient has an understanding of how to recognize that their health condition is worsening (Parry et al., 2003).

The model utilizes transitional coaches to follow patients along their transition from the hospital to their home. The transitional coaches are typically advanced practice nurses, registered nurses or social workers. The transitional coach operationalizes the four interventions through the mechanisms of the personal health record, visits and telephone calls (Parry et al., 2003). The transitional coach's aim is to facilitate the patient's self-management capabilities, by

empowering and educating the patient as to how they can meet their health care needs and promote care coordination across settings, in the post-discharge period (Parry et al., 2003).

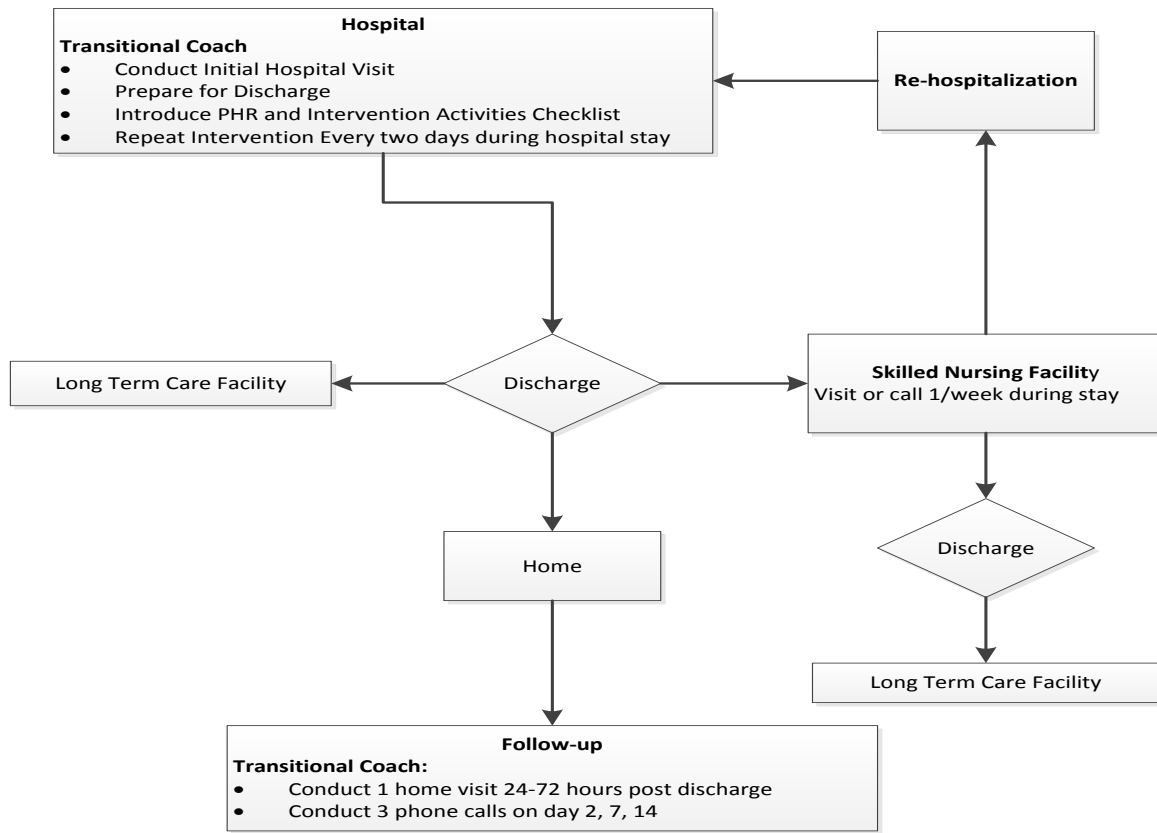
Patients are screened to identify those who are at greatest risk and for whom the service would be of greatest benefit (Coleman et al., 2004). Once entry into the service is determined, the transitional coach visits the patient while they are still in the hospital and reviews with the patient their discharge plan. Once home, the transitions coach visits the patient within 24 to 72 hours. Subsequent to the home visit, up to three telephone calls are completed by the transitional coach. The overall length of the intervention varies according to the patient's condition and care plan (Coleman et al., 2004). According to Coleman (2003), an effective transition informs the patient's expectations of the next level of care. This includes explaining how to manage their condition, recognising changes in their health condition, managing their medications and whom to contact in the event of a worsening health condition. Coleman (2003) asserts that a challenge with several care transitions models is that the patient and caregiver often take on a passive role during the intervention period, rather than being actively engaged in self-management activities. The care planning tool is seen as an essential element according to Coleman (2003) and should include: a current problem list, medications, allergies, baseline cognitive and functional status, advanced directives and primary provider contact information. Similarly, health care professionals require an updated care plan with a current problem list, updated medication information, allergies, baseline cognitive and functional status (Coleman, 2003).

Coleman (2003) identifies the central need for technology to facilitate the transfer of information between settings, including a universal care planning tool, uniform screening and assessment tools and two-way communication. While a means for electronic communication is recognized as beneficial, the electronic health record alone is not the solution. Boling (2009)

points out that, pragmatically speaking, it is probably not realistic to assume that health care organizations will have access to fully integrated records for some time and that other mechanisms of communication will need to be developed.

As detailed in Figure 3.1 below, in Coleman's model, eligible patients are identified through the daily hospital census and a review of the patient's medical record. Initial contact is made by the transitional coach while the patient is an inpatient in the hospital. The first home visit occurs within 24 to 48 hours after discharge, with phone calls occurring on day two (2), seven (7) and 14 (Coleman et al., 2004). The primary goal of this first visit is to reconcile the patient's medication, discuss with the patient the purpose of the medications being taken and to provide instructions for use and the medication's common side effects. Where medication discrepancies are identified, the transitional coach encourages the patient to call the primary care provider to seek clarification. Role playing is a key function of the transitional coach and patient, giving the patient the opportunity to rehearse how they might approach their care interactions with health care professionals in their care journey. A second purpose of the first visit is to reinforce, with the patient, warning signs of worsening patient condition, to identify red flags and what intervening actions the patient may take themselves to prevent exacerbation of their condition. Interactions also occur between the transitional coach and patient via telephone. The first telephone interaction usually involves ensuring the patient has the appropriate medication and services in the post-discharge period. Subsequent telephone conversations focus on evaluating the patient's progress towards achieving their health goals and to reinforce previous coaching (Parry et al., 2003). The Figure 1.3 below provides an overview of the Care Transitions Intervention described by (Parry et al., 2003).

Figure: 3.1 Structure of Care Transitions Intervention (Parry et al., 2003).



Adapted: (Parry et al., 2003)

A randomized control trial conducted by Coleman et al. (2006) demonstrated a reduction in the 30-day hospital readmission rate (8.3% versus 11.9%, $p = .048$) and the 90-day hospital readmission rate (16.7% versus 22.5%, $p = 0.04$) and lower rehospitalisation rate for the index hospital admission at 90 days (5.3% versus 9.85%, $p = 0.04$) and at 180 days (8.6% versus 13.9%, $p = 0.046$). The total hospital costs were lower for the intervention group estimated at \$2,058, compared to the control group \$2,546 at 180 days (log-transformed $p = 0.048$). The conclusion reached by the authors is that supporting and encouraging a more assertive role of patients and their caregivers as active participants, in the transition from the hospital to home, can significantly reduce hospital readmissions (Coleman et al., 2004; Coleman et al., 2006).

Parry et al. (2003) argue that the benefit of the lower intensity Transitional Care Intervention of Coleman (2003) compared to the more intense relationship between the Care Transitions Model of Naylor (1999) is that the primary focus is to provide patients with the self-management skills, that allow them to effectively manage their subsequent health system interactions, rather than reinforce a dependent relationship with their health care professional, as a direct care provider (Parry et al., 2003). This allows the transitional coach to manage a greater number of patients.

Comparing the Care Transitions Model and Care Transitions Intervention. The California Healthcare Foundation (2008) undertook a comparative evaluation of the Naylor Transitional Care Model and the Coleman Care Transition Intervention. They concluded that both models provide the support and tools patients require to taking a more active role in managing their care and provide a framework for broader system transformation. As demonstrated previously, both of these models proved effective in reducing hospital readmission rates at 30 days and 90 days in randomized trials (Coleman et al., 2006 & Naylor et al., 1999; Naylor et al., 2004).

A pilot intervention conducted by the California Healthcare Foundation (2008) demonstrated that Coleman's (2003) model was challenged with the appropriate stratification of patients, that is, identifying the patients that would benefit from the intervention and Naylor's (1999) model, with recruitment and retention of qualified staff. The sustainability of both was challenged as a result of the costs, particularly where the benefits of reduced hospitalizations was not realized. In terms of value, the return to the health system was higher with the Naylor model, which demonstrated a net benefit of \$3,301 to \$4,845 per case, compared to the savings generated through the Coleman model which demonstrated a net system benefit of \$488 per case.

The conclusion was, that in the current regulatory environment, care transition interventions will be implemented on a case by case basis, based on net savings realized (Darwin & Parrish, 2008).

Patient Stratification. Boling (2009) developed a conceptual model for thinking about the stratification of the patient to the intervention that most effectively addresses their care requirements. Patients who are relatively stable can be managed in office-based care, through episodic and preventative care. In the event of an acute episode, requiring hospitalization, on the transition from the hospital to home, the patient would be stratified to the care pathway that best meets their needs. Three different pathways of post-discharge care are identified, based on the intensity of the care required, they include: 1) office based; 2) intermediate or guided care post discharge; and 3) intensive or post-acute care for patients with high needs. It is this last group of patients which will require the most intensive and ongoing care (Boling, 2009). Boling (2009) does not suggest criteria or a tool with which to stratify patients.

Boling (2009) classifies the Coleman (2003) model of transitions as an intermediate level intervention, the effectiveness of which requires careful patient selection, while Naylor's (1999) model would be considered a more intensive approach to care coordination. The advantage of Coleman's (2003) intervention is that it is less costly and can be very effective at empowering patients and families to take on some of the responsibility for coordinating their discharge aftercare. Selecting patients who are too sick, without self-management capabilities, or who have complex medical problems which require changes to the medical care plan are not appropriate. Patients or their caregivers can be quickly overwhelmed in trying to manage their own health challenges (Boling, 2009).

Other Transitional Care Navigator Models. Several other navigator models have been described in the literature. In a one-group non-experimental study, Watkins & Kring (2013)

evaluated the effectiveness of a hospital-to-home program utilizing social workers as system navigators. In this role, the social worker acted as the system navigator and would arrange appropriate supports in the home and visit the patient within 72 hours of discharge from the hospital, to complete a home assessment, review medications, and confirm that services were arranged and implemented. The navigator followed the patient for at least 30 days and up to four months following discharge. The results demonstrated reduced readmissions in the intervention group by 22%, compared with the general patient population that had a readmission rate of 57%. Quality-of-life scores, as measured by the SF-36, showed significant improvements in all physical and mental health subscales and patients and families demonstrated a high degree of satisfaction with the post-discharge experience (Watkins, Hall, & Kring, 2012). The intervention cost \$204,311 to implement annually and saved \$682,202 in readmission costs (Watkins et al., 2012).

Another model described in the literature is called Project BOOST (Better Outcomes for Older Adults through Safe Transitions) (Society of Hospital Medicine, 2014; M. V. Williams et al., 2014). The aim of the program is to reduce the 30-day readmission rate for high risk patients and improve patient satisfaction scores. This is achieved through interventions aimed at improving communication between the hospital and outpatient physicians, and the optimization of the discharge process. There are five elements to the program which are: 1) comprehensive intervention, 2) a comprehensive intervention guide, 3) longitudinal technical assistance, 4) the BOOST collaborative, and 5) the BOOST data. Based on available data, readmission rates at early adopter sites have demonstrated a 13.6% reduction in 30-day readmission rates (William et al., 2014).

Another model developed by a team at Boston University Medical Centre is Project Re-engineered Discharge (RED) (Jack et al., 2009). The intervention is comprised of three key features: the nurse discharge advocate, after-hospital care plan and follow-up telephone call by the pharmacist. The components of project RED include: making appointments for follow-up medical care and testing, follow-up on tests pending at discharge, organization of post-discharge services and equipment, medication reconciliation and a patient-specific drug administration plan, a written discharge plan, discharge teaching, diagnosis-specific education, assessing patient knowledge of the discharge plan, a discharge summary to accepting physicians and reinforcement of the discharge plan and pharmacist post-discharge telephone follow-up (B. W. Jack MD et al., 2009).

Project RED reduced emergency department visits and readmissions by about 30% in the study site (Jack et al., 2009). The results demonstrated that emergency department costs at \$11,285 were less in the intervention group, compared to the control group with costs amounting to \$21,389. The inpatient costs for the control group amounted to \$412,544 compared to the intervention group costs of \$268,942. Comparing the cost per participant, the control group revealed an average cost of \$412 more than those in the intervention group. The intervention by the pharmacist resulted in the identification of medication problems in 65% of the cases. The total time commitment was approximately 90 minutes per patient for the discharge advocate and 30 minutes of pharmacist time. Berkowitz et al. (2013) adapted Project RED and applied it to patients discharged from the hospital to a skilled nursing facility. The rate of rehospitalisation in 30 days from a skilled nursing facility declined from 18.9% to 10.2% and patients reported higher levels of preparedness for discharge (Berkowitz et al., 2013).

Another transitional care intervention is INTERACT (Interventions to Reduce Acute Care Transfers) (Ouslander et al., 2011; Ouslander et al., 2014). The aim of this model is to improve the transition from nursing home to the hospital. This model is focused on the early identification of patients whose condition is deteriorating within long term care facilities. The program consists of a number of strategies that can be used to help identify changes in the patient's health status including the use of comprehensive assessment, improved documentation of changes in the patient's health status and processes and tools to improve communication between health care providers (Ouslander et al., 2014). The intervention resulted in a 17% relative reduction in the mean hospitalization rate per 1000 resident days (Ouslander et al., 2011).

Ornstein, Smith, Foer, Lopex-Cantor & Soriano (2011) applied a care transition intervention to a patient population that differed from the population served in the Naylor and Coleman interventions. The population included patients with cognitive impairment (59%), with an average age of 81 years, more frail, requiring assistance with five or more activities of daily living and utilizing 8.2 medications (Ornstein et al., 2011). The model did not demonstrate a reduction in utilization of hospital-based readmissions or costs (Ornstein, Smith, Foer, Lopez-cantor, Soriano, 2011). The model of service delivery involved a dedicated nurse practitioner, included as part of an existing home-based primary care program for homebound elderly patients, transitioning from the hospital to home. The nurse practitioner would follow-up and coordinate care in the inpatient setting in collaboration with the inpatient team for those patients admitted from an existing, home-based, primary care program. After discharge, the nurse practitioner would visit each discharged patient within three weeks of discharge from the hospital, in addition to regularly scheduled home-based visits by the primary care team. The

study used a mixed method pretest/ post-test design. Quantitatively, the study was not able to demonstrate significant differences in outcomes in terms of length of stay, readmission rates or costs. The qualitative feedback from patients and families involved was positive (Ornstein et al., 2011). The authors concluded that the feasibility of widespread implementation may be limited, given the lack of clear return on investment based on the outcome measures achieved.

Disease specific programs have been implemented with success. Anderson, Deepak, Amoateng-Adjepong & Zarich (2005) demonstrated the benefits of comprehensive inpatient education. Their transitional model focused specifically on patients with the diagnosis of congestive heart failure. The model utilized an experienced cardiac nurse educator to provide inpatient education, comprehensive discharge planning and coordinated home care and telephone follow-up in the immediate post discharge period. The goal of the intervention was to improve chronic disease self-management by increasing the patient's knowledge about their disease process, early symptom recognition, health behaviors and appropriate follow-up.

Separation of Primary Care from Inpatient Care. To address the care coordination challenges created through the introduction of hospitalists, a number of interventions have been trialed with the aim of improving continuity of care and reducing post-discharge adverse events, as the patient transitions from hospitalist-based care back to the community. Many have demonstrated benefit based on measures of post-discharge utilization, patient satisfaction or reductions in other post-discharge adverse events. Succinctly, the interventions include measures such as structured home visits from a general practitioner and nurse one week post-discharge (Rytter et al., 2010); informing the patient's primary care provider of admission to hospital (Arora et al., 2010); primary care notification on discharge, electronic discharge orders

and auto faxing of discharge information (Harlan et al., 2010); patient friendly discharge form and follow-up telephone call (Balaban, Weissman, Samuel & Woolhandler, 2008).

Dedhia et al. (2009) tested an intervention aimed at improving discharge communication between hospitalist-based physicians and primary care providers for patients aged 65 years and older. The intervention involved five core components: 1) admission form with geriatric cues; 2) facsimile to the primary care provider; 3) interdisciplinary worksheet to identify barriers to discharge; 4) pharmacist-physician collaboration on medication reconciliation; and 5) pre-discharge planning appointments. The results showed that patients in the intervention group had higher satisfaction with discharge as measured by Coleman's Care Transition Measure (Dedhia et al., 2009). The intervention group had fewer emergency department visits within the first three days of discharge and fewer readmissions and emergency department visits within 30 days of discharge. Several studies have reviewed the impact of hospitalist-run post-discharge clinics with generally positive results on timeliness of follow-up, but indefinite results on post-discharge utilization measures (Doctoroff et al., 2013; van Walraven et al., 2010).

Outcomes of Transitional Care Models

Cost Effectiveness. In terms of cost effectiveness, in a study reviewing the results of 15 randomized control trials of care coordination programs implemented through the Medicare Coordinated Care Demonstration Project in the United States, Peikes et al. (2009), found that none of the programs reduced net costs and only two of the programs yielded a statistically significant reduction in hospital use. Cost reductions demonstrated in one of the successful interventions were small and unsustainable (Peikes et al., 2009). The largest improvements occurred in higher severity patients, that is, patients with more complex and uncertain outcomes given their disease and frailty. The distinguishing features of successful programs included: 1)

had at least once a month patient contact; 2) patients whose disease is neither too mild nor too severe; 3) medication self-management; 4) strong care coordinator connection to hospital; 5) frequent interaction between care coordinators and physicians (Peikes et al., 2009). The programs which showed greatest promise were those that included a care transitions component (Peikes et al., 2009).

Hesselink et al. (2012) completed a systematic review of randomized control trials where interventions were implemented to improve the discharge and handovers from the hospital to primary care. Based on the results of 36 trials, 25 demonstrated statistical significance in favour of the intervention group. Thirty four of the studies involved multiple interventions (Hesselink et al., 2012a; Hesselink et al., 2012b). The interventions identified as effective included: medication reconciliation, electronically generated discharge summaries, electronic discharge notifications to primary care, and involvement of hospital and community providers, and web-based access for primary care providers in the post-discharge period (Hesselink et al., 2012a; Hesselink et al., 2012b). The interventions demonstrated positive impacts on readmission rates and improvements in continuity through better information sharing and patient satisfaction. Given the heterogeneity of the interventions, their poor descriptions and the diffuse aims of the studies and the variety of outcome measures, it was not possible to complete a meta-analysis (Hesselink et al., 2012a; Hesselink et al., 2012b).

Effectiveness in reducing readmissions. Naylor et al. (2011) completed a review of 21 randomized trials of transitional care interventions used in the care of chronically ill adults. The studies evaluated a variety of outcomes related to health status, quality of life, patient satisfaction, and resource utilization. The particular point of interest was the degree to which the

interventions reduced readmissions, including all-cause readmission, time to first readmission and readmission length of stay.

Generally, the populations of interest were the elderly, who suffered one or a number of chronic diseases and/or experienced significant readmissions. The interventions varied in terms of the point of initiation, intensity and duration. The types of interventions ranged from comprehensive discharge planning with (four studies), or without (three studies), home follow-up disease or case management (four studies), coaching (two studies), education (two studies), mobile crisis (one study) and one of each of telehealth, post-discharge geriatric assessment and primary care follow-up (Naylor et al., 2011). In fourteen of the interventions, patient contact was made prior to discharge. Eighteen of the studies designated a nurse as the clinical leader, that is, an advanced practice nurse or registered nurse, with the remaining relying on a social worker or peer support worker. Nine of the interventions demonstrated a statistically significant positive effect on hospital readmissions. The interventions that demonstrated a positive effect relied on nurses as clinical leaders or case manager and of these nine studies six included both a discharge planning component as well as a home follow-up component (Naylor et al., 2011).

Naylor et al. (2011) summarized the attributes of effective transitional interventions. These included: comprehensive discharge planning with follow-up interventions that incorporated patient and caregiver goal setting, care planning, education, behavioral interventions and direct clinical management and a tele-health facilitated component (Naylor et al., 2011). The three studies that effectively reduced readmissions through at least six to twelve months after discharge included a focus on patient self-management and connected acute care and primary care providers.

While many of the care transition models have many similarities, there are some key differences. The Transitional Care Model and the Care Transition Intervention follow the patient into the community and use advance practice nurses and transitional coaches. Both include home visits by the nurses and telephone follow-up. Project RED and BOOST focus on care provided by the hospital's inter-professional team to implement the interventions. Each demonstrated reductions in readmission and emergency department use within 30 days post discharge. BOOST showed a reduction in 30 day readmission rates from 14.2% to 11.2% (Society of Hospital Medicine, 2014). The Transitional Care Model did not demonstrate a reduction in the 30-day readmission rates, however, patients in the intervention group did use significantly fewer inpatient days, using 270 patient days compared to the control group that used 760 days (Naylor, 1999). For the Care Transition Intervention, Coleman (2003) demonstrated a reduction in the 30-day readmission rate and emergency department use. Project RED showed a 30% reduction in the 30-day readmission rate and 30-day emergency department utilization rates of 24% in the control group compared to the intervention group that had a 16% emergency department utilization rate in the post-discharge period (Watkins & Kring, 2013).

Attributes of an Effective Care Transitions Intervention

A significant challenge in evaluating the literature is the variation in the care transition interventions which have been implemented with both favourable and unfavourable results (Hansen, Young, & Hinami, 2011). As well, patient populations are not well defined in terms of objective measures of their health status and illness severity across studies. An intervention that might prove to be effective in one patient population may not work in a different patient population. Finally, given the immaturity of the science of care transitions, theoretical models

are only beginning to develop to enable the summarization of various studies into a theory of care transitions (Hansen et al., 2011).

There is a well-established consensus that single intervention strategies will not yield results that will achieve patient care or financial benefits to the health system (Kripalani, Theobald, Anctil, & Vasilevskis, 2014). According to Boling (2009), the requirements of a successful care transition intervention is that it be appropriately designed, target the appropriate population for which the intervention is intended and be executed by a well prepared team. It is Boling's (2009) view that while many interventions may be effective, it is essential that the intervention be adapted to the context of the local environment. Models and approaches, which appear to work well in one jurisdiction, may not always work well in others (Williams et al., 2009). Williams et al. (2009) identify that differences in funding, regulatory frameworks, available resources, service infrastructure and professional roles, local norms, family structures, living arrangements and individual choice influence the design and approaches to programs used.

Several authors have summarized the attributes of effective care transitions interventions. According to the California Healthcare Foundation (2008), the following are the key elements of an effective care transitions process: Medication reconciliation, red flags, that is, signs and symptoms of worsening condition, personal health record, an inter-disciplinary team approach, engagement of primary care and information dissemination. The implementation experiences in practice and research demonstrate that an ideal model would include identifying patients at risk in the pre-hospital phase, stratification of patients based on acuity, variable lengths of intervention that would include in home and telephone visits and a process for engaging and linking providers (California Healthcare Foundation, 2008).

Naylor and Sochalski (2010) summarized the key components of a care transition intervention to include: 1) comprehensive assessment of the patient's physical, emotional, cognitive and functional capacities and an evaluation of the patient's social network and environment; 2) implementation of an evidenced-based plan of care; 3) initiated at hospital admission and extending beyond the hospital through home visits and telephone visits; 4) communication tools to share information; 5) engagement of patients and families in planning and implementation of the care plan; and 6) coordinated by a qualified professional; often a master's-prepared nurse (Boutwell, 2011; Naylor et al., 2011; Naylor & Sochalski, 2010).

Reinhard and Lind (2011), in their policy review, identified the following features of successful care coordination programs for patients with multiple chronic conditions: 1) targeting high-cost patients who are at high risk for hospitalization; 2) frequent in-person contact with a health professional (at least once a month); 3) teaching patients how to take their medications; 4) strong care coordinator ties to primary care practitioners (i.e. care coordinators collocated with physicians and each physician's patients assigned to a single coordinator); 5) care coordinators with timely information about hospitalization and discharges; 6) financial incentives to encourage cooperation and collaboration by physicians and other clinicians.

Table 3.2 below summarizes the attributes of effective care transition interventions based on reviews by several authors (Berkowitz et al., 2013; R. F. Burke et al., 2013; R. E. Burke et al., 2014; Coleman, 2003; Coleman, Rosenbek, & Roman, 2013; Corbett, Setter, Daratha, Neumiller, & Wood, 2010; Darwin & Parrish, 2008; Dy, Apostol, Martinez, & Aslakson, 2013; B. W. Jack MD et al., 2009; Manderson et al., 2012; Ong & Coiera, 2011; Ornstein et al., 2011; Rennke et al., 2013; Rooney & Arbaje, 2012; Soares et al., 2012).

Table 3.2: Components of an Effective Transitional Intervention

Component	Attribute
Organizational Structure	Adapted to the local context, hospital or community lead
Transitional Lead	The transitional care nurse (TCN) or navigator with professional designation with accountability for coordination of care.
Early contact and Comprehensive in Hospital Assessment	Comprehensive in-hospital patient assessment of the patient's health status, clinical needs, home environment and social support network.
First Contact In-Hospital	Coordinating early face-to-face contact with patients and families while still in the hospital and scheduling the initial navigator in-home visit before discharge.
Evidenced Base Discharge Care Plan	Preparation and development of an evidenced-based plan of care.
Medication Management/ Reconciling Medications	Medication reconciliation on discharge and follow-up medication management. Pharmacist engagement discharge medication reconciliation and post discharge
Team based Approach	Involvement of interprofessional team in planning effective discharge
Home Follow-Up 24-48 hours	Home follow 24 to 48 hours post-discharge
Ongoing Monitoring	Regular home visits by the TCN with available, ongoing telephone support (seven days per week) through an average of two months post discharge implementing early follow-up after discharge with in-person home visits.
Primary Care Contact	Ideally within 7 days of discharge and engagement in discharge and transitional care plan development, appropriate transfer of information
Continuity of Care	Continuity of medical care between hospital and primary care physician facilitated by the TCN. Improving discharge planning by using checklists and patient's education tools. Following up to monitor and provide oversight and care coordination, as needed, for up to 90 days. Coordinating follow-up services through navigator in-home visits and phone contacts.
Holistic Approach	Comprehensive, holistic focus on each patient's needs, including the reason for the primary hospitalization as well as other complicating or coexisting events.
Advance Care Planning	Implementation of an advanced plan of care to articulate care goals and level of treatment
Engagement of Patient and Families	Active engagement of patients and their family and informal caregivers. Educating and assisting patients and caregivers on how to navigate in the health care system, find resources and obtain community supportive services
Patient Education and Training	Patient education which takes into account health literacy capacity and demonstrates progressive learning using techniques such as teach-back.
Early identification of Problems	Emphasis on early identification and response to health care risks and formal caregivers as part of the team Teaching patient in-home about warning signs that may lead to readmission
Linked to Disease Management	Linkage to disease management program for selected patient populations
Electronic Notifications	Notification to primary care regarding admission and discharge

The intervention in this study incorporates many of the above attributes. Structurally, the initiative was jointly led by the hospital and the community care access centre. First contact with the patient occurred through the care transitions nurse, shortly after hospital admission. The care transition nurse completed a comprehensive assessment of the patient, developed an evidence

based discharge plan, reconciled the patient's medications and made contact with the patient's primary care provider. The care transitions nurse engaged the patient and family in the discharge process, reinforcing the discharge plans and medications using teach-back. Referral was made to the appropriate disease management clinic. A hand-off occurred between the care transitions nurse to the rapid response nurse who follow-up with the patient at home within 24-48 hours post-discharge, reconciled medications, reinforced the discharge plan and help the patient prioritize their post-discharge activity.

Barriers to Adoption

Several barriers to the adoption of care transition models exist including: legal, regulatory, administrative, organizational, patient and providers expectations and information technology needs. Lind and Reinhard (2011), in an examination of the public policy implications of *the Patient Protection and Affordable Care Act of 2010*, identified several barriers to the adoption of transitional models in the United States. They include: misaligned payment systems focused on volume rather than quality, poor information systems making it difficult to track patients overtime, and models that have not been fully tested and where they have been tested, are challenged to demonstrate a sufficient return on investment to cover their costs.

Lack of Financial Incentives. In an examination of the lack of the widespread adoption of care transition models in the United States, Reinhard & Lind (2011) found that the overriding barrier was the misalignment of financial incentives. Specifically, current payment structures do not incentivize service integration. Where funding is on a fee-for-service basis, providers actually discourage such behaviors given the lack of reimbursement for this activity (Reinhard & Lind, 2011). This lack of financial alignment essentially perpetuates the continued

fragmentation of service delivery, with parts of the system funded on a volume driven fee-for-service model and other parts of the system, working within fixed budget envelopes and working under a framework of service rationalization. In the case of transitions from the hospital to the home, financially, hospitals are driven to move patients onto the next level of care, due to pressures in access to inpatient beds or financial pressures (Kripalani et al., 2014). More recently, in the United States, the Hospital Readmission Reduction Program has been established as part of the Affordable Care Act (Burke et al., 2013). This program penalizes hospitals providing care to Medicare and Medicaid beneficiaries based on their readmission performance on the selected diagnoses of congestive heart failure, pneumonia and acute myocardial infarction (R. F. Burke et al., 2013). Hospitals with higher than expected readmission rates are penalized a percentage of their total reimbursement received from the Centres for Medicare and Medicaid (Kripalani et al., 2014).

Mixed Results. The results from clinical trials have been mixed. Successful models have not been tested across different patient populations and contexts making the generalizability of findings to other jurisdictions and health systems unknown (Bott, Kapp, Johnson & Magno, 2009). Systematic reviews of care transition programs have shown that the results of individual interventions are mixed, although consensus is developing on what constitutes an effective care transitions intervention (Reinhard & Lind, 2011). Adoption takes time. According to Sussman (2006), it is not unusual for the adoption of a clinical innovation to take up to 20 years and even in the presence of strong evidence, system, organizational, provider and patient factors may limit adoption (Hudson et al., 2014).

Accountability and Leadership. Accountability, leadership and staff support are critical requirements for the success of any care transition intervention. The adoption of care transition

interventions has also been limited as a result of the current structure of the health care system, which is organized into distinct silos with limited integration or formal linkages between hospital providers, community agencies and primary care (Naylor & Sochalski, 2010).

Naylor and Sochalski (2010) have noted that translating care transitions models, which have been demonstrated to be effective in research studies, into practice has been met with some regulatory and legal challenges, requiring the models be adapted to meet local practice environments. This often requires fundamental changes to the structures, care processes and roles assumed by health care professionals and their relationship to each other and the patients they serve and, in the absence of strong leadership, is very difficult to achieve.

A qualitative analysis of the barriers to the implementation of project BOOST at six hospital sites in Illinois identified the lack of administrative support and staff buy-in as key areas challenging involvement (M. V. Williams et al., 2014). In a survey of the barriers experienced and perceived at discharge by physicians, nurses, patients and relatives, Hesselink et al. (2013) concluded that the *“lack of knowledge, understanding and interest between hospital and community care providers are important causes for ineffective and unsafe discharge.”* These examples reinforce a predominant view in health care that, when it comes to transitions, it is someone else’s responsibility to manage. In a 2013 release of Kaiser Health News (2013), Dr. Lucian Leape, a Harvard health policy analyst and nationally recognized patient safety leader, is quoted as saying, *“Nobody is responsible for coordinating care. That’s the dirty little secret about health care”* (Rabin, 2013).

The other challenge for health leaders is that there are few roadmaps to help translate demonstrated interventions into evidenced-based care practices in a systemic way (VanDeusen Lukas et al., 2008). Strong evidence, the presence of strong champions, the degree to which the

innovation fits with the organization's goals, leadership support through all levels of the organization and common measures of success are all required (Naylor et al., 2011; VanDeusen Lukas et al., 2008).

Staff Capacity. The availability of staff with the necessary skills to actually implement care transitions models is another challenge. Many of the models described above have employed nurse practitioners and other advanced practice nurses; others have used social workers and other navigators with other professional designations or non-health disciplines. Transitional care requires an experienced and committed staff, who are comfortable with independent work roles, who are able to maintain a strong working relationship with other healthcare providers and able to work with very sick patients (Boling, 2009). Naylor et al. (2011) argues that transitional care education should be foundational knowledge for all healthcare professionals and should be recognized as such by regulatory bodies.

Role confusion and the lack of clarity of team members responsible for the discharge planning process has been identified as another barrier to effective discharge and transitions (Nosbusch, Weiss, & Bobay, 2011). Others have identified the absence of the registered nurse in the discharge planning process resulting in a deskilling and the ability to manage even simple discharges (Wagstaff, Butler, Kalanovic, & Shepley, 2010).

Little has been written regarding nurses' perceptions of the effectiveness of transitional care strategies. Romagnoli, Handler, Ligons, & Hochheiser (2013) identified that greater information sharing and continuity may help to improve the impact that home-care nurses would have on reducing readmissions. Spehar et al. (2005) completed a mixed methods study, a phase of which included a content analysis of an expert panel of nine providers including nurses, managers and administrators. The key themes identified through the content analysis were that

targeting high risk patients, improving communication processes and better post-discharge coordination and follow-up could prevent readmissions.

Information Technology. Naylor et al. (2011) identified the implementation of information technology to enable the appropriate information exchange as a critical enabler. The perceived benefits of information technology relate mostly to improving timeliness, accuracy and accessibility of information, to enable care providers and patients to track health changes and respond appropriately (Naylor et al., 2011; Reinhard & Lind, 2011).

Boling (2009) identified that electronic systems are often poorly designed and fail to facilitate or enable care delivery. It is often difficult and expensive to achieve linkages and a reliable information transfer, between providers, who have different operating systems. Further, the evidence is limited in terms of the benefits of health information technology at improving discharge communication, unless advanced functionalities of the system are implemented (Cienki, Guerrero, Rose Steed, Kubo, & Baumann, 2013). A study reviewing how electronic records were used by front-line clinical professionals found that many hours were spent documenting information that was not used. The study found that few clinicians reviewed the patient's plan of care (Aragon Penoyer et al., 2014).

According to the National Transitions of Care Coalition Health Information Technology Work Group (2010) in the United States, the common barriers to achieving effective functioning of information systems include: lack of connectivity and interoperability of various technology systems, lack of shared goals related to care transitions, and lack of financial incentives to invest in information technology. Other factors are the lack of consumer engagement, health literacy challenges and issues of trust related to privacy and security.

Clinicians do not have mechanisms to identify and follow-up on at-risk patients and in some cases there is evidence that electronic records may be no better than paper-based systems at improving communication and the information-transfer process. In a review of the communication and information-transfer processes between healthcare professions in Scotland, after the implementation of the “*electronic immediate discharge document*”, 81% of primary care practices received the electronic document, but the majority of physicians used it in conjunction with the paper equivalent (Pillai, Thomas, & Garg, 2004). There was general dissatisfaction with the completeness and accuracy of the content related to medication and follow-up. On the positive side, the majority felt that it was faster and that significant cost savings could be achieved. The authors concluded that the discharge content was more important than the delivery method and that further emphasis needed to be put on ensuring the quality and completeness of the content (Pillai et al., 2004).

Achieving the desired outcomes of electronic health records requires investment in technical development and clinician time. Field et al. (2012) undertook a review of the technological resources, expertise and time needed to develop an automated system to enable the transfer of information from the hospital to primary care during transition. Total personal cost to implement the various interfaces was \$76,314 and required extensive physician involvement (614 hours) to develop the content and provide project coordination (Field et al., 2012).

Gurwitz et al. (2014) undertook a randomized control trial to assess the effectiveness of an electronic health record-based transitional care intervention that used automated alerts to primary care providers and staff, when older adults were discharged from the hospital. The intervention provided automated alerts, new drug information, drug interaction warnings, dose changes, and recommendations for monitoring and follow-up appointments (Gurwitz et al.,

2014). Using the 30-day readmission rate as the outcome, no significant changes were noted. The challenge with this study was that the 30-day readmission rate may not have been the most appropriate measure of effectiveness. The appropriate measures of effectiveness are critical for evaluating an intervention. Selecting a terminal outcome measure, to which, there is no relationship to the intervention itself, may result in inappropriate conclusions being reached related to the interventions effectiveness.

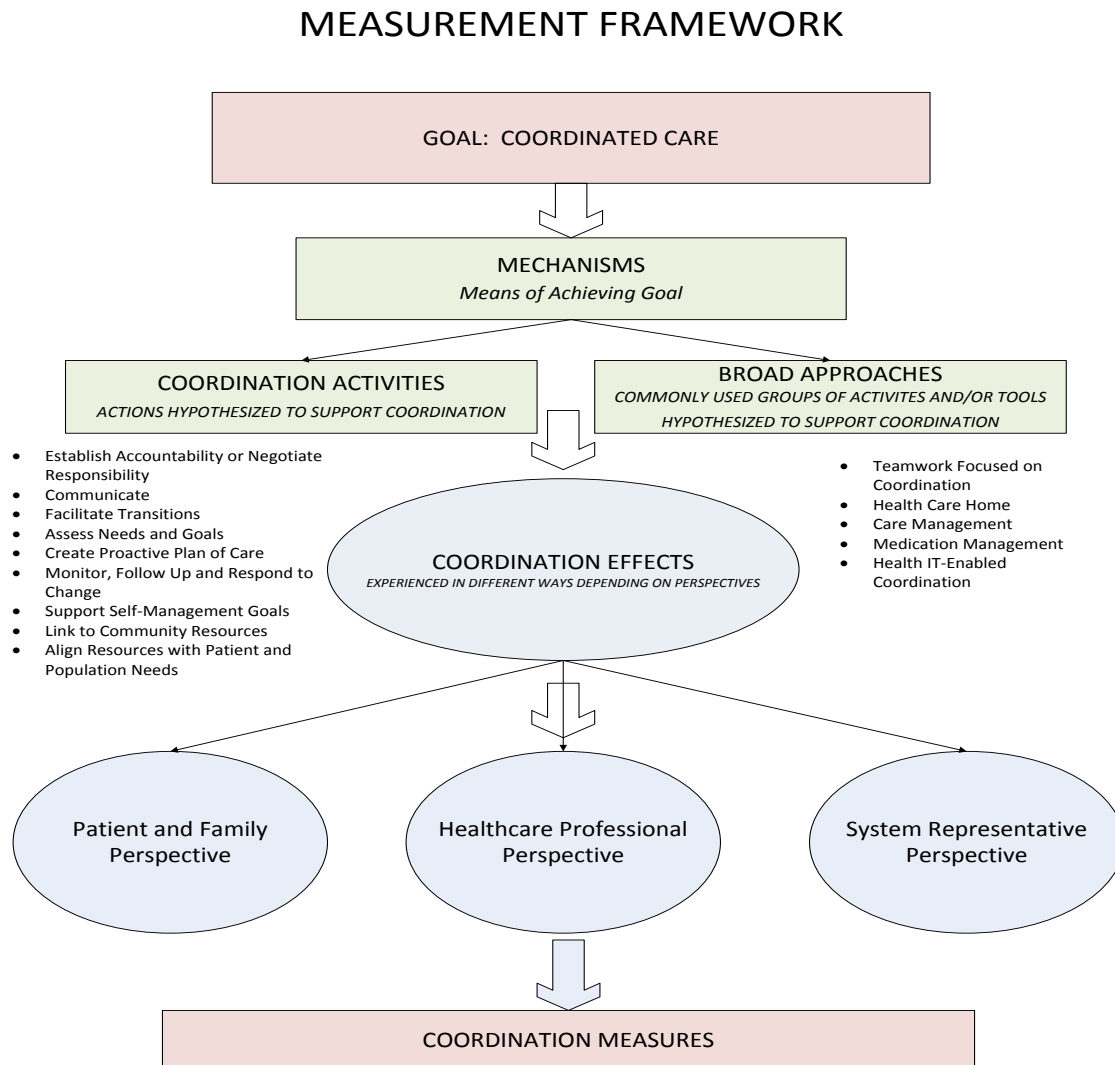
Measurement of Transitional Processes and Outcomes

Determining the success of transitional care interventions depends on the outcomes measured and from what perspective they are taken (Hudson et al., 2014). Naylor et al. (2011) argues that to accelerate the adoption of care transition models and to drive accountability, expanded, comprehensive measures that address both care transition processes and outcomes, for public reporting, require further development. Measures which address the patient and care giver experience, potentially avoidable readmissions and financial benefit, are identified as a priority (Naylor et al., 2011; Reinhard & Lind, 2011).

