



October 2007

Clients Returning to Inpatient Rehabilitation

Summary

Between 2003 and 2007, 11% of clients admitted to inpatient rehabilitation returned to rehabilitation after an initial discharge home. When clients returned for a second stay in rehabilitation for the same condition, they were often discharged at higher levels of function following the second stay. In contrast, if their second stay was related to a second or subsequent episode, they did not gain as much function following that second stay. These findings may help inform best practice and policy discussions around care pathways, as well as the important role of secondary prevention within rehabilitation.

Introduction

This Analysis in Brief examines the clinical and demographic characteristics of inpatient rehabilitation clients who return to inpatient rehabilitation following an initial stay. The analysis is based on a cohort of clients who were discharged home from inpatient rehabilitation for the first time in fiscal years 2003–2004 or 2004–2005 and subsequently returned to inpatient rehabilitation. This cohort was tracked for 24 months following discharge from the initial rehabilitation stay.

The term “return to rehabilitation” in this analysis focuses on inpatient rehabilitation clients who were readmitted to an inpatient rehabilitation facility following an initial stay in rehabilitation, but does not include those who may have been subsequently admitted to other levels of care or discharged home without undergoing a subsequent rehabilitation admission.

While a return to rehabilitation might be considered an indication of disease severity, not all returns are necessarily avoidable, preventable or undesirable. It is important to note that some returns to rehabilitation are planned events. For example, some clients with amputations may be admitted to inpatient rehabilitation to complete a pre-gait program, then be discharged home and then be readmitted later for intense gait training once their skin is healed and a prosthesis is fitted. This is an example of how different pathways of care may affect rates of return to inpatient rehabilitation. In addition, in the context of chronic disease management, multiple admissions to rehabilitation over an extended period might be a normal process of care.

Irrespective of the reason, lower rates of return to rehabilitation may suggest opportunities to learn from practices, care models or other factors contributing to desirable outcomes. Likewise, higher rates may prompt further analysis of potential factors (for example, client characteristics and follow-up care after discharge) and their relative contribution to the return to rehabilitation. These rates need to be considered in the context of other information, such as client and community characteristics, and services received during and after discharge from inpatient rehabilitation.

The results of this analysis shed some light on the demographic profiles, level of function and lengths of stay for client groups that have higher rates of returning to inpatient rehabilitation. The analysis also provides context for different pathways of care and the potential role for secondary prevention of subsequent returns to inpatient rehabilitation for the same or for a different condition.

Methods

This Analysis in Brief outlines the demographic and clinical profiles of clients who returned to rehabilitation in the 24 months after an initial stay. The analysis describes clients of three Rehabilitation Client Groupsⁱ (RCGs) (Orthopedic Conditions, Stroke and Amputation) found to return to inpatient rehabilitation more often and/or at a higher rate. It includes a closer look at the distinctions between clients who returned for the same condition or for a different condition within these three client groups. Determination of whether the condition on return to rehabilitation was the same or different was based on both the RCG and onset date. If clients returned to rehabilitation for the same RCG, analysis of the onset date of the two stays determined whether the second stay was related to the same condition as the first or related to a subsequent condition.

The cohort for analysis was defined as anyone having a first-time admission between April 1, 2003, and March 31, 2005, reported in the National Rehabilitation Reporting System (NRS). The cohort was tracked no later than March 31, 2007, to determine which clients returned to inpatient rehabilitation. For this analysis, only clients who were initially discharged to a home setting were considered. Further details on the selection of the cohort for analysis can be found in tables 6 to 8 in the technical notes at the end of this Analysis in Brief.

i. Rehabilitation Client Groups (RCGs) referenced herein are adapted with permission from the UDSMR impairment codes. Copyright 1997 Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc., all rights reserved.

About the NRS

The NRS was developed by CIHI in 2001 to support data collection by hospitals for inpatient rehabilitation clients who are mainly aged 18 years and older. The rehabilitation services are provided in specialized rehabilitation hospitals and in general hospitals within rehabilitation units, programs or designated rehabilitation beds. As of 2006–2007, there were over 156,000 pairs of admission and discharge records (that is, episodes) in the NRS database, submitted by over 95 hospitals in seven provinces and covering a range of health conditions including strokes, orthopedic conditions and amputations.

A total of 6,010 clients who were discharged for the first time from inpatient rehabilitation in 2003–2004 or 2004–2005 returned to rehabilitation at least once in a 24-month period following the initial discharge. This represented 12% of all clients in the NRS within that time period. By comparison, a total of 45,191 clients (88%) did not return to inpatient rehabilitation following their first stay in that same time period. Given the inherent differences between clients returning home and those discharged to other levels of care, the analysis was limited only to those clients who returned home between their initial inpatient rehabilitation stay and their subsequent readmission. Limiting the analysis to only those who were discharged home following their initial rehabilitation stay, the proportions were similar (11% returning to rehabilitation, 89% not returning to rehabilitation).

About the FIM™ Instrument and Total Function Scores

For the purposes of the NRS, functional status at inpatient rehabilitation admission and discharge is measured using the FIM™ instrument.ⁱⁱ The FIM™ instrument is a measure of disability and caregiver burden associated with the level of disability and is composed of 18 items (13 motor items and 5 cognitive items) that are rated on a scale representing gradations from independent (7) to dependent (1) function. Adding the ratings for these 18 items provides a Total Function Score,ⁱⁱⁱ which has an overall maximum of 126 (18 items x 7). The NRS standard requires that the FIM™ instrument be completed on admission and discharge for all clients who stay four days or longer in an inpatient rehabilitation facility or unit.

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- ii. The FIM™ instrument referenced herein is the property of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.
 - iii. Function Scores referenced in this document are based on data collected using the FIM™ instrument.

Characteristics of Clients Who Return to Inpatient Rehabilitation

As shown in Table 1, clients who returned to rehabilitation were, on average, slightly older than those who did not return (70 years versus 69 years). A higher proportion of these returning clients were female (64% versus 57% for non-returning clients). As well, more clients who returned to rehabilitation had lived alone following their initial discharge from rehabilitation (29% versus 27%).

