

Title: Post-acute care referral and inpatient rehabilitation admission criteria for persons with brain injury across two Canadian provinces

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Post-acute care referral and inpatient rehabilitation admission criteria for persons with brain injury across two Canadian provinces

Abstract

Purpose: Investigate health care providers' perceptions of referral and admission criteria to brain injury inpatient rehabilitation in two Canadian provinces.

Methods: Health care providers (n=345) from brain injury programs (13 acute care and 16 rehabilitation facilities) participated in a cross-sectional web-based survey. Participants rated the likelihood of patients (traumatic brain injury and cerebral hypoxia) to be referred/admitted to rehabilitation and the influence of 19 additional factors (e.g. tracheostomy). Participants reported the perceived usefulness of referral/admission policies and assessment tools used.

Results: Ninety-one percent acute care and 98% rehabilitation participants reported the person with traumatic brain injury would likely or very likely be referred/admitted to rehabilitation compared to respectively 43% and 53% for the patient with hypoxia. Two additional factors significantly decreased the likelihood of referral/admission: older age and the combined presence of minimal learning ability, memory impairment and physical aggression. Some significant inter-provincial variations in the perceived referral/admission procedure were observed. Most participants reported policies were helpful. Similar assessment tools were used in acute care and rehabilitation.

Conclusions: Health care providers appear to consider various factors when making decisions regarding referral and admission to rehabilitation. Variations in the perceived likelihood of referral/admission suggest a need for standardized referral/admission practices.

Key words: Health services accessibility, Brain injuries, Decision making, Patient selection, Neurological rehabilitation, Canada

Introduction

Multidisciplinary rehabilitation has been shown to be effective in assisting persons with brain injury overcome the challenges of their disability and improve psychosocial functioning [1,2]. The importance of providing *timely* rehabilitation services to all patients presenting with rehabilitation potential has been stressed in recent best-practice guidelines since earlier rehabilitation is usually associated with better outcome [1]. Nonetheless, differential access to rehabilitation services seems common. In the United States and Canada, studies have reported 15% to 31% of adults with traumatic brain injury referred to rehabilitation services after hospitalization [3-7]. Regional variability in the availability of rehabilitation services has also been observed, with some parts of Canada (e.g., Newfoundland and Labrador) having little or no brain injury rehabilitation services, while other regions (e.g., Québec and Ontario) have a relative abundance. Previous research suggests differential access to rehabilitation services following acquired brain injury can be attributed to the influence of various factors [8].

Patient-related factors have been found to influence clinicians' decisions when selecting brain injury patients for rehabilitation [9]. For example, it is commonly reported that older patients are less likely to access rehabilitation [10,11], while other patient characteristics such as co-morbid conditions or injury severity have also been found to influence access to such services [1,12,13]. Organizational factors may also influence admission to rehabilitation. Indeed, factors such as the availability of post-acute care rehabilitation resources (e.g., number of inpatient rehabilitation beds, early supported discharge programs, etc.) or the proximity of rehabilitation services to patients' homes have been found to influence post-acute care referral [9,14,15].

An environmental scan of factors affecting referral patterns of patients with brain injury was conducted with program managers of urban inpatient rehabilitation facilities in Québec and Ontario [16]. In this study, managers from four rehabilitation facilities reported using similar admission and exclusion criteria based on patients' rehabilitation potential' and on patients' ability to participate in therapies for 15-30 minutes per day. Patients in a comatose or persistent vegetative state, exhibiting medical instability, drug-resistant organisms, active psychiatric or behavioural issues impacting participation in rehabilitation were likely to be excluded from such facilities. However, one facility indicated virtually never refusing any referrals from hospitals and accepting patients on a trial basis sometimes up to 2 years post-injury, as long as patients can sustain 15 minutes of therapy per day.

Rehabilitation managers' viewpoints provided insight regarding patient access to rehabilitation services, but less is known regarding clinician's decision-making when selecting patients for rehabilitation. Clinicians involved in post-acute care referral decisions act as 'gatekeepers' of access to rehabilitation services [17]. They can play a critical role in the decision to refer a patient or not to rehabilitation by making judgements based on perceptions of patients' needs and assessing patients' rehabilitation potential. Most of their decisions are influenced by the various factors mentioned above. The question of referral and admission criteria is relevant to all stakeholders, including patients, families and policymakers. Indeed, certain individuals with brain injury may not be receiving the care they need because of variations in care delivery systems [18-20].