The predominant measures for the evaluation of care transitions initiatives have been primarily end-point criteria, specifically: readmissions rates, financial measures, emergency room visits, disease-specific readmissions, short-term clinical outcomes, functional status, quality of life and patient satisfaction (McDonald et al., 2010). These are useful outcome measures, but most do not evaluate the processes of care coordination, thus making it difficult to determine which care coordination interventions are actually effective, in achieving what they are intended to achieve.

Schultz, Pineda, Lonhart, Davies, & McDonald (2013) developed a conceptual framework to help organize measures of care coordination. The framework classifies care coordination measures into two domains: 1) Care Coordination and 2) Perspective.

Figure 3.2: Care Coordination Measurement Framework (McDonald et al., 2010)



Perspective refers to the view from which care coordination is being measured. The data can be generated from the perspective of the patient/ family, health care professional or a system representative perspective. The second domain describes the aspect of Care Coordination that is being measured. There are two groups of domains: 1) Coordination Activities; 2) Broad

Approaches (Schultz et al., 2013). Coordination activities include: 1) Establish accountability or negotiate responsibility; 2) Communicate; 3) Facilitate transitions; 4) Assess needs and goals; 5) Create a proactive plan of care; 6) Monitor, follow-up and respond to change; 7) Support self-management goals; 8) Link to community resources; 9) Align resources with patient and population needs. Broad approaches include: 1) Teamwork focused on coordination; 2) Health care home; 3) Care management; 4) Medication management; 5) Health IT- enabled coordination. The Figure 3.2 above provides an overview of the care coordination framework proposed by McDonald et al., 2010.

In a systematic review of care coordination measures published in the literature, Schultz et al. (2013) reviewed 96 instruments. The majority of the instruments relied on survey methods (88%) and measured aspects of communication (93%). Few of the instruments measured changing coordination needs (Schultz et al., 2013). Half measured the patient family perspective, 29% the system representative perspective and 27% health care professionals' perspective. The authors concluded that measures are needed to evaluate changes in coordination needs, coordination as perceived by healthcare professionals and coordination at end of life and in the home care settings, as very few existed (Schultz et al., 2013).

Care Transition Measure. The subject of interest for this particular research is the transition from the hospital to the home. The predominate measure in the literature for measuring this transition is the Care Transition Measure developed by Coleman, Smith, Frank, Eilerst et al. (2002).

It is a survey tool administered to the patient in the post-discharge period and measures the patient's view of the transition experience. The Care Transition Measure has been validated (Coleman, Smith, Frank, Eilersten et al., 2002) and developed with significant input from

patients and care givers. The Care Transitions Measure survey is available in a 15-item or the alternative 3-item questionnaire.

The Care Transition Measure (Coleman et al., 2002) has been used in a variety of research studies to measure its correlation with emergency department use, readmission and home care utilization in the post-discharge period (Ryvicker et al., 2013). A summary of the tool is available in Appendix F. The Care Transitions Measure can be used as a quality improvement tool to continuously improve patients and family satisfaction with the discharge process.

Care Transitions and Frail Populations

Care transition interventions have described their patient populations in terms of their demographic characteristics, disease state, cognitive capacity and self-management capacity (Coleman et al., 2004; Naylor et al., 2004). Several studies have described interventions targeting the frail elderly but without providing an objective measure of frailty. In order to better understand the impact of transitional interventions on different populations, a better description of the patient population is warranted. Interventions that work with one patient population in one context, may not work in another. One way to better understand the effectiveness of a particular intervention is to fully describe the context in which the intervention is being implemented and to objectively measure the patient population for which the intervention is being applied. One way that this can be achieved is through the objective measurement of frailty.

The presence of multiple chronic diseases and increasing age is associated with an increase in the prevalence of frailty (Clegg, Young, Lliffe, Rikkert, & Rockwood, 2013). The evidence demonstrates that frail individuals are higher users of health care resources (Zaslavsky, 2012). Frailty is associated with adverse outcomes including mortality, functional decline,

disability, hospitalization and institutionalization which affect both the individual and society at large (Fried, Ferrucci, Darer, Williamson, & Anderson, 2004; Fried et al., 2001; Lekan, 2013).

Frailty Definitions. While there is much debate about the definition of frailty, two predominate (Markle-Reid & Brown, 2003). The most common is the phenotypic definition, which attributes frailty to a loss of physiologic reserves, leading to a diminished capacity to adapt to stress, thereby increasing susceptibility to illness (Markle-Reid & Browne, 2003). Rockwood and Mitnitski (2011) propose another definition, which defines frailty as an at-risk state, caused by an age-associated accumulation of deficits (Rockwood & Mitnitski, 2011). They have developed a frailty index that can be used to measure frailty. Rockwood and Mitnitski's (2011) approach does not consider the nature of the deficits and takes the approach that the more deficits one accumulates, the more at risk is the patient. The basis of the frailty index is a Comprehensive Geriatric Assessment (Rockwood and Mitnitski, 2011).

The Impact of Frailty. According to the American Medical Association it is estimated that as many as 40 % of adults aged 80 years and older are frail (American Medical Association, 1990). If accurate, this clearly makes the management of frailty a major public health concern. In the population over the age of 85 years, a quarter to half of the population is frail and at risk for increased falls, disability, long term care and death (Clegg et al., 2013).

Etiology of Frailty. There is insufficient evidence to accurately describe the etiology or typology that captures the complexity of the frailty condition (Ahmed, Mandel, & Fain, 2007; Bergman et al., 2007; Xue, 2011). Factors which contribute to frailty develop over the lifespan of an individual and are influenced by: health status, health behaviors, genetics, social and environmental circumstances; including access to health care (Rodríguez-Mañas et al., 2013). Most conceptual models of frailty emphasize the associated biological aspects of frailty

(Gobbens, Luijkx, Wijnen-Sponselee, & Schols, 2010). However, there is a developing consensus that this view of frailty is inadequate (Lekan, 2013). A significant body of literature promotes a more integrative or holistic view that frailty is a multidimensional construct that includes biological, physical, social and spiritual factors (Gobbens et al., 2010). Such an approach provides a conceptual basis for moving away from an organ and disease-based approach, toward a health-based integrative approach, that encourages multidisciplinary intervention and addresses all aspects of the individual experience with frailty (Lekan, 2013).

Measuring Frailty. According to the premises of the frailty phenotype, biological and functional impairments of frailty are the result of underlying physiological abnormalities. These occur from the decreased compensatory reserve of the individual, a poor adaptive response to stressors and a consequential decline in cellular and organ function (Fried et al., 2001). Fried, Tangen, et al. (2001) described the frailty phenotype in the Cardiovascular Health Study. The model combined the evaluation of five criteria, they included: sedentariness, involuntary weight loss, fatigue, poor muscle strength, and slow gait speed. An older person is considered frail if they present with three or more of these defining criteria, pre-frail if they have one or two of the defining criteria and non-frail if they have none (Fried et al., 2004).

The Fried Frailty Index definition was validated in the Cardiovascular Health Study CHS cohort of community-living older adults ($n = 5,317, \geq 65$ years) (Fried et al., 2001). In the seven-year follow-up, the mortality rates for not frail, pre-frail and frail elderly were 12%, 23% and 48% respectively (Clegg et al., 2013; Fried et al., 2001). The tool displayed good psychometric properties with patients in community settings and was shown to be effective in research and clinical practice for the detection of frailty in routine care (Clegg et al., 2013).

Rockwood et al. (1999) developed a frailty index that has been used extensively in research as a means to objectively measure frailty. The Deficit Accumulation Model or Frailty Index was developed as part of the Canadian Study for Health and Aging, a five-year prospective cohort study (n = 10,263), the purpose of which was to investigate the epidemiology and burden of dementia in elderly people in Canada (Clegg et al., 2013).

Rockwood, Fox, Stolee, Robertson & Beattie (1994) consider the construct of frailty from the biomedical and psychosocial frame and consider frailty to be dynamic (Rockwood, Fox, Stolee, Robertson, & Beattie, 1994). Their model builds on the conceptualization of frailty described in Brocklehurst (1985) that views frailty as a balance of the biomedical and psychosocial assets and deficits of an individual (Rockwood et al., 1994). On the one side of the balance are the assets, which allow the individual to live independently and, on the other side, deficits which threaten ill health. The assets include health, functional capacity, positive attitude to health, social, spiritual, financial and environmental resources. On the side of deficits are items which threaten independence including ill health, chronic diseases, disability, dependence on others and burden on caregivers (Rockwood et al., 1994).

Essentially, the frailty index is based on the counting of accumulated deficits in health, based on clinical signs, symptoms, diseases, laboratory and radiographic abnormalities. This information is typically collected on the basis of a comprehensive geriatric assessment (Mitnitski, Mogilner, & Rockwood, 2001; Rockwood, Hogan, & Macknight, 2000). The number of deficits a person has is expressed as a ratio of the total number of deficits measured to yield an individual score between 0 (no deficits) to 1 (all deficits present). The larger the number of deficits an individual possesses, the greater their potential for adverse health outcomes, including death. The index is calculated based on the presence or absence of deficits. An individual with

20 deficits would have a frailty score of $20/92 = 0.22$ (Clegg et al., 2013). Where an individual has accumulated two-thirds of the potential deficits, they are considered frail. Data-reduction procedures have not been employed as a means to reduce the number of variables. The authors argue that the strength of the deficit model is that a change in the number of deficits, not their type, can significantly impact frailty. They consider this more appropriate when considering the complexity of frail elderly patients and models which employ data reduction techniques which they argue are not reflective of the true nature of biological processes (Evans, Sayers, Mitnitski, & Rockwood, 2014).

Conceptually, the frailty index is fairly simple and the process for developing the frailty index has been well established (Theou, Brothers, Mitnitski, & Rockwood, 2013). Consistently, these indices have been strongly associated with adverse outcomes including the risk of death and worsening health status (Mitnitski et al., 2001). A property of the frailty index is that there is a demonstrated sub-maximal limit at about two thirds of deficits. This means that in the case of an index with 30 variables the maximum number of deficits an individual would have would be 20, for 60 variables, 40 and so on (Mitnitski et al., 2001). The 99% limit to the frailty index (FI) in most cases was 0.7 in the community and 0.71 on admission to the hospital with 95% maximal values being 0.60 and 0.63 on admission (Rockwood & Mitnitski, 2006). Elderly nearing this level of frailty suffer a high probability of untoward health events (Bennett, Song, Mitnitski, & Rockwood, 2013). The instrument does not impose a ceiling effect, which has been argued to make sense clinically, as it reflects the notion that although the individual may not have accumulated every potential deficit but the deficits accumulated have resulted in the individual reaching a point that they can anticipate adverse outcomes (Bennett et al., 2013).

A frail individual in this construct is an individual where the precarious balance between non-frail and frail is upset and weighted towards deficits; this imbalance leads to a breakdown in multiple body and social systems (Mitnitski et al., 2001). The model is consistent with the idea of a depletion of homeostatic reserve and recognizes that while no one deficit causes an individual to be frail, the cumulative effects of several deficits stress the adaptive response of the individual and place them at increased risk of frailty (Rockwood et al., 1994). The physiological and psychological burden of deficit accumulation contributes to the deterioration of an individual's function that involves multiple body systems exceeding a threshold that causes regulatory functions to breakdown and compensatory reserves to decline. Over time, as frailty evolves, vulnerability to stressors increases (Rockwood, Rockwood, & Mitnitski, 2010). Based on the concepts of deficit accumulation model, Rockwood's (2007) has defined frailty "*as the variable vulnerability to adverse health outcomes for people of the same age*". It is this concept of frailty that will be used as the operational definition of frailty in this particular research project.

The continuous nature of the data is an advantage of the frailty index over other measurement tools of frailty. Additionally, 75% of what is required to complete the FI-CGA is within the medical record and it uses the information already available making it applicable in the clinical setting (Evans et al., 2014). Several studies have tested the prognostic capacity of the frailty index and have demonstrated its association to death, inpatient utilization and discharge destination (Evans et al., 2014; Hastings, Purser, Johnson, Sloane, & Whitson, 2008; Singh et al., 2012).

Application in Clinical Practice. Frailty is preventable and amenable to intervention, but to intervene it must be identifiable in the clinical setting using practical, reliable and valid

measures (Gill et al., 2002). The goal of course is whenever possible to identify it and prevent the onset of frailty, or at least reduce it (Subra, Gillette-Guyonnet, Cesari, Oustric, & Vellas, 2012).

Conventional assessments do not reliably identify frailty. Age and clinical presentation are often not reliable indicators in differentiating those who are at risk of becoming frail from those who are not at risk (Hubbard, O' Mahony, & Woodhouse, 2008; Lekan, 2013; Xue, 2011) The literature on the assessment of frailty in the hospital environment, particularly for patients in the period of transition from the hospital to the home is limited, although it has been more widely used for public policy and administrative purposes to assess population frailty and analyze resource needs, utilization, and costs (Lekan, 2013; Lucicesare, Hubbard, Searle, & Rockwood, 2010).

Frailty has been described as a dynamic condition with fluctuating levels of vulnerability between non-frail, frail and pre-frail conditions, the course of which can be altered through intervention (Gill et al., 2011). The evidence is that frailty does not have to be progressive; it can be halted and potentially reversed with appropriate interventions that address risk factors including appropriate disease management and proactively addressing things such as nutritional support, blood pressure control, social engagement, depression and exercise (Gill, Gahbauer, & Allore, 2006; Mitnitski, Song, & Rockwood, 2007; Rockwood & Mitnitski, 2011).

Hospitalization poses a threat to frailty trajectories with increased risk for functional decline, new dependence, disability during, and after, hospitalization (Gill, Gahbauer, Han, & Allore, 2008; Gill, Gahbauer, Han, & Allore, 2009; Gill et al., 2011; Heppenstall, Hanger, & Wilkinson, 2009). Given that frailty is amenable to intervention at the patient level and that

frailty is also predictive of mortality and institutionalization, it is worthwhile to identify in patients as part of the clinical assessment

Impact of Social Isolation

The emphasis of current health policy is to provide care for elders in their home, to avoid long-term placement and reduce dependency on inpatient hospitalization (Grenier & Guberman, 2009). Home care is not included in the Canada Health Act. Provinces have discretion in determining what will be covered through the public home care purse and how it will be delivered (Romanow, 2002). This lack of a common basket of services leads to variability in the public-private mix of services provided between provinces and between regions within a province. There is an inconsistent accessibility to services depending on one's geographic location that is driven by local policy and resource availability (P. Williams et al., 2011; P. A. Williams, Deber, & Lum, 2009). The basket of publicly funded home care services, similar to all health services, is increasingly faced with human and fiscal resource constraints and challenging resource allocation decisions. This has created a pragmatic context where services are focused on the physical care delivery needs, often at the expense of emotional and social considerations (Dale, Saevarheid, Kirkevoid, & Soderhamn, 2009). Ignoring social needs places the elderly, particularly the frail home-bound elderly, at greater risk of social isolation (Grenier & Guberman, 2009).

There is some evidence that social isolation increases with age (McPherson, Smith-Lovin, & Brashears, 2006). However, age alone does not appear to drive isolation, rather it appears to be a combination of age, illness and disability (Dale et al., 2009). There is evidence to indicate that where the elderly do experience social isolation, they are at an increased risk for mortality, morbidity, depression and cognitive decline (Brummett et al., 2001). Social isolation

has been associated with depression (Alpass & Neville, 2003) and heart disease (Sorkin, Rook, & Lu, 2002). Lack of social support and isolation is associated with higher rates of hospital readmission (Schwarz & Elman, 2003). According to Hawthorne (2006), the measurement of social isolation is important in the study of older adults, as an outcome in its own right, but also, to understand its influence on and response to public health interventions.

Based on a concept analysis of social isolation, Nicholson (2009) defines social isolation as: “*a state in which the individual lacks a sense of belonging socially, lacks engagement with others, has a minimal number of social contacts and they are deficient in fulfilling and quality relationships*”(Nicholson Jr., 2009). It is this conceptual analysis of social isolation which will guide this research.

The precursors to social isolation include: lack of relationships, psychological and physical impediments, limited resources and a poor social and physical environment. Factors which prevent isolation include feelings of belonging, fulfilling relationships, engagement and a meaningful social network (Nicholson Jr., 2009). Several authors have suggested that the assessment of social isolation be included in the care of elderly patients and screened through objective means as potentially impacting care outcomes (Nicholson Jr., 2009; Shimada et al., 2014).

Others have identified that in the discharge process, there is an over emphasis on the medical aspects of care and a failure to consider adequately the social aspects which may impact the patient and family in the post-discharge period. Social isolation must also be considered as a potentially intervening variable, impacting interventions where the goal is to improve the outcomes of frail patients discharged to home from the hospital. There is evidence that social isolation may contribute to rehospitalisation. Greysen et al. (2013) conducted a longitudinal data

analysis as part of the Veteran Aging Cohort Study and found that social isolation was an independent predictor of death and rehospitalisation. In a qualitative analysis of the functional, social and environmental barriers to recovery of patients discharged from the hospital to the home, Greysen et al. (2014) identified three themes impacting the patient's recovery, these included: 1) functional limitations, difficulty with mobility and self-care tasks; 2) Social isolation and lack of support from family and friends; 3) challenges from poverty and the built environment at home. Mistry, Rosansky, McQuire, McDermott, & Jarvik (2001) found that patients who had moderate to high degrees of social isolation were four (4) to five (5) times more likely to be rehospitalized.

Gaps in the Literature

To summarize, the science of care transitions is an immature, but rapidly emerging field of inquiry. It is being driven by the increased fragmentation of the health system and concern that poorly executed transitions adversely affect patient outcomes and increase health care utilization and costs.

There is a developing convergence in the literature on the components of an effective hospital to home transition and these have been summarized in this review. However, there remains significant heterogeneity in how these components are implemented in practice. Most interventions use a liaison role as a boundary spanning function, to help patients transition through a complex and fragmented health system in their journey from hospital to home. More recent hospital-led transitional initiatives are intra-organizational and include a short-term outreach component. These models have demonstrated mixed financial and utilization benefits, but do not fundamentally create transitional linkages between providers to ensure coordination and a continuum of care.

There are significant barriers to adoption and recognition of the need to develop strategies which can be implemented within the local context. Further research is required to evaluate how transitional care strategies can be integrated into the existing health system structures.

There is developing evidence of models of transition that engage multiple providers in transitional arrangements. There is developing evidence detailing how a care transition intervention might be implemented through a partnership between a hospital and community-based home health care service provider. There is no research regarding the implementation of a care transition intervention within the context of northeastern Ontario. Few trials have objectively measured patient frailty as an intervening factor impacting transitional intervention outcomes.

The theoretical models to guide research and the evaluation of interventions implemented in practice are just beginning to develop and there are few examples of where models of transition or care coordination have been used to guide transitional intervention research.

Differentiating patient populations for the appropriate care transition intervention is well recognized in the literature. The mechanisms of how this can be applied in daily clinical practice are not fully developed, with limited literature evaluating their application.

The literature is limited in terms of the perspectives of the challenges and barriers encountered by providers implementing care transition initiatives (Ba Econ, Garcia-Perez, Vazques-Diaz, Lorenzo-Riera, & Sarria-Santemera, 2011). Terminal outcome measures remain the predominant measures around which care transition initiatives are evaluated. The literature is

only beginning to develop around how process measures might be used to guide the implementation of care transitions interventions.

CHAPTER 4

METHODOLOGY

Study Overview

This mixed methods study evaluated the effectiveness of a care transitions and rapid response nurse intervention at lengthening the time to first readmission and reducing total post-discharge inpatient and emergency department utilization in a population of frail older patients. The intervening impact of social isolation and patient frailty on the outcomes was also evaluated.

This research was done in two phases. The first phase involved the completion of a randomized control trial which tested the efficacy of a care transitions and rapid response nurse follow-up intervention combined with referral to a chronic disease management clinic. The aim of the intervention was to lengthen the time to first readmission and reduce the 30-day, 60-day and 90-day readmission rates, hospital bed-day use and emergency department use, by patients, identified on admission, at high risk for readmission in the post-discharge period.

Patients meeting the inclusion criterion were randomized to either the intervention group or the control group. Patients randomized to the intervention group received standardized assessment, comprehensive discharge plan development, in-hospital teaching and medication reconciliation by a hospital-based care transitions nurse. A hand-off occurred between the hospital-based care transitions nurse and a community-based rapid response nurse. The rapid response nurse conducted an in-home follow-up visit within 24 to 48 hours after discharge. Additional in-home and telephone follow-up was provided by the rapid response nurse for a period of up to 30 days post-discharge. In addition, patients randomized to the intervention group were referred for follow-up at one or more of the following chronic disease management clinics for diabetes, congestive heart failure (CHF), and pulmonary rehabilitation for patients

with chronic obstructive pulmonary disease (COPD). High-risk patients, without access to a primary care provider, were referred to the Short-term Assessment and Treatment (STAT) service at the hospital. Patients randomized to the control group received normal care. The position descriptions of the rapid response nurse is outlined in Appendix A and the care transitions nurse in Appendix B.

The second phase of research involved a qualitative study undertaken using focus groups and interviews. The focus groups were conducted with the care transitions and rapid response nurses and the interviews with the front-line managers and executives. The purpose of the qualitative study was to determine, from the perspectives of those involved, the factors which facilitated or were barriers to the effective implementation of the care transitions and rapid response intervention and to help provide some context to the trial results. The data were analysed using thematic content analysis.

Prior to commencing this trial, the research procedures were tested through a modeling phase (Bowling, 2009). In this phase, the processes of identifying eligible patients, screening, recruitment, consent as well as the data collection forms, and the post-discharge interview protocols were tested and refined. This work was largely the responsibility of the Coordinator of the Care Transitions Service at the Hospital and the Manager of the Rapid Response Nursing Service at the Community Care Access Centre (CCAC). The respective managers for each organization reported progress through their individual organizations and collectively through a joint organizational Care Transitions Committee co-chaired by the hospital and the community care access centre.

The Study Setting

Eligible patients were selected from a population of patients admitted to Health Sciences North, an Academic Health Sciences Centre, located in the City of Greater Sudbury in Northeastern Ontario, Canada. According to the 2011 census information, Northeastern Ontario has a population of 553,090 with a land area of 395,577 km² representing 42% of Ontario's land mass (Dall, Lefebvre, Pacey, & Sahak, 2006; Statistic Canada, 2011). Sparsely populated, it has a population density of 1.4 persons/ km² compared with Ontario's 13.4 persons/ km² (Dall et al., 2006). The majority of its population is concentrated in six larger centres which include Sudbury (160,274), Sault Ste Marie (75,141), North Bay (53,651), Timmins (43,165), Elliot Lake (11,348) and Temiskaming Shores (10,400) (Statistics Canada, 2011). The remainder of the population is distributed in the smaller towns of Espanola, Blind River, Chapleau, Cochrane, Englehart, Hearst, Iroquois Falls, Kapuskasing, Kirkland Lake, Mossonee, French River, St. Charles, Markstay-Warren and West Nipissing and several other unorganized settlements.

A total of 55,823 persons of Aboriginal descent reside in Northeastern Ontario and represent approximately 10 percent of the population. They reside on and off reserve lands (Recollet, Rego, Partridge, & Manitowabi, 2011). The francophone population represents twenty three percent (23%) of the overall population. The population of northeastern Ontario is expected to decline and age in place (Ministry of Finance, 2010). The population over the age of 65 is expected to grow from 19% to 32% (106,550 to 180,074) by 2036. Proportionally, the population over the age of 75 years will account for the largest rate of increase (Ministry of Finance, 2010). The prevalence of chronic diseases including: circulatory disease, some forms of cancer and asthma, chronic bronchitis and arthritis are higher in Northeastern Ontario, compared to the balance of the province, creating a significant health burden (Canadian Institute

for Health Information, 2013a; Dall et al., 2006; North East Local Health Integration Network, 2013).

City of Greater Sudbury. The City of Greater Sudbury is the largest urban centre in Northern Ontario. According to the 2011 population census, the city's population was 160, 274 and growing at a rate of 0.32% annually. It represents one of the few areas in Northern Ontario experiencing population growth. The median age of the population is 41.1 years, slightly older than the provincial median of 39 years and slightly lower than the median Northern Ontario age of 43.3 years. Historically, it has been a predominantly resource-based community, with expansion into health, education and retail sectors occurring during the last 30 years. The city is surrounded by a number of small First Nations communities. The City of Greater Sudbury is situated in the broader Sudbury District. Approximately 92% of the district is comprised of unincorporated townships, settlements and First Nations reserves (City of Greater Sudbury, February, 2015; Statistics Canada, 2011a; Statistics Canada, 2011b).

The City of Greater Sudbury is considered to be bilingual. English is the language most often spoken at home by 80.1 % of the population, followed by French at 16.3%. According to the 2011 census data, 8.5 % of the population is of aboriginal descent. The percentage of visible minorities at 2.7% is considerably less than the Canadian average of 19.1 %. The population is less educated than the Canadian average, with only 17.2% of the population having a university degree, compared to 23.3% nationally and 18.1% with no certificate, diploma or degree compared to 17.3% nationally (Statistics Canada, 2011b).

Health Services. Health Sciences North is an Academic Health Sciences Centre located in the City of Greater Sudbury, serving the Sudbury District and Northeastern Ontario and caters to patients requiring access to specialized services. Health Sciences North has over 3,900

employees, 250 privileged medical staff and over 600 volunteers supporting its operations.

Health Sciences North provides a broad range of clinical services, on an inpatient and outpatient basis, in the areas of medicine and rehabilitation, cardiac and critical care, family and child health emergency and ambulatory care, surgical care, mental health and addictions and cancer care.

The Northeast Community Care Access Centre (NECCAC) is one of 14 such centres in Ontario, responsible for coordinating access to government-supported community health services. The NECCAC provides services to the population of Northeastern Ontario.

Community Care Access Centres (CCAC) were formed in 1996, with the purpose of coordinating access to government-funded home care services, community services and long term care. CCACs coordinate care with physicians, hospital teams and other health care providers to *“enhance access and co-ordinate care for people who need care in their own homes in the community, in supportive housing or a Long-Term Care Homes”* (Ministry of Health and Long Term Care, 2014). The eligibility for, and limitations on, hours and types of services are subject to government regulation (Appendix E). Care coordination is managed through Care Coordinators who are generally registered nurses. The intensity of care coordination varies according to the patient’s condition. Intensive case management is provided to those with longer term care requirements, such as children with significant medical complexity and fragility, older adults with high care needs, persons with disabilities and those requiring end-of-life care. Shorter-term acute support is provided to patients with less intense ongoing care needs. At the patient level, CCACs can make determination of service levels depending on the circumstances of the patient and the financial resources available to provide care. Services provided to meet patient care needs include: nursing, personal support (i.e. bathing and dressing), physiotherapy,

occupational therapy, speech language therapy, social work, nutritional counseling, medical supplies and equipment. Referral to CCACs can be made by anyone.

Numerous home support services are provided directly by a number of smaller, not-for-profit agencies, and volunteer-based agencies. This sector is generally known as the community service sector and its services include: assisted living, meal preparation, transportation, personal care, housekeeping and disease-specific supports such as Alzheimer's and Brain Injury.

Health Service Utilization Patterns. In Northeastern Ontario, the health system is heavily structured towards hospital and long-term institutionalized care. Emergency departments serve as the location of primary care in many communities throughout the northeast and hospitals serve as locations for long term care in many of the smaller communities (Altmayer, Ardal, Woodward, & Schull, 2005). Emergency department utilization by the population over the age of 75 is higher than the provincial average and long-term care is used more intensely as a location of care (Bronskill et al., 2010).

Research Questions

The following are the research questions which this study attempts to answer.

Primary Question

1. Does the implementation of an in-hospital care transitions nurse and community-based rapid response nurse intervention increase the time to first readmission for high-risk frail patients?

Secondary Questions

2. Does the implementation of an in-hospital care transitions nurse and community based rapid response nurse intervention reduce the 30-day, 60-day and 90-day

readmission rates, emergency department use and total bed-days used and do frailty and social isolation have an intervening effect?

3. Can a model of prediction be developed for the dependent variables of 30-day, 60-day and 90-day hospital readmissions, total inpatient bed utilization for the study period and total emergency department visits for the same periods?

4. Is there a difference in patient satisfaction with the transition between the intervention and control groups?

5. What are the factors that facilitated or were barriers to the implementation of this care transitional intervention from the perspective of the care providers involved in its implementation and what are the opportunities for improvement?

Study Procedures

Sampling. The study sample was drawn from a population of patients admitted from home or a home-like setting - i.e. house, apartment, assisted living facility, retirement home - to Health Sciences North between June 2013 and June 2014. The inclusion and exclusion criteria are detailed below.

Inclusion Criteria. The following were the inclusion criteria: admitted to one of four medical units at Health Sciences North; having one or more of the following chronic conditions: congestive heart failure, chronic obstructive pulmonary disease, diabetes or dementia; residing in the City of Greater Sudbury; admitted to hospital and discharged to home or home-like setting including residential assisted living facility or retirement home; having at least one previous admission in the last 12 months; able to be reached by telephone or cell phone; able to speak English or French or have a substitute decision-maker who is able to communicate in English or French. Patients who scored 10 or greater on the LACE index were identified for inclusion,

given the increasing probability of readmission risk within 30 days of discharge. The LACE index scores the patient's risk for readmission based on the criteria of: length of stay (L), acuity (A), comorbidity (C) and emergency department use (E) (Walraven et al., 2010). The readmission risk at LACE of 10 is 95% CI [8.7%-20.2%] with higher LACE scores associated with greater probability of readmission or death (Walraven et al., 2010).

Exclusion Criteria. The following were the exclusion criteria: patients admitted from a long-term care facility or chronic care facility; patients having severe cognitive impairment; patients residing outside of the Sudbury District; patients whose condition is palliative with an expected death within three months of discharge; patients whose primary diagnosis is a mental health diagnosis; patients unable to consent and with no substitute decision-maker who is able to consent. While not excluded from inclusion in the research there was not a particular focus on aboriginal elderly. It is acknowledged that the population of complex aboriginal elderly may have unique care needs but exploring these fully was beyond the scope of this current study.

Sampling Procedure and Process for Randomization and Consent. Patients admitted onto a medical unit, for which the current admission was at least their second admission in twelve months, were screened for potential inclusion into the study based on the inclusion criteria identified above.

Consent. Patients who met the inclusion criteria were approached by one of the hospital's care transitions nurses, who provided the patient with information about the study and invited the patient to participate. No inducement or compensation was offered. Where the patient chose to participate, informed consent was obtained from the patient. In those cases where the patient did not have the capacity to consent, or where capacity was unclear and where the patient had a defined substitute decision-maker according to Ontario law, consent was

obtained from the substitute decision-maker (Warner, McCarney, Griffin, Hill, & Fisher, 2008). The capacity of the patient to consent was assessed by the care transitions nurse and was based on the ability of the patient to understand the study procedures, weigh the risks and benefits of participation and to effectively communicate their decision to participate or not participate (Cohn, Jia, Smith, Erwin, & Larson, 2011). Written consent was obtained. In the few cases where the substitute decision-maker provided consent, the patient was involved in the consent process (Warner et al., 2008). Where a substitute decision-maker was not available and the patients were not capable of consent, they were excluded from the study. The patient or substitute decision-maker was provided the time to consider whether they wanted to participate in the trial or not (Cohn et al., 2011). The patient or substitute decision-maker were asked to repeat back relevant information regarding the study and its benefits and risks (Brown, Butow, Ellis, Boyle, & Tattersall, 2004). The care transitions nurse's script and the consent form appear in Appendix C. Once consent was obtained, the consenting nurse informed the study research assistant who allocated patients to either the intervention or control group. The researcher was blinded to the allocation of participants as were the consenting care transitions nurses.

A stratified blocked randomization process was used to achieve comparability between groups (Friedman, Furberg, & Demets, 2010). The prognostic factors on which the patients were stratified included the patient's LACE score, patient's sex, living location, and whether the patient lived alone or at home with the support of a significant other; family or friend. Patients were randomly assigned to either the intervention or control group within each stratum to ensure balance between the predefined prognostic factors. The purpose was to achieve equal allocation of participants within each stratum to reduce the potential impact of these confounders on the study results (Friedman et al., 2010). The strata allocation table is provided in Appendix D.

Patients were randomized within each stratum using a blocked randomization process to ensure equal representation of participants in the intervention and control groups within each stratum (Friedman et al., 2010). Blocks of two were chosen, with each of the intervention or control groups represented by the letter A or B resulting in two possible combinations of group assignments: AB or BA to which the study participant could be allocated. Each of the possible combinations was assigned a number from 1 or 2 and the combination of sequences allowing for up to 24 patients in each sequence, with sequences repeated creating cohorts of patients in each stratum that were then transferred into the randomization schedule attached in Appendix D. This was completed prior to participant enrollment. The schedule was securely stored in the office of the research assistant and unknown to those involved in implementing the intervention but was known to the researcher. The research assistant had no contact with the enrolled patients nor did the researcher, and both were blinded to allocation of participants as were the consenting care transitions nurses.

Blinding. Patients and care providers were unaware of assignment during the screening and assessment phase. Once assignment was made, the care transitions nurses became aware if the patient was randomized to the intervention or control group. Patients may have become aware of their assignment based on the particular services received. The researcher was not aware of the assignment of any particular patient and could not link the patient identification code to the patient's name or medical record until after the randomized allocation occurred. The researcher had no direct patient contact during the assessment or subsequent follow-up periods and therefore was unable to influence the care trajectory of any particular patient.

While the researcher had no direct patient contact, those providing direct patient care were aware of the patient's assignment, creating a potential for bias particularly around the

provision of compensatory and concomitant treatment for patients in the control group. What could not be controlled for was the potential that those involved in direct patient care might have felt that the patient was not being given the same opportunity and they might have provided additional care, services or advice as accommodation, whether this was done, consciously or unconsciously (Friedman et al., 2010).

Ethical Considerations. This research required the approval of Laurentian University Research Ethics Board. Once approval was achieved it was subsequently reviewed and approved by the Research Ethics Boards of Health Sciences North and the Research Ethics Board of the Northeast Community Care Access Centre.

The ethical concerns raised during the course of the study were related to the randomization of subjects to the intervention or control groups. There was no clear evidence of the superiority of the effectiveness of the intervention, thus addressing these ethical concerns around randomization (Bravo, Raiche, Dubois, & Hébert, 2008; Friedman et al., 2010). The other ethical concern was related to the position of authority of the researcher. There was a concern of possible undue influence in the qualitative study. This was managed by retaining a third-party facilitator who approached the participants to request their participation in the study, review the consent process and conduct the focus groups and interviews.

Sample Size. Effect size measures the difference between groups or the strength of association between variables (Grissom & Kim, 2012). According to Grissom & Kim (2012), in applied research it is important to go beyond simply reporting statistical significance and report the actual amount of difference or the effect size and its clinical, economic or other significance, as statistical significance does not necessarily indicate clinical or other significance. Identifying the actual amount of change from baseline scores provides valuable information in determining

the application of the research results (Bowling, 2009). Effect size is often considered within the context of statistical power to estimate the required sample size and the probability that a test will reject a null hypothesis when the null hypothesis is false (Grissom and Kim, 2012). There are a number of measures of effect. For the purposes of the power calculation in this study, Cohen's D is appropriate, as this study compared the differences between means in the control group and intervention group for a number of parameters (Norusis, 2012). Using Cohen's D, an effect size of 0 reflects no effect, 0.2 a weak effect, 0.5 a moderate effect and 0.8 or above a large effect. A larger effect size is associated with detecting a meaningful difference and with a lower risk of Type II error; that is failure, to detect a difference when a difference exists. A large effect of 0.8 was chosen (Norusis, 2012).

An estimate of the sample size was undertaken prior to conducting the study to determine the number of subjects required to detect a difference in the 30-day readmission rate between the intervention and control groups. The estimate was calculated using IBM SPSS Sample Power (IBM, 2014). The current 30-day readmission rate for the population of interest, that is, those patients having a diagnosis of chronic obstructive pulmonary disease, congestive heart failure or diabetes was approximately 17%. It was assumed that the intervention would yield a two- percentage-point drop in the 30-day readmission rate from 17% to 15% with a standard deviation of four percent. It was assumed that five percent of the data would be considered to be missing data. Based on these assumptions, a sample of 68 subjects per study group would be required to achieve a power of 80% with a two tailed alpha at 0.05. This would yield a statistically significant effect and allow the conclusion to be reached that the intervention was effective in reducing the 30-day readmission rate. If there was a 10%

variance from the assumed difference, between the intervention and control group, a sample size of 83 patients would be required in each study group. As a contingency, oversampling was used to secure an appropriate sample size to allow for this particular variance. This oversampling also considered previous research conducted by Naylor et al. (1999) who recommended a study cohort of 125 patients per study group.

Intervention Design

The following is the description of the intervention and control groups.

Control Group (Normal Discharge). Patients in the control group received usual discharge planning and home follow-up support. This is care available to all patients admitted to Health Sciences North and discharged home with Northeast Community Care Access Centre services. The normal discharge process for more complex patients is summarized in Table 4.1.

The usual discharge and transitional care planning process for complex patients being discharged from the hospital to the home involves members of the inpatient inter-professional team including: nursing staff, charge nurses, social workers, clinical resource reviewers, physicians and other allied health staff who interacted with the patient on a daily basis. The social workers, charge nurses and clinical resource reviewers take the lead role in developing discharge plans of care for the most complex patients on the medical units where this study took place. Patients' plans of care and discharge are discussed daily with members of the inter-professional team. The daily bullet rounds process is a time when all members of the team including the CCAC care coordinator are able to review the patients' current treatment plans, prospective discharge dates, post-discharge plans and care coordination needs. Attendance of physicians at daily bullet rounds is not consistent.

In terms of coordinating discharge and transitions from the hospital to the home for patient with more complex post discharge care requirements, the hospital's social worker, clinical resource reviewer and charge nurse work closely with the access care coordinator from the CCAC who is responsible for developing the post-discharge in-home service plan. The service plan details the types of post-discharge care the patient will receive through the CCAC. The service plan is based on the assessment of the patient's need and their eligibility for services, as established by legislation through the Long Term Care Act (2007) and additional criteria determined by policy through each Community Care Access Centre (Appendix E). This may vary depending on factors such as: financial resources, geographic impact, population density and access to service providers within the particular geographic regions within the service area. The access care coordinator typically does not complete the service plan until a written discharge order has been made by the attending physician. Services for other community support services for meals, transportation and assisted living are provided by the community support services sector and must be coordinated by the patient, although assistance and referral is often provided by discharging hospital staff or the CCAC care coordinator. Qualification for these services is based on criteria developed by each agency and depending on the service; clients may have to pay a user fee.

