STROKE SERVICES IN ONTARIO- BASED LONG-TERM CARE HOMES

by

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A thesis submitted in conformity with the requirements for the degree of Masters of Science
Department of Health Policy, Management and Evaluation
University of Toronto

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Abstract

There is limited information regarding the provision of rehabilitation services in long-term care (LTC) to meet the needs of residents living with stroke. This project assessed service availability within Ontario-based homes and examined the relationship between service comprehensiveness and functional outcome for residents with rehabilitation potential. The first phase involved survey development and distribution to a sample of homes to assess comprehensiveness. The second phase linked survey findings and administrative data to determine whether comprehensiveness (measured using an index score derived from survey responses) was correlated with change in functional status using linear regression modeling. There was marked variability in service comprehensiveness across responding homes (n=32 of 154 homes; 21%). No significant linear correlation was shown between comprehensiveness and change in ADL function (n=178). Although our study failed to show an association, rehabilitation should be considered an important aspect of LTC programming and should adhere to practice standards where possible.
Acknowledgements

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Chapter 1
Introduction

Stroke is a leading cause of long-term disability in Canada. Current estimates suggest there are about 300,000 people in Canada living with the effects of stroke, with approximately 100,000 Ontarians affected by stroke each year. Stroke is the leading cause of disability in Canada and the human cost of stroke is immeasurable.

In 2002, an estimated 157,000 long-term care beds were available across Canada. It is estimated that the number of seniors who need care in a long-term care home will be five to six times that capacity by the year 2031. Given the future need for long-term care services, it is important to understand the current capacity to provide restorative care and other aspects of care delivery. Canadians over the age of 80 years are the fastest growing age group in the country and many seniors are leading productive and active lives. It is important that long-term care homes can provide opportunities for seniors to improve their functional status and global health status; however there is not a good understanding of what types of services are delivered to which residents.

There is limited information regarding the availability of services to meet the needs of residents living with stroke particularly in the long-term care setting, yet an estimated 22% of individuals residing in long-term care are stroke survivors. The provision of restorative rehabilitation and care services for residents living with stroke in long-term care is important as an estimated 100,000 Ontarians live with the effects of stroke. The Stroke Evaluation Advisory Committee reported that 7.3% of patients discharged from acute care with stroke were admitted to long-term care. Despite this relatively high proportion of patients, limited information is known related to the current availability and provision of stroke services and access to specialized resources to support recovery in this population. The present research aims to highlight the availability of resources for residents with stroke in long-term care, while also describing the current subpopulations of residents in a sample of homes. Further, the main objective was to examine the relationship between the service comprehensiveness of long-term care homes and change in resident functional outcome.

1.1 Research goals

The goals of this research are:

(1) to describe the comprehensiveness of services and resources provided to residents living with the effects of stroke in a sample of long-term care homes in Ontario;
(2) to describe the population of residents living in Ontario-based long-term care facilities with the effects of an acute stroke, and;

(3) to examine the relationship between service comprehensiveness and resident change in ADL status.

1.2 Study objectives:

- To identify and quantify the types of stroke-specific services and resources available to residents living in Ontario-based long-term care facilities who have experienced a stroke event;

- To define and describe three resident populations living with stroke in long-term care:
  - those who have clear rehabilitation potential
  - those without demonstrated potential to improve functional outcomes and whose goal is to preserve current functional ability; or
  - those identified as palliative.

- To examine the relationship between facility-level service comprehensiveness and resident-level changes in ADL functional status for residents living in long-term care with rehabilitation potential following stroke,

- To identify gaps and opportunities for improvement in quality of care as defined by access to services and resources that would promote functional recovery for residents living in long term care homes in Ontario following an acute stroke.

1.3 Project overview

This project was conducted in two phases. The first phase involved an exploration of the availability of rehabilitation services in a sample of long-term care homes in Ontario through the administration of a survey. Specifically, the survey focused on the provision of services and resources for residents living with stroke in this setting. Using the survey response data, an index score was developed to evaluate service comprehensiveness. The second component of this project involved the linkage of survey results to administrative databases to describe a population of long-term care residents living with stroke identified as having clear rehabilitation potential, as well as to examine the relationship between service comprehensiveness at the facility level and changes in functional status of these residents.
Population aging is a striking demographic trend happening globally. Care for the elderly has garnered the attention of researchers, clinicians and policy makers in recent years with estimates of the “over-65” population in North America, Europe and parts of the Oceania between 12.3 to 17.2 \%. Adding to the complexities of caring for an elderly population is the rapid increase in chronic conditions among this vulnerable population. By the time individuals enter long-term care, management is often complicated by comorbid conditions. In fact, a significant number of long-term care residents are living with the residual functional and cognitive disabilities caused by stroke. To ensure residents in long-term care living with stroke maintain their current level of functional status for as long as possible with the opportunity to improve functional outcome, the provision and delivery of appropriate rehabilitation services is essential.

Care of individuals with chronic conditions is further complicated when the effects of illnesses such as stroke are no longer manageable and the resident is considered to be palliative. When assessing the comprehensiveness of services in long-term care, it is important to keep in mind the scope of care programs available for individuals with a range of functional abilities and independence. Palliative and end-of-life care for a resident with stroke has not been discussed at length in the literature, but is important to residents living with stroke in long-term care.

2.1 Defining Long-term Care Facilities

Long-term care facilities are referred to with various synonyms across Canada: nursing homes, residential care, homes for the aged, special care homes. In the United States, nursing home and skilled nursing facility (SNF) are commonly used terms. The objective of long-term care is to promote independence, while ensuring the best possible level of care for residents. In Ontario, long-term care facilities offer residents a comprehensive range of services, including nursing, personal care and other programs and treatment with the goal to enhance resident quality of life. Kane (2010) described “good” long-term care as the integration of personal care, housing and medical care.

2.2 Service Provision and Rehabilitation Care in Long-term Care

Individuals enter long-term care when sufficient support within the community is no longer available or when a patient is no longer able to cope at home due to a change in health status such
as following a hospitalization. Residents of long-term care homes in Ontario are those in need of high levels of personal care including assistance or supervision of activities of daily living (ADL). While the rehabilitation goals of long-term care residents may differ from those of individuals living with stroke in the community with better functional status or improved access to outpatient rehabilitation resources, they must not be ignored. However, given the funding model for provision of services in Ontario homes, it is a difficult task to ensure residents receive appropriate levels of rehabilitation.

Operational expenditures for Ontario long-term care homes must be allocated into one of four funding envelopes and are not to exceed the per diem requirements:

1. Nursing and Personal Care (NPC) – includes expenditures on salaries, wages, benefits and purchased services for care staff, as well as nursing and personal care administrators. These funds also account for expenditures for training, as well as equipment, supplies and devices used by staff.

2. Program and Support Services (PSS) – includes expenditures on salaries, benefits and purchased services for active staff such as physiotherapists, speech-language therapists, occupational therapists, recreational staff, as well as volunteer coordinators, social work and dieticians. These funds are also used for training of PSS staff and equipment used by staff. In 2007, the per diem PSS envelope for long-term care operators was $7.1211.

3. Raw Food (RF) – includes expenditures of raw food.

4. Other Accommodations (OA) – includes a variety of acceptable expenditures which will maintain or improve the care environment of the long-term care home.

To alleviate the costs of provision of rehabilitation services through the Program and Support Services (PSS) envelope, changes to the provision of physiotherapy services have been made by the Ministry of Health and Long-Term Care (MOHLTC). In 2005, the Ontario Health Insurance Plan (OHIP) began to fund physiotherapy services for long-term care residents over the age of 65 years under two models:

1. The **fee-for-service model** requires that services are provided by Designated Physiotherapy Clinics (DPCs) to residents of long-term care with a maximum of 100 services per patient annually. In cases of exceptional need, 50 additional services may be allowable.
2. The annual allocation model allows homes an annual allotment of $600 per bed to provide physiotherapy services to residents by a DPC or other contracted professional.

While there is information related to the utilization of rehabilitation services in long-term care since the implementation of additional funding, there is no available evidence regarding the extent to which the additional rehabilitation funding has affected resident functional health.

Despite the importance of rehabilitation for sustaining current levels of functional status, it has received limited attention in the health services literature. One study reported prevalence rates of therapy (both physical and occupational) for residents in nursing homes in several countries: 31% (Iceland), 30% (Japan), 23% (Denmark), 14% (Italy) and 11% (USA). More recent data has indicated that provision of therapy has reached 68% in nursing homes in Finland. In Canada, an investigation was conducted 10 years ago to determine levels of service and needs in a sample of Ontario long-term care facilities and found that only 10% of a small sample of long-term care residents with rehabilitation potential (14%) received physical therapy.

Knowledge of the availability of rehabilitation services in long-term care is important to understand when explaining resident quality of care and recovery of function for residents living with stroke. A government-funded project initiated more than a decade ago aimed to evaluate the provision of services in long-term care facilities, and to compare the acuity and services received in Ontario-based long-term care facilities to those of other care settings (such as complex continuing care), as well as provision to residents in other jurisdictions. Residents of long-term care homes in Ontario were found to have the highest levels of cognitive impairment (i.e. dementia or Alzheimer’s Disease) and depression across study sites, yet residents received less nursing, therapy and rehabilitation services compared to all other study jurisdictions. Ontario-based homes had the lowest level of nursing care at 2.04 hours per resident per day, as well as the lowest level of rehabilitation services as only 10% of residents with rehabilitation potential received rehabilitation services. Further, although 61% of the long-term care residents in Ontario presented with behavioural issues, the amount of restorative therapy received was among the lowest with an average of 10 minutes daily of psychological services per resident. This low-level of care extended beyond treatment for depression and other mental health issues to a lack of programming for exercise and physical rehabilitation services. In 2002, the Provincial Auditor of Ontario found there was no evidence that the government had addressed the findings of the PricewaterhouseCoopers report. The changes made to the provision of physiotherapy services in long-term care in 2005 by the Ministry of Health and Long-Term Care (MOHLTC) represent an
attempt to address some of these issues.

Two studies from the Netherlands have focused on physical recovery for nursing homes residents. Leemrijse and colleagues reported that the chance of nursing home residents (n=600) receiving physiotherapy differed significantly across nursing homes (n=15). This difference was largely due to the unequal supply of physiotherapists. This was the first investigation of the level of physiotherapy resources supplied in nursing homes in the Netherlands and highlights the need for a more in-depth examination of resource comprehensiveness in long-term care.

A recent comprehensive review examined training outcomes related to physical exercise, fitness, activities of daily living (ADL) functioning and quality-of-life in frail institutionalized individuals. In a review of 27 studies on older persons residing in long-term care facilities, using information from studies which showed a strong effect size, the authors concluded that there is firm evidence for the effectiveness of a training program to increase physical fitness, ADL performance and quality-of-life for frail, institutionalized individuals.

A challenge for practitioners in treating this resident population is the heterogeneity and diversity of resident health issues. A one-size-fits-all approach to treatment may not be appropriate in all contexts of care. The use of individualized care programs is not new, but is not consistently implemented in all care settings. It is especially difficult to provide individualized treatment plans with few resources and increased pressures that are present in long-term care. Bravo and colleagues conducted a randomized, controlled trial with 201 residents who were 65 years and older with difficulty in at least two areas of activities of daily living (ADL) functions from 40 long-term care facilities in Quebec. The study objective was to determine whether a tailored intervention could improve overall quality of care. The authors did not report any significant improvements in care; however, several limitations of the investigation were highlighted. While interventions were customized for each facility, they did not address staff resource constraints, which is a potential confounder of high quality care. While this investigation did not provide the anticipated result, the goal of customized interventions works well in long-term care as therapy goals for residents may vary.

Another factor confounding the effective rehabilitation of elderly individuals is the impact of the intensity and duration of services. While it is possible to ascertain of the amount of therapy provided in the seven days prior to assessment from the RAI-MDS, the duration of therapy is not measurable with administrative data. Wodchis and colleagues investigated the impact of rehabilitation intensity on discharge home for residents of skilled nursing facility (SNF) in two American states and in hospital-based long-term care in one Canadian province,
demonstrating that rehabilitation therapy increased the likelihood of discharge from long-term care to the community, except for residents with an expected discharge within 30 days of arrival. The authors demonstrated a convincing argument to target residents with an uncertain or negative discharge prognosis, as they appeared to benefit significantly from intensive therapy in the skilled nursing home setting.\textsuperscript{20}

Cognitive impairment and depression are also confounding factors to consider when examining this patient population. Carpenter and colleagues\textsuperscript{21} examined the responsiveness of the RAI-MDS ADL Scale to change over time using residents of long-term care homes with moderate to severe dementia and found that physical function in this population deteriorated over 6 months by an average of 1.78 points. This is substantial as a one-point change on the ADL Scale denotes a clinically meaningful change.\textsuperscript{21}

There is limited peer-reviewed research related to the availability of rehabilitation services in the long-term care setting. The complexities of caring for this population make the provision and delivery of services in this care setting difficult. Despite these challenges, services that can improve function and quality of life should not be withheld from motivated residents.