Study objectives

The overall goal of this study was thus to investigate health care providers', i.e., program managers and clinicians, perceptions of post-acute care referral and inpatient rehabilitation admission criteria. The specific objectives were to: (1) examine health care providers' perceptions about patient-related factors influencing decision-making with regards to transfer of persons with brain injury from acute care facilities to inpatient rehabilitation facilities, (2) compare Québec and Ontario's health care providers' perceptions of patient-related factors influencing such decision-making, (3) document the presence and perceived helpfulness of a policy or guidelines for referral or admission to inpatient rehabilitation, and 4) examine the assessment tools used to make referral and admission decisions. We also explored whether being involved on an admission committee influenced perceptions about the likelihood of admission to inpatient rehabilitation.

Methods

Study design

We conducted a web-based survey with a sample of health care providers (clinicians and program managers) working in brain injury programs in 13 acute care facilities and 16 inpatient rehabilitation facilities across the two most populated provinces in Canada, i.e., Québec and Ontario. Telephone interviews were also conducted with brain injury program managers to complete descriptive data. Ethical approval for this study was obtained from all participating facilities.

Participants

Program managers and clinicians (e.g., physicians, physical and occupational therapists, social workers) working with persons with brain injury in acute care and rehabilitation facilities were invited to participate in the study. They were recruited from facilities treating annually a substantive number of persons (> 50 /year) as documented in the Quebec Trauma Registry or researchers' direct knowledge of the Ontario health care system. Ontario-based programs include services delivered to persons with traumatic brain injury or acquired non-traumatic brain injury (e.g., hypoxia or cerebral tumors) excluding stroke, while in Québec the programs provide services exclusively to patients with traumatic brain injury. From here on, these programs will be referred to as brain injury programs. The participants were included in the study if they had worked at the facility's brain injury program for ≥ 6 months, had provided or managed brain injury rehabilitation for ≥ 3 of the previous 12 months, had been involved with service delivery or management of ≥ 2 adults with brain injury per month, could understand English or French and provided consent using an online form.

Recruitment

Managers of brain injury programs in rehabilitation facilities and managers of trauma units in acute care facilities were contacted electronically and by telephone. They were asked to forward an e-mail invitation to their entire staff inviting them to participate in a web-based survey. Two reminders were sent to clinicians two and four weeks later. For recruitment in acute care facilities, the invitation was further circulated within neurosurgery units and/or critical care, intensive care and stepdown units (or equivalent) to ensure all relevant acute care staff were contacted, particularly physicians. Likewise, within selected rehabilitation facilities,

program managers posted a copy of the email invitation on billboards because some staff (e.g., nurses) did not have e-mail accounts.

Survey instrument

The team developed a 10-15 min web-based survey for health care providers working in acute care and rehabilitation settings and made it available in English and French. Two rehabilitation professionals with experience in brain injury care tested the survey to verify clarity and coherence. The content of the survey was based on the environmental scan, a literature review on factors influencing transfer processes and the investigators' clinical expertise and included questions considered important in the Canadian context. The survey included four sections. The first section posed questions designed to document participants' professional characteristics. A second section included two clinical case scenarios developed and reviewed for plausibility and pertinence; one describing a patient with traumatic brain injury involved in a motor vehicle accident and another with a brain injury who suffered an hypoxic brain injury following cardiac arrest (please refer to this article's supplementary material for full case scenario description). The survey was deployed in two slightly different versions to reflect the realities of the two settings. Specifically, health care providers from *acute care* were asked to use a 4-point Likert scale to indicate the likelihood of *referral* of these patients to inpatient rehabilitation (very likely, somewhat likely, somewhat unlikely, very unlikely, not sure/don't know), while health care providers from inpatient *rehabilitation* facilities were asked to rate the likelihood that these patients would be *admitted* to the brain injury program of their facility. All other questions were identical. All participants were then asked to consider 19 additional and independent patient-related factors: patient has vancomycin resistant enterococcus, no

