

# Post-acute stroke patient outcomes in Ontario, Canada complex continuing care settings

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## ABSTRACT

**Purpose:** Outcomes are described for a sample of patients receiving less intensive and longer duration rehabilitation while recovering from stroke in Ontario complex continuing care (CCC) healthcare settings (similar to chronic care).

**Methods:** In 2006-2007, 81 post-acute stroke patients recovering in six Ontario, Canada CCC healthcare settings were studied. Both primary and secondary sources of data were used to calculate six clinical characteristics of study patients and three outcomes: patient satisfaction with CCC care, discharge location, and length of CCC stay. As well as descriptive statistics, tests of difference were employed to examine differences in clinical characteristics and outcomes for patients across facilities.

**Results:** Mean patient age was 74 years, 59% were female, 51% were married, and 34.6% lived alone prior to hospitalization. Data on six clinical characteristics is described for study patients. Almost half of patients were discharged to independent or semi-independent living. Mean length of stay was 112.8 days. Mean scores for patient-reported experiences with CCC care were 71 (out of 100). There were statistically significant differences in all outcomes across healthcare facilities.

**Conclusions:** : Less intensive and longer duration rehabilitation was successful in transitioning the majority of patients to independent living or to a healthcare setting providing less intensive care. Opportunities exist to promote increased patient satisfaction with care.

**Key Words:** Stroke, patient satisfaction, discharge location, length of stay, RAI-MDS

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## Introduction

The prevalence of cerebral vascular disease in Ontario, Canada is 1.9 for every 100 persons but in some areas is as high as 2.5 per 100 persons [1]. Stroke is a serious consequence of cerebral vascular disease and is the fourth leading cause of death in Canada. Stroke has significant impact on patients and families with almost 60% of stroke survivors suffering from moderate to severe impairment as well as some being so disabled that they require ongoing placement in long-term care facilities [2]. With a growing elderly population, the incidence of stroke is expected to increase [3]. Understanding these patients and their outcomes is imperative.

Some patients recovering from stroke may be well enough for discharge from acute care hospitals to home or previous living situations. Others may require continuing institutional healthcare. Those recovering from stroke and assessed to tolerate intensive rehabilitation (e.g., several hours of rehabilitation therapy daily) are usually discharged from acute care hospital to a traditional rehabilitation programme. However, some post-acute stroke patients are assessed as too frail to tolerate intensive rehabilitation of several hours of rehabilitation therapy daily but could benefit from lower intensity rehabilitation of up to 1 h of rehabilitation therapy daily that spans a longer period of time than that usually provided in traditional rehabilitation programmes. In complex continuing care (CCC) (chronic care)

settings in Ontario, Canada, post-acute stroke patients can receive 'slow stream' or less intensive inpatient rehabilitation therapy of approximately five hours of rehabilitation therapy per week [3,4-6]. In Ontario, this type of post-acute 'slow stream' rehabilitation is termed 'low tolerance long duration rehabilitation.' Such slow stream rehabilitation programmes have existed in other countries such as Australia for more than two decades [7]. The primary goal for these patients is to transfer care from CCC settings back to the community or to healthcare settings providing less care [8]. Without this programme of low intensity rehabilitation therapy, those post-acute stroke patients assessed as not having capacity to benefit from or tolerate intensive rehabilitation therapy (e.g., rehabilitation therapy of several hours duration daily) would be discharged directly from acute care hospital to long-term care facilities such as chronic care hospitals or nursing homes without having the opportunity to receive focused rehabilitation therapy. This article focuses on describing the clinical characteristics and outcomes for post-acute stroke patients discharged from acute care hospital to low tolerance long duration rehabilitation programmes (slow stream or less intensive) provided in Ontario CCC settings. Very little has been written about this patient population [9]. This research begins to address this knowledge gap. The purpose of this article is to describe health-related characteristics of post-acute stroke patients recovering in Ontario CCC settings as well as their performance or ratings on three outcomes: patient satisfaction

with care received, discharge location, and length of stay (LOS) within CCC settings.

