



# **Low Tolerance Long Duration (LTLD) Stroke Demonstration Project**

**Final Report  
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## EXECUTIVE SUMMARY

Since its inception, the Greater Toronto Area (GTA) Rehab Network has been actively involved in initiatives to support and promote the goals of the Coordinated Stroke Strategy. Most recently, the Network has focussed its attention on low tolerance long duration (LTLTD) stroke rehabilitation by conducting an LTLTD stroke demonstration project to describe the characteristics and outcomes of stroke survivors following LTLTD stroke rehab.

Although research findings about stroke rehabilitation have demonstrated that survivors of severe stroke can achieve improved functional outcomes<sup>1</sup> and are often better managed in a low tolerance, long duration (LTLTD) rehab program,<sup>2</sup> the availability of LTLTD stroke rehab is limited. The absence of designated funding presents a significant barrier for most hospitals to make such programming decisions as LTLTD services require an investment in specialized teams and longer lengths of stay than regular rehab. With limited access to LTLTD stroke rehab, survivors can be transferred to settings that do not provide the rehabilitation they require. The results of this demonstration project highlight the benefits of LTLTD stroke rehab at the patient and system levels.

### Approach

The project was conducted with no external funding and was designed as a short-term demonstration project. A quality improvement approach was chosen that did not require an ethics review and relied on current clinical practices and outcome measures used at each organization.

Data was collected on patients admitted to LTLTD stroke rehab programs from October 1, 2004 to September 30, 2005 in three types of settings: stand-alone complex continuing care (CCC), acute care with designated rehab beds and CCC beds, and a long-term care home (LTCH). The following four organizations participated in the project: Bridgepoint Health, Providence Healthcare, Lakeridge Health and Castlerview Wychwood Towers. Information on demographics and functional outcomes were collected using the data sets included in the National Rehabilitation Reporting System (NRS - FIM™)<sup>3</sup> and Continuing Care Reporting System (MDS).<sup>4</sup> To comply with privacy regulations, each organization compiled its own data and provided a data summary report of its findings using overall averaged data.

<sup>1</sup> See Teasell, RW, Foley NC, Bhogal, SK, Chakraverty, R, Bluvol A. (2005) *A rehabilitation program for patients with severe stroke*. The Canadian Journal of Neurological Sciences, 32 (4): 512-517.

<sup>2</sup> See Teasell, R., Foley, N., Bhogal, S.K., Jutai, J., & Speechley, M. (2003). *Evidence-Based Review of Stroke Rehabilitation*.

<sup>3</sup> FIM™ is a trademark of the Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc. The Functional Independence Measure (FIM™) assesses physical and cognitive disability in terms of burden of care. It includes an 18-item ordinal scale that measures independence in self-care, sphincter control, mobility, locomotion, communication and social cognition. The maximum total FIM™ score is 126. The maximum total motor FIM™ score is 91. FIM™ data is captured as part of the National Rehabilitation Reporting System developed by the Canadian Institute for Health Information.

<sup>4</sup> The clinical characteristics of patients in Complex Continuing Care settings are reported using the Continuing Care Reporting System. Data is captured using the Rater Assessment Instrument MDS 2.0. The RAI MDS 2.0 is © interRAI Corporation, Washington, D.C., 1997 and has been modified with permission for use by the Canadian Institute for Health Information. (2002). The Minimum Data Set is used to collect administrative and socio-

## Key Findings

Although the methodology used in this demonstration project precluded the use of rigorous statistical analysis from which firm conclusions could be drawn, the results of this project suggest that benefits of LTLD stroke rehab can be realized at the patient and system levels.

Patient Impact: Overall, the patients admitted to these LTLD stroke rehab programs showed improvements in functional level and personal care requirements resulting in a substantial proportion of stroke survivors who were able to return home.

System Impact: LTLD stroke rehab provides access to rehabilitation for a sub-population of stroke survivors who in the past have been denied service. In addition to positive patient outcomes, the availability of LTLD stroke rehab provides an interim level of care that increases the throughput of patients from acute care to other parts of the healthcare continuum and the community. By reducing the burden of care required for these patients, overall healthcare costs are reduced.

Key findings of the project include the following:

1. In total, data was collected on 294 patients (males = 51%; females = 49%) ranging between 28–97 years of age. Of these, 168 patients were admitted and discharged during the data collection period.
2. The patients admitted were medically complex with an average of 5 to 7 co-morbidities. The most frequently occurring co-morbidities were hypertension, hemiplegia, coronary artery disease, ischemic heart disease, diabetes and osteoarthritis.
3. Despite differences in service delivery models among facilities, the majority of patients (88%) showed functional improvement and a reduction in burden of care. Functional gains were also seen in patients who had extended wait times in acute care; however, it should be noted that the degree of functional gain made by these patients had they entered LTLD rehab earlier could not be determined.
4. Almost half (46%) of the patients were able to return home.
5. Greatest functional gains were seen during the first 3 months of rehab, but substantial gains were also seen during the 3–6 month period.
6. There was considerable variability in the functional level of patients on admission to these programs (median admission FIM™ scores ranged between 44–66), suggestive of inconsistencies in referral practices. A small percentage of patients were

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demographic information and to assess the care needs of patients in a number of functional areas. Information is collected on a quarterly basis.

transferred following a period of rehabilitation in a high tolerance short duration program. The extended length of stay in rehab provided more time for them to achieve their full rehab potential.

7. Wait list information suggests that the demand for LTLD stroke rehab exceeds the number of beds available for LTLD stroke rehab.

## Recommendations

This LTLD Stroke Rehab Demonstration Project was undertaken as a first step in Toronto towards increasing our understanding of survivors of severe stroke with respect to their characteristics, functional levels on admission and discharge, and factors that may influence length of stay, outcomes and discharge destination. The demonstration project has also pointed to a number of issues that affect access to LTLD stroke rehab with repercussions at both the patient and system levels. These issues with recommended strategies are highlighted below.

1. **Review of Service Delivery Model:** Currently, there are two inpatient rehab options for patients who have suffered a stroke – high tolerance short duration (HTSD) and low tolerance long duration (LTLD). This report highlighted that some patients make use of both types of programs. The impact of such transfers on the patient and family has not been examined.

**Recommendation:** A more in-depth review of current treatment models is warranted to determine if an intermediate level of stroke rehab is needed that would provide a higher intensity of rehab to patients with higher tolerance levels for a longer duration than is currently offered in HTSD and LTLD programs. The development of such a program may impact length of stay efficiencies as currently measured; however, rehab programming for stroke survivors must be responsive to clients' rehab needs.

2. **Review of Admission Criteria:** The project found considerable variation in the functional level of patients on admission to LTLD stroke rehab programs. Given that demand exceeds current capacity and the wait time for LTLD stroke rehab is often lengthy, it is important that the right patients are referred to the right programs without jeopardizing the ability to respond to individual patient needs. The pressure to fill beds often results in patients being accepted into programs that are not the most appropriate for their needs.

### Recommendations:

- (i) Ensure greater consistency in the application of admission criteria so that stroke survivors receive the appropriate level of rehab.
- (ii) Following a review of current service delivery models, incorporate programming changes into a triage framework as required.
- (iii) Institute a training program as required on the indicators used to make triage decisions for use in all acute care settings to support a more consistent approach in referral and admission practices.

3. **Use of Outcome Measurement Tools:** The challenges encountered due to the inconsistent use of outcome measures across the LTLD stroke rehab programs in this demonstration project demonstrate the need for designated tools. The National Rehab Reporting System (NRS – FIM™) is not used in all CCC rehab programs and the Complex Continuing Care Reporting System (MDS tool) is not used in programs with designated rehab beds, making it difficult to compare data across programs. Although the findings of this project are promising regarding the outcomes of LTLD stroke rehab, further data collection and analysis is warranted.

**Recommendation:** The FIM™ instrument may not always be sensitive enough to capture smaller changes in functional levels for patients with very severe stroke;<sup>5</sup> however, administration of the FIM™ instrument for patients in designated rehab beds is currently a requirement. The systematic use of the FIM™ instrument in all stroke rehab programs, regardless of setting, would allow for the comparison between stroke patients in LTLD and in regular rehab programs and ongoing evaluation of patient outcomes thus benefiting patients, clinicians and researchers.

It is also noted, however, that the use of the FIM™ instrument to measure clinical utilization and hospital performance (e.g. length of stay efficiency) would place LTLD rehab programs at a disadvantage if used to draw comparisons between regular rehab and LTLD rehab programs. The use of the MDS tool, however, in complex continuing care provides information about the resources that are required to care for patients in LTLD stroke rehab and is a more suitable indicator to underpin the funding formula for patients in complex continuing care. Its continued use is recommended.

4. **Specialized Stroke Team:** Successful stroke rehabilitation depends on the use of a dedicated team of rehab professionals with expertise in stroke rehabilitation. The goal of LTLD stroke rehab is to reduce functional impairment following severe stroke and the availability of rehab professionals to develop and implement treatment plans is essential. Further, patients admitted to LTLD stroke rehab are medically complex with a number of co-morbid conditions that require specialized nursing. Each of the organizations involved in the project have allocated resources to provide specialized stroke rehab in their LTLD programs to optimize patient outcomes.

**Recommendation:** Designated funding for rehab professionals and specialized nursing in LTLD stroke rehab is recommended to maximize the achievement of patients' full rehab potential and provide care for the medical complexities of these patients.

5. **Co-payment:** Traditionally, LTLD stroke rehab has been provided in complex continuing care beds. Although a co-payment is usually charged in CCC, the organizations in Toronto that provide LTLD stroke rehab typically waive the co-payment fee while patients are participating and benefiting from the rehab program and discharge

<sup>5</sup> A Rasch analysis can be used to convert ordinal scores to linear measures with equal interval properties. See Heinemann, Allen W., Linacre, John Michael, Wright, Benjamin D. & Granger, Carl., Measurement Characteristics of the Functional Independence Measure, *Topics in Stroke Rehabilitation*, 1994:1(3):1-15

home is anticipated. This practice reduces the financial burden of patients who are maintaining homes in the community, but results in lost revenue for the organization.

The provincial legislation that governs long-term care does not permit long-term care homes to waive the co-payment fee for residents receiving LTLT stroke rehab, thus creating a substantial burden for prospective recipients of LTLT rehab in long-term care.

**Recommendation:** A consistent approach to co-payment must be implemented across the system's organizations that provide LTLT stroke rehab in order to maximize patient access. Given that the co-payment requirement poses a considerable financial burden to some patients, it is recommended that organizations waive the co-payment fee and that the MOHLTC policy for the co-payment requirement be revised to allow this.

At the same time, it is also recommended that the MOHLTC recognize the financial implications for organizations when the co-payment is waived and that a funding mechanism be established to compensate organizations for the lost revenue.

6. **Length of Wait and Length of Stay:** It is difficult to determine if patients would have achieved more functional gain in less time if admitted earlier; however it was notable that patients did achieve functional gains despite wait times to enter the programs. Our project indicated that the most gain during LTLT was achieved between 0–3 month lengths of stay and 3–6 month lengths of stay.

**Recommendation:** Patients should be considered for admission to LTLT despite lengthy wait times and for those moved on to LTC, their referral should still be considered.

**Recommendation:** The optimal length of stay is up to 6 months; however, where patients continue to achieve gains, this should not be a limitation.

7. **Future Research:** The results of this demonstration project have laid some of the groundwork in furthering our understanding of stroke survivors in LTLT stroke rehab. However, the lack of external funding for this project imposed restrictions on the approach that was used and the quality of the data that was available for analysis.

**Recommendation:** A more in-depth multi-site research study with external funding would allow for valid conclusions to be drawn through the application of sophisticated methods of statistical analysis. The GTA Rehab Network is aware of other research projects investigating LTLT rehab and will keep abreast of their outcomes and recommendations.