discharge destination, reluctant to participate in rehabilitation, confused (requires one on one supervision), has a tracheotomy, has a peripherally inserted central catheter, has a history of substance abuse, requires intravenous access for antibiotics, has dysphagia requiring gastrostomy or jejunostomy, is 85 years old, lives alone without support in the area, has history of chronic psychiatric illness, does not speak English or French, has insurance covering 24 hours of nursing support after discharge, has some new learning ability but has quadriparesis, has some new learning ability but also quadriparesis and is verbally aggressive, has minimal new learning ability and is amnesic, has minimal new learning ability but also amnesic and verbally aggressive, has minimal new learning ability but also amnesic and physically aggressive. Participants rated the likelihood of post-acute care referral or inpatient rehabilitation admission of the patient depicted in the initial scenario while considering each one of these factors. Participants were asked to consider the influence of each factor independently from the others and not to consider the factors in a cumulative manner. The third section of the survey was also tailored for acute care and rehabilitation settings and asked participants whether they believed their facility had a policy to help determine which patients with brain injury would be *referred to*, or *admitted to* inpatient rehabilitation. Participants responding positively were then asked whether they felt the guidelines were helpful and respected: always, most of the time, sometimes, rarely, never or not sure / don't know. In the final section, participants were asked whether their facility routinely used assessment tools measures to help make referral or admission decisions and to indicate commonly used measures.

Data collection procedures

The survey, administered using the web service www.fluidsurveys.com was open to all facilities from April 15 to December 23, 2011. The participants received a request from their program manager about the study via email. This email included a hyperlink to the acute care or rehabilitation version of the survey and participants entered a facility-specific code to access the questionnaire. The code was designed to ensure participants were presented with the version of the consent form approved by their local research ethics board. Furthermore, a short telephone interview was conducted with program managers to document their facility's organizational characteristics. Questions related to whether their facility was university-affiliated, whether research on brain injury care was conducted within their facility, whether their facility had an official referral or admission policy or guidelines concerning patients with brain injury, how many designated beds were available for brain injury patients and how many brain injury patients had gone through their facility during the previous year.

Data analysis:

Descriptive statistics were used to describe the survey participants and facilities. More specifically, frequency counts were calculated to describe participant and facility characteristics, perceptions about the presence and helpfulness of referral or admission policies and to describe the reported assessment tools. For responses related to the case scenarios, percentages of participants who felt the patients in the initial case scenarios were 'likely' or 'very likely' to be referred/admitted was calculated. The impact of 19 patient-related factors was analyzed by examining the proportion of health care providers who felt the patient in the scenario was likely to be admitted as each additional patient-related factor was introduced into

the scenario. Percentage calculations were computed for the entire group of participants as well as separately for those from Québec and Ontario. Chi-square analyses were then conducted on the data from the entire group of participants to assess the perceived likelihood of referral/admission when each of the 19 characteristics was considered compared to responses to the initial scenario. Chi-square analyses were further used to compare perceived likelihood of referral/admission between health care providers from the two provinces on the initial scenario and when considering each of the 19 patient-related factors. Finally, chi-square analyses were conducted to determine whether being involved on an admission committee influenced their perception of the likelihood of referral/admission. In all analyses involving case scenarios, a significance threshold of $p < 0.01$ (instead of 0.05) was used as a precaution to account for the multiplicity of chi-square analyses and therefore decreasing the odds of obtaining significant results by chance only. Stata 12.1 software was used for statistical analysis [21].

Results

Survey response rate and participants' characteristics

Thirty-four facilities from the two provinces were identified and approached for the study. Five facilities declined to participate for various reasons (issues with time commitments and study pertinence), leaving 29 facilities included in the study. Figure 1 details the results of the recruitment process. Approximately 1144 individuals from acute care facilities were sent an e-mail invitation by their program managers to participate in the survey. One hundred and twenty-nine acute care participants began the survey but twenty-six did not complete it, thus

explaining the gradual decrease in number of acute care participants presented in the tables. Likewise, based on local managers' reports, approximately 788 individuals from rehabilitation facilities were sent an e-mail invitation. Two hundred and sixteen rehabilitation participants began the survey but twenty-two did not complete it. Overall, 433 individuals across all facilities provided consent to participate and 345 (80%) met the inclusion criteria and were included in the study. The characteristics of survey participants are in table 1.

Insert figure 1 about here

Insert table 1 about here

Participating facilities

Managers at 28 of the 29 facilities provided information on the organizational context of their facility (table 2). In acute care, program managers reported having access to 12 to 45 beds, with 3 Québec-based managers reporting no limits on the number of beds since their facility is not allowed to refuse patients. One Ontario-based program manager reported their facility had no designated beds for brain injury but rather a general neurosurgery unit. In rehabilitation, program managers reported having access to between 5 to 27 designated beds for brain injury with 6 facilities reporting no specific number. The number of patients treated for brain injury ranged from 10 to 533 for the last year on record. Program managers from 2/8 (25%) of Ontario and 3/5 (60%) of Québec acute care facilities reported inpatient and outpatient rehabilitation services were offered to patients with brain injury at their facility; 100% of inpatient rehabilitation facilities reported the same.

