July 2006

Life After Traumatic Spinal Cord Injury: From Inpatient Rehabilitation Back to the Community

1. Introduction

During 2003–2004, over 950 traumatic spinal cord injuries occurred in Canada.¹ The journey from acute care through inpatient rehabilitation and back to community living following a traumatic spinal cord injury is one that is filled with challenges. Rehabilitation is an important part of reintegration into the community setting after a person has sustained a traumatic spinal cord injury. The information presented in this Analysis in Brief paints a picture of life during and after inpatient rehabilitation following a traumatic spinal cord injury. Topics that are examined for clients who have received inpatient rehabilitation following a traumatic spinal cord injury include demographics, length of stay in inpatient rehabilitation, functional improvement during inpatient rehabilitation, discharge destination after inpatient rehabilitation and changes in vocational status from admission to follow-up. Data are from the National Rehabilitation Reporting System (NRS) at the Canadian Institute for Health Information (CIHI).

Since 2001, CIHI has been collecting data on adult inpatient rehabilitation services from participating NRS facilities in Canada. As of May 15, 2005, there were over 80,000 complete pairs of admission and discharge records (episodes) in the NRS database, submitted by 89 hospitals in seven provinces and covering a range of health conditions such as stroke, orthopedic conditions and arthritis. Of these, 1,257 episodes were for persons who had sustained a traumatic spinal cord injury.

Follow-up information is also collected on a voluntary basis by participating facilities as a means to assess sustainability of outcomes following discharge from inpatient rehabilitation. As of May 15, 2005, there were 107 follow-up records for clients with traumatic spinal cord injuries in the NRS database. Including follow-up information in this analysis provides additional information on the transitions faced by these clients when reintegrating into their communities.

¹ Canadian Institute for Health Information, National Trauma Registry, 2003–2004.
In this Analysis in Brief, clients with traumatic spinal cord injuries were further grouped into five sub-categories in order to highlight broad differences:

- Complete quadriplegia
- Incomplete quadriplegia
- Complete paraplegia
- Incomplete paraplegia
- Other traumatic spinal cord injuries

For the purposes of the NRS, a person who has sustained a spinal cord injury between the first and the eighth cervical vertebrae is classified into the quadriplegia group. An injury below the eighth cervical vertebrae will result in classification in the paraplegia group. The “complete” and “incomplete” designations indicate whether or not motor and/or sensory function is preserved below the level of the injury.

2. Demographics

This section will examine the demographic characteristics of clients who have received rehabilitation following a traumatic spinal cord injury. The higher incidence of spinal cord injuries in younger males is well-known. For example, National Trauma Registry data indicate that over three-quarters (77%) of traumatic spinal cord injuries in fiscal year 2003–2004 were sustained by males. The same data also indicate that almost 60% of traumatic spinal cord injuries occurred in people under the age of 50.²

Figure 1 demonstrates a similar pattern in NRS data for those who have received inpatient rehabilitation. Almost 80% of traumatic spinal cord injury clients who have participated in inpatient rehabilitation are males and 67% are under the age of 51. Figure 1 also shows a progressive decrease in the number of clients undergoing inpatient rehabilitation for traumatic spinal cord injuries with increasing age for both females and males.

² Canadian Institute for Health Information, National Trauma Registry, 2003.
3. The Rehabilitation Stay

For those who have experienced a traumatic spinal cord injury, inpatient rehabilitation is an important part of reintegration into daily activities following an acute stay in hospital. This section presents information related to the inpatient rehabilitation stay.

The length of stay (LOS) in inpatient rehabilitation is the number of days between admission to and discharge from an inpatient rehabilitation program. Note that this is strictly the time spent in an inpatient rehabilitation program; it does not include time spent in acute care. Table 1 presents the median LOS for the various traumatic spinal cord injury groups. The median LOS for all traumatic spinal cord injury clients is 59 days. For comparison, the median LOS for the stroke and the orthopedic conditions groups are 35 and 14 days, respectively. Clients with complete quadriplegia have the highest median LOS, at 101 days. Clients with incomplete paraplegia have a lower LOS, at 49 days, although clients who fall into the other traumatic SCI group have the lowest median LOS, at 29 days. The complete paraplegia and the incomplete quadriplegia groups have a similar median LOS.
Table 1. Median Inpatient Rehabilitation Length of Stay for Traumatic Spinal Cord Injury Clients

<table>
<thead>
<tr>
<th>Traumatic Spinal Cord Injury (SCI) Group</th>
<th>N</th>
<th>Median Length of Stay (Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete quadriplegia</td>
<td>196</td>
<td>101</td>
</tr>
<tr>
<td>Incomplete quadriplegia</td>
<td>398</td>
<td>64</td>
</tr>
<tr>
<td>Complete paraplegia</td>
<td>291</td>
<td>67</td>
</tr>
<tr>
<td>Incomplete paraplegia</td>
<td>271</td>
<td>49</td>
</tr>
<tr>
<td>Other traumatic SCI</td>
<td>101</td>
<td>29</td>
</tr>
<tr>
<td>All traumatic SCI</td>
<td>1257</td>
<td>59</td>
</tr>
</tbody>
</table>

Based on clients discharged from participating NRS facilities with complete admission and discharge assessments.


