Community Stroke Rehabilitation Model
May, 2013

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EXECUTIVE SUMMARY

The release of the second annual Ontario Stroke Report Card in June 2012 revealed that opportunities existed within the Hamilton Niagara Haldimand Brant (HNHB) Local Health Integration Network (LHIN) to reorganize how acute and inpatient stroke rehabilitation services were provided to:
- better align with best practice standards;
- improve stroke care and outcomes for patients; and
- improve overall system performance for stroke care.

The LHIN, working with the Central South Regional Stroke Network and LHIN hospital leaders, realized a vision for an Integrated Stroke Recovery System that crossed the continuum from acute to community. Key elements of this system included:
- the establishment of designated Integrated Stroke Units with the critical mass to support an inter-professional team of health care providers with expertise in stroke care; and
- availability of a community stroke rehabilitation service model of care that provided care based on best practice standards.

This report documents the development of a Community Stroke Rehabilitation (CSR) Model for the HNHB LHIN as a component of an integrated stroke recovery system that crosses the continuum from acute to community. The service model meets the recommended best practice guidelines and Expert Panel recommendations and will provide access to eligible residents within 30 minutes of where they live and will be transferable to other LHIN communities.

Development of a Community Stroke Rehabilitation Model

Define Eligible Population

Acute and inpatient rehabilitation care data was utilized to identify eligible community stroke rehabilitation candidates. The CSR Working Group (WG) adopted the Stroke Reference panel recommendations predicting 13% of acute patients would benefit from early supportive discharge post-acute care. The first three-digits of the postal code were used to map the discharge location of residence.

Community Stroke Integration Streams

Community Integration Streams were developed from the concept of the 'Central South *Banding Model*''. Three streams of care were determined to be applicable to the community, Mild, Moderate and Severe. The Community Model is geared to the level of need associated with the mild, moderate and severe streams and based on best practice recommendations. The level of support provided is tailored to the person's community integration goals. The visit estimates were made to accommodate the level of needs for each stream. The estimates are intended to represent overall averages realizing that some individuals within the stream will require more support and some will require less support. All of the streams would be supported by additional community based programs focused on prevention, recreation, peer support and community living.

Environmental Scan

An environmental scan identified eight (8) models to review. Application of the HNHB LHIN's Decision Making Framework (DMF) was utilized to evaluate the models. The WG concluded that each model had essential key elements necessary to a community stroke rehab program in the HNHB LHIN. The working group decided rather than adopt one of the existing models; an HNHB CSR model would be developed that incorporated the strengths of the models reviewed as well as the best practice and expert panel recommendations.

The Essential Key Elements of the HNHB CSR Model include the following:

1. Integration of the Community Stroke Rehab model into the care path of the Integrated Stroke Unit (ISU)
2. Identification of client's rehabilitation needs in the hospital stay, within 24-72 hours
3. Strong link with District and/or Regional Stroke Centre' s ISU
4. Strong link with Primary Care Physician
5. Dedicated care coordination
6. Time to first visit within 72 hours following hospital discharge
7. Care pathway based in best practice standards: 2-3 outpatient or community-based allied health professional visits/week (per required discipline) for 8-12 weeks.
8. Care path incorporates milestones and opportunities for reassessment
9. Consistency of Stroke Team Members (80% of care to be provided by consistent stroke team members)
10. Qualifications of Stroke Team Members – stroke expertise
11. Strong link with CCAC to promote flow and coordination of supportive care
12. Transferability of model (equitable access-availability of CSR model in all HNHB LHIN geographic regions)
13. Standardized reporting

The HNHB CSR model provides seamless transition through a standardized care path that details the patient's journey from emergency room to community. The pathway is comprised of three levels:
- Assessment of the patient's rehabilitation needs while in acute care
- Triage of patients to CSR streams and community rehabilitation care service expectations
- CSR goal achievement and discharge to community program

The report identifies an estimated range as to the additional resources required to implement the HNHB CSR Model as a mobile model in Haldimand, Brant and Norfolk from $60,322 to $362,875. A cost effectiveness analysis of the HNHB CSR model is incorporated as a component of the proposed pilot.

The opportunity for satellite clinics within communities where outpatient clinic based therapy programs do not exist can be considered relative to volumes, clusters of persons discharged to communities in close proximity to one another, availability of a congregate setting that provides an environment conducive to community rehabilitation, ability of the stroke team to establish and support a congregate setting in a timely manner and availability of health human resources with expertise in stroke rehabilitation.

The HNHB CSR Model evaluation framework seeks to address three objectives.

1. Demonstrate CSR outcomes at the patient, caregiver and system level that are consistent with those reported in the literature or by Expert Panels
2. Evaluate the value of key elements incorporated into the HNHB CSR Model
3. Identify core performance metrics that are available through existing data bases and can be used on an ongoing basis

BACKGROUND

In June 2012, the Canadian Stroke Network, the Ontario Stroke Network and the Institute for Clinical Evaluative Sciences released the second annual Ontario Stroke Report Card (report card), which reported on fiscal year 2010-11. The report card provides a snapshot of stroke care in Ontario at the provincial and Local Heath Integration Network (LHIN) level using a subset of 20 indicators[i]. The report card is a tool that:

- Provides a high level evaluation of stroke care according to standards set out in the Canadian Best Practice Recommendations for Stroke Care, 2010;
- Allows for consistency in comparing performance of the Ontario Stroke System across LHINs; and
- Allows for quick identification of gaps in regional improvement initiatives[ii].

A review of the report card revealed that for the second year in a row the HNHB LHIN fell below the benchmark on all 20 stroke indicators and fell below the 50th percentile on nine indicators. Following a review of the data, the HNHB LHIN in consultation with the Central South Regional Stroke Network, determined there were both immediate and longer term opportunities to improve stroke care and stroke outcomes within the HNHB LHIN. One of the opportunities identified was to improve transitions from inpatient stroke acute and rehabilitation care to CSR care. This report documents the development of a CSR model for the HNHB LHIN.

HNHB LHIN GEOGRAPHY AND POPULATION

The HNHB LHIN encompasses Brant, Burlington, Haldimand, Hamilton, Niagara and most of Norfolk County. The LHIN stretches from Fort Erie to Turkey Point and Paris to Lowville and covers approximately 7,000 square kilometers. The HNHB LHIN has the third largest population among Ontario LHINs and is geographically diverse. The LHIN has a mix of large urban, medium-sized communities and rural areas, which adds complexity to planning and delivering high quality integrated health services.

In 2011, the HNHB LHIN was home to 1.4 million people, 10.6% of the population of Ontario. Approximately 16% of the LHIN's population was seniors (65 years and older), higher than Ontario (14.2%) and is projected to account for 21% of the HNHB LHIN population by 2021. In 2011, the HNHB LHIN has the third highest percent of population aged 75 years of all Ontario LHINs[iii].

Compared to Ontario, the HNHB LHIN has a greater male to female ratio. Approximately 49% of the Ontario population is male, compared to approximately 51% of the HNHB LHIN population. The gender profile of elderly seniors (age 75+) in HNHB LHIN is markedly different from the rest of Ontario (roughly 60/40, compared with 40/60 males to females). The high proportion of men is unusual and may account for some of the differences in patterns of health service utilization being experienced by the LHIN. This anomaly is expected to normalize by 2017. The rate of growth of the seniors' population is slowing; however, the impact of the current and future total number of seniors will have major planning implications for the HNHB LHIN. By 2017, the number of seniors in the HNHB LHIN will be greater than the entire population of Burlington and Brantford combined[iv].

STROKE AND HNHB LHIN

Stroke has a significant impact on many individuals residing in the HNHB LHIN. A review of stroke data revealed 127 individuals per 100,000 population in the HNHB LHIN are hospitalized for stroke, compared to Ontario where 125 per 100,000 population are hospitalized[v]. The 30 day stroke in-hospital mortality in the HNHB LHIN is 16.5 higher than the in-hospital mortality rate in Ontario of 15.9[v]. For every ten strokes that occur in Ontario, at least one will affect a resident of Central South (HNHB and Waterloo Wellington LHINs) and 17% of all adult stroke or transient ischemic attack visits to an Ontario emergency department (ED) occur in the Central South region[ii].

Issues with Access

- The Ministry of Health and Long-Term Care Expert Panel on the Impact of Rehabilitation on ED/Alternate Level of Care (ALC) rates (2011) identified intensive outpatient and community rehabilitative services as one of three recommended best practice priorities[vi].
- Persons post stroke have limited access to intensive outpatient and community rehabilitation due to the erosion of ambulatory care services[vi].
- Recent data indicate a low proportion of patients discharged from acute care receive a referral for outpatient therapy, 6.2%, and those that are referred to CCAC receive consultative service only with a mean visit level of 4.1[vi].
- In smaller communities and rural settings, equitable access to outpatient and/or community rehabilitation presents a significant challenge[vi].
- 20.3% of inpatient rehabilitation admissions are mild patients (RPG 1150, 1160) due to availability of rehabilitation services in the community[vi].
- The mean rehabilitation length of stay for mild patients post stroke is 20.6 days[vi].
- Approximately 13.5% of current rehab admissions could be managed in the outpatient/community rehabilitation setting[vi].

Project – Objectives, Goals and Deliverables

In August 2012, the HNHB LHIN established the CSR Working Group (WG) to develop and pilot a CSR service model as a component of an Integrated Stroke Recovery System that crosses the continuum from acute to community. The WG was charged with developing:
- a service model that would meet recommended practice guidelines or Ministry of Health and Long-Term Care Expert Panel recommendations where available, provide access to eligible residents within 30 minutes of where they live and be transferable to other LHIN communities.
- an implementation plan to pilot the model in Norfolk and Haldimand counties and align the pilot with the integration of acute stroke and inpatient rehabilitation care within Brant, Haldimand and Norfolk Counties.

The goals of developing and implementing a CSR model are to:

- Improve access to evidence-based community outpatient stroke rehabilitation care
- Improve client outcomes post stroke event
- Reduce the acute inpatient stay for individuals who experience a stroke or transient ischemic attack by improving timely access to outpatient stroke rehabilitation services. Subsequently the working group recognized the development of the community stroke rehabilitation model would also decrease inpatient rehabilitation length of stay.
- Integrate outpatient stroke related services for eligible clients.

For the purposes of this report, the definition an Early Supportive Discharge (ESD) Program, such as Calgary's ESD program is one that focuses on an accelerated discharge of patients from the hospital and tends to have a higher intensity and possibly more medical support. CSR programs, on the other hand, are more broadly defined as early supportive care received following discharge from inpatient acute and or inpatient rehabilitation and focused on transition back to the home or community environment.