## Method

### *Design and settings*

This is a descriptive study of patients in Ontario low tolerance long duration rehabilitation programmes recovering from stroke. These patients received up to 5 h of rehabilitation therapy weekly. Patients in traditional intensive rehabilitation programmes receive several hours of rehabilitation therapy daily. In 2006–2007, stroke patients from six facilities with CCC units were studied. Patients were eligible to participate if they were: admitted to CCC from an acute care hospital where they were treated for stroke, able to speak and understand English, cognitively able to complete self-report measures, identified by staff as having potential for discharge within 180 days of admission, resident on the CCC patient care unit at least 10 days, and able to provide informed consent. Aphasic patients who met eligibility criteria were invited to participate if able to respond to questions using a thumb up (yes), hand flat (sometimes), and thumb down (no) gesture. Across the six facilities, 95 patients from eight units were eligible to participate. Of these, 81 patients agreed to participate (response rate = 85.3%). Patient participant response rates across the six facilities ranged from 70 to 94%.

### *Data sources*

There were two sources of data: primary study data collected from patients to evaluate satisfaction with care and secondary data extracted from the Resident Assessment Instrument – Minimum Data Set 2.0® (RAI–MDS) [10]. Consent was obtained from patients to access their RAI–MDS data.

Research assistants were trained to inform patients about the study, to obtain consent, and to administer satisfaction surveys. Research assistants approached patients after nursing staff briefly introduced the study and asked patients if they would be interested in learning more about participating. Once consent was provided, the satisfaction with care survey was administered. Patients were given the choice to complete the survey on their own, with family members, or with the research assistant. In all cases, patients opted to have the research assistant read the survey and fill in response options.

Secondary data related to patient characteristics, including health status, and two of the three outcomes (LOS and discharge location) were accessed from RAI–MDS data. These data are routinely collected by trained professional staff and are submitted quarterly to the Canadian Institute for Health Information where they are checked and edited for data quality. Strong evidence of RAI–MDS data quality (reliability and validity) have been consistently reported [11].

### *Variables and measurement*

*Patient Characteristics.* Both demographic and clinical health status information was collected for each study patient. Demographic information was accessed through RAI–MDS data and included age, sex, marital status, and living arrangements

prior to admission. Information about each patient's clinical status within 15 days after admission was also accessed through RAI–MDS data. Embedded within the MDS–RAI are a number of validated scales reflecting patient clinical health status. Patient scores on six clinical health indicator scales were calculated: Activities of Daily Living (ADL) Hierarchy [12], Social Engagement Measure [13], Cognitive Performance Scale (CPS) [14], Depression Rating Scale [15], Changes in Health, End-stage Disease, and Symptoms and Signs of Medical Problems Scale (CHESS) [16], and the Pain Scale [17].

The ADL Hierarchy [12] rates patient level of dependence in four areas: personal hygiene, toileting, locomotion, and eating. Four items from the RAI–MDS (physical functioning and structural problem section) are used to calculate this indicator. The higher the score (0–6), the more dependent is the patient.

The Social Engagement Measure [13] assesses the degree of participation and initiative demonstrated in social interactions. Six items (in psychosocial well-being section) from the RAI–MDS are used to calculate this indicator. Higher scores (0–6) indicate higher levels of participation and initiative.

The CPS [14] measures patient cognitive assets. Five RAI–MDS items are used to construct the CPS including two cognitive items, one communication item, one ADL item, and a comatose status item. Higher scores (0–6) indicate more severe cognitive impairment.

The Depression Rating Scale [15,18] is calculated using seven items in the RAI–MDS (mood and behavior patterns section). Each behavioral item is rated based on frequency of observation. Higher scores (0–14) indicate higher levels of depressive symptoms.

The CHESS [16] is a measure of risk for death and decline in health status. Nine items from the RAI–MDS are used to calculate this indicator. Possible scores range from 0 (not at all unstable) to 5 (highly unstable).

The Pain Scale [17] is calculated using two pain assessment items from the RAI–MDS. One item reflects frequency and the other reflects intensity of pain. Higher scores (0–3) indicate more frequent and severe pain.

*Patient Outcomes.* Three patient outcomes were measured including patient satisfaction with CCC care, discharge location, and LOS. Patient satisfaction with CCC care was measured using the nine-item ‘satisfaction with staff’ domain of the Long-term Care Resident Evaluation Survey [19]. Table I lists the nine survey items. Patients responded to each question with one of three response options: yes, sometimes, or no. A summative score was calculated for each participant by dividing the number of ‘yes’ responses by the number of answered items. The resulting number was multiplied by 100 to obtain a score out of 100. Higher scores indicate greater satisfaction with care. Sound psychometric properties of this instrument have been repeatedly reported [19–22].