Intervention: Care Transitions and Rapid Response Nurses. Study participants allocated to the intervention group received, in addition to those services provided to all patients in the normal discharge, the following services described below in Table 4.1.

Care Transitions Nurse. Patients allocated to the intervention group had their discharge plan coordinated by the hospital's care transitions nurse.

Table 4.1: Summary of Activities Intervention and Control Groups

	Actions	Organization	Provider	I	C
COMPREHENSIVE DISCHARGE	Comprehensive Discharge Planning	Hospital	Care Transitions Nurse (CTN)	X	
	Comprehensive Assessment	Hospital	Care Transitions Nurse	X	
	Patient Family Education	Hospital	Care Transition Nurse	X	
	Medication Reconciliation	Hospital	Care Transitions Nurse	X	
	Inter-professional team and family involvement in discharge plan	Hospital/ CCAC	Inter-professional Practice Team	X	X
	Referral to CCAC Access Case Manager	Hospital	Nurse/ Charge Nurse	X	X
	Assessment by Community Care Access Centre	CCAC	Access Case Manager	X	X
	Service Plan Development	CCAC/ Hospital	Access Case Manager/ Care Transitions Nurse	X	X
	Daily Bullet Rounds	Hospital	Inter professional Team	X	X
	Contact with primary care provider and paper copy of care plan faxed/ mailed	Hospital	Care Transition Nurse	X	
	Transfer of Discharge Plan Information	Hospital/ CCAC	Care Transition Nurse/ Rapid Response Nurse	X	
NURSING FOLLOW_UP	Home Visit within 24 -48 Hours of Discharge	CCAC	Rapid Response Nurse	X	
	In-home medication review and reconciliation	CCAC	Rapid Response Nurse	X	
	Home Environmental Assessment	CCAC	Rapid Response Nurse	X	
	Specialist and Diagnostic Follow-up	CCAC	Rapid Response Nurse	X	
	Transportation Coordination	CCAC	Rapid Response Nurse	X	
	Home Follow-up Visits	CCAC	Rapid Response Nurse	X	
	In-Home Telephone Follow-up	CCAC	Rapid Response Nurse	X	
	Community Personal Support Services	Community Service Provider Agency	Personal Support Workers	X	X
	Professional Nursing Services	CCAC	Registered Nurse/ Registered Practical Nurse	X	X
Professional Services	CCAC	Allied Health Professionals	X	X	
CHRONIC DISEASE MANAGEMENT FOLLOW_UP	Chronic Disease Management Care Plan	Hospital	Chronic Disease Management Nurse	X	
	Post discharge disease management plan follow-up	Hospital	Chronic Disease Management Nurse	X	
	In hospital education	Hospital	Chronic Disease Management Nurse	X	
	Clinic follow-up visit	Hospital	Chronic Disease Management Nurse	X	

The care transitions nurse coordinated the involvement of the inpatient interdisciplinary team in the process of developing the discharge plan through one-on-one interaction with members of the team and through daily bullet rounds on each medical unit. The inter-

professional team included: the social worker, clinical resource reviewer, charge nurse, registered nursing staff, physiotherapist, occupational therapist and pharmacist, as required and available.

The care transitions nurse completed a comprehensive assessment, identifying the underlying physical, social and emotional needs of the patient. A patient-centred care plan was developed based on seven common standardized practice statements.

The discharge plan was developed using practice statements for: bladder and bowel management, functional mobility, nutrition and hydration, cognitive functioning, pain control, medication management, and advanced care planning. The protocols implemented were based on the standard practice statements developed by the British Columbia Provincial Senior Hospital Care for Seniors Clinical Care (BC Patient Safety Council, 2014). The inclusion criteria in the study did not require that the patient have a primary care provider. Where the patient did not have a primary care provider, they were referred to outpatient follow-up service called the Short Term Assessment and Treatment (STAT) service provided by the hospital. All attempts were made by the care transitions nurse to engage the primary care provider in the development and implementation of the discharge plan. Where the primary care provider was unavailable to participate directly, telephone contact was attempted. In all cases, a written plan of care was provided to the primary care provider. Additional care plan items were included as required, but were not based on the standardized practice statements. Education, incorporating teach-back, was provided by the care transitions nurses based on the learning needs identified. Medications were reconciled for each patient prior to discharge from the hospital.

The care transitions nurse coordinated the referral process with the NECCAC. Referrals to community service agencies such as meals on wheels, transportation services and other in-

home support services were coordinated by the care transitions nurse in conjunction with the NECCAC care coordinator. Interventions included the completion of a comprehensive assessment by the care transitions nurse and the implementation of a comprehensive discharge plan of care.

Rapid Response Nurse. The rapid response nurse from the Community Care Access Centre completed an in-home visit within 24 to 48 hours of the patient being discharged from the hospital to home. During this first visit medications were reconciled. This medication reconciliation process involved reviewing the patient's home medications and communication with the patient's community pharmacy and primary care provider, where possible, to confirm the most accurate medication list. An assessment of the patient's home environment was completed to identify potential opportunities to better meet the patient's care needs and correct or reduce risks associated with the home environment. Professional services were coordinated by the rapid response nurse in conjunction with the care coordinator from the community care access centre.

The rapid response nurse assisted the patient with coordinating follow-up care, including attendance at the patient's scheduled appointments with their primary care provider and assisting with the arrangements for specialist or diagnostic appointments or other clinic visits. Transportation services were arranged by the rapid response nurse, to ensure that the patient could get to diagnostic services and reinforced the patient's care plan and education with the patient and family. Additional visits by the rapid response nurses were made based on the patient's condition and in-home risk assessment. Telephone follow-up occurred at least twice in the 30-day post-discharge period and more often, as determined appropriate, by the rapid

response nurse. After 30 days, the rapid response nurse transferred information to a NECCAC care coordinator, who managed the patient's care coordination needs thereafter.

Chronic Disease Management Clinic Visits. Referral to the most appropriate chronic disease management clinic for the conditions of diabetes, congestive heart failure or chronic obstructive pulmonary disease was coordinated by the care transitions nurse for patients randomized to the intervention group. The chronic disease management clinics are hospital-based ambulatory clinics with care delivered by an inter-professional team. The diabetes and congestive heart failure clinics included medical leads with specialization in the areas of endocrinology and cardiology respectively. Patients with chronic obstructive pulmonary disease were referred to the pulmonary rehabilitation service overseen by a non-specialist general practitioner. Referral was initiated by the care transitions nurse for those study participants who were randomized to a group that included follow-up in a chronic disease management clinic. Study participants referred to the chronic disease management clinic received in-hospital initial teaching, by the care transitions nurse. A follow-up appointment with the chronic disease management clinic was scheduled prior to the patient being discharged from the hospital.

Hand off Protocol. Communication between the care transitions nurse and rapid response nurses was undertaken using teleconferences and/or face to face or telephone meetings, during which time prospective patients were reviewed. On the day before discharge, telephone contact was made by the care transitions nurse to the rapid response nurse or the NECCAC team assistant, to review the patient's plan of care and service needs. The NECCAC team assistant coordinated the transfer of discharge documentation, between the care transitions nurse and rapid response nurse. The study design ensured that patient care data be tracked through a shared, secured, electronic portal. This electronic portal was intended to be used by the care transitions

and rapid response nurses to monitor the patient's progress, both in the hospital and once the patient was transferred to the community. The design allowed the care transitions nurse, to review the discharge plan of care with the NECCAC access care coordinator, to ensure that the patient's in-home services were arranged for the day of discharge. Once discharged home, the rapid response nurse would visit the patient at home within 24 to 48 hours of discharge as described above.

Data Collection Methods and Instruments

Each patient that consented to participate in the study was assigned a code for the purposes of de-identification of patient information collected during the course of the research process. The coding system was known only to the principal investigator. The de-identified data were linked back to the patient only if the patient was readmitted to the hospital. An electronic copy of the coding system linking the codes to the patient identification information was stored in a separate electronic file that was password protected and encrypted. A paper copy of the coding system was kept in the researcher's office in a locked filing cabinet. The paper copy of the list was updated weekly with the previous copy being shredded.

Patients admitted onto a medical unit, for which the current admission was at least their second admission in 12 months, were screened for potential inclusion into the study. Once the patient's consent was obtained each patient was screened using the LACE Index (Appendix F) (Walraven et al., 2010).

The LACE index is an internally and externally validated instrument that has demonstrated reliability in predicting readmission and death. It is a tool that has demonstrated utility in research and in daily clinical work for identifying patients at high risk for readmission (Walraven et al., 2010). The index was derived and validated in a prospective cohort study of

4,812 patients that involved the analysis of 50 factors independently associated with 30-day readmission and death. Screening involved the completion of the LACE index which scored the patient's risk for readmission and death based on the criteria of length of stay (L); acuity (A); comorbidity (C); and emergency department use (E) (Walraven et al., 2010). LACE scores can range from 0 (low probability of readmission or death) to 19 (high probability of readmission or death).

The Comprehensive Geriatric Assessment, Frailty Index (FI-CGA) was applied to all patients in the study. The FI-CGA also contains subscale scores related to social vulnerability, activities of daily living (ADLs) and independent activities of daily living (IDAL) (Evans et al., 2014). A web-based version of the tool was utilized; Videx FI-CGA (Rockwood, 2011). Only the composite frailty score was used for the purposes of this study (Appendix F).

Social isolation was measured using the Friendship Scale and done as part of the patient's admission assessment (Hawthorne, 2006). The Friendship Scale is a six-item scale for measuring social isolation. A copy of the tool is available in Appendix F. The tool's psychometric properties suggest that it possesses reliability and discrimination when assessed against other social relationship scales and is sensitive to known correlates of social isolation (Hawthorne, 2006).

The patient's evaluation of the discharge and follow-up experience was measured using *The Care Transitions Measure*, a validated and reliable tool, for measuring the quality of a patient's experience as they transition from the hospital to their home (Coleman, Smith, Frank, Eilerst et al., 2002). The survey is available in a 15-item and 3-item questionnaire with scoring based on a Likert scale as follows: strongly disagree = 1, disagree = 2, agree = 3, strongly agree = 4, don't know (Coleman et al., 2002). This study utilized the 15-item questionnaire to enable

the collection of more complete data and to identify more specifically challenges associated with the transition from the hospital to the home. It was administered at least 30 days post-discharge. The survey was completed by phone by a data research assistant blinded to the patient's assignment. A copy of the tool is available in Appendix F.

A summary of the data collection tools applied to each patient enrolled in the study is detailed in Table 4.2 below.

Episode-of-care data collected included the date of the patient's index admission and subsequent readmissions, in the post-discharge period from the time of the index admission discharge date. Other episode-of-care data collected included: the patient's length of stay per hospital admission, the number of emergency department visits in the post-discharge period from the date of the index admission discharge date. Post-hospital episode-of-care data included the date of admission and the dates of visits by the rapid response nurses.

Qualitative Study: Focus Groups and Interviews

The qualitative component of this study aimed to more fully understand the factors that facilitated or were barriers to the implementation of this care transitions intervention from the perspective of the care providers involved in its implementation. A second purpose was to identify opportunities for improvement based on the perspective of those directly and indirectly involved in delivering the service. Data were collected via focus groups with the care transitions and rapid response nurses, conducted separately, and interviews with the coordinators and senior managers at each of the respective organizations. These were conducted separately as well. An independent facilitator was retained to conduct all focus groups and interviews.

Table 4.2: Summary of Data Collection Instruments

Instrument	Purpose	Measures	Application and Scoring
LACE	Predicts Risk of readmission	Uses length of stay (L), number of previous admissions (A), comorbidities (C) and emergency visit (E) to risk profile patients. Scores from 0 low-risk to 19 – high risk.	Completed at the time of admission. Scored based on the sum of the individual items on the risk-assessment tool.
FI-CGA	Frailty Scoring	A web-based version of the tool was used Videx (2010). The score ranges from 0 to 1 and is calculated by dividing the number of deficits as recorded through the CGA by the maximum number of deficits.	Completed by Care Transitions Nurse. The score is provided based on the assessment completed and input through the web-based application. Scoring based on the ratio of deficits identified to all possible deficits.
Friendship Scale	To measure Social Isolation of the study participants	This is a validated 6-item tool which rates each item on a scale from: not at all, occasionally, about half of the time, most of the time, almost always. The score range is from 0 (complete isolation) to 24 (highly socially connected)	The tool will be administered as part of the admission assessment process. The scoring is based on the sum of the individual scored items.
Care Transitions Survey	Measure of Care Transitions Performance	Scored on a 1-4 Likert-scale from Strongly Disagree = 1; Disagree = 2, Agree = 3, Strongly Agree = 4. The scores are aggregated and then transformed to a scale ranging from 0 to 100 for individual participants total score. The survey is administered by telephone survey post discharge.	The tool was administered via telephone post discharge by data collection clerk. The total score of was based on the sum individual scores divided by the number of questions answered and transformed to a scale of 0 to 100. The means of individual questions were compared between the intervention and control groups.

A purposive sampling method was used and included representatives directly involved or providing oversight of the work.

Two focus groups were held, one included rapid response nurses employed by the NECCAC (n=3) and one included care transition nurses employed by Health Sciences North (n = 2). Individual interviews were conducted with the managers (n=2) and executives (n =2) from each of the respective organizations. The facilitator coordinated the focus group sessions and individual interviews, obtaining signed consent at the time of the focus group and interview sessions. The facilitator was retained by the researcher and was independent of either organization and had not been involved in other aspects of the research. Each focus group session lasted approximately 60 to 90 minutes and was conducted in a conference room at Health Sciences North. Individual interviews, with managers and senior leaders, took one hour to complete and were conducted at Health Science's North in a conference room for three of the interviews and one was conducted via telephone. The focus groups and interviews were taped and transcribed verbatim for analysis. The interview guide is available in Appendix G.

Quantitative Analysis: Randomized Control Trial

The primary end points were the time to first readmission for any reason. The secondary end points were the rate of readmissions within the time intervals of 30 days, 60 days and 90 days from the time of discharge of the index admission. Other end points included for the same time intervals, the total hospital bed-days used, the number of emergency department visits, the time to first readmission and the time to first emergency department visit in the post-discharge period.

The descriptive data analysis included basic demographic information, the LACE score and the frailty and social isolation scores. The relationships between frailty and social isolation scores were analyzed using Pearson Correlation Analysis.

Analysis was completed using the intention-to-treat principle. The primary end-point, time to first readmission and the time to first emergency department visit was analyzed using the Kaplan-Meier Survival Analysis. The Fisher exact test was used to compare the differences in utilization rates, between the intervention and control groups for the number of readmissions, emergency department visits at 30 days, 60 days and 90 days into the post-discharge period. The Mann-Whitney U test was used to compare total bed-days for the same periods. The independent t-test was used to determine if there were differences in frailty scores of those who died, compared to those who survived. Two-way analysis of variance was used to determine if there were differences in frailty and social isolation scores by gender and those living alone, compared to those not living alone. A mixed linear effect approach was utilized to determine those factors which were significantly associated with readmission, emergency department use and inpatient bed-use.

Qualitative Analysis

The available data from the focus groups and interviews was analysed using inductive thematic content analysis, with the aim of looking for patterns in the data, to identify factors, which may have contributed to the results of the quantitative study (Green, 2014). The data were combined with the qualitative data and survey results from patients, to provide an overall evaluation of the outcome of the care transitions and rapid response nurse intervention.

The analysis proceeded through the stages of transcription of interviews, reading transcripts and obtaining a general overview, inductive coding and the categorization of codes,

into main themes (Bragstad, 2014). The researcher listened to the interviews twice and read through the transcripts twice. The transcripts were manually reviewed line by line and key themes identified and labeled. This work was done on an excel spreadsheet. This process of reviewing and categorizing the interviews went on for several iterations. Once the categorization was completed and the key themes and subthemes identified the transcripts were then sorted by major category and subcategories within the excel documents. This information was then printed. The printed copies of each transcript were then cut up according to theme and subtheme and combined by major theme and subtheme onto flip chart paper. They were reviewed to ensure that the categorization of themes best reflected the discussion from the interviews and focus group responses. The transcribed documents were loaded into NVivo 10 for Windows Student Edition software for the purposes of cross-referencing the themes and key words. However, this software was only used in a supplementary fashion (NVivo, 2014). The analysis was validated by sharing back with the interview and focus group participants a written summary of the results. The interview and focus group guides are provided in Appendix G.

CHAPTER 5

RESULTS

Overview

The results of both the randomized control trial and the interviews and focus groups are summarized in the sections which follow. The results of the randomized control trial are provided first.

The randomized control trial tested the hypothesis that aligning professionals from two organizations into a single coherent process, that coordinates the transition of the patient from the hospital to the home, would result in the lengthening of the time to first readmission, reduce emergency department and inpatient bed utilization and improve patient satisfaction. In this particular trial the intervention tested was the care transitions and rapid response nurse intervention.

The preliminary results of the randomized control trial demonstrated that the intervention did not have an effect. To better understand the results of the randomized trial and to provide some context to the results, focus groups were conducted with the care transitions and rapid response nurses and interviews with front line managers and executives, to determine from the perspectives of those involved, the factors which facilitated or were barriers to the effective implementation of the care transitions and rapid response intervention.

QUANTITATIVE STUDY

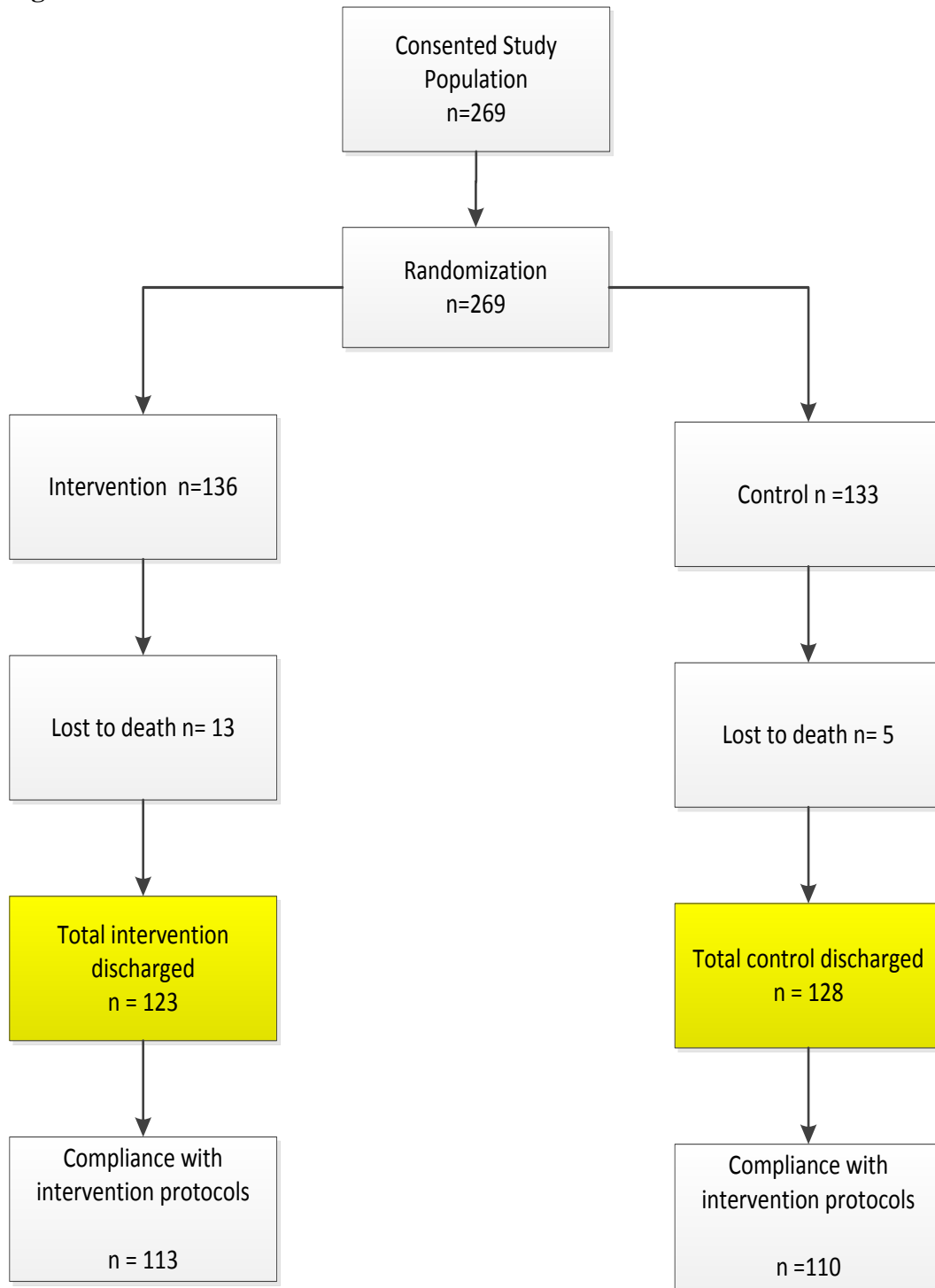
The quantitative analysis was completed using data generated through the randomized control trial. The data were collected according to the study protocols. All analyses were completed using IBM SPSS Version 21 software (IBM, 2012).

Population Sample and Protocol Adherence. The randomization of patients to the intervention (n = 136) and control groups (n = 133) is illustrated in Figure 5.1 below. Patients were entered into the trial from June 2013 to June 2014. There were n = 123 patients in the intervention group and n = 128 patients in the control group that were discharged home or to a home-like setting. Patients compliant with the protocols numbered n = 113 in the intervention group and n = 110 patients in the control group.

The data were analyzed using the intention-to-treat principle. The intention-to-treat principle provides an “*unbiased assessment of the efficacy of the intervention at the level of adherence observed in the trial,*” similar to that which might be observed in the community (Montori & Guyatt, 2001). Therefore, all 123 patients in the intervention group and all 128 patients in the control group, that were discharged home or to a home-like setting, were analyzed on the basis of how the patients were allocated.

Baseline descriptions of the intervention and control groups are provided in the sections which follow. It is assumed that the differences which might exist between the intervention and control groups were random differences as a result of chance (Pocock, Assmann, Enos, & Kasten, 2002). Therefore, statistical analysis was not completed to measure the differences in population attributes. Analysis was completed to understand the intervening impact of social isolation and frailty on the outcomes of interest.

Figure 5.1: Randomization and Protocol Adherence Intervention and Control



Sample Demographic Characteristics. Table 5.1 summarizes the basic demographic information of patients enrolled in the trial. All patients resided in the City of Greater Sudbury.

Table 5.1 Sample Population Demographic Characteristics, Intervention and Control

Randomized Assignment	Intervention n (%)	Control n (%)
Characteristic	136	133
Age (Mean, M, Standard & Deviation, SD)	75.11 +/- 10.9	75.21 +/- 10.4
Gender		
Male	65 (47.8)	58 (43.6)
Female	71 (52.2)	75 (56.3)
Lives Alone		
Yes	51 (37.5)	54 (40.6)
No	85 (62.5)	79 (59.4)
Living Location		
Apartment	42 (30.9)	45 (33.8)
House	65 (47.8)	64 (48.1)
Assisted Living	9 (6.6)	11 (8.3)
Retirement Home	12 (8.8)	7 (5.3)
Extended Family	8 (5.8)	6 (4.5)
Marital Status		
Married	58 (38.2)	57 (42.9)
Common Law	2 (1.5)	1 (0.8)
Divorced	11 (7.3)	11 (8.3)
Single	16 (11.8)	14 (10.5)
Widow	49 (36.0)	50 (37.6)

Health Characteristics. The characteristics of the patient population in the intervention and control groups are compared in Table 5.2 below. The number of medications taken differed between the intervention and control groups and the presence of dementia was higher in the intervention group.

The aim of the screening process was to identify a patient population that was considered to be at high risk for readmission or other post-discharge adverse events. Based on the population health status results, this was accomplished. The population identified was multi-morbid with 80% of the population having three (3) or more chronic diseases. The population utilized a significant number of medications, with 81% of the intervention and 87% of the control group utilizing more than 10 medications. In terms of the targeted chronic diseases, COPD was the most frequently occurring with 58% of the sample having the disease. Forty-nine

percent (49%) of the sample had diabetes and/or congestive heart failure. Twenty percent (23%) of the population had dementia. Eleven percent (11%) of the population did not have access to a primary care provider.

Table 5.2: Health Characteristics: Medication, Primary Care and Chronic Diseases

Characteristic	Intervention n (%)	Control n (%)
	136	133
Number of Medications		
< 6	2 (1.5)	10 (7.5)
>5<10	23 (16.9)	6 (4.5)
>10<20	89 (65.4)	59 (44.4)
>20	22 (16.2)	58 (43.6)
Primary Care Physician		
Yes	121 (89.0)	118 (88.7)
No	15 (11.0)	15 (11.3)
Number of Chronic Diseases	(M = 4.48, SD = 1.755)	(M = 4.34, SD = 1.723)
1	14 (10.3)	10 (7.5)
2	12 (8.8)	16 (12.0)
3	10 (7.4)	20 (15.0)
4	20 (14.7)	13 (9.8)
5	19 (14.0)	21 (15.8)
>5	61 (44.85)	53 (39.9)
Congestive Heart Failure		
Yes	64 (47.1)	67 (50.4)
No	72 (52.9)	66 (49.6)
Diabetes		
Yes	66 (48.5)	67 (50.4)
No	70 (51.5)	66 (49.6)
COPD		
Yes	82 (60.3)	75 (56.4)
No	54 (39.7)	58 (43.6)
Dementia		
Yes	31 (22.8)	23 (17.3)
No	108 (77.2)	106 (82.7)

Previous Health System Utilization. The population demonstrated a high percentage of hospitalization in the six months preceding entry into the trial, with 32% of the intervention group and 25% of the control group having more than one admission in the last six months. Similarly, emergency department utilization in the previous six months was high, with 23% of

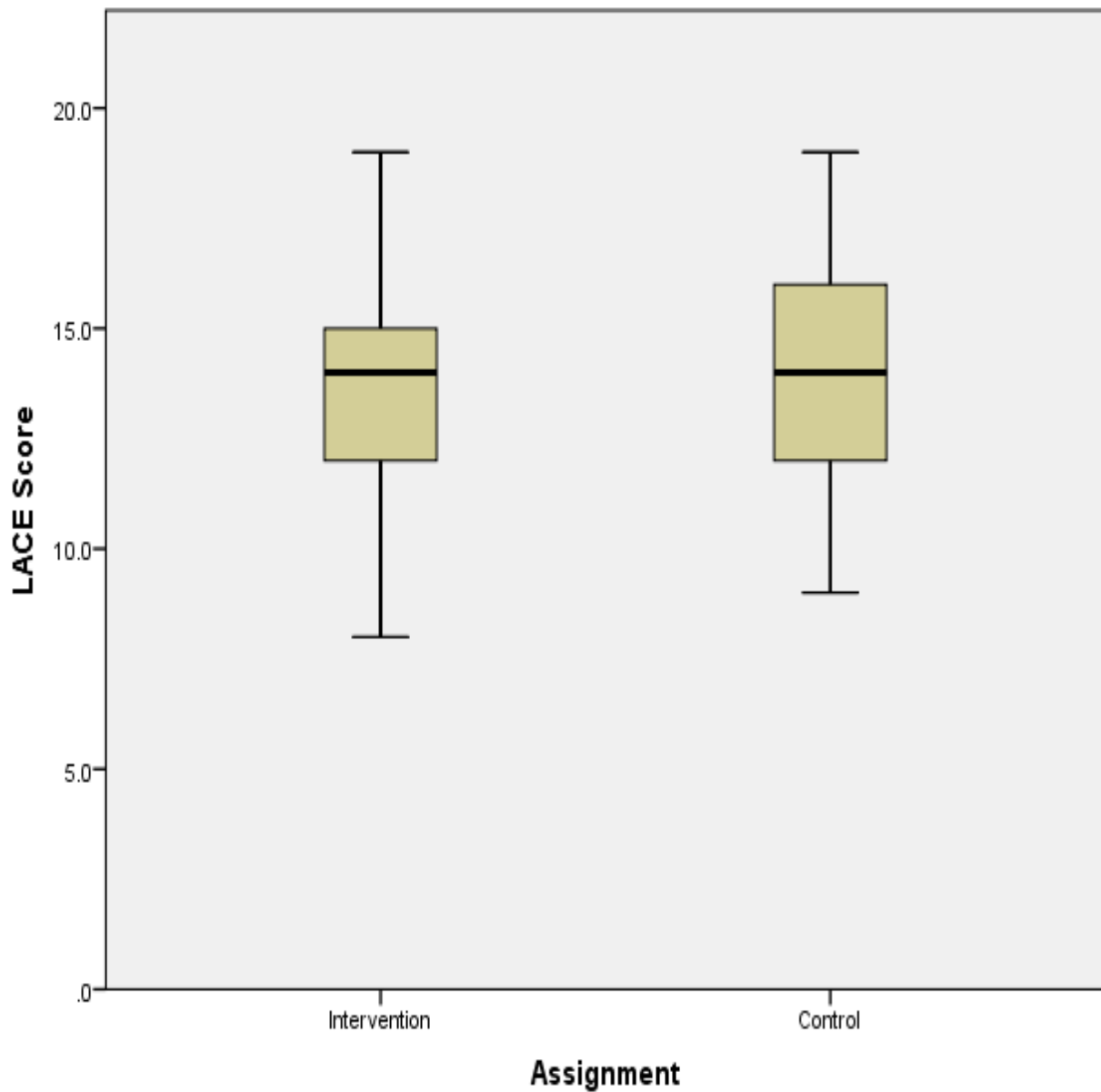
the intervention and 26% of the control group having more than one emergency department visit in the last six months. This information is summarized in Table 5.3 below.

Table 5.3: Previous 6 month Admissions and Emergency Department Visits

Characteristic	Intervention n (%) n=136	Control n (%) n=133
Previous Readmissions last 6 months	(M = 1.500, SD = 0.8861)	(M = 1.059, SD = 1.434)
1	92 (67.7)	98 (73.7)
2	29 (21.3)	28 (21.8)
3	8 (5.9)	3 (2.3)
4	6 (4.4)	1 (0.8)
5	0 (0)	1 (0.8)
6	1 (0.7)	1 (0.8)
Previous ED Visits Last 6 Months	(M = 4.48, SD = 1.755)	(M = 1.093, SD = 1.535)
0	59 (43.4)	63 (47.4)
1	46 (33.8)	35 (27.1)
2	14 (10.3)	12 (9.02)
3	8 (5.9)	11 (8.3)
4	4 (2.9)	5 (3.8)
5	3 (2.2)	4 (3.0)
>5	2 (1.5)	2 (1.5)

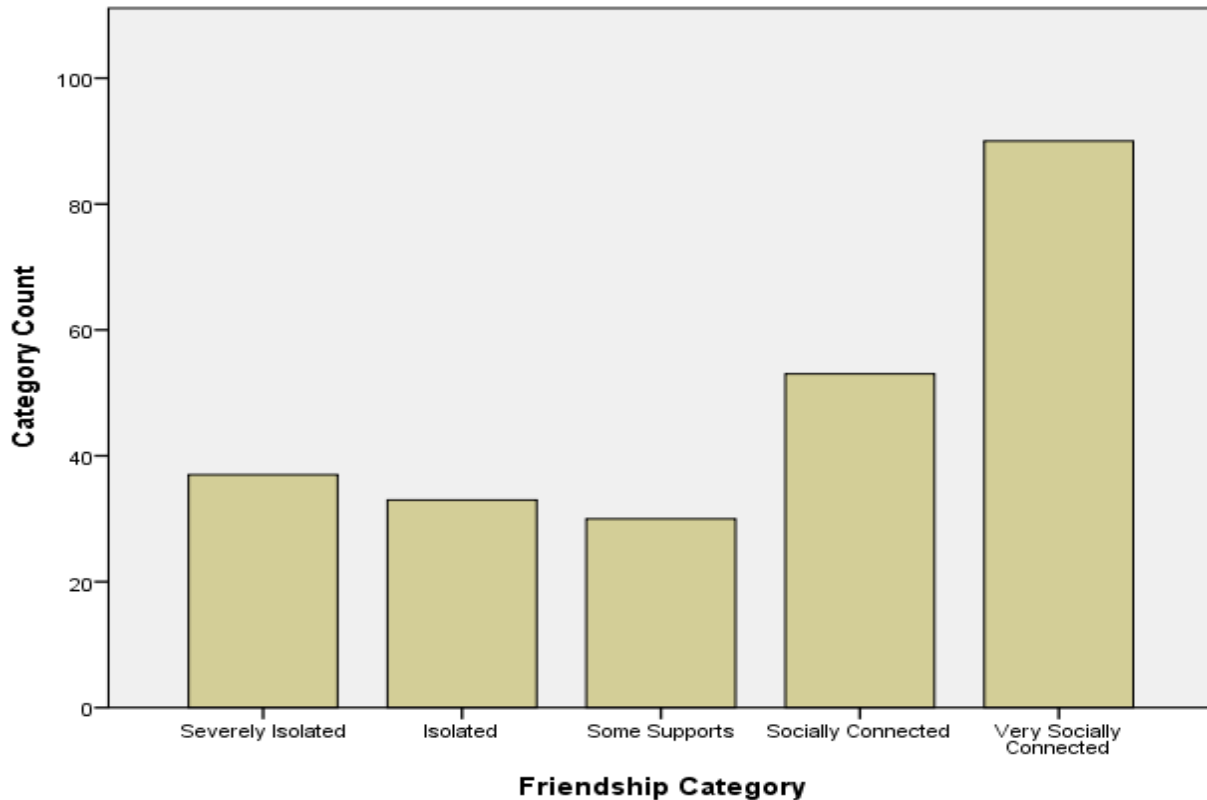
LACE. LACE is the mnemonic for: length of stay (“L”); acuity of admission (“A”); comorbidity of patient (“C”); and emergency department use (“E”) and is a measure of the expected risk for readmission and death within 30 days (Walraven et al., 2010). The LACE for the intervention group and control were, respectively, Mean (M) = 13.750, Standard Deviation (SD) = 2.090; M = 13.870, SD = 2.302. A LACE index score in this range would be considered high. A LACE index score of 13 has a 30-day predicted probability of readmission or death of 19.8% and a LACE index score of 14, twenty-three percent (23%) (Walraven et al., 2010). The median score and the distribution of LACE scores at the 25th and 75th percentile for the intervention and control groups are shown in the box plot in Figure 5.2 below. The whiskers in Figure 5.2 represent the highest and lowest scores. There were no outlier scores.

Figure 5.2: LACE Scores: Median and Distribution at 25th and 75th Percentiles



Friendship Scale (Social Isolation Measure). The Friendship score is a measure of social isolation. The Friendship scores can be categorized into five levels. Those who are very socially isolated having scores of 0-11; isolated, 12-15; some social supports, 16-18; socially connected, 19-21; and very socially connected, 22-24 (Hawthorne, 2006). The distribution of Friendship scores by social isolation category are shown in Figure 5.3 below.

Figure 5.3: Frequency Distribution of Friendship Scores by Social Isolation Category (n=269)



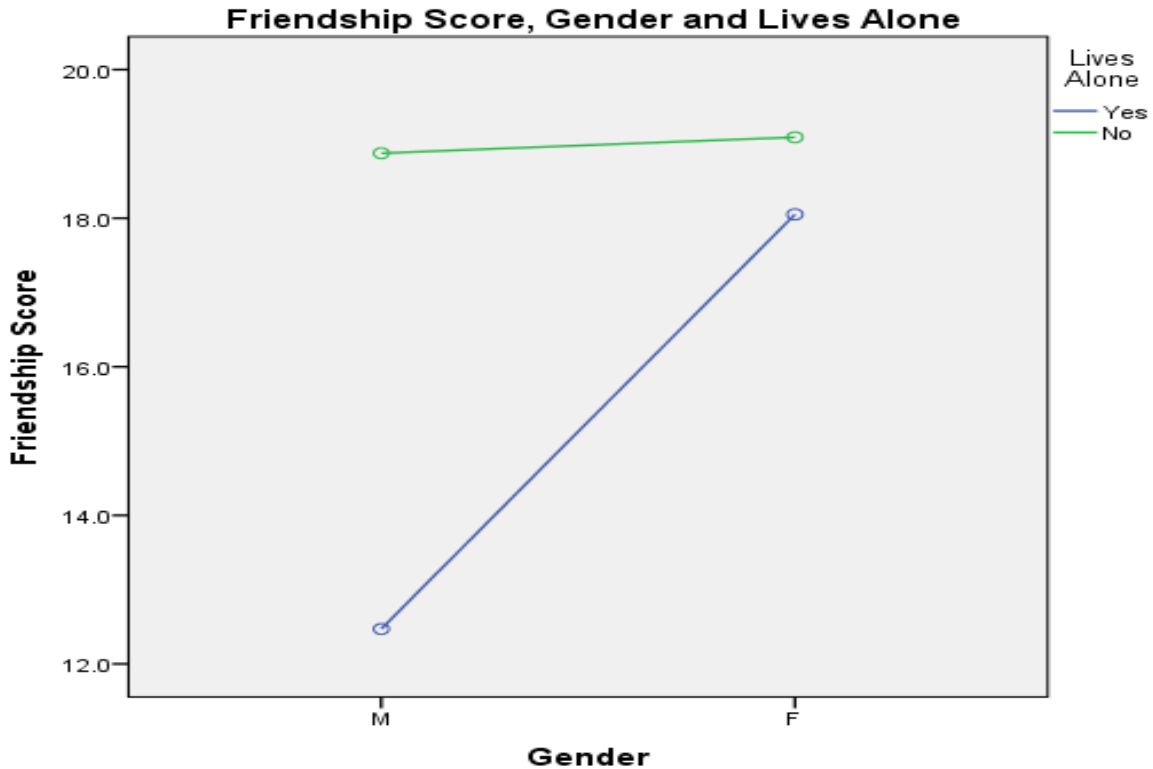
The mean and standard deviation of the Friendship scores for the intervention and control group were, respectively, $M = 17.60$, $SD = 6.225$; $M = 18.18$, $SD = 6.014$. The group in this case would best be characterized as having some social supports or being marginally socially connected (Hawthorne, 2006).

Men living alone were more socially isolated ($M = 12.6$, $SD = 8.329$) than men not living alone ($M = 19.0$, $SD = 5.389$), than women living alone ($M = 18.2$, $SD = 5.657$) and women not living alone ($M = 19.0$, $SD = 5.178$). Figure 5.4 below graphically shows the Friendship scores for each of the above mentioned groups.

The two-way analysis of variance demonstrated that a statistically significant interaction effect exists between sex and living alone: $F(1, 265) = 11.511$, $p < 0.001$. The pairwise comparisons demonstrated no differences in men and women not living alone, ($MD = 0.022$,

Standard Error (SE) = 0.906, $p = 0.980$) whereas men living alone compared to women living alone was significantly different (MD = 5.002, SE = 1.155, $p = 0.000$). The difference between men living alone and not living alone was also significantly different, (MD = 5.759, SE = 1.102, $p = 0.000$).

