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ORIGINAL REPORT

WHO WAITS FOR INPATIENT REHABILITATION SERVICES IN CANADA AFTER NEUROTRAUMA? A POPULATION-BASED STUDY

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Objective: **This study examined characteristics of patients with acquired brain injury associated with wait times for inpatient rehabilitation compared with a control population of patients with acquired spinal cord injury.**

Methods: **This cross-sectional study was based on 9458 patients captured in the National Rehabilitation Reporting System in Canada.**

Results: **Waiting for inpatient rehabilitation was found to be associated with language, geographical location, informal support, pre-admission living arrangement and payer source. The median differences in wait time, however, were at most a few days. Persons already receiving care had the longest median wait times.**

Conclusion: **The data reflect only the perspective of providers, and further research needs to examine days to inpatient admission using data from acute care.**

Key words: brain injuries; spinal cord injuries; rehabilitation; outcomes.

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INTRODUCTION

Wait times have become a major focus of Canadian health policy over the past decade. In the fall of 2004, First Ministers met to focus on better management of wait times and on reducing wait times that are longer than medically acceptable (1). Although 5 services were initially highlighted (cancer care, cardiac care, joint replacement, cataract surgery, and diagnostic imaging) this policy thrust carries with it the assumption that shorter wait times are the hallmark of high-quality care. A series of analyses of how best to minimize wait times has led to the recognition of the importance of transitions between hospitals and the community. Many patients may still require additional healthcare services, such as inpatient or outpatient rehabilitation, even after hospitalization. In fact, Blendon et al. (2) found that, based on a 5-country hospital survey in 2003, approximately half of hospital executives in Australia, Canada, the UK and the USA believed that limited availability of post-hospital care is often the main cause of delay in the discharge of patients. In that connection, rehabilitation plays a critical role. Although often necessary for optimal function, it strides the boundary of the Canada Health Act. Whereas inpatient rehabilitation is publicly insured, as are all medically necessary hospital-based and physician visits, this does not necessarily apply to care by non-physicians outside of hospital settings. As Hurley et al. (3) claim, there is the potential for issues at the interface between cases funded by the workers' compensation system, and those whose costs are paid publicly.

The Canadian Institute for Health Information (CIHI) (4) analyzed information about wait times for the 5 selected services and included data about wait times for inpatient rehabilitation after joint surgery. Based on 2004–05 data from 84 inpatient rehabilitation programs in 6 provinces who participated in the National Rehabilitation Reporting System (NRS), they found that most did not wait: "Across these facilities, about half of all patients (52%) were admitted to inpatient rehabilitation on the day that they were considered ready for the service. Another 16% entered the next day. At the other end of the scale, 10% waited over a week, with 2% waiting more than 30 days. Waits tended to be shortest for those admitted from inpatient acute units and longest for those referred by practitioners in the community" (p. 67). Wait time was shortest for planned admissions, and highest for unexpected cases (particularly hip fractures) (4). Accordingly, we examined whether there were systematic issues relating to access to post-acute care for a diagnosis not designated as 1 of the 5 targets, but for which rehabilitation is critical. A recent report by Colantonio et al. (5) highlighted some critical issues with respect to post-acute care for survivors of traumatic brain injury (TBI) in the province of Ontario. Factors other than need appeared to influence the receipt of inpatient rehabilitation and were related to sociodemographic variables, such as primary language, geography, and comorbidity. This examination, however, has yet to be extended to factors associated with wait times for inpatient rehabilitation on a large sample of patients with acquired brain injury (ABI), which includes persons injured from both traumatic and non-traumatic causes. In addition, there is little data in Ontario on the use and impact of rehabilitation services in this population that covers both private and publicly insured clients.

This study was conducted to understand which patients with ABI are most likely to wait for inpatient rehabilitation, using population-level data from the NRS logged in 2001–06. Infor-

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mation regarding the number and type of services referred to patients was also addressed in order to identify the differences in services provided for ABI survivors after discharge from an inpatient rehabilitation facility.