The discharge location variable was calculated using data from RAI–MDS discharge tracking forms which include a discharge status field with 12 patient disposition choices. These choices were grouped to create a three category variable based on intensity of care required: discharged to independent or semi-independent living, discharged to lower level care, or discharged to same or higher level of care. The discharge location requiring

the least intensity of care was home and the location requiring the greatest intensity of care was not discharged from CCC or discharged to acute care hospital.

**Table I.** Patients satisfaction survey items and overall percentage of 'yes' responses per item.

Item	'Yes' response (% of total sample)
Do staff show you that they care about you?	75.3
Do staff respect your wishes?	74.1
Do staff try to understand what you are feeling?	60.5
Do staff help you when you need it?	76.5
Is help freely given?	71.6
When staff come to your room, do they tell you what they have come for?	74.1
Are staff skilled and knowledgeable?	77.8
Do staff answer promptly when you call?	50.6
Do staff involve you in decisions about your care?	74.1

LOS was calculated from RAI-MDS data by counting day after admission as day 1 and ending the count on date of discharge. The LOS variable was adjusted for patients who remained longer than 180 days by right censoring LOS at 181 days so data were not overly skewed by the few patients that stayed longer than 180 days.

*Research ethics.* Approval was obtained from the University of Toronto Health Sciences Research Ethics Board and ethical review committees within participating hospitals.

*Data analyses.* Descriptive statistics were used to summarize patient characteristics and outcomes at each CCC site. To determine whether there were differences in patient characteristics and outcomes across facilities, tests of difference were implemented using Kruskal-Wallis tests for continuous variables (data were skewed) and Fisher's exact test for the categorical variable, discharge location. Because the number of observations in several cells in the discharge location variable was low, the association between discharge location and facility was determined using an extension of Fisher's exact test to larger tables [23]. When a significant Kruskal-Wallis test was found, each facility was compared to other facilities using a series of permutation tests that adjusted for multiple comparisons [24].

## Results

### *Patient characteristics*

Characteristics of study patients are detailed in Table II. No significant differences were found across facilities on patient demographics. However, small sample sizes from some facilities may have made it difficult to see differences that actually

existed. Overall, this sample of post-acute stroke patients was 74 years of age, 59% were female, 51% were married, and 35% lived alone prior to admission.

Using Kruskal-Wallis tests, clinical characteristics of patients were found to be statistically different across CCC facilities for four of six clinical status scales: ADL hierarchy ( $p=0.0016$ ), Social Engagement Measure ( $p=0.0017$ ), CPS ( $p=0.0290$ ), and CHESS scores ( $p=0.0053$ ).

Three significant differences were found across facilities in ADL Hierarchy scores: facility A patients had significantly lower scores than facility B ( $p=0.0117$ ), facility C ( $p=0.0310$ ), and facility D ( $p=0.0135$ ) patients. Two significant differences were found across facilities in mean Social Engagement Measure scores: facility A patients had higher social engagement scores than facility B ( $p=0.0400$ ) and facility D ( $p=0.0007$ ) patients. Despite a significant Kruskal-Wallis test indicating differences in CPS scores across facilities, no significant differences ( $p<0.05$ ) between any two facilities was found after adjusting for multiple comparisons. Two statistically significant differences were found in mean patient CHESS scores across facilities: facility E patients had significantly higher CHESS scores than facility B ( $p=0.0209$ ) and facility E ( $p=0.0221$ ) suggesting that facility E patients were more clinically unstable.

The overall health condition of study patients was relatively stable (mean CHESS = 1.4). They were moderately dependent on others, requiring limited or less assistance with eating and ambulation and extensive or more help with toileting and personal hygiene (mean ADL Hierarchy = 3.3). As a whole, patients were moderately socially engaged (mean Social Engagement = 3.6). In general, cognitive impairment was mild (mean CPS = 1.7) and study patients were assessed to exhibit few behaviours indicative of depression (mean Depression Rating Scale = 0.9).

### *Patient outcomes*

Table III identifies mean scores on three outcomes for study patients by facility. Nearly half (48%) were discharged to a location characterized by independent or semi-independent living (e.g., home). Thirty five percent were discharged to nursing home settings which provide lower levels of care than CCC settings. The remainder of patients stayed in CCC or were discharged to a facility that provided higher levels of care such as acute care hospitals. Using Fisher's exact test, a statistically significant difference was found across facilities for the outcome discharge location ( $p=0.0087$ ). Facility D had significantly fewer than expected patients discharged to independent living and significantly more than expected patients discharged to nursing homes. Facility C discharged significantly more than expected patients to independent living and discharged none to nursing homes.