Figure 5.4: Friendship Score by Gender and Lives Alone



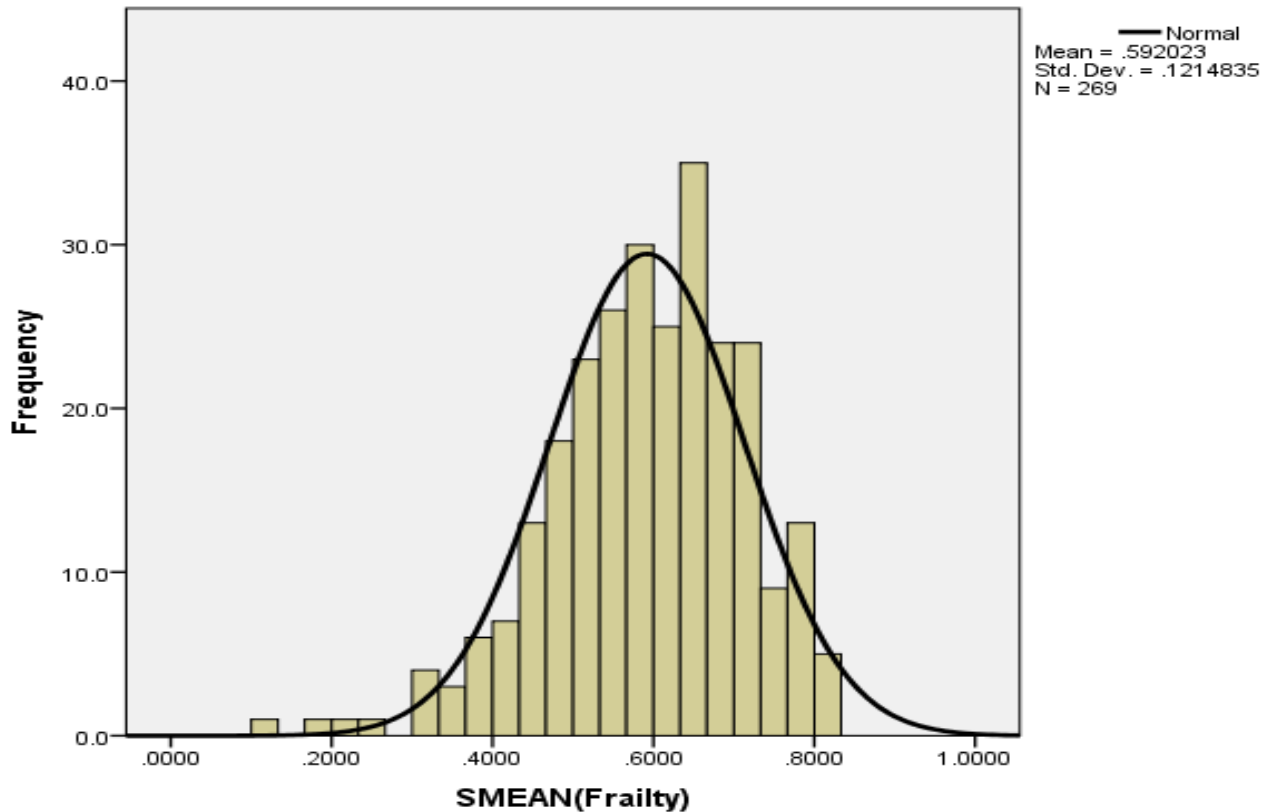
Frailty Measures. The frailty scores for the intervention and control groups were respectively, $M = 0.591$, $SD = 0.124$; $M = 0.592$, $SD = 0.119$. The mean frailty score on admission of 0.59 is considered to be high, characterizing a population that is very frail (Mitnitski et al., 2001). The distribution of frailty is normally distributed as illustrated in Figure 5.5 below.

Gender Differences in Frailty. The independent t- test demonstrated between gender differences in frailty scores, $t(265) = -3.05$, $p = 0.003$. The frailty scores for men and women are shown in Table 5.4 below.

Table 5.4: Mean Frailty Score by Gender

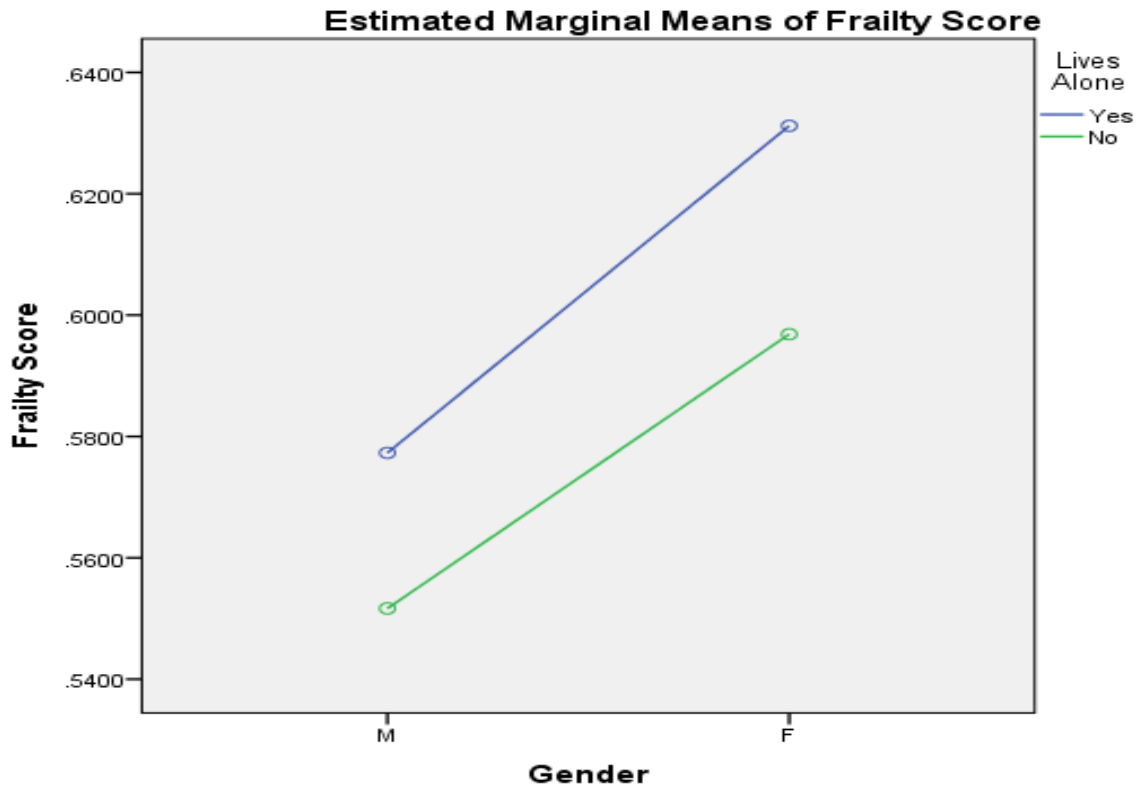
		Group Statistics			
	Sex	N	Mean	Std. Deviation	Std. Error Mean
Frailty Score	M	123	0.567	0.125	0.011
	F	146	0.612	0.115	0.009

Figure 5.5: Frailty Score Distribution Population Sample



The mean frailty and standard deviation scores for those living alone and not living alone were, respectively, $M = 0.607$, $SD = 0.111$; $M = 0.582$, $SD = 0.127$. No significant differences were found based on the independent t-test: $t(265) = 1.624$, $p = 0.106$. The two-way analysis of variance demonstrated significant differences in frailty between gender: $F(1, 265) = 8.658$, $p = 0.004$, but frailty was not significantly associated with living alone: $F(1, 265) = 1.690$, $p = 0.061$. Figure 5.6 below shows the association between frailty, living alone and gender.

Figure 5.6 Associations of Frailty, Lives Alone and Gender



Frailty was also significantly correlated with a number of other variables. Frailty is significantly correlated with length of stay of index admission, $r(265) = 0.193$, $p = 0.002$, number of medications, $r(265) = 0.373$, $p < 0.000$, friendship score (social isolation), $r(265) = -0.270$, $p < 0.000$ and patient's age, $r(265) = 0.181$, $p = 0.003$. There was a moderate and significant correlation between LACE index scores and frailty scores $r(265) = 0.224$, $p < 0.000$.

OUTCOMES

Mortality. The mortality rate for those patients who entered the trial was 22.7%. Patients were entered into the trial from June 2013 to June 2014. Mortality frequency was based on the period from the beginning of the trial in June 2013 to 90 days after the last patient was entered into the trial in June 2014. The results are summarized in Table 5.5 below.

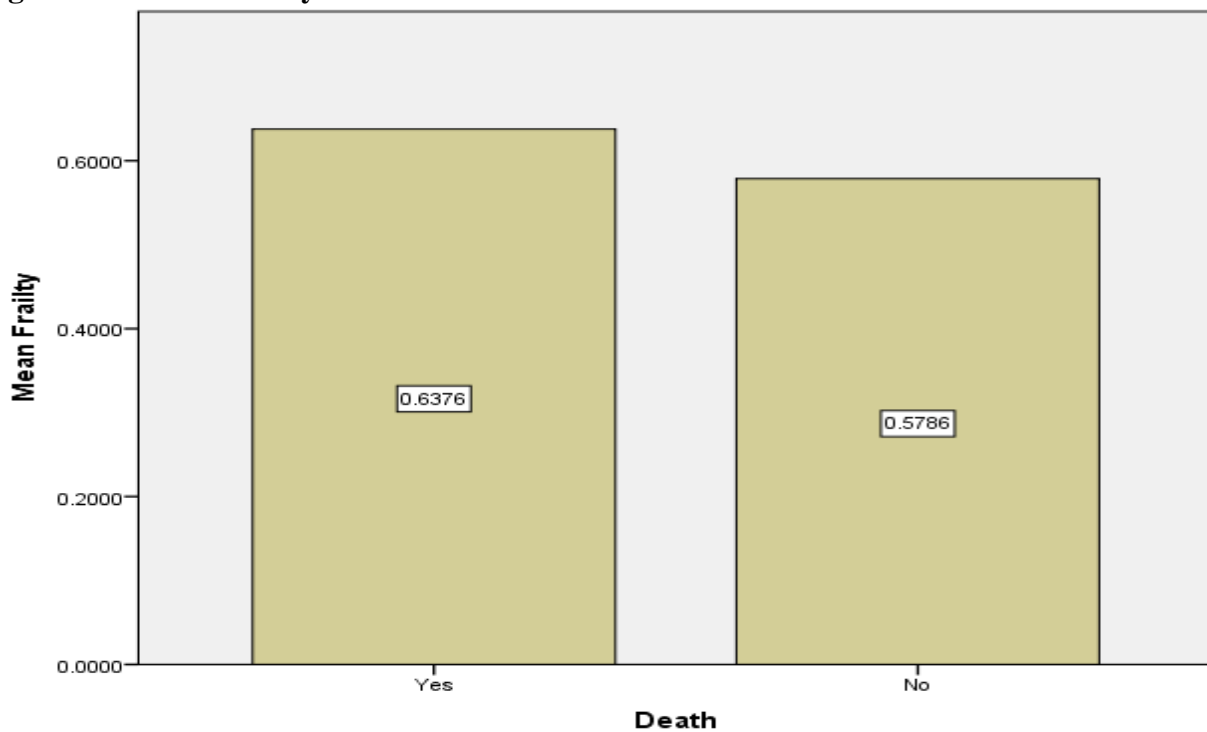
Table 5.5: Mortality Frequencies and Percentages during the Study Period

		Mortality Count and Percentage			
		Frequency	Percent	Valid Percent	Cumulative Percent
Death	Yes	61	22.7	22.7	22.7
	No	208	77.3	77.3	100.0
	Total	269	100.0	100.0	

The mean frailty score for those who died was (M = 0.638, SD = 0.104) and was significantly higher than those who did not (M = 0.579, SD = 0.123), $t(267) = 3.401$, $p = 0.001$.

This is illustrated in figure 5.7 below.

Figure 5.7: Mean Frailty Scores Death vs. No Death



Post-Discharge Utilization. The post-discharge utilization for the intervention and control groups for the 30-day, 60-day and 90-day readmission count, the total hospital bed-days used and emergency department visits for the same periods are presented below. Patients enrolled in the study, but who died while still in the hospital were not included in this analysis. A total of 18 patients died in hospital prior discharge.

The number of individual patients admitted during each of the post discharge periods is summarized in Table 5.6 below. It is important to note that an individual admitted and counted in one period may be counted in a subsequent period, if they were readmitted during that subsequent period.

Table 5.6: 30-Day, 60-Day, 90-Day Readmission Count and Percentage

	Cases					
	Readmitted		Not Readmitted		Total	
	n	Percent	n	Percent	n	Percent
30-day post-discharge readmission –cases	51	20.3%	200	79.7%	251	100.0%
Readmission cases 30-60 days post-discharge	36	14.3%	215	85.7%	251	100.0%
Readmission cases 60-90 days post-discharge	28	11.2%	223	88.8%	251	100.0%

Table 5.7 summarizes the results of the Fisher’s exact test, comparing the intervention and control groups on the measures of readmission at 30 days, 60 days, and 90 days in the post-discharge period. The post-discharge readmission date was calculated by measuring the difference between the index admission discharge date and the readmission date. Total readmissions were used, meaning that an individual patient could be readmitted more than once during a period. The analysis confirms the null hypothesis, that there is no difference between the control and the intervention groups, in terms of their rates of readmission, based on the results of the Fisher’s exact test.

Table 5.7: 30-Day, 60-Day, 90-Day Readmissions

	Assignment	Admitted (n)	Not Admitted (n)	Total Readmissions	Fisher Exact Test (p)
30-day post discharge readmissions	Intervention	26	97	28	0.7566
	Control	25	103	28	
Cumulative 60- day readmission	Intervention	38	85	47	0.7839
	Control	37	90	46	
Cumulative 90- day readmissions	Intervention	45	78	63	0.8954
	Control	45	83	60	

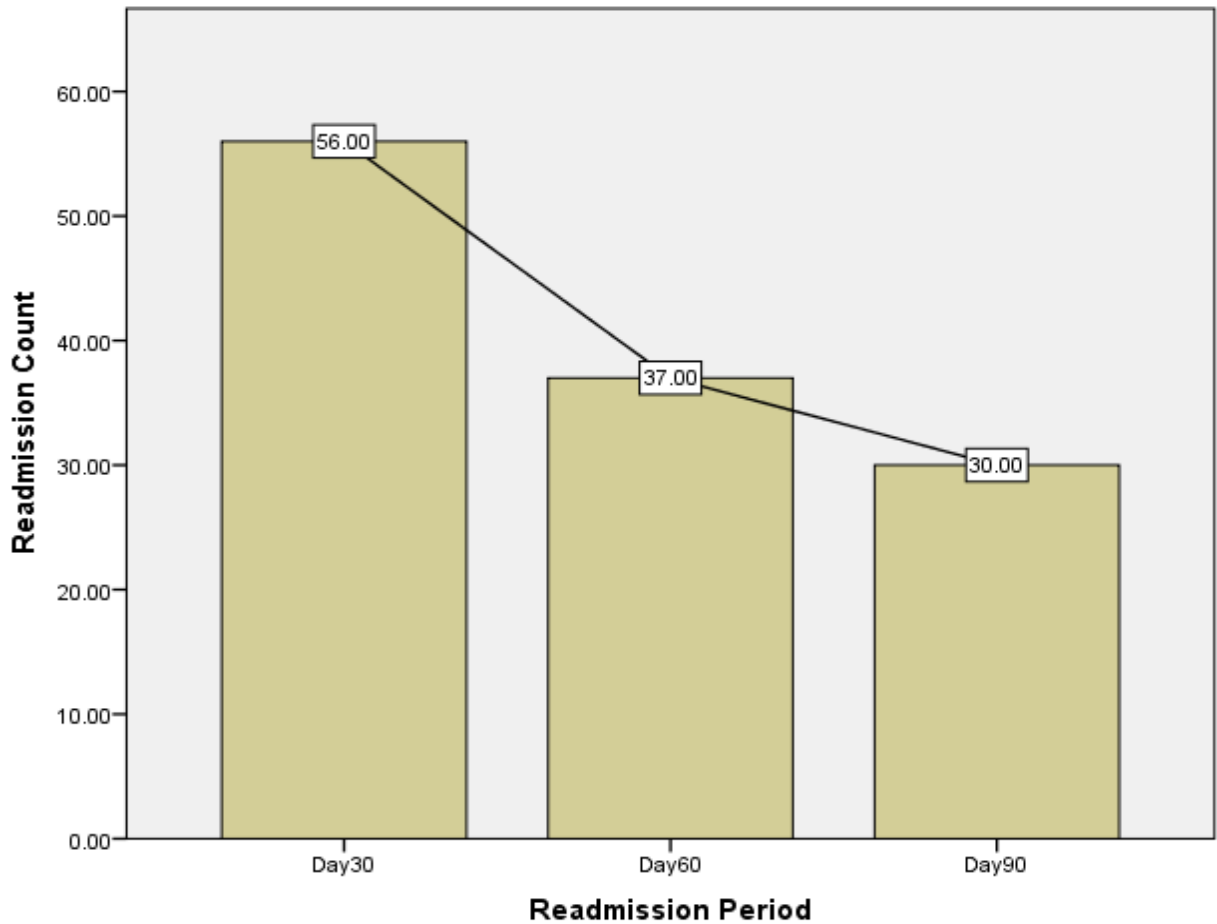
Readmission Rates. Readmission rates are defined as the number of readmissions in a period for a group of n individuals. In this case, the sample of interest is the 251 patients who were discharged home or to a homelike setting. The 18 patients enrolled in the trial but who died in hospital were excluded from the analysis. The cumulative 30-day, 60-day and 90-day readmission rates are shown in Table 5.8 below. The 30-day readmission rate of 22.31% is consistent with the expected readmission rate based on the LACE scores of the sample (Walraven et al., 2010).

Table 5.8: Cumulative Readmission Rates at 30-Day, 60-Day & 90-Day Post Discharge

Post Discharge Period	Readmission Rate (%)
30-day readmission rate	56/251 (22.31%)
60-day readmission rate	93/251 (37.05%)
90-day readmission rate	123/251 (49.00%)

Figure 5.8 below shows the 30-day, 30 to 60-day and 60 to 90-day readmission frequencies. The highest frequency of readmissions occurred in the 30-day post-discharge period. There is a clear decline in the number of readmissions between the time intervals. Trend analysis of the period differences was found to be statistically significant. The linear term contrast was $F(1, 752) = 8.598, p = 0.003$; and after adjusting for violations of homogeneity of variance, a significant linear contrast result was achieved of $t(464.81) = 2.833, p = 0.005$. Its eta value is 0.012 which can be interpreted as a weak effect.

Figure 5.8: 30-Day, 30-60-Day & 60-90-Day Readmission Events



Emergency Department Visits. Table 5.9 below summarizes the frequency of post-discharge emergency department visits. The count of visits represents the cumulative emergency department visits that did not result in a hospital admission. As with readmissions, an individual who visits the emergency department (ED) in one period can be counted in a subsequent period. The cumulative visits represent the total number of individual patients who had a visit to the emergency department. Comparing the intervention and control groups at 30 days, 60 days and 90 days in the post-discharge period; no statistically significant differences in the utilization of emergency department visits was found during the cumulative or interval time periods based on the results of the Fisher's exact test.

Table 5.9: Interval & Cumulative Emergency Department visits at 30, 60 & 90-days Post Discharge

	Assignment	ED Visit (n)	No ED Visit (n)	Visits	Fisher's Exact
Post discharge 30-day ED visits	Intervention	21	102	27	0.6287
	Control	25	103	31	
Post discharge 60-day ED visits	Intervention	14	109	18	0.6807
	Control	12	116	15	
Cumulative 60-day ED visits	Intervention	30	93	45	0.8832
	Control	33	98	46	
Post discharge 90-day ED visits	Intervention	15	108	18	0.5434
	Control	12	116	14	
Cumulative 90-day ED visits	Intervention	36	87	63	0.8906
	Control	39	89	59	

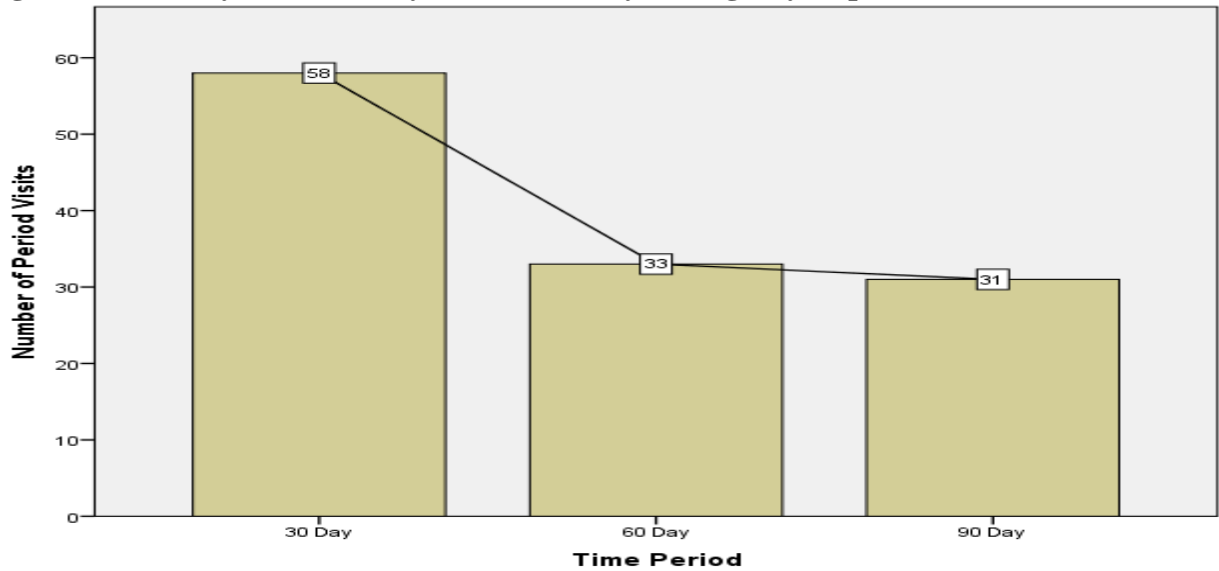
Emergency Department Utilization Rates. Emergency department visit rates are defined as the number of emergency department visits in a period for a group of n individuals. In this case, the sample of interest is the 251 patients who were discharged home or to a homelike setting. The 18 patients enrolled in the trial but who died in hospital were excluded from the analysis. Table 5.10 below summarizes the results.

Table 5.10: Emergency Department Post Discharge Utilization Rates

Post Discharge Period	Readmission Rate (%)
30-day readmission rate	58/251 (23.11)
60-day readmission rate	91/251 (36.25)
90-day readmission rate	122/251 (48.61)

Figure 5.9 below shows the 30-day, 30-60-day, 60-90-day emergency department visits. The highest frequency of emergency department visits occurred in the 30-day post-discharge period. There is a clear decline in the number of emergency department visits between the time intervals of 30 days and 30-60 days post-discharge. Trend Analysis of the period differences in emergency department visits was found to be statistically significant. The linear term contrast was found to be statistically significant; $F(1, 752) = 6.593, p = 0.010$ and after adjusting for violations of homogeneity of variances, the contrast result remained significant, $t(458.432) = 2.491, p = 0.013$. Its eta value is 0.011 which can be interpreted as a weak effect.

Figure 5.9: 30-Day, 30 to 60-Day & 60 to 90-Day Emergency Department Visits



Total Hospital Bed-Days Used. Table 5.11 summarizes the results of the Mann-Whitney U comparing the intervention and control groups on the measure of total hospital bed-days used at 30 days, 60 days and 90 days in the post-discharge period, calculated by measuring the difference between the index admission discharge date and the time to first readmission.

Table 5.11: 30-Day, 60-Day, 90-Day, Hospital Bed-Days Used, Intervention and Control

	Assignment	N	Mean Days	Std. Deviation	Median	Mann-Whitney U	Standard Score z	Sig. (2-tailed)
Total hospital days, 30 days post-discharge	Intervention	26	7.92	7.440	6	370.5	0.860	0.390
	Control	25	8.32	6.230	7			
Total 60-day post-discharge hospital days	Intervention	38	11.18	11.993	6.5	728.0	0.266	0.791
	Control	37	11.79	13.234	7			
Total 90-day post-discharge hospital days	Intervention	45	12.33	15.932	7	1,046.5	0.275	0.783
	Control	45	15.47	22.553	8			

Time to First Readmission. The time to first readmission from the discharge date of the index admission was analysed using a Kaplan-Meier survival analysis. The median period of

time to the first readmission for the intervention and control group are shown in Table 5.12 below.

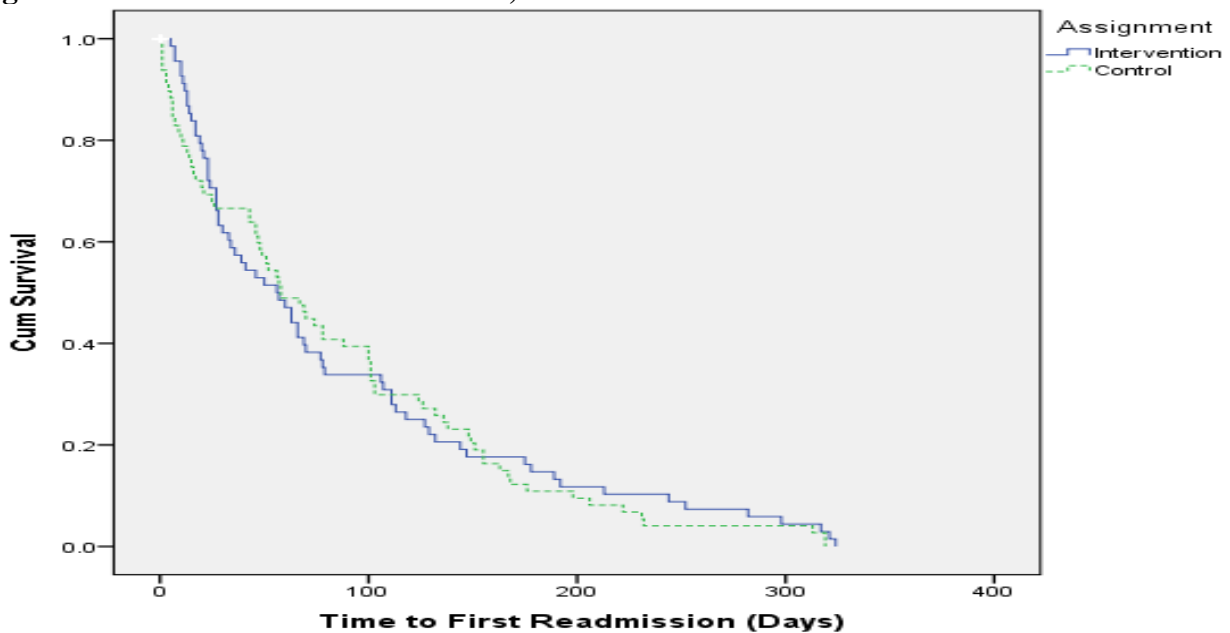
Table 5.12: Median Time to First Readmission

Median Time to First Readmission				
Assignment	Median			
	Estimate	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Intervention	56.000	12.369	31.756	80.244
Control	58.000	10.167	38.072	77.928
Overall	58.000	7.131	44.024	71.976

a. Estimation is limited to the largest survival time if it is censored.

The plot of the time to first readmission is shown in Figure 5.10 below. Based on the log rank (Mantel-Cox) test, there was no statistically significant differences in the time to first readmission between the intervention and control groups; $X^2(1, N=251) = 0.165, p = 0.685$.

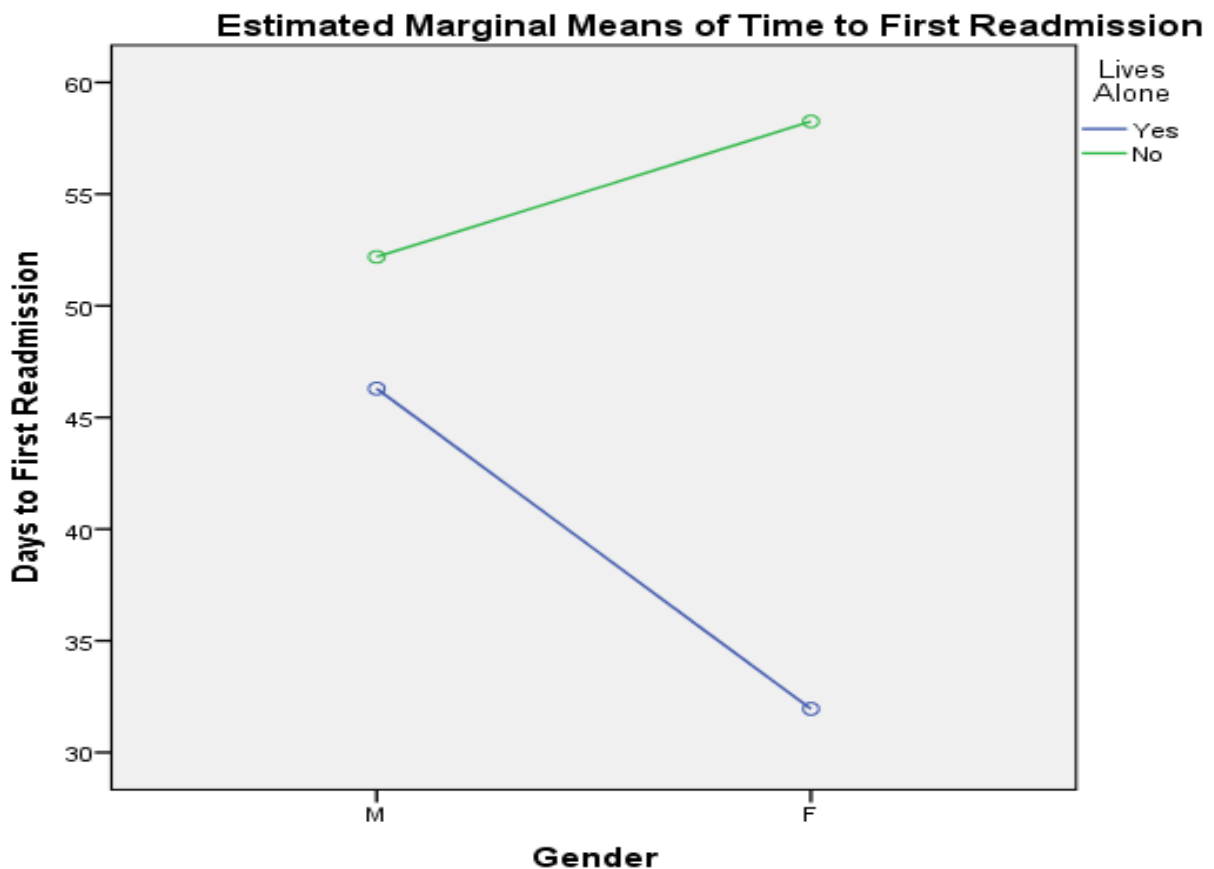
Figure 5.10: Time to First Readmission, Intervention vs. Control



Impact of Gender and Living Alone on Time to First Readmission. Two-way analysis of variance demonstrated a main effect of gender, $F(1, 137) = 0.158, p = 0.692$ and those living alone, $F(1, 137) = 1.8929, p = 0.178$, on the time to first readmission not to be

statistically significant. There was no significant interaction effect of gender and living alone; $F(1, 137) = 0.891, p = 0.347$. Further, analysis using multiple pairwise comparison demonstrated that females living alone had a time to first readmission that was less than females who did not live alone but that this difference was not significant ($MD = 34.015, SE = 19.543, p = 0.084$). Figure 5.11 below shows the differences in time to first readmission for males and females living alone and not living alone.

Figure 5.11: Time to First Readmission: Comparison of Men and Women Living Alone



Time to First Emergency Department Visit. The time to first emergency department visit from the discharge date of the index admission was analysed using a Kaplan-Meier survival analysis. The median period of time to the first readmissions for the intervention and control group are shown in Table 5.13 below and illustrated in Figure 5.12 below.

Table: 5.13: Median Time to First Emergency Department Visit

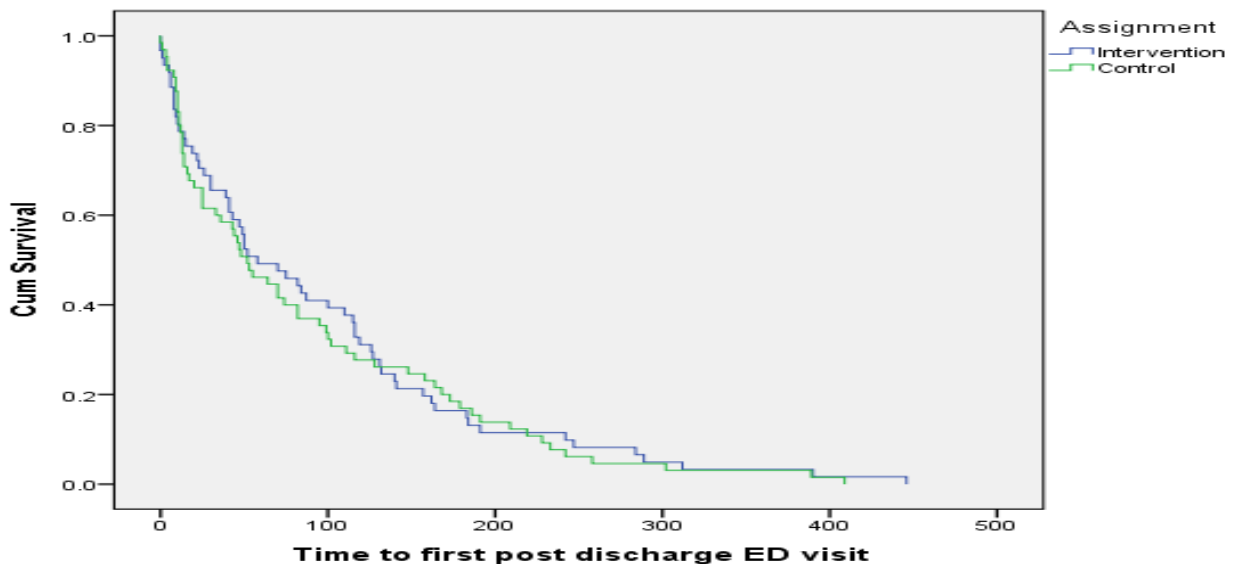
Median Time to First ED Visit				
Assignment	Median			
	Estimate	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Intervention	58.000	18.407	21.921	94.079
Control	52.000	11.516	29.428	74.572
Overall	52.000	8.980	34.399	69.601

a. Estimation is limited to the largest survival time if it is censored.

Based on the log rank (Mantel-Cox) test, there were no statistically significant differences in the time to first readmission between the intervention and control groups, $X^2(1, n=251) = 0.168, p = 0.682$.

Two-way analysis of variance demonstrated a main effect of gender, $F(1, 119) = 4.827, p = 0.03$, with females having a statistically significantly shorter time to first emergency department visit. There was no significant interaction effect of gender and living alone. $F(1, 119) = 0.022, p = 0.882$. No statistically significant differences in time to first emergency department visit were found between those who lived alone and not alone, $F(1, 119) = 0.018, p = 0.892$.

Figure 5.12: Time to First Post Discharge Emergency Visit (Days)



Impacts of Frailty. The mean frailty scores of those readmitted in the post-discharge period were higher ($M = 0.5968$, Standard Error (SE) = 0.0009) than those who were not readmitted ($M = 0.5780$, SE = 0.0129), but the differences were not significant, $t(249) = 1.188$, $p = 0.236$. No correlation was found between frailty and the time to first readmission, $r(141) = -0.054$, $p = 0.531$, the time to first emergency department visit, $F(2,120) = .691$, $p = .503$ or the total inpatient bed-days, $F(2,265) = 1.837$, $p = 0.161$.

Impacts of Social Isolation. No correlation was found between friendship category and the time to first readmission, $r(141) = -0.001$, $p = 0.994$. No differences were observed in the time to first readmission by friendship category, $F(4,133) = 2.366$, $p = 0.056$, the time to first emergency department visit by friendship category, $F(4,116) = 1.754$, $p = 0.143$, or total inpatient bed utilization by friendship category, $F(2,265) = 0.784$, $p = 0.536$.

Summary of Utilization Analysis. During the 15 month study period, 251 of 269 patients enrolled in the study were discharged home after their index admission. These 251 patients experienced a total of 272 readmissions during the study period. These readmissions resulted in the utilization of 5,197 bed-days, representing the equivalent utilization of 11.7 inpatient hospital beds. No statistically significant differences were found between the intervention and control groups at 30 days, 60 days or 90 days on the number of readmissions, or number of inpatient bed-days used, or the number of emergency department visits. No correlation was found between frailty and the time to first hospital readmission. Additionally, no statistically significant differences on key measures of utilization by frailty category were found. No statistically significant differences on key measures of utilization were found between social isolation categories as measured by the Friendship scale.

The inpatient readmission rates calculated from the discharge date of the index admission were at 30 days, 22.3%; at 60 days, 37%; and at 90 days, 49%. The median time to first readmission after the index discharge was 58 days. The emergency department utilization rates that did not result in an inpatient admission and calculated from the discharge date of the index admission were at 30 days, 23%; at 60 days, 36%; and at 90 days, 49%. The median time to first emergency department visit in the post-discharge period after the index admission discharge was 52 days. No statistically significant differences were found between the normal care group and the intervention group in regards to these outcomes.

Models of Prediction

A secondary goal of the trial was to determine if models of prediction could be developed for the 30-day, 60-day and 90-day hospital readmissions, inpatient bed used and emergency department visits.

As a first step in developing models of prediction, multiple linear regression was performed on all post-discharge measures of interest. In each regression model, the correlation of residuals was assessed using the Durbin-Watson statistic. In several cases, the Durbin-Watson statistic revealed that the data were serially correlated, the implication being that the independence of the data could not be assumed (Norusis, 2012). The repeated nature of the measurement on the same subjects resulted in a situation where the data were comparatively close to one another and thus correlated (Cleophas & Zwinderman, 2012).

Linear fixed models, such as multiple linear regression, are based on the assumption of independence of observations and the regression coefficients are considered fixed. The models do not account for correlations between cases which may occur on repeated measures on the same subjects (Bickle et al., 2007) . While it is most often the fixed effects that are of primary

interest in most studies, it is necessary to adjust for the covariance in cases where there is a repeated measurement of subjects or where the experimental subjects are nested in a hierarchical structure (SPSS Inc., 2002).

To accommodate the correlated and unequal variance associated with the repeated measures, a linear mixed-effect approach was employed with analysis being completed using IBM SPSS Version 21 software (IBM, 2012). The mixed linear model is useful in modeling correlations between observations. The linear-mixed effect model involves assessing both the fixed and random components. The fixed effect of the experimental intervention are generally thought of as affecting the population mean whereas random-effects factors are generally associated with the sampling procedure such as a subject effect (Bickle et al., 2007).

In this particular study, a linear mixed model was used to identify the factors associated with readmissions, emergency department and inpatient bed use with the time intervals of 30 days, 60 days and 90 days as the dependent variables of interest (Ishizaki et al., 2004). The fixed independent variables entered into each of the models were: the number of medications, primary care physician, friendship score, frailty score, age, gender, the number of emergency department admissions in the previous six months, living alone, number of chronic diseases and the number of admissions in the previous six months (Ishizaki et al., 2004). These variables are consistent with factors impacting health utilization identified in literature (Clegg et al., 2013; Shankar, McMunn, Banks, & Sfeptoe, 2011; Walraven et al., 2010). The random effect variable entered into each of the models was the patient identification code; as it was assumed that there were an infinite number of eligible patients (Ishizaki et al., 2004).

Table 5.14 below shows the results from the linear mixed model analysis. In terms of hospital bed-days used in the 30-day, 60-day and 90-day post-discharge period, gender was the

only significant predictor. Males occupied more beds than females in all of the post-discharge periods. The bed utilization rate for males and females during the 30-day post-discharge period was (Males = 1.96; Females = 0.97), during the 30 to 60-day period was (Males = 1.46; F = 1.39) and during the 60 to 90-day period was (M = 1.69; F = 0.73). Previous admission was found to be the only significant predictor of readmission at 60 days and 90 days. The results of the analysis are presented in Table 5.14 below.