Table 1. Demographic Profiles of Inpatient Rehabilitation Clients Returning and Not Returning to Rehabilitation, 2003 to 2007

Demographic Profiles	Returned to Rehabilitation (n = 4,228)	Did Not Return to Rehabilitation (n = 35,343)
Average Age at Initial Admission (Years)	69.9	68.6
Sex (Percent)		
Female	2,689 (63.6)	20,264 (57.3)
Male	1,538 (36.4)	15,075 (42.7)
Living Arrangement After Initial Discharge		
With Spouse/Partner/Family (Percent)	2,989 (70.7)	25,888 (73.3)
Alone (Percent)	1,238 (29.3)	9,447 (26.7)

Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Table 2 compares the RCG distribution of all clients who were discharged home after their initial stay only with those who returned to rehabilitation. As mentioned earlier, close to 11% of inpatient rehabilitation clients discharged home during 2003–2004 and 2004–2005 returned to rehabilitation at least once within 24 months following discharge. Of all clients discharged home after their initial stay, 8% returned as part of the same RCG, whereas 3% returned as part of another RCG. Those who were initially admitted with orthopedic conditions represented the largest number of clients who returned to inpatient rehabilitation (63%); however, they also represented the largest number of clients in the overall cohort (54%). In comparison, clients initially admitted for stroke represented 15% of all the clients in the cohort, but only 8% of those who returned to rehabilitation. Amputation clients represented just 3% of all clients in the cohort, but 5% of those who returned to rehabilitation.

Table 2. Rehabilitation Client Group Distribution of All Inpatient Rehabilitation Clients Discharged Home and of Clients Who Returned to Rehabilitation, 2003 to 2007

Rehabilitation Client Group	All Clients Discharged Home (n = 39,571)		Returned to Rehabilitation (n = 4,228)	
	Number	Percent	Number	Percent
Orthopedic Conditions	21,217	53.6	2,685	63.5
Stroke	5,958	15.1	341	8.1
Medically Complex	2,469	6.2	241	5.7
Amputation	1,218	3.1	218	5.1
Pulmonary	999	2.5	132	3.1
Debility	1,180	3.0	127	3.0
Spinal Cord Dysfunction	1,257	3.2	105	2.5
Cardiac	1,141	2.9	104	2.5
Neurological Conditions	901	2.3	79	1.9
Brain Dysfunction	1,637	4.1	72	1.7
Arthritis	400	1.0	53	1.2
Other	1,194*	3.0	71†	1.7
Total	39,571	100.0	4,228	100.0

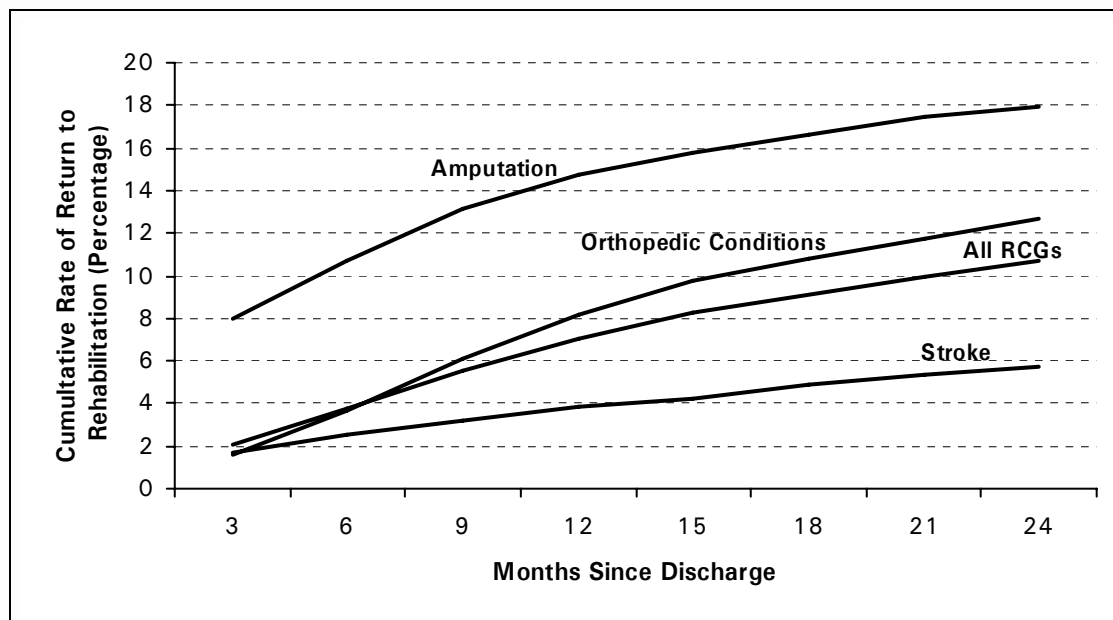
Notes:

* Includes Major Multiple Trauma, Pain Syndromes, Burns, Congenital Deformities, Other Disabling Impairments and Developmental Disabilities.

† Includes Pain Syndromes, Major Multiple Trauma, Other Disabling Impairments and Congenital Deformities.

Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Figure 1. Cumulative Rate of Return^{iv} to Inpatient Rehabilitation for All Rehabilitation Client Groups, Stroke, Orthopedic Conditions and Amputation, 2003 to 2007



Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Figure 1 shows the cumulative rate of return to inpatient rehabilitation for all clients, as well as for orthopedic conditions, stroke and amputation. Although amputation clients represent a smaller proportion of clients returning to rehabilitation, they actually return more frequently and thus have the highest cumulative rate of return compared to orthopedic and stroke client groups. Within three months, clients with a stroke or orthopedic condition were less likely to have returned to rehabilitation when compared with amputation clients (2% versus 8%). Over the 24 months following initial discharge, amputation and orthopedic-condition clients returned at a higher rate than stroke clients. After 24 months, 18% of amputation clients had returned to rehabilitation, compared to 13% and 6% of orthopedic condition and stroke clients, respectively.

The remainder of this Analysis in Brief focuses on differences in demographic characteristics, Function Scores and lengths of stay between clients who returned to rehabilitation and those who did not, within each of the three client groups selected for this analysis (orthopedic, stroke and amputation). In addition, within each group, analysis of clients returning to rehabilitation is further divided into clients who returned to rehabilitation for the same condition for which they were first admitted and those who returned for a different condition.

iv. The cumulative rate of return to inpatient rehabilitation is defined as the number of people who returned to rehabilitation at least once within 24 months following their initial discharge as a proportion of the total number of people who were admitted into rehabilitation for the first time between April 1, 2003, and March 31, 2005.