## 1.0 BACKGROUND

The Coordinated Stroke Strategy in Ontario outlines a clear vision for stroke rehabilitation through establishing a coordinated approach to the delivery of stroke rehabilitation services. The key focus of this approach is to ensure that stroke survivors are able to access stroke rehabilitation in a timely manner, at the right level of intensity and for the right duration to maximize their functional and psychosocial outcomes following stroke.<sup>6</sup> Recent research findings about stroke rehabilitation have demonstrated that specialized stroke rehabilitation provided by an interdisciplinary, stroke-specific team results in improved functional outcomes.<sup>7 8</sup> In contrast with earlier views about the limited rehab potential of individuals who have suffered a severe stroke, research has also shown that these stroke survivors can achieve improved functional outcomes<sup>9</sup> and are often better managed in a low tolerance, long duration rehab (LTLTD) program.<sup>10</sup>

The Greater Toronto Area (GTA) Rehab Network, since its inception, has been actively involved in initiatives to support and promote the goals of the Coordinated Stroke Strategy. The Network's Stroke Task Group was convened to provide a forum for stroke providers and the Regional Stroke Networks in the GTA to discuss and facilitate implementation of recommendations related to stroke rehabilitation that are commonly and collectively valued across the GTA Rehab Network membership. In 2001, the GTA Rehab Network received funding from the Ministry of Health and Long-Term Care (MOHLTC) and the Heart and Stroke Foundation of Ontario (HSFO) to conduct a needs assessment and develop a plan for a system of coordinated stroke rehabilitation services in the GTA.<sup>11</sup> In June 2002, the Network conducted an inventory of ambulatory stroke programs and services.<sup>12</sup> In 2004, the GTA Rehab Network held a Consensus Day session that brought together stakeholders from across the province to achieve consensus on the program components of a stroke LTLTD rehab program and to develop a triage framework for determining patient need for LTLTD stroke rehab.<sup>13</sup>

Building on its previous work, the GTA Rehab Network continued its focus on LTLTD stroke rehabilitation by addressing the need to increase the availability of and access to LTLTD stroke rehab. At present, the availability of LTLTD stroke rehab is dependent on the programming decisions of individual hospitals to allocate resources for this type of stroke rehab. However, the absence of designated funding presents a significant barrier for most hospitals to make such

<sup>6</sup> Please see the report of the Joint Stroke Strategy Working Group's report, *Towards an Integrated Stroke Strategy for Ontario*, HSFO & MOHLTC, June 2000.

<sup>7</sup> Teasell, R., Foley, N., Bhogal, S.K., Jutai, J., & Speechley, M. (2003). *Evidence-Based Review of Stroke Rehabilitation*.

<sup>8</sup> Hospital Report Research Collaborative (2005) *Hospital Report 2005: Rehabilitation*.

<sup>9</sup> Teasell, RW, Foley NC, Bhogal, SK, Chakraverty, R, Bluvol A. (2005) *A rehabilitation program for patients with severe stroke*. The Canadian Journal of Neurological Sciences, 32 (4): 512-517.

<sup>10</sup> Teasell, R., Foley, N., Bhogal, S.K., Jutai, J., & Speechley, M. (2003). *Evidence-Based Review of Stroke Rehabilitation*.

<sup>11</sup> For a summary of the findings, please see the GTA Rehab Network's report, *Needs Assessment & Plan for Integrated Stroke Rehabilitation in the GTA, February 2002*

<sup>12</sup> Findings of this initiative are summarized in the GTA Rehab Network's report, *Inventory of Ambulatory and In Home Stroke Rehabilitation Services in the GTA, February 2003*.

<sup>13</sup> For a summary of the Consensus Day Session, please see the GTA Rehab Network's report, *Low Tolerance Long Duration Stroke Rehabilitation Report, June 2004*.

programming decisions as LTLD services require an investment in specialized teams. Further, LTLD stroke rehab is a slower-paced program, geared towards the lower tolerance level of patients, with longer lengths of stay than regular rehab. As a result, LTLD rehab does not conform to the funding expectations established for regular rehab. With a limited number of organizations providing LTLD stroke rehab and a relatively slow turnover of patients, stroke survivors often have difficulty accessing LTLD stroke rehab services. Instead, survivors can be transferred to settings that do not provide the rehabilitation they require. It is not unusual for stroke survivors to be discharged directly to long-term care without a trial of rehab.<sup>14</sup> Since stroke survivors who require LTLD stroke rehabilitation are typically older, this is a growing concern as the population ages.<sup>15</sup>

With these considerations in mind, the GTA Rehab Network set out to conduct an LTLD stroke demonstration project. The findings of the project would be disseminated to key stakeholders, including the Ministry of Health and Long-Term Care (MOHLTC), to increase awareness and understanding of stroke patients in LTLD rehab and inform program planning. It was anticipated that the project would demonstrate LTLD stroke rehabilitation is a client-centred model of care that optimizes client functioning and reduces burden of care for the individual and the health care system.

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<sup>14</sup> GTA Rehab Network, *Needs Assessment and Plan for Integrated Stroke Rehabilitation in the GTA, February 2002*.

<sup>15</sup> Heart and Stroke Foundation of Ontario, *Stroke Rehabilitation Consensus Panel Report*, May 2000.

## 2.0 APPROACH

In June 2004, the LTLD Stroke Demonstration Project Planning Subgroup was convened to undertake the LTLD stroke demonstration project. As with all Network committees, membership in the subgroup was selected to reflect the whole Network, with members having the skills and experience relevant to the achievement of the committee's mandate and objectives. Membership for the subgroup was in part drawn from the GTA Rehab Network's Stroke Task Group. Membership also includes representatives from other organizations involved in the project (see Appendix 1).

### 2.1 Scope of Project

The scope of this project has been circumscribed by the following considerations:

1. The project was developed with no external funding and conducted by staff at each organization who have coordinated their time to plan and conduct the activities required.<sup>16</sup> The breadth of the project is also limited by the availability of human resources for data collection and analysis.
2. The project was designed as a short-term demonstration project to gather information about stroke survivors in LTLD stroke rehab programs. Findings of this work will be used to advocate for the rehab needs of this subgroup of stroke patients. The findings may also be used to clarify and determine the parameters of a more in-depth study in future.
3. It is beyond the scope of the project to determine an ideal model of inpatient LTLD stroke rehab or a single setting that is best suited to provide LTLD stroke rehab given the project's limited fiscal and human resources.

### 2.2 Project Goals

The subgroup consulted with the Hospital Programs branch of the MOHLTC, regarding the proposed project to gauge the Ministry's interest in the project and to assist with clarification around project goals. The subgroup was informed that LTLD stroke rehabilitation was an area of interest for the MOHLTC and further information regarding the types of patients who require LTLD stroke rehabilitation and the programming needs of these patients would be useful. The MOHLTC also advised the subgroup to obtain information across different types of settings in which LTLD stroke rehab is provided.

Based on this consultation, the subgroup determined the goals of the LTLD Stroke Demonstration Project as follows:

- To gain an understanding of the characteristics, resource needs and outcomes following LTLD stroke rehab for stroke patients in three different types of settings:
  - stand-alone complex continuing care (CCC)
  - long-term care (LTC)

<sup>16</sup> However, one of the participating organization, Castleview Wychwood Towers, a long-term care (LTC) facility, received prior funding approval to conduct a two-year pilot study to provide LTLD stroke rehab in 20 beds to residents with severe stroke.

- acute care with designated rehab beds and CCC beds.
- To increase awareness of the need for LTLD stroke rehab by incorporating the findings of the demonstration project in a business case to the MOHLTC to advocate for recognition of directed funded for LTLD stroke rehab
- To propose recommendations for indicators/tools that are appropriate to use with patients in an LTLD stroke rehab program.

### 2.3 Data Collection

Data was collected on patients admitted to LTLD stroke rehab programs in the participating organizations. These include:

- Bridgepoint Health (CCC)
- Providence Healthcare (CCC)
- Lakeridge Health (acute care setting with designated rehab beds and CCC beds)
- Castlerview Wychwood Towers (long-term care home)

Detailed descriptions of the LTLD programs in each of these organizations are provided in appendices 2–5.

Data collection was conducted in two phases. Bridgepoint Health and Providence Healthcare began data collection on October 1, 2004. Bridgepoint Health included retrospective data on patients in the program who were admitted before October 1, 2004. Providence Healthcare utilized a prospective approach and included data on patients admitted on or after October 1, 2004.

The second phase of data collection began in 2005. Lakeridge Health began data collection in January 2005 using a retrospective approach. Castlerview Wychwood Towers began data collection in February 2005. All organizations collected data until September 30, 2005.

With the exception of Castlerview Wychwood Towers, the collection of data was part of an internal program evaluation of existing clinical practices. As a result, patient consent and a research ethics process were not required. Castlerview Wychwood Towers, who received external funding to conduct a pilot study to provide LTLD stroke rehab to residents in 20 of its beds, underwent its own ethics review process.

### 2.4 Data Analysis

To comply with privacy regulations, each organization analyzed its own patient-specific data and provided a summary report of its data based on a standardized data retrieval and analysis template developed for the project (see Appendix 6). The objectives of the data analysis were:

- To describe the patient populations who receive LTLD stroke rehab in facilities
- To gain a better understanding of the factors that may influence discharge destination
- To identify the factors that may influence functional outcomes and length of stay

- To determine the influence of rehab waiting time on functional outcomes, lengths of stay and discharge location
- To determine the optimal length of stay in LTLD stroke rehab relative to change in function
- To estimate the demand for LTLD stroke rehab

### 3.0 PROJECT LIMITATIONS

#### 3.1 Admissions Issues

1. This demonstration project included patients admitted to LTLD stroke rehab programs in three types of settings: complex continuing care, long-term care and an acute care setting with designated rehab beds. Patients admitted to CCC beds or designated rehab in acute care were not required to pay for this service. In the case of patients admitted to a rehab program offered in CCC, the co-payment fee that is typically required in CCC is waived by the organization if the expectation is that the patient will be discharged to the community. However, long-term care facilities cannot waive the co-payment fee. Since patients can apply to other LTLD stroke rehab programs without incurring any financial burden, admission to the LTLD stroke rehab program at Castlerview Wychwood Towers was adversely affected.
2. At Lakeridge Health, an acute care facility with co-located rehab and CCC beds, all stroke patients are admitted to the regular rehab unit regardless of stroke severity and initial tolerance levels. Patients are usually transferred from acute care beds relatively soon following stroke onset (i.e. average 7.2 days post-onset). Because the organization's infrastructure enables early transfer to rehab, Lakeridge Health encountered some difficulties in making accurate determinations of LTLD status at such an early phase of illness and identifying reliable indicators to facilitate these "triage" decisions. Identification of patients for the demonstration project was therefore based on clinical assessment of all stroke patients admitted to the general rehab unit to assess patients' level of tolerance for therapy, medical complexity and potential for functional improvement.

#### 3.2 Data Indicators/Tools Issues

The original data collection indicators identified for the project were:

- FIM™/MDS scores on admission and at quarterly intervals<sup>17 18</sup>
- FIM™ scores on discharge
- Factors contributing to discharge destination
- Special needs (e.g. tracheotomies, wound care)
- Staffing workload
- Co-morbidities

<sup>17</sup> FIM™ is a trademark of the Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc. The Functional Independence Measure (FIM™) assesses physical and cognitive disability in terms of burden of care. It includes an 18-item ordinal scale that measures independence in self-care, sphincter control, mobility, locomotion, communication and social cognition. The maximum total FIM™ score is 126. The maximum total motor FIM™ score is 91. FIM™ data is captured as part of the National Rehabilitation Reporting System developed by the Canadian Institute for Health Information.

<sup>18</sup> The clinical characteristics of patients in complex continuing care settings are reported using the Continuing Care Reporting System. Data is captured using the Rater Assessment Instrument MDS 2.0. The RAI MDS 2.0 is © interRAI Corporation, Washington, D.C., 1997 and has been modified with permission for use by the Canadian Institute for Health Information. (2002). The Minimum Data Set is used to collect administrative and socio-demographic information and to assess the care needs of patients in a number of functional areas. Information is collected on a quarterly basis.

Additional data elements were also provided by SCRIPT (Stroke Coordinated Referral Initiative Pilot Toronto). The SCRIPT Project of the Toronto West Stroke Network has developed a standardized rehab assessment and referral process for stroke patients in the GTA.