Emergency department use in the 30-day post-discharge period was significantly associated with gender, with males visiting the emergency department on average 1.35 times and females 1.09 times. Expressed as a percentage, males used the emergency department at a 19.26% greater rate than females in the 30-day post-discharge period. Gender was found to be statistically significant with males having a 48% higher rate of emergency department utilization in the 60-day post-discharge period. Previous emergency department use and living alone were also found to be statistically significant. In the 90-day post-discharge period, gender was again found to be statistically significant with males having a 14 % higher rate of emergency department use. Previous admission was significantly associated with emergency department use in the 90-day post-discharge period.

Table 5.14: Linear Mixed Model, Bed Days, Readmissions and Emergency Department Use

	Estimate	Standard Error	Df	t	Significance
Total Bed Days					
30 Day Total Bed Days					
Gender	5.829	2.434	31.98	2.395	0.023
60 Day Total Bed Days					
Gender	3.992	1.96	52.482	2.037	0.047
90 Day Total Bed Days					
Gender	4.294	1.9	49.471	2.26	0.028
Readmissions					
30 Day Readmissions					
Gender	5.828	2.434	31.98	2.395	0.568
60 Day Readmissions					
Previous Readmissions	0.0744	0.0375	218.45	1.9855	0.048
90 Day Readmissions					
Previous Readmissions	0.051	0.023	114.033	2.223	0.028
Emergency Department Visits					
30 Day Post Discharge ED Visits					
Previous ED visits	0.115	0.023	224.000	5.007	0.000
Friendship (Social Isolation)	-0.011	0.006	224.000	-1.896	0.059
60 Day Post Discharge ED Visits					
Gender	0.115	0.046	224.000	2.487	0.014
Previous ED visits	0.106	0.150	224.000	7.109	0.000
Lives Alone	0.091	0.046	224.000	1.988	0.048
90 Day Post Discharge ED Visits					
Gender	0.115	0.044	225.636	2.601	0.010
Previous Readmissions	0.101	0.010	173.821	7.373	0.000

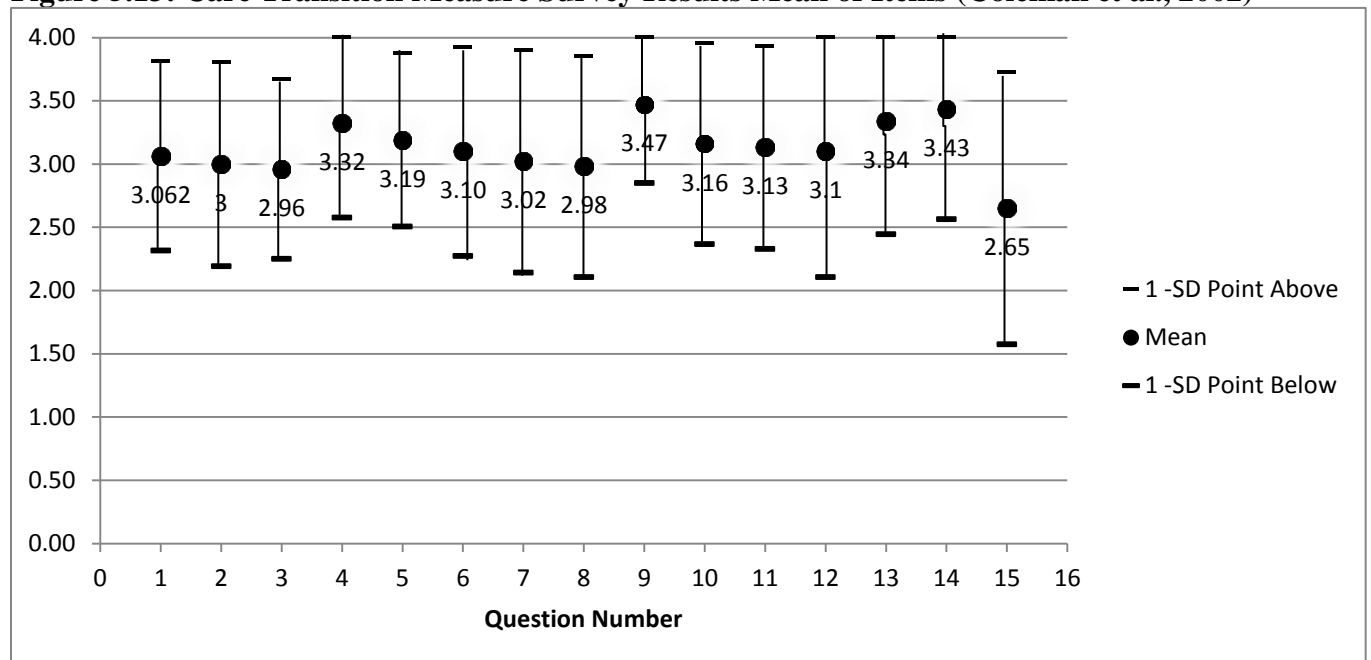
More detailed results are provided in Appendix H.

Patient Satisfaction with Transitions

Patient satisfaction with the transition from the hospital to the home was measured using the Care Transition Measure (Coleman et al., 2002). A total of 135 surveys were completed, representing a 50% survey completion rate. Surveys were completed over the telephone by a research assistant. All participants were eligible to complete the survey. The scores are rated: 1 – strongly disagree; 2 – disagree; 3 – agree; 4 - strongly agree. As the graph in Figure 5.13 below shows, all scores are within the range of agree to strongly agree indicating a moderate to high level of satisfaction.

No differences in the Care Transition Measure score was found between the intervention (M = 75.111, SD = 14.307) or the control group (M = 72.078; SD = 14.224); $t(120) = 1.179$, $p = 0.241$. Understanding the side effects of medications was rated poorly in both the intervention and control group.

Figure 5.13: Care Transition Measure Survey Results Mean of Items (Coleman et al., 2002)



Care Transition Measure Questions (Coleman et al., 2002)

- Q1 My health goals were clear and I understood how they would be reached
- Q2 My preferences were taken into account to meet my health needs on discharge
- Q3 My preferences in where health needs would be met on discharge were considered
- Q4 I had the information I needed to take care of myself on discharge
- Q5 I understood how to manage my health on discharge
- Q6 I understood warning signs and symptoms to watch for once discharged
- Q7 I had readable and easily understood care plan
- Q8 I had a good understanding of my health condition
- Q9 I understood my responsibilities for managing my health
- Q10 I was confident that I knew what to do to manage my health
- Q11 I was confident I could do the things I needed to take care of my health
- Q12 I had a list of my appointments and test
- Q13 I understood the purpose for taking each medication
- Q14 I understood how to take my medications
- Q15 I understood the side effects of my medications

Summary of Quantitative Results

The following summarizes the results of the hypothesis tested in this study.

Primary Question

1. Does the implementation of an in-hospital care transitions nurse and community-based rapid response nurse intervention increase the time to first readmission for high risk frail patients?

The null hypothesis is accepted as no differences were found in the time to first readmission between the intervention and control group.

Secondary Questions

2. Does the implementation of an in-hospital care transitions nurse and community-based rapid response nurse intervention reduce the 30-day, 60-day and 90-day readmission rates, emergency department use and total bed-days used and do frailty and social isolation have an intervening effect?

The null hypothesis is accepted as no differences were found between the intervention and control groups in the 30-day, 60-day and 90-day readmission rates, emergency department

use and total bed-days used. Frailty or social isolation was not shown in this trial to have an intervening impact on emergency department or inpatient bed utilization.

3. Can a model of prediction be developed for the dependent variables of 30-day, 60-day and 90-day hospital readmissions, total inpatient bed utilization for the study period and total emergency department visits for the same periods?

The null hypothesis was rejected as predictive models were developed for all of the utilization indicators.

4. Is there a difference in the patient's satisfaction with the transition between the intervention and control groups?

The null hypothesis was accepted as no differences were found between the intervention and control groups in terms of their satisfaction with transition.

Qualitative Analysis

The qualitative analysis explored, from the perspectives of those involved, the factors which facilitated or were barriers to the effective implementation of the care transitions and rapid response intervention.

Two focus groups were conducted. One included the care transition nurses from the hospital (n=2) and the other rapid response nurses from the NECCAC (n=3). Interviews were conducted with senior leaders (n=2) as well as front line managers from each organization (n=2). The analysis of the results of the interviews and focus groups are organized into key themes and detailed in the following sections.

Purpose: Facilitating transition, improving patient satisfaction and reducing readmissions

The key themes which emerged related to purpose were concerned with facilitating the transition from hospital to home, through standardization, the transfer of information with the aim of improving patient satisfaction and reducing readmissions.

The overall purpose of facilitating the transition of the patient from the hospital to the home was reflected in several comments, “...*the rapid response nurses, I think the goal is to transition the patient from the hospital to home,*” another interview participant, pragmatically stated, “*well the title of both programs right; Care Transitions ... it intuitively tells you pretty much what we are doing.*” Further commenting on the process of hand-off between the care transition and rapid response nurses, “*I think the relay is really important, like you are going from A to B to C and you have Care Transitions and there is a baton to Rapid Response as you move from acute care to the community.*” Another participant succinctly stated; “*to smooth transitions.*”

Another identified how she perceived the care transitions and rapid response nurse's roles as being patient-centred, aimed at facilitating the information transfer and preventing readmissions:

"I think the goals for sure are patient-oriented and the purpose is to work with each other and them to get the inside info for us and to pass that on so we can continue in the community, to continue the care and make sure that they do not go back into the hospital."

As identified in the previous statement, reducing readmissions emerged as a dominant theme, *"Everyone has the numbers coming in on why they are readmitted or admitted in the first place and especially this group because you are looking at readmission."*

The theme of patient satisfaction was identified by several of the participants from both organizations. As one participant stated, *"I think what it is showing that it is working is improved patient satisfaction."* Another participant reflected that the aim was to reduce readmissions and improve patient satisfaction through the introduction of medication management and community support processes, *"be it medication or supports that need to be put in place... if we had reliable aftercare, kind of follow-up process that might mitigate readmissions to the hospital and improve the patient satisfaction in that overall journey."*

Several spoke to the mandate for the rapid response nurses based on Ministry of Health and Long Term Care guidelines, introducing the concept of standardization. As one participant commented, *"there are guidelines of what they are supposed to be doing...there is a program guide for all the new nursing initiatives that the Ministry of Health has funded."*

While the need for standardization was required to meet Ministry of Health and Long Term care guidelines, there was recognition of the need for flexibility to meet local needs, but the idea of the need for standardization to achieve consistency remained, *"the intention there is*

to have some consistency through the province so no matter where you are there is a similar service, again, with some slight changes right, because every community is doing something slightly different.”

Barriers to Alignment: Lack of acceptance, differing mandates, trust and competition

The interviews and focus groups revealed several challenges with the implementation of the intervention and the degree of “*working together*”. The interviews and focus groups reflected that alignment between the care transitions and rapid response nurses was pursued on the premise of opportunity, but that in the process of pursuing this alignment, they encountered many challenges to its effective implementation, including perceived differences in organizational mandates and guiding principles, an underlying sense of lack of trust, competition and lack of acceptance.

The Care Transitions Service was first piloted at Health Sciences North. This was done prior to the introduction of the Rapid Response Nurses Program operated by the North East Community Care Access Centre (CCAC). The introduction of the Rapid Response Program required a revamping of the Care Transitions Service in an attempt to align with the Community Care Access Centre’s Rapid Response Nurse Program. Achieving agreement on the work processes, while conceptually beneficial, was practically difficult.

The potential opportunity and challenges of this realignment were reflected in the following comments of a member of the hospital’s care transitions team:

“...they were both so new to begin with. We were not established. We had literally just finished piloting a very different process actually, when we decided to integrate with Rapid Response just based on the fact that the pilot did not seem sustainable at the time....we noticed

alignment in what they were trying to achieve with what we were trying to achieve so we saw potential.”

An interview participant further reflected this idea of opportunity and challenge commenting specifically on the challenges of the differing mandates of the organizations, *“we did see the benefit in working together but the overall mandate...at HSN and CCAC were very different.”* The notion of differing guiding principles or mandates was reflected on by another hospital participant, *“The biggest one is maybe the fact that in working with different organizations, the guiding principles ...were not necessarily the same.”* The participant further commented on the difficulties these differing guiding principles had in achieving agreement on work processes, *“So trying to meet the needs or the requests of both organizations while trying to maximize service to the patient... we tested a few things, like your patient are our patients and how do we make this work.”* The challenge of achieving agreement on work processes was similarly reflected by a rapid response nurse, *“there have been many meetings with the care transitions team and that, but I mean it is to put it together, that is the problem.”* A hospital interview participant commented on the need for flexibility to remain patient-centred; not organizationally focused, *“I think that flexibility is a key trait, willingness to change what you are doing and willingness to focus on what is best for the patient rather than getting your numbers...but both partners need to be flexible....”*

There was an underlying sense of reluctance reflected in the comments of the rapid response nurses to accept the hospital’s focus on community-based post-discharge aftercare; a non-traditional location of care for the hospital. The hospital’s interest in post-discharge aftercare left the rapid response nurses questioning the hospital’s trust in the existing community based services; *“It almost seems like the hospital is trying to develop all these programs*

internally ... out in the community, because they do not trust either CCAC or the services that are already out in the community.” Another rapid response nurse saw it as the hospital competing for services and funding, *“It is like we are competing for the same dollars and they want to keep it.”* While gaps in service were acknowledged, the rapid response nurses felt that additional services were not needed but that through better communication many of the existing care gaps could be resolved, *“To say that there are some that fall between the cracks but I think if we had better communication and more meetings to do that, they would not need all those other services because the services are there.”* Reinforcing the rapid response nurse’s lack of acceptance of the hospital’s role in post-discharge care and reinforcing the questions of trust and competition was the acknowledgement that the nurse’s felt underutilized, *“It is just how we are being utilized because right now we feel we are under-utilized.”*

The lack of acceptance, by the rapid response nurses, of the hospital’s role in post-discharge aftercare was further reinforced by their view that this involvement would lead to further service duplication, *“I think we want to avoid duplication... but I think there is still duplication of who does what and I think if the hospital starts getting into the community services and duplicates what is already there...”*

The rapid response nurses reinforced this lack of acceptance by strongly delineating where the role of the hospital should stop, *“once the hand-off is done from care transitions, then basically it is the rapid response that could lead that and if it is referral to other services, that is part of what we do.”* Another rapid response nurse rationalized that a consequence of the hospital developing alternative community based services will be the reinforcement of the hospital as the location for care:

“Exactly. You know if you want to keep people out of the hospital, out of emergencies and leave the community in the community and keep the hospital in the hospital you know because if people are in and out of the hospital, where is going to be the place to go? It is going to be Emerg.”

Structures and Coordinating Mechanisms: Committees, Policies and Position Descriptions

The interviews and focus groups revealed that coordinating the intervention was structurally complex but facilitated through the coordinating mechanisms of committees, job descriptions and policies. Changing leadership or lack of leadership engagement on problems may have been a barrier to the effective implementation of the intervention.

A participant commented on the complexities of managing this initiative between two different organizations, *“having two separate organizations doing part of the process is doable but it makes it more complex.”* To manage this complexity, the Hospital and the CCAC put in place a committee, the Care Transitions Working Committee, as reflected in the comments from one of the interview participants, *“(the) Care Transitions Working Group that we had at the time... it was made up of all stakeholders and everybody in both agencies, other agencies knew what was going on.”*

A policy for care transitions and rapid response was formally developed as a result of the work of the Care Transitions Working Committee and formally adopted, *“formally we created an actual policy that went through our Discharge and Admission and Transfer Committee...we actually sat down as a team with rapid response ... we created a power point presentation so we had something concrete to show.”*

Position descriptions for the care transitions nurses and rapid response nurses were created as coordinating mechanisms, *“so I think this is one of the biggest things they did was*

clearly define the job descriptions of both of them and that we had the care transitions (working group) which met weekly, then biweekly, then monthly.”

Leadership turnover at the Community Care Access Centre occurred at both the director and manager levels during the course of the trial and just prior to the interviews being conducted. This leadership turnover may have made the alignment challenge that much more difficult. Both leaders faced considerable learning curves as reflected in the comments by one of the interview participants, *“I am new to this role...the information I have received ... has not been in a documented format, it just sort of a little bit of osmosis of hearing what is going on ..., I am at a disadvantage.”* Another who was only in the position for four months stated: *“so now I am just getting comfortable with my current position.”*

The leadership turnover did not enable issue resolution, nor was leadership viewed as to working together to resolve the challenges related to the alignment:

“ they should be meeting and communicating and listen to your front-line and then taking that, wherever you write it down and bringing it forward and saying okay these are the issues, let’s see how we can fix this and work it out.”

Role Clarity, Awareness, Acceptance and Perceived Legitimacy

Position descriptions were developed for each of the roles, as identified above, was a facilitator to the implementation of the intervention. The interviews and focus groups revealed several challenges or barriers with role clarity and role awareness amongst the staff, physicians and patients, leading to difficulties with role acceptance. Attempts were made to counter these challenges through education and demonstration of the role’s benefit.

The idea of role was observed in several of the comments. The job descriptions of both positions were documented and have been shared as indicated by a participant, *“we have*

documented what the different roles are...” Reflecting on the role of the care transitions nurse, a participant commented, “...*there are developed job descriptions and they clearly define what the person’s role is, although there has always been a little blurring.*” The need for continuous role clarification and evaluation was recognized by an interview participant from the hospital, “*some of the blockages is just the clarification of roles... on a go forward...the role should be looked at...and whoever else is in the discharge planning role...and pick what characteristics need to be carried forward and what does not.*”

Through the focus groups, the nurses described their roles in terms of their role function. A rapid response nurse described their role, “*that is where we come in, RN goes in and we do the education, we do the assessment, we figure out the medication, their weaknesses, what are their health concerns? Which program would benefit.*” An interview participant from the hospital described the role of the care transitions nurse:

“what we were doing ... is risk stratification for readmission, we were assessing clinical frailty... We thought if we knew what type of patient we were dealing with, we were able to address some of the barriers or gaps, be that in medications or supports that need to be put into place and then if we had a reliable aftercare, kind of a follow up process, that might mitigate readmissions to the hospital and improve the patient satisfaction in that overall journey....”

Through the course of the focus groups and interviews, there was a sense that nurses from both organizations were trying to justify the legitimacy of their role and struggled with creating role awareness and their contributions to the patient care experience. A care transitions nurse spoke to variable levels of role awareness, “*it depends...floors (inpatient units) who are really used to it, know exactly what we do, understand what we do...there are other units in the hospital where they do not necessarily care to understand...they are stuck in their ways.*”

Another care transitions nurse spoke of the struggle with role legitimacy, *“there is ... staff out there who just see what we do as frivolous...it is like, oh well, that does not need to be done, or it will really not make any difference...they do not see it as important.”* The participants in the focus groups reflected a growing acceptance, *“there are some who want to know and understand ... they realize it actually saves them time,”* another reflected, *“once they learn about it a little more and see actually how much we do for the patient on discharge and pretty much free up a huge part of their days, they are more interested.”*

The rapid response team spoke to an attempt at education to increase role awareness:

“the other thing that was tried at the hospital was to do some education to all staff about the Rapid Response so there were sessions for all shifts on all of those units and there was someone from Rapid Response and someone from the hospital together, just to show that connection but it still did not make a difference as far as reception.”

Another rapid response nurse commented that even within their own organization there was not awareness or clarity about their role, *“I have a lot of friends that work at the hospital, a lot of them even in CCAC are still asking, what do you guys do exactly”?* Another reflected on the need to be more visible, *“everybody take a unit and just go maybe once or twice a week and make us more visible.”*

With respect to physicians the rapid response nurses perceived their acceptance as generally positive, *“receptive physicians yes, but physicians that are not very receptive to what is out there in programs, I would say no.”* Another commented, *“Family Health Teams, they are very involved with us.”* In terms of their role acceptance on the inpatient units at the hospital, the rapid response nurses did not feel accepted, *“they make you feel very uncomfortable, so at that point it is either do you continue or do you just go do your work and whatever comes through,*

comes through...” another reflected, “we were not received very well, I am just putting it out there...they really did not want to talk to us.”

With respect to patient role awareness, the rapid response nurses identified a lack of awareness of their role and the need for constant clarification:

“If you go in and see a patient and you ask them do you know who I am? Do you know what Rapid Response is? The majority of them say no because there are so many people going into their home and it is hard to determine who is who.”

At a system level, role awareness has been created regarding the role of rapid response through the engagement lead at the CCAC, *“we have an engagement lead, so she goes around to different family physicians’ offices, wherever we figure she needs to go, she will make up a plan and then hit the road...promote and teach about the program.”*

Some of the challenges experienced by both groups in improving role awareness may have been the result of a lack of role clarity amongst the staff in both organizations. Speaking of her experiences, one rapid response nurse reflected:

“some of them knew there were no referrals and they would not come to rounds, but if there were, some of them would sit through rounds and I mean I worked with one specific and she sat through rounds but then you sit there and they look at you like why are you here because we are the ones that are at rounds and we are the ones who are going to pick who needs to be part of Rapid Response so that is where it comes into play. If they are doing rounds, do we really need to be there because it is true, that is where they are coming from, from Care Transitions, so there has got to be that, I don't know.”

Another participant, further reflected, *“Yes, like is there a point of having two of us there, and I think that is what it came down to is the floor was receptive to Care Transitions, and they were not receptive to us. And that is pretty much when we stopped going to rounds.”*

Effective Screening, Changing Criteria and Missed Patients: A source of frustration

The predominant theme was that of changing criteria for patient inclusion and this caused significant frustration and was exacerbated by the perception that patients for whom the intervention might benefit were being missed. The alignment of criteria for inclusion was viewed positively and seen as a facilitator. Screening was labour intensive but effective in identifying the patients intended.

During the initial phases, a decision was made to change one of the inclusion criteria in the screening of patients from two to one admission in the last 12 months. The changing criteria caused some frustration as reflected by a rapid response nurse, *“...again we have changed our criteria. Before it had to be two hospital admissions and now it is only one hospital admission.”* The nurse further articulated the implications to patient care, specifically that patients for whom the intervention might have benefited were missed, *“They could have been admitted seven months ago and been admitted to the ER last night and could have been referred to us but they are not referred to us.”*

The diagnosis for inclusion also changed over time. In the initial phase of implementation patients with the diagnosis of congestive heart failure and chronic obstructive pulmonary disease were included, after which, the diagnosis of diabetes and dementia were added. The changing criteria and the sense that eligible patients were still being missed was reflected by a rapid response participant:

“the problem is the identification of the right patients and I think that there are still many people that are being missed. Either they are seen by care transitions, and not rapid response, which I think is our concern. Many patients are seen and then not referred to rapid response or they are missed totally and I do not know, I mean the criteria of rapid response changed over time to better accommodate, but I think that some of those issues still need to be addressed.”

A care transitions participant from the hospital reflected on the changing criteria, *“your diagnosis - (for inclusion) - is a barrier then you have demographics ...obviously changing the criteria, the demographics open it ...there would be a ton more referrals.”* In this case, demographics refer to the eligibility criteria on the basis of diagnosis and their living location. Only patients that resided within the boundaries of the City of Greater Sudbury were eligible.

While the changing criteria were a frustration to staff, there was acknowledged benefit to patients, *“I think a barrier previously, but we have addressed it, was that the model....was not completely opened up to them ... there are four diagnoses that fit our criteria...they were not opened up to all four but we have done that now.”* The participant acknowledged that the positive aspect of the criteria-setting process was that the two services were aligned, *“...the one good thing is both the Rapid Response and Care Transitions use the same criteria.”*

While there was some common concern about the inclusion criteria, the screening and risk stratification of patients were seen as working well, *“what is working well is the identification of the patients themselves...identifying frailty through LACE and frailty is working well.”* While the outcome of the process may have been achieving what it was intended to achieve, those performing the work reflected on how labor intensive the screening processes were, *“even if there was a check box in Meditech... we should have something ... there is really nothing unless you go back and look at the patient’s previous admission.”* Another care

transition nurse reflected, *“we waste a lot of time screening”*.

Characteristics of the Patient Population: Was the Right Population Served?

The patient population was characterized by both teams as vulnerable and frail with a high rate of mortality. Patient motivation and compliance were predominant themes and to a lesser extent, issues related to patient choice and health literacy; these were viewed as barriers. The teams debated whether the intervention was serving the right patient population, again raising the issue of referral criteria.

The population would be best characterized as vulnerable and frail with fewer patients considered to having moderate care needs, as described by one of the nurses:

“amongst our patient population we kind of have two cohorts, we have a moderate group that may be more independent but they still have high readmission rates and they are sick with chronic disease ...they are autonomous and want to take a more active role in their care and then we have, that kind of more elderly group, a little more frail, a little sicker.”

Others spoke more to the issue of the frailty and high mortality, *“we have a pretty high mortality rate...I read the obituaries, I feel like I recognize half of the names on there, sometimes I feel that really impacts how effective we are...so these patients are really sick.”* Another commented, *“that rapid response is really looking at the elderly population, frail indices are off the charts, they have a chronic disease. This is not a temporary acute episode... as their health declines they are a riskier group.”* Similarly, a participant commented that for many patients, frailty predominates any intervention, *“a lot of people are going to come continuously back, but that is going to happen no matter what, because sometimes there is nothing we can do for them and they are sick, and they have to come back....”* This opinion was further validated by another

focus group member, *“if you can prevent it, sometime you can, sometimes it is just a natural progression.”*

Several of the participants questioned the appropriateness of the criteria and patient population being served, *“I am not sure we are focusing on the right group of people...I think if there was a focus on moderate risk, it may help us more in the long run than our current frequent flyers”*, that is, the high-risk, frail patients on which the intervention was primarily focused. The need to once again review the referral criteria was identified, *“maybe it is time to relook at the criteria ...patients are not necessarily the right patients based on criteria It has been changed and revised but I think that is part of what we need to relook at.”* A care transition nurse spoke of the appropriateness of the population being served in terms of resource prioritization, *“trying to even decide what patient population we focus on, not to exclude anybody but if we are seeing that what we are doing is going to benefit one group versus another.”*

Patient motivation was a theme raised several times. One of the participants commented on the degree to which patients followed through on referrals to chronic disease management clinics, *“our intention was to leverage our chronic disease management clinics ... I can put in the referrals, tell you how good pulmonary rehab is for you if you have COPD, but I cannot force you to go to your appointment.”* Another care transitions nurse identified that many patients do not want to participate, *“patients are not always open to it.”* A care transitions nurse reflected, *“I do not like to blame the patient but there are a few that compliance or willingness to fully participate has been a barrier...”* She went on to say, *“the patient will respond... no way is anyone coming into my home so they will put the brakes on as soon as you mention home follow-up.”* Another commented, *“I have had people who had no interest so they do not want to learn anything, it is not their job, it is not part of what they are here to do...”* The nurse identified that

the number declining participation was less than half but did not have a precise number. The challenges with compliance was repeated by another focus group participant, “ *we have patients that do not necessarily want to comply, who consent ... they get home and change their minds and then want to go back to their ways...they are cancelling appointments, or not taking their medications as directed....*”

In relation to the issues of patient choice and patient centeredness a member of the care transitions team reflected, that determining who is going to be involved in the patient’s post-discharge care is really a matter of patient choice:

“I think just giving them permission, some patients will say I am not going, do not even send a referral, we are acknowledging them and we are following their wishes so we are not forcing them to comply to each and every component of what we said was going to be care transitions and rapid response, we might still say, Mr. so and so that would only help you in the long run but if you do not really want to go then that is fine.” Another of the care transition nurses commented, *“they are allowed to make a choice, whatever choice they want whether or not it would be good or bad for their health in the long run we can only do so much ...as that coaching discharge planner.”*

The issue of health literacy and its informally observed relationship to frailty and readmission was raised by one participant, “ *they do not have the health literacy... some of these patients do not even read to grade 3 and we are seeing that come up in our frailty data collection and they seem to be the more frequent flyers.*” This lack of health literacy obviously increased the patient’s vulnerability.

Poor Referral Coordination Resulting in Missed Patients and Service Duplication

Themes related to the barriers to the effective implementation included poor referral

coordination resulting in low referral numbers, missed patients, service coordination challenges and duplication and in some instances overwhelming patients with visits from multiple providers. A potential facilitator identified was the improved integration of work processes.

The referral numbers and referral coordination were a particular concern to the rapid response nurses and seen as a barrier to success. An interview participant from the rapid response team commented, *“That is a barrier to success. If your numbers are not looking very good, then either A, we are not getting referrals, B we start to go down the menu of why they are not there.”*

To address the concern around the referral numbers, several suggestions were brought forward to improve the screening process. A potential solution to the screening process suggested by a member of the rapid response team was automatic referral, *“an automatic referral on Meditech ... our team assistant could double check it and weed them out if they are appropriate or not.”* Another suggestion to increase the referral numbers identified by a participant from the rapid response team was more direct contact with the care transition nurses on a daily basis; to create a space for face-to-face dialogue, as they put it, *“just to be able to answer questions ...so we can clarify if this is an adequate patient, is this a good referral and to just be there.”* A care transitions nurse spoke of the availability of care transition nurse resources as limiting the referral numbers, *“so the barriers are obviously staffing and then criteria of diagnosis and then demographics are my top three” ...I think for the amount of rapid response nurses that there are not enough care transition nurses.”*

A rapid response nurse participant commented on how she problem solves with the care transition nurses around missed referrals as these have a direct impact on referral numbers, *if a*

client does get missed, I let them know and I just tell them right away that for this client there was no service offer sent for Rapid Response... then they try to figure it out from their end.”

One of the rapid response nurses spoke about inappropriate referrals, “*we get some clients referred that are end-stage. I am sorry but these patients are going to be readmitted.*”

The nurse commented about getting patients earlier in the disease state as being important to making a difference in patient outcomes, “*Let's say it is a CHF patient ...the earlier we get them ...then we can teach them lifestyle changes help them with medication and get them plugged into services”... This is the best time for them to maintain their health.*” The nurse emphasized their limited ability to effectively intervene with end-stage patients, “*an end-stage patient then you are limited as to how much success you can have with that patient... again it comes down to right referrals.*”

Referral coordination was a challenge within the CCAC, as well as between the CCAC and the hospital. The rapid response nurses spoke of internal challenges with referral coordination within the CCAC system:

“There are some instances where we will have clients on the bullet rounds from the care transitions team but I will not receive a referral. So a week will go by and I will not get a referral. I will look in the CHRIS (CHRIS is our computer program) and sometimes they will outsourced to a different agency, like Bayshore, and they have gotten their nurse to provide the same care that we can provide. So I think that there is a miscommunication with our Access Team at CCAC as well.”

Another rapid response nurse spoke of similar challenges with referral coordination, “*if I have a client on my bullet rounds and I do not receive a referral, I will look into it, as to why. There are often times that Bayshore will go in.*” Another spoke to the increasing number of

programs and confusion around where to refer, creating challenges with both referral coordination and service coordination, *“there are so many new programs, the hospital nurses and access coordinators do not know who to refer to.”*

Positive progress was noted in referral coordination from one of the interview participants, *“you know we are finally getting there, the nurses have certain criteria to follow but they go all out, it has taken a while. It is a new program and it takes time to build capacity and sustain.”*

The challenges faced with referral coordination spilled over into service coordination. The overlap was a particular challenge for the patient once in the community. Referring to the overlap between rapid response and community nursing service providers, a rapid response nurse identified an occasion where one of the community service providers was assigned a referral initially designated a rapid response referral, *“it actually says medication reconciliation and wound care, all of this stuff. There is the answer. They just go in and do their wound care and get their hour... she will go in there for the wound, nothing else.”*

The rapid response nurses raised concerns regarding service coordination and service duplication. The rapid response nurses reflected on the issue of multiple service providers going into patients' homes, *“sometimes it is very confusing with all of the different services coming into the home.”* They identified that patients are left feeling overwhelmed, *“what I am hearing ... they see so many people, they are getting so many phone calls that they are overwhelmed by the number of phone calls...”* Another rapid response nurse stated, *“often when the patient gets home...the phone starts ringing the day after they are home...they are overwhelmed and just refuse to see anybody.”* They articulated that their role is often coaching the patient around the next steps, *“so by having rapid response go in we can tell them you need to stabilize ... when you*

are better you can follow-up...we just kind of make life simpler for them, shine some light on the next steps". The themes related to coaching and prioritizing the patient next steps are discussed more fully below.

Both teams suggested that there needed to be improved integration of the work of care transitions and rapid response. This is reflected in the comment from a rapid response nurse, *"whoever is in charge on the floor that day, it should be an automatic thing, oh they are referred to Rapid Response, let's forward this information or forward it to Access. There is a missing link there for that part."* A similar comment was made by one of the interview participants from the hospital, *"parts of what we do... will become the norm for every patient ...it is still not a pilot any more but we are still running it like a pilot."*

Absence of Open, Two-Way Communication

Communication was identified as essential at all levels for supporting relationships of ongoing respect and to enable the effective delivery of patient care, *"I think communication between us is critical ... I think it is important to have good communication and relationships with your key stakeholders."* While communication was acknowledged as a necessity, there were communication challenges identified by the participants as a barrier to the effective implementation of the intervention. The key themes which emerged were lack of open communication, unsustained use of communication mechanisms, the absence of two way communications and the inconsistent use of communication techniques resulting in a deteriorating relationship. There was a sense that communication was improving.

A rapid response nurse reflected on the perceived lack of open communication, particularly related to the current research project:

“...again if there is to be open communication, why not tell us what the program is about so we have a better understanding instead of being told they are in a control group you do not get them ... then they wonder why we feel the way we do, because on the research we had over 250 clients. That affects our program, affects our staffing, affects everything.”

Another rapid response nurse reflected on the perceived lack of open communication, *“I do not know why open communication is such a problem.”* The challenges with open communication were acknowledged by a member of the hospital’s care transitions team, *“we do not see communication actually happening right.* The nurse further reflected on the impact that communication challenges were having on patient care, *“but I do not think we have truly maximized what it could be for the benefit of the patient.”* The participant reflected that several communication mechanisms had been trialed but were not sustained, *“Weekly structured meetings were inconvenient so being able to throw someone an e-mail, hey give me a call, or vet it through their team assistant seemed to work.”* When probed regarding the timeliness and accuracy of communication, it was identified as inconsistent, *“it is not consistent and I will be honest with that”*.

The absence of regular effective communication between the organizations resulted in a deteriorating relationship as reflected in the following statement by a member of the rapid response team, *“There is a lack of communicationwhich happens often and then we are also not notified that ...patients are going into... different pilot projects or research and we are not getting them and there is the secretiveness....it is demeaning”*. The perceived lack of communication was reinforced by another rapid response nurse, *“So that is really indicative of and you used a really important term, demeaned or you feel that your work is demeaned.”* The nurse further reflected that this lack of communication did nothing to improve the sense of

working together or team building, *“lack of communication, you are not from the same team, not knowing if they are doing a research project or perhaps a pilot project,”* and questioned the absence of leadership, *“What about the leadership? Are they not doing anything to make it work better?”*

Reflecting on what might need to change to improve communication, a member of the care transitions team spoke of the need for an improved relationship, *“I think it would involve strengthening the relationship between the two teams for that transfer of information so that they better understand our role and what we have done and we understand better what they are doing.”* The nurse further reflected on the need for the communication to be two-way, *“having that two-way communication occur once the patient actually leaves because right now that is what is lacking.”*

Despite the challenges identified, it was generally recognized that communication was improving, *“there certainly has been an increase in improved communication.”*

Great Relationship Potential Impeded by Lack of Collaboration and Respect

The key themes which emerged as barriers to an effective relationship were lack of collaboration and respect. Facilitators identified were the desire and potential for an effective working relationship and ideas identified towards resolution of current challenges.

Relationship and respect are foundational to a collaborative working relationship. The perception of the rapid response nurses was that there was a lack of collaboration, *“there is a lot of that going on and I just feel that we are always working against each other, instead of with each other.”* Another rapid response nurse spoke of similar feelings regarding the lack of respect felt, *“I did rounds before rapid response, I did long term care, I worked Access and we were received pretty well but this was a whole new different ball game for me.”* The rapid response

nurses felt respected by patients and families and other community providers, but they felt little respect from the hospital as reflected in the comments from one of the rapid response nurse participants, *“there is a lot of respect because of our knowledge and what we provide, but as far as from the hospital, ... there is very little recognition for the rapid response nurses... it should be more of a team approach.”* Another rapid response nurse commented, *“I think the care transitions could be more of an advocate for the rapid response team”*. The nurse went on to discuss how the relationship deteriorated but also the desire for change, *“The way we were treated, and walls went up, so that is where we kind of stepped back and we just did our own thing, but it would be nice to have a relationship.”*

The potential and desire for an effective working relationship was reflected in the comments from several of the participants. One of the respondents from the hospital reflected, *“I think at a high level, we have done well at establishing the initial foundation of a relationship.* The respondent further commented that depending where one was situated in the organizational hierarchy, the perceptions of the effectiveness of the working relationship might be different, *I think speaking at the director level, manager level and the front-line level you would probably get three very different answers.”* Reflecting on the relationship, a rapid response nurse identified the desire for change, *“I would like to see things change,”* and identified the relationships potential, *“and I think that there is definitely the potential,”* but identified the need for a reciprocal commitment to be receptive, *“but we both have to be receptive.”*

Further comments on the desire for change and how this could be accomplished were discussed by the rapid response team who spoke to the need for more sharing of ideas on how things could improve, *“And receptive to ideas. If you have ideas and it cannot just be a one-way street, and we are open to your ideas also and so forth,”* and emphasize the importance of

communication, *“Again that comes down to communication ... say okay I am open, let's hear it, let's work together.”*

There was a sense by several of the participants that the issues of conflict were resolving, as one participant reflected, *“I think that although there was some differences or conflicts at the beginning...I think that this is resolved and there is more of a wish to work together...”* The strong sense of frustration did result in some ideas towards how the matter might be resolved, *“I do not know, maybe we need to be in the hospital... or at least a rapid response nurse to work maybe with a care transitions nurse... We need to do it. We did it and then we stopped going”*.

The rapid response services while they spend much of their time in patients' homes, do have office space located away from the acute care hospital site where the care transition nurses are located. Reflecting on this, one of the rapid response nurses commented, *“out of sight out of mind... I wonder if we are forgotten about...because they tend to forget if you know that the rapid response nurse is available when you do not often see her around...”* A participant from the hospital suggested that a potential solution to resolving the relationship challenges was to co-locate the teams, *“whether you house them in an office space...then they get to know one another...develop that informal communication which is probably as important as formal.”* The participant further reflected on the benefit that this would have on resolving the relationship challenges between the teams, *“it is easy to be mad at someone you do not know and say things and it is harder if you are looking them in the face...you actually know them...”* The idea of co-locating was supported by a care transitions nurse, *“I think having a designated area because right now we are very much floaters, we are all over the place... so we can clarify is this an adequate patient....is this a good referral and to just be there”*.

The care transitions nurses reflected a growing respect for their role both internally at the hospital and with the rapid response team, *“I would say from day one when we started to now, the respect has definitely grown...”* another reflected a more tentative but growing respect, *“I think it is variable, but it has come a long way...now maybe the respect was not there, but once they understood the job a bit more, obviously with that came respect.”* Another participant spoke of the appreciation she received in how the role supported front-line nurses in the discharge process, *“one girl made the comment on how it took her four hours to discharge a patient and he did not qualify for services anyways... they understand that this complex level of discharge planning can take a very long time.”*

Information Transfer Mechanisms: Effectiveness, Relevance and Reliability

The transfer of patient information is a specific aspect of communication that was analyzed, to assess, from the perspective of those delivering care, the degree to which it was effective. The facilitators identified included the coordinating mechanisms of the multidisciplinary team, bullet rounds, team assistant and faxes. The information transfer process was characterized as labour intensive, not entirely reliable, and lacking formal feedback mechanisms, which were barriers. The relevancy of the patient information provided was not clear.

