



Ontario Stroke Evaluation Report 2012

Prescribing System Solutions to Improve Stroke Outcomes

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About the Organizations Involved in This Report

The Ontario Stroke Network

With its vision of *Fewer Strokes, Better Outcomes*, the mission of the **Ontario Stroke Network** (OSN) is to provide provincial leadership and planning for the Ontario Stroke System (OSS) by measuring performance, partnering to achieve best practices, and supporting innovations for stroke prevention, care, recovery and reintegration. The OSN delivers on its mission by establishing province-wide goals and initiatives to implement best practices across the stroke continuum, evaluating and reporting on the progress of the OSS, and administering the Ontario Stroke Network research and knowledge translation program. The Ontario Ministry of Health and Long-Term Care provides funding to the OSN to measure, monitor and evaluate stroke care in Ontario.

The Ontario Stroke System

The Ontario Stroke System is a client-centred collaboration of 11 regional stroke networks supporting Ontario's 14 Local Health Integration Networks. Each region has a regional stroke centre and many have one or more district stroke centres. Each stroke network is a collaborative partnership of health care organizations and providers that spans the care continuum from prevention to community re-engagement. The goal of the OSS is to coordinate equitable access and improve outcomes for stroke survivors and their families through the integration of stroke best practices across the care continuum.

The Canadian Stroke Network

The **Canadian Stroke Network** (CSN), one of Canada's Networks of Centres of Excellence, is a collaborative effort that brings together researchers, students, government, industry and the non-profit sector. First funded in 1999, the CSN is a not-for-profit corporation with headquarters at the University of Ottawa. The CSN puts Canada at the forefront of stroke research through its multidisciplinary research program, high-quality training for Canadian scientists and clinicians, and national and global partnerships.

The CSN is dedicated to decreasing the physical, social and economic consequences of stroke on the individual and on society. In pursuit of this goal, it aims to:

- promote research excellence,
- train researchers and practitioners,
- maximize economic benefits,
- build national consensus on stroke policy, and
- create added value through partnerships.

In partnership with the **Heart and Stroke Foundation of Canada**, the CSN formally launched the Canadian Stroke Strategy (CSS) in 2006. The strategy promotes education and awareness about stroke, the need to use effective treatments, best practices in providing coordinated care in integrated stroke programs, the importance of delivering rehabilitation at the right time and in the right intensity, and the need to support stroke patients and their families in the community.

Institute for Clinical Evaluative Sciences

The Institute for Clinical Evaluative Sciences (ICES) is an independent, non-profit organization that produces knowledge to enhance the effectiveness of health care for Ontarians. Internationally recognized for its innovative use of population-based health information, ICES' evidence supports health policy development and guides changes to the organization and delivery of health care services.

Key to ICES' work is its ability to link population-based health information, at the patient-level, in a way that ensures the privacy and confidentiality of personal health information. Linked databases reflecting 13 million of 34 million Canadians allow researchers to follow patient populations through diagnosis and treatment, and to evaluate outcomes.

ICES brings the best and the brightest together under one roof. Many ICES scientists are not only internationally recognized leaders in their fields but also practicing clinicians who understand the grassroots of health care delivery, making

the knowledge produced at ICES clinically-focused and useful in changing practice. Other team members have expertise in statistics, epidemiology, project management or communications. The variety of skill sets and educational backgrounds ensures a multidisciplinary approach to issues and engenders a real-world mosaic of perspectives that is vital to shaping Ontario's future health care system.

ICES receives core funding from the Ontario Ministry of Health and Long-Term Care. In addition, ICES scientists and staff compete for peer-reviewed grants from federal funding agencies, such as the Canadian Institutes of Health Research, and project-specific funds from provincial and national organizations. These combined resources enable ICES to have a large number of projects underway, covering a broad range of topics. The knowledge that arises from these efforts is always produced independent of funding bodies, which is critical to ICES' success as Ontario's objective, credible source of evidence guiding health care.

About This Report

Background and Purpose

In April 2003, the Ontario Ministry of Health and Long-Term Care launched the Ontario Stroke Strategy Monitoring and Evaluation Initiative. The initiative's goals include:

- measuring changes and outcomes attributable to the Ontario Stroke System (OSS);^a
- identifying areas of excellence and areas for improvement;
- making recommendations to achieve better performance and outcomes at the provincial, regional, Local Health Integration Network (LHIN), facility and patient levels; and
- reporting on improvements and gaps in stroke prevention and care.

In August 2008, after a strategic planning process, the Ontario Stroke Network (OSN) was created as the governing body to provide coordination and leadership for the OSS, including evaluation and reporting responsibilities. The OSN is dedicated to driving system change and coordinating the implementation of best practices across the province. The Stroke Evaluation and Quality Committee (SEQC) is a committee of the OSN Board that, in collaboration with the OSN Evaluation Specialist, is responsible for measuring, monitoring, evaluating and reporting on the progress of the OSS.

Methods

Indicator Selection

To evaluate how well the Ontario Stroke System delivers best practice stroke care across the care continuum, in 2010 the SEQC reviewed over 150 performance indicators included in the Canadian Stroke Strategy's **2008 Performance Measurement Manual** and from them identified a set of 45 core performance indicators. The 2012 Stroke Evaluation Report provides a comprehensive look at each core performance indicator and the variation in stroke care by stroke care sectors, including Emergency Department, Acute Inpatient Care, Inpatient Rehabilitation, Complex Continuing Care, Long-Term Care, and Home Care Services in Ontario from 2003/04 to 2010/11.

The SEQC further identified a subset of 20 key indicators considered integral to system efficiency and effectiveness for presentation in a report card. The provincial and LHIN report cards can be found in Appendix B.

Data Sources

This report includes two main sources of data: data obtained through administrative datasets and data collected through biennial Ontario Stroke Audits.

Administrative Data

The following data sources, all housed at the Institute for Clinical Evaluative Sciences, were used to monitor the performance of the OSS:

- from the Canadian Institute for Health Information: the Discharge Abstract Database (CIHI-DAD), the National Ambulatory Care Reporting System (NACRS) Emergency Department subset, the National Rehabilitation Reporting System (NRS) and the Continuing Care Reporting System (CCRS); and
- from the Ontario Ministry of Health and Long-Term Care: the Home Care Database (HCD) and the Registered Persons Database (RPDB).

Encrypted health card numbers were used to link patients diagnosed with stroke or transient ischemic attack (TIA) across the various administrative databases.

Stroke Cohorts

Stroke cohorts were generated from the administrative databases using codes from the International Classification of Disease, 10th Revision, Canada (ICD-10-CA); the codes are listed in Appendix C. The most responsible or main problem diagnosis was used to identify adult stroke/TIA records in the CIHI-DAD and NACRS databases. For paediatric stroke/TIA records, all diagnostic code fields were searched. The first record for an individual in each fiscal year was used to measure the various indicators.

^a The OSS is a collaborative system of a provider organization and partners who deliver stroke care across the province and the care continuum.

Statistical Analyses

Process-based Indicators

Indicator analyses counted only unique patients for each fiscal year. The majority of indicators reported at the regional and LHIN levels are facility-based rather than patient residence-based (i.e., they examine how well the facilities in a LHIN performed on various indicators). Time- and therapy-based indicators are reported as median values. Median time/service is the time required or service received by half of a patient population (e.g., length of stay, rehabilitation, home care-based rehabilitation therapy).

Most of the indicators in the report are observed proportions or median values. For admissions data, direct standardization was used to compare rates between regions as if they had similar population compositions. The direct standardized rates were calculated for each fiscal year using the Ontario population as the standard population, and each region's rate was calculated as if it had the same age-sex distribution as the province.

Outcome Indicators

Revisit/readmission rates relate to patients who survived the initial stroke emergency department (ED) visit or hospitalization but revisited or were readmitted to hospital at least once within 30 days and 90 days of the index visit or admission. Indirect standardization based on an age-sex regression model was used to calculate an expected revisit/readmission rate for each region then, the crude (observed) rate for each region was divided by the expected rate and multiplied by the overall annual Ontario rate to provide the age- and sex-adjusted rate. Readmission rate is a good indicator of the existence of appropriate discharge planning to prevent secondary complications or another stroke/TIA event.

Mortality rates were also calculated using indirect standardization based on a risk-adjustment model similar to the Get With The Guidelines ischemic stroke mortality risk-adjustment model.¹ This model allows death rates to be adjusted for differences across regions in sociodemographic comorbidity and condition-specific indicators of illness severity. The model adjusts for age, sex, stroke type, arrival by

ambulance and common risk factors (atrial fibrillation, previous stroke/TIA, coronary artery disease, PCI, CABG, carotid disease, CEA/CES, diabetes, hypertension, peripheral vascular disease, and hyperlipidemia). Mortality indicators were analyzed for inpatients only (see Appendix K for model specifications). In-hospital mortality is based on the CIHI-DAD separation in that fiscal year. Thirty-day mortality measures the number of deaths that occurred within 30 days from the first stroke/TIA admission date each fiscal year, with death being identified in the Registered Persons Database.

The Ontario Stroke Registry (formerly the Registry of the Canadian Stroke Network) – 2002/03, 2004/05, 2008/09 and 2010/11 Acute Ontario Stroke Audits

The Ontario Stroke Audit (OSA) is a biennial random sample of stroke/TIA patients seen at over 140 acute care facilities in Ontario.^b The OSA is a retrospective chart abstraction project that captures clinical stroke care data not currently available from administrative data sources; these data encompass stroke symptom onset, stroke severity, dysphagia screening and stroke unit admission.

Participating Institutions

All Ontario acute care institutions, excluding mental health care hospitals and those with fewer than 10 stroke or TIA separations per year, were invited to participate in the Acute Ontario Stroke Audit. Based on the annual number of visits or admissions for stroke or TIA, institutions were categorized as low volume (fewer than 33), medium volume (33–99) or high volume (100 or more). Institutions were also classified as regional stroke centres, district stroke centres, non-designated hospitals or non-designated hospitals with Telestroke^c capacity.

Patient Sample

All patients (including non-Ontario residents) discharged from the ED or inpatient hospital stay between April 1, 2010 and March 31, 2011 with a main problem or most responsible diagnosis of stroke or TIA (excluding questionable or suspected diagnoses) were eligible for inclusion in the 2010/11 Acute Ontario Stroke Audit. Stroke and TIA separations were identified from CIHI-DAD and NACRS. For individuals with stroke/TIA separations in both databases, only the CIHI–

^b Ontario Stroke Audits in 2002/03, 2004/05 and 2008/09 were conducted on a random sample of 20% of all eligible cases, with oversampling performed at low-volume institutions where each contributed a minimum of 10 cases and at district stroke centres where each contributed a minimum of 50 cases. Only adult patients (18 years and older) and patients whose stroke occurred prior to hospital arrival were eligible for inclusion.

^c The Ontario Telestroke program is an emergency medicine application that provides emergency physicians with immediate access to neurologists with expertise in stroke care to support both the assessment and treatment of patients experiencing acute ischemic stroke. In 2010/11, the Ontario Telestroke program was supported by 12 stroke neurologists who provided emergency consultations for patients presenting to 17 referring hospitals with acute stroke symptoms (see Appendix D). The program is supported by the Ontario Telemedicine Network for connectivity, standard videoconferencing, imaging hardware and logistics. Ontario's Critical program provides a provincial call centre to initiate Telestroke consultations. The OSN provides oversight and governance.

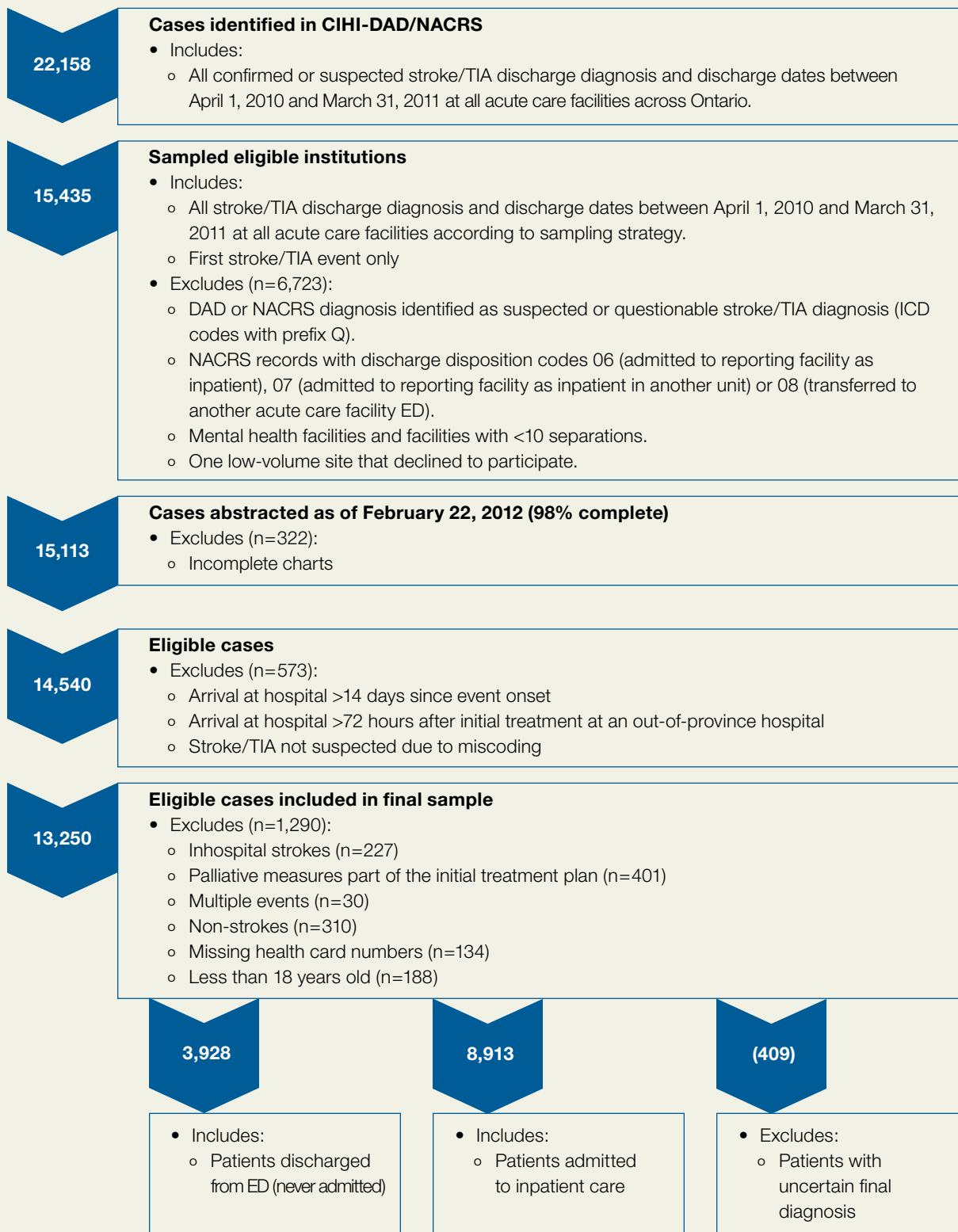
DAD separation was used. For individuals with more than one stroke/TIA during the sampling time frame, only the first stroke/TIA event was used. See Appendix C for the ICD-10-CA codes used to identify eligibility for inclusion in the 2010/11 OSA.

The 2010/11 OSA is the largest to date, representing 15,435 patient charts. A population-based sampling strategy was used that included 100% of patients seen at regional, district and enhanced district stroke centres and Telestroke sites; 30% of patients at high-volume, non-designated hospitals; 30 patients from each medium-volume, non-designated centre; and 10 patients from each low-volume, non-designated facility. All strokes, including those that occurred during hospital admission, and both adult and paediatric stroke/TIA patients were eligible for inclusion. Data analyses for this report was done when completeness of chart abstraction was at 98%. The

table below reports the completeness rate by region at the time of the data analyses.

Ontario Stroke System Region	Abstraction Completed (%)
Central East	100
Central South	94
East – Champlain	98
Northeast	100
Northwest	100
South East	100
Southwest	96
Toronto – North & East	100
Toronto – Southeast	100
Toronto – West	94
West GTA	100

2010/11 Ontario Stroke Audit sample of adult patients



2010/11 Ontario Stroke Audit sample of paediatric patients

A total of 480 paediatric cases (representing patients younger than 18 years of age) were identified using CIHI–DAD and NACRS. Of these, 100% were abstracted and 188 (39.2%) were found to be eligible cases (they arrived less than 14 days after event onset, less than 72 hours after initial treatment at an out-of-province hospital, or where a stroke/TIA was suspected). Of the eligible cases, 43 had a final diagnosis of non-stroke and were excluded, resulting in a final paediatric sample of 145 patients.

Data Abstraction and Management

Centrally-trained neurology research nurses performed chart abstraction at the participating hospitals. Data were collected on all aspects of acute stroke management, including patient demographics, the use of pre-hospital emergency medical services, and in-hospital and emergency department management, complications and outcomes. Data were entered electronically into a custom-designed Microsoft Access database that enhanced data validity by checking ranges and internal data consistency at the time of data entry. The program anonymized and encrypted the data before transfer via a secure telephone line to the Institute for Clinical Evaluative Sciences (ICES) in Toronto. The aggregate dataset was managed and analyzed by the Ontario Stroke Registry (OSR) team at ICES. Unique patient identification numbers were used to link the OSR database with the Registered Persons Database to obtain information on deaths that occurred after discharge from hospital.

The overall research project was approved annually by the Research Ethics Board at Sunnybrook Health Sciences Centre in Toronto, with additional approval by research ethics boards at participating institutions where required. ICES is a prescribed entity under Ontario's *Personal Health Information Protection Act*, and charts were audited without patient consent for the purposes of monitoring and improving the quality of stroke care delivery.

Statistical Analyses

Results are presented for the entire province and by sex, Ontario Stroke System (OSS) region, Local Health Integration Network (LHIN) and OSS hospital designation (includes 11 regional or enhanced district stroke centres, 17 district stroke centres, 107 non-designated hospitals and 7 Telestroke sites (non-designated hospitals). Telestroke is available in one of the 11 regional stroke centres and 9 of the 17 district stroke centres and was analysed as such for all indicators with the

exception of thrombolysis administration. Thrombolysis analyses report Telestroke performance based on all 17 participating facilities (1 regional stroke centre, 9 district stroke centres and 7 non-designated hospitals), as access to thrombolysis has been the primary role of the Telestroke program.

To account for oversampling at certain institutions, results were weighted based on hospital volume and the number of charts sampled. The weight assigned to a record was inversely proportional to the probability of that record being selected for inclusion in the study. By using weights in the analyses, an estimate that applied to the entire population of discharge records was obtained. See Appendix J for sample sizes for indicator calculations.

The characteristics, management and in-hospital outcomes of stroke patients by region and hospital designation were compared using Rao-Scott Chi-square tests for categorical variables. Tests for trends over time were performed using a survey logistic regression model. SAS version 9.2 was used for all data analyses. Analyses by region were based on facility rather than patient location for the majority of indicators.

Benchmark Calculations

Provincial benchmarks were calculated for a subset of indicators presented in the Ontario Stroke Report Cards (see Appendix B). The benchmarks were calculated using the Achievable Benchmarks of Care (ABC) methodology,^{2,3} which summarizes the performance of the top-ranked facilities representing at least 20% of all patients eligible for the appropriate care. The benchmarks were calculated using demonstrated care among a few facilities (i.e., not only the top-ranked facility) and therefore were attainable.

The following steps were used to calculate each benchmark:

1. Rank the care providers (facilities or subLHINs) in descending order of performance on the process indicator;
2. Beginning with the best-performing care provider, add the providers until at least 20% of the total number of patients are represented (in the denominator); and
3. Calculate the benchmark using only the selected providers in step 2 (20%) by dividing the total number of patients who received appropriate care by the total number of patients eligible for the care in the subset.

To ensure that high-performing care providers with low number of patients did not improperly influence the benchmark rates, the performance of facilities or subLHINs

with small sample sizes and high performance rates was adjusted, and rank order was based on the adjusted performance rates. The benchmark was calculated by ranking subLHIN performance, not facilities, for population-based indicators (report card indicators 1, 2, 11, 12 and 19). Report card indicators 3, 15 and 20 did not use the ABC methodology; the provincial performance rate was used.

Report Layout and Interpretation

This report provides **detailed information on progress across the care continuum** and at multiple levels of analysis, enabling the OSN and the OSS regions to compare performance to other LHINs/regions. This report highlights stroke system successes while pointing out inefficiencies and opportunities for improvement.