- 1. Additional Data Elements:** Additional data elements were collected to augment the indicators used in the NRS and MDS data set to allow for a more detailed understanding of the patients receiving LTLD stroke rehab. For example, capturing information on discharge destination provides limited information regarding the outcome of LTLD stroke rehab. Discharge destination is also determined by the availability of social support within the home and/or in the community and inclusion of the determinants of discharge location would have allowed for a more in-depth analysis of the data. Similarly, inclusion of information on the presence of co-morbidities and special needs, which frequently differentiate patients in LTLD stroke rehab from those in a regular rehab program, can add to the understanding of this rehab population group. However, the collection of some of this additional type of information was not feasible for the participating organizations given the limited resources available to track such data elements.
- 2. Use of the NRS and MDS Data Set:** Not all organizations were able to use both types of data collection tools. The MDS tool was not used in the long-term care or acute care rehab settings and one setting with CCC beds was unable to use the NRS tool as these tools were not part of regular clinical practice. Further, only two organizations had the staffing resources available to collect FIM™ data on a quarterly interval.
- 3. Workload Measurement:** Workload measurement information in LTLD stroke rehab would help to describe the program components recommended for LTLD stroke rehab; however collecting workload information proved to be a challenge as a consistent method of data collection is not used across the organizations. In the absence of a workload data collection system that captures workload on a per patient basis, it was difficult to measure workload for patients who received LTLD stroke rehab.
- 4. Models of Service Delivery:** The model of service delivery varied in each organization, thus presenting difficulties for comparison. Three organizations admit patients to rehab and LTLD within a single unit. At Lakeridge Health, for example, there are three possible streams in which patients may receive rehab. Patients with severe stroke may receive rehab on the regular rehab unit and subsequently be discharged to the community; some are subsequently transferred to a CCC bed for additional LTLD rehab; and on a few occasions, patients are transferred directly to CCC beds for LTLD stroke rehab. The data reporting requirements are different on the rehab unit than in CCC. Thus, at Lakeridge Health, it was difficult to aggregate its data and incorporate the findings with the aggregated data from the other organizations.
- 5. Patient-Identified Goals:** The feasibility of collecting data on the achievement of patient-identified goals was also explored. However, a number of complexities were identified that precluded the inclusion of tracking patient-identified goals:

- Patient goals evolve during their rehab period and may or may not be documented consistently.
- The identification of realistic patient goals would require in-depth audits of patient charts. The scope of this project precluded such a level of data collection.

#### **6. Limitations of Data Analysis:**

- Data analysis for this project was conducted in two phases. An initial analysis of the data collected on full encounters that occurred during the first six months of the project (October 1, 2004 – June 30, 2005) was conducted and summarized in a preliminary report.<sup>19</sup> A more in-depth analysis of all data was done at the end of the data collection period. However, the variability in the types of assessment tools used in the participating organizations and the small sample sizes limited the types of comparisons that could be made.
- In the absence of external funding, a quality improvement approach was chosen that did not require an ethics review. The project relied on current clinical practices and outcome measures used at each organization.
- Each organization compiled its own data and provided a data summary report of the findings using overall averaged data (e.g., average admission scores, average length of stay, etc.). Although the modal score for individual data elements would have been useful, the decision to report findings in an aggregated format precluded its use.

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<sup>19</sup> See GTA Rehab Network. (2005). *LTLTD Stroke Demonstration Project Interim Summary Report, October 2005*.

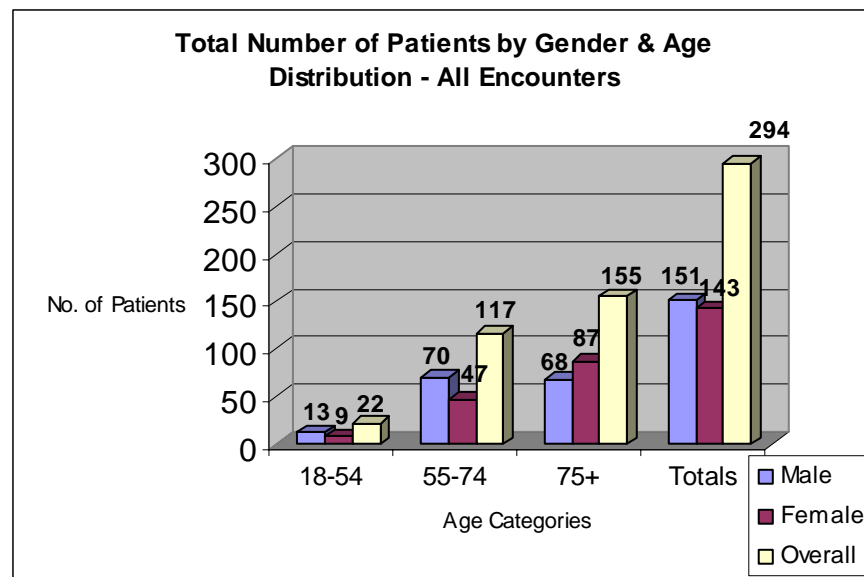
## 4.0 FINDINGS

The following summary represents key aggregate findings drawn from the facility-specific data reports.

### 4.1 Patient Profile

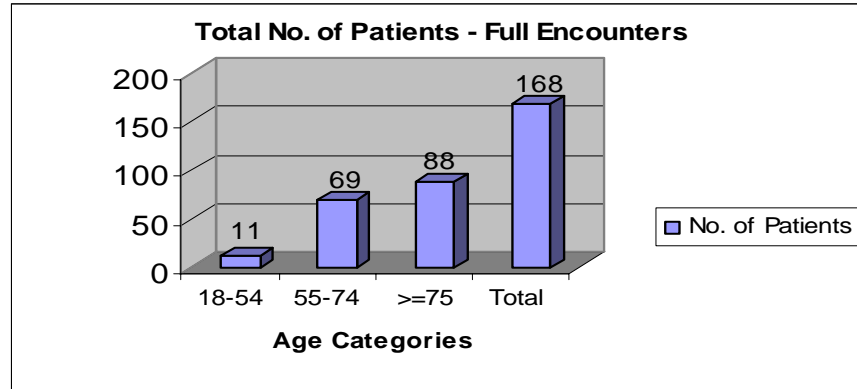
#### Demographics

In total, data was collected on 294 patients. Of these, 168 patients had full encounters.<sup>20</sup> Overall, male and female patients were fairly equally represented (males = 51%, females = 49%) and their ages ranged between 28–97 years of age. Although there is often an assumption that most patients who require LTLD stroke rehab are generally 75 years of age or older, of some surprise was the finding that the majority of patients spanned two age groups. Fifty-three percent of patients were 75 years of age or older and 40% of patients were in the 55–74 year age category. Males were more highly represented in the 55–74 year age group (60% males versus 40% females) while females were more highly represented in the 75 year or older age category (56% females versus 44% males) (Figures 1 and 2).



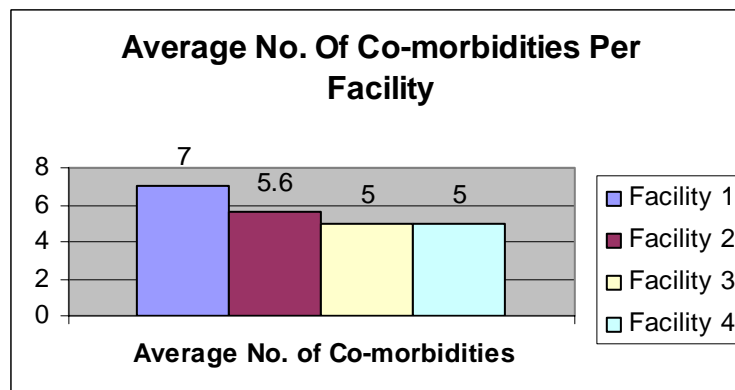
*Figure 1: All Encounters*

<sup>20</sup> A full encounter refers to a patient who was admitted and discharged within the data collection period.



*Figure 2: Full Encounters*

Stroke survivors admitted to LTLD stroke rehab programs are typically medically complex. Findings from this project showed that patients in LTLD stroke rehab had an average of 5 to 7 co-morbidities (Figure 3). This not only adds a level of medical complexity to the patient profiles, but these co-morbidities also complicate the functional profiles of these patients. The most frequently occurring co-morbidities were: hypertension, hemiplegia, coronary artery disease, ischemic heart disease, diabetes and osteoarthritis. The presence of a co-morbidity did not indicate the severity of that co-morbidity, and the sample size in each organization was relatively small; therefore, it was not possible to conduct a regression analysis to determine which type(s) of co-morbidities had the greatest impact on patient outcomes and length of stay. For example, it is the clinical opinion of the medical staff at Lakeridge Health that pre-morbid cardiac function is a significant determinant of patient outcomes in the LTLD stroke rehab population group, but we were unable to substantiate this.



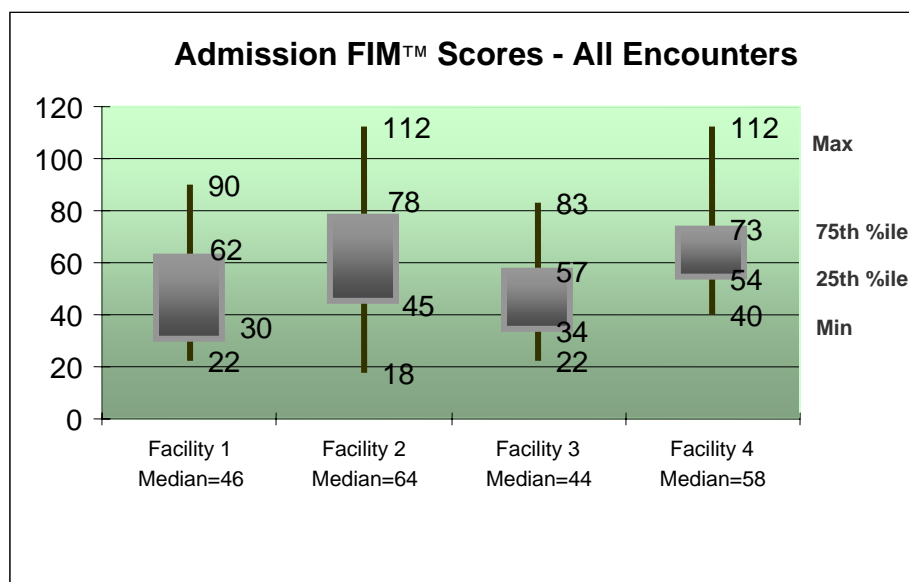
*Figure 3: Average Number of Co-morbidities*

### **Functional Level on Admission**

There was a wide variability in the functional level of patients admitted to these programs. Admission FIM™ scores ranged between 22 and 112 (median admission FIM™ scores ranged between 44–64) (Figure 4). In general, LTLD stroke rehab is considered to be appropriate for patients with severe strokes whose FIM™ scores < 40 while regular stroke rehab is geared

towards patients with moderate stroke who have early FIM™ scores between 40 – 80.<sup>21 22</sup> The variation in admission FIM™ scores would suggest that these parameters are not applied consistently during the rehab application process. Further, if early FIM™ scores are used, the time frame in which the “early” score is obtained may differ among organizations. However, the variability in functional levels on admission may also be owing to when patients are referred and by whom; patients for LTLD stroke rehab are referred by acute care and rehab facilities.

According to SCRIPT data, although most referrals for LTLD stroke rehab originate from acute care (155/1293 referrals or 13% of stroke referrals), a smaller number of referrals (11) are referred by rehab facilities. Further inquiry is needed to determine the functional level of patients admitted from rehab. There was some indication that facilities may be discharging patients from regular rehab programs and transferring them to LTLD rehab beds in CCC when patients have reached the maximum length of stay in the regular rehab program, even though they have not yet achieved their full rehab potential. By doing so, rehab facilities are able to maximize efficiencies within their organization. In the event that this kind of transfer occurs within the same facility and same unit, there is no disruption to the patient and family. However, the level of disruption is considerably higher when the transfer is to a new facility.