WG Deliverables:

- Define the 'eligible' population
- Identify the number of individuals that would be eligible for community outpatient stroke rehabilitation service in Norfolk and Haldimand and their location of residence by reviewing utilization data
- Identify eligible client streams and best practice guidelines for each stream
- Complete an environmental scan to identify potential models of care
- Review each model for:
    - opportunity to optimize and align existing resources i.e. aphasia services, community services, CCAC
    - client outcomes
    - resources – health human resources
    - cost analysis
    - feasibility of implementation
    - sustainability
    - resources
    - transferability
- Recommend service model
- Develop an implementation plan for a pilot that can be operational in the first quarter of fiscal year 2013-14 (April 1 – June 2013).
- Identify performance metrics to evaluate effectiveness of recommended service model.

The WG was comprised of representatives of the Central South Regional Stroke Program, Brant District Stroke Program, HNHB CCAC, HNHB LHIN hospital staff and HNHB LHIN staff. Representatives of Community Support Services were invited as the work progressed. See Appendix A for the Terms of Reference and Membership of the CSR WG. The project was limited to the adult population.

DEFINE "ELIGIBLE' POPULATION

Canadian Stroke Network best practice guidelines 6.5 (2010) state that stroke survivors should continue to have access to specialized stroke services after leaving hospital, whether from acute care or inpatient rehabilitation [Evidence Level A][vii].

  i.   Early supported discharge services should be provided by a well-resourced, coordinated specialized interprofessional team. This can be an acceptable alternative to more prolonged hospital stroke rehabilitation unit care and can reduce the length of hospital stay for selected patients [Evidence Level A][vii].

Best practice evidence demonstrates that early supportive discharge would be beneficial to all individuals who are currently receiving inpatient rehabilitation but also a portion of people who are currently discharged from acute care with mild deficits[viii]. Recognizing best practice evidence the WG decided that the population that would benefit from a best practice interprofessional CSR program included those individuals currently accessing some level of CSR through outpatients or CCAC. The WG also concluded that there is a group of individuals who are not currently accessing these services but would potentially benefit from a CSR program.

Use of Administrative Databases to Identify 'Eligible' Population

To estimate the total number of patients that would be eligible for a community rehabilitation program the WG accessed administrative databases (National Rehabilitation Reporting System – NRS and the Discharge Abstract Database- DAD,) using codes from the International Classification of Disease, 10th Revision, Canada (ICD-10-CA and Rehabilitation Patient Groups from the NRS (Refer to Appendix B). The WG utilized the Stroke Reference panel prediction that 13%[ix] of acute patients would benefit from early supportive discharge post-acute care. This number was included in the calculation to determine the proportion of acute patients that would be included in the calculation.

The initial analysis included only those patients with a primary diagnosis of stroke; however, the WG determined that best practice would indicate that individuals with a post admission stroke should also be included. As such a second analysis that included patients with a primary diagnosis of stroke and a post admit co-morbidity diagnosis of stroke was completed.

To identify the number of patients that received inpatient rehabilitation the WG accessed the NRS for Rehabilitation Patient Groups (RPG groups 1100, 1110, 1120, 1130 1140, 1150 and 1160) over a four year time period. Rather than limiting the analysis to individuals with a diagnosis of stroke discharged from health care institutions in the Brant Haldimand Norfolk area, the WG focused on residents of the Brant Haldimand Norfolk area who received care in any institution for stroke.

Calculations therefore involved the total number of residents of Haldimand and Norfolk discharged from inpatient rehabilitation from HNHB LHIN hospitals with a most responsible diagnosis of stroke through the RPG coding. Haldimand and Norfolk residents were identified by forward sortation areas (FSA- first three-digits of postal code) refer to Figure 1. This included subpopulations with ischemic strokes, hemorrhagic strokes, and transient ischemic attacks (TIA).   Using this methodology, an average of 36.75 patients were identified. Refer to Table 1. A review of Brant Community Healthcare System (BCHS) acute stroke and stroke rehabilitation discharges showed that 13% of the acute discharges and 100% of the inpatient rehabilitation discharges appear to be serviced within the outpatient community rehabilitation program (CRP) at BCHS and are therefore not included in Table 1.

To identify the number of patients who did not have an inpatient rehabilitation stay and could benefit from community stroke rehab the WG identified the number of patients post stroke discharged from acute care using the DAD and a most responsible diagnosis of stroke as defined by the Ontario Stroke Network definition of stroke and then applied the stroke reference methodology of 13%. An average annual number of 21.4 patients were identified. (Refer to

Table 2.). This number was cross referenced by mapping the FSA codes for residents of Haldimand Norfolk discharged from acute care – refer to Figure 2 (153 X 13% = 20 individuals).

Figure 1
Inpatient Rehabilitation Admissions to any Hospital for Haldimand/Norfolk Residents Living in the HNHB LHIN, 2011-12

Sources: Inpatient Rehabilitation-NRS, IntelliHealth Ontario, MOHLTC. Batchgeo.com Limitations: Only unique postal codes are mapped. If multiple people were hospitalized from a town that is represented by one postal code (as in rural areas), the corresponding postal code for that town will only be mapped once. Inclusions: Admissions made in 2011/12, Rehab Client Groups: 01.1, 01.2, 01.3, 01.4, 01.9, Any hospital in Ontario, Patient county = Haldimand & Norfolk, Patient LHIN = Hamilton Niagara Haldimand Brant. N=34 patient postal codes were plotted.

Figure 2
Acute Stroke Discharges from any Acute Care Hospital for Haldimand/Norfolk Residents Living in the HNHB LHIN, 2011-12

Sources: Inpatient Discharge Main Table (interim) – CIHI DAD, IntelliHealth Ontario, MOHLTC. Batchgeo.com Limitations: Only unique postal codes are mapped. If multiple people were hospitalized from a town that is represented by one postal code (as in rural areas), the corresponding postal code for that town will only be mapped once. Inclusions: Discharges made in 2011/12, Most responsible diagnosis stroke discharges only, Discharges from any acute care hospital in Ontario, Stroke ICD-10-CA codes: MRDx of G45 (excluding G45.4), I60-I69,

*Unplanned admissions only (i.e. urgent/emergent), Patient county = Haldimand & Norfolk, Patient LHIN = Hamilton Niagara Haldimand Brant N=153 patient postal codes were plotted (153*13%=19.89 individuals).*

The WG's methodology which incorporated a review of discharge data combined with mapping individual's residence by FSA to identify the 'eligible' population provided a degree of validation. Fifty eight (58) individuals were identified based on an analysis of discharge data, while fifty four (54) were identified through mapping discharges post stroke using FSA. The WG concluded that 58 individuals identified the 'eligible' population for Haldimand Norfolk. To provide additional validation of their prediction the WG reviewed HNHB CCAC home care data.

Table 1
Stroke Inpatient Rehab Admissions for HNHB LHIN Residents of Haldimand Norfolk

RGP Group	4 Year Average	2008-09	2009-10	2010-11	2011-12
1100	7.75	5	7	12	7
1110	10.5	12	9	8	13
1120	6.75	4	8	6	9
1130	6	9	7	2	6
1140	3.75	4	1	6	4
1150	2	1	3	2	2
1160	1	0	1	1	2
Total	36.75	35	36	37	43

Table 2
Number Stoke Discharges from Acute Care for Residents of Haldimand Norfolk by Fiscal Year

Fiscal Year	Stroke Discharges from Acute Care for Residents of Haldimand Norfolk
2008-09	171
2009-10	170
2010-11	165
2011-12	152
Average over 4 years	164.5
13% Discharged to Community Rehab	21.4

Source: DAD Diagnosis Sets with: All of (Any of (ICD10 Coded Block Description in "(I60-I69) Cerebrovascular diseases", All of (ICD10 Category Code in "G45", None of (ICD10 Diagnosis Code B Key = "G454"))), DAD Diagnosis Type Diagnosis Type Description in "Most Responsible", "Post Admit Comorbidity", DAD. DAD Facility LHIN Name in "Hamilton Niagara Haldimand Brant (HNHB)", DAD Discharge Fiscal Year in "FY 2008/09", "FY 2009/10", "FY 2010/11", "FY 2011/12") Rehab RPG Groups 1100, 1110, 1120, 1130, 1140, 1150, 1160 for Years 08/09, 09/10, 10/11, 11/12.

Use of HNHB CCAC Home Care Data to Identify "Eligible" Population

The WG reviewed data provided by the HNHB CCAC for the period April 1, 2010 to June 30, 2012. The initial analysis focused on the number of individuals discharged post stroke from acute care that were referred to CCAC for home care services using the same DAD diagnosis codes and a most responsible diagnosis of stroke. Over the 27 month period (April 1, 2010 to June 30, 2012) 399 residents from Haldimand Norfolk were discharged from LHIN acute care hospitals with a most responsible diagnosis of stroke. Of these, 166 were discharged home without support services and 65 were discharged home with support services. The clients discharged home with support were assessed by CCAC and 46 unique individual were admitted to home care services refer to table 3. Thirty three (33) of these residents received some type of therapy services (occupational therapy, physiotherapy, speech language pathology). Seventeen individuals received other services that included nursing, personal support, Assess/Restore).

The WG concluded that while only 33 of the 46 individuals referred to home services received some type home rehabilitative therapy, 17 required some type of support and those that were referred to an Assess/Restore program received the restorative services in the program. Based on this assumption, the number of individuals (46) referred for home services over the 27 months (46/27 =1.7 individuals per month or 20.4 individuals annually) aligns with the WG predictions as to the percent of acute discharges that could benefit from CSR (21.4 individuals annually).

Of interest to the WG, the CCAC data revealed that less than 50% of the individuals received a combination of therapies (interdisciplinary). The average number of visits provided per patient (6.7 –refer to Table 4) while higher than the mean number of CCAC visits reported for the HNHB LHIN in the 2011-12 Stroke Report Card (5.0)[x], the number is significantly lower than the recommended best practice[viii] (range of 16 to maximum of 108 visits for the severe stroke population).