Measuring client function and functional change is an important part of inpatient rehabilitation. In the NRS, this is achieved in part with the FIM™ instrument. The FIM™ instrument is an 18-item measure of function that is intended to quantify caregiver burden. The scores for each item are summed in order to calculate the Total Function Score, which ranges from 18 (dependent) to 126 (independent). Figure 2 presents the average admission and discharge Total Function Scores for the different traumatic spinal cord injury groups. All groups show functional improvement, although there are some differences between the groups.

3. The 18-item FIM™ instrument referenced herein is the property of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc. 2005.

4. Function Scores referenced in this document are based on data collected using the FIM™ instrument.
Figure 2. Functional Improvement During Inpatient Rehabilitation

Figure 2 shows that declining levels of severity of the traumatic spinal cord injury appear to correspond with higher admission and discharge scores. All client groups show functional improvement, and the amount of improvement as measured by the FIM™ instrument is similar for all groups except complete quadriplegia. Clients with complete quadriplegia show improvement; however, there is a smaller absolute score change as compared to the other groups. Moreover, the average admission and discharge scores are considerably lower in the complete quadriplegia group. This appears to be consistent with the fact that an injury higher in the spinal cord will tend to cause more functional impairment.
4. Back to the Community

Inpatient rehabilitation for people with traumatic spinal cord injuries is focused on maximizing the clients’ level of function in order to increase independence as much as possible. Going home is a frequent goal set out at the beginning of rehabilitation. Figure 3 presents the proportion of clients in each discharge destination category by traumatic spinal cord injury group.

![Discharge Destination by Traumatic Spinal Cord Injury Group](chart.png)

Based on clients discharged from participating NRS facilities with complete admission and discharge assessments. Excludes “Other Traumatic SCI” group and records where discharge destination could not be determined (N = 1155).


**Figure 3. Discharge Destination by Traumatic Spinal Cord Injury Group**

Over three-quarters of all traumatic spinal cord injury clients (79%) return to a private residence or apartment (home) following discharge from inpatient rehabilitation. Over 80% of the clients in the groups other than complete quadriplegia return to a private residence after discharge. Of the clients in the complete quadriplegia group, 62% return home.

Less than 10% of clients in the paraplegia groups and incomplete quadriplegia group are discharged to a long-term care or acute care facility. The complete quadriplegia group had the highest proportion of clients discharged to acute care (15%) and to long-term care (18%). This likely relates to the fact that there is more severe functional impairment associated with complete quadriplegia, as shown in Figure 2, resulting in a greater need for assistance.
5. Vocational Transitions

Given the relatively younger age of many clients who have sustained traumatic spinal cord injuries, the ability to return to work and/or studies is a key consideration when examining outcomes following inpatient rehabilitation. Because of the functional impairment resulting from a traumatic spinal cord injury, it is not always possible for people to return to the same vocation as prior to their injury.

Figure 4. Vocational Status by Assessment Period

There is a major shift in the post-discharge vocational status when compared to the pre-admission vocational status. Before admission to a rehabilitation program, the majority of traumatic spinal cord injury clients (64%) were employed. Upon discharge, on average, 10% of clients are employed, whereas the majority of clients are either unemployed (34%) or retired for disability (41%).

In the months following discharge from inpatient rehabilitation, NRS data indicate that some clients are returning to other vocational roles, either by obtaining employment or going to school. Three to six months following discharge from inpatient rehabilitation, there is a 4 percentage point increase in the proportion of clients in the “paid employment” category, a 5 percentage point increase in the proportion of clients in the “unpaid employment” category and an 8 percentage point increase in the proportion of clients who are students. There is a corresponding decrease in the proportion of clients who are unemployed and retired for disability, of 8 and 6 percentage points respectively.

Based on clients with complete admission, discharge and follow-up assessments (N = 107).
Note: Vocational status categories are not mutually exclusive. Clients can be included in multiple vocational status categories.
6. Conclusion

The NRS data presented in this Analysis in Brief represent a valuable source of information relating to outcomes for people who participate in inpatient rehabilitation following a traumatic spinal cord injury. People who receive inpatient rehabilitation following a traumatic spinal cord injury are predominantly younger males. The functional improvements that are evident from NRS data suggest that inpatient rehabilitation is an important part of the return to community living following a traumatic spinal cord injury. Not only do NRS data indicate that the majority of traumatic spinal cord injury clients return home following inpatient rehabilitation, but they also indicate that some clients are able to return to work and/or school in the three to six months following inpatient rehabilitation as part of the reintegration back into their communities.