The *Review of System Solutions* section provides an overview of findings and recommendations by stroke care sector. The use of happy, neutral and sad faces was introduced in the 2010 Ontario Stroke Evaluation Report and is continued in this report. **A happy face indicates improvement, a neutral face indicates no change, and a sad face indicates a need for investigation and/or improvement.**

For the purposes of this report, paediatric stroke patients aged 0–17 years were identified and are reported on separately from adult stroke/TIA patients. The sections of the report pertaining to adult patients are divided into hospital and patient characteristics; emergency department care; acute inpatient care; inpatient rehabilitation, complex continuing care and long-term care; home care services; and patient outcomes.

Where possible, data are presented by the 14 LHINs, 11 OSS regions and four facility types (regional stroke centres, district stroke centres, non-designated centres and Telestroke sites). This year's report includes Telestroke data for the first time. The 2010/11 Ontario Stroke Audit included a 100% sample from hospitals providing access to Telestroke (see Appendix D) to better understand the impact of Telestroke at these hospitals.

Influenced by the establishment of Echo: Improving Women's Health in Ontario (an agency of the Ontario Ministry of Health and Long-Term Care) and the publication of recent research on sex differences in health care in the province⁴, for the first time this year, **data are presented by patient sex where possible.**

Executive Summary

Prescribing System Solutions to Improve Stroke Outcomes

The 2012 Ontario Stroke Evaluation Report provides an overview of stroke care across the care continuum. Compared to the 2011 edition, this report delivers a more comprehensive review of stroke care, including an examination of differences in care provided to men and women, a description of the care provided at complex continuing care facilities and long-term care homes, and an analysis of the acute care provided through the Telestroke program. In addition, this year's report includes the results of the largest acute stroke audit conducted in Ontario to date (over 15,000 charts), including data on paediatric stroke. This larger audit allows for better estimates of regional performance on stroke quality indicators not available from administrative databases and the distribution of functional disability following an acute stroke.

The information in this year's report is used to assess the progress of the Ontario Stroke System (OSS), identify gaps and prescribe solutions that will improve outcomes for stroke/TIA patients in Ontario. This report once again demonstrates how the regional stroke networks have improved access to stroke best practices since 2009.

Areas of continued progress include:

- Reduced LHIN variation and increased percentage of stroke/TIA patients arriving by ambulance;
- Reduced LHIN variation in the percentage of stroke/TIA patients receiving neuroimaging within 24 hours of hospital arrival;
- Increased percentage of patients receiving tPA (stroke thrombolysis) within 60 minutes with more LHINs achieving this benchmark;
- Increased percentage of patients accessing stroke unit care;
- Increased percentage of carotid imaging among patients without atrial fibrillation and decreased time to carotid intervention;
- Reduced inhospital, 30-day and one-year stroke mortality rate;
- Reduced wait times for admission to inpatient rehabilitation from acute care; and
- Increased percentage of patients undergoing dysphagia screening.

However, improvements are needed in a number of areas: TIA inpatient admissions, the clinical management of atrial fibrillation, the proportion of severe stroke patients accessing inpatient rehabilitation facilities, home care provision of rehabilitation therapy, and 30- and 90-day non-elective stroke/TIA revisit/readmission rates. In addition, stroke/TIA patients admitted to hospital have almost one-third of their total length of stay considered Alternate Level of Care (ALC), and almost one in four admitted stroke/TIA patients have a median of six ALC days.

Given the complexity of making change in health care, it is impressive that steady progress is being made year over year. The OSN and the Regional Stroke Networks are well positioned to make further progress, particularly in those areas that have been challenging to improve. The planned work on improving and integrating prevention efforts through the Ontario Vascular Health Integration Strategy, the ER/ALC Rehab/CCC Expert Panel work on stroke rehabilitation, and the planned stroke patient-based funding initiative for 2013/14 should help continue the progress.

Prescribed Solutions

1. Rx: Improve public awareness of stroke risk factors and the signs and symptoms of stroke

Risk Factors

The 2010/11 Ontario Stroke Audit revealed that the prevalence of modifiable risk factors for stroke had increased: 69.3% of patients had documented high blood pressure, 26.4% had diabetes, 15.0% currently smoked and 41.8% had hyperlipidemia. This trend is consistent with the overall increase in prevalence of chronic disease risk factors and is associated with an aging population. If the trend continues, the positive results observed with stroke hospitalization rates will reverse.

Recommendation

The OSN should continue to partner with other networks to address the increased prevalence of risk factors for stroke and other vascular diseases. The Ontario Integrated Vascular Health Strategy Blueprint is an important step in addressing the rising tide of vascular risk factors.

Signs and Symptoms

The proportion of stroke/TIA adults arriving at the emergency department by ambulance increased from 52.8% in 2003/04 to 57.1% in 2010/11. This improvement was observed for the majority of LHINs and with decreased variation across LHINs. The steady improvement is associated with the implementation of provincial medical redirect protocols the public awareness and education campaigns of the Heart and Stroke Foundation and regional stroke networks. However, as two of every five stroke victims do not call 911 for emergency assistance, more needs to be done. Related to this, stroke thrombolysis rates are increasing steadily; the most recent data show that 9.6% of all ischemic stroke patients received tissue plasminogen activator (tPA) in 2010/11.

Recommendations

The OSN should continue to partner with the Heart and Stroke Foundation on its warning signs campaign. Awareness efforts should be enhanced and expanded. In addition, current work with the Ontario Telemedicine Network to develop LHIN/regionally-driven Telestroke plans should further increase access to tPA.

2. Rx: Improve access to secondary prevention clinics for TIA patients

The data show that over the past three years, there has been minimal change in inpatient admissions (approximately 18%) or length of stay (3 days) for patients with TIA, while referrals for TIA patients to secondary stroke prevention clinics (SPC) following discharge from the emergency department (ED) increased from 62.3% in 2008/09 to 72.6% in 2010/11 ($p=0.0001$). TIA patients had the highest 30-day (6.5%) and 90-day (8.3%) age- and sex-adjusted stroke/TIA-related readmissions. The rate of thirty-day all-cause readmissions among TIA patients decreased from 8.9% in 2003/04 to 7.9% in 2009/10 ($p=0.0002$). These rates are notably lower than an earlier study by Gladstone et al. reporting a 30-day all-cause readmission rate of 12%.⁵

Recommendations

These findings further underline the importance of the OSN-directed call for research to examine how Ontario's TIA patients are diagnosed and managed. The findings also align with the identification of TIA as a priority for the development of provincial care protocols by the OSN's Secondary Prevention and Acute Care Subcommittee. Similarly, the findings support the OSN's decision to conduct an audit of all secondary stroke prevention clinics in the province to evaluate

adherence to best practice TIA care and effectiveness of the clinics in reducing recurrent strokes/TIA.

3. Rx: Improve stroke inpatient access to stroke unit care

The findings of the 2010/11 Ontario Stroke Audit show that regional stroke networks have made great strides in improving access to stroke units. In 2010/11, 38.3% of admitted stroke/TIA patients spent some part of their inpatient stay on a stroke unit, whereas in 2008/09, only 30.3% were admitted to a stroke unit. However, of the 62% of stroke patients that did not receive stroke unit care, the majority (68%) were in non-designated hospitals. Ontario's results are dramatically lower than those observed in the 2010 Scottish Stroke Care Audit where 82% of admitted stroke patients were admitted to a stroke unit during their stay.⁶

Recommendations

These findings support the OSN's call for a detailed examination of stroke unit care and its structural variations within Ontario's regional stroke networks. The findings also support a decision by the OSN's Secondary Prevention and Acute Care Subcommittee to make stroke unit care a priority, as well as its plan to develop a stroke unit implementation tool kit. Health Quality Ontario's stroke care mega-analysis, which is focused in part on stroke unit care, will also be critical in driving change.

4. Rx: Improve access to appropriate rehabilitation following acute stroke

In 2010/11, the median time from admission to inpatient rehabilitation following an acute stroke hospitalization was 10 days, a 23% relative decrease from 2003/04 (13 days). Freestanding rehabilitation facilities demonstrated the greatest improvement, from a median time of 20 days in 2003/04 to 14 days in 2010/11.

Of the 3,337 patients admitted into inpatient rehabilitation following an acute stroke hospitalization in 2010/11, Alternate Level of Care days represented 24% of their total acute inpatient length of stay and 6% of their total length of stay in rehabilitation.

The proportion of inpatient stroke rehabilitation patients considered severely disabled has decreased over time, dropping from 37.6% in 2003/04 to 31.2% in 2010/11, with a corresponding increase in moderately disabled patients and a small decrease in mildly disabled patients being admitted. Severely disabled stroke patients admitted into more intense inpatient rehabilitation had lengths of stay of just over a

month compared to stroke patients admitted to complex continuing care where the median length of stay was 52 days and the extent of rehabilitation therapy was less than 30 minutes per day for each therapy (provided individually or in a group setting). The best practice recommendation is that inpatients receive three hours of therapy each day.

Community-based rehabilitation delivered through Community Care Access Centres reveals an inadequate amount of therapy to stroke patients: an average of six visits from all therapies over a 60-day period, with the first visit occurring, on average, more than two weeks after discharge from hospital.

Recommendations

The OSN's current work in support of the ER/ALC Rehab/CCC Expert Panel^d should continue. The standards of care identified by the OSN, if implemented, would effectively allow access to best practice rehabilitation and reduce Alternate Level of Care days and costs of care while improving patient outcomes. In particular, the development of the OSN stroke rehabilitation economic analysis and the collaborative work with Health Quality Ontario should provide decision makers with the tools to support change. The Stroke Rehabilitation Resource Portal^e will support knowledge transfer of leading provincial models for achieving access to stroke rehabilitation. Greater availability of ambulatory rehabilitation services through Community Care Access Centres or other service models could reduce ALC days.

Future reports need to evaluate the effectiveness of the OSN Stroke Reference Panel's recommendations for rehabilitation. The OSN should consider a directed research effort for 2013/14 that focuses on the development of knowledge to support implementation of the established Stroke Rehabilitation Recommendations.^f

5. Rx: Provide comprehensive data for stroke care outside of the acute setting

Data sources beyond the acute stroke care sector provide limited data to evaluate access and appropriateness of stroke rehabilitation duration, intensity and mix of rehabilitation providers. Different assessment tools are used to measure patient functional improvement in Community Care Access Centres, complex continuing care facilities and long-term care homes, and thus it is difficult to determine the appropriateness of these settings for stroke rehabilitation.

Without a source of data to assess outpatient rehabilitation beyond what Community Care Access Centres provide, we do not have a full picture of access to outpatient rehabilitation in Ontario.

Recommendations

The OSN should advance its work with the ER/ALC Rehab/CCC Expert Panel to advocate for the collection of provincial data on outpatient rehabilitation and intensity of rehabilitation therapy. The OSN should continue to partner with the Ministry of Health and Long-Term Care and the Canadian Institute for Health Information in addressing these data gaps. In addition, the OSN should continue to advocate for the inclusion of the AlphaFIM^g in the provincial Discharge Abstract Database.

^d The panel is focused on how best to reduce ALC lengths of stay throughout the stroke system by properly utilizing the capacity, role and expertise available in rehabilitation and complex continuing care.

^e The portal is comprised of resources that will support organizations implementing the Stroke Rehabilitation Recommendations.

^f Recommendations include: timely transfer of appropriate patients from acute facilities to inpatient rehabilitation; the provision of more intensive therapy in inpatient rehabilitation; and timely access to outpatient/community-based rehabilitation for appropriate patients.

^g AlphaFIM is a standardized assessment tool used to evaluate the disability and functional status of patients in acute care 3–5 days following stroke admission.

Review of System Solutions

Prescribing System Solutions to Improve Stroke Outcomes

The following is an overview of solutions that assist in achieving better outcomes for stroke patients in Ontario.

Improve awareness of stroke risk factors and the signs and symptoms of stroke

National Best Practices⁷

Stroke can be prevented by better management of risk factors, such as hypertension, heart disease, diabetes, atrial fibrillation and smoking.

Stroke is a medical emergency; the faster patients get to hospital, the better their chances of receiving treatments that could help reverse the effects of the stroke. There should be a coordinated emergency response system, and all members of the public should be able to recognize the signs and symptoms of stroke; these include the sudden onset of weakness, difficulty speaking, vision problems, headache and dizziness.

Findings

Hospitalization: There has been a significant reduction in hospitalization rates; however, more “baby boomers” are being hospitalized with stroke.



The annual age- and sex-adjusted rate of first hospital visit for stroke/TIA per 1,000 adults dropped by 5%, from 2.0 visits in 2003/04 to 1.9 visits in 2010/11 ($p < 0.0001$). In addition, the annual incidence rate of inpatient hospitalization for stroke/TIA per 1,000 adults dropped by 12%, from 1.7 hospitalizations in 2003/04 to 1.5 hospitalizations in 2010/11 ($p < 0.0001$). This may reflect several trends, including a reduction in smoking, better blood pressure control and increased availability of secondary stroke prevention clinics.



The proportion of stroke/TIA patients in the 46–65 year age group (the largest proportion of the Ontario population, known as the “baby boomers”) has increased, emphasizing the need to address modifiable risk factors, such as hypertension, diabetes, obesity, hyperlipidemia and tobacco smoking. In 2010/11, the first of the baby boomers turned 65. In the next 10 years, an increase in the prevalence of stroke/TIA may be expected as this large segment of the population moves into the 66–75 year age group, an age at which strokes are most likely to occur.

Calling 911: Public awareness has increased; significantly more people are calling 911, receiving clot-busting drugs and being cared for at stroke centres.



Overall, there was an increase in the proportion of stroke patients arriving at acute care hospitals by ambulance: from 52.8% in 2003/04 to 57.1% in 2010/11 ($p < 0.0001$). This is associated with an improvement in the proportion of stroke patients arriving at the emergency department in time to be considered for thrombolysis: from 34.0% in 2003/04 to 42.3% in 2010/11 ($p = 0.0001$). The benchmark is 52.0%, based on data from the 2010/11 Ontario Stroke Audit.



There was an increase in the proportion of patients arriving by ambulance to designated stroke centres: At regional stroke centres, this ranged from 57.4% in 2003/04 to 66.4% in 2010/11 ($p = 0.0001$), and at district stroke centres, from 53.7% in 2003/04 to 63.6% in 2010/11 ($p = 0.0001$). There was also a reduction in the range of variation across LHINs. These improvements may reflect the positive impact of new stroke centre designations, pre-hospital medical redirect protocols and the provincial paramedic prompt card, all improvements occurring since 2003/04.

Acute Thrombolysis: The provincial medical redirect protocol, the Telestroke program and greater public awareness are contributing to significant improvements in stroke thrombolysis rates.



Acute thrombolytic therapy (in the form of tissue plasminogen activator or tPA) was delivered to one in 10 (9.6%) ischemic stroke patients, which is higher than the national rate of 8%,¹¹ making Ontario one of the country's leading jurisdictions for this intervention. The provincial thrombolysis rate for eligible ischemic stroke patients presenting to hospital within the treatment window (within 3.5 hours of stroke onset in 2010/11 and within 2.5 hours in previous years), increased from 10.8% in 2002/03 to 29.6% in 2008/09 to 32.4% in 2010/11 ($p < 0.0001$).



Rates of tPA administration were highest at regional stroke centres (47.4%). At district stroke centres, there was a three-fold increase in the tPA administration rate: from 14.0% in 2002/03 to 41.8% in 2010/11. The 2010/11 benchmark for administering tPA to patients arriving within the treatment window is 61.2%. The observed improvements are likely attributable to the Heart and Stroke Foundation's public awareness campaign resulting in more stroke victims calling 911, the provincial stroke medical redirect protocol, the provincial paramedic prompt card and the Telestroke program.



In 2010/11, the median door-to-needle time (the time from ED arrival to administration of tPA) was 70.1 minutes, which was a minimal change from 2008/09 (69.7 minutes) but an improvement from 2004/05 (82.6 minutes), and higher than the benchmark of 60 minutes.⁷ Telestroke sites delivered tPA the fastest at 62.4 minutes. In Ontario, 38.1% of all ischemic patients received tPA within 60 minutes, which is higher than the national rate of 34%.¹¹

Prevention: The initial improvement in prescribing secondary prevention medication has plateaued, and there is a particular need for improvements for patients with atrial fibrillation.



The proportion of patients who were prescribed antithrombotic/anticoagulant, antihypertensive and anti-lipid drug therapies at discharge increased significantly, from 19.9% in 2002/03 to 52.1% in 2008/09 ($p \leq 0.0001$). In 2010/11, the results were unchanged at 51.4%.



There was little change in the proportion of ischemic stroke/TIA patients with atrial fibrillation who were prescribed or recommended warfarin upon discharge from acute care in 2010/11 compared to 2008/09 (72.1% vs. 73.8%; $p = 0.0394$). The benchmark is 86.0%, based on data from the 2010/11 OSA. Ontario's performance rate is better than rates observed in the 2010 Scottish Stroke Care Audit, where only 48% of stroke/TIA patients were found to be on anticoagulants at discharge.⁶ Women with atrial fibrillation were prescribed anticoagulant therapy at lower rates than men (70.9% vs. 73.4%), yet the prevalence of atrial fibrillation, hypertension and previous stroke/TIA was higher among women.

Recommendations

- 1.** The Ontario Stroke Network (OSN), regional stroke networks, Local Health Integration Networks and other organizations involved in vascular prevention should continue to build on current prevention strategies because they are associated with lower stroke hospitalization rates. In particular, a focus on improving access to best practice stroke prevention and care and to designated stroke facilities should help ameliorate the effect of the burgeoning baby boomer population.
- 2.** The decision by the Ontario Ministry of Health and Long-Term Care to fund the Heart and Stroke Foundation of Ontario's 2010/11 warning signs campaign is to be commended, as more stroke patients arrive at hospital by ambulance than patients who have heart attacks. The campaign needs to be sustained. The OSN should continue to support the Heart and Stroke Foundation in providing evidence of the campaign's impact.
- 3.** The impact of the revised prompt card (fully implemented in September 2011 to reflect the extended stroke thrombolysis treatment window) should be assessed in the next iteration of this report.
- 4.** The decline in the prescribing of warfarin to patients with atrial fibrillation upon discharge from a stroke/TIA hospitalization needs to be investigated, with particular attention given to differences between male and female patients. The recommendation by the Ontario Integrated Vascular Health Strategy Blueprint for the establishment of an atrial fibrillation task team is supported by these findings.
- 5.** The OSN should continue its collaboration with the Ontario Telemedicine Network to improve access to Telestroke services across the province and consider ways to evaluate Telestroke outcomes in the various care settings.

Improve access to secondary prevention clinics for TIA patients

National Best Practices⁷

Patients who present with symptoms suggestive of minor stroke or transient ischemic attack **must undergo a comprehensive evaluation** to confirm the diagnosis and begin treatment to reduce the risk of major stroke as soon as is appropriate to the clinical situation.

Patients with transient ischemic attack or non-disabling stroke and internal carotid artery stenosis (narrowing) of 70–99% should be offered **carotid endarterectomy within two weeks of the attack or stroke**, unless contraindicated.

Findings

Access: Significantly more patients are accessing stroke prevention clinics; however, inpatient admission rates for transient ischemic attack are unchanged.



In 2010/11, almost three of every four patients (72.6%) with transient ischemic attack (TIA) were referred to stroke secondary prevention clinics following an emergency department visit; this was an improvement from 62.3 % of patients in 2008/09 ($p \leq 0.0001$).



In 2010/11, almost one in five inpatient admissions (17.8%) was for TIA, a stable trend since 2003/04. Annually, this represented over 2,500 potentially avoidable inpatient stays. District stroke centres had the highest rate of TIA admissions at 20.6%. Admitting TIA patients signals an opportunity to increase access from emergency departments to outpatient clinics offering coordinated and rapid TIA assessment.

TIA Hospitalization: Fewer TIA patients than expected are being readmitted, and for those that are admitted, LOS and ALC is higher than other stroke subtypes.



Median length of stay for TIA patients remained stable at three days. Compared to other stroke subtypes, TIA patients with at least one Alternate Level of Care (ALC) day had the highest proportion of their total acute length of stay considered to be ALC: 66.2%, compared to 56.9% for ischemic stroke patients.



Rates of revisits/readmissions among TIA patients decreased from 2003/04 onward. From 2003/04 to 2009/10, the non-elective stroke/TIA revisit/readmission rate for TIA patients at 30 days dropped from 6.7% to 6.5% ($p=0.02329$); at 90 days, the rate dropped from 8.9% to 8.3% ($p=0.007$). The 30-day all-cause readmission rate for TIA patients decreased from 8.9% in 2003/04 to 7.9% in 2009/10 ($p=0.0002$). These rates are notably lower than the 30-day all-cause readmission rate of 12% reported by Gladstone et al.⁵

Diagnostic Testing: Significantly more patients are receiving diagnostic testing (carotid imaging); however, the trend is lower for females.



In 2010/11, 82.0% of ischemic stroke patients without atrial fibrillation either had carotid imaging done in hospital or were scheduled for imaging following hospital discharge, a marked increase from 56.3% in 2002/03 ($p \leq 0.0001$). Based on data from the 2010/11 Ontario Stroke Audit, the benchmark for carotid imaging being done prior to discharge is 92.8%. This remarkable improvement reflects efforts to implement best practice stroke care.