METHODS

Source of data

The primary data were collected by the NRS, a data source that was developed by the Canadian Institute for Health Information (CIHI) in order to support rehabilitation services, planning activities, and policy development. NRS data collection is mandatory in the province of Ontario, Canada. This data source provides information on clinical outcomes and on the characteristics of various rehabilitation activities. One of the advantages of this dataset is that it has not been based exclusively on data from large rehabilitation hospitals, unlike the Model Systems Data in the USA (6). The NRS also includes data from rehabilitation units within acute care hospitals, which are of greater number than large rehabilitation hospitals, especially within less populated areas. Therefore, this data source is believed to be less biased because it presents data beyond inpatient rehabilitation hospitals. In addition to data on inpatient rehabilitation services, the NRS includes a subset of outcome follow-up data. Indeed, this was the source used by CIHI (4) in their wait time report. The data is typically collected by health professionals involved in the clinical care of rehabilitation inpatients, and they must attend at least one training session of at least half a day. The NRS will only accept data from centers that have 100% completed data forms.

Key variables

The independent variables were classified into 3 categories: demographic characteristics, clinical characteristics and environmental variables. Fig. 1 shows the variables measured in this study.

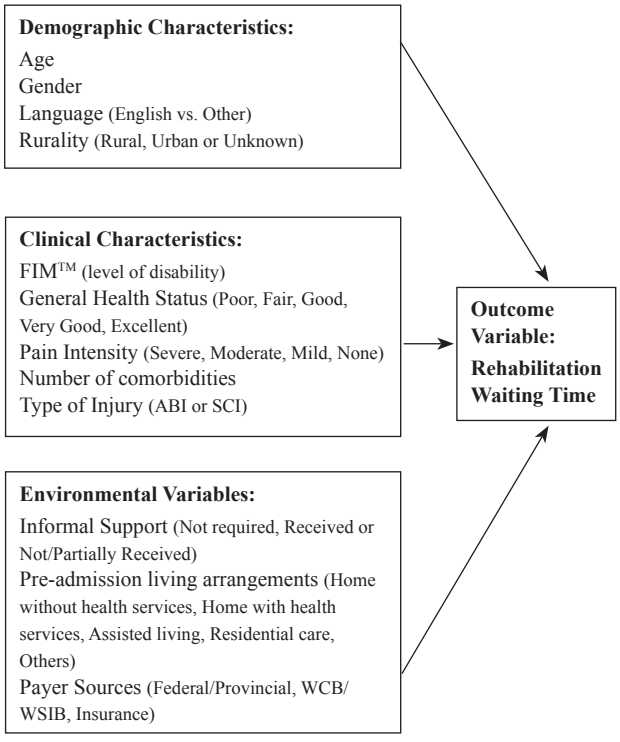

Fig. 1. Key variables measured. ABI: acquired brain injury; SCI: spinal cord injury; WCB: Workers' Compensation Board; WSIB: Workplace Safety and Insurance Board.

Demographic characteristics

Sociodemographic characteristics include age, gender, language and geographic location.

The residence of the patient was characterized as being in an urban or rural code based on the geocoding files from Statistics Canada (7).

Clinical characteristics

Case. This study focused primarily on brain dysfunction using data from the NRS. Brain dysfunction has both acquired and traumatic causes. ABI cases include etiologies such as neoplasm, metastases, encephalitis, metabolic toxicity or degenerative processes, whereas cases with motor or cognitive disorders secondary to trauma are known as traumatic brain dysfunction (8).

Control. Acquired spinal cord injury (SCI) patients were considered an adequate control group because of a similar risk profile at time of injury. Although the physical disability of survivors of SCI could be completely different from that of ABI survivors, the use of SCI patients as a comparison group served to show whether the findings reflect brain injury-specific issues or more global ones as they relate to other disability groups. Spinal cord injuries acquired from traumatic and non-traumatic causes were captured.

Level of disability. The Functional Independence Measure (FIM™) (9) was rigorously collected to provide a basis for the extent of disability. The FIM™ instrument is comprised of 18 items, each of which is scored on a 7-point ordinal scale. A higher score is indicative of higher functioning in activities of daily living. The FIM™ can be further broken down into the Motor FIM™ score and the Cognitive FIM™ score. The Motor FIM™ score describes the physical ability of the patient and the Cognitive FIM™ score measures cognition and communication through 5 factors: comprehension, expression, social interaction, problem solving, and memory (10–12).

Comorbidity. Diagnostic codes from the NRS were used to identify comorbidity. The NRS captures up to 10 comorbidities for each patient, which are coded into a specific category per patient. The number and type of comorbidity were studied. Mental health comorbidity was examined separately as it is frequently associated with ABI. In addition, patients were asked if they had pain and if so, the intensity of their pain.