Insert table 2 about here

Perceived likelihood of referral and admission to inpatient rehabilitation

Case scenario 1: 27-year-old woman who sustained a severe traumatic brain injury

Acute care: Table 3 provides the percentages of acute care participants who indicated this patient would be likely or very likely to be *referred* to inpatient rehabilitation. Ninety-one percent of all participants, both in Quebec and Ontario indicated this patient is either 'likely' or 'very likely' to be referred to inpatient rehabilitation. When acute care participants were asked to consider additional patient-related factors, all but five of the factors were perceived as decreasing the likelihood that this patient would be referred to rehabilitation. Significant differences were found between Québec and Ontario for two factors: 1) if the patient was reluctant to participate to rehabilitation and 2) if the patient presented with minimal new learning ability, and if they were amnesic and verbally aggressive, with both factors showing higher probabilities of referral in Quebec compared to Ontario.

Rehabilitation. Table 3 provides the percentages of participants who indicated that this patient would be likely or very likely to be *admitted* to their inpatient rehabilitation facility. Overall, 98% of all participants indicated this patient would be 'likely' or 'very likely' to be admitted, which was not significantly different between Quebec and Ontario). When rehabilitation participants were asked to consider additional patient-related factors, about a third of the factors were perceived as decreasing the likelihood of admission. There was a significant difference between Québec and Ontario for six factors, all probabilities of referral being higher in Quebec compared to Ontario. The perception of rehabilitation participants who reported being or having been on their facility's admission committee did not differ from the other

rehabilitation participants' perception as chi-square analyses indicated no significant differences for the initial case scenario or for any of the additional 19 patient-related factors.

Insert table 3 about here

Case scenario 2: 58-year-old man who sustained a cardiac arrest with hypoxic brain injury

Acute care. Table 4 provides the percentages of acute care participants who indicated this patient would be 'likely' or 'very likely' to be referred to inpatient rehabilitation. Forty-three percent of the participants indicated this patient is either 'likely' or 'very likely' to be referred, which was not significantly different between Quebec and Ontario. For the entire group of acute care participants, two additional patient-related factors significantly affected the perceived likelihood of referral: 1) if the patient was 85 years old and 2) if the patient presented with minimal new learning ability, and if they were amnesic and physically aggressive. Four significant interprovincial differences were identified, with the proportions being significantly higher in Quebec compared to Ontario in all cases (see Table 4).

Rehabilitation. Table 4 provides the percentages of participants who indicated this patient would be 'likely' or 'very likely' to be admitted to their inpatient rehabilitation facility. Overall, 52% of the participants indicated this patient was either 'likely' or 'very likely' to be admitted. Contrary to previous situations, the proportion of participants from rehabilitation who felt the patient was likely to be admitted to rehabilitation was significantly higher in Ontario (59%) compared to Quebec (41%). When asked to consider additional patient-related factors, four factors were perceived as decreasing the likelihood of admission: 1) if the patient

was infected with a multiple antibiotic-resistant organism, 2) if the patient had a history of substance abuse, 3) if the patient was 85 years old and 4) if the patient presented with minimal new learning abilities, is amnesic and physically aggressive. Eight significant interprovincial differences were identified, with all differences showing a higher probability of referral in Ontario compared to Quebec. The perception of rehabilitation participants who reported being or having been on their facility's admission committee did not differ from those of the other rehabilitation participants for the initial case scenario or for other patient-related factors.

Insert table 4 about here

Referral and admission policies or guidelines

Table 5 provides a description of participants' perception with regards to the presence and helpfulness of post-acute care referral to rehabilitation or inpatient rehabilitation admission policies or guidelines. The perception of rehabilitation participants who were, or had been, on an admission committee of a brain injury rehabilitation facility (n=51) were not significantly different from those of other participants (n=149).

Assessment tools

When asked about the use of assessment tools to make referral or admission decisions, there was a large proportion of participants who were unsure or did not know (35% of participants in acute care, 57% in rehabilitation). Nineteen percent of participants in acute care responded that assessment tools were never used, 17% indicated assessment tools were used for fewer than half of patients and 29% indicated assessment tools were used in more than half of cases.

As for rehabilitation participants, 15% indicated assessment tools were never used, 12% reported use for fewer than half of patients and 16 % indicated assessment tools were used in more than half of cases.