The inhospital carotid imaging rate was lower for women than for men (77.0% vs. 80.2%; $p = 0.0311$).



The extent of variation in rates of carotid imaging across LHINs decreased from 40.0 percentage points in 2002/03 to 21.4 percentage points in 2010/11.

Surgical Wait Times: Surgical wait times have significantly improved.



The time to a carotid intervention (carotid stenting or carotid endarterectomy) within six months of an initial stroke among adults decreased dramatically between 2003/04 and 2010/11. The median wait time was 51 days in 2003/04, dropping to 18 days in 2010/11 ($p \leq 0.0001$). In some LHINs, patients waited less than 7 days in 2010/11. This dramatic improvement may be associated with the implementation of stroke prevention clinics and increased awareness of surgical best practices.



In 2010/11, regional stroke centres continued to have the shortest wait times for carotid intervention with a median time of 10 days. District stroke centres had a median wait time of 22 days compared to 26 days at non-designated centres. The higher rate at district stroke centres is unexpected and should be monitored closely.

Readmission Rates: Ninety-day unplanned revisits/readmissions have decreased.



The ninety-day unplanned revisit/readmission rate for adult stroke or TIA decreased from 7.0% in 2003/04 to 6.6% in 2009/10 ($p = 0.007$). Rates of unplanned stroke-related revisits/readmission at 90 days varied from 5.8% to 8.1% across LHINs in 2009/10. There was minimal change in the provincial 30-day unplanned revisit/readmission rate for adult stroke or TIA: 5.0% in 2003/04 and 4.9% in 2009/10.

Recommendations

1. Continued effort is needed to ensure timely carotid artery imaging and prompt surgeon referral. The longer time to carotid intervention for patients at district stroke centres needs to be improved upon. The OSN needs to continue its efforts to understand the prolonged delayed to carotid intervention among patients seen at district stroke centres despite these centres having 80% of patients receiving imaging while in hospital.
2. Expanded accessibility to existing secondary prevention clinics and opening more clinics may further reduce hospital readmission rates for stroke.
3. Almost one in five inpatient stays were for TIA, a level that has remained consistent over time despite an increase in the number of secondary stroke prevention clinics in Ontario. These findings provide further support for the OSN-directed research call for an examination of the management of TIA patients across the province and for the OSN's Secondary Prevention and Acute Care Subcommittee identifying TIA as a priority. The findings also support the OSN's decision to conduct an audit of all secondary stroke prevention clinics in the province to evaluate best practice stroke/TIA care, as well as the clinics' effectiveness in reducing recurrent strokes/TIAs.
4. All individuals with mild stroke who are not admitted to hospital should be followed up in secondary prevention clinics, as the time of highest risk for major stroke is within 48 hours after the event.

Improve stroke inpatient access to stroke unit care

Best Practice

Acute stroke patients should be cared for by a team of experts in stroke, preferably in a special dedicated unit. Expert care results in reduced complications and decreased death and disability.

Findings

Readmissions and Mortality: Significantly fewer Ontarians are dying after a stroke.



The age- and sex-adjusted rate of all-cause non-elective readmissions following stroke/TIA at 30 days decreased from 8.8% in 2003/04 to 8.0% in 2009/10 ($p=0.0002$). Rates of all-cause non-elective readmissions at 30 days varied across LHINs, ranging from 5.6% to 9.6% in 2009/10. The extent of variation across LHINs decreased from 4.6 to 4.0 percentage points between 2003/04 and 2009/10.



Ontario's risk-adjusted in-hospital stroke/TIA mortality rate decreased from 14.4% in 2003/04 to 11.4% in 2010/11 ($p=0.0002$). District stroke centres had the lowest in-hospital mortality rates (10.4%), followed by regional (11.8%) and non-designated centres (12.8%). This supports the best practice that stroke/TIA patients have better immediate outcomes when cared for within designated stroke centres. Efforts to implement stroke unit care and reduce complications seem to be having an effect in reducing the in-hospital mortality rate.



The risk-adjusted all-cause mortality rate for adults within 30 days of inpatient discharge for stroke/TIA decreased from 16.0% in 2003/04 to 14.3% in 2009/10 ($p<0.0001$).



Variation in the risk-adjusted in-hospital mortality rate ranged from 8.5% to 15.0% across LHINs in 2009/10. The reasons for this variation should be explored.

Neuroimaging: Significantly more patients are receiving required diagnostic testing.



In 2010/11, 89.6% of patients underwent neuroimaging within 24 hours of hospital arrival, a significant improvement from 47.4% in 2002/03 ($p \leq 0.0001$). Regional stroke centres had the highest rate of inpatient neuroimaging prior to discharge (99.7%), followed by district stroke centres (99.5%), non-designated centres (98.1%), and Telestroke hospitals that were not considered district stroke centres (96.2%); ($p < 0.0001$). The benchmark for neuroimaging to be done within 24 hours of hospital arrival is 97.7%, based on data from the 2010/11 Ontario Stroke Audit.



In addition, the variation in neuroimaging across the LHINs decreased from 24 percentage points in 2008/09 to 19 percentage points in 2010/11.

Stroke Unit Access: There has been significant improvement in the proportion of patients receiving best practice care in stroke units.



In 2010/11, over half (53.8%) of stroke patients in Ontario were admitted to designated stroke centres, a 22.0% relative increase from 2003/04. This development is related to efforts across the province to increase access to stroke centres, the facilities where patients are more likely to receive best practice stroke care.



In 2010/11, 38.3% of patients admitted to hospital with stroke or TIA spent some part of their hospital stay in a stroke unit—an improvement from 30.3% in 2008/09, 18.6% in 2004/05 and 2.7% in 2002/03 and one that was seen across all hospital types and in virtually all regions ($p < 0.0001$). The benchmark is 87.5%, based on data from the 2010/11 OSA. There was little difference in rates of admission to stroke units by sex: 38.6% of women and 37.9% of men were admitted. Stroke unit access was equivalent at regional and district stroke centres, whereas less than one in 10 patients (7.2%) admitted to non-designated stroke centres received stroke unit care.



Provincially, 64.8% of stroke patients admitted to hospital in 2010/11 underwent screening for dysphagia (a swallowing disorder), an increase from 47.9% in 2002/03 ($p \leq 0.0001$) and a modest increase from 62.3% in 2008/09. The benchmark is 83.7%, based on data from the 2010/11 OSA. Improvements in screening for dysphagia were observed for all hospital types. In 2010/11, dysphagia screening rates were highest at district stroke centres (74.7%), followed by regional stroke centres (69.4%) and non-designated centres (56.8%).



Unfortunately, there was no evidence of a corresponding decline in the inpatient pneumonia rate across hospital designations. In-hospital pneumonia rates increased from 1.9% in 2003/04 to 2.1% in 2010/11. However, a rate of 2.1% is much lower than rates reported in the literature.^{8,9}

Recommendations

1. The data support the view that patients admitted to designated stroke centres have better outcomes in relation to rates of thrombolysis administration, neuroimaging, dysphagia screening, readmissions, inhospital mortality, and having a confirmed diagnosis at discharge. Efforts to increase access to care at specialized stroke centres should continue.
2. The findings support OSN's recent call for research proposals to further investigate the existence of a dose-response relationship for stroke unit care, and to compare outcomes of patients admitted to stroke units in the regional stroke networks and LHINs with outcomes of similar unadmitted patients.
3. The OSN's support of Health Quality Ontario's "stroke mega-analysis" focusing on stroke unit care will be critical to driving system change in stroke patient care in the province.
4. These findings also support the identification of stroke unit care as a priority by the OSN's Secondary Prevention and Acute Care Subcommittee and its work to develop a stroke unit implementation tool kit.
5. The OSN should continue to support acute hospital participation in Accreditation Canada's Stroke Services Distinction Program as a means of ensuring stroke units are implemented and sustained in this setting.
6. Efforts should continue toward the implementation of best practices for the screening and management of dysphagia.

Improve access to appropriate rehabilitation following acute stroke

National Best Practices⁷

All patients with stroke who are admitted to hospital and who require rehabilitation **should be treated in a comprehensive or rehabilitation stroke unit** by an interdisciplinary team.

Survivors of severe stroke **should be reassessed at regular intervals** for their rehabilitation needs.

People with stroke living in the community who have difficulty with activities of daily living **should have access, as appropriate, to therapy services** to improve or prevent deterioration in these activities.

Findings: Rehabilitation

Inpatient Rehabilitation: There has been significant improvement in the proportion and timeliness of patients accessing rehabilitation; however, the rate is approximately 10% lower than expected, fewer severe stroke patients are being admitted and ALC rates in acute care remain high.



There was a significant improvement in the proportion of stroke patients discharged from acute stroke hospitalization and admitted to inpatient rehabilitation: from 27.7% in 2003/04 to 30.7% in 2010/11 ($p < 0.0001$). The benchmark for this indicator is 42%, based on data from the 2010/11 OSA. Patients admitted to non-designated centres for inpatient acute stroke care were less likely to be discharged to inpatient rehabilitation than those admitted to designated stroke centres (19.4% compared to 26.3% at regional stroke centres and 29.9% at district stroke centres).



Over the eight-year study period, there was a 21.7% relative increase in admissions of moderately disabled patients into inpatient rehabilitation.



A 17.0% relative decrease was observed in admissions for severely disabled patients between 2003/04 and 2010/11. Over the eight years, freestanding inpatient rehabilitation facilities had the most dramatic decrease in admissions of severely disabled patients: from 34.2% in 2003/04 to 26.5% in 2010/11. Yet, the severe stroke patients that did access freestanding inpatient rehabilitation improved faster than those in integrated facilities, as measured by a higher median Functional Independence Measurement (FIM) efficiency score (0.7 vs. 0.6).



In 2010/11, the admission FIM score was 78, compared to 76 in 2003/04. It is generally agreed that the target FIM score for admission to stroke inpatient rehabilitation is in the range of 40 to 80. This also suggests that patients with mild disability were going to inpatient rehabilitation due to a lack of outpatient services and/or pressures on inpatient rehabilitation centres to reduce length of stay.



The median time from stroke onset to admission to an inpatient rehabilitation facility was 13 days in 2003/04, dropping to 10 days in 2010/11 ($p < 0.0001$). The marked regional variation in wait times for rehabilitation admission decreased over the eight years: from an 18-day difference across the LHINs in 2003/04 to a 7-day difference in 2010/11.



The proportion of patients going to long-term care facilities following inpatient rehabilitation decreased from 13.5% in 2003/04 to 9.8% in 2010/11.

Recommendations

1. The OSN's current work in support of the ER/ALC Rehab/CCC Expert Panel should continue. The standards of care identified by the OSN, if implemented, would effectively address access to best practices, thereby reducing ALC days and costs of care while improving patient outcomes. In particular, the development of the OSN's stroke rehabilitation economic analysis and its collaborative work with Health Quality Ontario will provide decision-makers with the tools to support change. The Stroke Rehabilitation Resource Portal will support knowledge transfer of leading provincial models for achieving stroke rehabilitation access to care.
2. The Stroke Reference Group is recommending adoption of the AlphaFIM assessment on day 3 following inpatient admission to facilitate decision-making for access to rehabilitation. The admission FIM score trend should be monitored closely, as there is province-wide adoption of the AlphaFIM.
3. Rehabilitation programs should identify and reduce barriers to admission for patients with severe stroke, as evidence indicates these patients stand to benefit from rehabilitation. Without access to rehabilitation services, they will continue to be a major source of acute care Alternate Level of Care days. Stroke patients in complex continuing care have, on average, 19 acute ALC days compared to 3 such days for patients receiving inpatient rehabilitation.

Findings: Complex continuing care and long-term care

Complex Continuing Care: Patients admitted to CCC have a longer length of stay and do not receive the appropriate intensity of rehabilitation compared to those admitted to inpatient rehabilitation.



Annually, close to 1,200 stroke patients are admitted into CCC following an acute stroke; they stay for a median of 57 days and receive less than 30 minutes of daily rehabilitation therapy (speech, occupational, physical or recreational). For those stroke patients discharged to CCC who do receive rehabilitation, the intensity does not meet the best practice recommendation of three hours per day.



In 2009/10, 28.7% of patients in complex continuing care were discharged to long-term care; this was experienced by only 10.2% of patients in inpatient rehabilitation. It appears that complex continuing care does not achieve the same outcomes as more intense inpatient rehabilitation.

Long-Term Care: The majority of stroke patients in long-term care homes are female. Very limited therapeutic services are offered to patients in long-term care.



In 2009/10, over 600 stroke patients resided in long-term care homes within six months of an acute stroke/TIA inpatient discharge; 20.6% had been residing in long-term care prior to their stroke/TIA. Their median age was 82 years, and almost two of every three residents (63.0%) were women. On average, residents received approximately 5–10 minutes per rehabilitative therapy (occupational, physical or recreational) per day, with physical therapy being the dominant treatment; 61% of residents received, on average, 10 minutes of physical therapy per day.



In 2010/11, patients in long-term care (LTC) homes post-stroke had a higher rate of discharge back into an acute care hospital compared to LTC residents in general: 37.4% vs. 15.3%.

Recommendations

1. The OSN should advance its work with the ER/ALC Rehab/CCC Expert Panel to advocate for the collection of data pertaining to standardized measurements of the intensity of rehabilitation provided (i.e., FIM scores). It is not known how many of the cohort received low-intensity, long-duration rehabilitation services in CCC.
2. The OSN should continue to work with the LTC sector to better understand rehabilitation expectations and trajectories of stroke patients residing in LTC homes and to develop appropriate infrastructure and services to meet the needs and expectations of stroke/TIA patients residing in LTC facilities.

Provide comprehensive data for stroke care delivered outside of the acute care setting

Best Practices in Outcome Measurement⁷

Patients should be regularly assessed throughout their recovery. The acquired data can be used to identify resource needs across the stroke care system.

Findings

Community Care Access Centres



The mean number of rehabilitation services offered by Community Care Access Centres (CCACs) declined over the last three years of the audit, dropping from an average of 4.4 visits in 2007/08 to 3.9 visits in 2009/10. Each rehabilitation therapy decreased by one visit over a six-month period. There was little variation in service intensity across the LHINs. CCAC service intensity was low and likely inadequate to achieve functional changes in those who had difficulty living independently. The median number of rehabilitation services (occupational therapy, physical therapy, speech therapy or social work) per client remained the same over time (three visits in 60 days).



The median time for a CCAC to provide home-based rehabilitation was two weeks from discharge from an acute stroke/TIA hospitalization (15 median days) in 2008/09.



Over the eight-year study period, there was only a 10.5% relative decrease in the proportion of mildly disabled stroke patients admitted to inpatient rehabilitation. The 2010/11 Ontario Stroke Audit revealed a 58.7% relative increase in the proportion of patients discharged to outpatient rehabilitation (4.6% in 2008/09 and 7.3% in 2010/11). There is no data source to validate these findings or determine patient functional improvement or intensity of therapy.



Data sources to evaluate stroke care beyond the acute care sector provide limited and non-comparable measures of functional improvement, making it difficult to evaluate access, appropriateness and outcomes of stroke rehabilitation care and integration back into the community.

Recommendations:

- 1.** The OSN should continue to partner with CIHI and MOHLTC in addressing these data gaps. In addition, the OSN should continue to advocate for inclusion of the AlphaFIM assessment in the provincial Discharge Abstract Database.
- 2.** The OSN should continue to work with the National Ambulatory Care Reporting System to capture data on ambulatory rehabilitation being delivered at inpatient facilities (both acute and rehabilitation).
- 3.** Investment in CCAC rehabilitation services could potentially reduce rates of readmission to hospitals and admission to long-term care homes.
- 4.** The findings of OSN research projects examining the impact of enhanced community-based rehabilitation in the South East and South West LHINs should be reported in order to share the knowledge gained through these initiatives.
- 5.** Future evaluation reports should look at time to CCAC rehabilitation services following an acute stroke hospitalization or inpatient rehabilitation separately to better understand the role of CCAC services in stroke patient rehabilitation.
- 6.** The OSN should advance its work with the ER/ALC Rehab/CCC Expert Panel to advocate for the collection of provincial data on outpatient rehabilitation and intensity of rehabilitation therapy.
- 7.** Standardized measurements of functional independence and intensity of rehabilitation therapy provided across all rehabilitation settings are needed to evaluate the appropriateness and effectiveness of rehabilitation.

List of Exhibits – Adult Stroke

i. Ontario Stroke Audit Hospital and Patient Characteristics

Exhibit i. Hospital characteristics from the Ontario Stroke Audit, 2010/11

Exhibit ii. Patient characteristics from the Ontario Stroke Audit, 2010/11

1. Emergency Department Care

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5. Patient Outcomes

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Findings and Exhibits – Adult Stroke

i. Ontario Stroke Audit Hospital and Patient Characteristics

Exhibit i. Ontario Stroke Audit Hospital Characteristics, 2010/11

Overall, 145 acute care institutions were eligible to participate in the 2010/11 Ontario Stroke Audit; only one low-volume hospital declined participation. Two of the institutions were paediatric hospitals. Of the 142 non-paediatric hospitals included in this analysis, 45 (31.7%) were low volume (less than 33 adult patients per year), 30 (21.1%) were medium volume (33–99 adult patients), and 67 (47.2%) were high volume (100 or more adult patients). The majority of institutions (77.0%) were large community or academic hospitals. In 2010/11, the Ontario Stroke System had 11 (7.7%) regional stroke centres, 17 (12.0%) district stroke centres, 107 (75.4%) non-designated hospitals, and 7 (4.9%) non-designated hospitals with Telestroke capacity. Twenty-seven hospitals had a stroke unit, 92 had computed tomography on site, and 43 had a stroke prevention clinic.

Thirty-nine percent of hospitals were considered to be in rural areas. Sixty-five percent of hospitals that saw at least 10 stroke/TIA patients per year had neuroimaging capacity, and almost 1 in 5 hospitals (19.0%) had stroke units.

Exhibit ii. Ontario Stroke Audit Patient Characteristics, 2010/11

The mean age at stroke presentation was 72.3 years, and 49.6% of patients were female. Sixty-nine percent were considered independent in their Activities of Daily Living (ADLs), and 5.2% were long-term care residents at the time of their stroke. Fifteen percent of patients lived in rural Ontario.^h

At the time of discharge, 62.2% of patients were considered to have had strokes, 34.2% TIAs, and 3.6% unable to determine. Among those with a diagnosis of stroke, 83.5% had an ischemic stroke, 10.8% an intracerebral hemorrhagic stroke and 4.7% a subarachnoid hemorrhagic stroke.

The prevalence of established stroke risk factors was high: 69.3% of patients had hypertension, 41.8% had hyperlipidemia, 26.4% had diabetes mellitus, 16.4% had atrial fibrillation and 15.0% were current smokers. Additionally, 30.7% had a previous stroke or TIA and 21.1% had a previous myocardial infarction. There were variations in patient characteristics across OSS regions and LHINs.

^h Rural is defined as populations outside of settlements of 1,000 or more residents with a population density of 400 or more inhabitants per square kilometer (Statistics Canada, 2007).

Exhibit i.