A care transitions nurse spoke to the coordinating mechanisms that existed for the transfer of patient information to support the transition of the patient from the hospital to the home, starting with involvement of the multidisciplinary team and daily bullet rounds, *“... we start with the whole multidisciplinary team and that is done on a daily basis. Every patient has a plan or needs a plan and this is discussed every day in most units in bullet rounds.”* The nurse further discussed the process of communicating the plan of care, *“ the plan is also communicated*

daily to Rapid Response via fax ...we communicate the plan to the patients and the families as well and that is done verbally. Everybody is made aware...”

Another care transitions nurse provided further information on the communication and information transfer mechanisms used with the rapid response team for the purposes of communicating referrals and seeking clarification, *“we send the sheet every day of patients we currently have in hospital, so if there is a patient we are not sure about, for whatever reason... we can contact them ahead of time.* The team assistant was identified as a critical coordinating mechanism for facilitating the information transfer between the two teams, *“they have a team assistant who we can call anytime...if they - rapid response team - is noticing anything on the list they are worried about they can get back to us...maybe happened once or twice.”* Another coordinating mechanism for information transfer was bullet rounds which occur on medical inpatient units daily, *“ every patient ...is discussed everyday on most units in bullet rounds and of course the plan is also communicated daily to rapid response via fax...we obviously communicate the plan each day with patients and family.”* The reflections of the rapid response on the information being provided was that it was inconsistent, *“yes care transitions has their way and their package and they send that to us but if Access (CCAC) goes in and says this patient is good for you guys and care transitions has not been involved we get nothing,”* the participant went on discussing the need for more consistency in access to the information.

Extensive effort was expended in preparing for the transfer of information from the rapid response nurse to the care transitions nurse as reflected in the comment of a care transitions nurse, *“on discharge we fax packages to each area that is going to be part of the patient’s out-of hospital care...rapid response, plus the heart failure, plus pulmonary rehab, plus the family physician, anybody, the pharmacy, the retirement residence.”* The goal of which is to create

awareness of the patient's discharge plan of care, *"Everywhere will get this package so that everyone is on the same page."* For patients readmitted, the coordination of information is less burdensome, *"like readmits we just call them...to see if there is anything else we need to do before the patient goes home."*

One of the care transition nurses spoke to the cumbersome and labour intensive nature of the patient information transfer process and the desire for a simplified mechanism, *"if we could just e-mail them and use patient names, but right now for confidentiality for some reason fax is okay, but email is not... it is just annoying and really it would be a lot quicker."*

Several comments were made regarding the ability of the teams to improve the mechanisms and the consistency and reliability of sharing patient information. One of the rapid response nurses spoke of the challenges, *"it has happened that I have gotten referrals and I have gone to see the client and then the next day I will get the care transitions nurse package."*

Another commented, *"it is better but it has been brought up to them, it is definitely better,"* an improvement was confirmed by another rapid response nurse; *"it has gotten much better though."* Securing patient information through the hospital based Meditech computer system was identified as a means of facilitating the information transfer, *"rapid response nurses have access to Meditech, so that is significant."*

The transfer of information was identified as being predominantly one way, from the care transitions nurses to the rapid response nurses with no formal feedback mechanism, *"... we normally we just fax them the package after the patient goes home and honestly, I think twice in a year and a half I have had a call back to ask me a questions about a patient after they have gone home and other than that it is just email..."* A care transitions nurse spoke of a desire for feedback on what actually happened to the patient once discharged to the community, *"We*

would know if it was beneficial to them. What the rapid response nurse did when they were there and who the rapid response nurse was.....We refer them but never know if they went...that would be nice to know...” Another of the care transition nurses reflected on the need for feedback, “I think more communication between both parties after patients are discharged ... so updates when they are discharged from hospital and updates for the hospital once they are discharged from rapid response.” Voicemail was viewed as a tool for facilitating two-way communication between the teams regarding patient care matters, “voice mail would be great.” The need for face-to-face communication was emphasized by the rapid response nurses, “at one time there was discussion, not face to face, but there was verbal discussion ...something is missing just through paper so those little FYI and that part is gone now.”

One of the interview participants from the hospital spoke of the need to improve the relevancy of information, “what we are realizing is, just because we as clinical people think this information is important, the other clinical people do not always see it as being valuable.” Reflecting further on the relevancy of the information provided from the hospital, “we have had some feedback from primary care providers saying well it is helpful, it is not helpful. It depends on their practice.” Commenting on the relevancy and utilization of the information by rapid response, a care transitions provider commented, “the rapid response team seems to appreciate the information given to them because they are going into the home to do medication reconciliation so they have the list for a comparison.”

Patient Centred, Comprehensive Care and Therapeutic Relationships

Much of the interview and focus group discussions concentrated on the degree to which the activities related to patient discharge were patient-centred. The key themes which emerged as facilitators included the comprehensiveness of planning efforts, medication reconciliation,

therapeutic relationships, reassurance and prioritization and strengthening of the patient's self-management capabilities through education, coaching and reinforcement. The key barrier which emerged was system responsiveness to support the patient in the case of worsening condition.

One of the themes that emerged was that of the therapeutic relationship with patients and families. In the case of the care transitions nurses, they were afforded the time to build a trusting and therapeutic relationship as they worked with patients and families to develop the transitional plan to home, *"you take time with the patients and listen to them and you know you gain their trust and build relationships with them."* A rapid response nurse identified how the relationship established with a patient and family allows them to provide reassurance, *"I tell them don't worry about that, you have to get well first and then we will concentrate on that"* and to assist the patient and family with encouragement and assistance in the prioritization of the next steps in their post-discharge care plan, *"a lot of them will say they are not going to that but then after a couple of weeks when they feel better then we will make the initial appointment for them because I find they are more receptive."* A rapid response nurse remarked on the capacity of some patients to manage their post-discharge care, given their level of frailty, *"some of our patients they are so frail and so chronically ill that they do not know where to start when they go home."* The nurse further commented on the assistance provided to the patient to enable them to cope, *"there is so much for them to do; it seems to be overwhelming so helping them walk through this process."*

A care transitions nurse reflected that in the case of the most vulnerable and frail population, the established therapeutic relationship is entirely with the family, *"for dementia patients...we are able to give their families some resources...kind of program so they have somewhere to call to get some information."* The nurse further commented, *"They really do not*

need clinics. They need more information; they need a phone number for somebody to call. They need to understand what is going on.”

Patient uncertainty in the post-discharge period was identified as a potential reason for readmission, *“if they have nobody and they are unsure and they do not know they are coming back in.”* Knowing that a nurse is going to be visiting them after discharge was viewed as providing a measure of reassurance, as reflected in the comment from a care transitions nurse, *“I think just having the contact and knowing that someone is going to come and see them, works well.”* Another interview participant made a similar remark on the reassurance provided, *“they are told a nurse is going to come to visit them at home and then I guess reassurance from knowing, that.”* In addition to reassurance the visiting nurse was seen as providing reinforcement or coaching related to the post-discharge plan of care, *“okay, I might have missed tons of things from the hospital but I have a nurse coming and she is going to help me through.”*

The rapid response nurses spoke of the reinforcement of education and coaching that occurs, *“we ensure that they completely understand what happened in the hospital.”* A management representative from the CCAC commented, *“well, I think it is the education piece that happens from the nurses”* ... on further reflection ... *“it is more than that, it is the follow-up that the patients are receiving ... they are in the home within 24 to 48 hours after discharge from hospital or emergency department visit so yes there is great value there.”* The benefit of this reinforcement and coaching was noted by the hospital, *“I think that the discharge type planning is good... I am not sure how much of the information is retained so I think the information given and reviewed with the clients and families is good.”* One of the rapid response nurses also commented on the patient teaching and coaching that occurs, particularly related to medications, *I find that that is a lot of our education, Rapid Response is going through their medications, do*

you know what you are taking, can you point those out? And why are you taking it? Why are you on this now?"

Several of the focus group and interview participants described supporting the self-management capabilities of the patients through education and coaching. A care transitions nurse spoke to the benefits of coaching and education related to medication management, *"coaching and education tied to the medications was a big win...the patients understand, I think, a lot better..."* An interview participant at the CCAC reflected on how the intervention was focused on building the self-management capacity of the patient, so they knew how to react in the event of worsening condition, *"the idea is we educate, we help, we coach, pick a verb; we make sure that they do not call 911 ..."* The objective of building the self-management capabilities of patients was reflected in several other comments. An interview participant from the CCAC remarked, *"...what we are supposed to be doing is arming the patient with information so that they know what to do or they know where to go..."* The care transitions nurse's impression was that for many patients, they had little understanding of their disease process or how it could be effectively managed, *"because no one else has ever talked to them about what their diagnosis is, what their disease is, why they are here, why they keep coming back, what they should be doing at home."*

Closely related to the theme of self-management capacity was that of early recognition and intervention. In terms of responsiveness of the service to patients, a rapid response nurse reflected on the need for a better mechanism to enable early intervention when patient's capacity to self-manage in the community is exhausted and there is an exacerbation in their disease state, *"so if we caught them two or three days earlier and you can treat them, you are not going to reverse the disease process but hopefully you can help them manage it ...you could have*

prevented that ED presentation.” The care transitions nurses reinforced the need for improved early recognition and intervention, *“they did not recognize something early and obviously...they could have gone to the clinic or they could have called rapid response.”*

The rapid response nurses identified that there is a continued reliance on the emergency department when post-discharge intervention is required, as few other community-based alternatives are available, *“I always tell them if you feel really unwell, definitely call 911...”* the participant further reflected that the establishment of alternative venues of care could avoid such requirements, *“but sometimes it could have been resolved at home.”* Another spoke of the success in avoiding an emergency department visit and potential hospital admission, *“she gave me a call and I was there within 10 minutes and I called the Heart Failure Clinic and they ordered blood workhad her blood work, then went home, the follow-up was all done during phone calls.”* Commenting on the continued reliance on the emergency department as the venue for intervention, a rapid response nurse reflected, *“some of that I think is the emergency department is there 24/7 and we are not there all the time... It is 8 o’clock at night, can I wait for the rapid response nurse the next day”.*

A barrier to realizing the benefits of early recognition and intervention was the system’s responsiveness driven by the fact that some patients did not have a primary care provider and for those that did, accessing the provider remained a challenge, as reflected in the comment from a rapid response nurse, *“another big problem is that some do not have a family physician, that is a huge problem, who do I follow-up with to help with this person?”* another reflected on the limited access to primary care providers, *“ we have no physician support at all...Monday to Thursday is good...but Friday afternoon on new admissions, ... you need to speak with a doctor, you are out of luck.”* A suggestion was made, that the hospital makes available a physician to

improve the responsiveness of the program and as a way to create a linkage, *“I do not know if the hospital could possibly have a doctor that could be a link that we would be able to call and follow-up”. That would be a great help.”*

It was identified that to enable system responsiveness the hours of the rapid response nursing program were going to be extended to include Saturdays. Both the rapid response nurses and the care transition nurses spoke positively about the expansion, *“rapid response has opened up to Saturdays.”*

The importance of medication reconciliation was identified as the most frequent patient-centred intervention. Medication reconciliation was done prior to discharge as reflected by a care transitions nurse, *“so the patient is in the hospital, there is medication reconciliation done prior to discharge.”* The care transition nurses spoke to the confusion that many patients experienced with their medications prior to admission, *“why people were coming back ...people are going home and are really confused on their meds prior to admission and just meds everywhere...”* Hospitalization often resulted in medication changes, worsening the confusion related to medications on discharge, *“and so we have new meds, but we are still going to continue to take all of these other ones, and they did, not knowing what to get rid of, and what to keep and what was important.”* A care transitions nurse spoke of the streamlining of medications and medication lists, *“the fact that we are spending the time to go through the meds and streamline that list for the patients and having them understand this is what you are going to go home on.”* Another care transition nurse spoke to the education related to medications in conjunction with the medication reconciliation process, *“we are assessing their learning and they seemed to be able to repeat back, okay these are the side effects, this is what I am watching for, these are what my meds are for,”* but reflected that based on the feedback from rapid

response nurses, confusion regarding medications remained, *“but then when they are going home, that is not necessarily what the nurse is seeing. And then again we can again see that evidence by the fact that they came back yet again.”*

Once home, medication reconciliation was then completed by the rapid response nurse, *“when you are in the hospital you are not actually looking through the bathroom cupboard, the rapid response nurse does...they ...do their reconciliation, they double check and then they follow-up...pharmacy is called, primary care provider if they have one.”* An interview participant from the hospital commented on the benefit of medication reconciliation once the patient has returned home, *“as much as we say medication reconciliation in the hospital, you need to actually see what the patient is taking in their home.”*

The rapid response nurses made several remarks regarding what they encountered in completing the home medication reconciliation, *“at home it is totally different and it is very confusing to them...often times we will even go in and they have not even picked up their prescription.”* The rapid response nurses spoke of the need for education reinforcement and coaching, *“they will say I am taking this in the blister packs and do you know what these medications are? No, no clue, just taking them.”* Several of the rapid response nurses spoke to discrepancies found, *“it was a pain medication and the dose they were on was three times higher than what the physician had ordered.”*

The need to leverage existing community pharmacy capacity was identified by an interview participant from the hospital, *“and not reinventing the wheel but using what is out there, reconciliation is a pharmacy job so utilizing it.”* Something that was supported by a member of the rapid response team, *“the pharmacists are excellent. Some of them are doing home visits so that helps too and then it decreases our role.”*

Several of the frontline providers working in the care transitions team reflected on the comprehensiveness of the program, *“Sometimes it going as far as having Red Cross come into the hospital to do that assessment for them and set them up with the service even before they go home.”* Another commented on how they helped facilitate the discharge and care processes by making phone calls or setting up appointments for the patient and the stress it removed from the patient and family, *“Okay that will be set up when you go and it just seemed to take the stress away from them going home considering how complicated they figured it would be to go home...”* The care transitions nurses spoke further of the comprehensiveness of the plan and how the plan was recorded, *“each person has a record of what they left the hospital doing”*

Outcomes: Measures not known or shared

Reducing the use of inpatient beds and the emergency department were the two utilization outcome criteria that the care transitions and rapid response program were trying to address, as one participant stated, *“the whole focus on this group is to keep you at home and improve your everyday life.”* The other outcome of interest was patient satisfaction. The teams did not receive results on either, other than what was provided through this trial, as this information was not collected and thus considered a barrier to the effective implementation of the intervention.

Subjectively, both teams believed they were making an impact, *“I do not know how many people who were convinced they were coming back and we are like oh no they have started going to the clinic and I feel like they are really good at keeping people out.”* Another nurse reflected, *“We have noticed that a lot of our patients are staying out of the hospital for at least four weeks when normally they would have come back within five to seven days.”*

A rapid response nurse commented, *“so I mean there are some success stories. I think we monitor reasons why they are readmitted but we should also be monitoring avoidance as well.”* Commenting on the effectiveness of the intervention at keeping people at home, a care transitions nurse commented, *“overall, it is kind of hard to tell because some patients who I am absolutely convinced that are going to come back, do not end up coming back, so obviously we did something right.”*

However it was acknowledged by an interview participant that there were not readily available data on which to base this conclusion:

“I just do not have that data to know...is it because of these programs or is it something else. I would guess that when the patients are armed with more information, a number to call and when rapid response goes in, I would guess calls get diverted elsewhere...we should be seeing this group not visiting the Emergency Department like they used to in the past.”

The lack of evaluation data was confirmed by another participant, *“I do not have access to that data, trying to get it because that really gives us a marker It is a starting point.”* The participant for the reflected on the need to get the patient’s perspective, *“That would be one part but then that it is all about us. The other part is what about the patient”? It is not just the exit. It would be interesting to hear what patients have to say.”*

Summary of Qualitative Findings

In summary, the interviews and focus groups showed that there was agreement on the purpose of the care transitions and rapid response intervention. However, difficulties with communication and role clarity did not allow for the establishment of mutually respectful work relationships and contributed to a level of frustration amongst the nurses. These factors, amongst others, including changing leadership, contributed to difficulties in coordination of activities

amongst the teams and within each respective organization. This ultimately led to missed patient referrals, inappropriate referrals and in some instances overlap of effort and duplication of services. Despite these challenges, there were indications through the focus groups and interviews that things were improving.

The focus groups and interviews revealed that the intervention was very patient-focused for those patients who received care. According to the participants, patients were extensively engaged, and received individualized care planning, self-management coaching, medication management, in-home and clinic follow-up and post-discharge care coordination.

In terms of the appropriateness of the intervention for the patient population selected, there was considerable debate as to whether the patient population selected for the intervention was too frail to benefit and whether a less frail population may have been more appropriate.

Key Themes: Qualitative Findings

The key themes from the interview and focus groups are highlighted in Table 5.15 below.

Table 5.15: Key Themes Qualitative Analysis

	Key Theme	Summary Statement	Subthemes
Purpose	Purpose: Facilitating Transition, Improving Satisfaction and Reducing Readmissions	Facilitating the transitions, through standardization, the transfer of information with the aim of improving patient satisfaction and reducing readmissions.	<ul style="list-style-type: none"> • Facilitating transitions • Reducing readmissions • Patient satisfaction • Information transfer • Standardization
Patient Selection	Characteristics of the Patient Population: Was the Right Population Served?	Patient population served frail, vulnerable with complex and uncertain outcomes. Patient motivation and health literacy were challenges. A belief that the intervention might be more effective in a less frail population.	<ul style="list-style-type: none"> • Frail/ Vulnerable • Appropriateness of referral criteria • High mortality • Patient motivation/compliance • Health Literacy • Patient choice
	Effective Screening, Changing Criteria and Missed Patients: A Source of Frustration	Changing criteria caused frustration that was exacerbated by perception of missed patients. Screening was labour- intensive, but effective in identifying the patients intended.	<ul style="list-style-type: none"> • Changing criteria • Effective identification & screening algorithm • Screening workload • Missed patients

	Key Theme	Summary Statement	Subthemes
	Patient Centred, Comprehensive Care and Therapeutic Relationships	Facilitators included the comprehensive of planning efforts, medication reconciliation, therapeutic relationships, reassurance and prioritization and strengthening of the patient's self-management capabilities through education, coaching and reinforcement. System responsiveness to support the patient in the case of worsening condition was a barrier.	<ul style="list-style-type: none"> • Patient and family education and support • Early recognition & intervention • Supporting self-management capabilities • Medication reconciliation • Therapeutic relationship • Prioritization post discharge care • Reassurance • Reinforcement, teaching and coaching • System responsiveness • Comprehensiveness of intervention
Alignment	Barriers to Alignment: Lack of acceptance, differing mandates, trust and competition	Challenges with the implementation of and the degree of “ <i>working together</i> ” related to perceptions of different mandates, acceptance and trust	<ul style="list-style-type: none"> • Opportunity • Challenges • Differing mandates and guiding principles • Agreement on work process • Lack of acceptance • Competition • Trust
	Structures and Coordinating Mechanisms: Committees, Policies and Position Descriptions	Formal management structures and processes established but opportunities to improve alignment and simplify the relationship.	<ul style="list-style-type: none"> • Structural complexity • Leadership turnover • Position descriptions • Formal structures/ polices/ committees
	Role Clarity, Awareness, Acceptance and Perceived Legitimacy	Roles defined and documented but challenges with role clarity, awareness acceptance and visibility.	<ul style="list-style-type: none"> • Role clarity • Role descriptions • Role awareness • Role functions • Role legitimacy • Role Awareness/ Visibility/ Justification • Role Acceptance/ Education
	Poor Referral Coordination Resulting in Missed Patients and Service Duplication	Referral and service coordination challenges led to missed referrals, duplication of effort and poor coordination of care in patient's home.	<ul style="list-style-type: none"> • Referral numbers • Inappropriate/ missed referrals • Referral coordination • Service duplication • Integration of work • Overwhelmed patients
Relationship and communication	Absence of Open, Two-Way Communication	The key themes which emerged were lack of open communication, unsustained use of communication mechanisms, the absence of two-way communications and the inconsistent use of communication techniques resulting in a deteriorating	<ul style="list-style-type: none"> • Lack of open communication • Communication mechanisms unsustained • Absence of two-way communication • Communication inconsistent • Deteriorating relationship • Recent improvements

	Key Theme	Summary Statement	Subthemes
		relationship. There was a sense that communication was improving.	
	Great Relationship Potential Impeded by Lack of Collaboration and Respect	Barriers to an effective relationship were lack of collaboration and respect. Facilitators identified were the desire and potential for an effective working relationship	<ul style="list-style-type: none"> • Lack of collaboration • Lack of team approach • Respect for knowledge/ expertise • Receptiveness to each other • Relationship potential • Desire for resolution
	Information Transfer Mechanisms: Effectiveness, Relevance and Reliability	The facilitators identified included the coordinating mechanisms of the multidisciplinary team, bullet rounds, team assistant and faxes. The information transfer process was characterized as labour intensive, not entirely reliable, and lacking formal feedback mechanisms which were barriers. The relevancy of the patient information provided was not clear.	<ul style="list-style-type: none"> • Coordinating mechanisms <ul style="list-style-type: none"> ○ Team assistant ○ Bullet rounds ○ Fax • Information transfer process • Cumbersome & labour intensive • Consistency & reliability concerns • Inadequate supporting tools • Lack of feedback • Relevancy of information provided not confirmed
Outcomes	Outcomes: Measures not known or shared	Monitoring of data limited to referral numbers, with no quantitative tracking or analysis, examples of success.	<ul style="list-style-type: none"> • Reduced readmissions and emergency department use • Improve patient satisfaction • Measures not known

CHAPTER 6

DISCUSSION

The discussion of the findings is organized into the following sections: 1) study summary; 2) study contributions; 3) study limitations; and 4) future research possibilities.

Summary of Study

The thesis, that clinical integration at the service delivery level will achieve improved care coordination and patient outcomes, was tested through the implementation of a hospital-to-home care transitions intervention. The intervention involved a hospital-based care transition nurse preparing the patient for discharge and completing a transfer to a rapid response nurse who followed the patient at home for a period of up to 30 days in the post-discharge period.

There were challenges with trial control. Ten of the patients enrolled in the intervention group did not receive their post-discharge follow-up visit by the rapid response nurse as a result of referral coordination challenges and 18 of the patients in the control group received post-discharge aftercare by the rapid response nurses when they should not have. The analysis of the results was based on the intention-to-treat principle; therefore, all patients randomized to the intervention and control groups, discharge home, were included in the analysis.

The quantitative results demonstrated that the intervention had no effect on the time to first readmission, time to first emergency department visit or the 30-day, 60-day or 90-day inpatient bed-days or emergency department use. Therefore, the null hypotheses were accepted.

Gender, previous emergency department and inpatient-bed utilization were found to be significant factors contributing to post-discharge readmission, emergency department and inpatient-bed use. No significant differences were found between the intervention and control

groups in satisfaction with the transition from the hospital to the home as measured by the Care Transitions Measure (Coleman, 2003).

While the quantitative analysis demonstrated that the intervention did not achieve what it intended to achieve, the results from the qualitative study do provide an indication of the underlying challenges with the implementation of intervention as designed. The qualitative results identified challenges with communication, relationships and the coordination of activities that led to missed patient referrals, inappropriate referrals, gaps and duplication of effort in the patient's transition and aftercare.

Intervention Design

This study differed from previous studies in that it implemented a hospital-to-home care transition initiative that spanned two different organizations. The initial study design contemplated utilizing a hospital-based care transition nurse in a liaison or navigator role, serving a system-spanning function, similar to work done elsewhere (Naylor et al., 1999; Parry et al., 2003). In the pilot phase of the trial, the care transitions nurse prepared the patient for discharge and followed the patient into the community for a period of up to 90 days. The pilot was found to be financially unsustainable for the hospital as it did not have sufficient resources to pay for all of the nursing hours required to implement the proposed model. As discussed in the literature, financial resource limitations represent a significant barrier to the implementation of care transition interventions (Naylor et al., 2011; Reinhard & Lind, 2011).

The introduction of the Rapid Response Nurse Program by the Northeast Community Care Access Centre provided an opportunity to align the work of the care transition nurses with the rapid response nurses. To leverage available financial resources, the intervention was redesigned. The redesign of the work processes related to the information transfer protocols was

left in the hands of the care transition and rapid response nursing teams and was led by the Coordinator of Care Transitions from the hospital and the Manager of Rapid Response from the Community Care Access Centre.

The analysis of data from the qualitative study does raise questions about the degree of alignment between the organizations, the design of the work processes including the mechanisms of communication and the relationships between the professionals responsible for the day-to-day work of transitioning patients. Issues of role clarity, role awareness and acceptance within the two organizations were identified as areas of concern. The adequacy and reinforcement of the coordinating mechanisms and the effectiveness of the information exchange protocols were identified through the interviews and focus groups as areas requiring improvement. Each is discussed below.

Alignment. The qualitative interviews revealed that achieving agreement on work processes, while conceptually beneficial, was practically difficult. Underlying notions of different organizational mandates, which were described as not necessarily being the same, challenged the design and testing of the work processes. Alignment was made more difficult by an underlying sense of competition. Additionally, concerns were expressed by the community-based rapid response nurses that they were not being fully utilized. They raised concerns that the hospital's involvement in post-discharge aftercare would lead to duplication of effort and reinforce the hospital's dominance as the location for care delivery within the community.

Work Processes. The intervention revealed the complexities of managing the patient transfer between two organizations. The challenges included different views regarding the appropriateness of referrals and problems with coordinating referrals. In terms of the appropriateness of the referrals, the criteria for inclusion underwent ongoing refinement to

ensure a sufficient number of referrals were generated and that the patients referred were patients for which the intervention could make a difference in the patient's care trajectory. This did result in some frustration.

Coordination of referrals was identified as an issue between the care transition nurses and rapid response nurses. It was also identified as an issue within the Community Care Access Centre itself with cases being referred directly to the community service provider and not to the rapid response nurses. There remained a sense that referrals were still being missed.

The challenges with the referral process had a spill-over effect on service coordination, raising concerns that this resulted in service duplication. This was a particular challenge for the patient once in the community. The multiple provider and patient interactions that occurred once the patient was at home, either directly in the home or through telephone contact, reportedly left the patient feeling overwhelmed. As a result, the rapid response nurses were required to assist the patient with prioritization of their post-discharge recovery services.

The care transition intervention differed from others, such as Naylor's (1999) Care Transitions Model, Coleman's Care Transition Program (2003) and others (Manderson et al., 2012) which used a liaison or navigator roles to serve a system-spanning function, linking and coordinating care by facilitating the flow of information between care settings and by removing barriers to post-discharge care (Dohan & Schrag, 2005). Accomplishing similar outcomes in the transition from the hospital to home, between two organizations, while identified as achievable during the qualitative interviews, would have required a much stronger relationship, clear alignment of visions and more effective communication processes focused on solving care coordination problems (Havens, Vasey, Gittell, & Lin, 2010). The qualitative interviews revealed that this relationship was not present.

A fundamental issue in the design of the intervention was that the home follow-up period was limited to 30 days. Given the frailty of the population, this was probably not sufficient. Many transitional interventions have longer periods of follow-up and have demonstrated longer-term success in changing health status and health utilization behaviors of the population they serve (Counsell et al., 2007; Dy et al., 2013; Enderlin et al., 2013; Manderson et al., 2012). Naylor et al. (2004) suggests that although transition interventions are successful in improving the patient's self-management capacity, there is a need for ongoing follow-up in the post-discharge period given the ongoing progressive nature of the chronic conditions of patients and in the case of this particular study, increasing levels of frailty.

Finally, the work design was made more difficult by the physical separation of workers. The rapid response nurses and care transitions nurses were located in separate sites. This impeded the ability of face-to-face communication, coordination of work and the development of work relationships.

Mechanisms of Communication. Communication was identified as essential at all levels for supporting relationships of ongoing respect and to enable the effective delivery of patient care. There was general acknowledgement, by the care transitions and rapid response nurses, that communication was neither as open nor effective as desired. Several mechanisms had been trialed including weekly meetings, web-portals, teleconferences that were described as inconvenient, untimely and inconsistent. The most effective mechanisms identified were e-mail or communicating through the intermediary of the Community Care Access Centre's rapid response nurse team assistant. The absence of regular effective communication between the teams did nothing to improve the sense of working together, left members of the teams feeling demeaned, uninformed and frustrated and resulted in a deterioration of already strained working

relationships. Inter and intra-organizational coordinating mechanisms have been identified as essential for coordinating the interdependencies within and between organizations (Gittel & Weiss, 2004; Nadler & Tushman, 1988). These mechanisms were not sustained making the coordination of work tasks more difficult.

Relationship Between Professionals. The issues of relationship, respect and communication were intertwined with issues around role clarity, alignment of organizational mandate and individual perceptions and attitudes of the nurses towards each other. The findings point towards a good working relationship at the managerial and committee level that did not seem to translate to those providing direct patient care. At the provider level, there were expressed perceptions of working against each other, a lack of mutual recognition and promotion of each other's role, reinforcing a sense of competition rather than collaboration. There were also comments that there was a lack of receptiveness to each other's ideas.

The work process and relationship issues clearly caused frustration and disengagement between the groups, impacting the degree to which the work might be considered truly integrated. While the qualitative study did demonstrate that both teams understood the common goal of reducing readmissions, similar to the findings of others, the effectiveness of the coordination was thwarted by ineffective communication mechanisms which affected the quality of the underlying relationships between the two teams (Gittel et al., 2013; Hartgerink et al., 2014). This eventually resulted in the discontinuation of several important coordinating mechanisms. The absence of well-defined processes and poor communication has been shown in the work of others (Bull & Roberts, 2001; Coleman et al., 2005; Kripalani et al., 2007) to result in adverse patient outcomes and may have contributed to the outcomes noted in this trial. The essential requirement of high-performing work systems is not exclusively the knowledge, skills

and commitment of employees, but also the relationship between employees in a relational work system of mutually reinforcing communication and relationships for the purposes of task integration (Gittell, 2002; Gittell, Hoffer, Wimbush, 2010).

Role Clarity and Role Awareness. Role clarity, role awareness and the degree of acceptance of the roles were consistently identified as a challenge by both the care transitions and rapid response nurses within each of their respective organizations. As described, the work was not well integrated into the daily workflows. Further, the relevance of the work was not well understood. Similar to the findings in this trial, in a qualitative analysis of the barriers related to the implementation of Better Outcome for Older Adults through Safe Transitions, known as Project BOOST(Society of Hospital Medicine, 2014), at six hospital sites in Illinois, William et. al (2014) identified issues of acceptance, lack of administrative support and staff buy-in as key areas challenging involvement and engagement.

The formal mechanisms through which work was structured between the two groups included the establishment of clear organizational accountability structures, documentation of roles, the development of policy and procedures, an electronic portal, access to electronic records, meetings, committees and joint presentations. The qualitative study revealed a lack of reinforcement of some of these formal structural elements and coordinating mechanisms, making the task of coordination of interdependent work processes more difficult.

Information Transfer. In terms of the information transfer, given the clinical complexity and the uncertainty of patient outcomes and the high degree of task interdependence, between the care transitions and rapid response nurses, the demands for the transfer of patient information were significant (Gittell & Weiss, 2004; McDonald et al., 2007; Nadler & Tushman, 1988). The qualitative interviews revealed that the care transition nurses went through an

extensive effort to provide patients, rapid response nurses, primary care providers and chronic disease management clinics with extensive amounts of information. The assessment of the relevancy of the information provided was not clear and described as only a one-way flow of information that was not always available in a timely manner.

The structural linking mechanisms that were utilized to facilitate the coordination of the information exchange included: the CCAC team assistant, faxes, informal e-mails and telephone feedback (McDonald et al., 2007; Nadler & Tushman, 1988). These mechanisms were identified as somewhat cumbersome by the teams. Daily bullet rounds were another structural linking mechanism that continued through the intervention, but were only attended by the care transition nurses and not the rapid response nurses. Established mechanisms that were not consistently sustained included regular meetings, education and the posting of patient information on the secured web portal. These mechanisms were ineffective and it was believed that alternative more effective mechanisms were required.

The task of transitions in this intervention operated in a sequentially interdependent manner (Nadler & Tushman, 1988). The flow of patient information tended to be one way, flowing from the care transitions nurses to the rapid response nurses and other providers. The lack of feedback mechanisms posed a barrier to the effective exchange of patient information, the appropriateness of referrals, the relevance and timeliness of the information provided and the outcomes of care (Gittel & Weiss, 2004). This lack of connection back to the hospital or hospital physician was reflected by the rapid response nurses. Similarly, the care transitions nurses pointed out that the lack of feedback on the outcomes of the patients once they were in the community as a barrier to improving their transitional planning work.

Similar challenges have been encountered with the implementation of care transition interventions in other jurisdictions. Rooney & Arbaje (2012) have discussed success with implementation of a post-discharge communication tool called “The PERFECT Form” which is used to report back findings within 72 hours of the first home visit. This generates team engagement and effectively links the hospital and community home healthcare providers to problem solve on how to address issues encountered with particular patients and more generally issues which may generate revisions to the established practice protocols.

The qualitative interviews identified agreement on the need for the work of the two teams to be more integrated, communication processes improved and coordination mechanisms reinforced. Suggestions to enable this improvement included co-location, partnering together and becoming more visible through regular engagement on the inpatient nursing units, attendance at daily bullet rounds and pursuing joint education initiatives. The need to coordinate services in the community to avoid service duplication and enhance mechanisms of physician support to enable more responsiveness to the rapid response nurses were also identified as opportunities for immediate improvement.

The qualitative interviews and focus groups revealed agreement that the purpose of the intervention was to reduce readmissions. The teams, however, did not monitor common process or outcome measures and were not aware of the effectiveness of the intervention at reducing readmissions. The rapid response nurses were concerned with the number of referrals and spent considerable time discussing the matter. The care transitions nurses, while aware of the issue, identified constraints of resources, criteria and geography as limiting the number of referrals generated. There was little evidence of joint problem solving to address these matters.

The monitoring and tracking of shared process and outcome measures is one way in which alignment between the two teams might have been better achieved. The idea of creating alignment through measurement accountability has been suggested by others as a way to force the forging of partnerships between providers to create a greater degree of mutual accountability to each other, the patient and the system (Burke, Kripalani, & Vasilevskis , 2013). The assertion is that what gets measured drives leadership and organizational behavior. Naylor et al. (2011) argues for the expansion of publicly reported measures for both transitional care processes and outcomes as a way to generate real system change with measures which address patient and caregiver experience, with potentially avoidable readmissions and financial benefit identified as priority areas of measurement (Naylor et al., 2011; Reinhard & Lind, 2011). A more formally structured accountability relationship at the organizational (macro) level to better link the outcomes of the teams at the micro level to organizational outcomes and accountabilities may have been of benefit in the case of this intervention.

These challenges faced by both of the teams is reflected in the literature related to transitions and discharge (Nosbusch, Weiss, & Bobay, 2011; Wagstaff et al., 2010). Finally, as articulated in the work of others, the success of any care transitions intervention is the function of leadership (Naylor et al, 2011). Leadership turnover clearly made this more of a challenge in this particular trial.

Patient Satisfaction

The evidence from the qualitative study shows that from the perspective of those delivering care, patients were extensively engaged and received individualized care planning, self-management coaching, medication management, in-home and clinic follow-up and post-discharge care coordination. Based on the survey results from the Care Transition Measure, both

the intervention and control groups demonstrated a moderate to high degree of satisfaction on the scoring of individual items. The exception was: “*understanding the side effects of medication*” which scored lower, in the disagree to agree range. The qualitative interviews revealed that significant effort went into the task of medication reconciliation and patient teaching about their medications. Why the results on this particular item were low is not completely understood. It may be that nurses did not specifically use the term side-effects in their teaching or that insufficient time was dedicated to discussing side effects of medication because of pressures of time, nurse’s knowledge or the patient’s readiness for teaching. Alternatively, the patients simply may have not retained all of the information provided. This would be understandable, given the considerable number of medications each patient was taking and their readiness to learn might have been affected by the considerable level of frailty of the population.

In the qualitative interviews, it was suggested that better integrating into the work of the transitional intervention the capacity available through local pharmacy services to complete the medication reconciliation on discharge. There is some support for this in the literature. Based on a systematic review of the literature, Kwan et al. (2013) found medication reconciliation was most effective when done with the involvement of a pharmacist and when combined with other care coordination and transitional care interventions such as the one implemented in this study. As well, post-discharge pharmacy engagement, has demonstrated success in hospital-based transitional care interventions such as project RED (Enderlin et al., 2013; B. W. Jack MD et al., 2009).

The Intervening Impact of Frailty

Consistently, the interview and focus group participants expressed the view that the intervention might have benefited a less frail population, or a population in which they might

have been able to intervene earlier in the patient's disease state. The results of the quantitative trial demonstrated that the frailty indices of the patients enrolled were high and that the intervention had no impact, supporting the observations of those involved in delivering direct patient care.

No correlations were found between frailty and the time to first readmission, nor were any differences found in the time to first readmission. Correlation analysis demonstrated that frailty was significantly correlated with the length of index admission and that the mean frailty scores of those who died during the course of the trial were statistically significantly higher than those who survived.

The prognostic capacity of the frailty index on the outcomes was limited in this trial, most likely because the sample population was a fairly homogenous cohort of highly frail patients. The trial results did not allow for the testing of the prognostic capacity of the frailty index across a broader range of index scores.

Evans, Sayers, Mitnitski & Rockwood (2014) tested the prognostic capacity of the frailty index in an acute care setting in relation to the risk of death, length of stay and discharge destination. Patients discharged home had the lowest admitting mean frailty index at 0.38, compared to those who died (Frailty Index=0.51) and those discharged to a nursing home (Frailty Index=0.49). The mean frailty score for the population cohort in this trial was 0.59, indicative of a highly frail population. The frailty of the population is corroborated by the finding that 18 of the patients enrolled in the trial were lost to death prior to discharge home and the overall mortality rate for the trial period was 22.7%. A further indication of the frailty of the population was the mean LACE score for the population which was 13.9, predictive of a 23% percent probability of mortality or hospital readmission within 30 days and consistent with the

current trials 30-day readmission rate of 22.31% in the current trial (Walraven et al., 2010). Finally, the distribution of frailty scores in the trial followed a normal distribution. In work done by Mitnitski, Mogilner & Rockwood (2001) they found that a normal distribution of frailty scores in a population is consistent with one whose adaptive potential is considerably compromised, that is, systems having large number of “*independent and uncompensated failures of subsystem and elements*”. According to Mitnitski, Mogilner & Rockwood (2001), the distribution of well groups follows the gamma distribution, in contrast to unwell groups which follows a normal distribution, characterized by a large number of independent and uncompensated failures of biologic subsystems (Mitnitski et al., 2001). So the views of the interview participants’ and the results of the quantitative analysis do support the assertion that the population may simply have been too frail to have benefited from the interventions.

While few trials have focused specifically on highly frail patients, in a mixed method study using a pre-post design, Ornstein et al. (2011) applied a care transition intervention to a patient population that included patients with cognitive impairment, that were generally older with an average age of 81 years, more frail, requiring assistance with five or more activities of daily living and utilizing more than 8.2 medications. The intervention did not demonstrate a reduction in hospital readmissions or costs (Ornstein, Smith, Foer, Lopez-cantor, Soriano, 2011).