When asked which assessment tools were routinely used to help make referral or admission decisions, few participants responded. Of the 103 participants in acute care who completed the survey, 35 (34%) named at least one assessment tool used to assist referral decisions. Of the 194 participants in rehabilitation who completed the survey, 32 (17%) named at least one assessment tool to assist admission decisions. Table 6 indicates the five most frequently mentioned assessment tools. The top 5 most frequently reported assessment tools were identical across acute care and rehabilitation facilities, although the frequency at which they were mentioned varied.

Insert table 5 and 6 about here

Discussion

A relatively large representative sample of health care providers from many disciplines across major centres providing care to brain injury patients in Québec and Ontario was obtained to investigate perceptions of post-acute care referral and inpatient rehabilitation admission criteria in the two most populated Canadian provinces. The majority of the respondents worked for more than six years with brain injury clientele indicating that they had expertise in the field. By probing the perceptions of survey respondents, the results for two clinical case scenarios illustrate how health care providers' perceptions of rehabilitation candidacy may differ and

how numerous factors can impact post-acute care referral and rehabilitation admission decisions. In the first case scenario (patient with traumatic brain injury), a vast majority of both acute care and rehabilitation health care providers were of the opinion that the patient was likely or very likely to be referred and admitted to rehabilitation. This is in contrast with results obtained for the second case scenario involving a patient with hypoxic brain injury since about only half of the health care providers would refer or admit this patient to rehabilitation. This result may reflect discrepancies in how health care providers perceive rehabilitation potential in certain patient situations. With regard to the influence of different patient-related factors on decision-making, two factors have consistently shown to significantly decrease the likelihood of referral or admission to inpatient rehabilitation: older age as well as the combined presence of minimal learning ability, memory impairment and physical aggression. Health care providers' perception that age and cognitive-behavioural status affect referral or admission to inpatient rehabilitation is congruent with evidence that older age and cognitive status are amongst factors associated with poorer rehabilitation outcome in the traumatic brain injury population [22,23]. Furthermore, more than half of the additional factors significantly decreased the likelihood of referral or admission for the patient in the first case scenario. Some of these factors related to situations requiring medical or nursing care (e.g., patient has tracheotomy). Other factors related to social situations (e.g., patient has no discharge destination) or to patient's motivation to participate in rehabilitation (e.g., patient is reluctant to participate in rehabilitation). These factors have also been reported to influence clinicians' assessment of acquired brain injury patients' rehabilitation potential for inpatient rehabilitation [24,25]. The patient in the second case scenario was much less likely to be referred or admitted from the outset and only two factors further reduced this likelihood.

Overall, acute care respondents were less likely to refer patients that their rehabilitation counterparts would likely have admitted. This suggests that some patients might not be referred to rehabilitation following acute care hospitalization even though health care providers in rehabilitation feel they can provide rehabilitation interventions for these patients. Ideally, dialogue should take place between acute care and rehabilitation for appropriate decision-making so the right patient can access rehabilitation at the right time, for the right reasons. Clinicians consider a multitude of factors when judging their patients' rehabilitation potential and the results of this study provide some further insights into the complexity of the task of determining who is an appropriate rehabilitation candidate [26].

With respect to the results regarding policies and guidelines, rehabilitation respondents' perception did not appear to be influenced by being on their facility's admission committee. The majority of participants in both provinces believe policies/guidelines are helpful and when present, reported that they were respected always or most of the time. This suggests that developing policies/guidelines is a worthwhile endeavour since they may help clinicians' decision-making and ultimately assist in standardizing care. Guidelines for determining stroke patients' rehabilitation candidacy have been recently published [27] and general inpatient rehabilitation referral guidelines have also been developed [28,29]. Moreover, clinical practice guidelines have been recently developed for the rehabilitation of persons with moderate and severe traumatic brain injury[30], however they do not include specific recommendations regarding referral and admission criteria for persons with brain injury for the Canadian context.

As for the results regarding the use of assessment tools, over a third of acute care participants and over half of rehabilitation participants were not sure or did not know whether their brain injury program routinely used standardized tools in referral or admission decisions.

Even more surprisingly, 15% to 19% of participants reported assessment tools were never used. Only a small number of responses were given about the assessment tools, perhaps because it was the last question on the survey. However, the five most frequently mentioned tools were identical for both acute care and rehabilitation participants (i.e. GCS, RLA, MoCA, FIM, GOAT). These tools were originally developed to screen or evaluate patient's impairments or activity limitations. While there is some literature about these tools in predicting long term outcome, little is known about the predictive value of these tools in regards to the value of rehabilitation admission. These results seem to indicate few tools exist to assist in clinical decision-making about referral and admission to rehabilitation.