Self-rated health. Patients were asked to rate their health as excellent, good, fair or poor.

Environmental variables

Informal support prior to admission. This variable assesses whether informal support through family, friends or neighbors was provided to a patient if required in the 7 days prior to admission. This variable was coded as not required, received, received with restrictions or not received. This information serves as a measure of informal social support that affects recovery. The information is obtained by requesting information from the patient and/or significant other as well as deducted from the patient's social situation.

Pre-admission living arrangements. This variable is an important variable used to assess the level of functioning prior to admission. If a person is discharged to an institution post-rehabilitation, it is important to know if the person is returning to a previous living environment or going to a new setting.

Services referred to after discharge. This variable is used to assess the range of service referrals that a patient receives. In addition, it is also used to assess discharge to home vs discharge to another institutionalized arrangement.

Payer sources. The NRS provides codes for Workplace Safety and Insurance Board (WSIB) and private insurance in addition to federal and provincial sources to describe the source of payment for inpatient rehabilitation. As noted by Hurley et al. (3), there is the possibility

that organizations may be more eager to see clients who have WSIB or private insurance coverage, as this provides an additional revenue source for hospitals, which are typically funded on global budgets from their provincial health plans. Supplemental insurance plans may also provide additional case management support that may facilitate referral to rehabilitation services.

Outcome variables

Days waiting for admission. This variable measures the number of days a patient is considered ready for inpatient rehabilitation before they are actually admitted to an inpatient unit. According to the high frequency of zero and one day waiting, we categorized this variable as no waiting (zero or one day waiting for admission) vs waiting (> one day waiting).

Statistical analysis

Descriptive statistics, such as frequency distribution and measures of central tendency, were generated. χ^2 and *t*-test/Wilcoxon statistics were used, depending on the distribution of the data, to examine differences between populations with ABI and populations with SCI.

To profile the characteristics of persons with ABI who were most likely to wait for inpatient rehabilitation, bivariate analyses of predictor variables with the outcome of interest were generated. Multivariate stepwise modeling was also conducted by using forward variables selection with a *p*-value of 0.2 or less, and backward variables elimination with a *p*-value of 0.05 or greater. All variables selected by stepwise autoregression were fitted into a multivariate logistic model for dichotomous outcome (rehabilitation waiting for admission vs no waiting). As many of the variables selected were correlated, and highly-correlated variables left in the model may lead to model instability, we tested the independent contribution of each variable individually using 0.05 as a level of significance.

RESULTS

This study reviewed data at admission and at discharge for 9458 patients who received inpatient medical rehabilitation services between April 2001 and March 2006. The data were collected from rehabilitation institutions across Canada, with 60.5% of the data collected in Ontario, where data collection is mandatory. The overall dataset contained 5434 patients with brain dysfunction and 4024 patients with spinal cord dysfunction, including traumatic and non-traumatic causes of injury.

Part I. Comparison between brain injury and spinal cord injury

We compared the demographic characteristics, clinical characteristics and environmental variables for ABI and SCI patients in this study.

Demographic characteristics. Compared with patients with spinal cord injury, brain injury patients were younger and were more likely to be female. Over 92% of patients in the ABI and SCI groups spoke English. A significantly larger proportion of ABI patients lived in urban areas (Table I).

Clinical characteristics. Patients with ABI were significantly different from patients with SCI in all clinical characteristics measured. At the time of admission, patients with ABI had higher Motor FIM™ scores, but lower Cognitive FIM™ scores. Overall, compared with patients with SCI, the patients with ABI had significantly higher total FIM™ scores. The patients with ABI had better health status in general; there was a larger proportion of patients with ABI who reported no pain. On average, however, they had a significantly greater number of comorbidities than patients with SCI (Table II).

Table I. Demographic characteristics: acquired brain injury (ABI) vs spinal cord injury (SCI)

	ABI ($n=5434$)	SCI ($n=4024$)	*p*-value
Age, years, mean (SD)	53.0 (20.1)	54.4 (18.8)	0.0007
Gender, *n* (%)			
Female	2085 (38.4)	1398 (34.7)	0.0003
Male	3349 (61.3)	2626 (65.3)	
Language, mean (SD)			
English	5021 (92.4)	3747 (93.1)	0.1852
Other	413 (7.6)	277 (6.9)	
Rurality, mean (SD)			
Rural	944 (17.4)	823 (20.5)	0.0007
Urban	4317 (79.4)	3081 (76.6)	
Unknown	173 (3.2)	120 (3.0)	

SD: standard deviation.