**Figure 4: Admission FIM™ Scores**

The wide variability in admission FIM™ scores and the different types of referral sources reflect the need for a closer look at the service delivery model to ensure that stroke survivors are able to access the most appropriate level of rehabilitation at the right time. A review of current service delivery models is recommended to ensure that benchmarks established for length of stay,

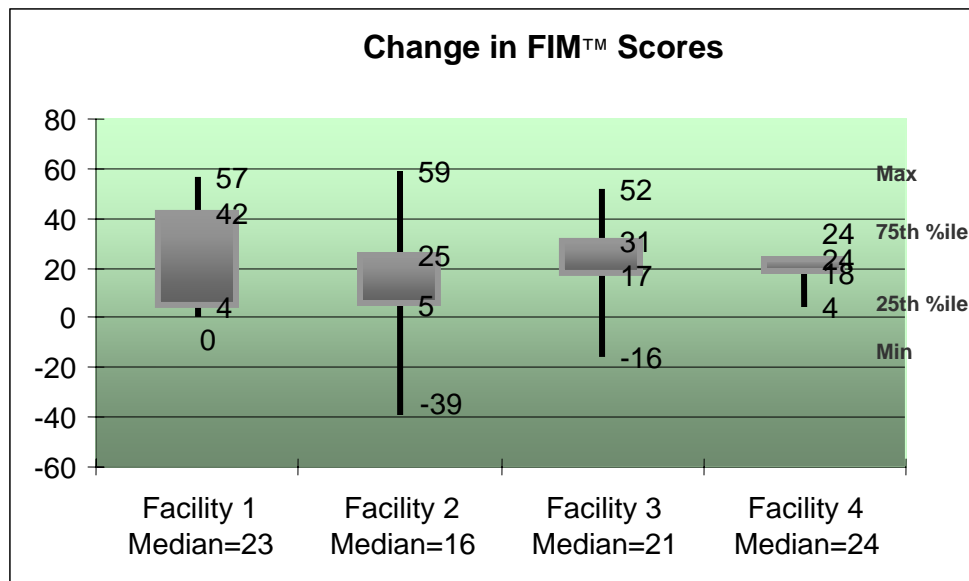
<sup>21</sup> Robert Teasell, Norine Foley, Sanjit K. Bhogal, Jeffrey Jutai, & Mark Speechley, *Evidence-Based Review of Stroke Rehabilitation: Module 4-Managing the Stroke Rehabilitation Triage Process*. Department of Physical Medicine and Rehabilitation, St. Joseph’s Health Care London, Parkwood Hospital, London, Ontario and the University of Western Ontario and the Department of Epidemiology and Biostatistics, the University of Western Ontario, London, Ontario, 2003

<sup>22</sup> GTA Rehab Network, *Low Tolerance Long Duration Stroke Rehabilitation Initiative Report*, June 2004.

tolerance levels and other patient outcomes in rehab programs are based on the rehabilitation needs of stroke survivors at different levels of stroke severity. This will also entail further refinement of admission criteria to improve the triage process of stroke patients.

### **Functional Level on Discharge**

The majority of patients showed statistically significant functional improvement as measured by the FIM™ instrument from admission to discharge. Average FIM™ change scores ranged between 15 and 22 points.<sup>23</sup> Median FIM™ change scores ranged between 16–23 points (Figure 5). Greater FIM™ change was seen on motor function than on cognitive function (Figure 6). The burden of care required for these patients as measured by the MDS-ADL long form also improved from admission to discharge. On admission, the average MDS scores ranged between 12–20 points. The average change in MDS scores by discharge ranged between -4 and -6, reflecting a reduction in the resources required to care for these patients (Figure 7).



**Figure 5: Change in FIM™ Scores**

Note: There were 20 patients (12%) whose functional levels declined during the course of LTLT rehab. Factors contributing to such declines may include the onset of another stroke or complications arising from the presence of co-morbidities.

<sup>23</sup> According to the Reporting Interpretation Guidelines of the National Rehabilitation Reporting System, a change of 20 points in the total FIM™ score is statistically significant.

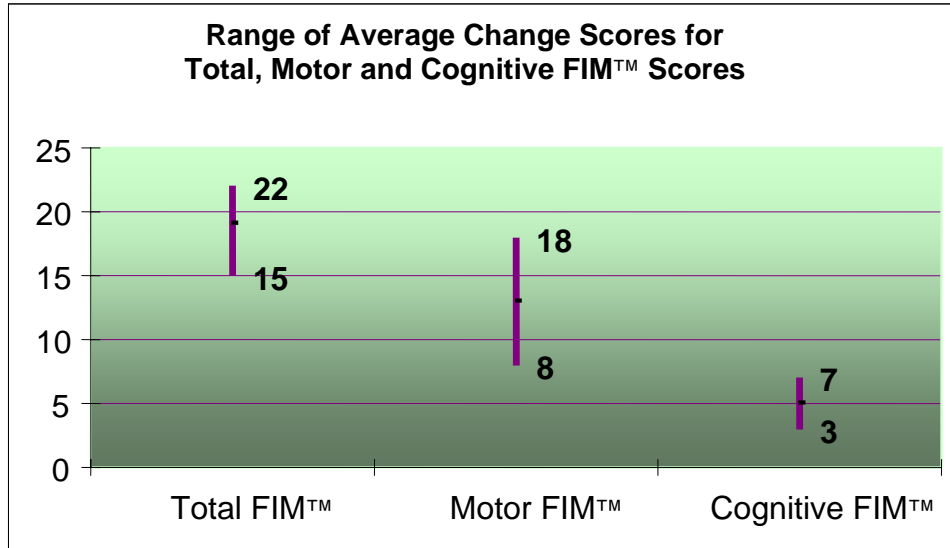


Figure 6: Change in Total, Motor and Cognitive FIM™

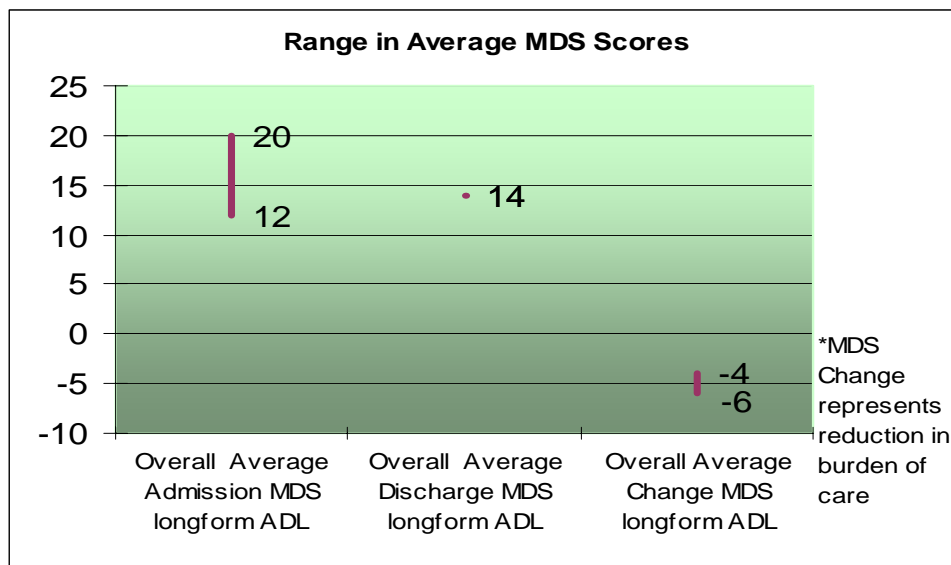


Figure 7: Average MDS Scores

**Average Length of Stay versus Optimal Length of Stay**

There was considerable variation in average lengths of stay across organizations (53–195 days).<sup>24</sup> However, the variability in length of stay may be accounted for, at least in part, by functional levels on admission and medical complexity. For example, the average admission FIM™ score of patients at Facility 1 is substantially lower than the average admission score of patients in Facility 2 and 3. Similarly, the medical complexity of patients as denoted by the average number of co-morbidities present in patients can also contribute to the length of stay (Figure 8).

<sup>24</sup> Information from Lakeridge Health was not included in these calculations owing to differences in its service delivery model which included regular rehab and rehab in CCC beds.

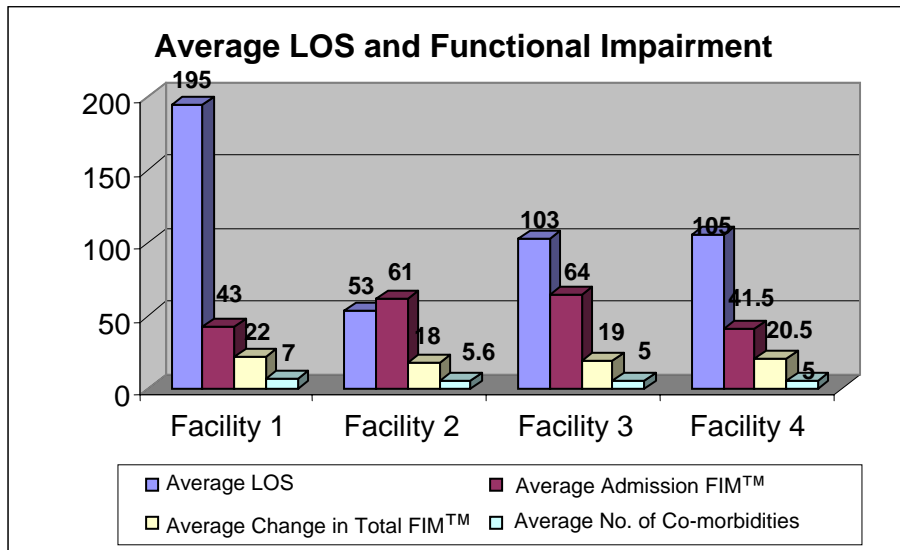
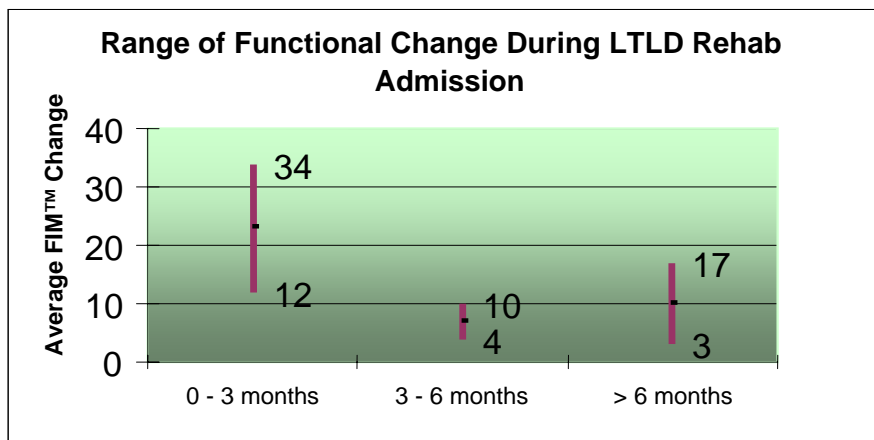


Figure 8: Average Length of Stay and Functional Impairment

The projects captured the change in FIM™ scores at each three month interval which coincided with the MDS reassessment cycle in an attempt to identify the optimal length of stay in LTLD stroke rehab. The information obtained suggests that the greatest improvement was seen during the first three months of rehab, but substantial gains were continued to be made during the three-to-six month period. In one case, improvement was seen beyond the six month length of stay; however, in another case, functional decline was seen from six months to nine months (Figure 9).



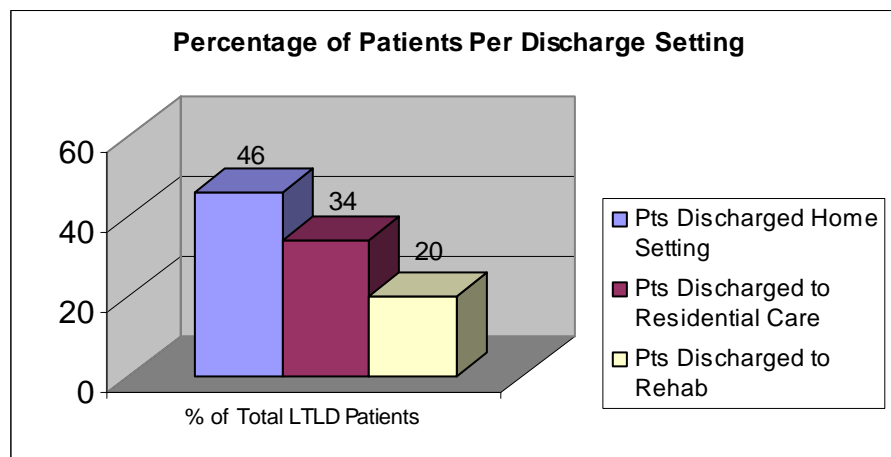
FIM™ Change score of 17 at >6 months denotes data from one patient only.