### 2.3 Stroke Care

Stroke is a leading cause of neurological disability in Canada with an estimated 50,000 new strokes annually\textsuperscript{22} and more than 300,000 Canadians living with the effects of stroke.\textsuperscript{23} As life expectancy post-stroke continues to increase in developed countries, individuals are left with residual deficits of stroke, provided annual incidence of stroke events remains constant.\textsuperscript{24} This will, undoubtedly, add considerable demand on an already strained healthcare system, healthcare personnel, as well as added burden on caregivers and the patients themselves. For example, stroke was cited as the leading cause of hospitalization for elderly Americans and, in Ontario, just over 11% of hospitalized stroke patients enter long-term care within 30 days of an acute stroke hospitalization.\textsuperscript{25} In Canada, recent estimates indicated that 10% of patients hospitalized for stroke were discharged to long-term care\textsuperscript{26}.

A recent investigation\textsuperscript{27} of 570 nursing home residents living with stroke in Ireland found the majority of residents with stroke encountered poor mobility, limited independence, as well as cognitive impairment. Beyond the physical functioning deficits, communication difficulties are common for this population.\textsuperscript{27} Taken together, the prevalence of stroke-related deficits in this patient population is substantial. Furthermore, the effects of stroke may cause distressing
symptoms such as pain, depression, confusion, agitation, nutrition or hydration problems that are important to manage, even if death is imminent.\textsuperscript{28} For long-term care residents living with stroke, it is important that restorative therapies are available for those with the capacity to undertake activities.

2.3.1 Stroke Care Pathway

The care trajectory for patients hospitalized following a stroke event may differ depending on factors related to the severity of the stroke, as well as comorbid conditions, age, gender and previous care history. The Canadian Best Practice Recommendations for Stroke Care (2010)\textsuperscript{2} highlighted the transition points commonly experienced by stroke patients along the care continuum. Following an acute hospitalization for stroke in Ontario, patients may be discharged to one of several places: home with services, home without services, inpatient rehabilitation program, complex continuing care (CCC) or long-term care (Figure 1).
The Ontario Stroke Evaluation Report 2010\textsuperscript{5} indicated that inpatient length of stay (LOS) for stroke patients in Ontario did not change from 2003-04 to 2007-08 with a median LOS of seven days at regional stroke centres and six days at non-designated centres. This was consistent
with national reports of median LOS of seven days\textsuperscript{26}. Following acute hospitalization, there are numerous ways to transition through the care continuum. Table 1 displays changes in the proportion of stroke patients discharged from acute care to various discharge destinations are compared across a four-year period (2003-04 to 2007-08)\textsuperscript{5}:

1. **Home (with or without service):** Nationally, 58\% of stroke patients are discharged home following acute hospitalization\textsuperscript{26}, which is comparable to the proportion of Ontario patients discharged home with or without services (Table 1).

2. **Inpatient Rehabilitation:** The National Audit for Stroke Care (2011) found that rehabilitation assessments in acute care were not well documented making it difficult to determine the appropriateness of the discharge from acute care\textsuperscript{26}.

3. **Complex Continuing Care (CCC):** In Ontario, complex continuing care (CCC) is used synonymously with “chronic care” and involves the provision of care in hospital for individuals who have chronic illnesses and are not able to get the care they need at home or in a long-term care facility\textsuperscript{29}. This type of care is similar to the care provided in a Skilled Nursing Facility (SNF) in the United States.

4. **Long-term Care:** Stroke patients can also be transitioned from inpatient rehabilitation to long-term care. In Ontario, the proportion of these patients decreased from 11.7\% (2006-07) to 8.6\% (2007-08)\textsuperscript{5}. While the trend toward decreasing discharge to long-term care is encouraging, it is important that individuals are discharged to ensure needs are met. During the same time period, the percentage of patients discharged from an inpatient rehabilitation program to home without service increased from 22.5\% to 26.6\%.\textsuperscript{5}

In addition to these transitions, individuals may be admitted to long term care subsequent to stays in inpatient rehabilitation, complex continuing care, or even from home if reintegration to the community is unsuccessful.
<table>
<thead>
<tr>
<th>Discharge Destination*†</th>
<th>Proportion of stroke patients discharged in 2003-04 (%)</th>
<th>Proportion of stroke patients discharged in 2007-08 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home (with services)</td>
<td>11.0</td>
<td>14.1</td>
</tr>
<tr>
<td>Home (without services)</td>
<td>44.9</td>
<td>41.4</td>
</tr>
<tr>
<td>Inpatient Rehabilitation</td>
<td>20.0</td>
<td>23.0</td>
</tr>
<tr>
<td>Complex Continuing Care</td>
<td>8.8</td>
<td>7.0</td>
</tr>
<tr>
<td>Long-Term Care</td>
<td>8.5</td>
<td>7.3</td>
</tr>
</tbody>
</table>

*Discharge destination from acute care based on acute care discharge records
† As reported by the Ontario Stroke Evaluation Advisory Committee

### 2.4 Stroke Rehabilitation in Long-term Care

Stroke has been reported as the largest primary diagnosis category in rehabilitation. In Ontario, an estimated 22% of residents living in long-term care are stroke survivors. It has been demonstrated that early mobilization of stroke survivors may lead to better functional outcomes post-stroke yet residents in long-term care have no access to an interprofessional model of care. In Canada, while there is increased coordination of specialized stroke care delivery in acute and rehabilitation care settings such as the emergence of dedicated stroke units, it is unclear to what extent this coordination has been implemented in the long-term care setting.

Stoole and colleagues examined the provision of rehabilitation services for residents with stroke in long-term care homes in Southwestern Ontario. The investigators conducted four site visits, which consisted of interviews with care staff and found exercise therapy was often held prior to a rehabilitation assessment for long-term care residents and residents sometimes wait 3-4 weeks for an assessment. Although the sample size was small, this is one of the only peer-reviewed studies examining rehabilitation services for residents living with stroke in Ontario-based long-term care homes. Using qualitative methods, the authors found that physiotherapy was the most common rehabilitation service available to residents and access to speech language pathology (SLP) therapy was limited for those with post-stroke communicative deficits. Funding constraints in the long-term care setting was cited as a factor.
It has been suggested that the needs of residents with stroke differ from those of other residents and require “specialized” care with trained and expert staff for stroke residents. Based on staff interviews, the authors believed that the implementation of stroke units into long-term care was a potential intervention to improve stroke care, especially in homes with a large proportion of stroke residents.

While there is limited research exploring effective models for rehabilitation in the long-term care population, there has been interest in examining various models of rehabilitation delivery within the acute care and inpatient rehabilitation setting. One meta-analysis examined three models of stroke care including acute stroke unit care, units combining acute and rehabilitative care, and rehabilitation units. Several positive gains were noted in patients receiving specialized care, including reduction in functional impairment, mortality and institutionalization although each model of care was not associated with equal benefit. As long-term care residents may contend with more functional and cognitive impairment than other patient populations, it is possible that specialized treatment can maximize gains from rehabilitation therapies to help residents maintain independence for as long as possible.

The delivery of effective stroke rehabilitation services to residents in long-term care provides unique challenges. As mentioned, older adults with stroke are often prone to cognitive or functional impairments, which may hinder the effectiveness of rehabilitation treatments. Cognitive deficits, even after controlling for physical impairment, have been associated with increased dependence following stroke. These are just some examples of the complex nature of stroke care in the long-term care setting; however, it is possible that some of the strategies employed at other stages of the care continuum can address these challenges and provide benefit for an older stroke population in long-term care.

2.4.1 Stroke Care Team

The concept of an interprofessional team for the provision of stroke care in Canada is not novel. The Canadian Stroke Strategy Best Practice Recommendations encouraged care for stroke patients with an interprofessional team wherever, and whenever, possible. This core team (for both acute and inpatient rehabilitation care) consists of experts in medicine, nursing, physiotherapy, occupational therapy, speech-language therapy, social work, clinical nutrition, as well as pharmacy, neuropsychology and even recreation therapy. The authors of the Canadian Best Practice Recommendations for Stroke Care also highlighted the importance of patient support and interprofessional care at transition periods across the care continuum, which is relevant to long-term care.
In Australia, the recently updated Clinical Guidelines for Stroke Management discussed the importance of providing care to stroke patients through the use of a coordinated and multidisciplinary team, including the acknowledgement of the patient and caregivers as an important aspect of the team.\(^3\) The terms ‘interprofessional’ and ‘interdisciplinary’ have been used to describe communication of treatment among care staff across various disciplines. The extent to which care for long-term care residents can be delivered by an interprofessional team of clinicians is unclear given challenges with provision of care in long-term care such as staff constraints.

### 2.4.2 Stroke Care Standards

Best practices for stroke care have been well defined in Canada and internationally.\(^5\) The Canadian Stroke Strategy Best Practices\(^2\)\(^\text{--}\)\(^3\)\(^4\) provided in-depth recommendations for rehabilitation across the care continuum; however, they are not specific to rehabilitation within the long-term care setting. Rather, the recommendations are generally stated as relevant across the continuum. Examples include: the regular re-assessment of rehabilitation needs for moderate to severe strokes; the development of a comprehensive, individualized rehabilitation plan, reflecting the severity of the stroke, as well as the needs and goals of the stroke patient, and treatment of post-acute stroke care by interprofessional care teams. These guidelines were developed based on extensive reviews and synthesis of the literature followed by a consensus process with members from the home care and long term care sector.

In Ontario, the Ontario Stroke Strategy (OSS) convened a panel of rehabilitation professionals as part of a consensus panel to develop key standards of care for stroke rehabilitation care.\(^4\) Along with 20 key standards to enhance the scope and practice of post-stroke rehabilitation in the province, the panel recommended that residents living in a long-term care home should have access to stroke rehabilitation services, based on clinical indication and goals of patient.\(^4\)

International guidelines for stroke care have also addressed the long-term management of individuals living with the effects of stroke.\(^2\)\(^8\)\(^3\)\(^5\) In the recent Australian Guidelines, recommendations were not specific to a long-term care population, but they addressed long-term rehabilitation and goal setting, both areas of importance for individuals with stroke residing in long-term care.\(^3\)\(^5\) Specifically, the Australian guidelines recommended that stroke survivors and family should have their expectations established and acknowledged. Further, it was recommended that stroke survivors with residual impairment at the end of formal rehabilitation processes are reviewed annually to assess whether further interventions are necessary.\(^3\)\(^5\) The
Royal College of Physicians United Kingdom National Clinical Guidelines for Stroke\textsuperscript{28} included recommendations specific to the care of patients in nursing/residential care homes in their discussion:

- All patients in nursing homes, care homes and residential homes should be able to receive assessment and treatment from specialist rehabilitation services (consensus evidence);
- All staff in nursing homes, care homes and residential homes should be familiar with the common clinical features of stroke and the optimal management of common impairments and activity limitations (consensus evidence).

2.5 Palliative Care

2.5.1 Palliative Care and Stroke

Palliative (end-of-life) care for stroke patients is an emerging field of knowledge in stroke research. It is an important and, until now, missing link of the stroke care continuum. One critical review examining the relationship between palliative care and stroke attempted to answer questions surrounding stroke mortality trends and provision of palliative care services.\textsuperscript{36} The review highlighted the need for further research in this area as it uncovered only one intervention study examining the issue.\textsuperscript{36} The delivery of palliative services to stroke patients beyond the acute phase is also a significant issue as this is not a usual component of routine care. Furthermore, the difficulty with the provision of palliative care is that the idea of a “good death” is not always considered a goal of medicine so much as ensuring longevity and providing quality care.\textsuperscript{37,38}

2.5.2 Palliative Care Standards

Palliative care was discussed in three major guidelines pertaining to stroke care\textsuperscript{2,28,35} highlighting the awareness of the importance of end-of-life care for clinicians and experts in the field. While the palliative care standards have focused within the acute setting, specific recommendations are transferable to a long-term care setting.

Treatment recommendations for palliative and end-of-life care were presented in the recent Canadian Best Practice Recommendations for Stroke Care.\textsuperscript{2} They addressed access of palliative specialists for stroke patients, the importance of interprofessional care to address the physical, spiritual, psychological, and social needs of the patient, and early engagement of the palliative care team.

The National Stroke Foundation of Australia also discussed palliative care for stroke patients in the updated Clinical Guidelines for Acute Stroke Management.\textsuperscript{35} Expert authors of the
guidelines included a care pathway for acute stroke palliative care to ensure that an accurate assessment of imminent death is made. These guidelines also recommended that, where applicable, acute stroke patients should have access to specialist palliative care services, consistent with the goals of palliative care. In the absence of high-level randomized, controlled trial evidence, an expert panel expressed the importance of the consideration of palliative care as a potential care pathway for stroke patients.

The Royal College National Clinical Guidelines of the United Kingdom addressed palliative care/ end of life management in their most recent stroke care guidelines. Recommendations included:

- Teams providing care for patients after stroke should be taught how to recognize patients who might benefit from palliative care;
- All staff caring for people dying with a stroke should be trained in the principles and practice of palliative care;
- All patients who are dying should have access to specialist palliative care expertise when needed; and,
- After stroke all end-of-life decisions to withhold or withdraw life-prolonging treatments (including artificial nutrition and hydration) should be in the best interests of the patient.