Environmental variables. A significantly smaller proportion of patients with ABI required informal support. Over 82% of patients with ABI were living at home without health services before being admitting to rehabilitation. Also, a higher percentage of patients with ABI were living in residential care facilities or in assisted living arrangements compared with those with SCI. From the payer source point of view, a significantly larger proportion of the rehabilitation costs of patients with SCI were covered by either WSIB or other forms of insurance, while more patients with ABI relied only on federal and provincial health plans (Table III).

Part II. Rehabilitation wait times

Descriptive analysis. In the overall data set, 3945 (41.7%) patients had zero days or one day of waiting for admission to inpatient rehabilitation. We called these "no waiting" patients in our analysis. There were 1969 (20.8%) patients who waited

Table II. *Clinical characteristics: acquired brain injury (ABI) vs spinal cord injury (SCI)*

	ABI ($n=5434$)	SCI ($n=4024$)	*p*-value
FIM™, mean (SD)			
Total	78.1 (27.7)	76.7 (21.6)	0.005
Motor	56.7 (23.2)	44 (20.4)	<0.0001
Cognitive	21.4 (8)	32.7 (4.3)	<0.0001
General health status, *n* (%)			
Poor	388 (7.7)	376 (9.7)	<0.0001
Fair	1498 (29.7)	1258 (32.6)	
Good	2396 (47.5)	1601 (41.4)	
Very good	549 (10.9)	474 (12.3)	
Excellent	214 (4.2)	155 (4)	
Pain intensity, *n* (%)			
Severe	322 (5.9)	648 (16.1)	<0.0001
Moderate	1224 (22.5)	1624 (40.4)	
Mild	882 (16.2)	689 (17.1)	
No	3006 (55.3)	1063 (26.4)	
No. of comorbidities, mean (SD)	3.7 (2.9)	2.8 (2.5)	<0.0001

FIM™: Functional Independence Measure; SD: standard deviation.

from 2 to 7 days, 1111 (11.7%) patients waited between 8 and 30 days, and 377 (4%) patients waited over 30 days. Unfortunately, approximately 21.7% of patients did not have records of their admission date so we could not calculate their wait times (Fig. 2).

To achieve a better understanding of how well the available data represent the overall dataset, we compared patients with records of waiting with those with missing values in terms of demographic and clinical characteristics. As shown in Table IV, patients with available data had significantly better health conditions with less pain, but had more types of comorbidity compared with those with missing wait times. A significantly higher proportion of patients with ABI were in the group with known wait times.

Using information from patients with available wait time for rehabilitation data, we examined the median number of days by patients' source of referral. From the plot below (Fig. 3), the median wait days for patients who were referred by themselves or their families was zero. Patients referred from a rehabilitation unit had the longest median wait time, of 7 days, followed by patients referred by private practice physicians, who had a 5 day median wait time. While the first category of patients will almost certainly be receiving services, even though designated as "waiting", it is not clear whether this would apply to those referred by private practice physicians. It is also unclear what waiting period would be seen as appropriate, and when waiting might have adverse health implications.

Overall, the median days of waiting for rehabilitation was one day. Over half of patients admitted to rehabilitation were admitted on the same day or on the following day after they were clinically ready for rehabilitation admission.

Bivariate analysis. Table V demonstrates the results of the bivariate analysis. Rehabilitation time was dichotomized to no waiting (0 or 1 day) vs waiting (≥2 days). All key variables, excluding pain intensity and number of comorbidities, were significantly associated with the outcome variable.

Table III. *Environmental variables: acquired brain injury (ABI) vs spinal cord injury (SCI)*

	ABI *n* (%) (*n*=5434)	SCI *n* (%) (*n*=4024)	*p*-value
Informal support			
Not required	2720 (53.5)	1880 (48.6)	<0.0001
Received	1439 (28.3)	1494 (38.6)	
Not/partially received	929 (18.3)	494 (12.8)	
Pre-admission living arrangements			
Home without health services	4480 (82.4)	3125 (77.7)	<0.0001
Home with health services	464 (8.5)	676 (16.8)	
Assisted living	133 (2.5)	52 (1.3)	
Residential care	162 (3)	61 (1.5)	
Other	195 (3.6)	110 (2.7)	
Payer sources			
Federal/provincial	5152 (94.8)	3770 (93.7)	<0.0001
WCB/WSIB	71 (1.3)	114 (2.8)	
Insurance	211 (3.9)	140 (4.5)	

WCB: Workers' Compensation Board; WSIB: Workplace Safety and Insurance Board.