Study limits

The results are based on perceptions and not observed behaviours and thus may not reflect actual practice. A further limitation relates to the fact that the survey instrument was developed specifically for this study and apart from content validity, did not undergo reliability testing or extensive validation. Furthermore, when participants were asked to consider the influence of additional patient-related factors on the likelihood of referral or admission to rehabilitation, systematic response bias may have been introduced given the order in which the additional factors were presented in the survey. Although participants were asked to consider each additional factor independently, participants may have had difficulty dissociating each factor from the prior one and this may have systematically influenced their following responses. For example, the first additional factor presented referred to older age (85 years old) and this factor may have influenced the participants responses regarding the following factors. Although there was a low response rate for the survey, we believe the relatively large sample of health care

providers included those most concerned with rehabilitation candidacy decisions in the participating facilities. Also, factors other than patient-related or organizational factors may influence the perception of rehabilitation potential in actual practice. Although this study provided some insights into the perception of health care providers working in two different types of setting (acute care and inpatient rehabilitation) and in two provinces, the influence of organizational factors on the perception of rehabilitation potential was not extensively investigated.

In conclusion, health care providers appear to consider various factors when making these decisions. Variations between acute care and rehabilitation health care providers' perceptions and inter-provincial variations in the perceived referral/admission procedures suggest there is a need for standardization of referral and admission practices. Research on a common definition of rehabilitation potential following brain injury and its measurement would be instrumental in reaching this objective and assisting clinicians in their decision-making process. Thus, further research is required to better understand the concept of rehabilitation potential and how it is, or should be, measured to provide equitable access to brain injury rehabilitation services.

Disclosure statement

The authors report no declarations of interest

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Figure 1. Recruitment process and survey response rate

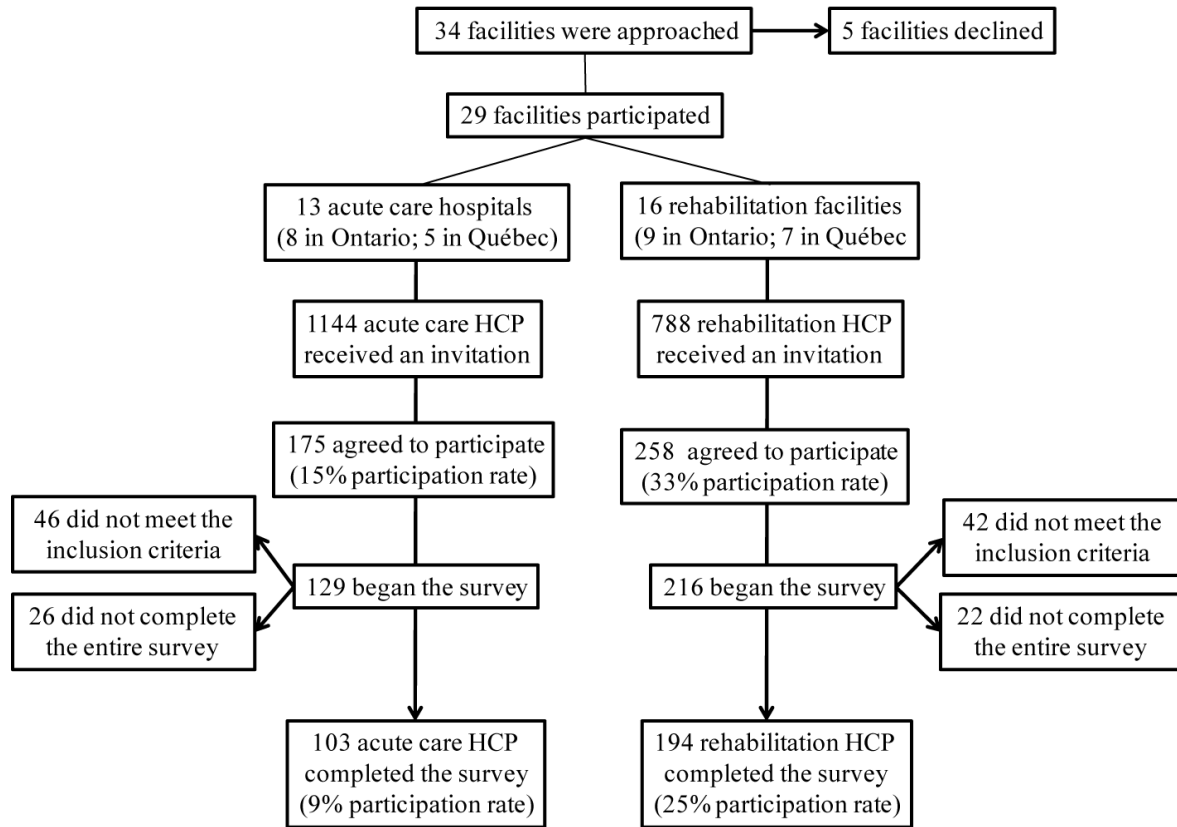


Table 1: Characteristics of survey respondents (n = 345)