Table 3
CCAC Services Provided to Residents of Haldimand Norfolk Admitted to Home Care Services Following Discharge from Acute Hospitals with a Diagnosis of Stroke Between April 2010 – June 30, 2012 (46 Unique Patients)

Services Received	# Patients
Occupational Therapy (OT) only	2
Physiotherapy (PT) only	16
Speech Language Pathology (SLP) only	1
OT, PT	8
OT, PT, SLP	1
OT, SLP,	5
Other CCAC services (e.g., Personal Support (PS), Nursing, Assess/Restore)	17
Grand Total	**50**

Source: CCAC –CHRIS March 2013

Table 4
CCAC Service Utilization - OT, PT, and SLP services

	OT	PT	SLP	All Tx
Number patients who received therapy service	16	25	7	**33**
Total # visits provided	46	132	42	**220**
Average # visits provided per patient	2.9	5.3	6.0	**6.7**
Average length of stay (LOS) on therapy service	31 days	34 days	88 days	
Average # visits provided per patient per week	0.7	1.1	0.5	

Source: HNHB CCAC – CHRIS March 2013

To capture the stroke population discharged from all bed types (acute, inpatient rehabilitation, complex care) a second analysis using data provided from the HNHB CCAC CHRIS database was completed. The data obtained from the CHRIS data included those patients with a primary and secondary diagnosis of stroke. Over the same 27 month period (April 1, 2010 to June 30, 2012) 116 residents from Haldimand Norfolk were discharged from LHIN acute care hospitals with a primary or a secondary diagnosis of stroke, refer to Table 5. Of these, eighty two (82) residents received some type of therapy services (occupational therapy, physiotherapy, speech language pathology). Thirty seven individuals received other services that included nursing, personal support, Assess/Restore).

To be consistent with the previous analysis, the WG made the assumption that all 116 patients received some

type of restorative services. Applying the same methodology to this population and compared to the 58 individuals identified through predicted volumes using data from DAD and NRS, a similar volume of 52 patients annually were identified (116/27 = 4.3 individuals per month or 52 patients annually).

In reviewing the services provided the WG noted that similar to the previous analysis less than 50% of the individuals received a combination of therapies (interdisciplinary). However, the average number of visits provided per patient were higher (7.9 vs. 6.7 – refer to Table 6), a possible explanation for this was that the patients discharged from acute beds only may have had a less severe stroke. The number of visits remain lower than the recommended best practice[ix] (range of 16 to maximum of 108 visits for the severe stroke population).

Table 5
CCAC Services Provided to Residents of Haldimand Norfolk Admitted to Home Care Services Following Discharge from Hospital-All Bed Types with a Diagnosis of Stroke Between April 2010 – June 30, 2012 (116 Unique Patients)

Services received	# Admissions
OT only	17
PT only	28
SLP only	1
OT, PT	25
OT, PT, SLP	5
OT, SLP	6
Other CCAC services (e.g., PSW, Nursing, Assess/Restore)	37
Grand Total	**119***

Source: HNHB CCAC – CHRIS May 2013

Table 6
CCAC Service Utilization - OT, PT, and SLP Services Provided to Residents of Haldimand Norfolk Admitted to Home Care Services Following Discharge from Hospitals (acute, rehabilitation and Complex Care) with a Primary and Secondary Diagnosis of Stroke Between April 2010 – June 30, 2012 (82 Unique Patients)

	OT	PT	SLP	All Tx
Number patients who received therapy service	53	58	12	**82**
Total # visits provided	162	417	70	**649**
Average # visits provided per patient	3.1	7.2	5.8	**7.9**
Average LOS on therapy service	47 days	44 days	79 days	
Average # visits provided per patient per week	0.5	1.1	0.5	

Source: HNHB CCAC – CHRIS May 2013

Conclusion Identification of "Eligible" Population

Based on the outcomes of the analysis to define and identify the "eligible" population the WG concluded that their projection of 58 individuals in Haldimand Norfolk requiring CSR was reasonable.

DEVELOPMENT OF COMMUNITY STROKE INTEGRATION STREAMS

The proposed community integration streams were developed from the concept of the "*Banding Model*" a key component of the Hamilton Health Sciences Corporation Integrated Stroke Model and the Waterloo Wellington Access to Quality Stroke Care plan. The Banding Model facilitates that patients will receive "the right care, at the right time, in the right place".

At the time of stroke admission a comprehensive assessment determines the patient trajectory or course. Based on this assessment, the patient is triaged and transitioned into a stroke service stream which is appropriate for their care goals. An individual's "path "or '"stream of care" is determined by the individual's needs rather than being driven by a preset system structure.   The notion of a seamless system of care where individuals are transitioned to the appropriate level of care was extended into the community for the purposes of this project.

Four streams of care were identified
- mild
- moderate
- severe
- palliative

Three of these streams were determined to be applicable to the community stroke rehabilitation model – mild, moderate and severe.
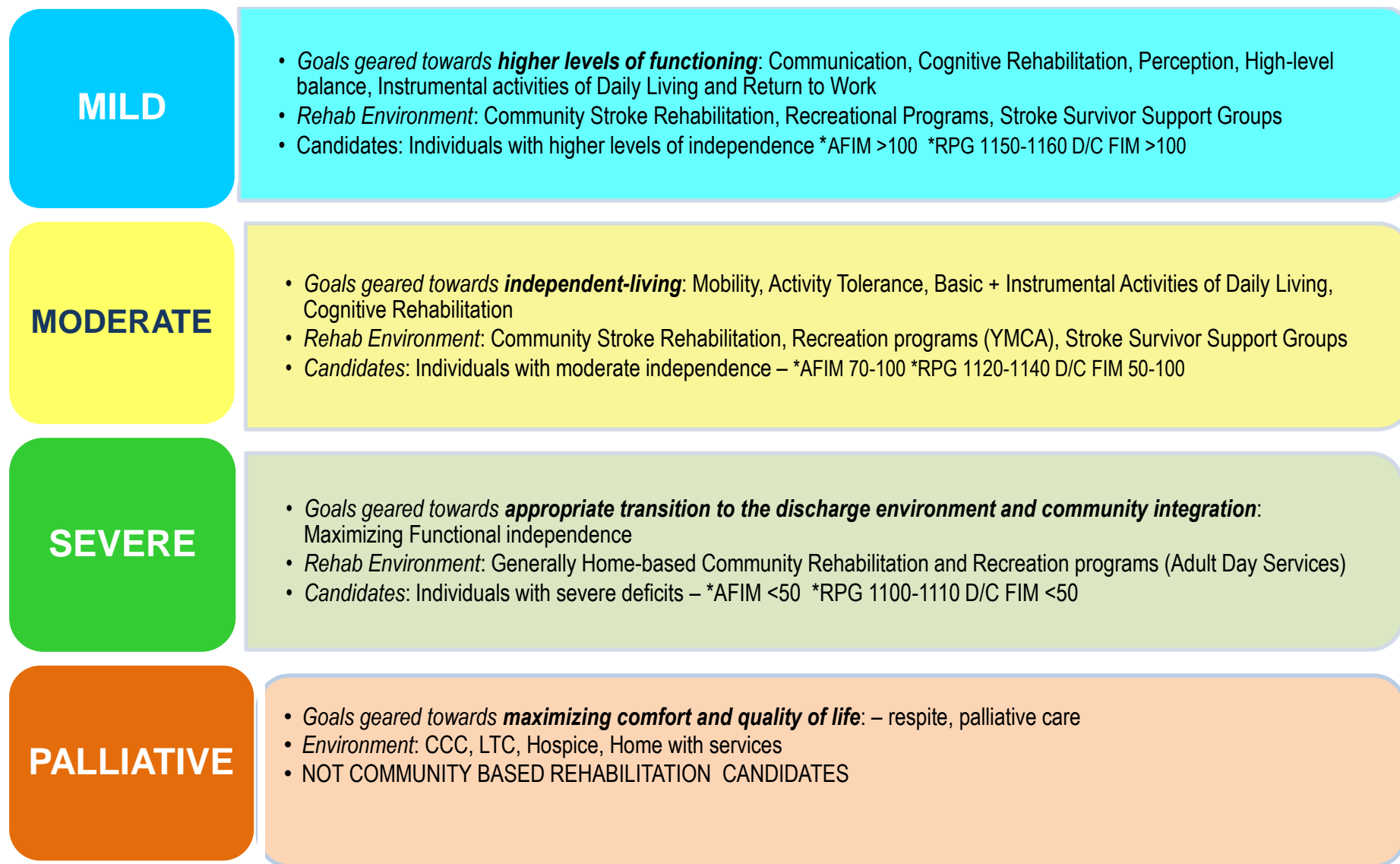
Within 72 hours of the acute admission or several weeks before discharge from inpatient rehabilitation, a person is assessed and a prediction is made, as to the level of care needed in the community - mild, moderate or severe.   The community rehabilitation program is then geared to the level of these needs and based on the best practice recommendations outlined by the Stroke Reference Panel. The level of support provided is tailored to the individual's community integration goals, refer to Figure 3. Further clarification was sought from the authors of the stroke reference report to determine the grouping of patients into mild, moderate and severe streams.

The Ontario Stroke Network Reference Group Recommendations indicate that individuals should have early supported discharge that involves two to three outpatient or community-based allied health professional visits per week (per required discipline) for eight to twelve weeks[ix]. The community integration streams allow for a 'person specific' approach based on the needs of each individual and aligns with best practice recommendations. Consultation with Matthew Meyer[xi] (Stroke Rehabilitation Expert with the Ontario Stroke Network) during the development of the community streams enabled the group to determine the average number of allied health visits required for each stream and the average number of visits.

These estimates are intended to represent overall averages realizing that some individuals within the stream will require more support and some will require less support. All of the streams would be supported by additional community based programs focused on prevention, recreation, peer support and community living.

Figure 3   **Community Stroke Integration Streams (Expansion of the "Banding" Model)**

MILD	• *Goals geared towards **higher levels of functioning***: Communication, Cognitive Rehabilitation, Perception, High-level balance, Instrumental activities of Daily Living and Return to Work • *Rehab Environment*: Community Stroke Rehabilitation, Recreational Programs, Stroke Survivor Support Groups • Candidates: Individuals with higher levels of independence *AFIM >100 *RPG 1150-1160 D/C FIM >100
MODERATE	• *Goals geared towards **independent-living***: Mobility, Activity Tolerance, Basic + Instrumental Activities of Daily Living, Cognitive Rehabilitation • *Rehab Environment*: Community Stroke Rehabilitation, Recreation programs (YMCA), Stroke Survivor Support Groups • *Candidates*: Individuals with moderate independence – *AFIM 70-100 *RPG 1120-1140 D/C FIM 50-100
SEVERE	• *Goals geared towards **appropriate transition to the discharge environment and community integration***: Maximizing Functional independence • *Rehab Environment*: Generally Home-based Community Rehabilitation and Recreation programs (Adult Day Services) • *Candidates*: Individuals with severe deficits – *AFIM <50 *RPG 1100-1110 D/C FIM <50
PALLIATIVE	• *Goals geared towards **maximizing comfort and quality of life***: – respite, palliative care • *Environment*: CCC, LTC, Hospice, Home with services • NOT COMMUNITY BASED REHABILITATION CANDIDATES

* Alpha FIM used for triage of patients discharged directly from acute care; RPG and Discharge FIM used for triage of patients discharged from inpatient rehabilitation

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ENVIRONMENTAL SCAN

Analysis of Identified Models

The working group utilized CSR evidence, the Stroke Best Practice Stroke Reference Group Recommendations as well as existing community stroke rehabilitation models to inform the development of the CSR model for the HNHB LHIN. WG members completed a preliminary review of the evidence supporting CSR. Evidence demonstrated enhanced rehabilitation services in the community following discharge from hospital result in improved patient functional outcomes as well as decreased health system utilization and decreased costs associated with length of stay[vi]. A meta-analysis comparing ESD to conventional care reported patients who receive ESD have an eight-day reduction in length of stay, resulting in associated cost savings[viii].