Figure 9: Functional Change per 3-month rehab period

#### 4.2 Factors Related to Discharge Destination

The conventional thinking about survivors of severe stroke has been that their rehab potential was limited and as a result, many were transferred to a long-term care facility without the benefit of a trial of rehabilitation to maximize their functional levels. Previous studies have indicated

that 11–15% of stroke survivors are discharged directly to long-term care homes.<sup>25 26</sup> The findings from this demonstration project, however, revealed that not only did patients demonstrate improvements in their functional levels, but almost half of the patients (46%) were able to return home (Figure 10). An additional 20% of patients were discharged from the LTLTD program to a regular rehab program and although the eventual discharge destination of these patients is not known, it is reasonable to assume that these patients were able to eventually return home, increasing the percentage of patients who return home to a possible 66%. Further, the limited MDS data available from this project indicates that some patients required fewer care resources at the time of discharge. Whether patients are discharged to home or to a long-term care facility with a lower burden of care, a return to the community reflects and improvement in quality of life and results in a reduction in overall healthcare costs.

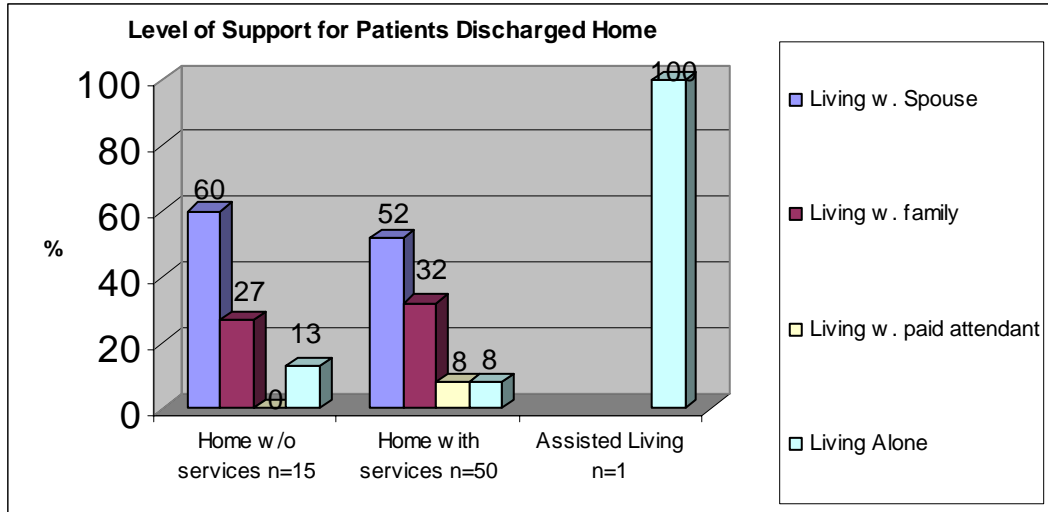


**Figure 10: Percentage of Patients and Discharge Setting**

In addition to the influence of functional status on a survivor’s ability to return home, the availability of informal or formal social support also plays a part in the choice of discharge destination. Of the 15 patients who were able to go home *without* services, 87% were living with a spouse or other family member. All patients who went home *with* services had some type of family support available (Figure 11). This project was not able to determine the extent to which the lack of community support services was a barrier to returning home. The availability of community services has implications for patients with or without family support. In the case of patients without family support, the need for community support is observable. However, it is important to note that although a stroke survivor may have a spouse at home, the age and health of the spouse may preclude the spouse from providing assistance to the stroke survivor who has residual effects from the stroke. In these situations, the availability of community support may be the defining factor in enabling a discharge home.

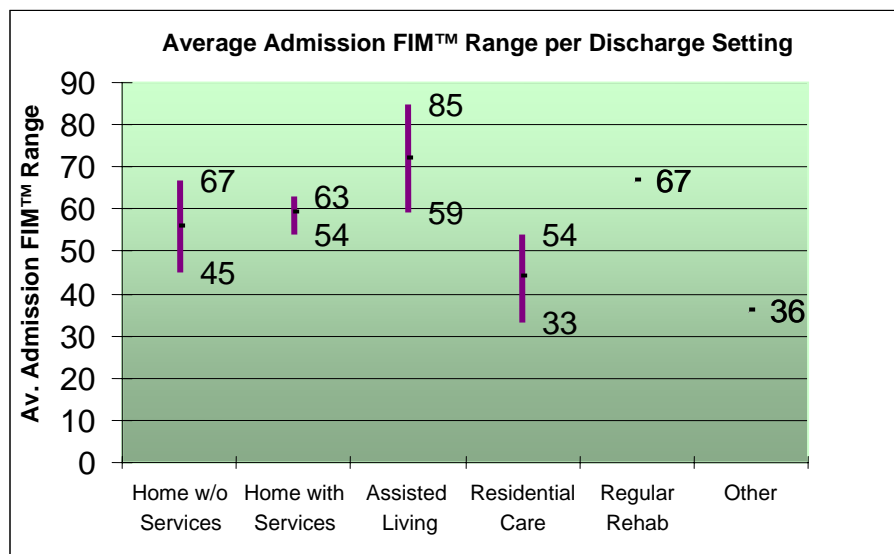
<sup>25</sup> NE Mayo, S. Wood-Dauphinee, S. Ahmed, C. Gordon, J. Higgins, S. McEwen & N. Salbach, “Disablement following stroke.” *Disabil Rehabil* 1992; 21: 258-268. In Teasell, *Evidence-Based Review of Stroke Rehabilitation: Module 3: Background Concepts of Stroke Rehabilitation*, 2003

<sup>26</sup> C. Tran, Z. Nadareishvili, L. Smurawska, PL Oh & JW Norris. “Decreasing costs of stroke hospitalisation in Toronto.” *Stroke* 1999; 30 : 185-186. In Teasell et al, *Evidence-Based Review of Stroke Rehabilitation, Module 3*, 2003.

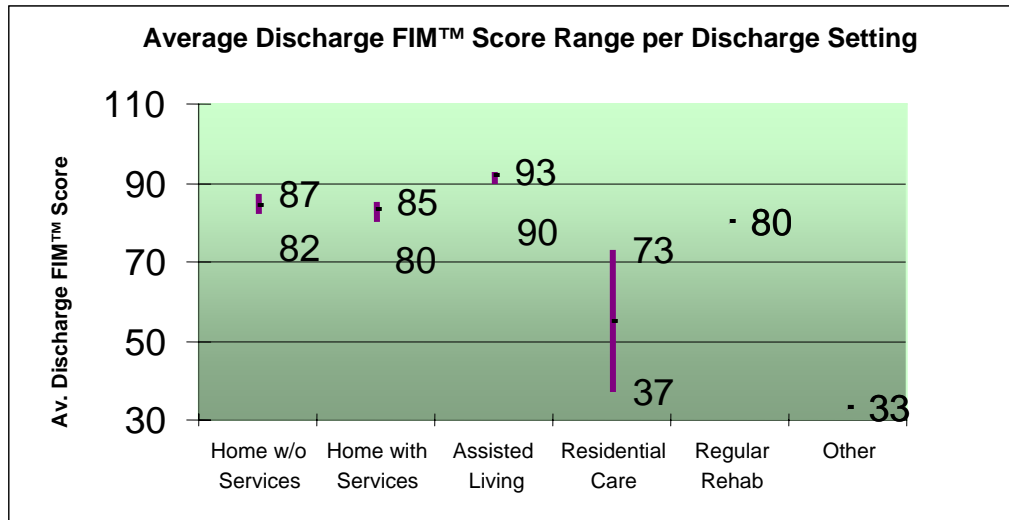


**Figure 11: Social Support and Discharge Home**

The data was also analyzed to compare functional levels on admission and discharge with discharge location. The following charts (Figures 12 and 13) denote the range of average FIM™ scores across all organizations on admission and at discharge. In general, patients who were discharged home were not as functionally impaired on admission and at discharge as those who were discharged to residential care. However, the strength of the relationship between FIM™ scores and discharge destination could not be measured reliably given the small sample sizes at each organization. The strongest relationship was observable between the discharge FIM™ score and discharge location. Also of note, the average admission and discharge FIM™ scores of patients who were transferred to rehab were higher than patients who were discharged to residential care.



**Figure 12: Average Admission FIM™ Range and Discharge Setting**



*Figure 13: Average Discharge FIM™ Range and Discharge Setting*

### 4.3 Demand and Access

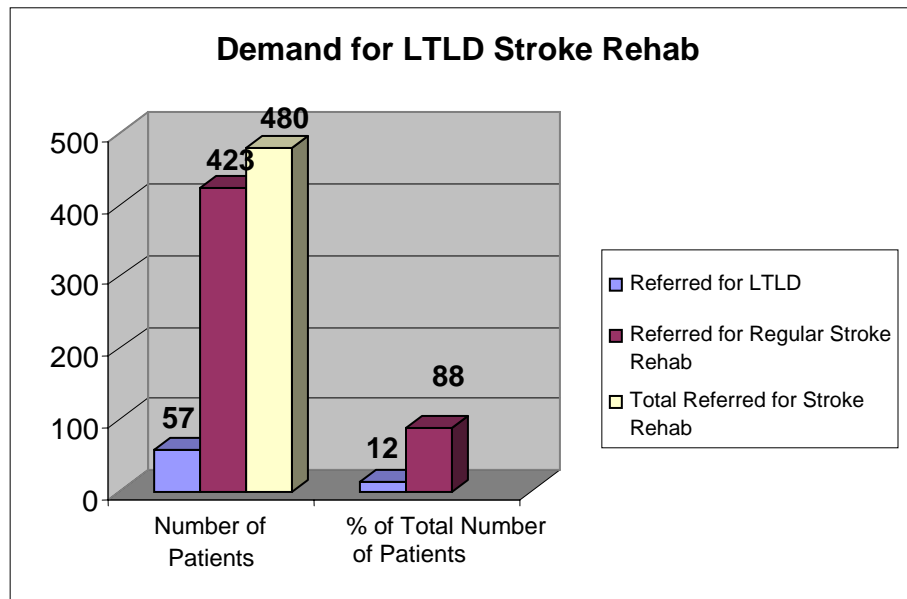
This project attempted to gain a better understanding of the demand for LTLD stroke rehab and the impact of wait time in acute care on functional outcomes following LTLD stroke rehab. Referral practices create challenges in accurately determining demand:

1. Intake/service coordinators, in the process of reviewing applications, at times “re-route” applications to a different type of service than that originally applied for. For example, a referral for LTLD stroke rehab might be assessed as more appropriate for the regular rehab program and vice versa.
2. Referrals for LTLD stroke rehab are typically sent to more than one facility thus artificially inflating the overall number of patients who have applied for LTLD stroke rehab across organizations.
3. Referral information from the SCRIPT database did not capture information from all organizations that make referrals for LTLD stroke rehab.<sup>27</sup> Notwithstanding these difficulties, the following information provides some general indication about the demand for LTLD stroke rehab.

According to SCRIPT data, the number of patients referred for LTLD stroke rehab comprises approximately 12% of the total number of patients referred for stroke rehab (Figure 14). However, information from other organizations suggests a higher demand for LTLD stroke rehab. For example, at Providence Healthcare, 50% of the referrals received for stroke rehab were designated as LTLD stroke rehab.<sup>28</sup>

<sup>27</sup> Data available from SCRIPT is based on referral information from the following organizations: St. Michael’s Hospital, Toronto Western Hospital, Toronto General Hospital, Mt. Sinai Hospital, St. Joseph’s Health Centre. (North York General Hospital, Toronto East General Hospital and Humber River Regional Hospital enrolled in SCRIPT in Spring 2005.)

<sup>28</sup> This figure represents data collected between April–September 2005. Prior to April 2005, referral information specific to LTLD referrals was unavailable as referral information was captured on all stroke referrals collectively.