Clients With Orthopedic Conditions

Close to 13% of clients who were initially admitted to inpatient rehabilitation with orthopedic conditions returned to rehabilitation within 24 months of their initial stay (see Table 3). Among those in this RCG who returned, clients were more likely to return for inpatient rehabilitation for an orthopedic condition (87%) than for any other condition. Clients who returned to inpatient rehabilitation were also younger, on average, than those who did not return (69 years versus 72 years).

Table 3. Frequency of Orthopedic-Condition Clients Returning to Rehabilitation, 2003 to 2007

Orthopedic-Condition Clients	Number	Percent
Did Not Return to Rehabilitation	18,532	87.3
Returned to Rehabilitation One or More Times:		
Reason: Same Orthopedic Condition	1,574	7.4
Reason: Subsequent Orthopedic Condition	760	3.6
Reason: Other Condition	351	1.7
Total	21,217	100.0

Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

A closer look at those who returned to rehabilitation reveals that 32% were initially admitted for post-hip replacement rehabilitation and 37% for post-knee replacement rehabilitation. Almost half of these clients in the orthopedic condition RCG (45%) had osteoarthritis as the most responsible health condition. In addition, 72% were women and 28% were men.

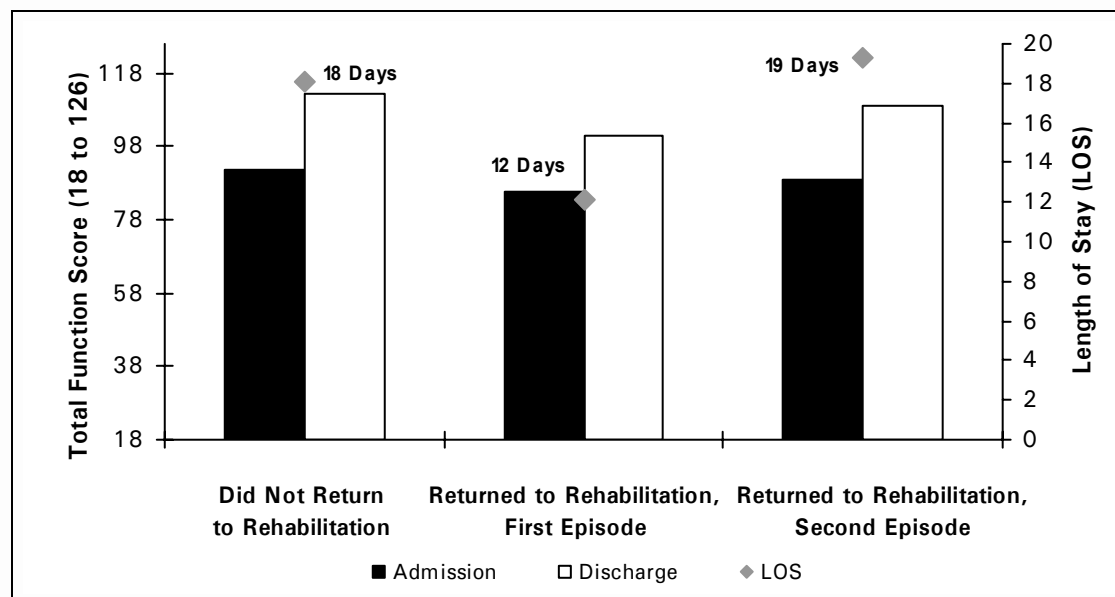
There are many reasons why some people with orthopedic conditions may need to return to rehabilitation following an initial stay. These reasons may be related to complications from surgery, an underlying chronic condition such as arthritis or a new condition not related to the first episode. The following sections focus on differences in Function Scores and length of stay between clients initially admitted to rehabilitation for an orthopedic condition who returned to rehabilitation for the same orthopedic condition, who returned to rehabilitation for a different orthopedic condition and who did not return.

Orthopedic-Condition Clients Returning to Inpatient Rehabilitation for the Same Orthopedic Condition

Clients returning to inpatient rehabilitation for the same orthopedic condition presented with different functional characteristics and different lengths of stay than clients who did not return at all. Those clients who returned to rehabilitation for the same orthopedic condition had significantly lower admission and discharge Total Function Scores during the first admission compared to those who did not return (Figure 2). This difference was almost entirely due to lower scores in the motor subscale of the FIM™ instrument on admission and discharge. Clients with orthopedic conditions returning to inpatient rehabilitation had a significantly shorter length of stay for their first stay when compared to those who did not return (12 days versus 18 days). Their subsequent stay, however, tended to be significantly longer than their first (19 days compared to 12 days).

As shown in Figure 2, clients who returned to rehabilitation for the same orthopedic condition appeared, on average at their second admission, to have lost some function since discharge. However, they were able to regain any lost function during the second rehabilitation stay and were discharged at a higher level of functioning compared to their first discharge. Furthermore, their level of function on discharge from their second stay was similar to that of clients who did not return to rehabilitation.

Figure 2. Average Admission and Discharge Total Function Scores and Length of Stay for Orthopedic Clients Not Returning to Rehabilitation and Orthopedic Clients Returning to Rehabilitation for the Same Orthopedic Condition, 2003 to 2007 (n = 18,941)