The WG considered the current Stroke Best Practice recommendations of enhanced community based rehabilitation services, which included the following:

- Timely access through prioritization
- Increased intensity (e.g. 2-3 visits/required therapy for 8 to 12 weeks), and
- An interprofessional model of care[xii].

Ontario Stroke Network resources identified six CSR Models:

1. The Southwest CSR Teams
2. The Calgary Early Supported Discharge (ESD) Model
3. The Calgary Community Accessible Reactivation (CAR) Program
4. The comparison of service utilization and costs for two models of publicly funded community services for persons with acquired brain Injury in Ontario.
5. Inter professional stroke rehabilitation for stroke survivors using home care
6. The Enhancing Community and LTC Rehabilitation Services for Stroke Survivors: Improving the System of Care in Southeastern Ontario – The Discharge Link

The working group reviewed the aforementioned six models as well as two additional service models as listed below:

1. A potential satellite clinic leveraging the current BCHS outpatient model.
2. CBI Health Group ambulatory outpatient rehab programs

The WG reviewed the eight CSR Models across ten elements; a standard definition list was developed for the elements. The ten elements were:

1. Program description
2. Quality client outcomes and system
3. Sustainability
4. Transferability
5. Resources: health human resources
6. Resources: operational costs and facility costs
7. Cost analysis
8. Feasibility of implementation
9. Opportunity to optimize and align existing resources: partnership opportunities
10. Alignment: meets best practice recommendations

Application of Decision Making Framework

To evaluate the eight CSR models the WG followed the LHIN's Decision Making Framework (DMF)[xiii]. As a first step the WG rated the 11 criteria in the DMF as to how they related to the LHIN and provincial priorities in the context of a CSR model. (refer to Appendix C). The rating was completed using Expert Choice software. Table 4 shows the results of rating. The WG agreed to eliminate those criteria that rated lower than 6%:

Table 7 Weighted DMF Criteria for CSR Model

Criteria	Weighed %
Quality	15.23
Sustainability	12.6
Access	9.75
Health Status	9.68
Client Focused	9.66
Integration	9.18
Alignment	8.65
Efficiency	7.91
Equity	7.48
Health Promotion	5.83
Partnership	4.04

As the initial focus for the implementation of a CSR model was Norfolk and Haldimand, the WG invited representatives from Norfolk General Hospital, West Haldimand General Hospital and the Adult Recreational Therapy Centre (accountable for the LHIN Wide Community Based Aphasia Service) to assist the WG in evaluating the eight community models. Individuals were identified for their knowledge and expertise as to the needs of the target population and geographic nuances of the area in respect to providing community services. Each model was then evaluated against the nine criteria listed in Table 7.

The eight models' overall ratings across the nine criteria ranged from 0.371 to 0.708.

The three models that ranked the highest were:
- Southwest Community Stroke Rehabilitation Teams (0.708)
- Calgary ESD program (0.690)
- Leveraging current Brant Haldimand Norfolk community stroke rehabilitation services (0.636)

The WG recognized that the amount of information available for each model at the time of the rating varied in depth. In reviewing how the models rated against each criteria, the group agreed that two models may have been rated higher if additional information was available, these were:
- CBI Health Group Ambulatory Outpatient Neuro-Rehab Program; and
- The Enhancing Community and LTC Rehabilitation Services for Stroke Survivors: Improving the System of Care in Southeastern Ontario – The Discharge Link

Refine Environmental Scan

Utilizing the results of the expert choice weighting, the WG through teleconferences met with representatives' of three community stroke rehabilitation models. Two members of the WG met with CBI and additional information on this program was obtained at the meeting and shared with the WG.

Teleconferences were therefore arranged with identified contacts for the following three models:

1. The Southwest CSR Teams
2. The Calgary Early Supported Discharge Model
3. The Southeast Enhanced CCAC Early Supported Discharge Model

A standardized questionnaire template was developed to guide and standardize the WG's follow up discussions with each program. The template questions focused on the following identified information gaps:

1. Overview of the client's journey/schedule of care by severity of stroke (mild, moderate and severe)
2. Linkages with community partners to coordinate services.
3. Patient demographics i.e. level of independence-proportion of each grouping of the population served.
4. Operational issues:
   - Travel time
   - Volumes of patients served-monthly-yearly
   - Average length of stay in program
   - Number of staff supporting the program by discipline
   - Description of patient visit
5. Key successes
6. Key challenges

Ten key elements of the three top rated CSR Programs were further compared. The key elements compared were identified by the group to capture priority factors to inform the development of a CSR model for Brant Haldimand Norfolk. The key comparison elements included:

1. Outcomes
2. Critical mass (# of patient per year per specialized team).
3. Volumes and outputs (# of patients per day per discipline, per week, per year, per team).
4. Team complements (i.e. Registered Nurses, PT, OT, SLP, SW, RD, rehab assistants, coordinator role, case coordination).
5. Intensity of therapy (# of visits per week per discipline, length of visit).
6. Linkages (i.e. examples of cross continuum case coordination/navigation/linkages and community partners and programs)
7. Length of stay
8. Cost per client
9. Health system utilization impact (i.e. reduction in admission/readmission rates, reduction in hospital LOS, reduction in ED visits etc.).

HNHB Community Stroke Rehabilitation Model Essential Key Elements

The broad environmental scan, expert choice weighting results, teleconference results combined with the refined environmental scan comparison informed the development of the key model elements. The WG concluded that each model contained essential key elements necessary to inform a community stroke rehab program in the HNHB LHIN. Rather than adopting one of the existing models the WG recognized the need to develop a model for HNHB that incorporated the strengths of several models.

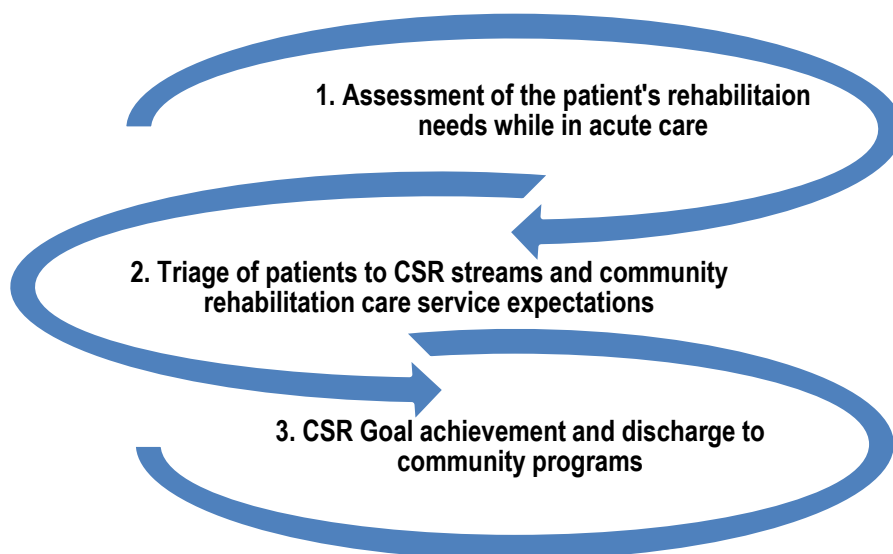Essential Key Elements of the HNHB CSR Model include the following:

1. Integration of the Community Stroke Rehab model into the care path of the Integrated Stroke Unit (ISU)
2. Identification of client's rehabilitation needs in the hospital stay, within 24-72 hours
3. Strong link with District and/or Regional Stroke Centre's ISU
4. Strong link with Primary Care Physician
5. Dedicated care coordination
6. Time to first visit within 72 hours following hospital discharge
7. Care pathway based in best practice standards: 2-3 outpatient or community-based allied health professional visits/week (per required discipline) for 8-12 weeks.
8. Care path incorporates milestones and opportunities for reassessment
9. Consistency of Stroke Team Members (80% of care to be provided by consistent stroke team members)
10. Qualifications of Stroke Team Members – stroke expertise
11. Strong link with CCAC to promote flow and coordination of supportive care
12. Transferability of model (equitable access-availability of CSR model in all HNHB LHIN geographic regions)
13. Standardized reporting

Refer to Table 8 for Key Elements rationale and evidence.

Table 8 HNHB Community Stroke Rehabilitation Model Key Elements Rationale and Evidence

Key Model Elements	Rationale	Evidence, Expert Report or the Reviewed models
Integration of the CSR model into the care path of the Integrated Stroke Unit (ISU)	Promotes seamless transition across the continuum. Provides patient and family information on this care path.	Meyer et al [xiv], Meyer, M., O'Callaghan C [ix]
Identification of client's rehabilitation needs in the hospital stay, within 24-72 hours, so that community care can be coordinated.	Promotes seamless transition across the continuum. Ensures opportunity to make greatest change with regards to neuroplasticity.	Lindsay et el [vii]
Strong link with the district and/or regional stroke centre Integrated Stroke Unit	Promote flow across the continuum. Encourage trust and collaboration. Facilitate and sustain stroke expertise with emerging stroke best practices.	Hillier et. el. [xv]
Strong link with Primary Care Physician	Coordinate care plan. Primary care physician is the most responsible physician.	Lindsay et el. [vii]
Dedicated care coordinator (consider within a geographic area)	Coordination of care plan. Support for system navigation.	Anderson, S. & Egan, M. et el [xvi], Lindsay et el [vii]
Time to first visit – 72 hours from discharge from hospital (may consider different targets for severity of stroke deficit i.e. mild, moderate, severe)	Ensures the opportunity to make the greatest change with functional recovery due to the evidence related to neuroplasticity. The earlier the rehabilitation starts, the better the outcome. Access to early, intensive, appropriate stroke rehabilitation improves functional status of stroke survivors. Evidence demonstrates improvement in arm and leg motor recovery, walking mobility, independence in self-care, participation in leisure activities, positive communication outcomes, increased well-being and social participation, and enhanced swallowing function.	Calgary ESD program [xvii]. Lindsay et el. [vii]
Care pathway based on best practice standards	Supports CSR best practice recommendations for timely access to outpatient/community-based rehabilitation for appropriate patients. 2-3 outpatient or community-based allied health professional visits/week (per required discipline) for 8-12 weeks.	Meyer et el Blueprint [xii]. Meyer, M. O'Callaghan et el [ix], Lindsey et el [vii]
Care path incorporates milestones	Promotes re-evaluation of status for initial stroke rehabilitation assessment.	Lindsay et el [vii]
Consistency of Stroke Team Members	Interdisciplinary team approach to goal setting and rehabilitation. Dedicated team members develop collaborative care plans and foster trust and communication with clients, primary care physician and regional and/or district stroke center team and all community partners.	Hillier et el [xv]. Meyer, M. O'Callaghan et el [ix]. SEO Enhanced Community Based Rehab [xviii]
Qualifications of Stroke Team Members	Promotes stroke expertise in the community.	Meyer, M. O'Callaghan et el [ix].
Strong linkage with CCAC for supportive care	Promotes access and coordination of care.	SEO Enhanced Community Based Rehab [xviii]
Transferability of model	To ensure equitable access-availability the model must be transferable to all HNHB LHIN geographic regions.	
Standardized reporting requirements	Accountability.	