There is not yet consensus in the literature as to what patient population is most appropriate for what intervention. As pointed out by Hansen, Young & Hinami (2011), the significant challenge in evaluating care transition interventions are that populations have not been well defined in terms of objective measures, making comparability difficult.

Frailty and Comorbidity. Another important characteristic of this patient population was the degree of comorbidity. Approximately 50% of the patients had five or more chronic

diseases. While frailty is distinct from comorbidity, the interaction between them does impact the health status of the patient and the causal relationship between them becomes more pronounced with advancing age (Fried et al., 2004). The management of multiple comorbidities is complex, resulting in interactions and incomparability of treatments, polypharmacy, as seen in this trial, and other adverse events (Fried et al., 2004). Additionally, there is a risk of fragmentation of care. Simply focusing on the management of a single chronic disease may lead to inadequate attention to other diseases and may actually lead to sub-optimal care (Fried et al., 2004). Frail patients have specific health needs which need to be addressed such as weight loss, activity tolerance and loss of strength and lean muscle which may be preventative in the avoidance of adverse health events such as hospitalization. However, as demonstrated in this study, frailty occurs simultaneously with comorbidity and each exacerbates the other (Fried et al., 2004).

There are interrelationships between comorbidity and frailty and, as suggested by the comments in the qualitative study different mechanisms to enable the coordination of care so that care interventions are appropriately targeted and at the appropriate time in the patient's recovery. The qualitative interviews identified issues in relation to the timing of chronic disease management clinic visits, the coordination of care amongst the clinics and the appropriateness of care. A common theme was that patients were simply not recovered sufficiently to benefit from the interventions provided by the chronic disease management clinics in their initial in-home recovery phase. They were not mentally or emotionally ready and they were overwhelmed with information and providers coming into their home to be able to participate in an effective way, given their lack of physical stamina, cognitive capacity and overall health status. This idea of differentiating the management of frailty and comorbidity has been suggested by others (Murad & Kitzman, 2012; Theou et al., 2012).

Finally, as identified through the qualitative interviews, and touched on above, agencies other than the hospital and the CCAC were providing care to patients in their home or in other care venues in the post-discharge period. This created service conflicts, duplication and contributed to the patient's sense of being overwhelmed. The optimal management of this patient group may require that coordinating mechanisms extend beyond the two agencies currently involved.

The Intervening Impact of Social Isolation

The distribution of social isolation scores were different for men compared to women. Social isolation scores for men living alone were significantly lower (more isolated) than for men living with a significant other or extended family. On the main question of the intervening impact of social isolation on the time to first readmission, no differences were found by social isolation category nor were differences found between social isolation category and the time to first emergency department visit or total inpatient bed utilization by social isolation category. Friendship scores, that is, the measure of social isolation used in this study were not a predictor of health care utilization.

The time to first readmission analysis showed that women who lived alone had a statistically significantly lower timespan to first readmission compared to men who lived alone. It may be that women are more likely to seek help earlier than men or that they have better social networks to encourage them to seek out care. The assertion that women living alone have a more fully developed social networks compared to men and have better social connectedness is supported in the literature (Michael, Berkman, Colditz, & Kawachi, 2001; Russell & Taylor, 2009).

Measures of frailty, social isolation and living alone are important factors to objectively screen for in older patients, to understand which health and social interventions will be most effective in improving overall health status, clinical outcomes and quality of life of the patient (Greysen et al., 2013; Mistry et al., 2001; Nicholson Jr., 2009).

Contributions

This study used a mixed method research design that included a randomized control trial, interviews and focus groups, involving providers and data available from the hospital and community care access centre. This enabled the evaluation of the intervention from multiple perspectives. The intervention tested was a unique care transitions intervention that spanned two organizations. The intervention leveraged existing resources available within the local health infrastructure, aligning them into a single process with the aim of better integrating care for the patient on the transition from the hospital to home. In the absence of the additional resources added to the Community Care Access Centre, this intervention would not have been possible. Finally, it was conducted within the unique context of Northeastern Ontario.

The intervention itself was built around the concept of health services integration, with the assumption that through improved clinical integration, care coordination would be improved and result in lower levels of health service utilization. The study applied the Organizational Design Framework of Care Coordination (McDonald et al., 2007) as a means to frame the study and guide the analysis. The study demonstrated that transitional interventions between two organizations are complex undertakings, the efforts of which may be weakened by lack of clear alignment, common accountabilities, role clarity and awareness, effective communication, relationships of mutual respect and clearly defined work practices.

The study established that a patient risk stratification approach can be applied in the daily operations of the hospital to identify patients at high risk for readmission and adverse outcomes. This was achieved through the application of a relatively simple algorithm and tools that included the identification of patients admitted at least once in the previous 12 months, the completion of the LACE tool and Frailty Index. The screening tools themselves were relatively easy to use after a period of practice. The qualitative interviews revealed that retrieving some information from the patient chart such as medications and past medical history was labor intensive. Reducing the burden of work was determined to be solvable with the implementation of a few identifiers within the electronic documentation system of the hospital. No stratification process can be relied on as being entirely predictive. It can help guide discharge and care transitions decision making and allow for the better matching of the intervention to the patient's care requirements.

The research builds on the knowledge base of interdisciplinary research using theoretical frameworks with strong organizational behavior, quality and system underpinnings. Further, while the intervention is focused on the practice of nurses it draws heavily on literature from the fields of medicine, nursing, social work and health systems management.

Finally, the study aimed to identify models of prediction using multiple linear regression. Given the repeated nature of the measurements, the data were found to be correlated and therefore, multiple linear regression was determined to be an inappropriate statistical method of analysis. Instead, a mixed linear model was used to identify statistically significant factors associated with post discharge inpatient and emergency department use. In terms of inpatient utilization in the post-discharge period, gender was the only significant predictor, with males using more inpatient bed-days than females in the 30-day, 60-day and 90-day post discharge

period. Gender was the only significant predictor of post discharge utilization in the 30-day post-discharge period with females having a statistically significant higher rate of readmission than males. Previous admission was found to be the only significant predictor of readmission at 60 and 90 days. Emergency department use was significantly associated with gender in the 30-day post-discharge period and gender and previous emergency department use in the 60-day and 90-day post-discharge periods.

Implications

Based on the results of this trial, at the local level, improvement work should be initiated to strengthen future interventions of a similar nature. Consideration should be given to more clearly defining roles, improving mechanisms of communication, simplifying the information transfer process and developing shared process and accountability measures. Additionally, a review of the current pathways of care should be undertaken to ensure a better matching of the interventions to patient care needs. Patients should be stratified according to the intensity of their care requirements, from low to medium to high intensity, based on different levels of complexity and uncertainty of their outcomes. Consideration should be given to the development of separate pathways for moderate care-needs patients with chronic diseases and for high-risk frail patients. The highly frail population may benefit from care pathways more focused on the establishment of longer term “goals of care” or an advance care planning pathway and/or palliative pathway.

As a starting point towards this end, a framework which builds on the work of Boling (2009) identifies revisions to the screening protocols used in this trial and is shown in Appendix I. The revised protocol introduces an alternative screening process using as a simpler screening tool called the Assessment Urgency Algorithm (AUA) for the identification of at-risk

populations in the emergency department (Rehabilitative Care Alliance, 2015). The screening tool can be applied quickly to enable the differentiation of the patient population based on the complexity and intensity of care need.

In this alternative model, the LACE tool would be applied to moderate risk patients admitted to the hospital with chronic disease and the FI-CGA to the high-risk patient populations. On discharge, low-risk patients would seek follow-up with their primary care provider. Moderate-risk patients would follow a chronic disease management pathway which may include follow-up in chronic disease management clinics, home follow-up by the rapid response nurses or community paramedic, telehomecare and primary care follow-up. High-risk patients would follow a “*goals of care pathway*” which would engage the patient and family through a process to designing a care plan.

Given the complexity of the patient population served in this current study and their dependency on multiple providers, it is suggested that the scope of involvement be expanded to include other health system agencies and health disciplines. As suggested by several authors, this improvement work needs to include consideration and perspectives of patients and health care providers (Ramsey & Fulop, 2008; Shaw et al., 2011; Simoens & Scott, 2005).

Executing successful care transition interventions between organizations where there is shared accountability for success requires system-based thinking and accountability measures that are focused on the processes of patient care in association with patient and system outcomes. Achieving this end point will require thinking systemically about how transitions between organizations can be executed through collaboration and shared accountability arrangements. As Naylor et al. (2011) have argued, unless there is an expansion of publicly reported measures for both transitional care processes and outcomes, real system change will not be realized. Measures

which address the patient and caregiver experience, potentially avoidable readmissions and financial benefit are identified as a priority (Naylor et al., 2011; Reinhard & Lind, 2011).

The proposed model of transitions implemented in this study could feasibly be implemented within the broader context of the Ontario health system. Broader application will require adaption to local contexts by examining how the current health resources are deployed and work processes function to achieve the goals of care coordination through the patient's transition from hospital to home. As reflected by Boling (2009), while many interventions may be effective, it is essential that the intervention be adapted to the context of the local environment.

Study limitations

This study has several limitations. Firstly, the results of the trial may not be generalizable to different population groups or to different clinical settings or geographic contexts. The patient population in this study was generally very frail and the results might be different with a less frail population. Additionally, this study was undertaken within the context of Northeastern Ontario in the District of Sudbury, characterized by a harsh climate and a relatively poor transportation infrastructure and limited community based services. These factors may have contributed to the outcomes of the study. For example, geographic distance and poor transportation infrastructure may have contributed to health seeking behaviors particularly for the frailest for which the effort could be overwhelming (Keating, Swindle, & Fletcher, 2011). This may not be unique to the study setting and requires further exploration.

The study's patient inclusion criteria were aimed at selecting a patient population at highest risk for readmission. The qualitative study identified that the patient population selected for the intervention may have been too frail. It was suggested that the focus should be on a less

frail patient population. A total of 18 patients died before being discharged home. While end-stage or palliative patients were not part of the inclusion criteria, the comments from some of the participants in the qualitative study suggest that the screening protocols were not sufficiently sensitive at identifying and excluding these patients from inclusion in the study. That being said, it is often a difficult task at the time of admission to identify the outcomes of a patient.

Maintaining adherence to study protocols proved to be difficult, partially due to what seemed to be the failure to achieve alignment within the provider groups. In this regard, it may have been beneficial to have extended the trial for a longer period of time. Additionally, challenges with referral processes, communications processes and relationships were identified in the qualitative analysis, all of which may have contributed to the lack of adherence. A total of 10 patients in the intervention group did not receive the intervention and 18 patients in the control group did receive the intervention. There is no evidence that this contamination was systematic. It was assumed in the trial design that there would be some lack of adherence. This contamination was compensated for by oversampling.

The allocation process ensured that patients were randomly assigned to either the intervention or control group; however, once assigned blinding was lost. The potential for compensatory interventions or attention to patients in the control group may have existed. It may, for example, have resulted in care coordinators working for the CCAC simply referring patients to the rapid response nurses because they felt that the patient should receive rapid response, potentially resulting in bias. The trial design did not include a control group that would have only received “sham” contacts. This would have been very difficult to achieve within an applied clinical setting and would have been ethically inappropriate.

The study time period was limited to 12 months, so the impact of the intervention in the longer term is not known. The intervention may simply have not been fully matured to be effective. Manderson et al. (2012) describes an investment effect, that is, the benefits of the interventions are not seen immediately but occur overtime, as time is required for the roles to be assimilated into the systems of care.

At the patient level, an investment effect might exist as well, that is, once patients have been stabilized with regular follow-up at the chronic disease management clinics, their utilization of hospital emergency department and inpatient care might be reduced. A notion reinforced by the significant trend effect noted in readmissions and emergency department use between the 30-day, 60-day and 90-day periods in measured in this trial.

The follow-up period for the rapid response nurses was limited to 30 days. Given the frailty of the population, a longer period of follow-up to ensure that the patient has settled at home, more fully recovered and able to take on more self-management functions may have been of benefit. Many transitional interventions have longer periods of follow-up and have demonstrated longer-term success in changing health status and health utilization behaviors of the population they serve (Counsell et al., 2007; Dy et al., 2013; Enderlin et al., 2013; Manderson et al., 2012; Naylor et al., 1999; Naylor et al., 2004; Stamp, Machado, & Allen, 2014). However, it is not clear that these studies were dealing with similarly frail populations. A longer period of follow-up would be required to more fully understand the investment effect of the intervention at the care provider and patient level.

The timeliness of primary care follow-up in the post-discharge period was not formally evaluated as part of this trial. Several studies have demonstrated that timely primary care follow-up in the post-discharge period is associated with the reduced risk of readmission (Doctoroff,

McNally, Vanka, Nall, & Mukamal, 2014; Misky, Wald, & Coleman, 2010). This may have had an intervening impact on the patient outcomes. The essential function that primary care providers have in ensuring the success of care transition interventions has been recognized in the literature (Arora et al., 2010; Balaban et al., 2008; Balaban & Williams, 2010; Dedhia et al., 2009; van Walraven et al., 2010). In this current study, 94% of patients had access to a primary care provider. Discharge information was provided to primary care providers by the care transition nurses. The relevancy or use of the information provided to primary care providers was not assessed as part of this research. The results from the qualitative interviews indicate that based on informal feedback, the utility of the information was mixed.

The qualitative analysis revealed the involvement of many overlapping providers going into the patient's home and a lack of coordination amongst the providers leaving the patient feeling overwhelmed. This lack of in-home coordination and adherence by the entire team in the post-discharge period to a common plan of care may have countered any of the coordination work done in the discharge planning process and the follow-up done by the rapid response nurses. While integration may have been achieved on one component of the transition from the hospital to the home, there was not a coordinated approach to care amongst the multiple care providers.

Predominantly, the evaluation of care transitions initiatives are end-point measures, such as short-term readmissions rates, financial cost-benefit, emergency room visits, disease-specific readmissions, functional status, quality of life and patient satisfaction (McDonald et al., 2010). The selection of measures for this study was driven by a desire to align with what is monitored at a health system level and to enable comparison with other care transition interventions implemented in other jurisdictions. While the measures selected are useful

measures, they do not evaluate the processes of care. Process measures should include such things as: the timeliness to first home visit, the number of follow-up visits, accuracy of medication reconciliation and time to first physician appointment. The tasks of care transitional interventions are to improve the processes of care through linkages and coordination. The goal is to evaluate if the processes of care are being effectively implemented. Embedding process measures, to evaluate the performance of the teams functioning and adherence to protocols may have been helpful in reinforcing the work standards and reducing study protocol adherence issues. These may have included such measures as: the confirmation of receipt of patient information from the care transitions nurse to the rapid response nurse; acknowledgement of first home visit by the rapid response team to the care transitions team; compliance with first home visit target timeframes; accuracy of discharge medication reconciliation with home medication reconciliation; time to first primary care physician appointment; number and type of care coordinating interventions completed by the rapid response nurse post discharge.

This study did not specifically explore, from the patient's perspective, the reasons for their readmission nor were detailed clinical level data collected to analyze the clinical indications for the patient's first readmission. Only data was collected using the Care Transition Measure Survey were available to assess patient satisfaction with the transition from hospital to home (Coleman, 2003). While a detailed qualitative analysis at the patient level was considered, this was excluded as part of this current study. An area of future research is to evaluate in more detail the patient's experience with the transition.

Finally, the study did not specifically explore or control for the clinical skill set of either the care transitions or rapid response nurses. Many authors speak to the clinical acumen of the professionals providing care through the transitions as critical to the success of care transition

interventions (Boling, 2009; Laugaland et al., 2012; Naylor et al., 2004). Several interventions have used nurses in advanced practice roles, such as nurse practitioners with specialized training in geriatric care (Naylor et al., 1999; Naylor et al., 2004). In this case, both the care transitions and rapid response nurses were registered nurses who functioned in a planning and coordinating role. Training was provided to the nurses to ensure adherence to the screening protocols, use of standardized care plans, tools and the processes of care.

The care transition nurses all had less than five years of experience. As reflected in the qualitative interviews, they initially struggled with achieving acceptance on the inpatient units. Their level of experience and comfort with being assertive in an environment of well-established care teams may have created some challenges in imbedding their function within daily work processes. Clinically, these nurses had the support of experienced inter-professional teams and their discharge and transitional processes were implemented using standardized assessment protocols and care plans.

The rapid response nurses had more than 10 years of experience, with some being highly tenured and with backgrounds working in acute care, community-based geriatric care and as care coordinators in community care and hospital access teams. They were all well suited to the demands of independent work in the community.

Future Research

There are several areas of future research. It is suggested that further research be undertaken to evaluate the outcomes of this study over a longer period of time, ideally for a period of two years, to determine if the outcomes improve overtime and as the intervention further matures and is integrated into the system (Manderson et al., 2012; Toseland et al., 1997).

This would allow time for the roles, communication processes and relationships to mature so they are not confounding factors in the study of the effectiveness of the intervention.

A second area of research should be to evaluate a model design where the period of follow-up in the community is extended beyond the current limit of 30 days. Ideally this would include different intervals of follow-up of up to two years, to determine if a longer-term intervention would have an effect on reducing emergency department and inpatient care use. Again, as reflected by others, where the patient population experiences comorbidity, it may be that given the complexities of these patients that an extended period of follow-up is required (Naylor et al., 2011).

The implementation of objective measures to stratify patients and match the post-discharge intervention both in type and intensity to the patient to achieve the desired outcomes requires ongoing development. This would allow for further testing of the patient stratification model used in this study (Boling, 2009).

The current study revealed that significant effort went into the transfer of information from the care transitions nurses to other community provider agencies and primary care providers. Future research should focus on identifying the essential elements of information that need to be shared amongst the various providers to reduce the gaps in the information transfer with the aim of streamlining work and reducing wasted effort.

To confirm the findings of the predictive analysis, it would be useful to undertake an analysis using a larger sample of the population to determine, for this high-risk frail population, if the models of prediction generated in this study are consistent with the results found in a larger sample population (Hudson et al., 2014). At the same time, the intervening impact of social isolation and frailty on post-discharge utilization could be further studied.

As discussed in the qualitative analysis, evaluating the impact of the intervention across low and moderate-risk patient populations would be of benefit, to determine if the intervention is more effective in reducing post-discharge emergency department and inpatient utilization.

Polypharmacy was a significant issue in this highly frail population. The appropriateness of drug use and its impact on patient health and health system utilization requires further evaluation. It is suggested that a descriptive study be first undertaken to explore the degree of polypharmacy within this at-risk patient population. Further research on interventions aimed at reducing the number of medications being taken and its impact on both patient and the health system is warranted.

The current study evaluated only the patient's perception of transition through the Care Transition Measure (Coleman, 2003) and only provided a single snapshot in time. Ideally, the use of the Care Transition Measure should also track the patient's perception of transitions overtime. This information could be used in ongoing quality improvement work. Further, the qualitative analysis identified that patients were simply overwhelmed and lacked clarity around their follow-up activities in their post-discharge period. Future research should focus on more in-depth analysis of the patient's perceptions of their transitional experience and how the intervention's design might be modified to improve patient satisfaction.

CHAPTER 7

CONCLUSION

The transition from hospital to home is a vulnerable period for patients, particularly for the elderly with complex conditions, who are often frail, at risk for adverse events and unable to navigate a system of poorly coordinated care in the post-discharge period. Achieving seamless transitions between care settings is viewed as crucial to high-quality care for the frail older persons.

The assumption that clinical integration at the service delivery level will achieve improved care coordination and patient outcomes was tested through the implementation of a hospital to home care transitions intervention. This mixed methods study tested this hypothesis by evaluating the effectiveness of a care transitions and rapid response nurse intervention at lengthening the time to first readmission and reducing total readmissions, emergency department use and total hospital bed-days during the 30-day, 60-day and 90-day post-discharge periods for patients at high risk of readmission. The intervening impact of social isolation and patient frailty was evaluated.

The randomized control trial revealed that this intervention was not effective; however, the study demonstrated, through the qualitative analysis of focus group and interview data, that transitional interventions between two organizations are complex undertakings, the efforts of which may be weakened by lack of clear alignment, common accountabilities, role clarity and awareness, clearly define work practices, excellent communication and relationships of mutual respect.

While the intervention was not shown to be effective in this particular study, it is difficult on the basis of this study to conclusively state that the intervention is not worthwhile. Many of the barriers identified as potentially contributing to the outcomes of this intervention are amenable to improvement. Addressing these barriers and testing the intervention on a much less frail patient population may prove a useful and worthwhile exercise.

It has been emphasized in the literature, and reinforced by the results of this trial, that for interventions to be effective they must be carefully tailored to meet the needs of the patient population being served (Boling, 2009; Williams et al. 2009). In the case of older patients, suffering multiple comorbidities, disease-specific interventions alone are not sufficient to prevent exacerbation and rehospitalization. Consideration also needs to be given to the patient's overall level of deficits or frailty. The design of care pathways must consider the patient's medical complexity, the desired outcomes sought by the patient and family and their willingness to engage in self-care activities. Future research is required to examine how to stratify patients and design care pathways which consider the patient's level of disease, capacity for self-care, frailty and outcomes of care they desire. A proposed model for future research is provided in Appendix I (Boling, 2009).

Correct patient stratification and well-designed pathways are a starting point. Essential to their effective implementation are high functioning and well integrated care teams within and across organizations. As demonstrated in this trial, transitions between organizations are complex and require clear alignment on purpose, clarity of task, leadership commitment and shared measures of accountability. Supportive structures, clearly defined roles, mechanisms for information sharing are required facilitators and essential to the formation of effective relationships and communication. Given the resource constraints in Northeastern Ontario,

achieving clinical and service integration is essential to enable the leveraging the limited resources available for the effective transitions of patient. Establishing the processes through which quality improvement efforts can be implemented to enable greater clinical and service integration and team performance is an area requiring further development and a focus of future research.

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Appendix A



Job Description

POSITION: Registered Nurse - Rapid Response
REPORTS TO: Manager, Client Services

PURPOSE STATEMENT/JOB SUMMARY

The Registered Nurse (RN) - Rapid Response focuses on the provision of direct nursing care to facilitate the transition from acute care to home care for eligible individuals within target population groups.

MAIN ACTIVITIES

Description of Specific Duties	Percentage of Time
<p>Rapid Response Nursing</p> <ul style="list-style-type: none"> • Provides the first in-home nursing visit within twenty four (24) hours of hospital discharge for complex/chronic adults. • Confirms the client’s hospital discharge care plan. • Communicates the importance of primary care to avoid re-hospitalization. • Reviews the discharge care plan and confirms outstanding medical tests have been scheduled and transportation is available. • Ensures new prescriptions are filled and conducts medication reconciliation with the client and in consultation with the pharmacist/primary care provider to confirm that no drug interactions or contraindications exist. • Reviews medication protocol with client and caregiver and answers any questions. • Initiates contact with the primary care provider and provides updates on client’s acute care event and post-discharge regime either directly or through the CCAC Care Coordinator. • Recommends and facilitates, as appropriate, a one-week client follow-up visit with the primary care provider. • Identifies clients requiring an accelerated in-home assessment and home care services with the CCAC Care Coordinator. • Informs and supports the Care Coordinator in developing the client’s care plan and ensuring a smooth transfer of the primary care physician and pharmacist to the ongoing care team. • Refers to longer-term community programs through the Care Coordinator as required (i.e. Chronic Disease Management, Tele-homecare program, etc.). • Answers any questions or concerns of the client and caregiver and provides appropriate contact information for support. • Maintains professional competence and knowledge of current practices by participating in professional development. • May oversee students in accordance with the College of Nurses of Ontario. • May mentor and/or assist new hires to become proficient with client service processes within NE CCAC. • Contributes to a safe and healthy environment by following safe work procedures, reporting injuries, illnesses, and unsafe working conditions affecting NE CCAC employees and clients. • Performs other duties as assigned. 	65%

Relationship Management

- Maintains open communication with clients and their family members/caregivers/substitute decision-makers (SDMs) to foster positive working relationships. 20%
- Shares knowledge, requests information, and collaborates with other service providers and health care professionals to deliver comprehensive and effective client services.
- Establishes and maintains effective relationships with external service providers, primary health care professionals, and appropriate agencies to ensure health care services and resources are available when needed.
- Participates in staff and committee meetings, represents NE CCAC in case conferences, and attends required workshops and conferences to contribute to program development and make recommendations regarding service delivery.
- May participate in events to promote NE CCAC objectives, activities, programs, and services.

Documentation and Record Keeping

- Protects client privacy and confidentiality in accordance with legislation, NE CCAC policies, and the College of Nurses of Ontario. 15%
- Maintains accurate clinical records and documents client assessment findings, goals, treatment plans, and interventions in accordance with NE CCAC policies and procedures and the College of Nurses of Ontario. Maintains accurate statistics on client care, submits records of weekly visits and mileage reports, and performs other administrative duties as required, in accordance with NE CCAC policies and procedures.

SKILLS

Knowledge

Nursing

- Registered Nurse in good standing with the College of Nurses of Ontario.
- Relevant experience working as a Registered Nurse.
- Current Emergency First Aid certification.
- Experience in service provision for assigned target populations e.g. chronic disease management.
- Knowledge of home health care and other community resources in the LHIN.
- Knowledge of best practice models of care/service provision used in community health care organizations.
- Problem-solving and decision-making skill and ability.
- Good understanding of the roles of other health care professionals affiliated with the NE CCAC.
- Must have a valid driver's license and access to a vehicle.

CCAC/Industry

- Understanding of NE CCAC business priorities, objectives, and requirements for client services.
- Practical knowledge and understanding of relevant legislation (e.g. regarding the provision of health care services, privacy, health, and safety, etc.).
- Comprehensive knowledge of the standards of practice and professional guidelines set forth by the College of Nurses of Ontario.

Administrative

- Ability to prioritize professional duties, manage multiple clients, and efficiently organize workload.
- Ability to accurately complete required documentation, reports, forms, and recommendations.
- Working knowledge of computer software (email, internet) and Microsoft Office applications (Word, Excel).

Communication/ Interpersonal Skills

- Strong interpersonal skills to work with diverse client groups with varying levels of comprehension

and language capability.

- Provides quality clinical service delivery in conjunction with clients, their family members/caregivers/SDMs, and other service providers.
- Ability to deal with demanding interpersonal situations and respond with good judgment and understanding.
- Ability to communicate information effectively through a variety of means including reports, letters, meetings, and presentations.
- Effective listening, observation, and facilitation skills to accurately assess clients and provide appropriate intervention.
- Advanced written and oral proficiency in English.
- Advanced written and oral proficiency in French may be required in specific job assignments.
- Demonstrated awareness of cultural diversity, as well as ability to behave discreetly and sensitively to confidential issues.

EFFORT

Physical, Visual, Auditory and Concentration Demands

Physical Demands

- Work may require moderate physical activity when providing direct care to clients and occasional need to move, carry, and/or lift equipment. May need to carry laptop (5kg), laptop bag (1.5kg), files and medical equipment such as blood pressure cuff and stethoscope.
- While in the office, intermittent or sustained periods of sitting and standing with frequent position changes.
- When driving to client homes, sitting requirements can range from 10 minutes to 90 minutes in duration. On average, may drive between 40 minutes and 2 hours a day.
- Regular computer and phone usage.

Visual Demands

- Visual attentiveness is required when reading and writing a variety of documents or when working at a computer.
- Frequent observation is required when assessing clients.
- Regular driving to and from service delivery locations.

Auditory Demands

- Auditory attention is required when consulting and listening to clients and their family members/caregivers/SDMs, other team members, and service providers.

Concentration Demands

- Work involves a high degree of alertness and concentration.
- Must be able to balance multiple priorities, manage the changing demands of clients, and process a high volume of information.
- Continuous observation and evaluation is required during assessments.
- Extended periods of focus are required while completing client assessments and care plans.

Problem Solving/ Complexity

- Work requires a high degree of analysis, independent judgment, and mental challenge when developing plans to address client needs.
- Creativity and innovation may be required to meet client needs.
- Refers to professional practice standards and guidelines (CNO), relevant legislation, NE CCAC policies and procedures, and professional associations to deliver client services and meet their needs.

RESPONSIBILITY

Accountability & Decision-Making

- Accountable for the provision of health care services to clients in a timely and effective manner and also keeps their family members/caregivers/SDMs and other members of the health care team

informed and up to date.

- Carries out work responsibilities with minimal direction, exercises judgment, makes decisions, and takes action within legislative framework, professional standards of practice, organizational goals, and NE CCAC policies and procedures.
- Maintains confidential and sensitive client information.
- Refers all client complaints, health and safety concerns, ethical dilemmas, and/or unusual/complex issues to the Manager.
- Demonstrates understanding of, and compliance with, responsibilities under the Occupational Health and Safety Act, Regulations, and the organization's health and safety program, policies, and procedures for NE CCAC employees and clients. Attends Health and Safety in-services and takes action to address unsafe conditions and procedures to ensure a healthy and safe work environment.

Risk

- Decisions regarding care plan and interventions significantly impact clients and their family members/caregivers/SDMs.
- Assessment, treatment, and/or recommendation errors could delay the provision of needed services to clients, negatively affecting client relations and/or the public image of the organization.
- Inappropriate assessments and inaccurate recommendations for care plans can further aggravate and damage the client's health and result in a failed transition from hospital to home care.

People (Leadership)

- May be required to mentor and evaluate nursing students during field work placements and educate other staff about the Rapid Response program.

WORKING CONDITIONS

Working Conditions

- Majority of work is carried out in the client's home and within normal office conditions, or in a home office environment.
- Shift work, including weekend and twenty four (24) hour on-call on a rotational basis may be required.
- May be exposed to unpleasant or emotional clients, their family members /caregivers/SDMs.
- Regularly exposed to psychological stressors related to client service delivery.
- May be exposed to disagreeable conditions when visiting clients (communicable diseases, unhygienic conditions, pets, secondhand smoke, unmaintained homes/driveways/walkways).
- May need to travel to remote areas where cell phone service is unavailable.
- Travel/driving is required and one may be exposed to seasonal risks when engaged in these activities.

Document Title: Registered Nurse - Rapid Response
Job Description
Version: 2
Approver: Moreau, Shelley (Senior Director, Corporate Services)

Effective Date: 29/10/2013
Date Approved: 29/10/2013
Next Review Date: 29/10/2014

Appendix B



Health Sciences North
Horizon Santé-Nord

Position Description Care Transitions Nurse

VALUE STATEMENT

Health Sciences North (HSN) and North East Community Care Access Centre (NE CCAC) committed to providing caring, compassionate, family centered patient care. The Integrated Care Transitions and Rapid Response Programs are focused on providing enhanced, patient centered discharge coordination to empower our community's high risk, medically complex and frail patient population in the long term management of their chronic diseases.

SERVICE DESCRIPTION

The Integrated Programs will include the use of both the LACE Index and Frailty Index-Comprehensive Geriatric Assessment (FI-CGA) to identify risk for hospital readmission and patient frailty. Other components of the Program entail:

1. The identification of patient/family learning needs
2. Patient/family education sessions
3. Evaluation of learning by incorporating the "Teach Back" method
4. Patient centered care plan development
5. Medication reconciliation
6. Coordination of Community Services referral
7. Coordination of care needs with NECCAC Access Case Manager
8. **Hand over to Rapid Response Nurses**
 - i. Includes home visit within 24-48hrs of patients hospital discharge
 - ii. Medication reconciliation in the home and communication with community pharmacy
 - iii. Head to toe physical assessment
 - iv. Environmental scan
 - v. Scheduling of follow up appointments with Primary Care, Specialists, Diagnostic...etc.
 - vi. Reinforcement of Patient Care Plan and Educational Resources with patient/family
 - vii. Community follow up for a minimum of 30 days
 - viii. Communication/Interventions with Primary Care Provider as required
 - ix. Communication with NE CCAC Community Care Coordinators

ADMISSION CRITERIA

1. Patients who are high risk, medically complex – frail adults and seniors who have a diagnosis of:
 - a. Chronic Obstructive Pulmonary Disease (COPD)

Care Transitions and Rapid Response Intervention

- b. Congestive Heart Failure (CHF)
 - c. Diabetes as a comorbid condition
 - d. Dementia
2. Including, but not exclusive to:
 - a. may screen as high risk for hospital readmission as evidenced by a LACE Index Score ≥ 10
 - b. Risk for polypharmacy (more than 3 medications for multiple chronic diseases)
 - c. Have one (1) or more hospital admissions within the previous six (6) months from their current hospital admission
 - i. Please note that patients without previous hospital admission may be considered for admission if referral volumes into The Integrated Programs are low
 - ii. Please note that a priority algorithm is required and will be developed
 - d. Have been assessed to have a brittle or poor support network
 3. Patients must have an address within the Greater City of Sudbury and within the geographic boundaries as identified by the North Eastern Community Care Access Centre (NECCAC).
 - a. **North** to Hanmer not including Capreol
 - b. **North West** to the outer limits of Chelmsford not including Dowling
 - c. **West** to Whitefish not including Worthington or Beaver Lake
 - d. **South** up to, but not including Alban
 - e. **East** to Coniston and as far as Wahnapiatae but not including Wahnapiatae
 - i. **Please see Appendix A – Map of Geographic Boundaries** (currently being developed by the IT Staff at NE CCAC)

CONSIDERATIONS

1. Patients must be discharged from the hospital into their own homes, which includes Assisted and Retirement Living; this includes patients being discharged home with a community A-1 Crisis Placement status.
2. Patients being discharged home to await commencement and transfer to an Inpatient Slow Paced Rehabilitation Program (SPR) may also be considered for admission upon further review of:
 - f. length of SPR wait list
 - g. level of acuity
 - h. referral volumes into The Integrated Programs
3. Patients must consent to participate in The Integrated Care Transitions & Rapid Response Programs.
4. Patients must consent to accept services provided by the North East Community Care Access Center (NE CCAC).
4. Patients to consider follow up with appropriate chronic Disease Management Clinics as recommended:
 - a. Cardiac and/or Pulmonary Rehabilitation

Care Transitions and Rapid Response Intervention

- b. Diabetes Education
 - c. Geriatric & Adult Rehabilitation Day Hospital (GARD)
 - i. Please note that this Program is being re-aligned with other HSN Geriatric Initiatives and will be renamed STAT
 - d. Heart Failure and Disease Management
5. Patients and/or their families must be willing to participate in the identification of learning needs, education sessions, teach back sessions and patient centered care plan development.

HANDOVER PROCESS

Once a patient has been assessed to meet the required admission criteria, The Care Transitions Nurses will complete the following as part of the Handover to the NECCAC Rapid Response Nurses.

1. Notify the NE CCAC Rapid Response Team of the patient's enrolment by telephone conversation with the Teams Assistant (TA).
2. NE CCAC Rapid Response TA to initiate patient priority list to notify Rapid Response Nurses of patient admission
 - a. permission is being obtained to include the use of the Health Partners Gateway online communication tool in order to notify the NE CCAC Rapid Response TA of patients admission into the Integrated Program, including date of hospital discharge
3. Enter MediTech referral requesting NECCAC Services for discharge home.
 - a. include actual discharge date
 - b. ensure clarity by detailing exact services required for discharge home, including request for
Rapid Response follow up
 - c. notify NE CCAC Access Care Coordinator during bullet rounds
 - i. **Please see Appendix B – Integrated Care Transitions and Rapid Response Programs Referral Process**
4. Communication with Rapid Response Team member on actual day of discharge.
 - a. telephone conversation with Rapid Response Team Assistant
 - b. face to face with Rapid Response Nurse (when available to bullet rounds)
 - c. telephone conversation with Rapid Response Nurse
5. On the actual day of the patient's hospital discharge, the Care Transitions Nurse will fax copies of the following documentation to the main NECCAC site at the attention of the Rapid Response Team Assistant.
 - b. discharge instructions
 - c. pre-hospitalization medication list (when possible)
 - d. list of medications to be continued at home
 - e. any prescriptions (medications or otherwise)
 - f. Care Transitions/Rapid Response Communication Record

Care Transitions and Rapid Response Intervention

- i. Please note that the communication record will include any outstanding action items, referrals and/or appointments to be coordinated by the Rapid Response Nurses
 - ii. Will include list of HSN/CSS Services already requested and/or implemented
6. Confirm that Rapid Response Team Assistant has in fact received the faxed handover package.
7. Weekly teleconferencing to occur between the Integrated Programs to coordinate and prioritize patient discharge looking specifically at:
 - a. Overall capacity and demand for the week
 - b. Patients that are being admitted
 - c. Provide list of patients being discharged; including actual date
 - d. Discussion re: potential admission of patients who do not necessarily meet the appropriate criteria but who would benefit from the program
 - e. Miscellaneous housekeeping
 - i. A summary note will be completed as part of the bullet rounds structures and the note will then be faxed/emailed to the Integrated Programs
8. The Clinical Coordinator and Manager of the Integrated Programs will meet every two (2) weeks in order to further discuss, review and refine processes.
9. All members of the Integrated Programs will meet once monthly in order to review challenges, successes and any relevant changes that need to be implemented.

COMMUNICATION

It is important to note that communication strategies are being examined and trialed for efficacy. The Integrated Care Transitions and Rapid Response Programs will be looking to implement a scheduled and structured teleconferencing model in order to standardize communication.

The NE CCAC are in the development stages of building an electronic communication tool that will be shared with the Care Transitions Nurses

- a. at this stage it is unclear what pieces of patient information will be shared

STAKEHOLDER REVIEW & APPROVAL

The following stakeholders have reviewed this policy and have indicated their approval.

Committee/Stakeholders	Date
Care Transitions Working Group	May 1, 2013

Appendix C

Consent Forms and Information Letters



SCRIPT FOR CARE TRANSITIONS NURSE

Hello **[name of potential participant]**, my name is **[insert name]** and I am a care transition nurse and a staff member of Health Sciences North. Health Sciences North is working with our community partners to develop an improved model of discharge and is researching the effectiveness of this model. The research is being led by David McNeil, who is a PhD Student at the Laurentian University School of Rural and Northern Health. The reason I am talking with you is that based on our admission information. You are a patient that would be eligible for this study and I am asking if you would like to learn more about what we are doing.

[IF NO] Thank you for your time. Good-bye

[IF YES] Continue

The transition of a patient from the hospital to the home is a complex process involving patients, families, the family physician and members of the multidisciplinary team from several organizations. Effective discharge processes have been shown to reduce readmissions to hospital. This research will study a model of discharge and follow-up that includes:

- The implementation of standardized care plans
- Clinic follow-up visits
- In-home and telephone nurse follow-up after discharge from the hospital
- A 10 minute telephone survey

I would like to assure you that:

This study has been reviewed and received ethics approval from Laurentian University's Research Ethics Board and Health Sciences North Research Ethics Board.

- Your participation in the study is completely voluntary
- Your care in no way will be affected if you choose to participate or not to participate in the study
- Your name will not be used in the study and any information collected beyond what would be collected as part of your normal care will be seen only by the research team
- Confidentiality will be maintained. No individual information or responses collected will be shared
- All identifying information will be removed from the data. You have the choice to answer only those questions you are comfortable answering
- Only summary data will be reported in studies and publications

Would you be interested in finding out more information?

[IF NO] Thank you for your time. Good-bye

[IF YES] Thank you; we appreciate your interest in our research. I have a brief one page information sheet that describes the study that I can go over with you.



INFORMATION LETTER

When will the study start?

The study is expected to start in April 2013 and end February 2014.

What is Involved?

The usual discharge process at the hospital involves members of the inpatient team including, your nurse, social workers, physician and as needed other members of the health care team. This team works closely the case manager from the Community Care Access Centre who is responsible for developing the post-discharge in-home service plan.