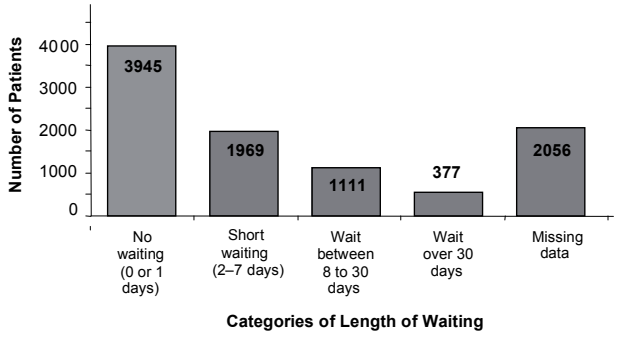

Fig. 2. Waiting time frequency distribution.

Multivariate analysis. To understand the association between key variables and rehabilitation wait times while controlling for other factors, a logistic regression model was used with outcome variables categorized as No waiting vs Waiting. All significant factors selected by the stepwise autoregression step were fitted into the logistic model to generate the outcomes shown in Table VI.

From the multivariate analysis, we found that patients who spoke languages other than English, lived in rural areas, received informal support before admission, lived in residential care, and who had only a federal or provincial health plan to

Table IV. *Comparison of patients with Not Known and Known ready-for-admission dates*

	Not Known (*n*=2056)	Known (*n*=7402)	*p*-value
Age, mean (SD)	53.0 (19.8)	53.7 (19.5)	0.1468
Gender, *n* (%)			
Female	731 (35.6)	2752 (37.2)	0.1791
Male	1325 (64.4)	4650 (62.8)	
Language, *n* (%)			
English	1896 (92.2)	6872 (92.8)	0.3379
Other	160 (7.8)	530 (7.2)	
Rurality, *n* (%)			
Rural	372 (18.1)	1395 (18.9)	0.0012*
Urban	1595 (77.6)	5803 (78.4)	
Unknown	89 (4.3)	204 (2.8)	
Admission FIM™ score, mean (SD)	77.1 (24.7)	77.6 (25.5)	0.3995
General health status, *n* (%)			
Poor	190 (9.9)	574 (8.2)	<0.0001*
Fair	670 (34.9)	2086 (29.8)	
Good	804 (41.9)	3193 (45.7)	
Very good	185 (9.7)	838 (12.0)	
Excellent	69 (3.6)	300 (4.3)	
Pain intensity, *n* (%)			
Severe	248 (12.1)	722 (9.8)	0.0002*
Moderate	600 (29.2)	2248 (30.4)	
Mild	382 (18.6)	1189 (16.1)	
None	826 (40.2)	3243 (43.8)	
Comorbidity, mean (SD)	3.0 (2.7)	3.4 (2.8)	<0.0001*
Injury type, *n* (%)			
ABI	1060 (51.6)	4374 (59.1)	<0.0001*
SCI	996 (48.4)	3028 (40.9)	

*significant values.
FIM™: Functional Independence Measure; ABI: acquired brain injury; SCI: spinal cord injury; SD: standard deviation.

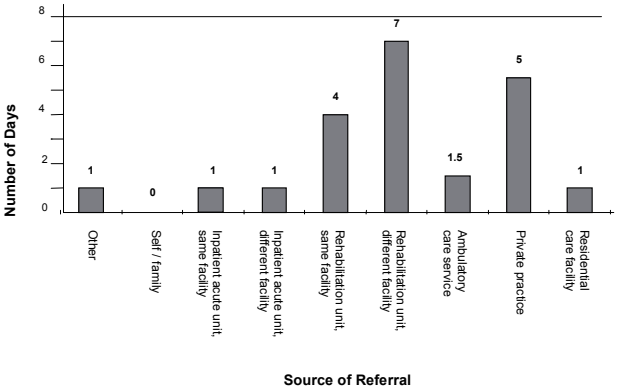

Fig. 3. Median number of days waiting for admission by source of referral.

pay for their rehabilitation costs had a greater chance of waiting, while controlling for age and injury severity.