HNHB COMMUNITY STROKE REHABILITATION REHAB MODEL

The HNHB CSR model provides seamless transition through a standardized care path that details the patient's journey from emergency room to community. Refer to Figure 4: CSR Model. The pathway is comprised of three main levels that incorporate the key elements that the WG considered were essential for the HNHB LHIN CSR Model.

1. Assessment of the patient's rehabilitaion needs while in acute care

2. Triage of patients to CSR streams and community rehabilitation care service expectations

3. CSR Goal achievement and discharge to community programs

### Assessments of the Patient's Rehabilitation Needs in Acute Care

The District/Regional Stroke Centre will incorporate CSR into the acute stroke pathway as a component of the stroke continuum. CSR candidates will be identified as part of the acute care assessment for rehabilitation in the emergency department and acute care within 24-72 hours of admission utilizing the Alpha FIM®[1],[xix] as well as a full complement of standardized measures founded in best practices that will demonstrate a complete picture of the candidates' current status. CSR candidates will also be assessed within inpatient rehabilitation/restorative care programs and long term care utilizing the FIM (Functional Independence Measure)[xx] and other best practice tools i.e. Montreal Cognitive Assessment (MoCA), Chedoke McMaster Stroke Assessment (CMSA), Chedoke Arm and Hand Assessment Inventory (CAHAI), Assessment of Living with Aphasia (ALA), 2 minute walk test, 6 minute walk test, Charleston Comorbidity scale.

The WG recognized the value of the AlphaFIM and FIM as tools to provide the functional baseline and to measure change in functional status during the patient's rehabilitation journey. The AlphaFIM is designed to provide a consistent method of assessing patient disability and functional status in the acute care hospital setting. It consists of six items that can be reliably collected in acute care: eating, grooming, bowel management, toilet transfers, expression, and memory. For patients who are able to walk 150 feet or more, the eating and grooming items are replaced by items evaluating walking and bed transfers. Results provide an AlphaFIM rating, with higher numbers indicating higher function, and an estimate of the patient's 'burden of care' in hours. AlphaFIM is completed by credentialed, registered health care professionals, primarily rehabilitation and nursing staff[1].

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[1] AlphaFim® is a trademark of Uniform Data Systems for Medical Rehabilitation, a division of UB Foundations Activities, Inc

Figure 4

COMMUNITY STROKE REHABILITATION MODEL
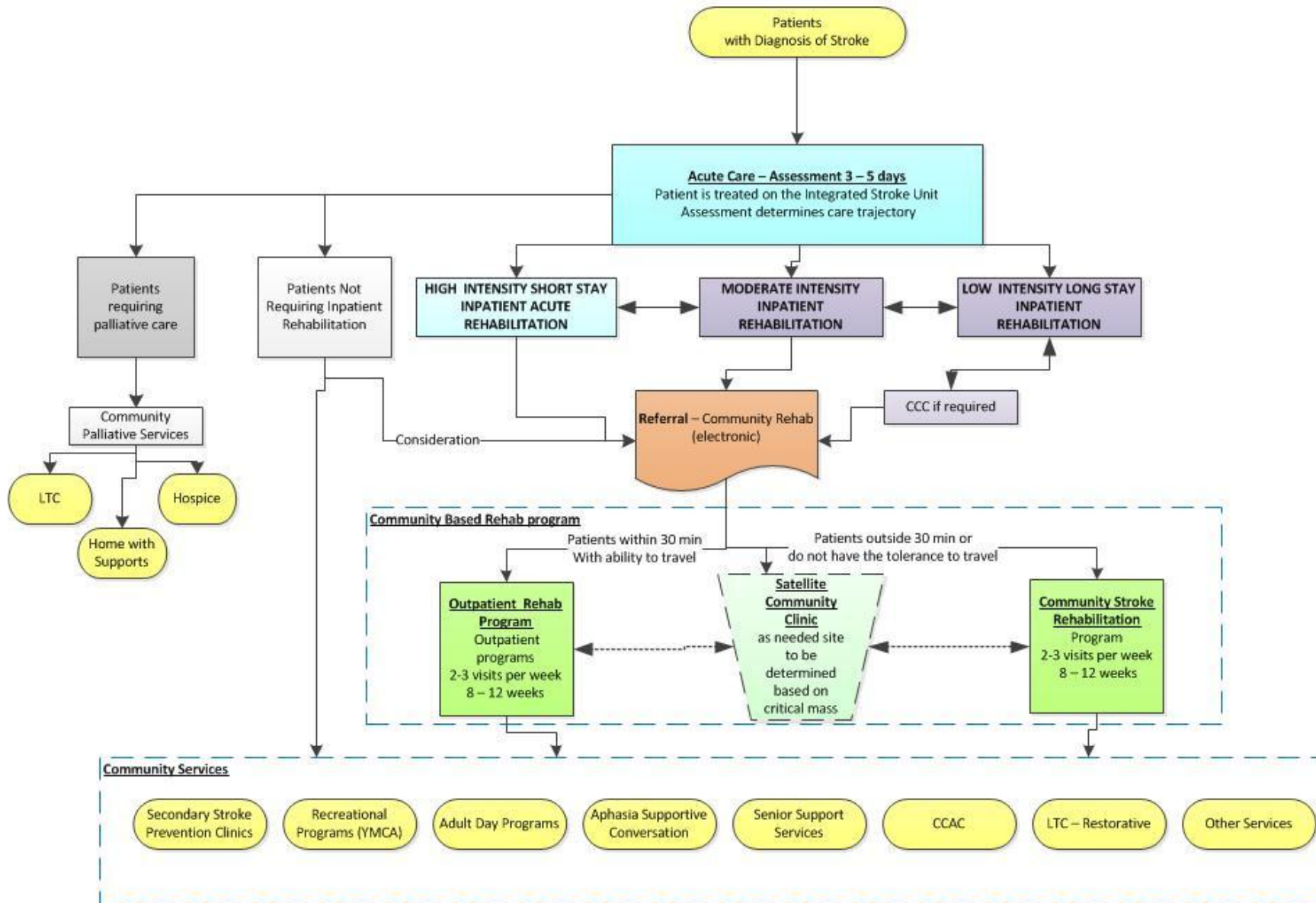
The FIM is intended to address issues of sensitivity and comprehensiveness as well as provide a uniform measurement system for disability. The FIM assesses the physical and cognitive disability in terms of burden of care. The FIM is a composite measure consisting of 18 items assessing six areas of function (self-care, sphincter control, mobility, locomotion, communication and social cognition). These fall into two basic domains; physical (13 items) and cognitive (five items). Each item is scored on a seven-point Likert scale indicative of the amount of assistance required to perform each item. A simple summed score of 18-126 is obtained where 18 represents complete dependence/total assistance and 126 represents complete independence. Administration of the FIM requires training and certification. The FIM will be utilized within the CSR model to assess and evaluate the patient's progress during rehabilitation in the community.

The District/Regional Stroke Centre ISU protocol will include a discharge process that ensures the patient's:
- CSR goals are identified and discussed with patient and family and the patient's community rehabilitation care coordinator prior to discharge.
- Primary care physician receives a discharge summary that includes the patient's rehabilitation goals and the contact information for the patient's community rehabilitation care coordinator.
- The hospital-based care coordinator will meet with the community based care coordinator prior to the patient's discharge to discuss the patient's community stroke rehab goals.

Triage of Patients to CSR Streams and Community Rehabilitation Care Service Expectations

Community Care Streams

The Central South Banding Model will be applied to stream patients into community stroke streams as follows:
- Mild
- Moderate
- Severe
- Palliative

Individuals within the mild and some individuals within the moderate stream will benefit from CSR upon discharge from acute inpatient beds. Persons post stroke in the moderate and severe streams will also benefit from CSR upon discharge from inpatient rehabilitation.

Persons post stroke will be triaged into two CSR programs
1. Outpatient clinic based therapy
2. Outreach home based therapy.

Eligibility for in home therapy will be based on the following criteria:

- Live beyond a 30 minute drive of a specialized clinic based outpatient stroke rehabilitation program
- Do not have the tolerance to travel 30 minutes to an outpatient program and participate in therapy

Community Care Service Expectations

Each patient prior to discharge will be referred to a community stroke care coordinator. The care coordinator will review the patient's rehabilitation goals with the CSR stroke team and a care plan will be developed that at a minimum includes:
- Patient's rehabilitation goals

- Time of first visit (must be within 72 hours of discharge)
- Stroke rehabilitation team members
- Detailed care pathway of the services to be provided that is based on best practice.
- Milestones (projection in time of when client will achieve set goals)
- Detailed outline of assessments and reassessments to be completed (refer to measurement and evaluation section)
- Identification of CCAC care coordinators for support services
- Dates that patient's primary care physician is to be provided with an update on patient's condition.
- The occupational therapist (OT) will complete a home safety assessment prior to discharge.
- An interprofessional team meeting will occur between the hospital and community 15-20 days following discharge.

Refer to Table 9 for details of the goals, services required, rehabilitation focus, patient population, estimated service volumes (visits) and additional services that maybe required for each community care stream.

Community Care Stroke Team - Expertise and Consistency

The HNHB CSR model recognizing best practice evidence requires the HNHB CSR Model to be provided by an interprofessional team trained in specialized neuro rehabilitation[vii]. The minimum staff neuro expertize requirements for the HNHB CSR Model are detailed below.