The effectiveness of palliative and end-of-life care pathways has not been well studied, which may be due, in part, to the ambiguity of a “good death” and how this can be measured. Other measures that may shed light on the utilization of palliative services at the long-term care facility level would include the routine initiation of a conversation related to palliative care, as well as the documentation of the advance directives and goals of care of the resident and family. It may be a reasonable first step to explore the time from request for palliative care to family meeting or referral.

2.6 Conclusion

Evidence related to the types and availability of rehabilitation services for residents living in long-term care with stroke is limited. This review of the literature identified key issues related to care for residents living with stroke in long-term care despite the limited scope of relevant research. This study will be one of the first to investigate the relationship between service comprehensiveness at the facility level and change in functional outcomes for long-term care residents living with stroke.
Chapter 3
Methods

3.1 Overview of methods

The first component of this project involved an exploration of the availability of rehabilitation services in a pre-specified sample of long-term care homes in Ontario using the collection of survey data. Specifically, the survey focused on the provision of services and resources for residents living with stroke in this setting. Using the survey response data, an index score was developed to valuate service comprehensiveness. The second component of the study involved the linkage of survey results to administrative databases to describe a population of long-term care residents living with stroke identified as having clear rehabilitation potential, as well as to examine the relationship between service comprehensiveness at the facility level and changes in functional status of these residents. This research project received approval from the Research Ethics Board of the Sunnybrook Health Sciences Centre and the University of Toronto.

3.2 Study Population

3.2.1 Long-term care facility sample

The facility sample was comprised of the 154 long-term care homes across Ontario where the Resident Assessment Instrument Minimum Data Set (RAI-MDS) assessment tool had been successfully implemented at the start of the accrual period, April 1, 2007. The list of eligible homes was compiled for a separate research study and was corroborated with evidence of at least one RAI-MDS record at time of accrual start date to ensure homes were invited as participants if they had implemented RAI-MDS at the start of the study period.

3.2.2 Resident population

The cohort was comprised of all patients who entered long-term care facilities in Ontario within 90 days of discharge from an acute care setting with a most responsible diagnosis of stroke at discharge based on *International Classification of Diseases, Tenth Revision* (ICD-10) codes I60, I61, I63, I64, G45. The index event date was defined as the date of acute hospitalization discharge. Only patients residing in one of the 154 Ontario-based long-term care homes that had contributed data to the RAI-MDS database during the first year of the study period (April 1, 2007 to March 31, 2008) were included in this analysis. Residents from these homes were included if they had completed two RAI-MDS assessments within 200 days of admission to the facility, in
order to assess change in functional status. Residents were excluded if they had a previous stroke within five years prior to admission to long-term care or if they had been previously admitted to long-term care in the previous three years from acute care discharge date. Previous stroke or long-term care admission may confound the capacity for residents to improve functional outcomes and influence results. The project timeline is presented in Appendix C.

Table 2. ICD-10 for Stroke

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I60</td>
<td>Subarachnoid hemorrhage</td>
</tr>
<tr>
<td>I61</td>
<td>Intracerebral hemorrhage</td>
</tr>
<tr>
<td>I63</td>
<td>Cerebral infarction</td>
</tr>
<tr>
<td>I64</td>
<td>Stroke, not specified as hemorrhage or infarction</td>
</tr>
<tr>
<td>G45</td>
<td>Transient ischemic attack</td>
</tr>
</tbody>
</table>

Long-term care residents living with stroke who met inclusion criteria of this study were categorized into one of three populations used as a proxy for appropriate rehabilitation treatment goals and expectations:

1. **Clear rehabilitation potential:** Residents were identified as having clear rehabilitation potential using the RAI Specifications Manual Resident Assessment Protocol (RAP) Triggers for Functional Rehabilitation Potential for the RAI-MDS 2.0. The RAP Triggers are used to identify care planning for long-term care staff. Clear rehabilitation potential was used as a proxy for rehabilitation treatment goals (i.e. assuming residents identified as having clear potential would be motivated to improve functional abilities). The algorithm is based on variables in the RAI-MDS including variables which contribute to the ADL Long Form score, as well as self and staff reported measures of resident capability to increase independence in ADLs, and the ability for the resident to make decisions. Specifically, the variables which contribute to the algorithm:

- Bed mobility (not independent)
- Transfer (not independent)
- Walk in room (not independent), walk in corridor (not independent)
- Locomotion on unit (not independent), locomotion off unit (not independent)
- Dressing (not independent)
- Eating (not independent)
Toilet use (not independent)
- Personal hygiene (not independent)
- Bathing (not independent)
- Resident believes s/he is capable of increased independence in at least some ADLs
- Staff believe resident capable of increased independence in at least some ADLs,
- No ability to make decisions.

The complete algorithm is presented in Appendix D.

2. **Palliative**: Palliative residents were identified using the variable indicating end stage disease on the initial RAI-MDS assessment (Variable J5C – End Stage Disease)

3. **Maintenance**: Any resident living with stroke and was not identified as palliative or having clear rehabilitation potential was classified as maintenance of functional status.

### 3.3 Data Sources

3.3.1 **Electronic facility survey**

A survey was developed to explore the provision of services and resources available to residents living with stroke and residing in long-term care facilities. The survey and a request to participate were sent electronically to the Administrator and the Director of Care of each facility that had implemented the RAI-MDS assessment tool at the start of the study period (April 1, 2007). All survey data was electronically collected and stored using the SurveyMonkey program.

Survey development included:

1. An extensive review of the literature to identify important factors related to stroke care provision and delivery, which explored areas such as service availability, conformity to best practice recommendations (e.g. interprofessional team care, assessment and referral to inpatient rehabilitation programs), palliative services and delivery of restorative and rehabilitation services in long-term care. This literature review informed the survey content.

2. A draft survey was circulated to an expert panel of members of the Heart and Stroke Foundation of Ontario Rehabilitation and Community Engagement subcommittee. The mandate of the subcommittees of the Regional Stroke Steering Committee was to support planning and decision making for stroke prevention, acute stroke care, stroke
rehabilitation and the stroke long-term care network. In 2007, the membership of the Rehabilitation and Community Engagement subcommittee comprised of representatives from across the care continuum including expertise in rehabilitation, and community and long-term care. Input from this subcommittee weighed heavily in refining and finalizing survey content. Specifically, this process included:

a. Circulation of the draft survey questions to the members of the subcommittee via email correspondence;

b. Subcommittee members were given 2 weeks to provide feedback prior to finalization of the survey tool;

c. Once the survey tool was finalized, it was presented to the subcommittee during an in-person meeting and specific components of the survey were discussed. Feedback from this meeting was incorporated into a final version of the survey tool that was distributed to homes.

3. The 154 long-term care facilities in Ontario who had implemented the RAI-MDS data system for resident assessment and tracking within the first year of the study period were asked to participate in the project via electronic distribution of an invitation and the survey, with follow up telephone contact;

4. The survey was administered using the electronic tool, Survey Monkey. Conditions of consent were explained within the letter of introduction and informed consent was implied with the completion of the survey;

5. A letter of introduction and the survey link was sent electronically to the Director of Care or Administrator at all eligible homes using publically available email address information (Appendix A). In cases where the email information was not readily available, homes were contacted directly for email information. The Directors of Care or Administrators were asked to share the survey link with staff members who were best able to provide accurate information regarding programs and services for residents living in their long-term care home with effects of stroke. Survey questions are presented in Appendix B;

6. The initial plan was to keep the survey link available for a period of 4 weeks with weekly electronic reminders, followed by telephone calls to homes to help achieve a reasonable response rate of >50%; however, the electronic link was kept active for 16 weeks while non-responding homes were contacted directly by telephone and asked to respond.
3.3.2 Overview of administrative databases used

Long term care resident data for this study were derived from links to four population-based administrative databases housed at the Institute for Clinical Evaluative Sciences, Toronto, Canada.

3.3.2.1 Canadian Institute for Health Information - Discharge Abstract Database (CIHI-DAD)

The Discharge Abstract Database (DAD) contains information on acute care hospital discharges across Canada. The Canadian Institute for Health Information (CIHI) receives data directly from participating hospitals. The DAD contains demographic, administrative and clinical data for hospitals discharges (acute inpatient, chronic, rehabilitation) and day surgeries in Canada. The DAD database was used to identify patients with stroke as main diagnosis for hospitalization.

*Validity/ Reliability:* A validation study examined the accuracy of 50 of the top most responsible diagnoses using chart re-abstraction. For stroke, the kappa statistic was 0.74 (95% CI, 0.68 to 0.80), while the sensitivity was 0.81 (95% CI, 0.73 to 0.88) and the positive predictive value 0.69 (95% CI, 0.61 to 0.77). A kappa statistic between 0.61 and 0.80 is considered substantial agreement, while a kappa between 0.81 and 1.00 is considered almost perfect agreement.

3.3.2.2 Resident Assessment Instrument Minimum Data Set (RAI-MDS)

The RAI-MDS 2.0 is a comprehensive assessment tool containing more than 400 items related to diagnoses of long-term care residents, functioning and treatment. Specifically, the RAI-MDS contains information related to demographic, cognitive patterns, communication/ hearing patterns, psychosocial wellbeing, physical and social functioning as well as performance in activities of daily living (ADL). The dataset is managed by CIHI and long-term care homes are required to complete an initial assessment within 14 days of an admission, followed by reassessments every 90 days. At ICES, the RAI-MDS is housed within the Continuing Care Reporting System (CCRS). *Validity/ Reliability:* In an examination of the reliability of the interRAI suite of assessment instruments, Hirdes and colleagues found that the highest mean kappa was indicated for the long-term care facility instrument (kappa = 0.74).

3.3.2.3 Canadian Institute for Health Information - National Ambulatory Care Reporting System (NACRS)

The National Ambulatory Care Reporting System (NACRS) includes data for all hospital-based ambulatory care provided in emergency departments. NACRS was used to measure readmissions.
to ED for the subpopulations of residents classified as maintenance or palliative. Client visit data are collected at time of service in participating facilities. Data elements include: demographic data, clinical data, administrative data and financial information, as well as service-specific data elements for day surgery and emergency department services. This database was used to examine secondary outcomes including readmission to emergency department (ED). Validity/ Reliability: A recent CIHI examination of NACRS data quality reported that changes to stroke coding in the ED produced a 34% increase in the number of stroke cases between 2007–08 and 2009–10.45 Prior to 2008, only the symptoms of the actual condition were coded and not the diagnosis. This may increase the sensitivity of identification of stroke in ED.

3.3.2.4 Ontario Drug Benefit (ODB) Database

The ODB database contains comprehensive prescription records from the Ontario Public Drug Program for Ontario residents 65 years or older, as well as younger patients meeting eligibility criteria for social assistance, including unemployment, disability, high prescription drug costs relative to net household income, receipt of home care services, and residence in a long-term care facility. This database was used to determine the medications dispensed to the residents in our cohort. Validity/ Reliability: The coding accuracy of drug claims housed in the Ontario Drug Benefit program database has been reported as excellent, with an error rate of 0.7%.46

3.4 Important definitions

3.4.1 Outcome

1. For those residents classified as having clear rehabilitation potential as defined using the RAI-MDS Resident Assessment Protocol (RAP), the primary outcome was the change in resident functional status as measured by the Activity of Daily Living (ADL) Long Form, which was reported at initial RAI-MDS assessment and subsequent RAI-MDS assessment. The ADL-Long Form scale includes seven components: bed mobility, transfer, locomotion (includes in room and in corridor), dressing, feeding, personal hygiene (includes combing hair, brushing teeth, washing and drying hair and face, but excludes baths and showers) and toilet self-performance.

2. Secondary outcomes were planned for residents in our sample who were identified as either maintenance or palliative. Specifically, the outcome of interest was the number of readmissions to emergency department (ED) or acute care within the 200 days following admission to long-term care. Unplanned readmissions to hospital may indicate bad health
outcomes. While it may be difficult to identify whether readmissions could have been avoided in an elderly population such as that in long-term care, unplanned readmissions to hospital or ED may highlight areas for improvement in care processes in long-term care.

3.4.2 Definition of independent variable
The independent variable for this analysis was defined as service comprehensiveness and was measured at the facility level using an index score derived from responses to the electronic survey at the facility level. The index score was derived from key survey components related to service comprehensiveness in long-term care, including provision of rehabilitation services (the types of services provided), delivery of rehabilitation services (the way in which the rehabilitation services are provided), the use of interprofessional teams (delivery of care), stroke expertise (compliance to best practice guidelines, use of available resources and subjective measure of the level of staff education of stroke) and palliative expertise (subjective measure of the level of staff education of palliative care). The index score ranged from ‘0’ (lowest service comprehensiveness) to ‘34’ (highest service comprehensiveness). The specific survey questions comprising the index score are presented in Table 3 and the survey tool is presented in Appendix B.