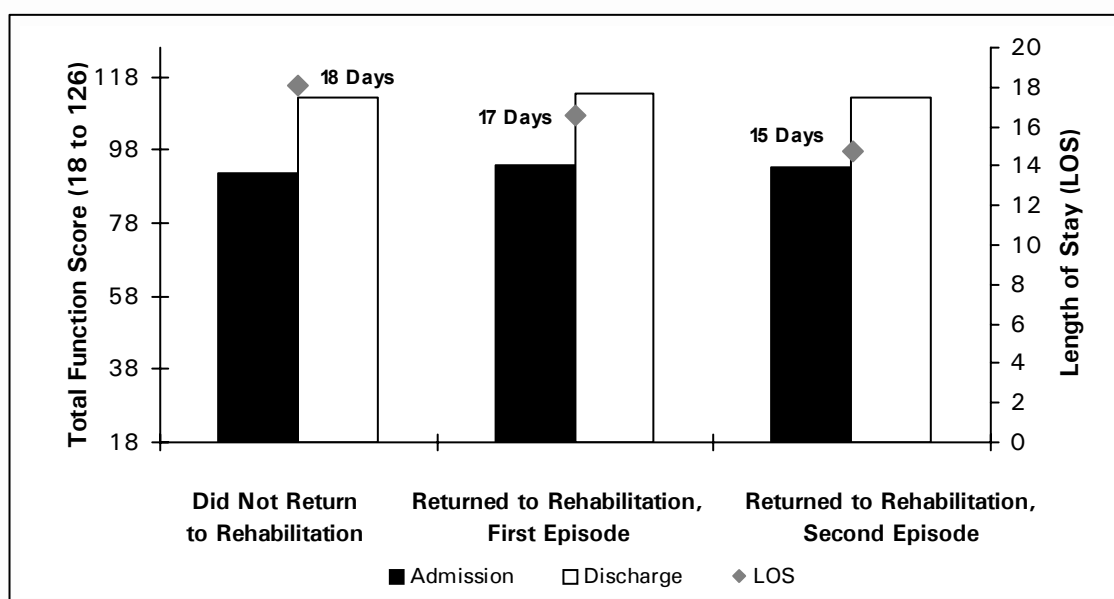
Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Orthopedic-Condition Clients Returning to Inpatient Rehabilitation for a Different Orthopedic Condition

Some orthopedic clients returned to rehabilitation for a different orthopedic condition as suggested by a different date of onset. These clients may be returning for conditions such as a joint replacement revision, another joint replacement or another related or unrelated orthopedic condition. Clients who returned to rehabilitation for a different orthopedic condition did not demonstrate the same patterns in function as those who returned for the same orthopedic condition.

Figure 3 illustrates that clients returning for a different orthopedic condition had similar Total Function Scores on admission and discharge for their first and second stays compared to those who did not return to rehabilitation. This pattern in Total Function Scores across stays may support the idea that each stay was relatively independent, so although the underlying chronic disease (for example, arthritis) remains, admissions to inpatient rehabilitation for orthopedic conditions may be quite episodic in nature. The repetitive pattern in changes in function may therefore reflect the often post-surgical nature of the stays. However, these clients tended to have slightly lower Total Function Scores on discharge from their second stay as compared to their first stay. Therefore, further study analyzing multiple returns to rehabilitation may assist in providing larger context. The average length of stay of the subsequent admission for clients returning for a different orthopedic condition was significantly shorter than their first (15 days versus 17 days).

Figure 3. Average Admission and Discharge Total Function Scores and Length of Stay for Orthopedic Clients Not Returning to Rehabilitation and Orthopedic Clients Returning to Rehabilitation for a Different Orthopedic Condition, 2003 to 2007 (n = 21,152)



Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Stroke Clients

Close to 6% of clients who underwent inpatient rehabilitation for a stroke returned to inpatient rehabilitation within 24 months of discharge from their initial stay (see Table 4). The most frequently occurring reason for a return to rehabilitation was for a condition other than a stroke—for example, orthopedic conditions, medically complex conditions and debility. However, just over half of stroke clients who returned returned due to a stroke-related reason.

Stroke clients who returned to rehabilitation due to the same stroke were significantly younger, on average, than those who did not return (61 years versus 69 years) and those who returned with a subsequent stroke (70 years). They were also more likely to be male (78%) as compared to stroke clients who did not return to rehabilitation (55%) and those who returned for a subsequent stroke (52%).

Table 4. Frequency of Stroke Clients Returning to Rehabilitation, 2003 to 2007

Stroke Clients	Number	Percent
Did Not Return to Rehabilitation	5,617	94.3
Returned to Rehabilitation One or More Times:		
Reason: Same Stroke	46	0.8
Reason: Subsequent Stroke	131	2.2
Reason: Other Condition	164	2.7
Total	5,958	100.0

Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Inpatient rehabilitation following a stroke often includes comprehensive interdisciplinary care focused on improving both physical and cognitive function. Clients who have had a subsequent stroke may have different needs on their return to inpatient rehabilitation, compared to those who return for further rehabilitation following the same initial stroke. The following sections illustrate the functional abilities and changes in function, as well as the amount of time these two groups of clients spend in inpatient rehabilitation.

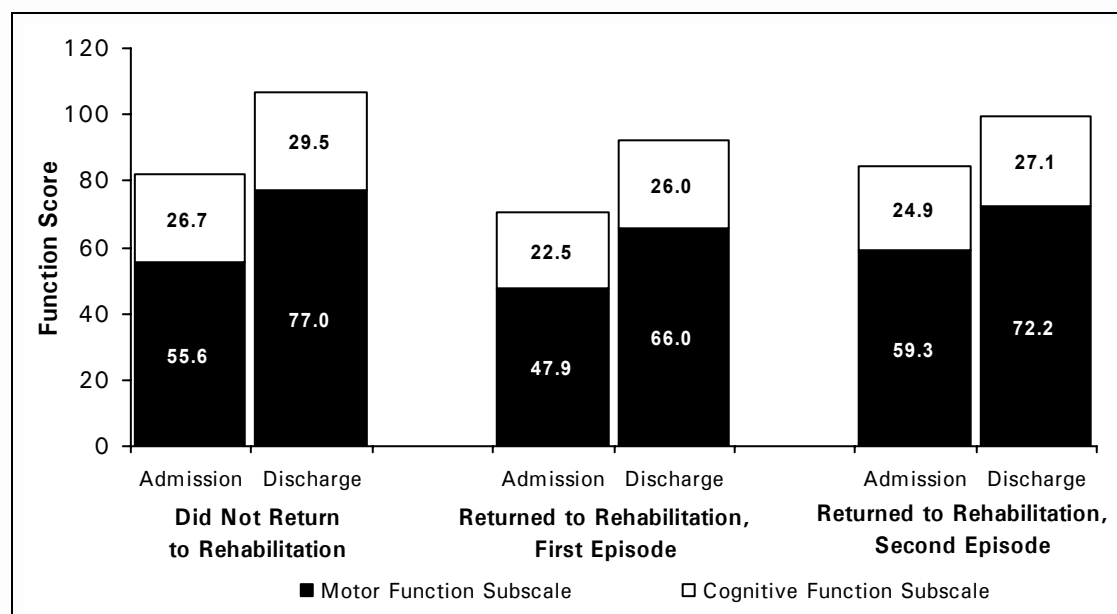
Stroke Clients Returning to Inpatient Rehabilitation for the Same Stroke

Among stroke clients who returned to rehabilitation, 14% returned due to the same stroke as their initial stay. Compared to clients who did not return to rehabilitation after a stroke, clients returning to inpatient rehabilitation for the same stroke had significantly lower Motor and Cognitive Function Scores on admission and discharge for their first stay (see Figure 4). However, on their second stay, these clients tended to have higher Total Function Scores on admission and discharge as compared to their first stay. In fact, at discharge from their second stay, stroke clients who returned for

the same stroke had, on average, similar Motor and Cognitive Function Scores to stroke clients who did not return to rehabilitation. Clients who returned for the same stroke stayed in rehabilitation longer on both their first (41 days) and second (40 days) stays, compared to those who did not return (38 days). These findings suggest that these returning stroke clients continue to make gains in function over time, but may take longer to achieve comparable levels of function than those who did not return.