As part of this study, in addition to the usual discharge process, a care transitions nurse at the hospital will work with you and your care team to develop a discharge plan using standardized plans of care. You may also be selected to receive follow-up in one of our chronic disease management clinics. Once you are home, you will receive a home follow-up visits by a rapid response nurse from the community care access centre 24 hours after your discharge. These visits will take approximately 1 hour each at which time your medications will be reviewed and your care plan reviewed with you and health teaching done. The rapid response nurse will do additional visits if you need further follow-up. The rapid response nurse will also call you up three (3) times or more depending on how you are doing for the 12 week period following discharge. You will also receive a phone call approximately 6 weeks after your discharge home by a research assistant asking you about your experience going from the hospital to the home; that will take approximately 10 minutes of your time.

What are the benefits of the study?

Participants in the study will be randomly assigned to a usual discharge group or to the group who will receive Health Sciences North new model of follow-up so you may or may not directly receive a benefit from participating in this study. However, participation in this study will provide us valuable information regarding the effectiveness of this new model of follow-care for patient discharged from Health Sciences North.

Confidentiality

Confidentiality will be maintained and information will be stored in secure location. No study information will be shared beyond the members of the research team. Your care related information will continued to be shared with members of your care team.

Protecting Privacy

Data collected as part of the research will only be reported as grouped information.

Care Transitions and Rapid Response Intervention

The group results will be published and form the basis of a thesis for David McNeil as part of the Interdisciplinary PhD program requirements in School of Rural and Northern Health at Laurentian University. No individual results will be shared and the study data securely stored.

Sharing the Findings

The group findings will be shared with Health Sciences North and may be published in academic journals and shared in the thesis of David McNeil PhD candidate. You will be provided a summary of the study findings if you wish to provide a contact address on the consent form as to where the findings can be sent.

What are the Risks?

There are no known harms associated with participating in this study. Participating in the study will involve your time associated with the two home visits and telephone follow-up you're your care transitions/ rapid response registered nurse.

This is an exploratory study and the outcomes on health and the long term outcomes on your health or longevity can not be predicted.

Ethics Approval

Ethics approval for this study has been granted by the Laurentian University Ethics Board. Should you have any questions related to this studies ethics approval you may contact:

- Robin Craig, Research Activities Manager, Laurentian University, 705 – 675 1151 ext 3213 or toll free 1-800 461 4030. Email ethics@laurentian.ca

Study Contact Information

For further information, please contact:

PhD Student

David McNeil, RN., MHA., PhD Student,
School of Rural and Northern Health, Laurentian University
E-mail dmcneil@hsnsudbury.ca
Confidential Toll Free Number: XXXXXXXXXXXX

Supervisor

Dr. Roger Strasser AM
Dean and Professor
Northern Ontario School of Medicine
Laurentian University
935 Ramsey Lake Road
Sudbury, Ontario P3E 2C6
(T) 705-671-3874
(F) 705-671-3830
Email: roger.strasser@nosm.ca



RESEARCH CONSENT FORM FOR PATIENT PARTICIPANT

Institution: Laurentian University, School of Rural and Northern Health

Study Title: The Effectiveness of Combining a Protocol Driven Discharge Plan with Disease Management Clinic Enrolment and Registered Nurse Follow-up in Reducing Hospital Readmission Rates and Emergency Department Use in the Frail Elderly with Multiple Chronic Conditions who are at Risk of Social Isolation.

Institution: Laurentian University, School of Rural and Northern Health/ Health Sciences North

Principal Investigator: David McNeil, RN, MHA, Ph. D. Student

Co-Investigators: Dr. Roger Strasser MD (Ph.D. Supervisor)
Dr. Nancy Lightfoot, Ph.D. (Committee Member)
Dr. Raymond Pong, Ph.D. (Committee Member)

I have read and understand the information given in the information letter about the study being conducted by David McNeil (PhD candidate), Dr. Roger Strasser, Dr. Nancy Lightfoot, and Dr. Raymond Pong from Laurentian University in Sudbury, Ontario.

I understand that I am being asked to participate in a study to assist in evaluating the effectiveness of a new model of discharge and follow-up care that includes:

- The use of standardized care plans
- Scheduled clinic follow-up visits
- In-home and telephone, nurse follow-up after discharge from the hospital
- A 10 minute telephone survey regarding my experience in the transition from the hospital to home.

I understand that:

- My participation in this study is entirely voluntary and that I may withdraw from the study at any time.
- Declining to participate or withdrawing from the study will not compromise the quality or continuation of my care.
- This is an exploratory study and that the outcomes on my health can not be predicted.

I understand that I may not benefit directly from my involvement in the study and that a copy of the information letter has been provided to me. I voluntarily consent to participate in this study. I understand that confidentiality of my health information will be maintained and information will be stored in secure location. No study information will be shared beyond the members of the research team. Your care related information will continue to be shared with members of your care team. I further understand that the data collected as part of the research will only be reported as grouped information.

I understand that this study has been granted ethics approval by the Laurentian University Ethics Board and that should I have any questions regarding this study's ethical approval I may contact:

Care Transitions and Rapid Response Intervention

- Robin Craig, Research Activities Manager, Laurentian University, 705 – 675 1151 ext 3213 or toll free 1-800 461 4030. Email ethics@laurentian.ca

I understand that this study has been granted ethics approval by the Health Sciences North Research Ethics Board and that should I have any questions regarding this study's ethical approval I may contact:

- Health Sciences North Research Ethics Board at 705-523-7100 ext 2409 or by email: reb@hsnsudbury.ca.

These people are not part of the study team. Everything that you discuss will be kept confidential.

Name of Participant (Please Print): _____ Date: _____

Signature of Participant: _____

OR

Signature of Substitute Decision Maker: _____

Telephone Survey Contact Information: _____

I wish that a summary of the results of this study be sent to me at:

Email: _____

OR

Home Address: _____

For further information, please contact:

PhD Student

David McNeil, RN., MHA., PhD Candidate,
School of Rural and Northern Health, Laurentian University
E-mail dmcneil@hsnsudbury.ca
Confidential Toll Free Number: xxxxxxxxx

Supervisor

Dr. Roger Strasser AM
Dean and Professor
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Laurentian University
935 Ramsey Lake Road
Sudbury, Ontario P3E 2C6
(T) 705-671-3874
(F) 705-671-3830
Email: roger.strasser@nosm.ca



RESEARCH CONSENT FORM FOR INTERVIEW PARTICIPANT

Institution: Laurentian University, School of Rural and North Health

Study Title: The Effectiveness of a Care Transitions and Rapid Response Nurse Intervention at Reducing Readmissions and Emergency Department Use for High Risk Patients.

Institution: Laurentian University, School of Rural and Northern Health/ Health Sciences North

Principal Investigator: David McNeil, RN, MHA, Ph. D. Candidate

Co-Investigators: Dr. Roger Strasser MD (Ph.D. Supervisor)
Dr. Nancy Lightfoot, Ph.D. (Committee Member)
Dr. Raymond Pong, Ph.D. (Committee Member)

I have read and understand the information given in this information letter about the study being conducted by David McNeil (PhD candidate), Dr. Roger Strasser, Dr. Nancy Lightfoot, and Dr. Raymond Pong from Laurentian University in Sudbury, ON.

I understand that I am being asked to participate in a study to assist in evaluating the facilitators, barriers and opportunities to improve the effectiveness of the Care Transitions and Rapid Response Service being implemented at Health Sciences North and the Northeast Community Care Access Centre.

I understand that:

- My participation in this study is entirely voluntary and that I may withdraw from the study at any time.
- I will be asked to participate in an interview which may take up to 60 minutes of my time and it will be audio recorded.
- I may not benefit directly from my involvement in the study and that a copy of the information letter has been provided to me.
- I voluntarily consent to participate in this study.
- I understand that the disclosure of activities which breach professional standards will require disclosure by the researcher.

Name of Participant (Please Print): _____ Date: _____

Signature of Participant: _____

For further information, please contact:
David McNeil, RN., MHA., PhD Candidate,
School of Rural and Northern Health, Laurentian University
E-mail dmcneil@hsnsudbury.ca
Tele 705-522-2200 ext 3602



RESEARCH CONSENT FORM FOR FOCUS GROUP PARTICIPANT

Institution: Laurentian University, School of Rural and North Health

Study Title: The Effectiveness of a Care Transitions and Rapid Response Nurse Intervention at Reducing Readmissions and Emergency Department Use for High Risk Patients.

Institution: Laurentian University, School of Rural and Northern Health/ Health Sciences North

Principal Investigator: David McNeil, RN, MHA, Ph. D. Candidate

Co-Investigators: Dr. Roger Strasser MD (Ph.D. Supervisor)
Dr. Nancy Lightfoot, Ph.D. (Committee Member)
Dr. Raymond Pong, Ph.D. (Committee Member)

I have read and understand the information given in this information letter about the study being conducted by David McNeil (PhD candidate), Dr. Roger Strasser, Dr. Nancy Lightfoot, and Dr. Raymond Pong from Laurentian University in Sudbury, ON.

I understand that I am being asked to participate in a study to assist in evaluating the facilitators, barriers and opportunities to improve the effectiveness of the Care Transitions and Rapid Response Service being implemented at Health Sciences North and the Community Care Access Centre.

I understand that:

- My participation in this study is entirely voluntary and that I may withdraw from the study at any time.
- I will be asked to participate in a focus group which may take up to 90 minutes of my time. I understand that session will be audio recorded.
- I understand that the information collected during the focus group may not remain private or confidential but participants will be asked to respect confidentiality.
- I may not benefit directly from my involvement in the study and that a copy of the information letter has been provided to me.
- I voluntarily consent to participate in this study.
- I understand that the disclosure of activities which breach professional standards will require disclosure by the researcher.

Name of Participant (Please Print): _____ Date: _____

Signature of Participant: _____

For further information, please contact:
David McNeil, RN., MHA., PhD Candidate,
School of Rural and Northern Health, Laurentian University
E-mail dmcneil@hsnsudbury.ca
Tele 705-522-2200 ext 3602



INFORMATION AND CONSENT CARE TRANSITIONS AND RAPID RESPONSE NURSE FOCUS GROUP

Study Title: The Effectiveness of a Care Transitions and Rapid Response Nurse Intervention at Reducing Readmissions and Emergency Department Use for High Risk Patients.

Institution: Laurentian University, School of Rural and Northern Health/ Health Sciences North

Principal Investigator: David McNeil, RN, MHA, Ph. D. Candidate,

Co-Investigators: Dr. Roger Strasser MD (Ph.D. Supervisor)
Dr. Nancy Lightfoot, Ph.D. (Committee Member)
Dr. Raymond Pong, Ph.D. (Committee Member)

Dear Participant:

My name is Gisele Guenard, I am a research assistant working with David McNeil who is a PhD candidate in the Interdisciplinary PhD in Rural and Northern Health at Laurentian University in Sudbury, Ontario, Canada. David is the principal investigator of a research study exploring a model to improve the discharge process of patients leaving Health Sciences North and referred to the Northeast Community Care Access Centre for follow-up care in the post-discharge period. The information contained in this letter will help you decide whether or not you would like to participate in this study. This letter explains the purpose of the study, the potential risks and benefits of your participation, and your rights as a participant. Your participation in this research is entirely voluntary and your decision to participate or not in this study will in no way influence your work at Health Sciences North or the North East Community Care Access Centre. No information collected as part of this research will be shared by the researcher. Findings will be published in a summary fashion and no personal identifying information shared. Additional information is provided to answer any further questions that you might have related to this project.

What is the Purpose of this Research?

The transition of patients from the hospital to the home is a complex process involving patients, families, the family physician and members of the multidisciplinary team from multiple organizations. Effective discharge processes have been shown to reduce readmissions to hospital. The purpose of this study is gain insight from the perspective of those involved in the Care Transitions and Rapid Response Nurse Service as to the facilitators, barriers and opportunities to improve its effective implementation.

What does participation in the research involve?

Care Transitions and Rapid Response Intervention

If you agree to participate in the study you will participate in one of two focus groups. One focus group will involve the Rapid Response Nurses and the other Care Transition Nurses. The groups will be led by a facilitator who is not employed by either Health Sciences North or the Northeast Community Care Access Centre. The focus group will be comprised of a few structured questions. The focus groups will take approximately 90 minutes of your time.

It is important for you to know that your name or other identifying information will not be used in the study and all personal information and your responses to questions will not be shared by the facilitator or researchers. The information collected in the study will be used for research purposes and shared in a summary form. Each focus group will be given the opportunity to review the information. Knowledge from the research will be published and form the basis of a thesis for David McNeil as part of the Interdisciplinary PhD program requirement in Rural and Northern Health at Laurentian University.

What are the potential benefits?

Your participation in this study may not provide you a direct benefit. Your participation will provide valuable insight regarding the discharge and transition process from Health Sciences North to the Northeast Community Care Access Centre in improving the effectiveness of patient transitions from the hospital to the home.

Potential harms, risks, or discomforts

There are no known harms associated with participating in this study. Participating in the study will involve your time. The time committed to the research is approximately 90 minutes.

Participants' rights

Your participation in the study is completely voluntary. You are not under any obligation to answer questions that you are not comfortable answering. You may choose to withdraw from the study at any time without consequence.

How will confidentiality be maintained?

All measures of privacy, confidentiality and security will be respected. All individual information will be kept confidential. No individual information or responses will be shared and all identifying information will be removed from the data that is collected. The information you provide will be grouped with other information and shared in a summary format. The data from the research will be destroyed. As you will be participating in a focus group the researcher cannot control what information might be shared by other participants.

All research data collected along with computer files generated for this research will be kept in the a locked office of David McNeil at Health Sciences North. Only the research team of Dr. Roger Strasser, Dr. Nancy Lightfoot, Ph.D., and Dr Raymond Pong, Ph.D. will have access to

Care Transitions and Rapid Response Intervention

data collected as part of this research. All hardware will be password protected and only pseudonyms will be used as individual identifiers.

What is the cost of participating in this study?

The cost of participating in this study will be your time.

Ethical Approval

This study has been reviewed and has received ethics approval by the Research Ethics Office at Laurentian University and Health Sciences North.

If you have concerns or questions about your rights as a participant or about the way the study is conducted, you may contact:

Ms Pauline Zanetti
Coordinator for the Research Ethics Board
Laurentian University Research Office
E-mail: pzanetti@laurentian.ca
Telephone: 1-705-675-1151 ext 2436 or 1-800-675-1151 ext 2436

Question and contact information

Thank you for taking the time to review this letter explaining this study. If you have any questions about your rights as a research participant or the conduct of the study you may contact David McNeil at 1-705-522-2200 ext 3602 or by email at dmcneil@hsnsudbury.ca. You may also contact Dr. Roger Strasser (PhD Supervisor) at the School of Rural and Northern Health at 705-671-3874.

Sincerely,

David McNeil RN, MHA, CHE, PhD Candidate



INFORMATION AND CONSENT CARE TRANSITIONS AND RAPID RESPONSE NURSE INTERVIEW

Study Title: The Effectiveness of a Care Transitions and Rapid Response Nurse Intervention at Reducing Readmissions and Emergency Department Use for High Risk Patients.

Institution: Laurentian University, School of Rural and Northern Health/ Health Sciences North

Principal Investigator: David McNeil, RN, MHA, Ph. D. Candidate,

Co-Investigators: Dr. Roger Strasser MD (Ph.D. Supervisor)
Dr. Nancy Lightfoot, Ph.D. (Committee Member)
Dr. Raymond Pong, Ph.D. (Committee Member)

Dear Participant:

My name is, XXXXX, I am a research assistant working with David McNeil who is a PhD candidate in the Interdisciplinary PhD in Rural and Northern Health at Laurentian University in Sudbury, Ontario, Canada. David is the principal investigator of a research study exploring a model to improve the discharge process of patients leaving Health Sciences North and referred to the Northeast Community Care Access Centre for follow-up care in the post-discharge period. The information contained in this letter will help you decide whether or not you would like to participate in this study. This letter explains the purpose of the study, the potential risks and benefits of your participation, and your rights as a participant. Your participation in this research is entirely voluntary and your decision to participate, or not in this study will in no way influence your work at Health Sciences North or the North East Community Care Access Centre. No information collected as part of this research will be shared by the researcher. Findings will be published in a summary fashion and no personal identifying information shared. Additional information is provided to answer any further questions that you might have related to this project.

What is the Purpose of this Research?

The transition of patients from the hospital to the home is a complex process involving patients, families, the family physician and members of the multidisciplinary team from multiple organizations. Effective discharge processes have been shown to reduce readmissions to hospital. The purpose of this study is gain insight from the perspective of providers involved in the Care Transitions and Rapid Response Nurse Service as to the facilitators, barriers and opportunities to improve its effective implementation.

What does participation in the research involve?

Care Transitions and Rapid Response Intervention

If you agree to participate in the study you will be interviewed by an independent facilitator who is not employed by either Health Sciences North or the Northeast Community Care Access Centre. The interview will be comprised of a few structured questions and will take approximately 60 minutes of your time. You will receive a \$20 Tim Horton Gift Card for your participation in the research.

It is important for you to know that your name or other identifying information will not be used in the study and all personal information and your responses to questions will not be shared by the facilitator or researchers. The information collected in the study will be used for research purposes and shared in a summary form. Each focus group will be given the opportunity to review the information. Knowledge from the research will be published and form the basis of a thesis for David McNeil as part of the Interdisciplinary PhD program requirement in Rural and Northern Health at Laurentian University.

What are the potential benefits?

Your participation in this study may not provide you a direct benefit. Your participation will provide valuable insight regarding the discharge and transition process from Health Sciences North to the Northeast Community Care Access Centre in improving the effectiveness of patient transitions from the hospital to the home.

Potential harms, risks, or discomforts

There are no known harms associated with participating in this study. Participating in the study will involve your time. The time committed to the research is approximately 60 minutes.

Participants' rights

Your participation in the study is completely voluntary. You are not under any obligation to answer questions that you are not comfortable answering. You may choose to withdraw from the study at any time without consequence.

How will confidentiality be maintained?

All measures of privacy, confidentiality and security will be respected. All individual information will be kept confidential. No individual information or responses will be shared and all identifying information will be removed from the data that is collected. The information you provide will be grouped with other information and shared in a summary format. The data from the research will be destroyed.

All research data collected along with computer files generated for this research will be kept in the a locked office of David McNeil at Health Sciences North. Only the research team of Dr. Roger Strasser, Dr. Nancy Lightfoot, Ph.D., and Dr Raymond Pong, Ph.D. will have access to

Care Transitions and Rapid Response Intervention

data collected as part of this research. All hardware will be password protected and only pseudonyms will be used as individual identifiers.

What is the cost of participating in this study?

The cost of participating in this study will be your time.

Ethical Approval

This study has been reviewed and has received ethics approval by the Research Ethics Office at Laurentian University and Health Sciences North.

If you have concerns or questions about your rights as a participant or about the way the study is conducted, you may contact:

Ms Pauline Zanetti
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E-mail: pzanetti@laurentian.ca
Telephone: 1-705-675-1151 ext 2436 or 1-800-675-1151 ext 2436

Question and contact information

Thank you for taking the time to review this letter explaining this study. If you have any questions about your rights as a research participant or the conduct of the study you may contact David McNeil at 1-705-522-2200 ext 3602 or by email at dmcneil@hsnsudbury.ca. You may also contact Dr. Roger Strasser (PhD Supervisor) at the School of Rural and Northern Health at 705-671-3874.

Sincerely,

David McNeil RN, MHA, CHE, PhD Candidate

Appendix E

Community Care Access Service Maximums

Regulation 386/99 of the Long Term Care Act (2007) states:

s. 4(1) A community care access centre shall not provide a person with more than the lesser of the following amounts of nursing services:

1. 28 visits from a registered nurse or registered practical nurse in a seven-day period.
2. The following number of hours of service in a seven-day period:
 - i. if services are provided by registered nurses, 43 hours of service,
 - ii if services are provided by registered practical nurses, 53 hours of service, or
 - iii. if services are provided by both registered nurses and registered practical nurses, 48 hours of service.

Note: There are no regulated service maximums for the other professional health services provided by the CCAC. These services include other than nursing social work, dietetics, physiotherapy, occupational therapy, speech-language pathology

Appendix F

LACE INDEX SCREENING TOOL

STEP 1: LENGTH OF STAY

Length of Stay (days)	Score (circle as appropriate)
1	1
2	2
3	3
4-6	4
7-13	5
14+	7

Enter the appropriate score into Box 'L'

BOX 'L'

Admission	Discharge

STEP 2: ACUITY OF ADMISSION

Patient Admission from the Emergency Department?

Yes, enter the #3 , if no, enter the # 0 into Box 'A'

BOX 'A'

--

STEP 3: COMORBIDITIES

Condition	Score (circle as appropriate)
Previous Myocardial Infarction	+1
Cerebrovascular Disease	+1
Peripheral Vascular Disease	+1
Diabetes	+1
Heart Failure	+2
COPD	+2
Mild Liver Disease	+2
Any Tumor (including: lymphoma or leukemia)	+2
Dementia	+3
Connective Tissue Disease	+3
AIDS	+4
Moderate or Severe Liver Disease	+4
Metastatic Solid Tumor	+5

BOX 'C'

--

-If the TOTAL score is **between 0-3** enter the actual score into Box 'C'

-If the TOTAL score is **greater than or equal to 4**, enter a score of 5 into Box 'C'

STEP 4: EMERGENCY DEPARTMENT VISITS

-How many times has the patient visited the Emergency Department in 6 months prior to admission? (not including ED visit immediately preceding current admission) - Enter the total number of visits or the #4 into Box 'E' (whichever is smaller)

BOX 'E'

--

FINAL STEP:

Add the values from boxes L, A, C & E together in order to generate a LACE score: **If patient's LACE score is greater than or equal to 10, refer patient to Care Transitions & Virtual Ward**

LACE Scores

Admission	Discharge

Care Transitions and Rapid Response Intervention

VIDEX FI-CGA

Patient Name:	
Reason for Form: New Patient <input type="checkbox"/> Annual Visit <input type="checkbox"/> Post Hospitalization <input type="checkbox"/> Other <input type="checkbox"/> Post Part A, Stay Level 2 or Higher <input type="checkbox"/> In ER Last 30 Days <input type="checkbox"/> In Hospital Last 90 Days <input type="checkbox"/>	
Advance Directives in Place? Y <input type="checkbox"/> N <input type="checkbox"/>	Code Status: DNR <input type="checkbox"/> Resuscitate <input type="checkbox"/>
Demographics: Sex: F <input type="checkbox"/> M <input type="checkbox"/> Age: <input type="text"/> <input type="text"/> <input type="text"/> Lifelong Occupation: Education (yrs): <input type="text"/> Marital Status: M <input type="checkbox"/> D <input type="checkbox"/> S <input type="checkbox"/> W <input type="checkbox"/>	
Social Living Arrangements: Alone <input type="checkbox"/> Spouse <input type="checkbox"/> Other <input type="checkbox"/> Home: House 1 Level <input type="checkbox"/> House > 1 Levels <input type="checkbox"/> Apt <input type="checkbox"/> AL <input type="checkbox"/> Steps <input type="checkbox"/> NH <input type="checkbox"/> Other <input type="checkbox"/> Caregiver Relationship: Spouse <input type="checkbox"/> Sibling <input type="checkbox"/> Offspring <input type="checkbox"/> Other <input type="checkbox"/> Caregiver Stress: None <input type="checkbox"/> Low <input type="checkbox"/> Med High <input type="checkbox"/> Caregiver Occupation: Socially Engaged: Freq <input type="checkbox"/> Occ <input type="checkbox"/> Often Alone <input type="checkbox"/> Care Supports: Informal <input type="checkbox"/> HCNS <input type="checkbox"/> Other <input type="checkbox"/> None <input type="checkbox"/> Req More Support <input type="checkbox"/>	
Cognition: Normal <input type="checkbox"/> CIND <input type="checkbox"/> MCI <input type="checkbox"/> Delirium N <input type="checkbox"/> MMSE <input type="checkbox"/> Score: <input type="text"/> <input type="text"/> Y <input type="checkbox"/> Today Mini Cog <input type="checkbox"/> Within the last 2 days <input type="checkbox"/> Within the last 2 weeks <input type="checkbox"/> Mild Dem <input type="checkbox"/> Mod Dem <input type="checkbox"/> Sev Dem <input type="checkbox"/>	
Emotional: Mood: Not Depressed <input type="checkbox"/> Low Mood <input type="checkbox"/> Depressed <input type="checkbox"/> Anxious <input type="checkbox"/> Fatigued <input type="checkbox"/> Other: Hallucinations <input type="checkbox"/> Delusions <input type="checkbox"/> Sundowning <input type="checkbox"/>	
Motivation: High <input type="checkbox"/> Usual <input type="checkbox"/> Low <input type="checkbox"/> Health Attitude: Excellent <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> Can't Say <input type="checkbox"/>	
Communication: Speech: WNL <input type="checkbox"/> Impaired <input type="checkbox"/> Hearing: WNL <input type="checkbox"/> Impaired <input type="checkbox"/> Vision: WNL <input type="checkbox"/> Impaired <input type="checkbox"/>	
Strength: WNL <input type="checkbox"/> Weak <input type="checkbox"/> Proximal: Upper <input type="checkbox"/> Lower <input type="checkbox"/> Distal: Upper <input type="checkbox"/> Lower <input type="checkbox"/>	
Sleep: WNL <input type="checkbox"/> Disrupted <input type="checkbox"/> Daytime Drowsiness <input type="checkbox"/>	
Mobility: Baseline (2 weeks ago) Transfer: Ind <input type="checkbox"/> St. By <input type="checkbox"/> Asst Dep <input type="checkbox"/> Walking: Ind <input type="checkbox"/> St. By <input type="checkbox"/> Asst Dep <input type="checkbox"/> Aid: None <input type="checkbox"/> Cane <input type="checkbox"/> Walker <input type="checkbox"/> Wheelchair <input type="checkbox"/>	Current Transfer: Ind <input type="checkbox"/> St. By <input type="checkbox"/> Asst Dep <input type="checkbox"/> Walking: Ind <input type="checkbox"/> St. By <input type="checkbox"/> Asst Dep <input type="checkbox"/> Aid: None <input type="checkbox"/> Cane <input type="checkbox"/> Walker <input type="checkbox"/> Wheelchair <input type="checkbox"/>

Care Transitions and Rapid Response Intervention

Balance: Baseline (2 weeks ago) Balance: WNL <input type="checkbox"/> Impair <input type="checkbox"/> Falls: Y <input type="checkbox"/> N <input type="checkbox"/> Number: 1 2 3 4 5+	Current Balance: WNL <input type="checkbox"/> Impair <input type="checkbox"/> Falls: Y <input type="checkbox"/> N <input type="checkbox"/> Number: 1 2 3 4 5+
Elimination: Baseline (2 weeks ago) Bowel: WNL <input type="checkbox"/> Incontinent <input type="checkbox"/> Constipated <input type="checkbox"/> Bladder: WNL <input type="checkbox"/> Incontinent <input type="checkbox"/> Catheter <input type="checkbox"/>	Current Bowel: WNL <input type="checkbox"/> Incontinent <input type="checkbox"/> Constipated <input type="checkbox"/> Bladder: WNL <input type="checkbox"/> Incontinent <input type="checkbox"/> Catheter <input type="checkbox"/>
Nutrition: Baseline (2 Weeks ago) Weight: Good <input type="checkbox"/> Under <input type="checkbox"/> Over <input type="checkbox"/> Obese <input type="checkbox"/> Appetite: WNL <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/>	Current Weight: Stable <input type="checkbox"/> Loss <input type="checkbox"/> Gain <input type="checkbox"/> Appetite: WNL <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/>
ADLS: Baseline (2 weeks ago) Feeding: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Bathing: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Dressing: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Toileting: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/>	Current Feeding: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Bathing: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Dressing: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Toileting: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/>
IADLS: Baseline (2 weeks ago) Cooking: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Cleaning: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Shopping: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Meds: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Driving: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Banking: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/>	Current Cooking: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Cleaning: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Shopping: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Meds: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Driving: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/> Banking: Indep <input type="checkbox"/> Assisted <input type="checkbox"/> Dep. <input type="checkbox"/>
Other: Smoker: Never <input type="checkbox"/> Current <input type="checkbox"/> Ex-Smoker <input type="checkbox"/> Unknown <input type="checkbox"/> For How Long? _____.	
<p style="text-align: center;">Medical Problems</p> 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.	<p style="text-align: center;">Associated Medications</p> 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

The Friendship Scale

During the past four weeks:

- | | |
|--|--|
| 1. It has been easy to relate to other:
<input type="checkbox"/> Almost always
<input type="checkbox"/> Most of the time
<input type="checkbox"/> About half of the time
<input type="checkbox"/> Occasionally
<input type="checkbox"/> Not at All | 2. I felt isolated from other people:
<input type="checkbox"/> Almost always
<input type="checkbox"/> Most of the time
<input type="checkbox"/> About half of the time
<input type="checkbox"/> Occasionally
<input type="checkbox"/> Not at All |
| 3. I had someone to share my feelings with:
<input type="checkbox"/> Almost always
<input type="checkbox"/> Most of the time
<input type="checkbox"/> About half of the time
<input type="checkbox"/> Occasionally
<input type="checkbox"/> Not at All | 4. I found it easy to get in touch with others when I needed to:
<input type="checkbox"/> Almost always
<input type="checkbox"/> Most of the time
<input type="checkbox"/> About half of the time
<input type="checkbox"/> Occasionally
<input type="checkbox"/> Not at All |
| 5. When with other people I felt separate from them:
<input type="checkbox"/> Almost always
<input type="checkbox"/> Most of the time
<input type="checkbox"/> About half of the time
<input type="checkbox"/> Occasionally
<input type="checkbox"/> Not at All | 6. I felt alone and friendless:
<input type="checkbox"/> Almost always
<input type="checkbox"/> Most of the time
<input type="checkbox"/> About half of the time
<input type="checkbox"/> Occasionally
<input type="checkbox"/> Not at All |

CARE TRANSITIONS MEASURE

Patient Name: _____ Date: _____.

The first few statements are about the time you were in the hospital.....

1. Before I left the hospital, the staff and I agreed about clear health goals for me and how these would be reached?

Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember

2. The hospital staff took my preferences and those of my family or caregiver into account in deciding what my health care needs would be when I left the hospital?

Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember

3. The hospital staff took my preferences and those of my family or caregiver into account in deciding where my healthcare needs would be met when I left the hospital?

Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember

The next set of statements is about when you were preparing to leave the hospital

4. When I left the hospital, I had all of the information I needed to be able to take care of myself.

Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember

5. When I left the hospital, I clearly understood how to manage my health.

Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember

6. When I left hospital, I clearly understood the warning signs and symptoms I should watch for to monitor my health condition.

Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember

7. When I left the hospital, I had a readable and easily understood written plan that described how all of my health care needs were going to be met.

Care Transitions and Rapid Response Intervention

**Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember**

8. When I left the hospital, I had a good understanding of my health condition and what makes it better or worse.

**Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember**

9. When I left the hospital, I had a good understanding of the things I was responsible for in my managing my health

**Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember**

10. When I left the hospital, I was confident that I knew what to do to manage my health.

**Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember**

11. When I left the hospital, I was confident I could actually do the things I needed to do to care of my health.

**Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember**

The next statement is about your follow-up doctor's appointment

12. When I left the hospital, I had a readable and easily understood written list of appointments or tests I needed to complete within the next several weeks.

**Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember**

The next set of statements is about your medication

13. When I left the hospital, I clearly understood the purpose for taking each of my medications.

**Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember**

14. When I left the hospital, I clearly understood how to take each of my medication including how much I should take when.

Care Transitions and Rapid Response Intervention

**Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember**

15. When I left the hospital, I clearly understood the possible side effects of each of my medications.

**Strongly Disagree Disagree Agree Strongly Agree Don't know
Don't Remember**

Appendix G
Focus Group Guide

The following are the focus group questions:

1. How would you describe the purpose and goals of the Care Transitions and Rapid Response service?
 - Describe the degree to which in your opinion the service is achieving its intended purpose? What worked well?
 - What are some of the barriers you experienced in delivering care?
2. How and with whom do you communicate to plan the patient's transition from the hospital to home?
 - How would you describe the timeliness, accuracy and frequency of your communication with the Care Transitions Nurse/Rapid Response Nurse in relation to the patients transitional care plan?
 - What opportunities exist to improve the communication and information exchange?
3. How much do people know and understand your work?
 - Do you think the Care Transitions /Rapid Response nurse understand your role?
 - How would you characterize the degree of respect for your role?
4. What are the characteristics of this program that make it patient centred?
 - What are the factors contributing to patients' readmissions?
 - What are some of the other adverse events patients have experienced in their transition from hospital to home?
 - In your view what can be done to reduce the risks of adverse events during the transition?
5. How would you change the current work process to improve the service?

Focus groups will be conducted with:

- 3 Care Transition Nurses = 3
- 4 Rapid Response Nurses = 4

All focus groups will be tape recorded and transcribed fully for analysis. Data from all the interviews will be analyzed qualitatively by reading and re-reading interview transcripts and schedules. Through this process issues and themes will be identified. The presentation of the data and analysis will be based on themes which emerged during analysis.

Interview Guide

The following are the focus group and interview questions:

1. How would you describe the purpose and goals of the Care Transitions and Rapid Response service?
 - Describe the degree to which in your opinion the service achieving its intended purpose? What worked well?
 - What are some of the barriers experienced in the implementation of the care transitions and rapid response service model?
2. Transitions are high risk events to what degree do you believe this intervention reduces patient risk?
 - How would you describe the timeliness, accuracy and frequency of the communication with the Care Transitions Nurse/Rapid Response Nurse in relation to the patients transitional care plan?
 - What opportunities exist to improve the communication and information exchange?
3. What actions did you take as a leader to introduce the roles of the care transitions and rapid response nurses?
 - What actions were taken to clarify the roles of the Care Transitions /Rapid Response nurse roles to ensure they were well understand? Were these roles documented and shared?
 - In your view are the roles valued? Please explain your answer.
4. What are the characteristics of this program that make it patient centred?
 - What are the factors contributing to patients' readmissions?
 - What are some of the other adverse events patients have experienced in their transition from hospital to home?
 - In your view what can be done to reduce the risks of adverse events during the transition?
5. How would you change the current work process to improve the services?

Interviews will be conducted with the following:

- Managers for the respective programs = 2
- A senior leader from the respective organizations = 2

Appendix H

Total Bed Days, Emergency, Readmissions Linear Mixed Model Results

TOTAL BED DAYS	30 Day Post Discharge Bed Days				60 Day Post Discharge Bed Days				90 Day Post Discharge Bed Days			
	df N	df D	F	Sig	df N	df D	F	Sig	df N	df D	F	Sig
SE = Standard Error; sig = significance; N = Numerator; D = Denominator												
Fixed Effects												
Intercept	1	31.916	0.709	0.406	1	51.984	0.014	0.906	1	54.399	0.072	0.790
Gender	1	31.980	5.737	0.023*	1	52.482	4.148	0.047*	1	49.471	5.106	0.028*
Lives Alone	1	31.968	0.818	0.372	1	55.053	0.02	0.888	1	55.032	0.002	0.964
Number of Medications	3	31.988	1.126	0.353	3	49.854	0.609	0.612	3	42.822	0.549	0.652
Primary Care Provider	1	31.963	0.183	0.672	1	44.606	1.248	0.27	1	39.402	0.809	0.374
Age	1	31.927	2.933	0.421	1	48.397	2.38	0.129	1	47.498	2.810	0.100
Number of Chronic Diseases	5	31.972	1.023	0.096	5	50.703	1.507	0.204	5	51.084	1.398	0.241
Previous 6 month Admissions	1	31.930	0.009	0.927	1	45.431	0.031	0.86	1	44.805	0.031	0.860
Previous 6month ED	1	31.966	0.405	0.529	1	53.933	0.19	0.665	1	49.158	0.223	0.750
Friendship	1	31.984	0.211	0.649	1	52.701	2.505	0.119	1	53.607	2.118	0.350
Frailty	1	31.994	1.283	0.266	1	54.531	0.581	0.449	1	59.025	0.887	0.151
Randon Effects												
Patient ID		Estimate	SE.	Sig.		Estimate	SE.	Sig.		Estimate	SE.	Sig.
		45.691	11.524	0		22.201	0.000	0		0.04669	0.000	0
EMERGENCY												
	Emergency Visits 30 days				Emergency Visits 60 days				Emergency Visits 90 days			
	df N	df D	F	Sig	df N	df D	F	Sig	df N	df D	F	Sig
Fixed Effects												
Intercept	1	224.000	0.181	0.671	1	224.286	0.455	0.501	1	234.113	7.091	0.008
Gender	1	224.000	2.172	0.142	1	224.000	6.186	0.014*	1	225.636	6.765	0.010
Lives Alone	1	224.000	1.678	0.196	1	224.000	3.954	0.048*	1	210.145	2.592	0.109
Number of Medications	3	224.000	1.638	0.182	3	224.000	1.126	0.340	3	226.366	1.533	0.207
Primary Care Provider	1	224.000	0.131	0.718	1	224.000	0	0.984	1	190.526	0.177	0.674
Number of Chronic Diseases	1	224.000	0.629	0.678	1	224.000	0.904	0.479	1	219.124	0.757	0.581
Age	5	224.000	3.364	0.068	5	224.000	0.028	0.868	5	216.146	0.007	0.934
Previous 6 month Admissions	1	224.000	0.071	0.790	1	224.000	0.484	0.487	1	151.286	0.001	0.976
Previous 6month ED	1	224.000	25.069	0.000*	1	224.000	50.531	0.000*	1	173.821	54.366	0.000
Friendship	1	224.000	3.594	0.059	1	224.000	0.553	0.458	1	198.379	1.703	0.193
Frailty	1	224.000	1.556	0.214	1	224.000	0.04	0.841	1	232.080	0.092	0.762
Randon Effects												
Patient ID		Estimate	SE.	Sig.		Estimate	SE.	Sig.		Estimate	SE.	Sig.
		0.1257	0	0		0.095	0.000	0		0.143	0	0
READMISSIONS												
	Readmitted 30 days				Readmitted 60 days				Readmitted 90 days			
	df N	df D	F	Sig	df N	df D	F	Sig	df N	df D	F	Sig
Fixed Effects												
Intercept	1	224.000	0.630	0.428	1	230.873	1.224	0.270	1	194.353	4.469	0.036
Gender	1	224.000	0.327	0.568	1	230.056	0.492	0.484	1	91.259	0.658	0.419
Lives Alone	1	224.000	0.932	0.335	1	228.490	0.886	0.347	1	91.390	0.177	0.675
Number of Medications	3	224.000	0.305	0.822	3	231.162	0.377	0.770	3	99.859	1.432	0.238
Primary Care Provider	1	224.000	0.753	0.386	1	201.491	1.601	0.207	1	63.569	1.505	0.224
Number of Chronic Diseases	1	224.000	0.273	0.928	1	227.865	0.363	0.873	1	105.970	1.542	0.183
Age	5	224.000	0.965	0.327	5	231.616	1.648	0.201	5	136.173	1.489	0.225
Previous 6 month Admissions	1	224.000	3.326	0.070	1	218.450	3.941	0.048*	1	114.033	4.953	0.0280*
Previous 6month ED	1	224.000	0.320	0.572	1	201.964	0.601	0.439	1	83.192	0.280	0.598
Friendship	1	224.000	0.258	0.612	1	231.686	0.161	0.689	1	92.075	0.295	0.588
Frailty	1	224.000	1.125	0.290	1	230.753	1.985	0.169	1	115.107	0.046	0.830
Randon Effects												
Patient ID		Estimate	SE.	Sig.		Estimate	SE.	Sig.		Estimate	SE.	Sig.
		0.1095	0	0		0.123	0.000	0		0.0192	0	0

Appendix I

Concept Risk Stratification Model

STRATIFIED INTEGRATED PATHWAY