**Figure 14: Number of Patients Referred for Stroke Rehab – SCRIPT**

In an attempt to capture additional information about the demand and supply of LTLD stroke rehab, information about the number of referrals received and the number of referrals waitlisted was collected.<sup>29</sup> At Castleview Wychwood Towers, a total of 18 referrals were received. Of these, no referrals were waitlisted. At Providence Healthcare, during the period for which LTLD-specific information is available,<sup>30</sup> a total of 146 referrals for LTLD stroke rehab were accepted, 4 were admitted without being waitlisted and 142 referrals were waitlisted. Of those waitlisted, 110 were eventually admitted with an average wait time of 12 days. At Bridgepoint Health, 96 referrals for LTLD stroke rehab were received, 52 patients were admitted, 10 referrals were declined and 52 referrals<sup>31</sup> were waitlisted with an average wait time of 6–8 weeks.

The above wait list information indicates that the demand for LTLD stroke rehab exceeds the number of beds that are available for LTLD stroke rehab. As a result, patients often have lengthy wait times in acute care before they are able to access LTLD stroke rehab. From a systems perspective, these patients in acute care are viewed as “bed blockers.” For those that do reach LTLD stroke rehab, the average wait time for LTLD stroke rehab is 19.93 days (standard deviation = 17.995).

To further examine the impact of wait time in acute care on functional outcomes following stroke rehab, the average change in FIM™ scores was collected for patients waiting in acute care. Both the waiting time from stroke onset to rehab readiness and time from rehab readiness to

<sup>29</sup> Owing to the admission processes and the co-location of rehab and CCC beds at Lakeridge Health that enables early admission to the rehab unit, this information was not collected.

<sup>30</sup> Information on specific LTLD stroke referrals is available for referrals received between April–September 2005. Prior to April 2005, referral information specific to LTLD referrals was unavailable as referral information was captured on all stroke referrals collectively.

<sup>31</sup> Twenty-two of the 52 referrals waitlisted were on the waitlist at the start of the demonstration project.

admission was captured and is depicted below (Figures 15 and 16). The findings suggest that regardless of wait time in acute care, patients demonstrated functional improvement during their LTLD rehab stay.

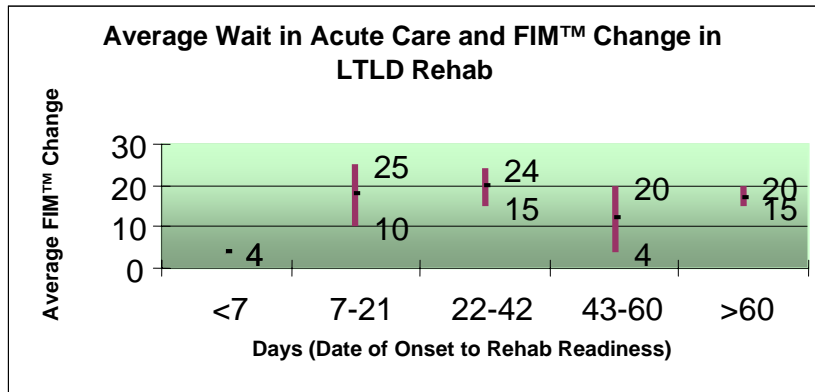


Figure 15: Acute Care Wait Time and FIM™ Change

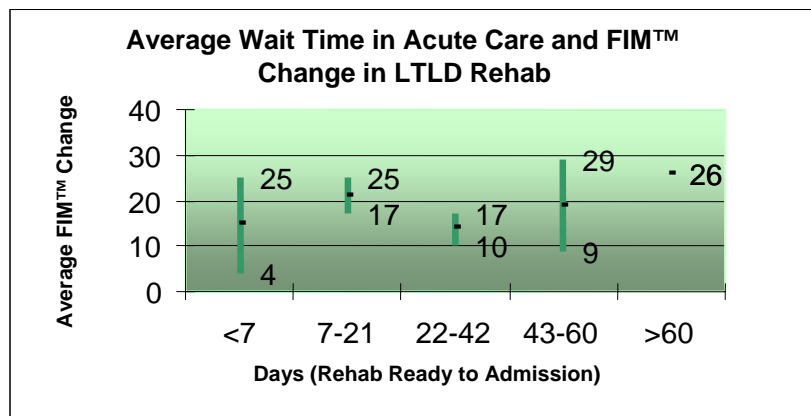


Figure 16: Acute Care Wait Time (Rehab Ready to Admission) and FIM™ Change

## 5.0 SUMMARY AND RECOMMENDATIONS

This LTLD Stroke Rehab Demonstration Project was undertaken as a first step in the GTA towards increasing our understanding of survivors of severe stroke with respect to their characteristics, functional levels on admission and discharge, and factors that may influence length of stay, outcomes and discharge destination. Although there were limitations imposed on data collection and analysis, the results of this LTLD stroke demonstration project suggest that benefits of LTLD stroke rehab can be realized at the patient and system levels.

**Patient Impact:** Overall, the patients admitted to the participating LTLD stroke rehab programs showed improvements in functional status and care requirements resulting in a substantial proportion of stroke survivors who were able to return home.

**System Impact:** LTLD stroke rehab provides access to rehabilitation for a sub-population of stroke survivors who in the past have been denied service. In addition to positive patient outcomes, the availability of LTLD stroke rehab provides an interim level of care that increases the throughput of patients from acute care to other parts of the healthcare continuum and the community. By reducing the burden of care required for these patients, overall healthcare costs are reduced.

This demonstration project has also pointed to a number of issues that affect access to LTLD stroke rehab with repercussions at both the patient and system levels.

1. **Review of Service Delivery Model:** Currently, there are two inpatient rehab options for patients who have suffered a stroke: high tolerance short duration (HTSD) and low tolerance long duration (LTLD). This report highlighted that some patients make use of both types of programs (e.g. some referrals for LTLD stroke rehab come from rehab and some patients are referred to HTSD stroke rehab following LTLD stroke rehab). The impact of such transfers on patients and families has not been examined. We also know that some patients receive therapy in acute care beds and in general complex care beds. Other patients are discharged home with services through the CCAC and others access private therapy services.

**Recommendation:** A more in-depth review of current treatment models is warranted to determine if an intermediate level of stroke rehab is needed that would provide a higher intensity of rehab to patients with higher tolerance levels for a longer duration than is currently offered in HTSD and LTLD programs. The development of such a program may impact length of stay efficiencies as currently measured; however, rehab programming for stroke survivors must be responsive to clients' rehab needs.

2. **Review of Admission Criteria:** The project demonstrated considerable variation in the functional level of patients on admission to LTLD stroke rehab programs. The triage framework for LTLD stroke rehab developed by the GTA Rehab Network relies on the availability of an early FIM™ score, age and tolerance levels to determine which patients are suited for LTLD stroke rehab versus regular rehab. However, early FIM™ scores are not always available, and when available, may not have been obtained at the same

relative point in time. The admission FIM™ scores of some of the patients admitted to the participating organizations during the data collection period were surprisingly high, giving rise to the question of why these patients were not admitted to a regular stroke rehab program at the outset. Given that demand exceeds current capacity and the wait time for LTLD stroke rehab is often lengthy, it is important that the right patients are referred to the right programs without jeopardizing the ability to respond to individual patient needs. The pressure to fill beds often results in patients being accepted into programs that are not the most appropriate for their needs.

**Recommendations:** Five strategies are suggested:

- (i) Ensure greater consistency in the application of admission criteria so that stroke survivors receive the appropriate level of rehab.
- (ii) Following a review of current service delivery models, incorporate programming changes into a triage framework as required.
- (iii) Institute a training program for use in all acute care settings to provide training on the AlphaFIM®<sup>32</sup> to support the use of the LTLD stroke rehab triage framework. This would result in a more consistent approach in referral and admission practices.
- (iv) Establish consistency in when the early FIM™ score will be obtained.
- (v) In the event that the use of the AlphaFIM® is not feasible, further refinement of the triage framework is required for use in settings where an early FIM™ score is unavailable.

3. **Use of Outcome Measurement Tools:** The challenges encountered due to the inconsistent use of outcome measures across the LTLD stroke rehab programs in this demonstration project demonstrates the need for designated tools. The National Rehabilitation Reporting System (NRS–FIM™) is not used in all CCC rehab programs and the Complex Continuing Care Reporting System (MDS tool) is not used in programs with designated rehab beds. As a result, it was difficult to make good comparisons in the data across all of the organizations involved in the project, limiting the strength of the conclusions that could be drawn for this report. Although the findings of this project are promising regarding the outcomes of LTLD stroke rehab, further data collection and analysis is warranted.

**Recommendation:** The FIM™ instrument may not always be sensitive enough to capture smaller changes in functional levels for patients with very severe stroke;<sup>33</sup> however, administration of the FIM™ instrument for patients in designated rehab beds is currently a requirement. The systematic use of the FIM™ instrument in all stroke rehab programs, regardless of setting, would allow for comparison between stroke patients in LTLD and in regular rehab programs. It would also facilitate the ongoing evaluation of patient outcomes thus benefiting patients, clinicians and researchers.

<sup>32</sup> The AlphaFIM® was developed by the authors of the FIM™ instrument and has been created for use in acute care settings. It is administered within the first 72 hours of admission and again before discharge.

<sup>33</sup> A Rasch analysis can be used to convert ordinal scores to linear measures with equal interval properties. See Heinemann, Allen W., Linacre, John Michael, Wright, Benjamin D. & Granger, Carl., Measurement Characteristics of the Functional Independence Measure, *Topics in Stroke Rehabilitation*, 1994:1(3):1-15

That said, the use of the FIM™ instrument to measure clinical utilization and hospital performance (e.g. length of stay efficiency) must take into account patients who require longer lengths of stay, whether in a high tolerance or low tolerance program, to achieve their full rehab potential. Comparisons between short duration and long duration programs using the FIM™ instrument would place long duration rehab programs at a disadvantage if used to draw comparisons between these programs. The use of the MDS tool, however, in complex continuing care provides information about the resources that are required to care for patients in LTLD stroke rehab and is a more suitable indicator to underpin the funding formula for patients in complex continuing care and its continued use is recommended.

4. **Specialized Stroke Team:** Successful stroke rehabilitation depends on the use of a dedicated team of rehab professionals with expertise in stroke rehabilitation. The goal of LTLD stroke rehab is to reduce functional impairment following severe stroke and the availability of rehab professionals to develop and implement treatment plans is essential. Further, patients admitted to LTLD stroke rehab are medically complex with a number of co-morbid conditions that require specialized nursing. Each of the organizations involved in the project have allocated resources to provide specialized stroke rehab in their LTLD programs to optimize patient outcomes.

**Recommendation:** Designated funding for rehab professionals and specialized nursing in LTLD stroke rehab is recommended to maximize the achievement of patients' full rehab potential and provide care for the medical complexities of these patients.

5. **Co-payment:** Traditionally, LTLD stroke rehab has been provided in complex continuing care beds. Although a co-payment is usually charged in CCC, the organizations in Toronto that provide LTLD stroke rehab typically waive the co-payment fee while patients are participating and benefiting from the rehab program and discharge home is anticipated. This practice reduces the financial burden of patients who are maintaining homes in the community, but results in lost revenue for the organization.

This project has also described the LTLD stroke rehab program that has been piloted at Castleview Wychwood Towers, a long-term care facility. Owing to provincial legislation that governs long-term care, the co-payment fee could not be waived for residents participating in this program. This created a financial barrier for many prospective participants in the program who, as a result, did not apply to the program. For others, discussions around the co-payment fee increased the wait time to enter the program. Furthermore, referral sources were often unwilling to promote the LTLD stroke rehab program because of the co-payment requirement. As a result of these factors, the LTLD rehab program at Castleview Wychwood Towers has not run at full capacity.

**Recommendation:** A consistent approach to co-payment must be implemented across the system's organizations that provide LTLD stroke rehab in order to maximize patient access. Given that the co-payment requirement poses a considerable financial burden to

some patients, it is recommended that organizations waive the co-payment fee and that the MOHLTC policy for the co-payment requirement be revised to allow this.