Table 3. Survey components used to calculate the service comprehensiveness index score with reference to specific survey questions

<table>
<thead>
<tr>
<th>Survey Components</th>
<th>Questions (Valid range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision of Rehabilitation</td>
<td>Survey Question 2:</td>
</tr>
<tr>
<td></td>
<td>Provision of therapy to all residents with stroke (0 to 8, one point for each type of</td>
</tr>
<tr>
<td></td>
<td>therapy provided)</td>
</tr>
<tr>
<td>Delivery of Rehabilitation</td>
<td>Survey Question 4:</td>
</tr>
<tr>
<td>Services</td>
<td>Delivery of rehabilitation to residents with stroke using an individualized program (0</td>
</tr>
<tr>
<td></td>
<td>to 5, based on percentage quintiles of patients with individualized program)</td>
</tr>
<tr>
<td></td>
<td>Survey Question 7(a):</td>
</tr>
<tr>
<td></td>
<td>Opportunity for re-assessment for inpatient rehabilitation (0 to 5)</td>
</tr>
<tr>
<td>Interprofessional Care</td>
<td>Survey Question 6:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Survey Components</td>
<td>Questions (Valid range)</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td><em>Interdisciplinary Stroke Team (0 to 5)</em></td>
</tr>
<tr>
<td>Stroke Expertise</td>
<td><em>Compliance with best practice guidelines (0 to 2)</em></td>
</tr>
<tr>
<td></td>
<td><em>Survey Question 11(a):</em></td>
</tr>
<tr>
<td></td>
<td><em>Use of Heart &amp; Stroke Foundation of Ontario resource, Tips and Tools (0 – 2)</em></td>
</tr>
<tr>
<td></td>
<td>0 defined as never used or not aware of resource;</td>
</tr>
<tr>
<td></td>
<td>1 defined as rarely used; and</td>
</tr>
<tr>
<td></td>
<td>2 defined as always or sometimes used to align with compliance with best practice guidelines</td>
</tr>
<tr>
<td></td>
<td><em>Survey Question 10:</em></td>
</tr>
<tr>
<td></td>
<td><em>Stroke care expertise (0 to 5)</em></td>
</tr>
<tr>
<td></td>
<td><em>Survey Question 9(a):</em></td>
</tr>
<tr>
<td>Palliative Expertise</td>
<td><em>Palliative expertise (0 to 2)</em></td>
</tr>
<tr>
<td></td>
<td>0 defined as less than 20%</td>
</tr>
<tr>
<td></td>
<td>1 defined as moderate expertise (21 to 80%), and</td>
</tr>
<tr>
<td></td>
<td>2 defined as high (81 to 100%)</td>
</tr>
</tbody>
</table>

3.4.3 Resident statistics

Descriptive baseline statistics (means, medians, IQR) were calculated for residents living with stroke in responding homes using the RAI-MDS data from the Continuing Care Reporting System (CCRS) administrative database. Baseline characteristics were compared between residents from responding and non-responding long-term care homes to gauge the generalizability of the findings. Baseline characteristics included in the analysis consisted of:

- Age
- Living arrangement prior to admission to long-term care facility.
- Patient-level rehabilitation therapy: recorded on the RAI-MDS as the total number of minutes of therapy provided over the course of seven days prior to RAI-MDS assessment.
- The RAI-MDS Activities of Daily Living (ADL) Long Form assessment was used to determine baseline functional status. The RAI-MDS ADL Long Form is a summative measure of seven individual ADL items ranging from ‘0’ to ‘28’ with higher scores indicating greater dependence.  
The RAI-MDS CHESS scale is used to predict mortality and measure instability in the long-term care population\textsuperscript{44} and has been shown to be a good predictor of complex medical issues.

- The Depression Rating Scale (DRS) of the RAI-MDS was calculated to determine level of depression in the clear rehabilitation population. The DRS is a summative measure derived from seven RAI-MDS assessment variables related to depressive symptoms: negative statements, persistent anger, expressions of unrealistic fears, repetitive health complaints, repetitive anxious complaints, sad/pained/worried facial expression and tearfulness.\textsuperscript{48} The RAI-MDS DRS has proven reliability for detection of depression with a sensitivity of 91% and specificity of 69% when tested against diagnoses of major or non-major depression.\textsuperscript{49}

- The Cognitive Performance Scale (CPS) in the RAI-MDS is a measure used to classify levels of cognitive stability in residents. The CPS classifies residents into one of seven categories ranging from ‘0’ (intact) to ‘6’ (very severe impairment).\textsuperscript{21} The RAI-MDS CPS measure has been validated in an elderly population.\textsuperscript{50}

- Number of discrete drugs in one year prior to acute discharge date was calculated using ODB data.

### 3.5 Analysis Plan

#### 3.5.1 Need/ Supply analysis of all residents with first stroke in responding long-term care homes

In order to gain a better understanding of the proportion of residents in the responding facilities living with stroke, the capacity of the facilities was measured using the number of licensed beds and residents were categorized according to the service comprehensiveness of the home in relation to individual functional status. A cross sectional analysis of all residents living in the responding long-term care homes was conducted to better understand the relationship between resident need in responding homes and availability of service (supply). To achieve this goal, baseline functional status was examined in a cross-section of residents with at least one RAI-MDS assessment using the ADL- Long Form.\textsuperscript{39}

#### 3.5.2 Statistical Regression Analysis

The goal of this research was to provide an interpretable association between service comprehensiveness and all changes in functional outcome. Linear regression was used to examine
the correlation between functional outcome and facility-level service comprehensiveness. The benefit of determining the magnitude of the functional outcome attributable to a one-unit increase in the independent variable – service comprehensiveness – was seen a strength of the analysis. If the dependent variable – change in functional outcome – was analyzed as a binary variable (e.g. low or high change in functional status) a resident with a relatively large, positive change in outcome would be comparable to a resident with a minimal, positive change in outcome.

Since residents in this sample were clustered into homes and each home could have its own behaviours or policies that may affect care (negatively or positively) at that facility, the assumption of independence is violated with Ordinary Least Squares (OLS) regression. As a result, a random intercept, mixed (multilevel) model was used to adjust for non-independence.51

The main model (model 1) examined the association between change in resident functional status and service comprehensiveness to compare parameter estimates. Secondary analyses further examined the association between change in resident functional status and specific components of rehabilitation provision, including: interprofessional provision of care (model 2), delivery of rehabilitation services (model 3) and expertise in stroke care (model 4).

Crude, unadjusted analysis of the models was conducted to determine the crude relationship prior to adjustment for potentially confounding factors. All models were adjusted for covariates identified as potential confounders of improved functional status in long-term care residents. Model covariates included: age, sex, baseline ADL score, previous hip fracture, cognitive performance scale score, depression rating scale score, number of distinct medications in previous year, and minutes of rehabilitation therapy in one week prior to follow up assessment.

3.6 Model Assumptions

The predictive probability of (1) facility-level service comprehensiveness, and (2) resident-level rehabilitation therapy was assessed using 95% confidence intervals. Collinearity was assessed using variance inflation factor (VIF) analysis. VIF greater than 10 was used as evidence of colinearity among covariates. Final adjusted models were tested for linear regression assumptions using the evaluation of residual plots and histograms. All statistics and models were analyzed with SAS for UNIX, version 9.2 (SAS Institute, Cary, NC).
Chapter 4
Results

4.1 Overview of Findings

The first component of this project involved an exploration of the availability of rehabilitation services in a sample of 154 of the more than 620 long-term care homes in Ontario. Of the 154 homes asked to participate, 32 responded (21% response rate). Using the survey response data an index score was developed to valuate service comprehensiveness. The second component of this project involved the linkage of administrative databases to describe a population of residents living with stroke identified as having clear rehabilitation potential in the 32 responding homes (n=178) (Figure 1). The relationship between service comprehensiveness at the facility level and the functional status of the resident was examined.

Figure 2: Project overview of two phases across study period (2007 – 2010)
4.2 Main Findings

4.2.1 Findings for Objective #1

*To identify and quantify the types of stroke-specific services available to residents living with stroke in Ontario-based long-term care facilities*

At the start of the study period (April 1, 2007), approximately 154 of more than 620 long-term care homes had implemented the RAI-MDS. Of the 154 homes invited to participate in this study, 32 homes completed all survey questions (21%). Of the responding homes, 59% (19 of 32 homes) were designated as for-profit facilities. The average bed capacity was 141 and there was representation from all 14 Local Health Integration Networks (LHIN) across Ontario. Table 4 presents survey findings for all responding homes.
Table 4. Survey findings from the responding long-term care homes (n=32)

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Resident Subpopulation</th>
<th>Percentage of residents with stroke receiving the following services as reported by the home</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No residents (0%)</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Treatment plans decided upon with interprofessional team input:</td>
<td>Clear Potential</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Palliative</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>Individualized rehabilitation treatment plan for residents with stroke:</td>
<td>Clear Potential</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Palliative</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>Percentage of residents with stroke reassessed for rehab potential:</td>
<td>Clear Potential</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Palliative</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>4</td>
</tr>
<tr>
<td>Percentage of residents with stroke reassessed for rehab who are re-referred to inpatient program:</td>
<td>Clear Potential</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Palliative</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>15</td>
</tr>
<tr>
<td>Percentage re-referred to inpatient program who are admitted into program:</td>
<td>Clear Potential</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Palliative*</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Maintenance*</td>
<td>12</td>
</tr>
</tbody>
</table>

### Care Delivery Questions

<table>
<thead>
<tr>
<th>Proportion of Care Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of care staff with expertise in stroke care:</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Percentage of care staff with expertise in palliative care:</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

* The total number of responding homes for this question was 28
4.2.1.1 Provision of Rehabilitation

All responding facilities employed physiotherapists as either a contracted provider (91% of homes) or as an employee of the facility (9%). Of the 32 responding facilities, 31 (97%) reported using a recreation/activation therapist. Psychotherapy and social work services were provided in 53% and 69% of facilities, respectively. Provision of speech language pathology was indicated as available in most homes (84%) through the community care access centres (CCACs). Findings are displayed below (Table 5). Residents rarely participated in community-based rehabilitation services outside of the facility (20 of 32 facilities – 63% - reported this was never the case).

Table 5. Service provision for residents living with stroke in responding long-term care facilities in Ontario (n=32)

<table>
<thead>
<tr>
<th>Service</th>
<th>Employee of LTC Facility</th>
<th>Contracted Provider</th>
<th>Community Care Access Centre (CCAC)</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational therapy</td>
<td>0</td>
<td>14</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>3</td>
<td>29</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Speech language pathology</td>
<td>0</td>
<td>2</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>Dietetics</td>
<td>12</td>
<td>18</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Social work</td>
<td>17</td>
<td>3</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Recreation therapy</td>
<td>29</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rehab assistant</td>
<td>18</td>
<td>15</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Psychotherapy</td>
<td>0</td>
<td>13</td>
<td>4</td>
<td>15</td>
</tr>
</tbody>
</table>

All facilities reported that staff regularly addressed the following care components: mobility and skin care, the implementation of an individualized treatment plan and the application of positioning techniques when required. Nearly all homes (97%) reported that routine activities of daily living (ADLs) were regularly addressed. The least commonly reported care component was bladder re-training with 23 of 32 (72%) facilities reporting this was regularly addressed (Table 6).
Table 6. Care components regularly addressed by care staff for residents living with stroke in responding long-term care facilities in Ontario (n=32)

<table>
<thead>
<tr>
<th>Care components</th>
<th>Proportion of LTC Facilities (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility and skin care</td>
<td>100</td>
</tr>
<tr>
<td>Positioning techniques applied when required</td>
<td>100</td>
</tr>
<tr>
<td>Individualized care plan for modification of risk factors</td>
<td>100</td>
</tr>
<tr>
<td>Routine Activities of Daily Living (ADL)</td>
<td>97</td>
</tr>
<tr>
<td>Supported participation in leisure activities of the resident’s choice</td>
<td>94</td>
</tr>
<tr>
<td>Meal assistance and hydration</td>
<td>94</td>
</tr>
<tr>
<td>Facilitation of communication for those with communicative impairment</td>
<td>90</td>
</tr>
<tr>
<td>Cueing techniques applied when required</td>
<td>90</td>
</tr>
<tr>
<td>Psychosocial needs (e.g. depression, anxiety)</td>
<td>90</td>
</tr>
<tr>
<td>Cognitive and perceptual problems</td>
<td>90</td>
</tr>
<tr>
<td>Bladder retraining for those with bladder dysfunction</td>
<td>74</td>
</tr>
</tbody>
</table>

4.2.1.2 Reassessment for rehabilitation in responding homes

For residents deemed as having clear rehabilitation potential by care staff at responding homes, 16 of 32 homes (50%) reassessed the majority of residents for rehabilitation potential at resident care planning meetings. Fifteen of 32 homes (47%) identified reassessment for rehabilitation potential for those residents considered palliative or maintenance. Residents viewed as having clear rehabilitation potential were never reassessed in 19% of responding homes and fewer than five facilities reassessed residents of maintenance status. Of the 32 responding homes, 47% did not make referrals to inpatient rehabilitation units for residents considered maintenance or for those residents identified as clear rehabilitation potential.
4.2.1.3 Individualized rehabilitation treatment plan

Of the responding homes, 25% provided care for the majority of their residents (81–100%) who were considered clear rehabilitation potential and maintenance by following individualized treatment plans. Individualized treatment plans were implemented for fewer than 20% of residents in 17 of 32 facilities (53%) for those with clear rehabilitation potential, 10 of 32 facilities (31%) for those maintaining function and 23 of 32 (71%) for palliative residents. At the time of development of resident care plans, 28 of 32 facilities (88%) indicated that factors such as resident activity, resident needs, resident goals and family/caregiver support were all taken into account. Respondents were asked to describe ways in which the needs of residents were being addressed at their facility. All responses are displayed in Appendix E.