These findings may support interest in use of the FIM™ instrument in the acute care setting to determine which type of rehabilitation program would be most appropriate for an individual client. For example, some clients may benefit from more intensive therapy soon after the stroke, while others make functional gains at a slower rate and benefit more from longer-duration, less intense therapy.

Figure 4. Average Function Scores for Stroke Clients Not Returning to Rehabilitation and the First and Second Episode of Stroke Clients Returning to Rehabilitation With the Same Stroke, 2003 to 2007 (n = 5,827)



Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Stroke Clients Returning to Inpatient Rehabilitation for a Subsequent Stroke

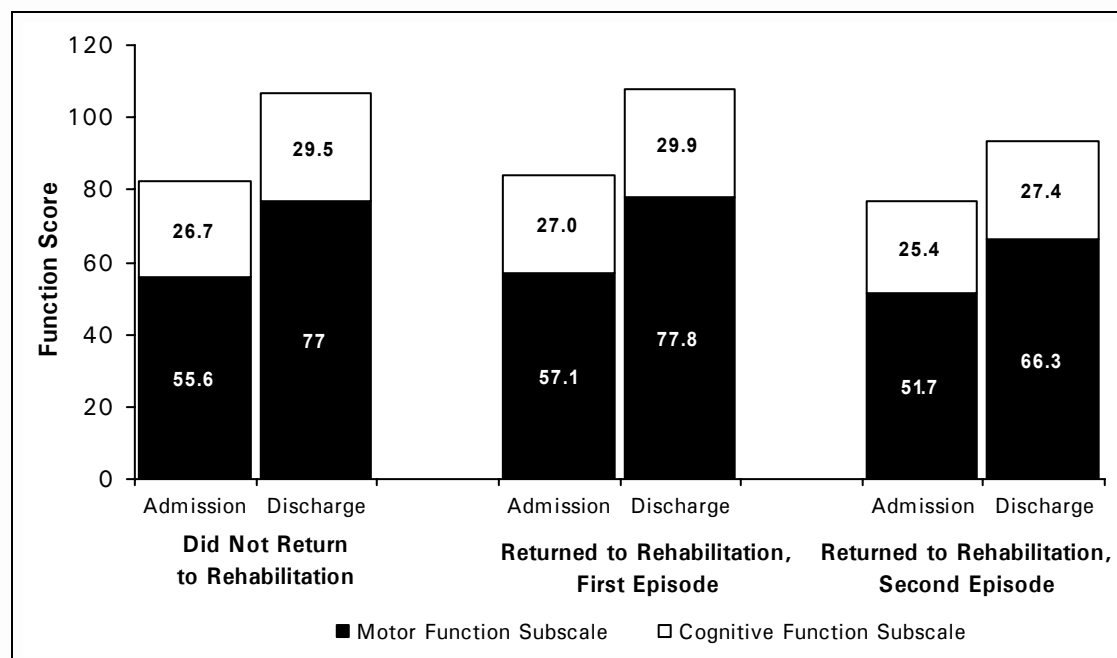
Of clients who returned to rehabilitation following stroke, about 39% returned to rehabilitation following a subsequent stroke. Subsequent strokes can be on the same side but different location, or on the opposite side of the brain. Admission and discharge Function Scores and lengths of stay were similar between the initial

rehabilitation stays of clients who then returned to rehabilitation for a subsequent stroke and those of clients who did not return at all. In other words, returning clients made gains in function after their first stroke that were comparable to those who did not return.

Stroke clients who returned to inpatient rehabilitation following a subsequent stroke, however, had significantly lower Motor Function Scores on admission and discharge compared to their initial stay. In other words, as expected, they did not make as much improvement in function as they did following their first stroke (Figure 5). Lower discharge Function Scores may translate into a change in care needs for these clients following discharge the second time. For example, these clients may need more assistance from family or others to live in a home setting.

As the analysis suggests, the impacts of a second stroke can be significant. Many initiatives in different jurisdictions are aimed at secondary stroke prevention. For example, secondary prevention clinics are found in more and more hospitals where clients can attend regular follow-up appointments to monitor things like blood pressure and cholesterol levels. Further studies investigating the role of inpatient rehabilitation in secondary prevention may assist in determining best practices to reduce the chances of subsequent strokes and their impacts.

Figure 5. Average Function Scores for Stroke Clients Not Returning to Rehabilitation and for the First and Second Episodes of Stroke Clients Returning to Rehabilitation With a Subsequent Stroke, 2003 to 2007 (n = 5,912)



Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Clients With Amputations

Clients undergoing inpatient rehabilitation after an amputation had the highest cumulative rate of return to rehabilitation within 24 months of their initial stay (see Figure 1). Of the 18% of amputation clients who returned, 41% returned for the same amputation, and the same proportion (41%) returned for a subsequent amputation. Eighteen percent (18%) of clients returned for a different condition, such as orthopedic and medically complex conditions.

There were no statistically significant differences in the demographic profiles of amputation clients who did not return to rehabilitation, those who returned for the same amputation and those who returned for a different amputation. Amputation clients who returned to rehabilitation were 65 years of age, on average, when entering inpatient rehabilitation for the first time, were mostly male (69%) and most lived with family members following discharge from their first stay in rehabilitation (78%).