Hospital characteristics¹ from the Ontario Stroke Audit, 2010/11

Group/Subgroup	OSS Designation			Annual Stroke Patient Volume			Location		Ontario Hospital Peer Group			Stroke Unit Onsite	CT ³ Onsite	MRI ⁴ Onsite	SPC ⁵ Onsite	Telestroke Capacity ⁶
	Non-designated	Regional stroke centre	District stroke centre	Low (<33)	Medium (33–99)	High (≥100)	Urban	Rural ²	Large community	Small community	Academic					
Ontario	107	11	17	45	30	67	82	58	92	30	18	27	92	55	42	17
Ontario Stroke System Region																
Central East	14	1	4	0	7	12	14	5	16	3	0	5	17	9	6	2
Central South	16	1	3	2	4	14	15	5	12	4	4	3	14	10	6	2
East – Champlain	13	1	1	9	2	6	8	9	6	7	4	2	5	2	4	3
Northeast	13	1	3	12	3	3	6	12	7	10	1	3	6	4	4	5
Northwest	1	1	0	3	1	1	2	3	2	2	1	1	5	1	5	3
South East	7	1	1	2	4	3	4	5	7	1	1	2	7	2	4	1
Southwest	26	1	5	17	7	9	14	19	28	3	2	3	16	9	6	1
Toronto – North & East	3	1	0	0	0	4	4	0	2	0	2	3	4	3	2	0
Toronto – Southeast	3	1	0	0	0	4	4	0	3	0	1	1	4	4	2	0
Toronto – West	4	1	0	0	0	5	5	0	3	0	2	3	7	6	2	0
West GTA	7	1	0	0	2	6	6	0	6	0	0	1	7	5	1	0
Local Health Integration Network																
1. Erie St. Clair	4	0	3	2	1	4	6	1	7	0	0	2	5	4	3	0
2. South West	22	1	2	15	6	5	8	18	21	3	2	1	11	5	3	1
3. Waterloo Wellington	6	0	1	2	1	4	4	3	5	2	0	1	4	2	1	0
4. Hamilton Niagara Haldimand Brant	10	1	2	0	3	10	11	2	7	2	4	2	10	8	5	2
5. Central West	3	0	0	0	0	3	2	0	2	0	0	0	3	2	0	0
6. Mississauga Halton	4	1	0	0	2	3	4	0	4	0	0	1	4	3	1	0
7. Toronto Central	3	3	0	0	0	6	6	0	2	0	4	3	8	8	4	0
8. Central	6	0	1	0	1	6	7	0	5	1	1	5	6	4	5	0
9. Central East	11	0	2	0	4	9	10	3	11	2	0	3	12	8	2	2
10. South East	7	1	1	2	4	3	4	5	7	1	1	2	7	2	4	1
11. Champlain	13	1	1	9	2	6	8	9	6	7	4	2	5	2	4	3
12. North Simcoe Muskoka	4	1	1	0	2	4	4	2	6	0	0	1	6	2	1	0
13. North East	13	1	3	12	3	3	6	12	7	10	1	3	6	4	4	5
14. North West	1	1	0	3	1	1	2	3	2	2	1	1	5	1	5	3

¹ Based on a survey of provincial hospital resources in November 2011; includes only institutions whose records were abstracted in 2010/11 (N=142); excludes two paediatric acute care hospitals (Hospital for Sick Children and Children's Hospital of Eastern Ontario).

² Defined as populations outside of settlements of 1,000 or more residents with a population density of 400 or more inhabitants per square kilometer (Statistics Canada, 2007).

³ Computed tomography scanner

⁴ Magnetic resonance imaging equipment

⁵ Secondary stroke prevention clinic; includes SPCs open at the time of the 2010/11 audit. One SPC has since opened but is not included in this table. Excludes one paediatric SPC.

⁶ Only includes hospitals with Telestroke capacity at the time of the 2010/11 audit. Two sites have subsequently implemented the Telestroke program.

Note:

Royal Victoria Hospital and Health Sciences North are included as regional stroke centres. In previous years, they were included as district stroke centres due to their enhanced district stroke centre designation.

Exhibit ii.

Patient characteristics from the Ontario Stroke Audit, 2010/11

Group/Subgroup	Provincial Total ¹ (n)	Audit Sample (n)	Mean Age (years)	Median Age (years)	Long-Term Care Residence ² n (%)	Independent ^{2,3} n (%)	Rural Residence ² n (%)	Comorbidities ² , n (%)						
								Prior stroke/TIA	Diabetes	Hypertension	Current smoker	Hyperlipidemia	Atrial fibrillation	Myocardial infarction
Ontario	19,570	13,250	72.3	74.2	955 (5.2)	12,620 (69.0)	2,708 (14.8)	5,608 (30.7)	4,836 (26.4)	12,676 (69.3)	2,750 (15.0)	7,652 (41.8)	2,998 (16.4)	2,211 (12.1)
Female	9,713	6,574	74.5	76.9	643 (7.2)	5,605 (62.5)	1,263 (14.1)	2,820 (31.5)	2,200 (24.6)	6,456 (72.0)	975 (10.9)	3,587 (40.0)	1,687 (18.8)	871 (9.7)
Male	9,856	6,676	70.3	71.6	312 (3.3)	7,015 (75.2)	1,444 (15.5)	2,787 (29.9)	2,636 (28.3)	6,219 (66.7)	1,775 (19.0)	4,065 (43.6)	1,310 (14.0)	1,340 (14.4)
Ontario Stroke System Region														
Central East	2,899	1,960	72.9	74.9	110 (4.1)	1,915 (71.0)	498 (18.5)	808 (30.0)	654 (24.3)	1,727 (64.1)	352 (13.0)	1,040 (38.6)	415 (15.4)	300 (11.1)
Central South	3,526	2,164	72.6	74.7	188 (5.5)	2,258 (66.1)	214 (6.3)	1,027 (30.1)	843 (24.7)	2,251 (65.9)	489 (14.3)	1,201 (35.2)	557 (16.3)	356 (10.4)
East – Champlain	1,843	1,357	72.5	74.5	111 (6.5)	1,025 (59.8)	399 (23.3)	551 (32.1)	422 (24.6)	1,183 (69.0)	303 (17.7)	741 (43.2)	331 (19.3)	297 (17.4)
Northeast	1,034	929	71.7	73.5	48 (4.7)	751 (74.9)	318 (31.7)	317 (31.6)	290 (28.9)	767 (76.4)	171 (17.1)	506 (50.5)	155 (15.5)	127 (12.7)
Northwest	442	442	72.2	73.2	18 (4.3)	340 (81.3)	124 (29.8)	118 (28.2)	124 (29.7)	257 (61.5)	71 (17.0)	120 (28.7)	74 (17.7)	30 (7.2)
South East	831	659	73.5	75.1	27 (3.6)	561 (73.7)	343 (45.0)	234 (30.7)	205 (26.9)	514 (67.5)	143 (18.8)	281 (36.8)	121 (15.9)	101 (13.3)
Southwest	2,993	2,283	72.5	74.3	126 (4.4)	1,893 (66.4)	697 (24.4)	983 (34.5)	769 (27.0)	2,024 (71.0)	471 (16.5)	1,314 (46.1)	471 (16.5)	394 (13.8)
Toronto – North & East	1,339	812	73.3	75.2	81 (6.5)	882 (71.5)	8 (0.7)	335 (27.2)	292 (23.7)	874 (70.8)	146 (11.8)	558 (45.2)	178 (14.5)	147 (11.9)
Toronto – Southeast	1,102	634	69.3	70.9	51 (5.2)	727 (73.7)	9 (1.0)	277 (28.1)	277 (28.2)	727 (73.8)	181 (18.3)	458 (46.4)	151 (15.3)	92 (9.3)
Toronto – West	1,334	763	72.4	74.6	81 (7.1)	517 (45.2)	9 (0.8)	337 (29.5)	328 (28.7)	829 (72.5)	190 (16.6)	497 (43.5)	186 (16.3)	140 (12.3)
West GTA	2,227	1,247	71.5	73.0	114 (5.5)	1,752 (84.6)	88 (4.3)	620 (29.9)	632 (30.5)	1,523 (73.5)	234 (11.3)	937 (45.3)	359 (17.3)	226 (10.9)
Ontario Stroke System Classification														
Regional stroke centre	5,781	5,489	70.5	72.1	226 (4.4)	3,799 (73.3)	422 (8.2)	1,501 (28.9)	1,316 (25.4)	3,591 (69.3)	862 (16.6)	2,343 (45.2)	986 (19.0)	649 (12.5)
District stroke centre	4,138	4,106	73.1	75.0	195 (4.9)	2,724 (68.2)	555 (13.9)	1,282 (32.1)	1,014 (25.4)	2,812 (70.4)	611 (15.3)	1,701 (42.6)	668 (16.7)	526 (13.2)
Non-designated	9,285	3,289	73.1	74.8	511 (5.8)	5,864 (66.9)	1,578 (18.0)	2,725 (31.1)	2,396 (27.3)	6,063 (69.1)	1,226 (14.0)	3,483 (39.7)	1,301 (14.8)	1,005 (11.5)
Telestroke ⁴	366	366	73.4	74.7	22 (6.5)	233 (68.7)	152 (45.1)	100 (29.5)	110 (32.4)	210 (61.9)	51 (15.0)	124 (36.6)	42 (12.4)	31 (9.1)
Local Health Integration Network														
1. Erie St. Clair	1,254	1,021	72.5	74.3	60 (5.0)	760 (63.0)	103 (8.5)	430 (35.6)	348 (28.8)	885 (73.3)	201 (16.7)	573 (47.5)	197 (16.3)	180 (14.9)
2. South West	1,739	1,262	72.6	74.3	66 (4.0)	1,133 (68.9)	594 (36.1)	553 (33.6)	421 (25.6)	1,138 (69.2)	270 (16.4)	741 (45.1)	274 (16.7)	214 (13.0)
3. Waterloo Wellington	1,001	643	72.3	74.7	41 (4.2)	729 (73.4)	115 (11.6)	311 (31.3)	223 (22.5)	593 (59.7)	120 (12.1)	276 (27.8)	125 (12.6)	88 (8.8)
4. Hamilton Niagara Haldimand Brant	2,525	1,521	72.8	74.7	147 (6.1)	1,529 (63.2)	99 (4.1)	716 (29.6)	620 (25.6)	1,658 (68.5)	369 (15.3)	925 (38.2)	432 (17.8)	268 (11.1)
5. Central West	804	245	70.2	71.5	36 (4.7)	666 (86.4)	63 (8.1)	230 (29.8)	279 (36.2)	594 (77.0)	85 (11.1)	338 (43.8)	115 (14.9)	72 (9.4)
6. Mississauga Halton	1,423	1,002	72.1	73.8	77 (6.0)	1,085 (83.5)	25 (2.0)	390 (30.0)	353 (27.1)	928 (71.5)	148 (11.4)	599 (46.1)	244 (18.8)	153 (11.8)
7. Toronto Central	2,214	1,736	70.5	72.3	97 (5.0)	1,318 (67.9)	14 (0.7)	554 (28.6)	513 (26.5)	1,377 (71.0)	339 (17.5)	882 (45.5)	306 (15.8)	218 (11.2)
8. Central	1,666	764	73.0	75.1	83 (5.5)	913 (61.1)	33 (2.2)	363 (24.3)	344 (23.1)	971 (65.0)	159 (10.6)	576 (38.6)	227 (15.2)	152 (10.2)
9. Central East	2,068	1,196	73.4	75.0	120 (6.3)	1,290 (67.3)	210 (11.0)	563 (29.4)	506 (26.4)	1,314 (68.6)	247 (12.9)	793 (41.4)	296 (15.4)	226 (11.8)
10. South East	831	659	73.5	75.1	27 (3.6)	561 (73.7)	343 (45.0)	234 (30.7)	205 (26.9)	514 (67.5)	143 (18.8)	281 (36.8)	121 (15.9)	101 (13.3)
11. Champlain	1,843	1,357	72.5	74.5	111 (6.5)	1,025 (59.8)	399 (23.3)	551 (32.1)	422 (24.6)	1,183 (69.0)	303 (17.7)	741 (43.2)	331 (19.3)	297 (17.4)
12. North Simcoe Muskoka	726	473	73.1	74.1	24 (3.4)	520 (73.4)	268 (37.9)	278 (39.2)	187 (26.4)	496 (70.0)	124 (17.5)	300 (42.4)	101 (14.3)	84 (11.8)
13. North East	1,034	929	71.7	73.5	48 (4.7)	751 (74.9)	318 (31.7)	317 (31.6)	290 (28.9)	767 (76.4)	171 (17.1)	506 (50.5)	155 (15.5)	127 (12.7)
14. North West	442	442	72.2	73.2	18 (4.3)	340 (81.3)	124 (29.8)	118 (28.2)	124 (29.7)	257 (61.5)	71 (17.0)	120 (28.7)	74 (17.7)	30 (7.2)

Group/Subgroup	Stroke Diagnosis, n (%)			Final Stroke Type, n (%)			
	Stroke	Transient ischemic attack	Unable to determine	Intracerebral hemorrhage	Ischemic stroke	Subarachnoid hemorrhage	Unable to determine
Ontario	12,171 (62.2)	6,697 (34.2)	702 (3.6)	1,316 (10.8)	10,158 (83.5)	577 (4.7)	119 (1.0)
Female	5,945 (61.2)	3,371 (34.7)	398 (4.1)	570 (9.6)	4,955 (83.4)	353 (5.9)	66 (1.1)
Male	6,226 (63.2)	3,326 (33.7)	304 (3.1)	746 (12.0)	5,203 (83.6)	224 (3.6)	53 (0.9)
Ontario Stroke System Region							
Central East	1,599 (55.2)	1,113 (38.4)	187 (6.4)	168 (10.5)	1,390 (86.9)	16 (1.0)	25 (1.6)
Central South	2,096 (59.4)	1,408 (39.9)	22 (0.6)	247 (11.8)	1,742 (83.1)	90 (4.3)	17 (0.8)
East – Champlain	1,141 (61.9)	640 (34.7)	62 (3.4)	92 (8.0)	963 (84.4)	67 (5.8)	20 (1.7)
Northeast	570 (55.1)	455 (44.0)	9 (0.9)	55 (9.6)	473 (83.0)	22 (3.8)	20 (3.6)
Northwest	288 (65.2)	140 (31.7)	14 (3.2)	29 (10.1)	249 (86.5)	10 (3.5)	-
South East	541 (65.1)	238 (28.6)	53 (6.3)	61 (11.3)	453 (83.7)	17 (3.1)	10 (1.9)
Southwest	1,778 (59.4)	1,165 (38.9)	50 (1.7)	142 (8.0)	1,523 (85.7)	91 (5.1)	21 (1.2)
Toronto – North & East	930 (69.5)	344 (25.7)	64 (4.8)	118 (12.6)	772 (83.0)	41 (4.4)	-
Toronto – Southeast	753 (68.3)	337 (30.6)	12 (1.1)	71 (9.5)	571 (75.8)	105 (13.9)	7 (0.9)
Toronto – West	964 (72.3)	231 (17.3)	138 (10.4)	127 (13.1)	785 (81.4)	52 (5.4)	-
West GTA	1,511 (67.8)	626 (28.1)	90 (4.1)	127 (13.1)	785 (81.4)	52 (5.4)	-
Ontario Stroke System Classification							
Regional stroke centre	4,135 (71.5)	1,508 (26.1)	138 (2.4)	558 (13.5)	3,101 (75.0)	459 (11.1)	17 (0.4)
District stroke centre	2,528 (61.1)	1,510 (36.5)	100 (2.4)	254 (10.0)	2,225 (88.0)	42 (1.7)	7 (0.3)
Non-designated	5,302 (57.1)	3,545 (38.2)	438 (4.7)	486 (9.2)	4,648 (87.7)	75 (1.4)	93 (1.8)
Telestroke ⁴	206 (56.3)	134 (36.6)	26 (7.1)	18 (8.7)	184 (89.3)	**	**
Local Health Integration Network							
1. Erie St. Clair	700 (55.8)	530 (42.3)	24 (1.9)	53 (7.5)	621 (88.7)	23 (3.3)	**
2. South West	1,077 (62.0)	635 (36.5)	26 (1.5)	89 (8.3)	902 (83.8)	68 (6.3)	18 (1.7)
3. Waterloo Wellington	547 (54.6)	451 (45.1)	**	47 (8.6)	488 (89.2)	**	8 (1.4)
4. Hamilton Niagara Haldimand Brant	1,549 (61.4)	957 (37.9)	19 (0.8)	200 (12.9)	1,255 (81.0)	86 (5.5)	9 (0.6)
5. Central West	503 (62.5)	279 (34.7)	23 (2.8)	79 (15.7)	414 (82.4)	10 (2.0)	-
6. Mississauga Halton	1,008 (70.9)	347 (24.4)	68 (4.8)	129 (12.8)	823 (81.6)	56 (5.6)	-
7. Toronto Central	1,567 (70.8)	551 (24.9)	96 (4.3)	206 (13.2)	1,183 (75.5)	178 (11.4)	-
8. Central	1,016 (61.0)	496 (29.8)	154 (9.2)	102 (10.0)	890 (87.6)	18 (1.8)	7 (0.7)
9. Central East	1,267 (61.3)	663 (32.1)	137 (6.6)	139 (10.9)	1,105 (87.2)	15 (1.2)	9 (0.7)
10. South East	541 (65.1)	238 (28.6)	53 (6.3)	61 (11.3)	453 (83.7)	17 (3.1)	10 (1.9)
11. Champlain	1,141 (61.9)	640 (34.7)	62 (3.4)	92 (8.0)	963 (84.4)	67 (5.8)	20 (1.7)
12. North Simcoe Muskoka	396 (54.5)	315 (43.5)	15 (2.0)	36 (9.2)	340 (86.0)	**	16 (4.0)
13. North East	570 (55.1)	455 (44.0)	9 (0.9)	55 (9.6)	473 (83.0)	22 (3.8)	20 (3.6)
14. North West	288 (65.2)	140 (31.7)	14 (3.2)	29 (10.1)	249 (86.5)	10 (3.5)	-

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged ≥18 years admitted to an emergency department or inpatient care at an acute care facility in Ontario for stroke or transient ischemic attack.

- ¹ Results were weighted based on hospital volume and the number of charts sampled.
- ² Among patients with a final diagnosis of stroke or transient ischemic attack (TIA) excluding subarachnoid hemorrhage.
- ³ Independent refers to a patient who is fully independent in all activities of daily living and instrumental activities of daily living.
- ⁴ Non-designated centres (n=7). The remaining 10 Telestroke sites are district stroke centres.

** Cell value suppressed for reasons of privacy and confidentiality.

Note:

Cells in which there were no reported/available data are marked with a hyphen (-).

1. Emergency Department Care

Emergency Department Admissions

Exhibit 1.1: In 2010/11, 19,703 adults with a median age of 75 years visited Ontario emergency departments (EDs) with the main problem considered to be stroke/TIA. Women represented 50.7% of these ED visits. The annual incidence of ED visits for stroke/TIA among 46–65 year olds increased 3.7% over the study period, rising from 21.8% in 2003/04 to 25.5% in 2010/11 ($p < 0.0001$). From 2003/04 to 2010/11, there was also a 2.7% increase in the prevalence of stroke/TIA ED visits in the over-85 age group, and a 6.4% decrease in the 66–85 year age group ($p < 0.0001$). No differences by patient sex were observed in these trends, but women were five years older than men at time of presentation (median years, 77 vs. 72). Over half (54.4%) of the women with stroke/TIA ED visits were over 75 years of age compared to 40.7% of men.

Exhibit 1.2: Provincially, there was a decrease in the number of stroke-related ED visits per 1,000 population, dropping from 2.0 in 2003/04 to 1.9 in 2010/11 ($p < 0.0001$). There was modest variation in rates across Ontario, but the majority of LHINs saw a decline in stroke/TIA-related ED visits over time. The Mississauga Halton LHIN experienced a consistent decline (from 1.8 to 1.6 per 1,000; $p < 0.0001$) and in 2010/11 had the lowest rates of stroke/TIA-related ED visits among the LHINs. The Erie St. Clair and North West LHINs consistently had the highest rates of stroke/TIA-related ED visits.

Exhibit 1.3: Provincially, there was little change in the proportion of patients arriving at the ED of designated stroke centres from 2008/09 to 2010/11. The percentage of stroke/TIA related visits at designated stroke centres increased from 39.9% in 2003/04 to 47.2% in 2008/09 and remained relatively stable at 48.2% in 2009/10 and 48.5% in 2010/11. Overall, 43.1% of patients seen in the ED with a possible diagnosis of stroke/TIA were discharged without a confirmed diagnosis (“unable to determine” stroke type). Surprisingly, the prevalence of this diagnostic code was similar at regional stroke centres and non-designated stroke centres (45.2% and 44.4%, respectively). The prevalence of this code was lower at district stroke centres (36.9% in 2010/11) and decreased steadily from 2008/09 to 2010/11, whereas the prevalence at regional stroke centres did not change in that time period.

Conclusions

The increase in the proportion of ED visits for stroke/TIA in the 46–65 year age group (referred to as “baby boomers,” representing the largest proportion of the Ontario population) emphasizes the need to address modifiable risk factors such as hypertension, obesity, diabetes, hyperlipidemia and tobacco smoking in this cohort. In 2010/11, the oldest members of the baby boomer cohort turned 65 years of age. Over the next 10 years, an increase may be observed in the 66–75 year age group as more baby boomers enter this segment of the population. We also observed an increase in the proportion of stroke/TIA visits among those over 85 years of age, as life expectancy continues to increase and the likelihood of experiencing a stroke increases. However, it is unclear whether the observed trends are solely reflective of the aging population or involve other contributing factors.

Between 2003/04 and 2010/11, there was a 6.5% relative decrease in rates of ED visits for stroke/TIA. Stroke prevention efforts may be having an effect overall; however, the variation across the LHINs suggests a need for targeted campaigns to address risk factor modification in different regions. According to the 2010/11 Ontario Stroke Audit, the Champlain LHIN had the highest rate of atrial fibrillation (19.3%), the Central West LHIN had the highest prevalence of diabetes and hypertension (36.2% and 77.0%, respectively), and the North East LHIN had the highest rate of hyperlipidemia (50.5%)—all known risk factors for stroke.