4.2.1.4 Use of interprofessional care teams

Interprofessional care teams were implemented for the majority of residents with clear rehabilitation potential (81–100% of residents) in 11 of 32 facilities (34%) compared with 10 of 32 (31%) for palliative residents and 13 of 32 (41%) for those residents classified as preserving function. In 47% of responding homes (15 of 32), fewer than 20% of residents considered clear rehabilitation potential were treated with an interprofessional care team. The three most common members of an interprofessional care team were nurses (100%), physiotherapists (97%) and physicians (90%). Psychologists were included as members of the care team in four of 32 facilities (13%). Findings are displayed in Figure 3.
4.2.1.5 Stroke expertise

Sixteen of 32 facilities (50%) indicated that 20% or fewer of care staff had expertise in stroke care as reported by the survey respondent.

4.2.1.6 Use of stroke care resources

As reported by survey respondents (i.e. Director of Care or Administrator of home) responding facilities indicated the use of best practice guidelines ‘often’ or ‘always’ in 41% of homes (13 of 32) and ‘rarely’ or ‘never used’ in 59% of homes. The Tips and Tools resource of the Heart and Stroke Foundation of Ontario was indicated as being used ‘often to always’ in 41% of responding homes and ‘rarely to never’ in 41% of homes. Six homes reported they were unaware of the resource.
4.2.1.7 Palliative expertise

Survey respondents reported a high proportion of care staff (81 to 100%) as having expertise in palliative care for 31% of responding homes (10 of 32) as reported by the survey respondent. In contrast, 14 of 32 facilities (44%) reported that fewer than 40% of care staff had expertise related to palliative care. The three most commonly carried out care components for residents defined as palliative were: the documentation of goals and advanced directives (97%), the control of physical symptoms to ensure maximum comfort for the resident (94%), and maintained communication with the resident (87%). The proportion of institutions who implemented other palliative care components are displayed in Table 7.

Table 7. Palliative care components regularly addressed by care staff in responding long-term care facilities in Ontario (n=32)

<table>
<thead>
<tr>
<th>Palliative care components</th>
<th>Proportion of LTC Facilities (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documented goals of care and advance directives</td>
<td>97</td>
</tr>
<tr>
<td>Control of physical symptoms to ensure maximum comfort for the resident</td>
<td>94</td>
</tr>
<tr>
<td>Communication is maintained with the individual throughout the course of illness</td>
<td>87</td>
</tr>
<tr>
<td>Psychosocial needs of the resident and family/caregiver(s) are met (e.g. grief counseling)</td>
<td>74</td>
</tr>
<tr>
<td>Palliative care conversations are initiated with the family/caregiver(s) early in the process</td>
<td>71</td>
</tr>
<tr>
<td>Palliative care planning is carried out early in the resident's progression of a debilitating disease</td>
<td>58</td>
</tr>
<tr>
<td>Palliative care conversations are initiated with the resident early in the process</td>
<td>58</td>
</tr>
</tbody>
</table>
4.2.1.8 Definition of Clear Rehabilitation Potential

Survey responders were also asked to define the term “clear rehabilitation potential” as used commonly used within their facility. There was variability in the definitions used among the 32 responding homes. Many homes referred to some aspect of physical functioning within their definition. The desire and willingness of the resident to participate in rehabilitation was explicitly mentioned by five responding homes. All responses are presented in Appendix F.

4.2.2 Findings for Objective #2

To define and describe three resident populations living with stroke in selected long-term care facilities in Ontario

Residents living with stroke from responding long-term care institutions were classified into one of three categories to characterize residents according to rehabilitation potential:

1. those residents with stroke who were identified as having clear rehabilitation potential,
2. those without demonstrated potential to improve functional outcomes and whose goal is to preserve current functional status,
3. those identified as palliative,

Residents from responding institutions were identified as having clear rehabilitation potential definition defined using the RAI-MDS Resident Assessment Protocol (RAP) algorithm from the RAI-MDS 2.0 Specifications Manual.39

4.2.2.1 Cohort description

Following the linkage of patient records from CIHI DAD and the CCRS, 49,131 patients were identified as having a most responsible diagnosis of stroke and admitted to long-term care within the study period of April 1, 2007 to March 31, 2010. Applying the exclusion criteria of those with previous stroke (n= 6,965 excluded), those residents previously admitted to LTC (n= 3,107 excluded), there were 3,426 patients linked to CCRS with a record having an admission to long-term care on or following hospital discharge date. Residents were further excluded if they had no RAI-MDS assessments within 200 days (n=1,036 excluded) or if they had fewer than two assessments within 200 days of admission to long-term care (n= 799). Fewer then 10 patients were identified as palliative or maintenance. Residents were then identified from responding
institutions (n= 178 from 32 institutions) and compared with residents from non-responding institutions (n=1,406 from all other institutions reporting to the CCRS).

The median age of our cohort of residents (n=178) from responding homes was 82 years, 65% were female and 24% lived alone prior to admission to long-term care. Residents in responding homes were similar to residents living in non-responding homes (n=1,406) on measures of baseline ADL function, amount of therapy provided, cognitive performance scale, age or socioeconomic status (SES). Residents from the 32 responding homes (n=178) tended to score (1) lower on the Depression Rating Scale (DRS) at baseline (p=0.01), (2) lower on CHESS scores at baseline, indicating fewer complexities of care (0.04) and (3) an increased number of discrete medications in the one year prior to cohort entry date (p=0.01). For residents in responding facilities the range of the number of medications prescribed in the one year prior to assessment was one to 43. Demographic and baseline characteristics of residents living in responding institutions are reported in Table 8.

![Figure 4. Selection of the cohort including exclusions over the study period.](image-url)
Table 8. Baseline characteristics of residents living with stroke in responding and non-responding long-term care facilities

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Responding Institutions (N=178)</th>
<th>Non-responding Institutions (N=1,406)</th>
<th>p-value</th>
<th>Need/Supply Analysis (N=221)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>82 (77 – 87)</td>
<td>82 (76 – 87)</td>
<td>0.61</td>
<td>81 (77-87)</td>
</tr>
<tr>
<td><strong>Male (%)</strong></td>
<td>35</td>
<td>41</td>
<td>0.13</td>
<td>38</td>
</tr>
<tr>
<td><strong>Income Quintile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>47 (27)</td>
<td>349 (25)</td>
<td>0.95</td>
<td>57 (26)</td>
</tr>
<tr>
<td>2</td>
<td>35 (20)</td>
<td>311 (22)</td>
<td></td>
<td>43 (19)</td>
</tr>
<tr>
<td>3</td>
<td>36 (20)</td>
<td>287 (20)</td>
<td></td>
<td>45 (20)</td>
</tr>
<tr>
<td>4</td>
<td>30 (17)</td>
<td>234 (17)</td>
<td></td>
<td>37 (17)</td>
</tr>
<tr>
<td>5</td>
<td>29 (16)</td>
<td>221 (16)</td>
<td></td>
<td>39 (18)</td>
</tr>
<tr>
<td><strong>CHESS Score (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>154 (86.5)</td>
<td>1,123 (80)</td>
<td>0.04</td>
<td>186 (84)</td>
</tr>
<tr>
<td>1+</td>
<td>24 (13.5)</td>
<td>283 (20)</td>
<td></td>
<td>16 (16)</td>
</tr>
<tr>
<td><strong>Physical therapy time (mins)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>33.87 ± 42.55</td>
<td>30.58 ± 49.61</td>
<td>0.40</td>
<td>43.61 ± 52.56</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>30 (0-45)</td>
<td>25 (0-45)</td>
<td>0.30</td>
<td>30 (0-50)</td>
</tr>
<tr>
<td><strong>Number of prescription drugs in previous year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>13.77 ± 7.33</td>
<td>12.48 ± 7.49</td>
<td>0.04</td>
<td>13.42 ± 7.22</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>13 (9-18)</td>
<td>12 (7-16)</td>
<td>0.01</td>
<td>13 (8-18)</td>
</tr>
<tr>
<td><strong>Depression Rating Scale (DRS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.21 ± 1.76</td>
<td>1.63 ± 2.16</td>
<td>0.01</td>
<td>1.26 ± 1.68</td>
</tr>
<tr>
<td><strong>ADL Long Form</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>15.62 ± 8.66</td>
<td>16.13 ± 8.35</td>
<td>0.45</td>
<td>15.49 ± 9.89</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>17 (9 - 24)</td>
<td>18 (10 – 23)</td>
<td>0.51</td>
<td>16 (9-23)</td>
</tr>
<tr>
<td><strong>ADL Short Form</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>8.61 ± 4.69</td>
<td>8.85 ± 4.74</td>
<td>0.65</td>
<td>8.58 ± 4.55</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>9 (5 – 13)</td>
<td>9 (5 – 13)</td>
<td>0.68</td>
<td>8 (5-13)</td>
</tr>
<tr>
<td><strong>Cognitive Performance Scale (CPS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.23 ± 1.61</td>
<td>2.37 ± 1.64</td>
<td>0.12</td>
<td>3.11 ± 1.98</td>
</tr>
</tbody>
</table>

36
The amount of physical therapy provided was measured using two RAI-MDS variables: a measure of the amount of therapy (in minutes) provided over the 7 days prior to assessment and a measure of the number of days of which therapy was provided within the 7 days prior to assessment. Approximately 55% of residents identified as having clear rehabilitation potential within responding homes did not receive any physical therapy in the 7 days prior to RAI-MDS assessment (Table 9). Further, 99% of residents did not receive any occupational therapy at time of first RAI-MDS assessment.

Table 9. Proportion of residents identified as clear rehabilitation potential who did not receive physical therapy in the seven days prior to assessment as measured by days or minutes.

<table>
<thead>
<tr>
<th>RAI-MDS Measure</th>
<th>Proportion of Residents Not Receiving Physical Therapy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days of therapy (at least 15 minutes per day) in 7 days prior to assessment</td>
<td>First Assessment</td>
</tr>
<tr>
<td></td>
<td>Follow-up Assessment</td>
</tr>
<tr>
<td>Amount of therapy time received over the 7 days prior to assessment less than 30 minutes</td>
<td>First Assessment</td>
</tr>
<tr>
<td></td>
<td>Follow-up Assessment</td>
</tr>
</tbody>
</table>

The distribution of the change in functional status between baseline and follow-up RAI-MDS assessment is displayed in Figure 5. The average change in ADL status for residents with stroke within responding homes was +0.38. The percentage of residents with a change in ADL status of one-point or greater between RAI-MDS assessments was 26.9% (48 residents of 178).
4.2.2.2 Maintenance and palliative subpopulations of residents with stroke in long-term care

Fewer than ten residents meeting the inclusion criteria were classified as palliative or maintenance. Given this, it was not possible to examine secondary outcomes within these subpopulations of residents living with stroke in long-term care.

4.2.2.3 Need/Supply analysis of all residents with first stroke in responding long-term care homes

Within the 32 responding long-term care facilities, 221 residents living with stroke were identified as having a baseline RAI-MDS assessment. The median age of this population was 81 years, 62% female, prescribed 13 medications in the one year prior to assessment, on average, and demonstrating a mean score of 14.9 on the ADL Long Form. The number of residents living
with stroke in the responding homes ranged from fewer than five to 26 with an average of seven residents per facility living with the effects of stroke.

In an attempt to interpret resident need within the responding homes, residents were categorized based on the index score for service comprehensiveness of their home (Table 10). The proportion of all residents with stroke (measured using at least 1 RAI-MDS assessment) in the responding homes provided an average prevalence estimate of 4.7%.