At the same time, it is also recommended that the MOHLTC recognize the financial implications for organizations when the co-payment is waived and that a funding mechanism be established to compensate organizations for the lost revenue.

- 6. Length of Wait and Length of Stay:** It is difficult to determine if patients would have achieved more functional gain in less time if admitted earlier; however it was notable that patients did achieve functional gains despite wait times to enter the programs. Our project indicated that the most gain during LTLTD was achieved between 0–3 month lengths of stay and 3–6 month lengths of stay.

**Recommendation:** Patients should be considered for admission to LTLTD despite lengthy wait times and for those moved on to LTC that their referral still be considered.

**Recommendation:** The optimal length of stay is up to 6 months; however, where patients continue to achieve gains, this should not be a limitation.

- 7. Future Research:** The results of this demonstration project have laid some of the groundwork in furthering our understanding of stroke survivors in LTLTD stroke rehab. However, the lack of external funding for this project imposed restrictions on the approach that was used and the quality of the data that was available for analysis.

**Recommendation:** A more in-depth multi-site research study with external funding would allow for valid conclusions to be drawn through the application of sophisticated methods of statistical analysis. The GTA Rehab Network is aware of other research projects investigating LTLTD rehab and will keep abreast of their outcomes and recommendations.

## 6.0 APPENDICES

### Appendix 1:

#### Members of the LTLD Stroke Demonstration Project Planning Subgroup

Gaye Walsh, Bridgepoint Health (Chair)  
Carol Anderson, Lakeridge Health  
Rob Forbes, Providence Healthcare  
Carol Jarman, Providence Healthcare  
Vija Mallia, Castleview Wychwood Towers  
Andrew Marsden, Lakeridge Health  
Lynda McColl, Castleview Wychwood Towers  
Shelley Sharp, Toronto West Stroke Network  
Nicola Tahair, SCRIPT Project  
Tajbanu Thobani-Lakhani, Providence Healthcare  
Josie Walsh, Providence Healthcare  
Dionne Williams, Bridgepoint Health

Charissa Levy/Heather Brien, GTA Rehab Network  
Sue Balogh, GTA Rehab Network

**Appendix 2:****LTLTD Stroke Rehab Program Description – Bridgepoint Health**

<b>Neurological Care and Activation Program</b>	
<p>Patients in this program have complex, often unstable clinical conditions and require a range of inter-disciplinary diagnostic and therapeutic services. Some patients may have swallowing disorders and are feeding tube dependent and in some cases may have the potential to receive all nutrition by mouth. The patients on this unit do not have an end stage disease or a severe psychiatric disorder.</p> <p>The 7-West Neuro-Activation service offers a moderately intensive neuro-rehabilitation program. The program is designed for individuals who have received six months of intensive neuro-rehabilitation and are now able to transfer to a neuro-activation program, where they can continue to participate in therapy programs on an ongoing basis.</p>	
Anticipated Length of Stay	8–12 months
Primary Diagnosis	acquired brain injury, cerebral vascular accident, Guillain-Barré syndrome, chronic inflammatory demyelinating polyradiculoneuropathy, multi-system disease
Admission Criteria	<p>The patient:</p> <ul style="list-style-type: none"> <li>• has a significant neurologically-based condition which interferes with activities of daily living</li> <li>• is dependent on technology based continuing or intermittent care</li> <li>• may require feeding or medication administered through an enterostomy tube and/or intravenous therapy; complex wound care; airway suctioning; continuous oxygen administration; and tracheostomy care which may require the support provided by a communications device</li> <li>• requires the assistance of an inter-disciplinary team for all activities of daily living and/or behaviours of daily living, medications, treatments associated with maintaining or enhancing physical, emotional, social and spiritual well-being</li> <li>• is not dependent on active medical treatment from an acute care hospital</li> <li>• has the potential to be weaned off a feeding tube (i.e. a series of trials were successful)</li> <li>• is unable to participate in an intensive rehabilitation program but presents with a good prognosis for recovery</li> <li>• requires inpatient treatment with identifiable outcome goals</li> <li>• understands and is willing to accept that intensity of therapy will vary according to individual needs and goals, and will change over the course of stay</li> <li>• is able to reach maximum potential in 6–12 months</li> <li>• requires an extended period of therapy due to an illness or injury where a slow recovery is expected</li> </ul>

**Appendix 3:****LTLD Stroke Rehab Program Description – Providence Healthcare**

<b>Specialized Stroke Services</b>	
<p>The Specialized Stroke Services units are located on A3 and B3. We have a total of 84 beds of which 62 are designated step-down (LTLD) rehab beds and 22 beds are designated active rehab beds. Both A3 and B3 are non-secured units and each unit has 42 beds. The step-down (LTLD) and the active beds are currently integrated within the units.</p> <p>The core team and services for Specialized Stroke Services is nursing 24 hours per day, seven days per week with medical staff on call. The other members of the core team are available from Monday to Friday and these team members are physiotherapy, occupational therapy, social work, speech language pathologist, dietician, recreation and pharmacy. Psychiatric and psychology consultations are available as required.</p>	
Anticipated Length of Stay	
Primary Diagnosis	Established diagnosis of stroke or other recent neurological event
Admission Criteria	<ul style="list-style-type: none"> <li>• Adults</li> <li>• Medically stable</li> <li>• Defined rehabilitation goals</li> <li>• Confirmed discharge plan</li> <li>• No severe cognitive, mental health and/or behavioural difficulties that would impede the rehabilitation process</li> <li>• Individuals admitted to step-down (LTLD) program should be able to participate in rehab therapy up to three times per week.</li> <li>• All applications are submitted to the admitting department and the applications are reviewed by the clinical leaders daily (Monday to Friday) and the decision to accept or reject is based on the applicant's ability to meet the admission criteria.</li> </ul>

## Appendix 4:

### LTLD Stroke Rehab Program Description – Lakeridge Health

<b>LTLD Patient Management</b>	
<p>Lakeridge Health (LH) offers rehabilitation in two different settings:</p> <ol style="list-style-type: none"> <li>1. Lakeridge Health Whitby, Complex Continuing Care, Geriatric Rehabilitation Unit - GRU (32 beds)</li> <li>2. Lakeridge Health Oshawa, Inpatient Rehabilitation Unit - IRU (51 beds).</li> </ol> <p>LH utilizes a Clinical Coordinator who reviews all rehabilitation referrals in acute care and determines where best the individuals' needs can be met. LH embraces the idea that ALL stroke patients deserve a trial on the IRU, regardless of their initial apparent tolerance (e.g. oftentimes tolerance is related to motivation which may improve when an individual is "expected" to participate). As well, since LH admits LTLD patients much quicker from the acute care setting, it is often difficult to get a true concept of one's tolerance early on in the acute phase of the stroke.</p>	
Anticipated Length of Stay	<ul style="list-style-type: none"> <li>• IRU: up to 3 months</li> <li>• GRU: up to 6 months</li> </ul>
Primary Diagnosis	<ul style="list-style-type: none"> <li>• stroke/neuro, musculoskeletal, geriatric</li> </ul>
Admission Criteria	<ul style="list-style-type: none"> <li>• The IRU offers general medical rehabilitation for primarily the complex orthopedic population and the neurological population (primarily stroke) to patients 16 years of age or older.</li> <li>• If an individual is clearly not managing the intensity and frequency of therapy in the IRU, they will be referred to the GRU for a longer, slower paced program.</li> <li>• The GRU admits patients who are 60 years of age or older. The unit offers LTLD ("slow stream") rehabilitation to individuals who cannot manage the frequency and intensity of a regular stream program and/or whose rehabilitation is compromised due to multiple medical complexities and co-morbidities.</li> <li>• On occasion, LTLD patients are admitted directly to the GRU; this usually occurs as a result of bed pressures or lack of an available IRU bed – it is better for the patient to receive some therapy, than to wait for an IRU bed in the acute care setting.</li> </ul>

## Appendix 5:

### LTLTD Stroke Rehab Program Description – Castleview Wychwood Towers

<b>Low Tolerance Long Duration Stroke Rehab Program</b>	
<p>Castleview Wychwood Towers is a 456 bed not for profit long term care home owned and operated by the City of Toronto. The Home fosters a high quality environment designed to meet the physical, intellectual, social, cultural, emotional and spiritual needs of our residents. Currently, 10% of the population at Castleview Wychwood Towers is comprised of adults less than 65 years age.</p> <p>Castleview Wychwood Towers has 110 residents (24%) with a diagnosis of stroke. There are two stroke teams functioning in the home. The stroke teams have received education in “Supported Conversation with Adults with Aphasia” from the Aphasia Institute “Tips and Tools,” and have a strong partnership with the education outreach team from Toronto West Regional Stroke Centre.</p> <p>At meetings of the home’s admissions committee, applicants with a diagnosis of stroke are discussed in great depth. Twenty beds are devoted to persons requiring low tolerance long duration (LTLTD) stroke rehab at Castleview Wychwood Towers. The twenty beds are clustered on the 7<sup>th</sup> floor. The low tolerance long duration rehabilitation program admitted the first resident on February 4, 2005.</p> <p>The needs of the stroke survivor are met through a team comprised of existing Castleview Wychwood Towers staff and contracted therapists to supplement services at Castleview Wychwood Towers as required. Services are provided as identified on an individual basis. The contracted therapists include:</p> <ul style="list-style-type: none"> <li>○ Occupational therapist – 1 day per week</li> <li>○ Physiotherapist – 3 days per week</li> <li>○ Speech language therapist – 1 day per week</li> </ul> <p>Other care services include recreation, rehabilitation, nutrition, spiritual care, social work, medical, housekeeping, music and art therapies, as well as related complimentary care such as aroma therapy, light massage and administrative supports.</p>	
Anticipated Length of Stay	<ul style="list-style-type: none"> <li>● The needs of the individual residents for their continued placement within the unit must undergo continual reassessment and be evaluated at 7 days, 6 weeks, 3 months and 6 months or change in status.</li> <li>● The same criteria for admission are applied in the reassessment, and where the programs and services are no longer benefiting the LTLTD resident, appropriate recommendations and planning is initiated.</li> </ul>
Primary Diagnosis	<ul style="list-style-type: none"> <li>● stroke</li> </ul>
Admission Criteria	<p>Recommendations for placement of an applicant/resident is based on ensuring that the programs and services as outlined in the Divisional, Homes for the Aged mission statements and the 7<sup>th</sup> floor low tolerance long duration (LTLTD) beds Statement of Purpose best meet the individual’s need.</p> <p>In addition, the following guidelines must be considered in the recommendation:</p>

### Low Tolerance Long Duration Stroke Rehab Program

- The applicant/resident has rehabilitation potential.
- The applicant/resident is assessed to:
  - be medically stable
  - require a restorative ability enhancing environment
  - be able to benefit from the long term care environment
  - have a FIM™ score of greater than 40
  - require a length of stay up to 180 days to achieve goals or reach plateau
  - meet the criteria developed for residents who are deemed Low Tolerance Long duration (LTLD) by the GTA Rehab Network
  - be able to participate in goal setting
  - be co-operative and willing to participate in a rehabilitation program
    - a) tolerate minimum of 20 minutes of therapy a session
    - b) minimum of 2 times per day
    - c) minimum of 3 hours per week
    - d) sit supported for 30 minutes at a time
  - be able to follow instructions and remember them
  - be likely to improve from stroke rehabilitation
  - have predetermined goals from referring facility

**APPENDIX 6:****LTLT STROKE DEMONSTRATION PROJECT DATA REPORTING TEMPLATE**

This report represents the findings of: \_\_\_\_\_  
(Facility Name)

**The following template is divided into 4 data analysis sections. Each section contains a list of questions to guide your data analysis. Each section also includes the corresponding charts for your data. Please provide commentaries for each chart in each section.**

**Section I: Patient Population****Questions for considerations:*****Client Profile:***

- Total number of patients admitted to the LTLT program and of these, how many had full encounters and how many had partial encounters? How many were discharged within 72 hours?
- For those admitted and discharged within 72 hours, describe the factors that contributed to short stay.
- Analysis of breakdown of age groups: Are patients primarily elderly?
- How long do these patients wait in acute care? Are there any differences among the age categories?
- Average number of co-morbidities: Are there any differences among age groups?  
[For SCRIPT only: The median age and Rehab Ready FIM™ for patients referred through SCRIPT for LTLT stroke rehab.]