Recommendations

The OSS regions should continue to work with their health promotion partners to identify strategies targeted at the relevant modifiable risk factors for stroke. In its 2011/12–2015/16 strategic plan, the OSN established a 12% relative reduction in ED stroke/TIA-related visits as its target; this is almost double the decrease observed from 2003/04 to 2010/11. The OSN should continue to work with its partners on a provincial strategy that focuses on primary prevention initiatives to reduce the risk of all vascular diseases.

The quality of stroke administrative data is improving; however, further efforts should be made to eliminate the “unable to determine” stroke type as it is important to know the cause of stroke, and almost all (90%) of suspected stroke/TIA patients receive diagnostic imaging within 24 hours of hospital arrival (based on 2010/11 OSA data). Improvements in adherence to best practices in diagnosis strategies and health records data-capture procedures are recommended. The OSS regions need to inform hospitals within their regions

of the Canadian Institute for Health Information online coding course, Different Codes for Different Strokes. Health records staff at the Grand River District Stroke Centre participated in this course and observed a dramatic decline in the prevalence of the “unable to determine” stroke type diagnosis code.

Arrival by Ambulance

Exhibit 1.4: In 2010/11, 57.1% of stroke/TIA patients arrived at hospital by ambulance compared to 52.8% in 2003/04 ($p < 0.0001$). There was minimal change from 2008/09 to 2010/11, which may reflect the absence of the televised public awareness stroke signs and symptoms campaign. More women than men arrived by ambulance (59.7% vs. 54.4%). Regional and district stroke centres continued to have the highest rates of patient arrival by ambulance (66.4% and 63.6% in 2010/11, respectively) compared to non-designated centres (49.4%). There was a reduction in the amount of variation across LHINs (a 15.9% range in 2003/04 compared to 9.8% in 2010/11).

Conclusions

Over forty percent of stroke/TIA patients (42.9%) did not arrive at hospital by ambulance, with little change from 2008/09 to 2010/11. While high, 47.7% of acute myocardial infarction patients did not arrive by ambulance.¹ The variation in ambulance transportation rates across LHINs decreased by 6% over the eight-year study period; this may reflect the periodic airing of television public awareness campaigns that started in 2003, as well as the OSS implementation of the paramedic prompt card that provides Emergency Medical Services staff with standardized criteria to guide transportation of patients to designated stroke centres. The lack of change from 2008/09 to 2010/11 corresponds to the period of time when the Heart and Stroke Foundation of Ontario’s warning signs campaign was not airing on television.

Recommendations

The OSN will continue to monitor this indicator in light of a commitment made by the Ministry of Health and Long-Term Care to the Heart and Stroke Foundation of Ontario to fund further advertising in 2010/11.

The dramatic improvement observed in the proportion of stroke/TIA patients arriving at designated stroke hospitals by ambulance may reflect the pre-hospital medical redirect/bypass protocols established by the OSS regions since 2003/04.

Ongoing evaluation of this indicator is recommended to ensure stroke patients are going to facilities where best practice stroke care can be delivered.

Emergency Department Arrival Time

Exhibit 1.5: Overall, in 2010/11, 42.3% of patients arrived at hospital within the recommended treatment window compared to 35.2% in 2008/09. The dramatic improvement observed from 2008/09 is related to the increase in the treatment window time (the time from stroke symptom onset to when tissue plasminogen activator [tPA] can be safely delivered) based on the ECASS II trial results released in September 2008. In December 2008, the Canadian Stroke Strategy 2008 Best Practice Guidelines revised the treatment window from 2.5 hours to 3.5 hours to reflect the ECASS II results.¹⁰ The OSS revised the paramedic prompt card to reflect this increase, with province-wide implementation starting in the spring of 2011.

The results for the 2010/11 Ontario Stroke Audit are population-based to reflect the fact that hospitals do not influence how quickly patients respond to their symptoms and call 911 or go to hospital for treatment. There were variations in rates across the LHINs, ranging from just over one in three residents (36.0%) in the Central LHIN arriving within 3.5 hours of symptom onset to just over half of residents (51.1%) in the South West LHIN.

Conclusions

With the one-hour increase in the treatment window for tPA administration, the proportion of ischemic stroke patients arriving within the treatment window increased to 42.3% in 2010/11. When we analyzed the proportion of patients arriving within the 2.5 hour treatment window in 2010/11, the proportion was 36.3% (data not shown), a 1% increase from 2008/09. The benchmark rate is 52.0%, based on data from the 2010/11 OSA.

The observed increase in patients seeking medical attention should not be viewed as an increased awareness of stroke warning signs and symptoms nor as an impact of the revised stroke prompt card, as during 2010/11, the stroke warning signs advertising campaign was not broadcast on television nor was the revised paramedic prompt card fully implemented throughout the OSS.

¹ Based on NACRS data identifying the main problem as AMI via ICD-10-CA code I21.

Recommendations

The OSN in partnership with the Ontario Heart and Stroke Foundation needs to advocate for increasing the penetration of the stroke public awareness campaigns. In particular, certain regions may need to consult with relevant ethnic groups in order to improve the effectiveness of these public campaigns.

Regions with low rates of ED arrivals need to consider the ethnic composition of their populations and develop campaigns accordingly. The Heart and Stroke Foundation of Canada needs to consider ways of increasing the penetration of its stroke warning signs television campaign.

Neuroimaging Rates

Exhibit 1.6: In 2010/11, 89.6% of patients underwent neuroimaging within 24 hours of hospital arrival, a dramatic improvement from 47.4% in 2002/03 ($p < 0.0001$) and one observed in all LHINs. The benchmark rate is 97.7%, based on data from the 2010/11 OSA. There was no statistically significant difference in neuroimaging rates by sex within 24 hours ($p = 0.54$), but more men received neuroimaging before discharge ($p = 0.0004$). Neuroimaging rates varied by 16.5% across OSS regions in 2010/11; however, these variations were less pronounced than in previous years (there was a 23.0% variation in 2008/09). Neuroimaging rates were high across all hospital designations: Regional stroke centres had a pre-discharge inpatient imaging rate of 99.7%, followed by district stroke centres, non-designated centres and non-designated Telestroke hospitals with rates of 99.5%, 98.1% and 96.2%, respectively.

Conclusion

Stroke/TIA patients were more likely to undergo neuroimaging within 24 hours of presentation to the emergency department at designated stroke centres than at other hospital types.

Recommendations

Patients should be cared for in designated stroke centres to ensure a timely diagnosis. The OSN is considering retiring neuroimaging as an indicator of acute stroke care due to the high level of performance (more than 98% of all suspected stroke/TIA patients in Ontario received neuroimaging prior to discharge).

tPA Administration

Exhibit 1.7: Acute thrombolytic therapy in the form of tissue plasminogen activator (tPA) was administered to 1 in 10 ischemic stroke patients in Ontario (9.6%). The provincial thrombolysis administration rate for ischemic stroke patients presenting to hospital within the treatment window (within 3.5 hours of stroke onset in 2010/11 and within 2.5 hours in prior years) and without contraindications for tPA, increased from 10.8% in 2002/03 to 29.6% in 2008/09 to 32.4% in 2010/11 ($p \leq 0.0001$). The 2010/11 benchmark for tPA among patients arriving within 3.5 hours of symptom onset without contraindications is 61.2%, based on OSA 2010/11 data for hospitals with the capacity to deliver tPA.

A higher proportion of women received tPA compared to men (33.0% vs. 31.7%). Rates of tPA administration were highest at regional stroke centres (47.4%), followed by district stroke centres and Telestroke centres (both 41.8%) and non-designated centres (3.8%).

The median door-to-needle time for tPA administration was 70.1 minutes, an improvement from 82.6 minutes in 2004/05, but still above the benchmark of 60 minutes. Compared to men, a greater proportion of women were administered tPA in less than 60 minutes from arrival at hospital (36.8% vs. 39.4%). Five LHINs (South East, Champlain, Central East, Hamilton Niagara Haldimand Brant and Waterloo Wellington) were able to administer tPA in 60 minutes or less. In 2010/11, Telestroke hospitals delivered tPA the fastest (62.4 minutes), followed by district stroke centres (69.1 minutes) and regional stroke centres (69.4 minutes). Telestroke hospitals also had the greatest proportion of patients receiving tPA within 60 minutes (44.0%). All designations improved from 2004/05 onward but were still above the benchmark of 60 minutes, and only 2 in 5 patients (38.1%) receiving tPA got it within 60 minutes. Recent data reveal that district stroke centres continue to improve in administering tPA within 60 minutes, although compared to regional stroke centres, the proportion of patients receiving tPA within 60 minutes is lower (40.0% vs. 35.7%).

Conclusions

Within the OSS, we have seen a tripling in the proportion of eligible patients receiving tPA over the past eight years and improvements in door-to-needle time, but continued effort is needed as provincially it is taking over an hour to deliver tPA, and most regions are not achieving the 60-minute benchmark. In Ontario, 9.6% of all ischemic patients received tPA; this is above the national rate of 8% and similar to rates for ischemic stroke patients reported in the international literature.^{11, 12} Ontario delivers tPA within 60 minutes to 38.1% of patients; the national rate is 34%.¹¹

Recommendations

The OSN continues to work to increase access to thrombolysis through the Telestroke program. The OSS regions need to look at local facilities that are achieving the benchmark of 60 minutes and learn from their best practices.

In mid-2011 an Ontario Telestroke Steering Committee was established to provide a forum to identify, plan and monitor provincial initiatives related to Telestroke acute care. In early 2012, the Steering Committee recommended to undertake a Telestroke Program that would consider a plan for the existing tPA delivery model, as well as other acute stroke services.

Exhibit 1.1

Number and percentage of adult patients¹ presenting to the emergency department with stroke or transient ischemic attack, in Ontario and by sex and age group, 2003/04 and 2008/09–2010/11

Characteristic	2003/04	2008/09	2009/10	2010/11
Ontario, n	18,961	19,477	20,003	19,703
Sex, n (%)				
Female	9,600 (50.6)	9,894 (50.8)	10,238 (51.2)	9,990 (50.7)
Male	9,361 (49.4)	9,583 (49.2)	9,765 (48.8)	9,713 (49.3)
Age				
Mean ± SD	72.6 ± 13.3	72.1 ± 13.9	72.3 ± 14.0	72.2 ± 14.0
Median (IQR)	75 (65–82)	75 (63–83)	75 (63–83)	75 (63–83)
Age Group, n (%)				
18–45	793 (4.2)	867 (4.5)	872 (4.4)	851 (4.3)
46–65	4,139 (21.8)	4,862 (25.0)	4,976 (24.9)	5,028 (25.5)
66–75	4,825 (25.4)	4,447 (22.8)	4,446 (22.2)	4,432 (22.5)
76–85	6,449 (34.0)	6,222 (31.9)	6,265 (31.3)	6,011 (30.5)
>85	2,755 (14.5)	3,079 (15.8)	3,444 (17.2)	3,381 (17.2)
Female Age				
Mean ± SD	74.6 ± 13.4	74.1 ± 14.2	74.2 ± 14.3	74.1 ± 14.2
Median (IQR)	77 (68–84)	77 (66–84)	78 (66–85)	77 (65–85)
Female Age Group, n (%)				
18–45	379 (3.9)	428 (4.3)	459 (4.5)	420 (4.2)
46–65	1,686 (17.6)	2,011 (20.3)	2,045 (20.0)	2,105 (21.1)
66–75	2,124 (22.1)	1,969 (19.9)	2,025 (19.8)	2,028 (20.3)
76–85	3,523 (36.7)	3,391 (34.3)	3,391 (33.1)	3,170 (31.7)
>85	1,888 (19.7)	2,095 (21.2)	2,318 (22.6)	2,267 (22.7)
Male Age				
Mean ± SD	70.5 ± 12.9	70.0 ± 13.3	70.3 ± 13.4	70.2 ± 13.6
Median (IQR)	73 (63–80)	72 (61–80)	72 (61–80)	72 (61–81)
Male Age Group, n (%)				
18–45	414 (4.4)	439 (4.6)	413 (4.2)	431 (4.4)
46–65	2,453 (26.2)	2,851 (29.8)	2,931 (30.0)	2,923 (30.1)
66–75	2,701 (28.9)	2,478 (25.9)	2,421 (24.8)	2,404 (24.8)
76–85	2,926 (31.3)	2,831 (29.5)	2,874 (29.4)	2,841 (29.2)
>85	867 (9.3)	984 (10.3)	1,126 (11.5)	1,114 (11.5)

Data source: Canadian Institute for Health Information, National Ambulatory Care Reporting System (NACRS), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years discharged from an emergency department with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack.

Exclusion criteria: Patients with a scheduled emergency department visit.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

Note:

Excludes all NACRS records with ICD codes that include the prefix "Q" (suspected, questionable diagnoses) starting in 2008/09.

SD = standard deviation; IQR = interquartile range (25th–75th percentile)

Exhibit 1.2

Age- and sex-adjusted rates of emergency department visits by adult stroke or transient ischemic attack patients¹ per 1,000 LHIN population, in Ontario and by Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	2003/04	2008/09	2009/10	2010/11
	Emergency Department Visit Rates, % (n)			
Provincial Rate²	2.0 (18,935)	1.9 (19,461)	1.9 (19,982)	1.9 (19,686)
Standardized Rate³	2.0 (18,935)	1.8 (19,461)	1.8 (19,982)	1.7 (19,686)
Local Health Integration Network²				
1. Erie St. Clair	2.4 (1,236)	2.3 (1,234)	2.5 (1,361)	2.3 (1,274)
2. South West	1.7 (1,348)	1.9 (1,551)	2.1 (1,708)	1.9 (1,613)
3. Waterloo Wellington	1.9 (921)	1.9 (995)	1.9 (1,051)	1.9 (1,047)
4. Hamilton Niagara Haldimand Brant	2.0 (2,409)	1.9 (2,396)	1.9 (2,426)	2.0 (2,502)
5. Central West	2.0 (812)	1.9 (902)	1.8 (890)	1.8 (941)
6. Mississauga Halton	1.8 (1,067)	1.6 (1,171)	1.7 (1,244)	1.6 (1,181)
7. Toronto Central	1.8 (1,604)	1.8 (1,601)	1.8 (1,664)	1.6 (1,546)
8. Central	1.9 (1,877)	1.7 (2,067)	1.6 (1,986)	1.7 (2,080)
9. Central East	2.0 (2,234)	1.9 (2,299)	2.0 (2,414)	1.9 (2,325)
10. South East	2.2 (1,014)	2.0 (936)	2.0 (938)	2.0 (929)
11. Champlain	2.2 (1,973)	2.0 (1,945)	2.0 (1,906)	2.0 (1,923)
12. North Simcoe Muskoka	2.3 (787)	2.0 (755)	2.0 (787)	2.0 (805)
13. North East	2.4 (1,174)	2.2 (1,132)	2.2 (1,124)	2.0 (1,050)
14. North West	2.4 (479)	2.4 (477)	2.5 (483)	2.4 (470)

Data sources: Canadian Institute for Health Information, National Ambulatory Care Reporting System (NACRS), 2003/04–2010/11; Statistics Canada, Ontario intercensal population estimate, 2003.

Inclusion criteria: All patients aged ≥18 years with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack.

Exclusion criteria: Patients with a scheduled emergency department visit.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Age- and sex-adjusted rate using each year's Ontario population as the standard.

³ Age- and sex-adjusted rate using the 2003/04 Ontario population as the standard.

Notes:

(1) Population-based analysis (i.e., the location of the patient's residence is used to report regional performance).

(2) Excludes patients with missing postal codes.

(3) Excludes all NACRS records with ICD codes that include the prefix "Q" (suspected, questionable diagnoses) starting in 2008/09.

(4) Indicates a significant difference from the provincial rate.