Table 5. Frequency of Amputation Clients Returning to Rehabilitation, 2003 to 2007

Amputation Clients	Number	Percent
Did Not Return to Rehabilitation	1,000	82.1
Returned to Rehabilitation One or More Times:		
Reason: Same Amputation	90	7.4
Reason: Subsequent Amputation	89	7.3
Reason: Other Condition	39	3.2
Total	1,218	100.0

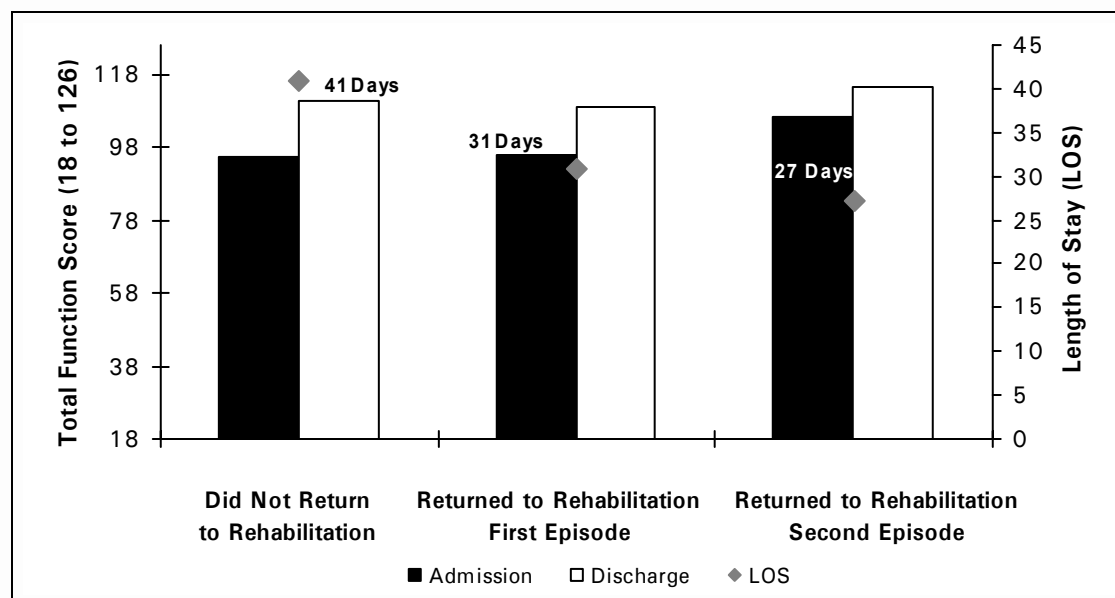
Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Inpatient rehabilitation after an amputation often includes both training to gain independence in activities of daily living without a prosthesis and prosthetic training focused on independent activity with a prosthesis. Clients returning to inpatient rehabilitation for the same amputation and for a subsequent amputation may have different needs and pathways of care. The following provides an overview of their differences in Function Scores and lengths of stay.

Amputation Clients Returning to Inpatient Rehabilitation for the Same Amputation

Clients who returned to rehabilitation for the same amputation had similar Total Function Scores on admission and discharge during the first stay compared to those who did not return to rehabilitation (Figure 6). However, those who returned tended to have higher Total Function Scores on admission and discharge for their second stay as compared to their first stay. Clients who returned for the same amputation had significantly shorter lengths of stay on both their first (31 days) and second (27 days) stays, compared to those who did not return (41 days). However, their total time in rehabilitation (58 days) for the two stays was obviously much longer.

Figure 6. Average Admission and Discharge Total Function Scores for Amputation Clients Not Returning to Rehabilitation and the First and Second Episode of Amputation Clients Returning to Rehabilitation With the Same Amputation, 2003 to 2007 (n = 559)

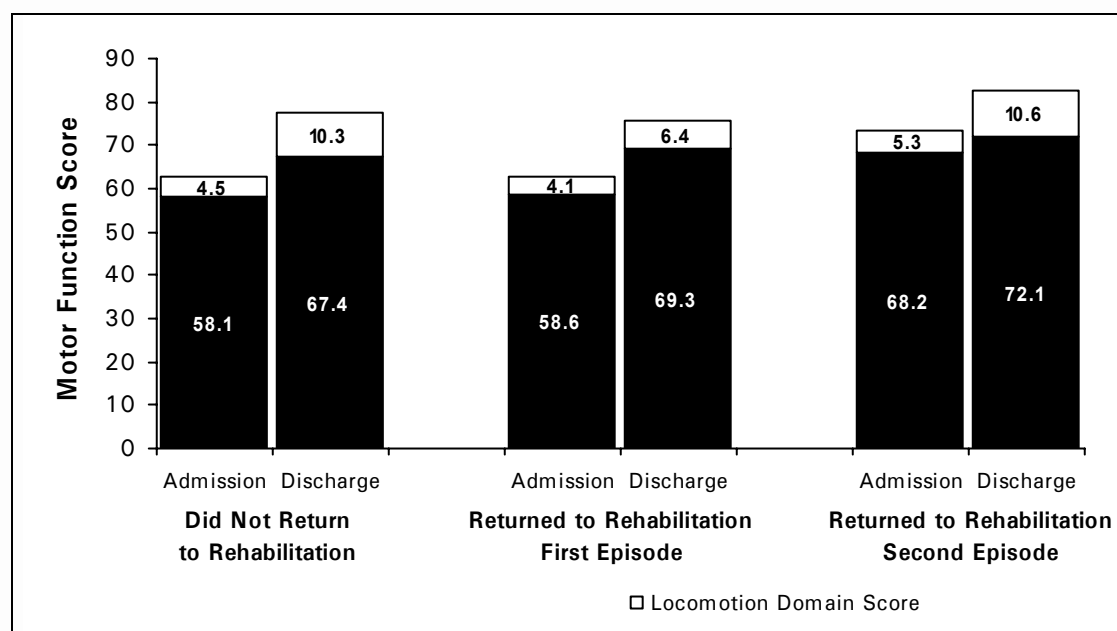


Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Figure 7 highlights separately the Admission, Discharge and Change Motor Function Scores for clients with an amputation. Because of the focus on training for walking and mobility with a prosthesis, the locomotion domain score has also been highlighted. The locomotion domain includes two items on the FIM™ instrument: locomotion (wheelchair or walking) and stairs. The scores, therefore, range from 2 to 14, with 12 being the highest possible score for clients using a prosthesis.