**Functional Status of patients on admission:**

- Analysis of Admission FIM™ and Admission MDS long form ADL scores: Is there a difference in Admission FIM™/MDS scores among patients in different age categories?

**Outcomes:**

- Do these patients improve? What is the average change in FIM™/MDS scores? Any differences among age categories?
- Is there a reduction in the burden of care? (e.g. change in MDS RUG score)?
- Average wait time for rehab: Are there any differences among age categories?

***Please provide commentaries on each of the following charts using these questions as a guideline for your analysis.***

Please provide a commentary based on the chart below:

ALL ENCOUNTERS	Age: 18-54	Age: 55-74	Age: ≥ 75	Overall Totals
Total number of patients admitted				
Number of patients with Admission FIM™ and Discharge FIM™				
Number of patients with Admission FIM™ only				
Average Admission FIM™ for patients with Admission FIM™ only				
Number of patients admitted & discharged within 72 hours				
Reasons patients admitted & discharged within 72 hours				
Note: For patients admitted directly to Lakeridge CCC, only MDS scores are available. Report Average Score in MDS long form ADL at Admission and Discharge as applicable.				

Provide a commentary based on the chart below:

FULL ENCOUNTERS only	Age: 18-54	Age: 55-74	Age: ≥ 75	Overall
Av. Admission Total FIM™ score				
Av. Discharge Total FIM™ score				
Av. Change in Total FIM™ score				
Av. Score in MDS long form ADL at admission				
Av. Score in MDS long form ADL at discharge				
Av. Change in score in MDS long form ADL				
*Av. Length of stay in acute care (date of onset to admission to rehab)				
Av. Wait Time from date of rehab ready to admission to rehab				
Av. Change in MDS RUG score from admission to discharge				
Av. Number of co-morbidities from Admission NRS				

\* For Average Length of Stay in Acute Care: Because the date of admission to acute care cannot be determined using NRS data, date of stroke onset will be used with the assumption that the date of onset is equal to date of admission for patients whose stroke occurred before admission. This assumption does not apply if stroke occurred after admission to acute care.

## Section II: Factors Influencing Discharge Setting

### Questions for consideration:

- How many patients were able to return to their pre-hospital living arrangement?
- Describe the factors that are significantly correlated with discharge setting (e.g. age, gender, LOS)

- Is average admission FIM™ score correlated with any discharge setting? (e.g. home with/without services, assisted living, residential care)
- Are the average discharge FIM™ and/or change in FIM™ score correlated with any discharge setting?
- How many patients were able to go home with or without services?
- How many patients required a supported living arrangement on discharge?
- Is there a statistically significant change in FIM™/MDS that allows people to go home?
- Does the level of social support (post-discharge living arrangement) influence where the patient is discharged to?
- Which category(ies) of social support and discharge setting have the greatest number/percentage of patients? Which has the least? What was the most frequent discharge setting for those that had no social support?
- How frequently was discharge setting determined by patient preference, availability of social support, publicly-funded community support or lack of financial means to augment publicly-funded community support?

Provide a commentary based on the chart below:

<b>Number (and percentage) of patients who returned to their pre-hospital living arrangements?</b>					
<b>FULL ENCOUNTERS ONLY</b>					
<b>Age: 18-54</b>		<b>Age: 55-74</b>		<b>Age: ≥ 75</b>	
<b>No. of pts</b>	<b>% of pts</b>	<b>No. of pts</b>	<b>% of pts</b>	<b>No. of pts</b>	<b>% of pts</b>

Provide a commentary based on the chart below:

<b>No. of patients in each category &amp; relationship between discharge location from LTLD rehab and (1) gender; (2) age; (3) and LOS in the LTLD program</b>									
<i>Using raw data, calculate if there is a significant relationship between discharge setting and these three variables.</i>									
<b>FULL ENCOUNTERS ONLY</b>	<b>Age: 18-54</b>			<b>Age: 55-74</b>			<b>Age: ≥ 75</b>		
	<b>Sex</b>		<b>LOS</b>	<b>Sex</b>		<b>LOS</b>	<b>Sex</b>		<b>LOS</b>
	<b>M</b>	<b>F</b>		<b>M</b>	<b>F</b>		<b>M</b>	<b>F</b>	
<b>Home w/o services</b>									
<b>Home w/ services</b>									
<b>Boarding House</b>									
<b>Assisted living (retirement or group home)</b>									
<b>Residential Care</b>									
<b>Regular Rehab</b>									

Provide a commentary based on the chart below:

<b>Average Admission/Discharge FIM™ and FIM™ Change for Each Discharge Setting</b> Using raw data, calculate the correlation between discharge location and Average Admission FIM™; (2) Average Discharge FIM™; (3) Average Change in FIM™					
<b>FULL ENCOUNTERS ONLY</b>	<b>Home without services</b>	<b>Home with services</b>	<b>Assisted living *</b>	<b>Residential Care **</b>	<b>Regular Rehab</b>
<b>Av. Admission FIM™</b>					
<b>Av. Discharge FIM™</b>					
<b>Av. Change in FIM™</b>					
<b>No. of pts</b>					
<b>% of pts</b>					

\* Assisted Living = group home, retirement home, supervised living setting (NRS definition)

\*\* Residential Care = LTC, convalescent care, nursing home, home for the aged (NRS definition)

Provide a commentary based on the chart below:

<b>Number of Patients in Each Discharge Setting for Each Level of Social Support (Post-discharge Living Arrangement)</b> Using raw data, calculate the correlation between discharge location and social support* available at discharge										
<b>FULL ENCOUNTERS ONLY</b>	<b>Home w/o services</b>		<b>Home with services</b>		<b>Assisted living **</b>		<b>Residential Care***</b>		<b>Regular Rehab</b>	
	<b>No. of pts</b>	<b>% of pts</b>	<b>No. of pts</b>	<b>% of pts</b>	<b>No. of pts</b>	<b>% of pts</b>	<b>No. of pts</b>	<b>% of pts</b>	<b>No. of pts</b>	<b>% of pts</b>
<b>Social Support #1</b>										
<b>Social Support #2</b>										
<b>Social Support #3</b>										
<b>Social Support #4</b>										
<b>Social Support #5</b>										

\* Social Support based on NRS categories used to describe the following post-discharge living arrangements: 1. Living with spouse/partner 2. Living with family (includes extended) 3. Living with non-family, unpaid (includes friends) 4. Living with paid attendant 5. Living alone

\*\* Assisted Living = group home, retirement home, supervised living setting (NRS definition)

\*\*\* Residential Care = LTC, convalescent care, nursing home, home for the aged (NRS definition)

### Section III: The Impact of Co-Morbidities

#### Questions for consideration:

- What are the 10 most frequently reported co-morbidities associated with this patient population?
- What is the average age associated with each of the 10 most frequently reported co-morbidities?
- Is there any relationship between the type of co-morbidity and average LOS?
- Is there any relationship between the type of co-morbidity and average change in FIM<sup>TM</sup>/MDS scores?
- Which co-morbidity has the greatest impact on LOS and FIM<sup>TM</sup>/MDS change? (Following data retrieval, each organization to review data and determine feasibility of performing a regression analysis.)

*Please provide a commentary on the following chart using these questions as a guideline for your analysis.*

*Provide a commentary based on the chart below of the top 10 co-morbidities.*

FULL ENCOUNTERS ONLY	Type of Co-morbidity (from Admission NRS)	# of pts	Average LOS			Average FIM <sup>TM</sup> Change	Average Change in MDS long form ADL	Average Age
			< 60 days	60-90 days	91-120 days			
Co-morbidity 1								
Co-morbidity 2								
Co-morbidity 3								
Co-morbidity 4								
Co-morbidity 5								
Co-morbidity 6								
Co-morbidity 7								
Co-morbidity 8								
Co-morbidity 9								
Co-morbidity 10								

### Section IV: System Issues

#### Questions for consideration:

- Impact of therapy time on outcome: Is there a relationship between the amount of therapy and patients' functional outcomes and LOS?
- To what extent does length of stay in acute care account for functional change/outcomes in rehab?
- Based on the average changes in FIM<sup>TM</sup>/MDS scores in each 3 month interval during the admission, when does the most change in function occur? What is the optimal length of stay in LTLD rehab to maximize rehab benefits and functional outcomes?
- What is the demand for LTLD stroke rehab based on the number of referrals received, number of patients admitted, and the referrals waitlisted or declined?
- [For SCRIPT data only: What is the demand for LTLD stroke rehab based on the percentage of patients referred for LTLD relative to total number of referrals?]

Provide commentary on the chart below.

<b>Impact of Therapy Time on Outcomes &amp; LOS</b>	
Using raw data from table below, provide correlation between therapy and: average change in total FIM™, change in FIM™ motor, change in FIM™ cognitive, average change in MDS long form ADL and average LOS.	
<b>FULL ENCOUNTERS ONLY</b>	
Average Change in Total FIM™	
Change in FIM™ motor	
Change in FIM™ cognitive	
Average Change in Score in MDS long form ADL	
Average Change in Cognitive Performance Scale - MDS	
Average LOS (Av. LOS = Av. LOS – Service Interruptions)	
Average Total Therapy*	

\* Total Therapy = Total minutes for OT, PT, SLP per patient during rehab admission. (RT & RN not included)

Average Total Therapy = Total therapy time per total number of patients

Provide commentary on the chart below.

<b>Impact of LOS in Acute Care on Functional Outcomes</b>										
<i>Use raw data from table to perform a regression analysis.</i>										
<b>FULL ENCOUNTERS ONLY</b>	<b>Average time from Date of Onset to Rehab Readiness</b>					<b>Av. Wait Time from Rehab Readiness to Admission</b>				
	<7 days	8-21 days	22-42 days	43-60 days	>60 days	<7 days	8-21 days	22-42 days	43-60 days	>60 days
Av. Admission FIM™										
Av. Discharge FIM™										
Av. Change in FIM™										
Av. Score in MDS long form ADL at admission										
Av. Score in MDS long form ADL at discharge										
Av. Change in Score in MDS long form ADL										

Provide commentary on the average change in FIM and MDS scores in each 3-month interval.

<b>The Optimal Length of Stay in LTLD Rehab Relative to Change in Function.</b>			
<b>FULL ENCOUNTERS ONLY</b>	<b>Average Change in Total FIM score</b>	<b>FACILITY</b>	<b>Average Change in MDS long form ADL</b>
<b>0-3 months</b>		<b>0-3 months</b>	
<b>3-6 months</b>		<b>3-6 months</b>	
<b>6-9 months</b>		<b>6-9 months</b>	
<b>9-12 months</b>		<b>9-12 months</b>	

Provide commentary on the number of referrals and number of patients who are admitted, waitlisted or declined access to LTLD stroke rehab.

<b>Demand for LTLD Stroke Rehab</b>				
<b>ALL ENCOUNTERS</b>	<b>No. of referrals for LTLD stroke rehab</b>	<b>No. of pts admitted to LTLD stroke rehab</b>	<b>No. of referrals declined</b>	<b>No. of referrals waitlisted</b>
<b>FACILITY*</b>				

\*Include referrals through SCRIPT and from non-SCRIPT sources

For SCRIPT only:

<b>The Percentage of LTLD Stroke Patients Referred through SCRIPT</b>	
<b>Total number of SCRIPT referrals for stroke rehab</b>	<b>% of total SCRIPT referrals for LTLD stroke rehab</b>

<b>Demand for LTLD Stroke Rehab</b>						
<b>No. of pts. referred for LTLD stroke rehab</b>	<b>No. of referrals for LTLD stroke rehab</b>	<b>No. of pts admitted to LTLD stroke rehab</b>	<b>No. of pts. declined</b>	<b>No. of referrals declined</b>	<b>No. of pts. waitlisted</b>	<b>No. of referrals waitlisted</b>

GTA Rehab Network  
550 University Avenue, Room 920  
Toronto, ON M5G 2A2  
(416) 597-3057  
[info@gtarehabnetwork.ca](mailto:info@gtarehabnetwork.ca)  
[www.gtarehabnetwork.ca](http://www.gtarehabnetwork.ca)