Exhibit 1.3

Number and percentage of adult stroke or transient ischemic attack patients¹ arriving at the emergency department of regional stroke centres, district stroke centres and non-designated centres, in Ontario and by sex, stroke type, OSS region and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	2003/04				2008/09				2009/10				2010/11			
	All	Regional Stroke Centre	District Stroke Centre	Non-designated	All	Regional Stroke Centre	District Stroke Centre	Non-designated	All	Regional Stroke Centre	District Stroke Centre	Non-designated	All	Regional Stroke Centre	District Stroke Centre	Non-designated
Patients, n (%)																
Ontario	18,961	4,212	3,344	11,405	19,477	5,259	3,942	10,276	20,003	5,408	4,228	10,367	19,703	5,397	4,168	10,138
Stroke Type																
Intracerebral hemorrhage	All 1,121 (5.9)	367 (8.7)	173 (5.2)	581 (5.1)	1,266 (6.5)	435 (8.3)	248 (6.3)	583 (5.7)	1,382 (6.9)	476 (8.8)	332 (7.9)	574 (5.5)	1,343 (6.8)	417 (7.7)	308 (7.4)	618 (6.1)
	Female 554 (49.4)	164 (44.7)	85 (49.1)	305 (52.5)	652 (51.5)	223 (51.3)	135 (54.4)	294 (50.4)	665 (48.1)	211 (44.3)	157 (47.3)	297 (51.7)	676 (50.3)	193 (46.3)	157 (51.0)	326 (52.8)
Ischemic stroke	All 968 (5.1)	306 (7.3)	172 (5.1)	490 (4.3)	1,749 (9.0)	547 (10.4)	555 (14.1)	647 (6.3)	1,890 (9.4)	589 (10.9)	622 (14.7)	679 (6.5)	2,245 (11.4)	715 (13.2)	679 (16.3)	851 (8.4)
	Female 465 (48.0)	133 (43.5)	88 (51.2)	244 (49.8)	855 (48.9)	266 (48.6)	264 (47.6)	325 (50.2)	979 (51.8)	300 (50.9)	324 (52.1)	355 (52.3)	1,108 (49.4)	342 (47.8)	338 (49.8)	428 (50.3)
Subarachnoid hemorrhage	All 604 (3.2)	210 (5.0)	91 (2.7)	303 (2.7)	666 (3.4)	211 (4.0)	106 (2.7)	349 (3.4)	677 (3.4)	232 (4.3)	113 (2.7)	332 (3.2)	714 (3.6)	211 (3.9)	136 (3.3)	367 (3.6)
	Female 349 (57.8)	113 (53.8)	59 (64.8)	177 (58.4)	371 (55.7)	114 (54.0)	60 (56.6)	197 (56.4)	380 (56.1)	129 (55.6)	63 (55.8)	188 (56.6)	411 (57.6)	123 (58.3)	79 (58.1)	209 (56.9)
Transient ischemic attack	All 6,597 (34.8)	1,314 (31.2)	1,175 (35.1)	4,108 (36.0)	7,122 (36.6)	1,666 (31.7)	1,366 (34.7)	4,090 (39.8)	7,380 (36.9)	1,770 (32.7)	1,456 (34.4)	4,154 (40.1)	6,917 (35.1)	1,616 (29.9)	1,505 (36.1)	3,796 (37.4)
	Female 3,394 (51.4)	659 (50.2)	597 (50.8)	2,138 (52.0)	3,683 (51.7)	842 (50.5)	710 (52.0)	2,131 (52.1)	3,876 (52.5)	916 (51.8)	756 (51.9)	2,204 (53.1)	3,545 (51.3)	802 (49.6)	747 (49.6)	1,996 (52.6)
Unable to determine ²	All 9,671 (51.0)	2,015 (47.8)	1,733 (51.8)	5,923 (51.9)	8,674 (44.5)	2,400 (45.6)	1,667 (42.3)	4,607 (44.8)	8,674 (43.4)	2,341 (43.3)	1,705 (40.3)	4,628 (44.6)	8,484 (43.1)	2,438 (45.2)	1,540 (36.9)	4,506 (44.4)
	Female 4,838 (50.0)	974 (48.3)	880 (50.8)	2,984 (50.4)	4,333 (50.0)	1,176 (49.0)	837 (50.2)	2,320 (50.4)	4,338 (50.0)	1,156 (49.4)	845 (49.6)	2,337 (50.5)	4,250 (50.1)	1,172 (48.1)	807 (52.4)	2,271 (50.4)
Ontario Stroke System Region																
Central East	2,821 (14.9)	252 (6.0)	966 (28.9)	1,603 (14.1)	3,004 (15.4)	345 (6.6)	1,238 (31.4)	1,421 (13.8)	3,101 (15.5)	321 (5.9)	1,300 (30.7)	1,480 (14.3)	3,102 (15.7)	323 (6.0)	1,284 (30.8)	1,495 (14.7)
Central South	3,294 (17.4)	460 (10.9)	663 (19.8)	2,171 (19.0)	3,347 (17.2)	496 (9.4)	974 (24.7)	1,877 (18.3)	3,426 (17.1)	474 (8.8)	1,054 (24.9)	1,898 (18.3)	3,494 (17.7)	511 (9.5)	1,128 (27.1)	1,855 (18.3)
East – Champlain	2,016 (10.6)	432 (10.3)	115 (3.4)	1,469 (12.9)	1,970 (10.1)	733 (13.9)	119 (3.0)	1,118 (10.9)	1,950 (9.7)	735 (13.6)	126 (3.0)	1,089 (10.5)	1,955 (9.9)	733 (13.6)	129 (3.1)	1,093 (10.8)
Northeast	1,149 (6.1)	320 (7.6)	436 (13.0)	393 (3.4)	1,099 (5.6)	317 (6.0)	437 (11.1)	345 (3.4)	1,092 (5.5)	280 (5.2)	441 (10.4)	371 (3.6)	1,021 (5.2)	278 (5.2)	386 (9.3)	357 (3.5)
Northwest	480 (2.5)	305 (7.2)	n/a	175 (1.5)	477 (2.4)	285 (5.4)	n/a	192 (1.9)	480 (2.4)	296 (5.5)	n/a	184 (1.8)	474 (2.4)	322 (6.0)	n/a	152 (1.5)
South East	1,009 (5.3)	389 (9.2)	143 (4.3)	477 (4.2)	919 (4.7)	329 (6.3)	133 (3.4)	457 (4.4)	921 (4.6)	349 (6.5)	135 (3.2)	437 (4.2)	887 (4.5)	360 (6.7)	133 (3.2)	394 (3.9)
Southwest	2,580 (13.6)	466 (11.1)	1,021 (30.5)	1,093 (9.6)	2,791 (14.3)	603 (11.5)	1,041 (26.4)	1,147 (11.2)	3,093 (15.5)	698 (12.9)	1,172 (27.7)	1,223 (11.8)	2,889 (14.7)	614 (11.4)	1,108 (26.6)	1,167 (11.5)
Toronto – North & East	1,329 (7.0)	383 (9.1)	n/a	946 (8.3)	1,377 (7.1)	530 (10.1)	n/a	847 (8.2)	1,332 (6.7)	581 (10.7)	n/a	751 (7.2)	1,333 (6.8)	554 (10.3)	n/a	779 (7.7)
Toronto – Southeast	973 (5.1)	167 (4.0)	n/a	806 (7.1)	1,014 (5.2)	340 (6.5)	n/a	674 (6.6)	1,078 (5.4)	372 (6.9)	n/a	706 (6.8)	1,039 (5.3)	365 (6.8)	n/a	674 (6.6)
Toronto – West	1,407 (7.4)	447 (10.6)	n/a	960 (8.4)	1,412 (7.2)	589 (11.2)	n/a	823 (8.0)	1,440 (7.2)	603 (11.2)	n/a	837 (8.1)	1,374 (7.0)	596 (11.0)	n/a	778 (7.7)
West GTA	1,903 (10.0)	591 (14.0)	n/a	1,312 (11.5)	2,067 (10.6)	692 (13.2)	n/a	1,375 (13.4)	2,090 (10.4)	699 (12.9)	n/a	1,391 (13.4)	2,135 (10.8)	741 (13.7)	n/a	1,394 (13.8)
Local Health Integration Network																
1. Erie St. Clair	1,185 (6.2)	n/a	809 (24.2)	376 (3.3)	1,195 (6.1)	n/a	812 (20.6)	383 (3.7)	1,312 (6.6)	n/a	931 (22.0)	381 (3.7)	1,235 (6.3)	n/a	894 (21.4)	341 (3.4)
2. South West	1,395 (7.4)	466 (11.1)	212 (6.3)	717 (6.3)	1,596 (8.2)	603 (11.5)	229 (5.8)	764 (7.4)	1,781 (8.9)	698 (12.9)	241 (5.7)	842 (8.1)	1,654 (8.4)	614 (11.4)	214 (5.1)	826 (8.1)
3. Waterloo Wellington	876 (4.6)	n/a	257 (7.7)	619 (5.4)	972 (5.0)	n/a	444 (11.3)	528 (5.1)	1,021 (5.1)	n/a	467 (11.0)	554 (5.3)	1,011 (5.1)	n/a	490 (11.8)	521 (5.1)
4. Hamilton Niagara Haldimand Brant	2,418 (12.8)	460 (10.9)	406 (12.1)	1,552 (13.6)	2,375 (12.2)	496 (9.4)	530 (13.4)	1,349 (13.1)	2,405 (12)	474 (8.8)	587 (13.9)	1,344 (13.0)	2,483 (12.6)	511 (9.5)	638 (15.3)	1,334 (13.2)
5. Central West	784 (4.1)	n/a	n/a	784 (6.9)	733 (3.8)	n/a	n/a	733 (7.1)	725 (3.6)	n/a	n/a	725 (7.0)	799 (4.1)	n/a	n/a	799 (7.9)
6. Mississauga Halton	1,119 (5.9)	591 (14.0)	n/a	528 (4.6)	1,334 (6.8)	692 (13.2)	n/a	642 (6.2)	1,365 (6.8)	699 (12.9)	n/a	666 (6.4)	1,336 (6.8)	741 (13.7)	n/a	595 (5.9)
7. Toronto Central	1,806 (9.5)	997 (23.7)	n/a	809 (7.1)	2,109 (10.8)	1,459 (27.7)	n/a	650 (6.3)	2,274 (11.4)	1,556 (28.8)	n/a	718 (6.9)	2,122 (10.8)	1,515 (28.1)	n/a	607 (6.0)
8. Central	1,699 (9.0)	n/a	266 (8.0)	1,433 (12.6)	1,812 (9.3)	n/a	443 (11.2)	1,369 (13.3)	1,712 (8.6)	n/a	407 (9.6)	1,305 (12.6)	1,812 (9.2)	n/a	431 (10.3)	1,381 (13.6)
9. Central East	2,175 (11.5)	n/a	625 (18.7)	1,550 (13.6)	2,072 (10.6)	n/a	720 (18.3)	1,352 (13.2)	2,144 (10.7)	n/a	812 (19.2)	1,332 (12.8)	2,065 (10.5)	n/a	770 (18.5)	1,295 (12.8)
10. South East	1,009 (5.3)	389 (9.2)	143 (4.3)	477 (4.2)	919 (4.7)	329 (6.3)	133 (3.4)	457 (4.4)	921 (4.6)	349 (6.5)	135 (3.2)	437 (4.2)	887 (4.5)	360 (6.7)	133 (3.2)	394 (3.9)
11. Champlain	2,016 (10.6)	432 (10.3)	115 (3.4)	1,469 (12.9)	1,970 (10.1)	733 (13.9)	119 (3.0)	1,118 (10.9)	1,950 (9.7)	735 (13.6)	126 (3.0)	1,089 (10.5)	1,955 (9.9)	733 (13.6)	129 (3.1)	1,093 (10.8)
12. North Simcoe Muskoka	850 (4.5)	252 (6.0)	75 (2.2)	523 (4.6)	814 (4.2)	345 (6.6)	75 (1.9)	394 (3.8)	821 (4.1)	321 (5.9)	81 (1.9)	419 (4.0)	849 (4.3)	323 (6.0)	83 (2.0)	443 (4.4)
13. North East	1,149 (6.1)	320 (7.6)	436 (13.0)	393 (3.4)	1,099 (5.6)	317 (6.0)	437 (11.1)	345 (3.4)	1,092 (5.5)	280 (5.2)	441 (10.4)	371 (3.6)	1,021 (5.2)	278 (5.2)	386 (9.3)	357 (3.5)
14. North West	480 (2.5)	305 (7.2)	n/a	175 (1.5)	477 (2.4)	285 (5.4)	n/a	192 (1.9)	480 (2.4)	296 (5.5)	n/a	184 (1.8)	474 (2.4)	322 (6.0)	n/a	152 (1.5)

Data source: Canadian Institute for Health Information, National Ambulatory Care Reporting System (NACRS), 2003/04–2010/11.

Inclusion criteria: Unique patients aged ≥18 years discharged from an emergency department with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack.

Exclusion criteria: Patients with a scheduled emergency department visit.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Includes stroke, not specified as hemorrhagic or infarction.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Excludes all NACRS records with ICD codes that include the prefix "Q" (suspected, questionable diagnoses) starting in 2008/09.

(3) Female rows display the proportion of females relative to "All" for the given subgroup.

(4) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

n/a = not applicable

Exhibit 1.4

Number and percentage of adult stroke or transient ischemic attack patients¹ transported to hospital by ambulance, in Ontario and by sex, OSS region, OSS classification, and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	2003/04 (N=18,961)	2008/09 (N=19,477)	2009/10 (N=20,003)	2010/11 (N=19,703)
	Patients, n (%)			
Ontario	10,006 (52.8)	10,711 (55.0)	11,110 (55.5)	11,244 (57.1)
Female	5,250 (54.7)	5,682 (57.4)	5,965 (58.3)	5,962 (59.7)
Male	4,756 (50.8)	5,029 (52.5)	5,145 (52.7)	5,282 (54.4)
Ontario Stroke System Region				
Central East	1,373 (48.7)	1,727 (57.5)	1,721 (55.5)	1,759 (56.7)
Central South	1,790 (54.3)	1,943 (58.1)	2,005 (58.5)	2,086 (59.7)
East – Champlain	1,064 (52.8)	1,131 (57.4)	1,141 (58.5)	1,162 (59.4)
Northeast	587 (51.1)	557 (50.7)	603 (55.2)	552 (54.1)
Northwest	198 (41.3)	233 (48.8)	267 (55.6)	243 (51.3)
South East	577 (57.2)	500 (54.4)	513 (55.7)	540 (60.9)
Southwest	1,370 (53.1)	1,464 (52.5)	1,608 (52.0)	1,554 (53.8)
Toronto – North & East	755 (56.8)	753 (54.7)	764 (57.4)	758 (56.9)
Toronto – Southeast	520 (53.4)	550 (54.2)	578 (53.6)	611 (58.8)
Toronto – West	803 (57.1)	791 (56.0)	789 (54.8)	793 (57.7)
West GTA	969 (50.9)	1,062 (51.4)	1,121 (53.6)	1,186 (55.6)
Ontario Stroke System Classification				
Regional stroke centre	2,419 (57.4)	3,393 (64.5)	3,558 (65.8)	3,582 (66.4)
District stroke centre	1,796 (53.7)	2,444 (62.0)	2,615 (61.8)	2,651 (63.6)
Non-designated	5,791 (50.8)	4,874 (47.4)	4,937 (47.6)	5,011 (49.4)
Local Health Integration Network				
1. Erie St. Clair	651 (54.9)	651 (54.5)	726 (55.3)	708 (57.3)
2. South West	719 (51.5)	813 (50.9)	882 (49.5)	846 (51.1)
3. Waterloo Wellington	477 (54.5)	570 (58.6)	584 (57.2)	599 (59.2)
4. Hamilton Niagara Haldimand Brant	1,313 (54.3)	1,373 (57.8)	1,421 (59.1)	1,487 (59.9)
5. Central West	428 (54.6)	373 (50.9)	375 (51.7)	408 (51.1)
6. Mississauga Halton	541 (48.3)	689 (51.6)	746 (54.7)	778 (58.2)
7. Toronto Central	959 (53.1)	1,166 (55.3)	1,268 (55.8)	1,226 (57.8)
8. Central	942 (55.4)	1,000 (55.2)	937 (54.7)	1,022 (56.4)
9. Central East	1,139 (52.4)	1,166 (56.3)	1,188 (55.4)	1,181 (57.2)
10. South East	577 (57.2)	500 (54.4)	513 (55.7)	540 (60.9)
11. Champlain	1,064 (52.8)	1,131 (57.4)	1,141 (58.5)	1,162 (59.4)
12. North Simcoe Muskoka	411 (48.4)	489 (60.1)	459 (55.9)	492 (58.0)
13. North East	587 (51.1)	557 (50.7)	603 (55.2)	552 (54.1)
14. North West	198 (41.3)	233 (48.8)	267 (55.6)	243 (51.3)

Data source: Canadian Institute for Health Information, National Ambulatory Care Reporting System (NACRS), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years discharged from an emergency department with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

Notes:

- (1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).
- (2) Excludes all NACRS records with ICD codes that include the prefix "Q" (suspected, questionable diagnoses) starting in 2008/09.
- (3) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

Exhibit 1.5

Number and percentage of adult stroke or transient ischemic attack patients who sought medical attention within the treatment window¹, in Ontario and by sex and Local Health Integration Network, 2002/03, 2004/05, 2008/09 and 2010/11

Group/Subgroup	2002/03	2004/05	2008/09	2010/11
	Patients, n (%)			
Ontario	8,428 (34.0)	7,895 (34.1)	7,863 (35.2)	8,197 (42.3)
Female	-	-	-	3,995 (41.5)
Male	-	-	-	4,201 (43.0)
Local Health Integration Network				
1. Erie St. Clair	668 (43.4)	536 (33.9)	625 (44.8)	584 (44.8)
2. South West	630 (34.1)	730 (38.7)	613 (34.4)	860 (51.1)
3. Waterloo Wellington	472 (41.6)	439 (35.1)	432 (36.7)	472 (44.5)
4. Hamilton Niagara Haldimand Brant	1,290 (39.9)	967 (32.7)	973 (36.3)	1,020 (40.9)
5. Central West	156 (14.1)	326 (33.5)	322 (29.6)	406 (41.7)
6. Mississauga Halton	194 (14.2)	514 (33.5)	464 (31.7)	519 (40.9)
7. Toronto Central	663 (31.1)	499 (26.3)	551 (31.6)	560 (38.1)
8. Central	756 (32.1)	694 (28.4)	718 (29.3)	726 (36.0)
9. Central East	975 (34.1)	824 (30.5)	836 (32.3)	881 (39.0)
10. South East	521 (39.4)	464 (43.7)	407 (41.6)	318 (37.0)
11. Champlain	1,057 (40.4)	920 (45.1)	826 (38.9)	870 (48.4)
12. North Simcoe Muskoka	313 (29.5)	293 (30.9)	361 (37.6)	299 (41.9)
13. North East	535 (32.8)	494 (35.5)	584 (41.4)	492 (46.4)
14. North West	198 (35.9)	195 (38.8)	151 (31.0)	189 (43.7)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2002/03, 2004/05, 2008/09 and 2010/11.

Inclusion criteria: All patients aged ≥18 years admitted to an emergency department at an acute care facility in Ontario for stroke or transient ischemic attack with a known stroke onset time.

¹ From 2002/03 to 2009/10, the calculated treatment window was 2.5 hours; in 2010/11, it was changed to 3.5 hours to reflect updated best practice guidelines.

Notes:

- (1) Population-based analysis (i.e., the location of the patient's residence is used to report regional performance).
- (2) Excludes all NACRS records with ICD codes that include the prefix "Q" (suspected, questionable diagnoses) starting in 2008/09.
- (3) In 2010/11, 36.3% of stroke/TIA patients sought medical attention within 2.5 hours of symptom onset.
- (4) Cells in which there were no reported/available data are marked with a hyphen (-).
- (5) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 1.6

Number and percentage of adult stroke or transient ischemic attack patients who received neuroimaging within 24 hours of presenting to the emergency department and prior to discharge, in Ontario and by sex, OSS region, OSS classification and Local Health Integration Network, 2002/03, 2004/05, 2008/09 and 2010/11

Group/Subgroup	2002/03		2004/05		2008/09		2010/11	
	Patients, n (%)							
	Within 24 hours ¹	Before discharge ²	Within 24 hours ¹	Before discharge ²	Within 24 hours ¹	Before discharge ²	Within 24 hours ¹	Before discharge ²
Ontario	6,344 (47.4)	14,699 (90.3)	11,705 (68.6)	14,345 (92.4)	15,897 (86.3)	14,818 (97.8)	15,634 (89.6)	12,639 (98.9)
Female	-	-	-	-	-	-	7,700 (89.4)	6,256 (98.5)
Male	-	-	-	-	-	-	7,934 (89.8)	6,383 (99.4)
Ontario Stroke System Region								
Central East	563 (31.7)	1,857 (89.0)	1,692 (64.6)	2,020 (92.3)	1,789 (84.5)	1,899 (99.0)	1,990 (89.2)	1,633 (98.9)
Central South	1,721 (52.9)	2,427 (89.1)	1,506 (60.5)	2,618 (92.5)	2,752 (87.5)	2,417 (98.0)	2,801 (88.3)	2,297 (99.2)
East – Champlain	846 (50.4)	1,361 (85.7)	1,176 (67.3)	1,060 (89.0)	1,636 (89.9)	1,192 (99.4)	1,520 (92.8)	1,036 (99.0)
Northeast	559 (44.1)	953 (88.6)	378 (46.6)	872 (84.7)	807 (78.2)	983 (94.2)	739 (80.0)	719 (96.2)
Northwest	222 (41.9)	331 (81.9)	284 (59.3)	325 (86.7)	399 (81.1)	413 (91.3)	375 (91.0)	342 (98.3)
South East	9 (1.8)	636 (81.4)	483 (53.7)	632 (92.4)	612 (72.8)	595 (94.4)	587 (81.9)	542 (97.5)
Southwest	757 (42.1)	2,113 (86.3)	1,323 (54.1)	2,008 (86.0)	2,418 (76.9)	2,114 (95.9)	2,352 (82.4)	1,828 (98.2)
Toronto – North & East	477 (68.8)	1,206 (97.1)	1,308 (90.8)	1,278 (99.1)	757 (91.0)	1,143 (100.0)	1,082 (95.5)	1,024 (100.0)
Toronto – Southeast	144 (61.0)	898 (97.1)	963 (90.7)	754 (100.0)	1,157 (94.9)	901 (99.3)	1,019 (95.0)	743 (99.4)
Toronto – West	524 (82.1)	1,438 (99.4)	946 (85.8)	1,182 (97.1)	1,313 (95.8)	1,320 (100.0)	1,144 (96.5)	997 (100.0)
West GTA	522 (52.3)	1,479 (95.6)	1,646 (83.4)	1,596 (98.0)	2,255 (93.8)	1,842 (98.7)	2,024 (95.9)	1,477 (99.9)
Ontario Stroke System Classification								
Regional stroke centre	960 (57.4)	3,274 (96.8)	3,610 (90.6)	3,147 (98.9)	4,982 (95.1)	4,359 (99.9)	5,294 (95.4)	4,285 (99.7)
District stroke centre	1,847 (57.8)	2,863 (90.8)	2,158 (69.7)	3,176 (93.4)	3,868 (90.7)	3,427 (98.1)	3,361 (92.5)	2,732 (99.5)
Non-designated	3,537 (41.5)	8,562 (88.0)	5,937 (59.4)	8,022 (89.7)	7,048 (79.1)	7,033 (96.4)	6,731 (84.6)	5,421 (98.1)
Telestroke ³	-	-	-	-	-	-	248 (80.5)	201 (96.2)
Local Health Integration Network								
1. Erie St. Clair	601 (56.3)	969 (85.9)	639 (62.1)	969 (91.7)	1,138 (83.9)	883 (96.9)	1,067 (88.2)	744 (99.5)
2. South West	156 (21.3)	1,144 (86.7)	684 (48.2)	1,039 (81.3)	1,281 (71.6)	1,231 (95.1)	1,285 (78.1)	1,084 (97.4)
3. Waterloo Wellington	423 (50.1)	596 (88.3)	519 (60.2)	698 (91.8)	809 (90.1)	689 (98.0)	827 (90.8)	614 (99.4)
4. Hamilton Niagara Haldimand Brant	1,298 (53.9)	1,831 (89.4)	987 (60.7)	1,920 (92.7)	1,943 (86.5)	1,729 (98.0)	1,974 (87.2)	1,683 (99.1)
5. Central West	522 (72.5)	558 (95.4)	654 (85.8)	534 (98.9)	777 (93.8)	590 (100.0)	715 (97.3)	509 (100.0)
6. Mississauga Halton	-	921 (95.7)	992 (81.8)	1,062 (97.5)	1,478 (93.8)	1,252 (98.1)	1,309 (95.1)	968 (99.8)
7. Toronto Central	747 (81.8)	1,822 (98.5)	2,043 (94.2)	1,787 (99.4)	2,209 (95.8)	1,967 (100.0)	2,028 (97.1)	1,652 (99.9)
8. Central	349 (58.6)	1,321 (98.1)	1,008 (81.0)	1,277 (95.3)	1,118 (93.4)	1,329 (99.1)	1,274 (94.2)	1,068 (99.4)
9. Central East	601 (41.5)	1,659 (90.1)	1,575 (72.1)	1,546 (97.2)	1,112 (83.2)	1,369 (99.1)	1,384 (88.2)	1,231 (99.0)
10. South East	9 (1.7)	656 (81.4)	501 (51.9)	662 (92.7)	612 (72.8)	595 (94.4)	587 (81.9)	542 (97.5)
11. Champlain	846 (51.5)	1,341 (85.7)	1,158 (68.8)	1,030 (88.7)	1,636 (89.9)	1,192 (99.4)	1,520 (92.8)	1,036 (99.0)
12. North Simcoe Muskoka	11 (2.8)	597 (89.9)	283 (45.0)	624 (86.5)	579 (82.5)	596 (100.0)	549 (89.9)	446 (99.3)
13. North East	559 (44.1)	953 (88.6)	378 (46.6)	872 (84.7)	807 (78.2)	983 (94.2)	739 (80.0)	719 (96.2)
14. North West	222 (41.9)	331 (81.9)	284 (59.3)	325 (86.7)	399 (81.1)	413 (91.3)	375 (91.0)	342 (98.3)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2002/03, 2004/05, 2008/09 and 2010/11.