A human resources stroke expertise document was developed by the WG to indicate minimum requirements of staff involved in a specialized neuro rehabilitation team as well as recommended requirements (See Appendix D). The minimum mandatory requirements include:

- Accredited Neuro Motor Rehabilitation Training for OT, PT, OTA, PTA
- Supportive Conversation for Adults with Aphasia (SCA™) training for all disciplines
- Discipline Specific Interdisciplinary Learning Objectives for Stroke Care to identify team members' knowledge, skills and judgment and to identify ongoing learning objectives to inform learning plan for all disciplines
- Current Canadian Best Practice Recommendations for Stroke Care knowledge for all disciplines
- Functional Impairment Measure (FIM) training for all disciplines
- Montreal Cognitive Assessment (MOCA) knowledge for OT and nursing

The recommended additional requirements include:

1. Assessment of Living with Aphasia (ALA) for SLP
2. Chedoke McMaster Stroke Assessment (CMSA) for PT and OT
3. Chedoke McMaster Arm and Hand Assessment Inventory (CAHAI) for OT
4. Alpha FIM knowledge for all disciplines
5. Participation in regional stroke rehabilitation and beyond annual best practices conference for all disciplines
6. Participation in Regional Stroke Nursing Best Practices annual conference for nursing
7. Knowledge of Evidence Based Review of Stroke Rehab (EBRSR) a web based best practice resource
8. Knowledge of the latest evidence and resources on the Ontario Stroke Network website
9. Knowledge of the Stroke Engine Best Practice Resources
10. Hemispheres Stroke Competency Series

Table 9 CSR Streams Goals, Services, Rehabilitation Focus, Population and Service Volumes

Community Stroke Rehabilitation	Goals	Therapy Services Required	Rehabilitation Focus	Candidates	Number of visits	Other Potential Services
Mild	Geared towards higher levels of functioning: communication, cognitive rehabilitation, perception, high-level balance, instrumental activities of daily living and return to work.	OT, PT, and SLP	Body functions/structures: cognition, perception, mood, communication, high-level balance, activity tolerance, fine motor control. Activity and Participation: functional communication, community mobility, instrumental activities of daily living, return to work, etc.	Stroke survivors who are discharged from: acute care: AlphaFIM Instrument Tool >100 inpatient rehab: RPG grouping 1150/1160	2 therapists – 2.5 (schedule fluctuates between 2 visits one week and 3 visits the next week) times each per week for 10 wks. Average 50 visits. Range 16-50 visits. LOS 8-12 wks.	SW, Nutrition
Moderate	Geared towards independent-living: mobility, activity tolerance, basic and instrumental activities of daily living, cognitive rehabilitation.	OT, PT, and SLP	Body functions/structures: neuro-motor return, balance, cognition, perception, mood, communication, activity tolerance. Activity: mobility, communication, basic activities of daily living and instrumental activities of daily living, etc.	Stroke survivors who are discharged from: acute care: AlphaFIM 70-110 inpatient rehab: RPG grouping 1120-1140	2 Therapists – 2.5 (schedule fluctuates between 2 visits one week and 3 visits the next week) times each per week for 10 weeks. Average 50 visits. Range 16-50 visits. LOS 8-12 wks*.	SW, Nutrition
Severe	Geared towards appropriate transition to the discharge environment and community integration: maximizing functional independence.	OT, PT, and SLP	Body functions/structures: neuro-motor return, cognition, perception, mood, communication, balance, activity tolerance. Activity: mobility, communication, basic activities of daily living, etc.	Acute Care: AlphaFIM >50 Inpatient Rehab: RPG 1100-1110	3 Therapists – 1 visit each per week for 10 weeks=30 visits. 1 Therapy Assistant – 2 visits each week for 10 weeks=20 visits. Average 50 visits. LOS 8-12 wks*.	SW, Nutrition, OTA/PTA, RPN, PSW
Palliative	To utilize community resources to maximize comfort and quality of life.	Not community based rehabilitation candidates.	Focus on maximizing comfort and emotional support	Not Applicable	None	SW, RPN, PSW, OT/PT for home safety, assistive devices.

SW (Social Work); PT(Physiotherapy); OT (Occupational Therapy); SLP (Speech Language Pathology); RPN (Registered Practical Nurse); OTA (OT Assistant); PTA (PT Assistant);; PSW (Personal Support Worker). *Some persons may require the maximum number of visits 108.

To promote a working relationship with the client, family and the District/Regional Stroke Centre the WG required that the CSR Model must ensure a delivery model where a patient's stroke rehabilitation is provided by a designated Stroke Team that provides a minimum consistency of rehabilitation staff of 80%. That is 80% of the therapy is provided by the same team members. This 80%/20% split allows for vacations/sick time.

The mandatory and additional Stroke expertise requirements are expected to change as best practice advances in stroke care are established and released. Key considerations for the stroke expertise of the CSR model include evaluation of stroke expertise and learning needs on an annual basis due to ongoing changes in current practice due to new evidence. Recruitment of staff with stroke expertise and experience in neuro rehabilitation as well as community practice are key considerations. Retention of staff with stroke expertise should be considered in the ongoing educational opportunities provided to experienced, specialized staff to remain current in stroke rehabilitation practices.

Goal Achievement and Discharge to Community Programs

All patients following completion of their CSR program will be discharged to community support programs. The community stroke care coordinator will ensure a discharge report on the patients progress will be provided to the primary care provider.

The WG saw the benefit of the District/Regional Stroke Centre and the CSR Program completing formal post discharge case reviews on a quarterly basis as an opportunity for assessing existing processes/practices as a quality improvement tool.

Costing of the HNHB CSR Model

The Stroke Reference Group (SRG) report indicates that the community sector offers the greatest opportunity for improving patient flow but also requires the largest investment. The SRG recommends that patients have timely access to outpatient and community stroke rehabilitation (early supported discharge care) with the appropriate level of therapy visits based on patient need[ix].

As noted earlier a review of HNHB CCAC data for Haldimand Norfolk revealed that less than 50% of patients received a combination of interdisciplinary therapies and that while the average number of visits provided per patient (6.7) was higher than the mean number of CCAC visits reported for the 2011-12 HNHB LHIN Stroke Report Card (5.0)[xxi], the number was significantly lower than the recommended best practice[ix] (range of 16-50 visits to a maximum number of visits of 108).

The WG calculated the additional costs required to support best practice community based therapy assuming all patients would require a total of 50 therapy visits over 10 weeks with 50% requiring SLP services. Adjusting for the resources provided by CCAC an additional investment of $490,426 would be required, refer to Table 10. Recognizing that CCAC costs vary across the province, the WG applied the same methodology using HNHB CCAC specific costs with this adjustment. The additional investment was reduced to $364,875, refer to Table 11.

WG realized that not all patients would require 50 visits over a ten week period. To estimate the range of funding the WG calculated the additional costs at the lower therapy range using the same methodology but assuming 50% of the patients would require 1 visit of PT and OT therapy a week for eight weeks and 50% would require the addition of SLP services for the eight 8 weeks.   An additional investment of $60,322 was identified.

The WG concluded that the additional investment to support the implementation of the CSR model in Haldimand Norfolk and Brant an additional investment that ranged from $60,322 to $362,875 would be required.

Table 10 Estimated Total Cost of a Community Stroke Rehabilitation Program - Using Bundled Cost from Ontario Stroke Network

Rehabilitation Program	Services Included	Total Cost Estimate	No. of Individuals	Cost	Less Current CCAC Costs	Additional Costs to Support Model
Community without SLP	PT and OT - 2.5 visits/week per therapy X 10 Weeks	$6,427.75	35	$224,971.25	26,587.50	$198,383.75
Community with SLP	PT, OT and SLP - 2.5 visits/week per therapy X 10 Weeks	$9,955.75	35	$348,451.25	56,408.70	$292,042.55
Note: Cost estimated on 70 patients estimated based on information provided by CCAC that included Brant, Haldimand and Norfolk (Feb 2013)		Total Cost		$573,422.50		**$490,426.30**

Assumption: 100% of patients will require PT and OT and 50% will required SLP *Source for assumption: Ontario Stroke Network: The*
Impact of Moving to Stroke Rehabilitation Best Practices in Ontario p.6

Table 11 Estimated Total Cost of a Community Stroke Rehabilitation Program - Using Bundled Cost Approach from Ontario Stroke Network & HNHB CCAC 2012 Costs

Rehabilitation Program	Services Included	Total Cost Estimate	No. of Individuals	Cost	Less Current CCAC Costs	Additional Costs to Support Model
Community without SLP	PT and OT - 2.5 visits/week per therapy X 10 Weeks	$4936.59	35	$172,780.73	$26,587.50	$146,193.23
Community with SLP	PT, OT and SLP - 2.5 visits per therapy /week X 10 Weeks	$7859.75	35	$275,091.18	$56,408.70	$218,682.48
Note: Cost estimated on 70 patients estimated based on information provided by CCAC that included Brant, Haldimand and Norfolk (Feb 2013)		Total Cost		$448,871.91		**$364,875.71**

Assumption: 100% of patients will require PT and OT and 50% will required SLP

Source for assumption: Ontario Stroke Network: The Impact of Moving to Stroke Rehabilitation Best Practices in Ontario p.6 Adjusted for HNHB CCAC therapy costs identified by HNHN CCAC September 2012

Table 12 Estimated Total Cost of a Community Stroke Rehabilitation Program - Using Bundled Cost Approach from Ontario Stroke Network & HNHB CCAC 2012 Costs Assuming - Lower Range Estimate for Therapy Visits

Rehabilitation Program	Services Included	Total Cost Estimate	No. of Individuals	Cost	Less Current CCAC Costs	Additional Costs to Support Model
Community without SLP	PT and OT - 1 visits/week per therapy X 8 Weeks	$1,579.71	35	$55,289.83	$26,587.50	$28,702.33
Community with SLP	PT, OT and SLP -1 visits per therapy /week X 8 Weeks	$2515.12	35	$88,029.18	$56,408.70	$31, 620.48
Note: Cost estimated on 70 patients estimated based on information provided by CCAC that included Brant, Haldimand and Norfolk (Feb 2013)		Total Cost	$143,319.01			**$60,322.81**

Assumption: 100% of patients will require PT and OT and 50% will require SLP

Source for assumption: Ontario Stroke Network: The Impact of Moving to Stroke Rehabilitation Best Practices in Ontario p.6 Adjusted for HNHB CCAC therapy costs identified by HNHN CCAC September 2012

SERVICE DELIVERY MODEL

Mobile versus Clinic

To estimate the percent of patients discharged from hospital following a stroke and lived within 30 minutes of an outpatient stroke rehabilitation program Meyer's et el combined data from the Canadian Institute for Health Information's DAD and NRS with results from a 2009 survey of outpatient rehabilitation clinics. The analysis suggested that approximately 88% of Ontario patients discharged home from hospital after stroke live within a 30 minute drive of an outpatient rehabilitation program[ix].   However, the authors noted that a 30 minute driving distance from hospital is an arbitrary determinate of suitability for outpatient versus community-based rehabilitation noting other factors that needed to be considered including patient's physical status and availability of transportation and that further research was required to refine this estimate[ix].