Respondents who began the survey	Acute care (n = 129)	Rehabilitation (n = 216)
Worked at facility's program for persons with ABI/TBI		
7 months - 5 years	67 (38%)	97 (38%)
6+ years	101 (58%)	148 (57%)
Highest level of professional training		
Vocational or university certificate	20 (16%)	42 (19%)
Bachelor's	68 (53%)	87 (40%)
Masters / Professional masters	30 (23%)	65 (30%)
PhD	2 (2%)	15 (7%)
MD	9 (7%)	7 (3%)
Profession		
Nurse	50 (39%)	31 (14%)
Physiotherapist	26 (20%)	22 (10%)
Social worker	15 (12%)	22 (10%)
Occupational therapist	14 (11%)	23 (11%)
Physician	9 (7%)	7 (3%)
Speech language therapist	3 (2%)	19 (9%)
Psychologist	2 (2%)	3 (1%)
Neuropsychologist	2 (2%)	18 (8%)
Other*	8 (6%)	71 (33%)
Are / Have been on an admission committee		
Yes	N/A	51 (26%)
No		149 (74%)
Number of respondents who completed the survey		
Yes	103 (80%)	194 (90%)
No	26 (20%)	22 (10%)

* In acute care, participants from 'other' professions included dietitians, respiratory therapists and others who did not indicate a profession. In rehabilitation, participants from 'other' professions included rehabilitation therapists and assistants, managers (of unspecified profession), specialized educators, therapeutic recreationists, spiritual care counsellors, dietitians, psychoeducators, pharmacists and life skills counsellors.

Table 2: Characteristics of participating facilities as disclosed by program managers (n = 28)

Acute care facilities			Inpatient rehabilitation facilities		
	Québec (5)	Ontario (8)		Québec (7)	Ontario (8)
University-affiliated	100%	100%	University-affiliated	57%	88%
Research on brain injury care conducted at their facility	100%	63%	Research on brain injury care conducted at their facility	86%	88%
Official discharge policy	100%	50%	Official admission policy	86%	100%
			Admissions decided:		
			Using phone	100%	63%
			Using in-person visits	0%	75%
			Using fax / mail	100%	88%
			Using e-systems	29%	63%

Table 3: Case scenario 1 - Percentage of participants who indicated the patient (pt) would be 'likely' or 'very likely' to be referred to or admitted to inpatient rehabilitation

	Acute care perception of likelihood of referral			Rehabilitation perception of likelihood of referral		
	TOTAL (n=114)	Québec (n=46)	Ontario (n=68)	TOTAL (n=200)	Québec (n=82)	Ontario (n=118)
Initial case scenario 1 (Pt with TBI)	91%	91%	91%	98%	99%	97%
Pt has VRE	85%	83%	87%	92%	93%	91%
Pt has no discharge destination	77% *	80%	75%	91%	96%	87%
Pt is reluctant to participate in rehabilitation	63% *	85% §	49%	82% *	89% §	76%
Pt is confused, 1:1 supervision	64% *	74%	57%	82% *	90% §	76%
Pt has tracheotomy	59% *	61%	57%	71% *	65%	75%
Pt has PICC-line	75% *	67%	81%	78% *	74%	81%
Pt has history of substance abuse	85%	91%	81%	100%	100%	99%
Pt requires IV access for antibiotics	73% *	70%	75%	83% *	85%	85%
Pt has dysphagia requiring gastrostomy or jejunostomy	88%	87%	88%	91% *	96%	87%
Pt is 85 years old	69% *	80%	62%	83% *	91% §	76%
Pt lives alone, no support in the area	83%	89%	78%	100%	99%	100%
Pt has history of chronic psychiatric illness	70% *	74%	68%	92%	89%	93%
Pt does not speak English or French	80% *	83%	78%	91%	96%	87%
Pt has insurance covering 24h nursing support after discharge	84%	85%	84%	96%	96%	95%
Pt has some new learning ability but has quadriparesis	78% *	83%	75%	86% *	85%	86%
Pt has some new learning ability but also quadriparesis and is verbally aggressive	69% *	76%	65%	81% *	83%	80%
Pt has minimal new learning ability and is amnesic	58% *	74%	47%	82% *	90% §	75%
Pt has minimal new learning ability, is amnesic and verbally aggressive	57% *	70% §	49%	72% *	82% §	64%
Pt has minimal new learning ability, is amnesic and physically aggressive	49% *	61%	41%	61% *	72% §	53%