Table 10. The categorization of residents and responding homes according to need (baseline ADL) and supply (service comprehensiveness)

<table>
<thead>
<tr>
<th>Facility-Level Service Comprehensiveness</th>
<th>Low Index Score: 8 to 16 (N_{homes}=9)</th>
<th>Moderate Index Score: 17 to 24 (N_{homes}=12)</th>
<th>High Index Score: 25 to 32 (N_{homes}=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Baseline ADL- Long Form (LF) Score (N_{residents})</td>
<td>14.0 (54)</td>
<td>15.0 (53)</td>
<td>16.4 (114)</td>
</tr>
</tbody>
</table>

4.2.3 Findings for Objective #3

To examine the relationship between the comprehensiveness of available stroke services and change in ADL functional status based on RAI-MDS assessments

4.2.3.1 Unadjusted Model

Linear regression models with random effects were developed to examine the association between resident functional outcome of residents with stroke identified as having clear rehabilitation potential and pre-specified facility characteristics. The crude, unadjusted parameter estimates are presented in Table 11.
Table 11. Unadjusted analysis of model coefficients

<table>
<thead>
<tr>
<th>Measures</th>
<th>Parameter Estimates</th>
<th>SE</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total service comprehensiveness</td>
<td>0.06</td>
<td>0.04</td>
<td>0.09</td>
</tr>
<tr>
<td>Interprofessional teams</td>
<td>0.21</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>Delivery of rehabilitation services</td>
<td>0.21</td>
<td>0.14</td>
<td>0.13</td>
</tr>
<tr>
<td>Expertise in stroke care</td>
<td>0.21</td>
<td>0.20</td>
<td>0.29</td>
</tr>
</tbody>
</table>

The main regression model examined the linear correlation between resident functional status and service comprehensiveness and found there was no significant association between them. Following adjustment for age, sex, baseline ADL score, the Depression Rating Scale score, the Cognitive Performance Scale (CPS) score, number of medications in one year prior to acute care discharge, as well as minutes of physical therapy in seven days prior to baseline assessment, the mean change in ADL status was not significantly associated with the service comprehensiveness score (PE 0.06, SD 0.04, p=0.16) (Figure 6).
Secondary analyses examined the association between resident-level change in functional status and various components of rehabilitation service comprehensiveness as per survey responses. Model 2 explored the association of resident-level change in functional status and interprofessional care provision. Following adjustment for baseline characteristics, no association was found (PE 0.14, SD 0.16, p=0.36). Furthermore, no significant associations were found for the third and fourth models examining change in functional status compared to the delivery of rehabilitation services and expertise in stroke care, respectively. Parameter estimates for all models are displayed below (Table 12).
Table 12. Multilevel linear regression analyses of resident change in functional status

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimates</th>
<th>SE</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total service comprehensiveness</strong></td>
<td>0.06</td>
<td>0.04</td>
<td>0.16</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.01</td>
<td>0.04</td>
<td>0.73</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.50</td>
<td>0.67</td>
<td>0.45</td>
</tr>
<tr>
<td>Baseline ADL</td>
<td>-0.03</td>
<td>0.04</td>
<td>0.39</td>
</tr>
<tr>
<td>Depression Rating Scale</td>
<td>-0.04</td>
<td>0.20</td>
<td>0.86</td>
</tr>
<tr>
<td>Cognitive Performance Scale</td>
<td>0.43</td>
<td>0.27</td>
<td>0.11</td>
</tr>
<tr>
<td>Number of unique drugs</td>
<td>-0.09</td>
<td>0.04</td>
<td>0.05</td>
</tr>
<tr>
<td>Therapy time (minutes)</td>
<td>0.00</td>
<td>0.01</td>
<td>0.98</td>
</tr>
<tr>
<td><strong>Secondary Analyses:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interprofessional care</strong></td>
<td>0.14</td>
<td>0.16</td>
<td>0.36</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.01</td>
<td>0.04</td>
<td>0.76</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.47</td>
<td>0.67</td>
<td>0.48</td>
</tr>
<tr>
<td>Baseline ADL</td>
<td>-0.03</td>
<td>0.04</td>
<td>0.46</td>
</tr>
<tr>
<td>Depression Rating Scale</td>
<td>-0.08</td>
<td>0.20</td>
<td>0.67</td>
</tr>
<tr>
<td>Cognitive Performance Scale</td>
<td>0.48</td>
<td>0.22</td>
<td>0.03</td>
</tr>
<tr>
<td>Number of unique drugs</td>
<td>-0.08</td>
<td>0.04</td>
<td>0.06</td>
</tr>
<tr>
<td>Therapy time (minutes)</td>
<td>0.00</td>
<td>0.01</td>
<td>0.97</td>
</tr>
<tr>
<td><strong>Delivery of rehabilitation services</strong></td>
<td>0.19</td>
<td>0.15</td>
<td>0.21</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.01</td>
<td>0.04</td>
<td>0.78</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.51</td>
<td>0.67</td>
<td>0.44</td>
</tr>
<tr>
<td>Baseline ADL</td>
<td>-0.03</td>
<td>0.04</td>
<td>0.44</td>
</tr>
<tr>
<td>Depression Rating Scale</td>
<td>-0.07</td>
<td>0.20</td>
<td>0.71</td>
</tr>
<tr>
<td>Cognitive Performance Scale</td>
<td>0.49</td>
<td>0.21</td>
<td>0.02</td>
</tr>
<tr>
<td>Number of unique drugs</td>
<td>-0.08</td>
<td>0.04</td>
<td>0.06</td>
</tr>
<tr>
<td>Therapy time (minutes)</td>
<td>0.00</td>
<td>0.01</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>Expertise in Stroke Care</strong></td>
<td>0.19</td>
<td>0.21</td>
<td>0.37</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.02</td>
<td>0.04</td>
<td>0.64</td>
</tr>
<tr>
<td>Sex</td>
<td>-0.49</td>
<td>0.67</td>
<td>0.47</td>
</tr>
<tr>
<td>Baseline ADL</td>
<td>-0.03</td>
<td>0.04</td>
<td>0.45</td>
</tr>
<tr>
<td>Depression Rating Scale</td>
<td>-0.12</td>
<td>0.19</td>
<td>0.53</td>
</tr>
<tr>
<td>Cognitive Performance Scale</td>
<td>0.52</td>
<td>0.21</td>
<td>0.01</td>
</tr>
<tr>
<td>Number of unique drugs</td>
<td>-0.08</td>
<td>0.04</td>
<td>0.06</td>
</tr>
<tr>
<td>Therapy time (minutes)</td>
<td>0.00</td>
<td>0.01</td>
<td>0.98</td>
</tr>
</tbody>
</table>
4.3 Model Assumptions

The final adjusted models were tested for linear regression assumptions using residual plots. The residuals for the main analysis demonstrated good linear distribution (Appendix G). Although the left tail is slightly skewed, the linear assumption does hold.
Chapter 5
Discussion

5.1 Major Findings

5.1.1 What types of stroke-specific services are available to residents living with stroke in Ontario-based long-term care facilities?

This research is among the first to attempt to explore and quantify the provision of rehabilitation services for residents living with stroke in long-term care in Ontario. This study highlighted several important findings related to the availability of the provision and delivery of rehabilitation services for residents with stroke in long-term care:

1. There was variability among homes regarding the provision of rehabilitation services based on the wide range found on the index score for service comprehensiveness (homes scored between 8 and 34 on the 34-point scale).
2. Only one quarter of responding homes treated the majority of their residents (81 – 100%) with individualized treatment plans.
3. Of the responding homes only 50% reported the consistent reassessment of residents with clear rehabilitation potential for inpatient rehabilitation programs.
4. The Canadian Best Practice Recommendations for Stroke Care were rarely or never used in 59% of responding homes.

Based on our findings, it appears that mental health services are not widely available to residents living with stroke in long-term care homes in Ontario, which may not be surprising given the small amount of expenditures allowable through the Program and Support Services (PSS) funding envelope which was $7.12 per resident in 2007. While just over half of our responding homes indicated that psychotherapy was an applicable service for residents in their home, only 13% of homes indicated the presence of a psychologist as a team member on the interprofessional care team. Given that individuals are susceptible to depression post-stroke, and that depression within the elderly population is common, mental health support services should be regularly provided to long-term care residents. A publication from the Canadian Institute for Health Information reported that in a sample of nearly 50,000 elderly Canadians living in residential care facilities such as long-term care, nearly half (44%) had a diagnosis or symptoms of depression. Cognitive impairment has also been shown to be common among residents in long-term care homes. In the present study, cognitive impairment was the only covariate significantly associated with the outcome variable, change in functional outcome.
Increased cognitive impairment may be indicative of declined functional abilities within this population.

The reassessment and referral of long-term care residents to inpatient stroke rehabilitation programs is an area of concern. The Stroke Evaluation Advisory Committee reported a decrease in referrals to inpatient rehabilitation from long-term care from 2% of accepted patients in 2003-2004 to 1.1% in 2007-2008. Although long-term residents may have more significant functional and cognitive deficits, there is growing evidence that patients recovering from severe stroke with pronounced deficits can benefit from inpatient and outpatient rehabilitation services.

5.1.2 How can we describe the resident populations living with stroke in long-term care facilities in Ontario?

The description of residents living with stroke in long-term care is novel. In this study, the majority of residents meeting the inclusion criteria were identified as clear rehabilitation potential as measured using the Resident Assessment Protocol (RAP) definition. There was interest in this patient population to examine the relationship between service comprehensiveness and change in functional outcome as it was expected that any resident labeled as having rehabilitation potential would have access to restorative care services and may be motivated to maintain their level of functioning.

Fewer than 10 residents in our cohort were identified as palliative or maintenance. This is comparable to the numbers of palliative patients identified for fiscal year 2007-2008 in the Stroke Evaluation Advisory Committee Annual Report as the percentage of all stroke patients identified as Palliative Care (not limited to long-term care residents) was 0.3% of stroke patients discharged from acute care. Initially, the analytic plan included further analyses involving residents who were defined as palliative or maintenance and attempting to identify the rate of avoidable readmission to hospital or Emergency Department (ED); however, given the low numbers, these analyses lacked power to detect differences.
5.1.3 What is the relationship between facility-level service comprehensiveness and resident-level changes in ADL functional status for residents living in long-term care with rehabilitation potential following stroke?

The relationship between facility-level service comprehensiveness and change in resident functional outcome has not been studied. There was no statistically significant association found between the service comprehensiveness and resident functional outcome. While there may be factors and limited power confounding the true relationship, this study did highlight the limited scope of rehabilitation services in Ontario-based homes. It also demonstrated the lack of measurable functional improvement found in this patient population.

This investigation was a novel approach to quantify service comprehensiveness as it relates to the provision of services to residents with stroke in long-term care. It was felt that an interpretable finding could express the magnitude of ADL change for residents with stroke as it correlates to one unit change in service comprehensiveness.

According to Carpenter and colleagues, a change in one point on the ADL scale denotes a clinically meaningful change. In our study, the average change in ADL status between baseline and follow up assessment in the residents from responding long-term care homes (n=178) was +0.38, with 26.9% of residents in our sample achieving a change of greater than 1 point on the ADL scale. In the current sample of long-term care residents with stroke, regardless of service comprehensiveness, clinically meaningful improvements in functional outcomes were not reached. It is worth noting that recent changes to long-term care legislation may enhance the provision of rehabilitation care within the long-term care setting in Ontario, but it remains to be seen to what extent it may improve quality of care. In July 2010, the *Long-Term Care Homes Act, 2007* came into effect. This legislation reinforced the responsibility of long-term care homes to provide care that meets the holistic needs of the resident – including physical, psychological, social, spiritual and cultural. This legislation incorporates rights of the resident for various components of care, including provision of care with use of care plans and appropriate staffing which may help improve functional outcome following admission to long-term care.
5.1.4 What, if any, are the opportunities for improvement in quality of care of residents living with stroke in long-term care that would promote functional recovery and reintegration?

The findings of the current study provide an opportunity to identify areas for improvement and enhanced quality of care for residents living with stroke in long-term care. No formal evaluation strategy was employed in this analysis as our objective was to describe this resident population and to highlight gaps in provision and delivery of services in this care setting.

The important findings highlight the limited scope and intensity of rehabilitation activities in long-term care homes. According to the RAI-MDS data, more than 55% of 178 residents in Ontario were without any physical therapy in the seven days prior to initial assessment and 68% at time of follow-up assessment. Evidence has demonstrated that early mobilization led to improved functional outcomes following stroke. While this is accepted for individuals in acute care and inpatient rehabilitation programs and documented within best practice guidelines for those specific patient populations, fewer investigations have explored the potential gains that can be made for residents in long-term care following stroke. In a cohort of residents identified as having clear rehabilitation potential, this appears low; however, this seems to be comparable with provision of therapy to this patient population in other jurisdictions and is in line with the amount of funding available through the physiotherapy fee models. While not restricted to residents with stroke, a qualitative investigation of rehabilitation in nursing homes by Huijben-Schoenmakers and colleagues found that 80% of time for the residents in their study was spent in non-therapeutic activities.

The lack of intensity and frequency of physical therapy in this patient population may be indicative of the expectations and rehabilitation goals of long-term care residents. Residents in long-term care are not often expected to improve functional outcome, but rather, the aim is to slow the rate of decline in functional status and quality of life. Oftentimes, resident live with comorbid conditions which inhibit rehabilitation such as depressive symptoms which may reflect in an unwillingness to participate in rehabilitation service. Residents in long-term care may benefit more from rehabilitation programs if the focus of treatment is redefined to one of well-being instead of recovery of function.
5.2 Strengths

Several strengths of this project are related to the robust methods used for survey development and collection. Rigorous methodology was employed to develop the index score for service comprehensiveness:

- The approach to survey distribution and collection was systematic and comprehensive
- With the input and expertise from a subcommittee dedicated to long term care and community engagement, it was felt that our survey addressed all important aspects of rehabilitation service provision to this population.
- Survey questions included several components of rehabilitation provision and delivery of care considered important for stroke care based on expert opinion and with reference to the Canadian Best Practices for Stroke Care and resources from the Heart and Stroke Foundation of Ontario.
- The use of the RAI-MDS Resident Assessment Protocol definition provided an objective approach to identification of residents as having clear rehabilitation potential.

Although the facility sample included early adopters of the RAI-MDS assessment tool, the service comprehensiveness index score was evenly distributed (index scores ranged from ‘8’ to ‘34’) across responding homes and representative of all designations of home operators (i.e. for-profit, not-for-profit, charitable and municipal).

5.3 Limitations

Several limitations of this study merit emphasis. First, observational research is, by definition, subject to issues of confounding. The issue of confounding can be addressed in several ways, including matching techniques or the comparison to a reference population, neither of which was employed in this analysis. For non-responding institutions, there was no way to measure service comprehensiveness, so residents were not able to serve as controls for this population.