The WG to meet their deliverables considered the establishment of various models of outpatient clinics in Haldimand Norfolk and concluded that there was insufficient critical mass to support a full time outpatient stroke rehabilitation clinic in Haldimand-Norfolk. The feasibility of a satellite stroke rehabilitation clinic as an outreach program from Brant Community Care Healthcare System was also considered but was not seen to be sustainable or cost effective.

The WG concluded that the opportunity for satellite clinics within communities where outpatient clinic based therapy programs do not exist can be considered relative to:
- volumes
- clusters of persons discharged to community in close proximity to one another in order to assess critical mass required to support congregate treatment
- availability of a congregate setting that provides an environment conclusive to community rehabilitation
- ability of the stroke team to establish and support a congregate setting in a timely manner
- availability of health human resources with expertise in stroke rehabilitation

Application of the Model to Brant/Haldimand/Norfolk

In determining the CSR service delivery model for Brant, Haldimand-Norfolk the WG considered the factors listed above, i.e. volumes, clusters. It was assumed that the majority of residents living in the Brant area would be within 30 minutes of the Community Rehabilitation Program (CRP) offered at the Brant Community Health Centre.

Residents of the Haldimand Norfolk communities however likely live more than 30 minutes from this program and therefore a community based program was determined to be the more effective option for this group. However, the recommendation is that if a critical mass of people post stroke were identified, the opportunity may exist for a satellite clinic in Haldimand or Norfolk. This satellite would be developed as needed to support the needs of persons post stroke living in rural areas (refer to Figure 4: CSR Model)[xi].

HNHB CSR Pilot Model

The HNHB CSR Model will be piloted in Brant, Haldimand Norfolk optimizing existing resources.

EVALUATION AND MEASUREMENT

The WG identified three objectives for the evaluation of the HNHB CSR Model:

1. Demonstrate CSR outcomes at the patient, caregiver and system level that are consistent with those reported in the literature or by Expert Panels.
2. Evaluate the value of key elements incorporated into the HNHB CSR Model.
3. Identify core performance metrics that are available through existing data bases and can be used on an ongoing basis.

The WG as an initial step used a logic model approach to identify CSR objectives and potential process and outcome measures that could be used to evaluate CSR as to its impact to optimize quality, effectiveness and efficiency at the patient, caregiver, system and model levels (refer to Appendix E). Each potential measure was then assessed for its use as a CSR core or pilot performance metric. Core performance metrics were those that can be obtained through existing data basis and can be compared over time. Pilot measures were ones that needed to be collected manually at the patient, caregiver or system level. While the WG recognized the burden of collecting and reporting on the pilot performance measures they considered that this information was essential for evaluating the impact and value of the models key components. The information obtained through the pilot evaluation would inform further model development and or refinement. The WG agreed that surveys to assess patient and or caregiver experience would be considered as a core metric.

The performance measures identified as either core or pilot measures were further assessed as to their alignment for reporting against Health Quality Ontario's nine attributes of a high performing healthcare system. Table 13 summarizes the HNHB CSR Model core and pilot performance measures by HQO's nine dimensions.

Specifics on pilot measures identified in Table 13
- Assessment upon admission and reassessment at discharge and 12 month follow up
- RAI-HC in hospital and RAI CHA upon admission, discharge and 12 month follow up in the community.
- FIM on admission, at every 30 days on therapy, at discharge and at 12 month follow up.
- Depression Rating Scale (DRS) at admission and discharge (information obtained through the RAI)
- Goal Measurement Scale i.e. Canadian Occupational Performance Measure (COPM)
- Client and caregiver satisfaction survey
- Reintegration to normal living index (RNLI)
- Discipline Specific measures to be determined i.e. MOCA, CMSA, CAHAI, ALA, 2 minute walk test, 6 minute walk test Charleston comorbidity, etc.
- Number of patients per band or per RPG accessing CSR
- Number of discharge planning meetings involving community and hospital team
- Proportion of patients identified as candidates for the CSR program on the Stroke care pathway and those who attend the CSR Program
- Number of visits as per the CSR Stream (RPG/Band)

A report on the pilot project will be submitted 30 days following the completion of the pilot and will include a cost effectiveness analysis.

Table 13 HNHB Community Stroke Rehabilitation Model Performance Metrics

Dimensions	Core CSR Model Metrics	Additional CSR Model Metrics for Pilot
Access	• 90th percentile wait time from discharge to first visit (target 72 hours from hospital discharge- source CHRIS) • Average number of therapy visits received by patients referred for CSR (Sources: Stroke Report Card and CHRIS)	• Number (#) of patients served • Stratify # of patients served by community stroke integrated stream • Referral source
Patient Centered	• % of patients receive CSR by identified stroke rehab stream (CHRIS- target 80%) • Patient and caregiver experience (Source: questionnaire)	• % of patients that remain on identified CSR care pathway • % of patients that complete CSR pathway by stream

Effective - Safe	• % of patients that receive therapies and services consistent with their identified stream
	• 30 day stroke readmission rate (CIHI)
	• % of patients that meet their stroke rehabilitation goals (CHRIS)
		• Patient outcomes as measured by:
		  o improvement in functional independence (FIM),
		  o decreased depression (DRS)
		  o goal achievement (scale), increased satisfaction (questionnaire)
		  o Reintegration to normal living index (RNLI).

Integrated	• # of patients post stroke referred to CSR from acute (Source: Stoke Report Card & CHRIS) • % of patients post stroke who are linked with primary care upon discharge	• % of patients post stroke who are linked with primary care upon discharge • # of discharge planning meetings involving CSR and hospital stroke team • % of patients referred to community programs post discharge from CSR
Efficient	• length of stay (LOS) by primary diagnosis and post admit comorbidity diagnosis of stroke in acute and inpatient rehabilitant (Source: DAD and NRS) • Alternate level of care (ALC) days for patients with diagnosis of stroke (Source: WTIS and ALCIS)	• Average number of therapies per client per stream • Average number of visits per therapy per client stream • Average length of stay on program by CSR stream • Refer to the logic model for further detail
Equity		• # of patients referred to CSR – mobile model by geographic area as a percent of total patients discharged with a primary and post admit comorbidity diagnosis of stroke
Appropriately Resourced		• Consistency in CSR therapy staff (80%)
Population Health		• # of patients that received follow up visits at 12 months post discharge from CSR.

Note: CHRIS = CCAC Database

STAKEHOLDER ENGAGEMENT PLAN

Utilizing the 'Core Principles for LHIN Community Engagement' (LHIN Community Engagement Guidelines and Toolkit, 2011) a comprehensive stakeholder engagement plan was formulated with a target of being purposeful, accessible and transparent to the public and LHIN decision makers. Community engagement strategies and working templates have been adopted as outlined in the toolkit and incorporated into this plan. The stakeholder engagement plan consists of communication with internal stakeholders including senior leaders, acute and rehab staff, as well as external stakeholders including primary care, acute groups, rehabilitation and community stakeholders. Communities of interest including the Central South Regional Stroke Committees as well as political entities and leadership forums have been included.

APPENDIX A: Community Stroke Rehabilitation Model Working Group (WG) Terms of Reference

Purpose:
To develop and pilot a Community Stroke Rehabilitation Service Model as a component of a stroke recovery system that crosses the continuum from acute to community. The service model will meet recommended practice guidelines or Expert Panel recommendations where available, provide access to eligible residents within 30 minutes of where they live and be transferable to other LHIN communities.

The model will be piloted in Norfolk and Haldimand counties and align with the integration of acute stroke and inpatient rehabilitation care in Brant, Haldimand and Norfolk Counties.

Background:
Refer to Integrated Acute Stroke Services Phase 1 Project Charter.

Goals:
- To improve access to evidence based community outpatient stroke rehabilitation care
- To improve client outcomes post stroke event
- To reduce the acute inpatient stay for individuals who experience a stroke of transient ischemic attack by improving timely access to outpatient stroke rehabilitation services
- To integrate outpatient stroke related services for eligible clients

Deliverables:
- Define 'eligible' population
- Identify the number of individuals that would be eligible for community outpatient stroke rehabilitation service in Norfolk and Haldimand and their location of residence by reviewing utilization data
- Identify eligible client streams and best practice guidelines for each stream
- Complete an environmental scan to identify potential models of care
- Review each model for:
    o opportunity to optimize and align existing resources i.e. aphasia services, community services, CCAC
    o client outcomes
    o resources – health human resources
    o cost analysis
    o feasibility of implementation
    o sustainability
    o resources
    o transferability
- Recommend service model
- Develop an implementation plan for a pilot that can be operational April 1, 2013
- Identify performance metrics to evaluate effectiveness of recommended service model

Membership:

WG membership will be comprised of representatives of the Central South Regional Stroke Program, Regional Stroke Program, Brant District Program, HNHB Community Care Access Centre, LHIN Aphasia program and the HNHB LHIN. Representatives of Community Support Services will be invited as needed.

The WG will be Co-chaired by the Central South Regional Stroke Program Director and Director, Access to Care HNHB LHIN.

A quorum will be met with half plus one of the members in attendance and when the chair or their delegate is present.

Member Responsibilities
- Attend meetings as scheduled;
- Review materials and participate in group discussions at the meetings;
- Engage and follow up with respective community based LHIN providers;
- Provide leadership and support for group recommendations; and
- Engage with and seek input from other key stakeholders through members' discussions with colleagues, as well as members' linkages to other networks and committees.