Compared to clients who did not return to rehabilitation, those who returned for the same amputation had significantly lower discharge locomotion domain scores following their first stay. On their second stay, these clients were admitted with higher Motor Function Scores, compared to both their own first stay and to clients who did not return to inpatient rehabilitation. As well, during their second stay, clients made the majority of their motor function gains in the locomotion domain (5.4 of the 7.8 Change in Motor Function Score was in the locomotion domain), and at discharge they achieved levels of locomotor function similar to those of clients who did not return to rehabilitation (10.6 versus 10.3).

Figure 7. Average Admission, Discharge and Change Motor Function Scores for Amputation Clients Not Returning to Rehabilitation and the First and Second Episode of Amputation Clients Returning to Rehabilitation With the Same Amputation, 2003 to 2007 (n = 559)



Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

The findings for amputation clients in this section support the notion that clients may be returning to rehabilitation for the same amputation as a planned event. For example, such a pathway of care may involve amputation clients with chronic diseases returning for gait training using a prosthesis.

Looking at Different Pathways of Care for Rehabilitation Clients With Amputations

Frequently, the amputation of a client's limb is related to chronic diseases such as diabetes and peripheral vascular disease. In many of these cases, healing of the surgical wound may be delayed.

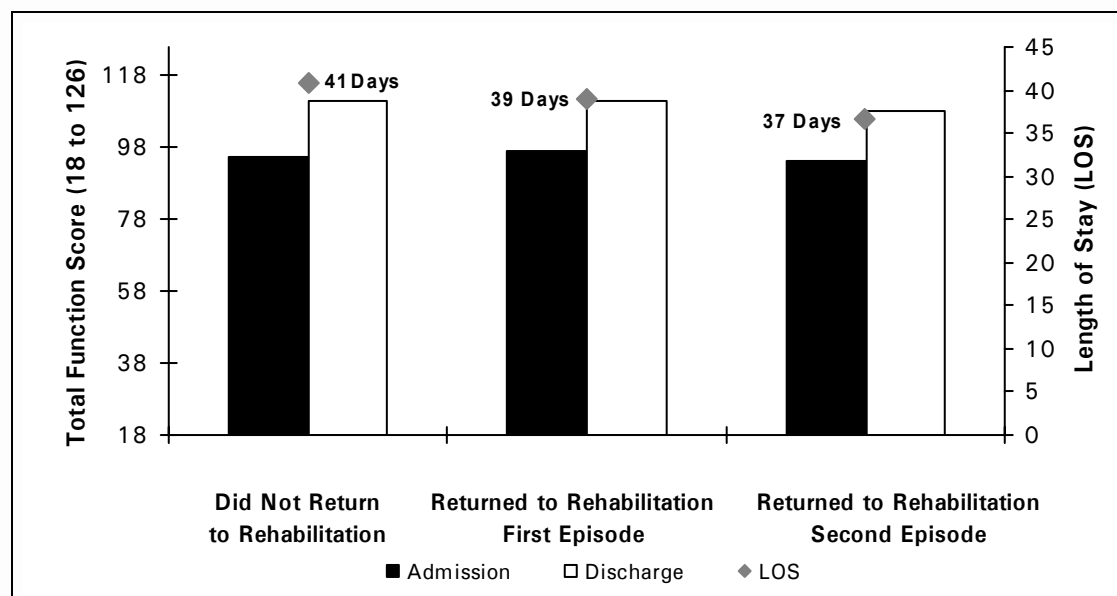
At West Park Health Centre in Toronto, the Amputee team has considered this important clinical feature when identifying the most appropriate care path for clients coming to rehabilitation after an amputation. Since many clients do have diabetes and also delayed healing of their surgical wounds, their rehabilitation is divided into segments to optimize their outcomes. Clients are admitted to inpatient rehabilitation immediately following their initial surgical stay and undergo initial rehabilitation to achieve independence in activities of daily living without a prosthesis. Clients may go home for a period of time. During this time, they are followed in the outpatient clinic by the interdisciplinary team. Once healing has occurred, they will have their prosthesis cast and created as outpatients. When ready, some clients will return to inpatient rehabilitation to learn to walk and achieve independence with their new prosthesis. Other clients may complete their prosthetic training as outpatients, depending on their personal circumstances.

Different rehabilitation facilities may identify other care pathways to meet the needs of clients with complex needs, such as those with lower limb amputations. Facilities can monitor the outcomes of their own pathways and compare with peers through the NRS quarterly comparative reports.

Amputation Clients Returning to Inpatient Rehabilitation for a Subsequent Amputation

Of all clients who underwent inpatient rehabilitation after an amputation, about 7% returned to rehabilitation following a subsequent amputation. Subsequent amputations could be of the same limb, often at a higher level, or of a different limb. As may be expected, clients who returned to rehabilitation following a subsequent amputation did not demonstrate the same patterns in function as those who returned for the same amputation.

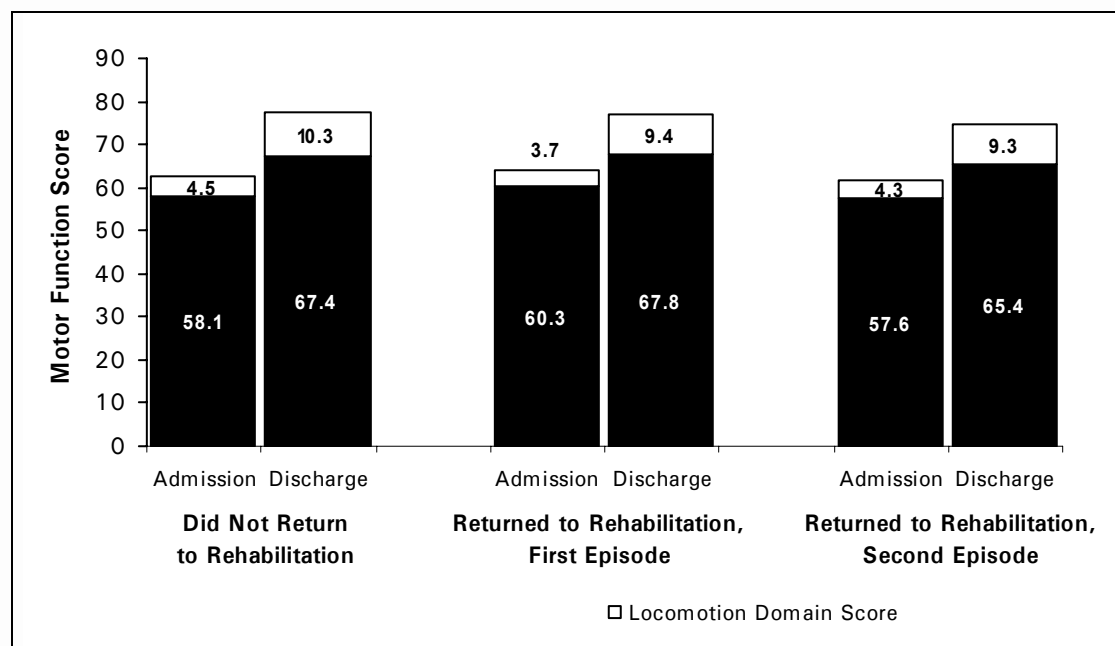
Figure 8. Average Admission and Discharge Total Function Scores and Length of Stay for Amputation Clients Not Returning to Rehabilitation and the First and Second Episode of Amputation Clients Returning to Rehabilitation for a Subsequent Amputation, 2003 to 2007 (n = 551)



Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

There were no significant differences in the admission and discharge Function Scores between those clients who did not return to inpatient rehabilitation and those who returned, following either their first or subsequent amputation (Figure 8). Of note, however, is the fact that these returning clients made improvements in total function and were discharged at comparable levels of function to those at which they were discharged after their first stay. These findings also suggest clients continue to benefit from inpatient rehabilitation on their second stay, given that they make similar gains in overall function.

Figure 9. Average Admission, Discharge and Change Motor Function Scores for Amputation Clients Not Returning to Rehabilitation and First and Second Episodes of Amputation Clients Returning to Rehabilitation for a Subsequent Amputation, 2003 to 2007 (n = 551)



Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Clients who returned to rehabilitation following a subsequent amputation made similar gains in motor function (including in the locomotion domain) on their first stay to those who did not return (Figure 9). When they returned to inpatient rehabilitation, they were admitted and discharged with Motor Function Scores similar to those of their first stay. There were no significant differences in the gains in Motor Function Score between the first and second inpatient rehabilitation stays.

In contrast to amputation clients returning for the same amputation, clients returning after a subsequent amputation did not make the majority of their motor function gains in the locomotion domain. In fact, clients returning after a subsequent amputation had lower locomotion domain scores on discharge as compared to amputation clients who did not return to rehabilitation.

These findings support the notion that clients returning after a subsequent amputation may be “starting over” in terms of their physical rehabilitation. They may be returning after an amputation at either a higher level on the same leg (for example, secondary to a trans-femoral revision after an initial trans-tibial amputation) or after an amputation on the previously unaffected side. This concept is further supported by lengths of stay for clients who did not return to rehabilitation (41 days), which were similar to the lengths of both the first stay (39 days) and second stay (37 days) for clients who did return following a subsequent amputation.

Similar to the results for clients who returned to rehabilitation after a subsequent stroke, these results raise potential questions about the current and potential role for secondary prevention during inpatient rehabilitation. For example, are there opportunities to further connect clients with community and primary care agencies to monitor their chronic underlying disease and prevent subsequent amputations? Further studies assessing the complete pathways of care including ambulatory, acute and home care information could be used to answer these questions.

Conclusion

This analysis sheds light on characteristics of clients returning to inpatient rehabilitation that might inform clinical practice, program planning and management or policy. In particular, the analysis focuses on inpatient rehabilitation clients with orthopedic conditions, stroke and amputation, as they represent the largest and most frequent groups that return.

Clients returning to inpatient rehabilitation for the same orthopedic condition, stroke and amputation tend to have lower Function Scores on their first stay. When they return for their second stay, they regain more function and are discharged with similar Function Scores, on average, to clients who did not return to rehabilitation.

Clients returning to inpatient rehabilitation for subsequent orthopedic conditions, strokes and amputations tended to make similar gains in function on their first stay to those who did not return; however, on their second stay, on average, they demonstrated less functional improvement and were discharged at a lower level of function than their own first stay and than clients who did not return to rehabilitation.

While returns to inpatient rehabilitation are not necessarily to be prevented, and in some cases are planned as part of the delivery of care, developing an understanding of these clients may be useful for clinicians, managers and system planners in the following ways:

- Contributing to enhanced discharge planning (for example, role of rehabilitation in secondary prevention and community support) for orthopedic conditions, stroke and amputation rehabilitation clients;
- Adjusting admission criteria for inpatient rehabilitation to better ensure clients are accessing the appropriate level of care at the right time; and
- Prompting further analysis of return rates in specific facilities to investigate opportunities to learn from practices, care models or other factors contributing to good outcomes where return rates are low, and looking at patient characteristics, follow-up care on discharge and community characteristics where return rates are high.

For additional information on the National Rehabilitation Reporting System (NRS) and additional NRS publications, please write to rehab@cihi.ca or visit the NRS website at www.cihi.ca/nrs.

Technical Notes

Table 6. Determining Unique Persons in the NRS Database	Number
Admissions (2003–2004 to 2004–2005)	
Episodes	63,790
Episodes Excluded*	-241
Total Episodes	63,549
Total Persons†	56,406

Notes:

* Episodes with unknown health card number excluded.

† Unique persons identified by health card number, health card province code and admission date.

Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Table 7. Exclusion Criteria for Analysis	Number	Percent
Total Persons, 2003 to 2005	56,406	100.0
Exclude if First Admission Class Code Is		
Readmission or Continuing Rehabilitation	-979	1.7
Exclude if First Discharge Date Is Missing	-4,155	7.4
Exclude if Second Admission Date Is Prior to First		
Discharge Date	-71	0.1
Exclude if Discharge Destination Other Than Home	-11,630	20.6
Total Persons Considered for Analysis	39,571	70.2

Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.

Table 8. Frequency of Returning to Rehabilitation and Discharge Destination

	Home		Other*	
	Number	Percent	Number	Percent
Did Not Return to Rehabilitation	35,343	89.3	9,848	84.7
Returned to Rehabilitation:				
Reason: Same RCG	3,071	7.8	1,198	10.3
Reason: Different RCG	1,157	2.9	584	5.0
Total	39,571	100.0	11,630	100.0

Note:

* Includes assisted living, residential care, other or unknown.

Source: National Rehabilitation Reporting System, 2003–2004 to 2006–2007, CIHI.