The threat of selection bias is also a common concern when conducting observational research. The responding institutions may be categorically different than those facilities that did not respond to the survey. In this analysis, it was addressed with a comparison of the baseline characteristics between residents in responding and non-responding institutions and, while there were no significant differences on baseline characteristics (Table 11), the groups differed
significantly on the CHESS score, the number of drugs prescribed in one year prior to initial RAI-MDS assessment, as well as on the Depression Rating Scale. It is unclear to what extent differences between the residents in responding versus non-responding homes may affect the change in functional outcome. It is worth noting, however, that the residents in responding homes reported similar baseline ADL scores as compared with residents from non-responding homes. For example, it has been reported that only scores of three or higher on the DRS are indicative of a diagnosis of depression and the mean DRS scores for residents in both the responding and non-responding facilities was less than two suggesting that while the groups did differ significantly, the average resident score indicated symptoms of depression below a diagnostic threshold.

The complexity of care for residents weighs heavily on the ability of care staff to provide appropriate rehabilitation services for residents. Further, the ability of home operators to provide appropriate rehabilitation services is largely dependent on the subsidy support from the Ministry of Health and Long Term Care.

It is impossible to account for resident motivation, which plays an important role in the success of rehabilitation. Related to this, the validity of the variables used to define the dependent variable is unknown. It is possible that the period between measures of ADL functional status may not be long enough to capture true change in status; however, it has been shown that the greatest recovery following a stroke event occurs within the first 90 days.55

Another limitation of the study is the validity of the documentation of the RAI-MDS within the Ontario long-term care setting. With recent implementation of the RAI-MDS assessments in Ontario homes, it has not yet been possible to adequately measure the data quality. Further, the reliability of the survey was not possible to address. While the scores for service comprehensiveness were normally distributed ranging from ‘8’ to ‘34’ (highest possible score), it is not possible to determine the accuracy of response from survey participants.

Finally, due to the trajectory of care for stroke patients across the care continuum (e.g. transition from acute to rehabilitation or CCC before admission to LTC), patients were allowed to enter long-term care within 90 days of discharge for acute stroke. Given the age and comorbid conditions of many individuals entering long-term care, it is possible that maximum functional recovery had been reached prior to admission to long-term care for some residents. Any change in functional status which occurred prior to admission to long-term care would not be captured within the RAI-MDS. The analysis did not account for different trajectories of care or interim care services provided between acute care discharge and LTC admission within 90 days.
5.4 Future Research

This exploratory study highlighted preliminary findings regarding the availability of services for residents with stroke in long-term care. Further, it uncovered a lack of mental health and physical therapy resources for elderly residents. Future research should formally assess gaps in quality of care through the use of structured interviews or a more in-depth examination of the RAI-MDS data using global health status measures. The aim of this project was to explore the long-term care environment and offer insight into opportunities for improving the quality of care for residents living with stroke. From these findings it is clear that it is difficult for long-term care operators to provide appropriate rehabilitation services to their residents based on the funding allocation for such services. It is possible that programming for residents is focused on quality of life, which was not assessed in this analysis.

5.5 Policy Implications

As the Canadian population ages, long-term care residents may be more motivated to remain independent. The ability to maintain independence in self-care has been reported as one of the most important resident outcomes (Li et al. 2010). Policy makers need to assess the provision of care and service delivery for residents with chronic and disabling conditions in long-term care. The recent Canadian Best Practices Recommendations for Stroke Care\(^2\) from the Canadian Stroke Strategy recommended that stroke patients should be followed up by a primary care provider to address ongoing rehabilitation needs and to continue treatment of comorbidities. If residents are not given the opportunity to recover function following stroke (or any other disabling chronic condition), the system is failing this population. Given the restrictions on funding allocation for programs and services, it is felt that the funding envelopes for long-term care should be reviewed and reconsidered annually to ensure it meets the needs of Ontario residents.

Our findings have implications for the health and quality of care for residents in long-term care as they highlight the limited scope of services such as physical therapy and mental health resources. There may be ways to improve the provision and delivery of therapy to ensure residents with stroke and other chronic conditions which may limit functioning are given the best chance to recover and improve their functional and global health status. Some options to expand programming may involve collaboration of long-term care advocates with inpatient rehabilitation programs to ensure individuals receive inpatient rehabilitation prior to admission to long-term care. Incentive-based programs – in partnership with the MOHLTC - for the provision of
rehabilitation services within long-term care may help to ensure that residents are receiving appropriate rehabilitation services.

5.6 Conclusions

There was no significant association found between facility-level service comprehensiveness and the change in functional status for residents living in long-term care with stroke in Ontario. Further, marginal improvements in functional status were shown for a subpopulation of residents with stroke defined as having clear rehabilitation potential on follow-up assessments of function. There are gaps in provision of service to this subpopulation, as more than 55% of residents identified as having clear rehabilitation potential did not receive any physical therapy in the 7 days prior to baseline assessment. Since funding allocation for rehabilitation services severely hinders the ability for long-term care homes to provide appropriate levels of service to residents, government policies should be continually reviewed to ensure they meet resident care needs. For example, it has been reported that the number of residents aged 65 years and older who reached or exceeded their annual service maximum increased from 22,693 in 2007 to 31,610 in 2008. Although there are numerous competing factors related to provision of rehabilitation services in the long-term care setting including the restrictions imposed by the funding model for physiotherapy services, decision-makers should ensure that long-term care residents are adequately supported to promote independence for as long as possible.
Reference List


12. Physiotherapy Services Committee of the Ministry of Health and Long-Term Care (2010, April) Utilization & Trend Analysis of Physiotherapy Services: Fiscal Year 2008/09 [PowerPoint slides]. Presented at the Physiotherapy Services Committee of the Ministry of Health and Long-Term Care Meeting.

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(39) Canadian Institute for Health Information. CCRS RAI-MDS 2.0© Output Specifications, 2009. Ottawa, Ontario, CIHI.


Appendix A. Letter of participation to long-term care home Administrators or Directors of Care

Request to Participate in a Research Project:
Stroke-related Services in LTC Homes

<date>
«Prefix» «FirstName» «LastName»
«Title»
«Organization»
«Address»
«City», «Province» «Post_Code»
«Business_Telephone»

Dear «Prefix» «LastName»:

We are conducting a study to find out how stroke-related services are provided to residents living with stroke at Ontario Long-Term Care (LTC) Homes. Our survey will ask questions about your home’s services for residents living with stroke, including how those services are delivered, as well as questions pertaining to palliative care for this resident population. The questions we are asking you to complete have been developed in collaboration with clinicians and administrators from the Heart and Stroke Foundation of Ontario.

The title of our research project is: Stroke Services in Ontario-based Long-term Care Facilities: Assessing service comprehensiveness, patient-level rehabilitation therapy and resident outcome. This research is sponsored by Heart and Stroke Foundation of Ontario, as well as the Canadian Institute for Health Research.

As you may know, stroke is the leading cause of long-term disability in Canada. Current estimates suggest there are about 300,000 people in Canada living with the effects of stroke, and approximately 60% of these survivors will require some amount of rehabilitation, regardless of their living arrangements following acute hospital discharge. Many residents of LTC homes are living with the effects caused by a stroke event, yet little is known about the availability of services for this resident population in LTC. Our goal is to find out and report on what services are available for residents with stroke in Ontario-based LTC homes and how care is delivered to this resident population.

We invite you to participate in a short, electronic survey to help us better understand the services and resources available to residents living in long term care with the effects of stroke.

If you agree to participate in the study and complete and return the attached survey, our study team will compile your responses alongside those of other respondents and return to you a clear one-page summary of your Home’s results in comparison to those of other study Homes. In addition to providing this feedback to your organization we will prepare lay summary and scholarly publications of the overall results. In these latter publications we will not include any information that could be used to identify any one LTC Home.

Your participation in the research is voluntary, you may refuse to participate or may withdraw from the study at any time. You do not have to answer any/all questions included in the survey. We estimate that it will take you about 20-25 minutes to respond to the enclosed survey.

Completing and returning the survey form is an indication of consent to participate in this study. We request that you complete and return the survey within two weeks of receiving this package. Please retain this letter for your records.
We prefer that you complete this survey online by opening your web-browser to the following link and typing in your username and password. The online survey is identical to the paper-based version and allows you to save your responses and continue at a later time.

Survey Site: https://www.xxx.xxx/LTCHomeQualitySurvey.xxx>
Username : <LTCID>
Password : <secure generated password>

Your participation is greatly appreciated and is invaluable to meeting the study’s objectives. The completeness and accuracy of survey responses will affect the validity of the study findings. If you have any questions regarding the survey, or would like to complete this survey via paper or telephone rather than electronically, please feel free to contact the study co-Principal Investigator for this study, Chelsea Hellings at (647) 500-5380 or chelsea@canadianstrokenetwork.ca

We would like you to understand that this research has been reviewed and approved by the University of Toronto Research Ethics Office. The study will thereby comply with all human subjects research protocols. Confidentiality will be ensured at all points in the study, the data will be maintained in a secure environment and will be destroyed after the study is complete. Only anonymized results will be made publicly available. We note that you waive no legal rights by participating in this research and that confidentiality can only be guaranteed to the extent permitted by law. If you have any questions or concerns about your rights as a subject in this research please contact Jill Parsons, Research Ethics Officer, Health Sciences jc.parsons@utoronto.ca or 416-946-5806.

Thank you for your consideration of this request.

Sincerely,

Chelsea Hellings, B.Sc. (H), M.Sc. (C)

Co-Principal investigator(s):
Walter Wodchis, PhD, University of Toronto
Patrice Lindsay, PhD, University of Toronto
Appendix B. Electronic survey tool administered to long-term care home Administrators or Directors of Care

Note to Respondents: When completing the following questions, please think back carefully to services and programs available to residents of your facility over the course of the last two fiscal years (April 2007- March 2009)

Facility Name: 
Designation: 
Current number of beds in your facility: 
Current number of residents living with stroke: 
Number of residents having experienced the stroke event since admission to your facility: 

1. Throughout the survey, we ask about specific residents populations. We understand that there are many definitions for residents with clear rehabilitation potential and ask that you tell us how it is you are defining “clear rehabilitation potential”. There is no “right” or “wrong” answer, we simply need to know how you define it for comparison purpose [open-ended response to define “clear rehabilitation potential”]

2. Please indicate how rehabilitation services are delivered to residents at your facility:

<table>
<thead>
<tr>
<th>Rehabilitation Service</th>
<th>Employee of LTC Home</th>
<th>Contracted Provider</th>
<th>Community Care Access Centre (CCAC)</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational Therapy (OT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiotherapy (PT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech Language Pathology (SLP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietetics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Work</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation/ Activation Therapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehabilitation Assistant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychotherapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. What percentage of stroke residents use community-based rehabilitation resources (e.g. ambulatory/ outpatient, CCAC)?
- 0
- ≤20
- 21-40
- 41-60
- 61- 80
3(b). Please check all services that residents at your facility use:
- Ambulatory / outpatient
- CCAC
- None of these
- Other (please specify): _

4. What percentage of residents living with stroke have an individualized rehabilitation treatment plan that is implemented:

<table>
<thead>
<tr>
<th>Category</th>
<th>0</th>
<th>≤ 20%</th>
<th>21-40%</th>
<th>41-60%</th>
<th>61-80%</th>
<th>81-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents with clear rehabilitation potential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents identified as palliative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents preserving functional ability (No clear rehab potential, but not palliative at this point in time)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Please share with us how your facility addresses the needs of residents with stroke (e.g. therapy provision)

6(a). What percentage of resident rehabilitation treatment plans for residents with stroke are decided upon in collaboration with an interdisciplinary care team?

<table>
<thead>
<tr>
<th>Category</th>
<th>0</th>
<th>≤ 20%</th>
<th>21-40%</th>
<th>41-60%</th>
<th>61-80%</th>
<th>81-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents with clear rehabilitation potential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents identified as palliative</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Residents preserving functional ability (No clear rehab potential, but not palliative at this point in time)</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

6(b). Specifically, which of the following care providers are routinely included as part of the interdisciplinary care team for stroke residents?
- Physician
- Nurse
- Physical therapist
- Occupational therapist
- Speech language pathologist
6(c). When creating rehabilitation treatment plans for stroke residents, which of the following factors are taken into account:

☐ Resident severity
☐ Needs of resident
☐ Resident goals
☐ Family/ caregiver support
☐ All of the above
☐ None of the above

7(a). What percentage of residents are re-assessed for rehabilitation potential at resident care planning meetings?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>≤ 20%</th>
<th>21- 40%</th>
<th>41- 60%</th>
<th>61- 80%</th>
<th>81- 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents with clear rehabilitation potential</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<tr>
<td>Residents preserving functional ability (No clear rehab potential, but not palliative at this point in time)</td>
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</table>

7(b). Of those residents with stroke who were re-assessed for inpatient rehabilitation potential, what percentage are re-referred to an inpatient rehabilitation program?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>≤ 20%</th>
<th>21- 40%</th>
<th>41- 60%</th>
<th>61- 80%</th>
<th>81- 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents with clear rehabilitation potential</td>
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<td></td>
</tr>
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</tr>
</tbody>
</table>
7(c). What percentage of those residents living with stroke who are re-referred are admitted to an inpatient rehabilitation program?