Members:
- Louise MacRae, Central South Regional Stroke Program Director (Co-Chair)
- Rosalind Tarrant, Director, Access to Care, HNHB LHIN (Co-Chair)
- Cheryl Cullimore, Advisor, Access to Care, HNHB LHIN
- Ingrid Fell, Vice President, Patient Services, West Haldimand General Hospital
- Kathryn Leatherland, Director Client Services, Haldimand-Norfolk Branch, HNHB CCAC
- Heather Levens, Masters Student, D'Youville College NY, US*
- Lisa Muraca, Advisor, Finance, HNHB LHIN
- Janet Noble, Director Client Services, Hamilton Branch, HNHB CCAC
- Stefano Pagliuso, Central South Regional Stroke Rehabilitation and Community Coordinator*
- Wendy Pomponio, District Stroke Coordinator for Brant Haldimand and Norfolk
- Shirley Stewart, Advisor, Health System Transformation, HNHB LHIN*
- Kim Young, Advisor, Access to Care, HNHB LHIN (Changed role from Central South Regional Stroke Rehabilitation and Community Coordinator to Advisor, Access to Care, HNHB LHIN)

Ad Hoc Members:
- Brian Bailey, Information Controller, HNHB LHIN*
- Janice Macovich, Director, Chronic Care/Rehabilitation Services, Norfolk General Hospital
- Dr. Wes Oczkowski, Regional Stroke Network Medical Director
- Lori Santilli, Executive Director, Adult Recreation Therapy Centre

Members that either joined or left the WG during the project

Reporting Relationship:
Norfolk General Hospital
Brant Community Healthcare System
Regional Stroke Steering Committee

Decision Making:

One vote per organization.

The Working Group decision will be based on consensus. If consensus is not possible, the Co-chairs may call a vote. Decisions arrived at by voting will be recorded with the percentage in favor of the decision and the content of any opposing positions. Decisions by consensus or vote require a quorum, set at 50% of working group members.

Meetings:

- WG meetings will be scheduled as detailed in the work plan. Frequency may be changed by the Co-chairs to meet objectives set out in these terms of reference.
- The meetings will continue until March 31, 2013, at which time the objectives set out are to be met.

APPENDIX B: Stroke ICD-10-CA Codes International Classification of Disease, 10th Revision, Canada Category ICD-10 Code Stroke Type

Stroke ICD-10-CA Codes International Classification of Disease, 10th Revision, Canada Category ICD-10 Code Stroke Type	
Transient ischemic attack	G45 (excl. G45.4)
Acute stroke	H34.1, I60, I61, I63 (excl. I63.6), I64
Subarachnoid Hemorrhage	I60
Intracerebral Hemorrhage	I61
Ischemic Stroke	I63, I64
Stroke Type not Specified/Undetermined	I64
In Hospital Complications	
Deep Vein Thrombosis	I80
Pneumonia	J13, J14, J15
Gastrointestinal Bleeding	K92.2
Vascular Surgery	
Carotid Stenting	1JE.50
Carotid Endarterectomy	1JE.57

Source: Institute for Clinical Evaluative Sciences April 2010

APPENDIX C: Local Health Integration Network (LHIN) Priority Setting & Decision Making Framework (DMF) for Community Stroke Rehab Working Group - October 24, 2012

Criteria Name	Definition	Examples - Considerations

Alignment	Means the program or service aligns with:
	• LHIN and Ministry strategic directions
	  o Clinical Service Plan - Integrated Acute Care Stroke Recovery System within the HNHB LHIN
	  o Supporting transitions in care by establishing a continuum of rehabilitative care for individuals with stroke
	  o LHIN ACTION plan – integrated services and moving programs / services into to the community as appropriate
	• Specific priorities for Stroke:
	  o Provides standardized evidenced based stroke care according to the Canadian Best Practice Recommendations for Stroke Care 2010
	  o Improves stroke care that will be demonstrated in the HNHB LHIN Stroke report card*-
		o When rating programs, the focus is on the <u>degree of impact on advancing the priorities</u>
		
		o Provides evidence based stroke care according to the Stroke Reference Group Recommendations for Best Practice i.e. 1) 12 week LOS, 2-3 visits per required discipline per week 2) Timely access through prioritization 3) Inter professional model of care.

Sustainability	Means the Model: • Has the resources – HHR, equipment, and facilities to keep the program going • Financial sustainability through the health care system (existing resources) • Can adapt to changes or fluctuations in the critical mass	
Integration	Means that the experience of care from the patients' perspective is integrated: • Navigable-the patient can better navigate the system, moving from one care provider to another • Seamless – the care feels seamless to the patient, without repeating their story, no gaps, no duplication • Continuous – patient moves along the full continuum of care (i.e. from acute inpatient stroke recovery system to community stroke rehab)	• When rating programs, the focus is on the <u>extent to which the program improves integrated care delivery for the person/patient</u>
Quality	Guiding principles for Quality include the extent to which a program/initiative improves safety, effectiveness and client experience of health services provided: • Care organized around the client to support his or her health • Continuous improvement is a critical goal • Care informed by the very best evidence and standards of care • Quality supports and advances the efficient use of resources	
Access	Means the program or service improves timely access to appropriate level of health services for a defined population.	• When rating programs, the focus on <u>the extent to which the program improves access</u> • Is their evidence of wait lists for the service?

Criteria Name	Definition	Examples - Considerations
Equity	Extent to which program reduces the gap in health status or access to services regardless of geography or for targeted sub-populations as compared to the general population. Means the target population will receive the same level of service based on best practice and: • Can easily access the service • Service is based on best practice • Model is adaptable to the needs of the client (clinics setting vs. home due to physical limitations)	
Efficiency	Means the program or service: • Is cost effective • Demonstrates the best use of resources (HR/$/capacity) • Demonstrates good value for $$ • And demonstrates capacity to optimize health and other benefits within the system	
Client-Focused	Extent in which the model meets the needs of the defined population and the degree in which the client has a say in the type and delivery of care.	
Partnerships	Degree to which the model has the potential to incorporate LHIN funding and Non LHIN funded partners to enhance service quality, improve comprehensiveness, optimize resources, and reduce duplication.	
Health Status	Means the impact on health outcomes for the patient/client, including risk of adverse events, and/or impact on physical, mental or social quality of life as compared to current practice for service.	• Does the program assist the individual to improve or maintain their health status
Health Promotion & Disease Prevention	Means the models impact on illness and/or injury prevention and promotion of health and well-being as measured by: • projected longer term maintenance or • improvement in health and/or • likelihood of downstream service utilization reduction.	• Focus is on maintaining health and quality of life and preventing deterioration not on education-based promotion campaigns

APPENDIX D: Stroke Expertise Courses

Course	Required	Recommended	Discipline	Description
Neuro Motor Rehabilitation	*		OT, PT, OTA, PTA	OT, PT, OTA, PTA, Accredited neuro motor rehabilitation course in working with adults with hemiplegia.
Supportive Conversation for Adults with Aphasia (SCA™)	*		ALL	All disciplines must be trained in supportive conversation for adults with aphasia (SCA™)
Discipline Specific Interdisciplinary Learning Objectives for Stroke Care	*		ALL	Knowledge, Skills and Judgement. Completion required. ILOs guide learning plan.
Canadian Best Practice Recommendations for Stroke Care	*		All	Web based. Updates reviewed at annual Stroke Rehabilitation event mentioned above.
Functional Independence Measure (FIM)	*		All	Measures Burden of Care. Mandatory inpatient rehabilitation assessment upon admission and discharge. May be used in the community.
Montreal Cognitive Assessment (MoCA)	*		OT, Nursing	
Assessment of Living with Aphasia (ALA)		*	SLP	
Chedoke McMaster Stroke Assessment (CMSA)		*	PT/OT	Planned Full Day Regional Education Session for fiscal year 2013/2014.
Chedoke McMaster Arm and Hand Assessment Inventory (CAHAI)		*	OT	Full Day Education Session on administration of the Arm and Hand Assessment Inventory.
Alpha FIM		*	All	Measures Burden of Care. Abbreviated version of the FIM. Alpha FIM score is converted to a full FIM score. Alpha FIM is used in acute care as a shortened version of the full FIM used in rehab. Alpha FIM is utilized as a triage tool.
Stroke Rehabilitation and Beyond		*	All	Annual Stroke Rehabilitation Best Practices Conference.
Building Nursing Best Practices in Stroke Care: Putting Evidence into Practice.		*	Nursing	Annual Stroke Nursing Best Practices Conference.

Course	Required	Recommended	Discipline	Description
Evidence Based Review of Stroke Rehab (EBRSR)		*	All	Web based best practice resources
Ontario Stroke Network (OSN)		*	All	Web based best practice resources
Stroke Engine		*	All	Web based best practice resources
Hemispheres Stroke Competency Series		*	All	Web based best practice resource.

Appendix E: Community Stroke Rehabilitation Logic Model

Main Components	Patient and Caregiver	Model	System
Implementation Objectives	• Improved patient outcomes • Improved patient satisfaction • Decreased caregiver burden • Improved caregiver satisfaction	• Improved provider satisfaction • Increased access to community stroke rehabilitation • Increased intensity	• Improved flow from acute and rehabilitation • Improved access to community stroke rehabilitation

Outputs	• # of patients served
	• LOS
	• Location of client
	• # of patients identified on stroke care pathway as candidates for community stroke rehab
	• # of patients within each community stroke integration stream
	• # of patients linked with primary care upon discharge
		• Time to first contact
		• Time to first visit
		• # of referrals
		• Number of joint visits with ISU staff
		  Number of discharge planning meetings involving community and hospital team
		• Number of visits per discipline
		  Length of time on service
		• Proportion of patients identified on community stroke rehab path and those who are attending the community stroke rehab program
		• # of patients who remain on community stroke rehab care path
		• # of visits per stream
		• # of patients per stream
		• # of disciplines involved per stream
		• # of visits per discipline per stream (# of SLP, OT, PT)
		• # of weeks per stream 8, 10 or 12
		• cost per visit per discipline
		• cost per stream
			• Decreased acute LOS
			• Decreased readmission rate
			• Decreased ED visits
			• Decreased inpatient rehab LOS
			• Referral source
			• Proportion of patients treated and referred from and Integrated Stroke Unit
			• # of links to community providers
			• # of patients transitioned to recreation programs
			• # of patients per stream or per RPG accessing CSR
			• ALC
			• Proportion of patients discharged to LTC
			• # of follow up visits at 12 mos
			• # of contacts with primary care
			• Proportion of patients treated on an Integrated Stroke Unit

Outcomes	• FIM-admission, 30 days and Discharge • Depression Rating Scale (DRS) • Canadian Occupational Performance Measure (COPM) • Client and caregiver satisfaction survey • RNLI • Discharge destination • Reassessment at discharge and 12 mos • RAI-CA in hospital • RAI-HC in community admission and discharge and 12 mos • Discipline Specific Measures to be determined i.e. MOCA, CMSA, CAHAI, ALA, two minute walk test, six minute walk test, Charleston comorbidity	• Provider satisfaction survey • Compare outputs related to other models in other geographical areas	• Patient and caregiver access question incorporated within satisfaction survey • Provider access question incorporated within satisfaction survey • Cost effectiveness

ENDNOTES

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