* Significantly different from the initial scenario ($p < 0.01$); § Significant difference between the two provinces.

Pt, patient; VRE, vancomycin resistant enterococcus; PICC, peripherally inserted central catheter; IV, Intravenous

Table 4: Case scenario 2 - Percentage of participants who indicated the patient (pt) would be 'likely' or 'very likely' to be referred to or admitted to inpatient rehabilitation

	Acute care perception of likelihood of referral			Rehabilitation perception of likelihood of referral		
	TOTAL (n=103)	Québec (n=40)	Ontario (n=63)	TOTAL (n=195)	Québec (n=78)	Ontario (n=117)
Initial case scenario 2 (Pt with anoxia)	43%	48%	40%	52%	41% [§]	59%
Pt has vancomycin resistant enterococcus (VRE)	44%	43%	44%	57%*	46%	65%
Pt has no discharge destination	33%	45% [§]	25%	52%	45%	57%
Pt is reluctant to participate in rehabilitation	33%	53% [§]	21%	46%	41%	50%
Pt is confused, 1:1 supervision	32%	45% [§]	24%	48%	37% [§]	55%
Pt has tracheotomy	33%	33%	33%	46%	36%	53%
Pt has PICC-line	45%	45%	44%	52%	44%	58%
Pt has history of substance abuse	46%	50%	43%	60%*	46% [§]	68%
Pt requires IV access for antibiotics	40%	43%	38%	52%	42%	58%
Pt has dysphagia requiring gastrostomy or jejunostomy	47%	50%	44%	54%	45%	61%
Pt is 85 years old	26%*	25%	27%	39%*	32%	44%
Pt lives alone, no support in the area	41%	53% [§]	33%	55%	44% [§]	62%
Pt has history of chronic psychiatric illness	31%	38%	27%	49%	39% [§]	56%
Pt does not speak English or French	44%	45%	43%	54%	46%	59%
Pt has insurance covering 24h nursing support after discharge	47%	45%	48%	56%	44% [§]	64%
Pt has some new learning ability but has quadriparesis	36%	35%	40%	57%	42% [§]	64%
Pt has some new learning ability but also quadriparesis and is verbally aggressive	32%	35%	30%	54%	40% [§]	63%
Pt has minimal new learning ability and is amnesic	32%	33%	32%	49%	44%	52%
Pt has minimal new learning ability, is amnesic and verbally aggressive	29%	33%	27%	46%	40%	50%
Pt has minimal new learning ability, is amnesic and physically aggressive	22%*	25%	21%	36%*	31% [§]	39%

* Significantly different from the initial scenario ($p < 0.01$); § Significant difference between the two provinces.

Pt, patient; VRE, vancomycin resistant enterococcus; PICC, peripherally inserted central catheter; IV, Intravenous

Table 5: Participants' perceptions regarding the presence and helpfulness of referral or admission policies for persons with brain injury at their facility

	Acute (n=129)	Rehab (n=216)
Program managers report an official referral/admission policy or guidelines	69%	93%
Survey participants believe their facility has a referral/admission policy or guidelines	74%	88%
	Acute (n=93)	Rehab (n=191)
Participants believe referral/admission policy or guidelines are helpful ('always' + 'most of the time')	82%	89%
Participants believe referral/admission policy or guidelines are respected ('always' + 'most of the time')	87%	86%

Table 6: Top 5 most frequently listed assessment tools used to help make referral or admission decisions

Tool	Number of acute care participants (n=35)	Number of rehabilitation participants (n=32)
Glasgow Coma Scale (GCS)	18 (51%)	17 (53%)
Rancho Los Amigos Scale (RLA)	13 (37%)	17 (53%)
Montreal Cognitive Assessment (MoCA)	11 (31%)	12 (38%)
Functional Independence Measure (FIM)	10 (29%)	9 (28%)
Galveston Orientation and Amnesia Test (GOAT)	9 (26%)	5 (16%)