DISCUSSION

The characteristics of patients with brain injury and spinal cord injury were significantly different for all variables we measured, except language spoken. Compared with patients with spinal cord injury, those with ABI were younger and reported better perceived health. On average, patients with ABI had a higher motor FIM™ score, a greater number of comorbidities and a lower cognitive FIM™ score at the time of admission. That is, in rehabilitation, patients with SCI need more help to improve their motor ability, and patients with brain injury have more complex diagnoses, especially in terms of cognition, as would be expected. Fewer patients with ABI were covered by workers' compensation and insurance other than federal or provincial health benefits.

We also compared patients referred from different sources. Patients who were referred from another rehabilitation unit had the longest wait times, followed by those referred from private practice sites. Patients referred from inpatient acute care facilities or residential care facilities had much shorter median wait times. In other words, patients who were receiving some rehabilitation services already had to wait longer than those who were waiting for rehabilitation services immediately after acute care.

Predictors of chance of waiting for rehabilitation were identified using bivariate analysis and multivariate logistic regression. For populations with ABI and SCI combined, chance of waiting was predicted by living in a rural area, being English speaking, requiring but not receiving or partially receiving informal support, living at home with healthcare or living in residential care, and having rehabilitation costs covered only by federal or provincial health plans, while controlling for age and level of function. Type of injury/condition did not emerge as a significant variable so there were no real differences between the population with ABI and controls. Our finding about payer source agreed with a previous study by Plata et al. (13) on patients with TBI. In their study, they found that insurance status was the primary influential factor determining whether a

Table V. *Bivariate analyses of rehabilitation waiting: acquired brain injury (ABI) vs spinal cord injury (SCI)*

	No waiting (n=3945)	Waiting (n=3457)	p-value
Demographic characteristics			
Age, years, mean (SD)	55.3 (19.8)	52 (19.1)	<0.0001
Gender, *n* (%)			
Female	1513 (55)	1239 (45)	0.0257
Male	2432 (52.3)	2218 (47.7)	
Language			
English	3719 (94.3)	3153 (91.2)	<0.0001
Other	226 (5.7)	304 (8.8)	
Rurality			
Rural	623 (15.8)	772 (22.3)	<0.0001
Urban	3214 (81.5)	2589 (74.9)	
Unknown	108 (2.7)	96 (2.8)	
Clinical characteristics			
FIM™, mean (SD)			
Total	76.7 (24.8)	78.6 (26.2)	0.0012
Motor	50.1 (22.1)	53.5 (23.9)	<0.0001
Cognitive	26.5 (8.6)	25.2 (8.5)	<0.0001
General health status, *n* (%)			
Poor	324 (8.7)	250 (7.6)	0.0464
Fair	1149 (30.9)	937 (28.7)	
Good	1665 (44.8)	1528 (46.7)	
Very good	437 (11.7)	401 (12.3)	
Excellent	146 (3.9)	154 (4.7)	
Pain intensity, *n* (%)			
Severe	404 (10.2)	318 (9.2)	0.0913
Moderate	1231 (31.2)	1017 (29.4)	
Mild	618 (15.7)	571 (16.5)	
No pain	1692 (42.9)	1551 (44.9)	
Number of comorbidities, mean (SD)	3.5 (2.8)	3.4 (2.8)	0.1369
Injury type, *n* (%)			
ABI	2171 (55.0)	2203 (63.7)	<0.0001
SCI	1774 (45.0)	1254 (36.3)	
Environmental variables			
Informal support, *n* (%)			
Not required	1853 (49.1)	1691 (52.2)	<0.0001
Received	1111 (29.5)	1123 (34.6)	
Not/partially received	806 (21.4)	428 (13.2)	
Pre-admission living arrangements, *n* (%)			
Home without health services	3205 (81.2)	2789 (80.7)	0.0183
Home with health services	443 (11.2)	402 (11.6)	
Assisted living	94 (2.4)	51 (1.5)	
Residential care	85 (2.2)	88 (2.5)	
Other	118 (3.0)	127 (3.7)	
Payer sources			
Federal/ provincial	3653 (92.6)	3304 (95.6)	<0.0001
WCB/WSIB	73 (1.8)	49 (1.4)	
Insurance	219 (5.6)	104 (3.0)	

FIM™: Functional Independence Measure; SD: standard deviation; WCB: Workers' Compensation Board; WSIB: Workplace Safety and Insurance Board.