The mean adjusted LOS for patients was 112.8 days and ranged from 11 to 181 days. There were three statistically significant differences across facilities. Facility B patients had significantly longer LOS than patients in three facilities: facility A ( $p=0.0015$ ), facility D ( $p=0.0001$ ), and facility F ( $p=0.0011$ ). When tested for differences in LOS based on discharge location, no significant interaction effects were found.

**Table II.** Patient characteristics: demographic and clinical health status

Facility	A	B	C	D	E	F	Whole sample	P*
<b>N</b>	<b>36</b>	<b>10</b>	<b>7</b>	<b>15</b>	<b>6</b>	<b>7</b>	<b>81</b>	
<b>Demographic characteristics</b>								
Mean age (SD)	70.9 (11.3)	74.0 (11.6)	71.7 (6.2)	80.4 (9.9)	76.1 (5.3)	76.9 (6.2)	74.0 (10.5)	NS
% Female	61.1	50.0	57.1	73.3	33.3	57.1	59.3	NS
% married	51.5	40.0	Not reported	40.0	80.0	71.4	51.4	NS
% living alone	33.3	40.0	20	35.7	33.3	42.9	34.6	NS
<b>Clinical health status</b>								
ADL hierarchy	2.7 (1.1)	4.1 (1.3)	4.1 (1.2)	3.8 (1.3)	3.8 (1.2)	2.9 (1.8)	3.3 (1.4)	0.0016
Social engagement	4.5 (1.4)	2.7 (1.6)	3.4 (1.6)	2.3 (1.7)	2.7 (2.3)	4.0 (2.6)	3.6 (1.9)	0.0017
Cognitive performance	1.4 (1.2)	2.1 (0.9)	0.6 (0.8)	2.1 (1.8)	2.2 (0.8)	2.4 (1.4)	1.7 (1.3)	0.0290
Depression rating	0.7 (1.1)	0.9 (1.4)	0.6 (1.1)	1.1 (1.2)	1.7 (1.8)	1.3 (1.9)	0.9 (1.3)	NS
CHESS	1.5 (1.1)	0.7 (1.3)	1.6 (0.8)	0.7 (0.9)	2.3 (1.2)	2.0 (1.0)	1.4 (1.1)	.0053
Pain scale	1.2 (0.8)	0.5 (0.7)	1.3 (1.1)	1.2 (0.9)	1.5 (0.5)	1.3 (1.0)	1.1 (0.8)	NS

SD, standard deviation; ADL, Activities of Daily Living; CHESS, Changes in Health, End-stage Disease, and Symptoms and Signs of Medical Problems; NS = non-significant

\*P value refers to probability of finding a significant difference among facilities for a variable by chance

Mean LOS for patients discharged to independent or semi-independent living was 123 days, those discharged to nursing homes stayed 98 days, and those who remained in CCC or were transferred to acute care hospital stayed 114 days.

The mean score for patient satisfaction with CCC care was 71 out of 100 and ranged from 40 to 87. Two statistically significant differences were found across facilities. Patients in facility E reported significantly lower satisfaction than did patients in facility A ( $p=0.0156$ ) and facility C ( $p=0.0498$ ). Table I identifies the percentage of all sample patients that chose a 'yes' response for each item. More than 75% reported the following aspects of care were consistently observed: staff showing they care, staff helping when patients need help, and staff being skilled and knowledgeable. Two staff behaviours that patients reported as least observed were: staff answering promptly when called and staff trying to understand what patients were feeling.

## Discussion

### Patient characteristics

The characteristics of this study sample were similar to the patient population described in the 2004/2005 Ontario Stroke Audit [1]. Overall, post-acute stroke patients in CCC settings

needed resources that provided moderate support to manage ADL. This is not unexpected given this patient group was admitted for less intensive rehabilitation therapy. Social engagement scores were moderate. It has been found previously that the ability to participate and engage in rehabilitation and other social activities increases the likelihood of positive discharge outcomes such as discharge to home [25]. This suggests that encouraging and facilitating social engagement activities for post-acute stroke patients may positively impact their discharge location.