Inclusion criteria: All patients aged ≥18 years admitted to an acute care facility in Ontario for suspected stroke or transient ischemic attack.

¹ Among all patients admitted to an emergency department or to inpatient care with a scan date and time (N = 13,384 in 2002/03, 17,072 in 2004/05, 18,416 in 2008/09 and 17,453 in 2010/11).

² Among all patients admitted to inpatient care (N = 16,269 in 2002/03, 15,525 in 2004/05, 15,150 in 2008/09 and 12,775 in 2010/11).

³ Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Excludes all NACRS records with ICD codes that include the prefix "Q" (suspected, questionable diagnoses) starting in 2008/09.

(3) Cells in which there were no reported/available data are marked with a hyphen (-).

(4) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(5) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 1.7

Number and percentage of ischemic and eligible adult stroke patients who received acute thrombolytic therapy (tPA) and the door-to-needle time¹, in Ontario and by sex, OSS region, OSS classification and Local Health Integration Network, 2002/03, 2004/05, 2008/09 and 2010/11

Group/Subgroup	2002/03						2004/05					
	All Ischemic Patients ²		Patients Who Arrived Within the Treatment Window ³		Patients Who Received tPA Intravenously ⁴		All Ischemic Patients ²		Patients Who Arrived Within the Treatment Window ³		Patients Who Received tPA Intravenously ⁴	
	tPA administered n (%)	tPA administered within 60 minutes n (%)	tPA administered n (%)	tPA administered within 60 minutes n (%)	Mean time to tPA administration (minutes)	Median time to tPA administration (minutes)	tPA administered n (%)	tPA administered within 60 minutes n (%)	tPA administered n (%)	tPA administered within 60 minutes n (%)	Mean time to tPA administration (minutes)	Median time to tPA administration (minutes)
Ontario	384 (3.2)	93 (26.1)	284 (10.8)	74 (27.8)	82.6	80.5	422 (3.9)	104 (27.4)	398 (15.2)	104 (28.3)	82.4	82.6
Female	-	-	-	-	-	-	-	-	-	-	-	-
Male	-	-	-	-	-	-	-	-	-	-	-	-
Ontario Stroke System Region												
Central East	-	-	-	-	-	-	12 (0.8)	-	12 (3.2)	-	110.0	95.0
Central South	18 (1.1)	-	9 (2.5)	-	109.5	82.0	42 (2.2)	6 (14.3)	42 (9.7)	6 (14.3)	99.6	94.0
East – Champlain	56 (3.9)	9 (16.1)	56 (14.5)	9 (16.1)	91.4	85.0	52 (5.9)	**	52 (19.2)	**	89.4	76.0
Northeast	28 (4.1)	-	28 (18.9)	-	103.2	100.4	33 (5.4)	6 (18.2)	33 (21.2)	6 (18.2)	96.2	100.7
Northwest	9 (3.2)	-	9 (10.5)	-	119.0	119.0	20 (8.6)	**	20 (33.9)	**	74.8	67.0
South East	81 (15.2)	36 (50.0)	63 (39.1)	27 (42.9)	69.5	60.0	25 (4.5)	20 (100.0)	25 (14.9)	20 (100.0)	43.0	38.0
Southwest	64 (3.3)	28 (43.7)	54 (10.3)	18 (33.3)	64.0	53.2	69 (4.5)	14 (22.2)	63 (18.7)	14 (22.2)	84.4	79.3
Toronto – North & East	-	-	-	-	-	-	42 (4.5)	12 (40.0)	42 (16.7)	12 (40.0)	84.8	71.0
Toronto – Southeast	18 (2.8)	-	18 (15.0)	-	114.5	111.0	-	-	-	-	-	-
Toronto – West	38 (3.9)	20 (69.0)	38 (14.8)	20 (69.0)	68.6	49.8	49 (5.4)	6 (20.0)	43 (20.3)	6 (20.0)	91.2	85.0
West GTA	72 (5.6)	-	9 (33.3)	-	84.1	75.5	78 (6.2)	30 (38.5)	66 (20.8)	30 (45.5)	65.3	66.5
Ontario Stroke System Classification												
Regional stroke centre	254 (11.0)	74 (31.4)	164 (34.0)	56 (36.1)	80.4	71.7	277 (12.3)	84 (33.9)	253 (40.4)	84 (35.6)	74.4	71.3
District stroke centre	82 (3.7)	18 (22.0)	82 (14.0)	18 (22.0)	82.0	84.2	78 (3.5)	10 (12.8)	78 (14.5)	10 (12.8)	94.9	95.5
Non-designated	48 (0.6)	**	38 (2.4)	-	97.2	84.9	67 (1.0)	10 (18.5)	67 (4.6)	10 (18.5)	99.7	111.0
Telestroke ⁵	-	-	-	-	-	-	-	-	-	-	-	-
Local Health Integration Network												
1. Erie St. Clair	45 (4.6)	9 (20.0)	36 (14.2)	-	92.5	82.0	16 (2.3)	**	16 (10.7)	**	84.0	64.0
2. South West	19 (2.0)	19 (100.0)	18 (6.6)	18 (100.0)	27.3	21.4	50 (6.2)	10 (22.7)	47 (25.1)	10 (22.7)	84.6	79.5
3. Waterloo Wellington	9 (1.6)	-	-	-	82.0	82.0	12 (2.3)	-	6 (4.7)	-	85.0	85.0
4. Hamilton Niagara Haldimand Brant	19 (1.8)	10 (52.6)	9 (4.1)	10 (52.6)	137.0	137.0	42 (3.0)	6 (14.3)	36 (11.7)	6 (14.3)	102.0	103.0
5. Central West	27 (4.9)	-	-	-	-	-	15 (3.0)	6 (40.0)	-	6 (40.0)	-	-
6. Mississauga Halton	27 (4.3)	-	9 (33.3)	-	84.1	75.5	61 (7.7)	30 (55.6)	66 (34.6)	30 (62.5)	65.3	66.5
7. Toronto Central	54 (4.6)	-	56 (22.8)	-	86.2	74.6	48 (4.7)	6 (20.0)	60 (24.8)	6 (20.0)	87.0	90.0
8. Central	10 (0.8)	10 (100.0)	-	10 (100.0)	-	-	42 (3.6)	6 (16.7)	37 (14.0)	6 (16.7)	98.6	87.5
9. Central East	-	-	-	-	-	-	**	**	-	**	-	-
10. South East	81 (13.5)	36 (50.0)	63 (38.0)	27 (42.9)	69.5	60.0	26 (4.4)	15 (71.4)	25 (14.4)	15 (100.0)	43.0	38.0
11. Champlain	56 (4.2)	9 (16.1)	56 (14.7)	9 (16.1)	91.4	85.0	47 (5.6)	-	52 (19.6)	-	89.4	76.0
12. North Simcoe Muskoka	-	-	-	-	-	-	-	-	-	-	-	-
13. North East	28 (4.0)	-	28 (18.9)	-	103.2	100.4	38 (6.1)	11 (28.9)	33 (21.2)	11 (28.9)	96.2	100.7
14. North West	9 (3.3)	-	9 (10.5)	-	119.0	119.0	20 (8.4)	**	20 (33.9)	**	74.8	67.0

/Continued

Group/Subgroup	2008/09						2010/11					
	All Ischemic Patients ²		Patients Who Arrived Within the Treatment Window ³		Patients Who Received tPA Intravenously ⁴		All Ischemic Patients ²		Patients Who Arrived Within the Treatment Window ³		Patients Who Received tPA Intravenously ⁴	
	tPA administered n (%)	tPA administered within 60 minutes n (%)	tPA administered n (%)	tPA administered within 60 minutes n (%)	Mean time to tPA administration (minutes)	Median time to tPA administration (minutes)	tPA administered n (%)	tPA administered within 60 minutes n (%)	tPA administered n (%)	tPA administered within 60 minutes n (%)	Mean time to tPA administration (minutes)	Median time to tPA administration (minutes)
Ontario	942 (8.4)	269 (30.4)	809 (29.6)	240 (29.7)	88.4	69.7	979 (9.6)	368 (38.1)	937 (32.4)	354 (38.1)	78.8	70.1
Female	-	-	-	-	-	-	481 (9.7)	187 (39.2)	462 (33.0)	182 (39.4)	78.8	67.5
Male	-	-	-	-	-	-	498 (9.6)	181 (37.0)	474 (31.7)	173 (36.8)	78.8	71.5
Ontario Stroke System Region												
Central East	128 (8.7)	26 (20.9)	121 (33.6)	24 (19.8)	130.5	75.5	173 (12.4)	63 (36.4)	169 (36.7)	62 (36.7)	71.2	65.1
Central South	133 (7.1)	19 (14.9)	126 (31.4)	19 (14.9)	85.5	71.9	168 (9.7)	69 (41.5)	158 (30.0)	62 (39.3)	90.8	67.3
East – Champlain	101 (9.4)	10 (11.2)	82 (34.2)	**	100.6	93.3	102 (10.6)	63 (64.3)	95 (31.6)	63 (66.4)	60.5	52.2
Northeast	30 (5.4)	9 (29.7)	30 (17.3)	9 (29.7)	75.6	63.6	38 (8.1)	9 (24.3)	35 (25.7)	8 (22.9)	114.1	83.7
Northwest	14 (4.7)	14 (100.0)	7 (11.0)	7 (100.0)	54.0	49.2	26 (10.4)	6 (24.0)	23 (31.5)	**	98.1	79.2
South East	54 (12.4)	32 (62.5)	44 (29.9)	25 (57.1)	54.1	43.2	55 (12.1)	42 (76.4)	55 (43.9)	42 (76.4)	47.5	41.1
Southwest	107 (6.5)	25 (24.4)	97 (19.9)	25 (26.0)	97.3	77.5	115 (7.6)	34 (29.7)	114 (22.2)	34 (29.9)	79.1	74.5
Toronto – North & East	102 (12.2)	32 (33.3)	83 (45.0)	32 (38.4)	69.6	64.4	67 (8.7)	16 (24.2)	63 (37.3)	16 (25.4)	86.8	82.5
Toronto – Southeast	46 (6.9)	13 (33.3)	33 (24.6)	13 (40.0)	68.2	58.5	44 (7.7)	13 (28.9)	40 (33.7)	13 (31.8)	76.1	74.1
Toronto – West	53 (5.6)	13 (25.2)	47 (29.6)	13 (28.9)	93.6	87.4	54 (6.8)	13 (26.0)	52 (35.2)	12 (24.9)	86.2	81.7
West GTA	174 (12.0)	76 (47.7)	139 (36.1)	69 (49.8)	73.0	58.6	136 (11.0)	39 (29.3)	132 (41.4)	37 (28.7)	80.2	75.2
Ontario Stroke System Classification												
Regional stroke centre	543 (17.4)	199 (36.7)	476 (47.2)	173 (36.2)	75.5	66.0	577 (18.6)	223 (39.5)	548 (47.4)	217 (40.0)	73.5	69.4
District stroke centre	307 (12.0)	57 (18.6)	295 (36.1)	55 (18.6)	106.9	74.7	353 (15.9)	128 (36.6)	341 (41.8)	121 (35.7)	84.6	69.1
Non-designated	91 (1.6)	13 (34.3)	37 (4.1)	13 (34.3)	111.4	91.3	33 (0.7)	13 (39.9)	33 (3.8)	13 (39.9)	93.1	87.0
Telestroke ⁵	-	-	-	-	-	-	223 (15.4)	100 (45.0)	211 (41.8)	93 (44.0)	89.1	62.4
Local Health Integration Network												
1. Erie St. Clair	41 (5.9)	6 (15.6)	35 (13.2)	6 (18.5)	131.3	78.9	54 (8.7)	10 (19.2)	53 (27.8)	10 (19.6)	90.2	88.3
2. South West	66 (6.9)	19 (30.2)	63 (27.6)	19 (30.2)	75.0	70.2	61 (6.8)	24 (38.7)	61 (18.9)	24 (38.7)	69.1	66.9
3. Waterloo Wellington	19 (3.2)	-	13 (23.5)	-	64.5	63.0	40 (8.3)	**	39 (25.4)	**	83.5	81.0
4. Hamilton Niagara Haldimand Brant	113 (9.0)	19 (16.6)	113 (32.7)	19 (16.6)	87.9	73.9	128 (10.2)	66 (52.3)	119 (31.8)	59 (49.9)	93.1	58.2
5. Central West	7 (1.4)	-	-	-	-	-	7 (1.6)	**	7 (8.6)	**	153.0	52.2
6. Mississauga Halton	167 (17.3)	76 (47.7)	139 (41.0)	69 (49.8)	73.0	58.6	129 (15.7)	36 (28.3)	125 (51.7)	34 (27.6)	76.5	75.2
7. Toronto Central	182 (13.1)	52 (28.6)	156 (41.5)	52 (33.4)	77.1	64.8	158 (13.4)	35 (22.9)	148 (45.5)	34 (23.6)	86.0	80.1
8. Central	46 (4.3)	6 (13.8)	46 (24.5)	6 (13.8)	79.8	77.2	44 (5.0)	14 (31.8)	44 (23.6)	14 (31.8)	72.2	67.8
9. Central East	45 (4.5)	7 (20.0)	33 (22.6)	7 (20.0)	275.9	63.6	99 (9.0)	46 (45.8)	97 (36.8)	46 (46.7)	65.2	60.8
10. South East	54 (12.4)	32 (62.5)	44 (29.9)	25 (57.1)	54.1	43.2	55 (12.1)	42 (76.4)	55 (43.9)	42 (76.4)	47.5	41.1
11. Champlain	101 (9.4)	10 (11.2)	82 (34.2)	**	100.6	93.3	102 (10.6)	63 (64.3)	95 (31.6)	63 (66.4)	60.5	52.2
12. North Simcoe Muskoka	56 (11.9)	19 (37.8)	49 (37.9)	17 (35.7)	72.2	70.6	36 (10.5)	10 (27.8)	34 (29.1)	9 (26.5)	80.0	79.5
13. North East	30 (5.4)	9 (29.7)	30 (17.3)	9 (29.7)	75.6	63.6	38 (8.1)	9 (24.3)	35 (25.7)	8 (22.9)	114.1	83.7
14. North West	14 (4.7)	14 (100.0)	7 (11.0)	7 (100.0)	54.0	49.2	26 (10.4)	6 (24.0)	23 (31.5)	**	98.1	79.2

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2002/03, 2004/05, 2008/09 and 2010/11.

Inclusion criteria: All ischemic stroke patients aged ≥18 years admitted to an emergency department or inpatient care at an acute care facility in Ontario.

¹ Time between a patient's arrival in hospital to the time tPA was first administered.

² Among ischemic stroke patients (N = 11,978 in 2002/03, 10,959 in 2004/05, 11,256 in 2008/09 and 10,158 in 2010/11).

³ Among ischemic stroke patients who arrived at an emergency department within the treatment window (considered within 2.5 hours of symptom onset from 2002/03 to 2009/10 and within 3.5 hours of symptom onset in 2010/11), who do not have contraindications to tPA (N = 2,636 in 2002/03, 2,625 in 2004/05, 2,735 in 2008/09 and 2,895 in 2010/11).

⁴ Among patients who received tPA intravenously (N = 375 in 2002/03, 400 in 2004/05, 844 in 2008/09 and 942 in 2010/11).

⁵ All Telestroke sites (n=17); includes one regional stroke centre, nine district stroke centres and seven non-designated centres.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Excludes all NACRS records with ICD codes that include the prefix "Q" (suspected, questionable diagnoses) starting in 2008/09.

(3) Cells in which there were no reported/available data are marked with a hyphen (-).

(4) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(5) See Appendix J for the Ontario Stroke Audit sample sizes.

2. Acute Inpatient Care

Inpatient Admissions

Exhibit 2.1: The average age of stroke/TIA patients admitted to acute care hospitals remained stable at 73 years (median, 76 years), with women being older than men (79 vs. 73 median years). There was minimal difference by sex among admitted stroke/TIA patients over time, with women comprising 50.8% of patients in 2010/11. Women admitted to acute care were consistently older, with a median age of 79 years in 2010/11 compared to 73 years for men. Among Ontarians, the proportion of stroke/TIA inpatient admissions among those aged 46–65 years increased from 19.2% in 2003/04 to 23.4% in 2010/11. Among adults over 85 years of age, the proportion of women admitted to acute care with stroke/TIA was twice that of men (24.9% vs. 12.6%).

Exhibit 2.2: In 2010/11, almost one in five inpatient admissions (17.8%) was for TIA, a stable trend since 2003/04. District stroke centres had the highest rate of TIA admissions (20.6%) compared to non-designated hospitals (19.4%) and regional stroke centres (13.7%). Subarachnoid hemorrhagic stroke is the least prevalent stroke type, yet women represented 61.8% of all such strokes. This may be related to the fact that women tend to be older than men at the time of admission and that the risk of subarachnoid hemorrhage increases with age. For all other stroke types, prevalence was similar between women and men.

Provincially, the proportion of patients discharged from an inpatient stay with an “unable to determine” (UTD) stroke type decreased from 32.7% in 2003/04 to 16.9% in 2010/11. A higher proportion of patients at non-designated stroke centres (24.4%) had a UTD stroke diagnosis code compared to patients at designated centres (14.3% and 7.9% at district and regional stroke centres, respectively).

Exhibit 2.3: Provincially, the age- and sex-adjusted incidence rate of admission for stroke/TIA per 1,000 population declined from 1.7 in 2003/04 to 1.5 in 2008/09 and remained unchanged to 2010/11. When each year’s rates were applied to the 2003/04 Ontario population structure (keeping the same age/sex structure over time), we observed a decline from 1.7 per 1,000 LHIN population in 2003/04 to 1.4 per 1,000 LHIN population in 2010/11 ($p < 0.0001$). Inpatient stroke/TIA admission rates were consistently highest in Northern Ontario (2.0 per 1,000 population in the North East LHIN and 2.2 per 1,000 population in the North West LHIN). The North Simcoe Muskoka LHIN witnessed a declining trend from 2003/04 to

2010/11, and the Champlain LHIN maintained the lowest rate of inpatient stroke/TIA admissions over the eight-year study period. The degree of variation across the LHINs increased; in 2003/04, the difference between the highest and lowest rate was 0.8, whereas in 2010/11, the difference increased to 0.9.

Conclusions

The median age of females admitted to acute inpatient care was significantly higher than that of males (79 vs. 73 years). This may have implications for admission to long-term care facilities and readmission to hospital.

The reduction in the use of the “unable to determine” (UTD) stroke type diagnosis code is a positive trend, reflecting improved coding and/or diagnosis of stroke. However, there is still room for improvement, as almost 1 in 5 patients left hospital without a definitive diagnosis. The UTD stroke type is not an appropriate diagnosis, and for the prevention of future strokes, it is important to determine the cause of stroke. Designated centres have lower diagnostic coding rates of the UTD stroke type, reinforcing the importance of having patients go to designated stroke centres. Regional stroke centres were also more likely to classify TIAs as stroke, which may account for the substantial difference in TIA rates among hospital types.

Admission of TIA patients to hospital continues to occur in Ontario and has been steadily above 17% since 2003/04, despite an increase in the number of stroke secondary prevention clinics across the province over the past eight years. This may represent better awareness of the signs of TIA and stroke, although only a small percentage of TIA patients require an inpatient admission.

Recommendations

Admitting TIA patients signals an opportunity to impact emergency department and ALC days through the use of coordinated rapid TIA assessment outpatient clinics. Annually, this represents over 2,500 potentially avoidable inpatient stays. It is recommended that patients with TIA or mild stroke be treated on an outpatient basis to alleviate the demand for acute care beds, and that secondary prevention clinics review their practice patterns in an effort to reduce TIA inpatient admissions. It is also recommended that rapid cardiovascular response clinics be enabled to treat TIAs and mild strokes to alleviate demands on acute care hospital beds. The OSN’s annual research request for proposals to better understand the management of TIA patients should help explain the shift toward TIA inpatient admissions in the

province. The OSN needs to investigate patient outcomes following an inpatient stay for TIA to gain a better understanding of this observed pattern of care.

The prevalence of the UTD stroke type code being assigned to admitted stroke/TIA patients was lower in comparison to stroke-related ED visits; however, it is recommended that both inpatient and ED coders in health records departments participate in the CIHI online course in stroke coding.