Table VI. *Multivariate logistic regression analyses for rehabilitation waiting (*n *= 7012)*

Significant variable	Median wait days	ORs	*p*-value
Age, years			
Young (<30) (*n*=1011)	2	Ref.	<0.0001
Middle (30–70) (*n*=4184)	1	0.916	
Old (>70) (*n*=1817)	1	0.668	
Language			
English (*n*=6503)	1	Ref.	<0.0001
Other (*n*=509)	2	1.64	
Rurality			
Rural (*n*=1312)	3	Ref.	<0.0001
Urban (*n*=5501)	1	0.627	
Unknown (*n*=199)	1	0.688	
Motor FIM™ score	1	1.008	<0.0001
Cognitive FIM™ score	1	0.974	<0.0001
Informal support			
Not required (*n*=3544)	1	Ref.	<0.0001
Received (*n*=2234)	2	1.145	
Not/partially received (*n*=1234)	1	0.555	
Pre-admission living arrangement			
Home without health services (*n*=5665)	1	Ref.	0.0043
Home with health services (*n*=813)	1	1.268	
Assisted living (143)	1	0.823	
Residential care (*n*=164)	2	1.368	
Other (*n*=227)	2	1.302	
Payer sources			
Federal/provincial (*n*=6584)	1	Ref.	<0.0001
WCB/WSIB (*n*=106)	1	0.723	
Insurance (*n*=322)	0	0.526	

FIM™: Functional Independence Measure; WCB: Workers' Compensation Board; WSIB: Workplace Safety and Insurance Board; OR: odds ratio.

patient received post-TBI rehabilitation. As we found, patients with other payer sources, such as workers' compensation or private insurance, were more likely to commence rehabilitation programs without waiting. This may be because without other cost coverage, patients have less choice regarding type of hospital accommodation (e.g. private, semi-private or a standard room). A person without private insurance may be restricted as to the type of bed they can access. In addition, private insurance may facilitate better case management, facilitating inpatient rehabilitation. Although there were statistically significant differences, in reality the median wait times for those with or without private insurance differed by about one day. This is true for many of the other variables.

The research findings also reveal some general challenges that exist in terms of providing a publicly funded universally accessible healthcare service within a large geographical area with a relatively sparse population. Patients from more rural areas may be differentially affected in terms of access due to their distance from inpatient rehabilitation services; as such, further investigation should include actual patient outcomes. Accessibility regarding primary language also requires further investigation, as Canada has a very diverse population (14).

The limitations of this study related to issues relevant to secondary data analysis. There were missing observations relating to our key outcome variable. Furthermore, our measure of wait time was from the perspective of the provider of inpatient rehabilitation and may not necessarily reflect actual wait time, especially from the perspective of those referring patients to care. Despite these limitations, the NRS captures a wide range of variables that are systematically collected prospectively at a population level, and as such, provides very valuable information. Our very large sample also resulted in statistically significant findings, even among small differences.

In conclusion, factors associated with perceived wait times appear to be similar for both populations with ABI and SCI. Factors that influence wait times also relate to both conditions. Persons already being serviced either in private practice or in another rehabilitation facility had the longest wait times. From a policy viewpoint, the glass can be seen as half full, or half empty. In general, median wait times were relatively small, with most people being admitted relatively quickly. There may be efficiency issues for rehabilitation facilities; for instance, we do not know from these data how many patients were waiting in acute care for an inpatient rehabilitation bed, even though they may not have required acute care services. It should be noted that Canadian inpatient rehabilitation hospitals and services require a patient be medically stable for rehabilitation services; tolerance for at least two hours of rehabilitation is also required. Most patients go directly to inpatient rehabilitation services in Canada, with a small minority going to slow-stream rehabilitation in complex continuing care before admission to inpatient rehabilitation vs attending a sub-acute facility. As such, Canadian patients typically spend more time in acute care prior to admission to inpatient rehabilitation than in the USA (14). Future research should therefore address whether patients are waiting for rehabilitation in acute care, as delays in accessing rehabilitation may be detrimental to recovery from brain injury (15).

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