Worthy of note, are the low levels of depressive behaviours and cognitive impairment in study patients. Our findings were not similar to other study findings [26–28]. Comparison of depression rating findings from our study with those from others is imperfect because of the variety of instruments used to measure depression. Differences in rates of depression after stroke across studies may also be related to cultural differences or even differences in timing of depression assessments.

Overall low levels of cognitive impairment found with this patient sample are likely influenced by study eligibility criteria. This limits the ability to compare cognitive impairment incidence and levels with those previously reported. Despite our findings, others have reported that vascular cognitive impairment affects up to 60% of stroke survivors and is associated with decreased function in ADL [29]. CCC stroke rehabilitation

**Table III.** Patient outcomes by facility

Facility outcome	A	B	C	D	E	F	Whole sample	P
Discharge location:								0.0087
% to independent or semi-independent	60	50	71	13	40	42	48	
% to long-term care	23	40	0	80	40	29	35	
% to higher level of care	17	10	29	7	20	29	17	
Mean length of stay (SD)	109 (47)	174 (22)	124 (60)	88 (42)	112 (47)	88 (19)	113 (49)	0.0009
Mean patient satisfaction with care score (SD)	80 (30)	58 (21)	83 (27)	60 (37)	40 (25)	87 (12)	71 (31)	0.0053

SD = standard deviation

programmes such as in this study may exclude patients with moderate to severe cognitive impairment because these patients may be assessed as not having rehabilitation potential or because rehabilitation staff may not be adequately trained on specific cognitive strategies to rehabilitate patients with lower levels of cognition.

### *Patient outcomes*

In this study, low tolerance long duration rehabilitation therapy provided in CCC settings led to transitioning almost half (48%) of stroke patients who would not have been eligible for traditional intensive rehabilitation care back into the community (e.g., home). A little more than one-third of study patients (35%) were discharged to a healthcare facility providing less care than what is normally provided in CCC settings (e.g., long-term care/nursing home). Only 17% of patients required a higher, more costly level of care. These findings suggest (but do not confirm) that there is considerable benefit to providing less intensive rehabilitation care such as that provided in Ontario's low tolerance long duration rehabilitation programmes that enabled almost half of post-acute stroke patients to return to independent or semi-independent living. Without such slow stream rehabilitation programmes, post-acute stroke patients who are unable to tolerate traditional intensive rehabilitation therapy of several hours duration daily, such as those patients in this study, would simply have been discharged from acute care hospitals to either chronic care facilities or to long-term care healthcare facilities such as nursing homes. Such patients would have little or no chance of returning to independent or semi-independent living situations. They would not have had the opportunity to receive 'slow stream' rehabilitation therapy that enabled them to regain adequate functional status.

The average LOS of 113 days is longer for this sample of post-acute stroke patients than has been reported by others for similar patient groups [7]. Future research including cost-benefit analyses is suggested to determine whether benefits to discharge location outweigh costs of CCC hospitalization. The extended LOS found with this sample of post-acute stroke patients may be related to other underlying co-morbidities, availability of support in the home, or health care insurance plan differences outside Canada.

Overall, patient scores pertaining to patient satisfaction with care and support received in CCC did not reflect high levels of satisfaction. Opportunities to improve patient experiences are evident in patient response patterns. In particular, two survey items provide opportunities for improving patient experiences: improving staff response times when they are called and staff being more effective in understanding patients' feelings. Given the physical dependency of this patient group, any delay for assistance, particularly related to basic human needs such as toileting, eating or ambulating would be very frustrating and may delay or negate rehabilitation efforts.

Differences were found in outcomes for study patients across CCC settings. It is impossible to determine whether differences in patient outcomes across facilities were related to differences in the structures and processes of rehabilitation care provided in different CCC settings or whether these differences

were related to the clinical characteristics of study patients. Further research is required to address this issue.

Two limitations affect external validity of findings: the small sample size and selection bias due to study eligibility criteria. Representativeness of this patient sample to the larger post-acute stroke patient population is unknown and generalization should be considered with caution.

### **Conclusion**

Slow stream rehabilitation therapy up to 5 h per week such as that provided in Ontario low tolerance long duration rehabilitation programmes was successful in enabling the majority of post-acute stroke patients either to independent living (48%) or to healthcare settings providing less care (35%). However, considerable opportunities exist to promote increased patient satisfaction with care. Further research is suggested to identify benefits and costs related to lengths of stay and improved discharge locations for post-acute stroke patients.

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