- 0
- ≤20
- 21-40
- 41-60
- 61-80
- 81-100

8. For each of the following care components, which are regularly addressed by your staff:

- Psychosocial needs (e.g. depression, anxiety)
- Facilitation of communication for those with communicative impairment
- Supported participation in leisure activities of the resident’s choice
- Mobility and skin care
- Routine Activities of Daily Living
- Meal assistance and hydration
- Bladder retraining for those with bladder dysfunction
- Individualized care plan for modification of risk factors
- Cueing techniques applied when required
- Positioning techniques applied when required
- Cognitive and perceptual problems

9(a). What percentage of staff at your facility who work with palliative residents have expertise in palliative care?

- 0
- ≤20
- 21-40
- 41-60
- 61-80
- 81-100

9(b). For each of the following care components, which are regularly addressed by your staff when dealing with residents that are palliative due to effects of stroke:

- Palliative care planning is carried out early in the patient’s progression of a debilitating illness
- Palliative care conversations are initiated with the patient early in the process
• Palliative care conversations are initiated with the family/caregiver(s) early in the process
• Documented patients’ goals of care and advance directives
• Control of physical symptoms to ensure maximum comfort for patient
• Communication is maintained with the patient throughout course of illness
• Psychosocial needs of the patient and family/caregiver(s) are met (e.g. grief counseling)

10. What percentage of care staff at your facility have expertise specific to stroke care?
   - 0
   - ≤20
   - 21-40
   - 41-60
   - 61-80
   - 81-100

11(a). How often is care for residents with stroke provided with reference to available evidence-based, best practice guidelines (such as the Canadian Stroke Strategy Best Practice Recommendations for Stroke Care)?
   - Never
   - Rarely
   - Often

11(b). Are staff members at your facility familiar with the Canadian Stroke Strategy Best Practice Recommendations for Stroke Care?
   - Yes
   - No
   Additional comments:

12. Tips and guidelines for stroke-related care are available in a resource from the Heart and Stroke Foundation of Ontario, “Tip and Tools for Everyday Living: A Guide for Stroke Caregivers”. At your facility, to what degree is this resource used in caring for residents with stroke?
   - Tips and Tools is always used for stroke resident care
   - Tips and Tools is sometimes used for stroke resident care
   - Tips and Tools is rarely used for stroke resident care
   - Tips and Tools is never used for stroke resident care
   - Not aware of this resource
   Comments:
Appendix C: Graphical depiction of study timeline

Accrual Window

Look-back Window
5 years

Observation Window:
April 1, 2007 to March 31, 2010

Max Follow-up Date:
March 31, 2010

Accrual Start/End Dates: April 01, 2007 to September 18, 2009

Max Follow-up Date (second assessment): March 31, 2010

<table>
<thead>
<tr>
<th>ADL—Functional Rehabilitation Potential RAP</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valid Values</strong></td>
<td></td>
</tr>
<tr>
<td>0 = RAP not triggered</td>
<td></td>
</tr>
<tr>
<td>1 = RAP is triggered</td>
<td></td>
</tr>
<tr>
<td><strong>Data Elements and Corresponding Valid Values</strong></td>
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</tr>
<tr>
<td>G1aA – Bed Mobility – Not Independent</td>
<td>0, 1, 2, 3, 4, 8</td>
</tr>
<tr>
<td>G1bA – Transfer – Not Independent</td>
<td>0, 1, 2, 3, 4, 8</td>
</tr>
<tr>
<td>G1cA – Walk in Room – Not Independent</td>
<td>0, 1, 2, 3, 4, 8</td>
</tr>
<tr>
<td>G1dA – Walk in Corridor - Not Independent</td>
<td>0, 1, 2, 3, 4, 8</td>
</tr>
<tr>
<td>G1eA – Locomotion on Unit - Not Independent</td>
<td>0, 1, 2, 3, 4, 8</td>
</tr>
<tr>
<td>G1fA – Locomotion off Unit - Not Independent</td>
<td>0, 1, 2, 3, 4, 8</td>
</tr>
<tr>
<td>G1gA – Dressing - Not Independent</td>
<td>0, 1, 2, 3, 4, 8</td>
</tr>
<tr>
<td>G1hA – Eating - Not Independent</td>
<td>0, 1, 2, 3, 4, 8</td>
</tr>
<tr>
<td>G1iA – Toilet Use - Not Independent</td>
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<tr>
<td>G1jA – Personal Hygiene - Not Independent</td>
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<tr>
<td>G2A – Bathing - Not Independent</td>
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<tr>
<td>G8a - Resident Believes He/She Capable of Increased Independence in at Least Some ADLs</td>
<td>0, 1</td>
</tr>
<tr>
<td>G8b - Staff Believe He/She Capable of Increased Independence in at Least Some ADLs</td>
<td>0, 1</td>
</tr>
<tr>
<td><strong>Prerequisite Calculations</strong></td>
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<tr>
<td>B4 No Ability to Make Decisions</td>
<td>0, 1, 2, 3, 4, 8</td>
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<tr>
<td><strong>Logic</strong></td>
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<td><em>{Temporary Variables}</em></td>
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<tr>
<td><strong>Trigger A: Rehabilitation</strong></td>
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<tr>
<td>ADL_Trigger_A = 1 ELSE</td>
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</tr>
<tr>
<td>ADL_Trigger_A = 0</td>
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</tr>
<tr>
<td>END IF</td>
<td></td>
</tr>
<tr>
<td><strong>Trigger B: Maintenance</strong></td>
<td></td>
</tr>
<tr>
<td>IF B4 = 3 THEN</td>
<td></td>
</tr>
<tr>
<td>ADL_Trigger_B = 1 ELSE</td>
<td></td>
</tr>
<tr>
<td>ADL_Trigger_B = 0</td>
<td></td>
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<td>END IF</td>
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<tr>
<td><strong>{Computation of Output}</strong></td>
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<tr>
<td><strong>ADL—Function Rehabilitation Potential RAP:</strong></td>
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<tr>
<td>IF ADL_Trigger_A = 1 OR ADL_Trigger_B = 1 THEN</td>
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</tr>
<tr>
<td>ADL_RAP_cc = 1 ELSE</td>
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</tr>
<tr>
<td>ADL_RAP_cc = 0</td>
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<tr>
<td>END IF</td>
<td></td>
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</tbody>
</table>
Appendix E. Responses from long-term care facilities regarding ways in which the needs of residents are regularly addressed

How are the needs of residents addressed?

Physiotherapy is initiated as well as a nursing rehab care plan, restorative feeding, activation rehabilitation

Physiotherapy three times a week.

Monthly occupational therapy.

Weekly conferences with social services and more often if requested by resident or if identified as a need by staff.

Immediate referrals to physiotherapy, dietician, restorative care, activation supervisor for assessment.

Neurogym equipment.

Physiotherapy programs.

Physiotherapy and RHA to assist with exercise programs.

Referral to physiotherapy, on site access to occupational therapy through CCC or private.

Physiotherapy assessment, treatment plan, reassessment on quarterly basis, individual therapy twice a week and daily fun and fitness.

Therapy provided by outside physiotherapy firm (contract), restorative care provided by our own staff: nursing, PSW and restoration programs.

Restorative therapy, physiotherapy and occupational therapy.

Most treatment is basic. Physiotherapy assessment and plan of care continued by rehab assistant, but very little occupational therapy, speech therapy etc.

Therapy provided by contract therapy and in-house training of care workers.

Assistive devices, physiotherapy assessment and exercise plan, nursing, restorative care.

Physiotherapy, occupational therapy, nursing assessment, MD, plan of care, family input.

RN/RPN will identify the residents who have the needs and refer to occupational therapy and physiotherapy for assessment and consider for appropriate restorative program.

We provide a variety of treatments, for example: paraffin wax, ultrasound therapy, hot and cold therapy, cognitive retraining (computerized and non-computerized), exercise programs, ADL programs, counseling, spiritual services and general activities.

Contract with a physiotherapy provider with an OHIP billing licence.

Our physiotherapist assesses all residents and develops a maintenance program that PTA implements. Restorative programs are also available if the resident qualifies (i.e. ability to improve and capable of participating).

Physiotherapy, nursing, physiotherapy aides, activities walk to dine.

Initial assessments and based on assessment residents are categorized in different groups of rehabilitation.

Care plan to address the physiotherapy and restorative needs, as well as ADL participation.
How are the needs of residents addressed?

The residents’ needs are addressed in a holistic approach. The resident (if able), family members, Attending MD, nurse, PT, OT, social worker collaborate together to initiate the best approach for each resident according to their physical, mental and emotional limitations that have been affected post CVA.

Assessed by the physiotherapist.

Try to provide adaptive aids if possible. PT assessment and follow-up with PTA/ Restorative care and nursing rehab

RHA meeting monthly with residents on designated units

Both by PT, PT techs and nursing staff.

In house physiotherapy five days a week, OT, SLP available through local hospital or CCAC, restorative care aides seven days a week.

Assessed by physiotherapist and OT, dietician – multidisciplinary team.

Individual care planning done by physio/OT/nursing.

Initial assessment by physiotherapy with the multidisciplinary team (RAI MDS)

Development of multidisciplinary treatment plan.
Appendix F: Definitions of ‘Clear Rehabilitation Potential’ from survey respondents as applicable to their home

**Definitions for “Clear Rehabilitation Potential”**

Those with clear rehab potential are those with recent diagnosis (within past month) and are on an active PT program for rehab purposes

Clear rehab potential would describe those residents who have the desire and the physical and cognitive ability to prevent further loss of functioning and/or improve physical & cognitive functioning with the goal of increasing the Resident's level of independence and feelings of accomplishment.

Clear rehab potential we define at a recent onset of stroke that the resident is able to participate in rehab and the outcomes are measurable and clear improvement by the resident is happening. Once the resident is not improving and maintenance is now key, the goal would be maintenance, not improvement;

Clear rehab potential is determined by the physiotherapist for physical rehab and nursing for any other type of potential rehab (speech, swallowing etc.)

Rehab potential - increase ability to function in their daily lives with ADLs, transfers, mobility.

Any resident who has the ability to maintain and or improve on their physical abilities.

Able to participate in rehab and regain some of the function that was present prior to the stroke.

Currently receiving physio services with goals for improved function and independence.

Clear rehab potential is that which allows the patient to return to their previous level of function, or to a level where they are able to perform their own ADL.

Resident who is cognitively able to follow instruction for OT or physiotherapy. One that has an acute CVA and not already years between rehab. Most already have contractures or an associated dementia.

Potential for restorative.

Capable of maintaining or improving ADLs

Someone who will return to a previous function level or not deteriorate any further

Clear rehabilitation potential would be restoring function to affected area or through reintegration/rehabilitation to perform tasks/functions prior to stroke.

Residents who are stable, resident who are willing to participate. Residents are assessed by Physiotherapist to help determine rehab potential;

To identify the potential rehab program for the resident to maintain or improve their function and ability

Potential to improve function or find alternate ways to deal with deficits

Clear rehab potential includes the client's ability to participate in a goal focused rehabilitation program which aims to increase function

The potential to improve function in their daily lives. That is, to be able to work towards achieving goals that will impact their daily lives (such as safer and more independent transfers, ability to perform more ADLs, improved quality of gait)

Any ability to improve any function; mobility, continence, language, ADLs

A resident that will regain functioning partly of their affected side, i.e. return to feeding themselves.
Definitions for “Clear Rehabilitation Potential”

Rehabilitation to previous stroke abilities

Able to follow the instruction from the physiotherapist; willing to participate the rehab program

Clear Rehab Potential= resident that has the potential with the help of physiotherapy programs to increase their current level of independence in some, most or all aspects of daily living.

These potentials are carried out by the therapy departments - physiotherapy and restorative care.

Residents who have had recent CVA resulting in possible reversible deficits.

The resident has expressed his/her desire to improve own status and consent to participate in rehabilitation programs.

The designated resident has been assessed by the interdisciplinary professional and identified his/her rehabilitation potentials.

Clear rehab potential is planned if the resident is cognitive - therefore able to follow direction. Even if the resident can improve one of the ADL's - they are started on a rehab program to head to whatever independence level that they can. From that point on - it's all about sustaining what ability they have until/if further health decline occurs.

We see this as a potential for maintenance of present function or opportunity to regain skill sets if focused therapy if available. They would need to be able to cooperate with efforts both physically and cognitively.

Returning to near former status.

The resident has to be able to follow directions. They must be able to stand for 1 minute unassisted. Able to ambulate with an assistive aid or 1-2 person assist. Able to see a progression.

Specific Measureable Attainable Realistic Time oriented Goals (SMART)

Clear Rehabilitation Potential is indicated in individuals with impairments, activity limitations, and participation restrictions where they have the ability to identify and reach their optimal physical, mental and social functional level through client focused care with the individual, family and healthcare providers. These individuals have the capacity to learn and retain newly learned abilities and present with adequate insight to identify deficits and set appropriate goals to facilitate independence and social integration.
Appendix G: QQ Plot of the Distribution of Residuals for Final Adjusted Linear Regression Model