Stroke Unit Admission

Exhibit 2.4: In 2010/11, 38.3% of patients admitted to hospital with stroke/TIA spent some part of their hospital stay in a stroke unit, an improvement from 30.3% in 2008/09, 18.6% in 2004/05 and 2.7% in 2002/03 and seen across all hospital types and in virtually all regions ($p \leq 0.0001$). The 2010/11 benchmark rate for stroke unit admission is 87.5% among hospitals with stroke units. There was little difference in rates of admission to stroke units by sex (38.6% of women vs. 37.9% of men). Across the LHINs, the number of hospitals with a stroke unit varied from one in several LHINs to five in the Central LHIN (see Appendix D). Rates of admission to acute care stroke units varied across LHINs, ranging from 22.4% of patients in the North Simcoe Muskoka LHIN to 70.1% of patients in the North West LHIN. In 2010/11, regional and district stroke centres had consistently higher rates of stroke unit admission than non-designated stroke centres (63.9%, 63.6% and 7.2%, respectively). The district stroke centres made remarkable advances in stroke unit admission, the rate of which increased from 40.1% in 2008/09 to 63.6% in 2010/11, an almost 60% relative improvement.

Conclusions

In Ontario, stroke/TIA patients are much more likely to be treated on a stroke unit if they are admitted to a designated stroke centre. Coding errors may account for the underrepresentation of stroke unit admissions at some hospitals. The Health System Funding Policy Branch of the Ministry of Health and Long-Term Care recently announced that stroke unit admissions and related measures of stroke care are to be mandatory data elements in the Discharge Abstract Database; this requirement should help improve the coding of stroke unit admissions.

Although there has been significant progress in stroke unit admissions, further improvement is achievable. The 2010 Scottish Stroke Care Audit found that 82% of stroke patients were admitted to a stroke unit.⁶ Patients cared for on designated stroke units have been shown to have improved

outcomes, including lower mortality and less disability and institutionalization.^{13, 14} Stroke unit admission remains a monitoring indicator in the 2012/13 Hospital Service Accountability Agreements between the LHINs and the specialized stroke centres.

Recommendations

Stroke units save lives and reduce institutionalization. Stroke patients need to be transferred to facilities where stroke units exist.

These findings support the identification of stroke unit care as a priority by the OSN's Secondary Prevention and Acute Care Subcommittee and its work to develop a stroke unit tool kit.

The OSN will soon be accepting research proposals to further investigate the existence of a dose-response relationship for stroke unit care and compare outcomes of patients admitted to stroke units with similar patients not admitted within the Ontario stroke system.

The OSN's support of Health Quality Ontario's "stroke mega-analysis" focusing on stroke unit care will be critical to driving system change in stroke patient care in the province. The OSN continues to work with the Ministry of Health and Long-Term Care and the Canadian Institute for Health Information to ensure the quality of this mandatory data element beginning in 2012/13. The OSN supports acute hospital participation in Accreditation Canada's Stroke Services Distinction Program as a means of ensuring stroke units are implemented and sustained in acute care hospitals.

Length of Stay and Inpatient Care

Exhibit 2.5a: There was a slight decrease in median length of stay (LOS) for ischemic stroke patients, from 8 days in 2003/04 to 7 days in 2010/11. Among hemorrhagic stroke inpatients, the median LOS increased by 1 day between 2003/04 and 2010/11. Median length of stay for TIA patients remained stable at 3 days. There was little difference between men and women in inpatient LOS.

Provincially in 2010/11, admitted stroke/TIA patients had almost one-third (32.5%) of their total LOS considered to be Alternate Level of Care (ALC), with minimal difference between men and women (33.0% vs. 32.1%). The benchmark is 14.0%, achieved by Halton Health Services, Oakville site. Regional stroke centres consistently had longer LOS compared to district stroke centres and non-designated hospitals; this was likely attributable to hemorrhagic stroke patients typically being admitted to regional stroke centres. However, regional

stroke centres had the lowest proportion of ALC days compared to total inpatient LOS: 26.4%, compared to 28.5% and 38.3% at district and non-designated facilities, respectively. Across the LHINs, the median total LOS varied by 2 days. There was wide variation in the proportion of ALC days to total LOS across the LHINs, with the lowest proportion of ALC days (19.0%) observed in the South West LHIN and the highest (42.8%) in the North West LHIN.

Exhibit 2.5b: In 2010/11, there were 3,584 admitted stroke/TIA patients with at least one ALC day; their ALC days represented over half (56.5%) of their median inpatient LOS of 17 days. This number of patients (3,584) indicates that almost one in four (23.1%) admitted stroke/TIA patients had at least one ALC day (median 6 ALC days). Among women, the median number of ALC days was 7, one day longer than among men. Women represented 53.4% of stroke/TIA patients with ALC days. Among stroke types, 27.7%, 25.9%, 15.1% and 5.6% of ischemic, intracerebral hemorrhagic, subarachnoid hemorrhagic and TIA patients, respectively, had at least one ALC day. TIA patients with at least one ALC day had the highest proportion of their total acute LOS considered to be ALC: 66.2%, compared to 56.9% among ischemic stroke patients. Among patients with ALC days, those admitted to regional stroke centres had the lowest proportion of their total LOS considered ALC: 51.8%, compared to 53.7% and 59.9% for patients admitted to district stroke centres and non-designated hospitals, respectively. Across LHINs, the median ALC LOS varied from 5 days in the Toronto Central LHIN to 9 days in the Champlain LHIN. Additionally, across LHINs the variation in the proportion of total acute LOS considered to be ALC among patients with at least one ALC day ranged from a high of 63.8% in the North East LHIN to a low of 47.4% for acute hospitals in the Central West LHIN. Interestingly, the North East LHIN had the oldest patient age profile among the LHINs.¹⁵

Conclusions

Patients with TIA continued to be admitted to hospital; with a median stay of three days, this represents over 8,000 acute bed days per year. This occurrence is surprising given that Ontario has over 40 secondary stroke prevention clinics to provide investigations and assessments.

There was wide variation in the proportion of ALC days to total LOS across LHINs in 2010/11, ranging from 19.0% to 42.8%. Among the 23% of admitted stroke/TIA patients who had at least one ALC day, the proportion of ALC days to total LOS was 56.5%, varying from 47.4% to 63.8% across LHINs. Among TIA patients admitted to hospital who had at least one

ALC day, these patients had ALC days representing over half of the total acute LOS (66.2%, median 6 ALC days). This suggests that closer examination is needed, as this subgroup may require more complex case management beyond best practice stroke care.

Almost one in four admitted stroke/TIA patients had at least one ALC day (23.1%). There was a four-day variation in the median number of ALC days across the province.

Recommendations

The OSN should continue its work with the Emergency Department ALC–Stroke Reference Group to address emergency ALC issues as they relate to stroke/TIA. The OSN will continue to monitor ALC days among admitted stroke/TIA patients.

The OSN will continue to examine access to rapid TIA assessment clinics and secondary prevention clinics as a means to reduce TIA hospitalizations.

Exhibit 2.6: The proportion of stroke inpatients who were screened for dysphagia (a swallowing disorder) within three days of inpatient admission increased from 47.9% in 2002/03 to 64.8% in 2010/11 ($p \leq 0.0001$). The benchmark for dysphagia screening is 83.7%, based on the 2010/11 OSA. Increases were observed for all hospital types. In 2010/11, dysphagia screening rates were highest at district stroke centres (74.7%), followed by regional stroke centres (69.4%) and non-designated centres (56.8%). In 2010/11, the variation in dysphagia screening rates across OSS regions ranged from 56.5% in the Toronto–North & East Region to 88.9% in the Northwest Region. The variation was similar across LHINs, ranging from 57.4% in the South West LHIN to 88.9% in the North West LHIN.

Exhibit 2.7: Provincially, pneumonia rates increased from 1.9% in 2003/04 to 2.1% in 2010/11 ($p=0.49$). Rates at the regional stroke centres increased from 2.4% in 2003/04 to 3.0% in 2010/11. Regional stroke centres had the highest adjusted pneumonia rate, followed by non-designated and district stroke centres (1.5% and 1.3%, respectively). Rates in LHINs with sample sizes greater than 30 varied from 2.6% in the Champlain LHIN to 3.2% in the Toronto Central LHIN.

Conclusions

Rates for dysphagia screening improved over time. This may reflect the efforts of the OSS in implementing best practices for screening; however, there is room for further improvement. The Scottish Stroke Care Audit found that 82% of stroke patients had a swallowing screening done within two days of admission.⁶ Wide variability in screening rates exists across the province.

The increase in pneumonia rates may reflect coding practices that capture more complex patients. Regional stroke centres had the highest pneumonia rates, which may reflect their more complex patients and/or their coding practices. A provincial pneumonia rate of 2.1% is much lower than rates reported in the literature,¹⁶ and the national stroke audit¹¹ reported a 5.7% prevalence rate among admitted stroke/TIA patients. The 2010/11 OSA results indicate a pneumonia prevalence of 6.6% among admitted stroke/TIA patients. The fluctuating numbers seen in Exhibit 2.7 could represent variation in coding, as the identification of this diagnosis code was not based on the “most responsible diagnosis” data field and therefore merits further examination. Data from regional stroke centres in Ontario report a rate of 7%, yet our analyses, which are based on administrative data, indicate a pneumonia rate of 3.0% at regional stroke centres in 2010/11.¹⁶

Recommendations

Regions and facilities should examine their overall in-hospital pneumonia rates to gain a better understanding of them. The OSN will continue to monitor pneumonia rates and compare them to national data and to the next Ontario Stroke Audit.

Inpatient Discharge Destinations

Exhibit 2.8a: Provincially, the proportion of stroke/TIA patients discharged to inpatient rehabilitation increased from 20.5% in 2003/04 to 23.9% in 2010/11 ($p < 0.0001$), and the proportion discharged to long-term care and complex continuing care decreased, respectively, from 8.5% in 2003/04 to 6.8% in 2010/11 ($p < 0.0001$) and from 8.8% in 2003/04 to 6.8% in 2010/11 ($p < 0.0001$). The proportion of stroke patients discharged to acute care rose from 4.6% in 2003/04 to 6.6% in 2010/11 ($p < 0.0001$). The proportion of stroke patients discharged home with services following an acute stroke/TIA hospitalization increased from 11.1% in 2003/04 to 13.8% in 2010/11 ($p < 0.0001$). The proportion of TIA patients discharged to long-term care remained consistent at about 5% over the eight years of the study.

Similar trends were observed in men and women; however, fewer women were discharged to rehabilitation (22.9% compared to 24.9% of men in 2010/11), whereas almost twice as many women were transferred to long-term care homes as men (9.0% vs. 4.6%).

Across all hospital types, the proportion of patients discharged to inpatient rehabilitation increased, but district stroke centres

had the highest rate of discharge to rehabilitation (29.9%), followed by regional stroke centres at 26.3%. Non-designated centres had the highest discharge rates to long-term care and home with services.

There was wide variation across the LHINs in discharging to inpatient rehabilitation, ranging from 17.3% in the Waterloo Wellington LHIN to 33.0% in the Erie St. Clair LHIN. The North West, North East and Central East LHINs had dramatic increases in discharging to inpatient rehabilitation, ranging from 5.4%, 9.9%, and 20.5% in 2003/04 to 22.7%, 18.7% and 30.7% in 2010/11, respectively. Across the LHINs, discharging to long-term care varied from 3.9% to 11.1%, with a similar range of variation observed for discharge to complex continuing care.

Exhibit 2.8b: Overall in the province, referrals to secondary stroke prevention clinics (SPCs) among patients discharged directly from the ED increased from 57.2% in 2008/09 to 72.4% in 2010/11. Similarly, among patients discharged alive (from ED or acute inpatient care), referrals to SPCs rose from 37.5% in 2008/09 to 54.3% in 2010/11. A greater proportion of men than women were referred to SPCs over time.

In 2010/11, regional stroke centres referred the most patients to SPCs (69.2%), followed by district stroke centres (52.6%), non-designated centres (46.3%) and Telestroke sites (46.0%). Among stroke types, ischemic stroke and TIA patients were the most likely to be discharged from the ED with an SPC referral; there was a marked increase in the number of hemorrhagic patients over the two years. There was also large variation in referrals across LHINs (ranging from 32.6% to 75.5% in 2010/11) despite 13 of 14 LHINs containing at least one SPC.

Conclusions

Provincially, the proportion of stroke patients discharged to inpatient rehabilitation and home with services continued to increase, and the proportion discharged to complex continuing care and long-term care homes decreased. The overall increase in the proportion of patients discharged to another acute care facility may reflect the repatriation of stroke/TIA patients from designated stroke centres to non-designated hospitals as the demand for acute care beds increases.

The proportion of stroke/TIA patients discharged from acute care and referred to secondary prevention services has increased over time. The overall increase may reflect the increase in resources, as the number of SPCs across the province increased from 37 in 2008/09 to 42 in 2010/11.

Recommendations

Further improvements can be made in this area by clarifying rehabilitation admission criteria and ensuring that stroke rehabilitation services have the capacity to manage more complex stroke patients.

It is recommended that the OSN lead the development of province-wide criteria for admission into inpatient rehabilitation, continue efforts to implement AlphaFIM across acute care hospitals, and work with the Canadian Institute for Health Information to have AlphaFIM data collected in the Discharge Abstract Database.

The dramatic improvement in discharge to inpatient rehabilitation practice patterns observed in the North East, North West and Central East LHINs should be shared with the OSN Stroke Reference Panel.

As the number of patients referred to SPCs increases, it is recommended the OSN evaluate the stroke care provided by them. Current SPC data in Ontario are limited. The OSN has planned a provincial audit in 2012 of all operating SPCs to better understand SPC care and their impact on stroke outcomes.

Carotid Intervention

Exhibit 2.9: Overall in 2010/11, 82.0% of patients with ischemic stroke had carotid imaging done in hospital or had a scheduled appointment following hospital discharge, an increase from 56.3% of patients in 2002/03 ($p < 0.0001$). The benchmark for carotid imaging to be done prior to discharge is 92.8%, based on 2010/11 OSA data. Women had lower carotid imaging rates while in hospital compared to men (77.0% vs. 80.2%). There was considerable improvement across most OSS regions in the proportion of patients accessing carotid imaging prior to hospital discharge. In 2002/03, only half of patients received imaging prior to discharge, but by 2010/11, this had risen to almost 4 of every 5 patients (78.7%). Yet regional variations in rates of carotid imaging remain: the Central West LHIN had the highest rate of carotid imaging prior to discharge (88.3%) compared to the Hamilton Niagara Haldimand Brant LHIN with the lowest rate (66.9%).

Exhibit 2.10: From 2008/09 to 2010/11, the capacity for carotid intervention appeared to be in the range of 450–500 patients per year. The time to carotid intervention decreased substantially in Ontario over time. The median number of days for intervention was 51 days in 2003/04 and 18 days in 2010/11 ($p < 0.0001$). While this is a significant improvement, the latter rate is still higher than the two-week best practice

benchmark.⁷ Among patients receiving carotid intervention, women represented only slightly more than one in four patients (27.5%). Women waited longer for the intervention in 2010/11 than men (18 days vs. 17 days). Patients discharged from regional stroke centres had the shortest wait time (median 10 days) and achieved the benchmark of two weeks, compared to 22 days and 26 days for patients discharged from district and non-designated hospitals, respectively. There was considerable variation in wait times across OSS regions and LHINs, with the highest median wait times observed in the Central East, South West and Hamilton Niagara Haldimand Brant LHINs. This variation may reflect differences in neurosurgical access.

Conclusions

Carotid imaging is an important tool for diagnosing the cause of strokes and TIAs and preventing further events. Across the province, the majority of inpatients with ischemic stroke without atrial fibrillation underwent carotid imaging prior to discharge and overall carotid imaging rates increased significantly across the study time frame ($p \leq 0.0001$). Women had lower in-hospital carotid imaging rates compared to men (77.0% vs. 80.2%). Previous research suggests that this is attributable to differences in surgical eligibility.¹⁷

The time to carotid intervention improved significantly in Ontario outside of the provincial Wait Time Strategy initiative.

Recommendations

We have only reported carotid imaging rates among ischemic stroke inpatients. Future work should examine the prevalence of carotid imaging among TIA patients, as well as rates of imaging scheduled following discharge from the ED.

There is a need for continued efforts to ensure timely carotid artery imaging and prompt referrals to surgeons to achieve the stroke care best practice recommendation of two weeks.⁷ Regional stroke centres have significantly lower carotid intervention wait times than district or non-designated centres, reinforcing the importance of patients going to regional stroke centres for stroke care.

The OSN should continue to contribute to and advise the Ontario Wait Time Strategy as it relates to access to carotid interventions. The OSN needs to advance its understanding of the prolonged delayed to carotid intervention among patients seen at district stroke centres, despite these centres having 80% of the patients receiving imaging while in hospital.

Prescription Rates

Exhibit 2.11: The proportion of patients who were prescribed antithrombotic/anticoagulant, antihypertensive and anti-lipid drug therapy at discharge increased significantly from 19.9% in 2002/03 to 52.1% in 2008/09 ($p \leq 0.0001$), but there was little change observed in 2010/11 (51.4%). The 2010/11 performance of this practice was better at regional and district stroke centres (57.2% and 53.1%, respectively) compared to non-designated centres (47.7%). Wide variation existed in the prescribing of all three medications, with the highest prescribing rate observed in the North West LHIN (60.2%) and the lowest in the Waterloo Wellington LHIN (41.2%).

Exhibit 2.12: Improvement was observed in the proportion of ischemic stroke patients with atrial fibrillation who were prescribed or recommended warfarin or other anticoagulants upon discharge from acute care, increasing from 66.8% of patients in 2002/03 to 72.1% in 2010/11 ($p = 0.0394$). The benchmark is 86.0%, based on 2010/11 OSA data. Ontario's performance was better than rates observed in the 2010 Scottish Care Stroke Audit where only 48% were found to be on anticoagulants at discharge.⁶ Women with atrial fibrillation were prescribed or recommended anticoagulants on discharge at a slightly lower rate than men, 70.9% vs. 73.4% ($p = 0.2518$). Improvement was observed across all facility types. Performance rates at non-designated facilities were similar to those observed at district stroke centres (70.7% and 69.1%, respectively). Although regional stroke centres demonstrated consistently higher prescribing rates, their performance rates remained below earlier years. There was an 18-point variation across LHINs, ranging from a low of 62.6% in the Hamilton Niagara Haldimand Brant LHIN to a high of 80.4% in the Champlain LHIN. Interestingly, the Champlain LHIN had the highest prevalence of atrial fibrillation (see Exhibit ii).

Conclusions and recommendations

No significant improvements were made since 2008/09 in prescribing all three secondary stroke prevention medications (antithrombotics/anticoagulants, antihypertensives and anti-lipids) upon discharge from acute care facilities in Ontario, despite the increasing prevalence of stroke-related risk factors in the population.

The increase in anticoagulant prescription rates for warfarin among stroke/TIA patients with atrial fibrillation upon discharge from acute care may be related to data collection changes introduced in the 2010/11 OSA. Previously, this performance was based solely on warfarin prescribing, but in

2010/11, data was collected on other types of anticoagulants, and on whether drugs were recommended. Continual monitoring is needed as patients with atrial fibrillation are at high risk for stroke and stroke recurrence.

Exhibit 2.13: In 2010/11, 61.6% of patients were discharged with no or minimal disability (modified Rankin score of 0–2) following a stroke/TIA, and 38.4% were discharged with moderate to severe functional disability (score 3–5). Over 40% of women were considered to have moderate to severe functional disability at discharge compared to just over a third (35.1%) of men. Intracerebral hemorrhagic and ischemic stroke patients had the highest proportion of patients with moderate to severe disability on discharge (69.6% and 56.1%, respectively). A higher proportion of patients at regional stroke centres were discharged with moderate to severe disability compared to those at district stroke centres, non-designated facilities and non-designated Telestroke facilities (41.1%, 39.7%, 36.1% and 35.2%, respectively). Variation across LHINs in the proportion of patients discharged with moderate to severe disability was modest, with the lowest prevalence in the Champlain LHIN (30.6%) and the highest in the Toronto Central LHIN (46.0%).

Exhibit 2.14a: In 2010/11, 78.4% of stroke/TIA patients with mild disability (modified Rankin score of 0–2) were discharged home without services; this discharge destination represented 76.3% of women and 80.3% of men. Among patients with mild functional disability, similar proportions were referred to outpatient and inpatient rehabilitation at discharge (4.5% vs. 3.9%), and a similar pattern was observed across all hospital designations. There was wide variation across LHINs in the proportion of patients with a mild degree of disability being discharged to outpatient rehabilitation, ranging from 1.5% in the Erie St. Clair LHIN to 15.4% in the North West LHIN. Discharge to inpatient rehabilitation varied across the OSS, ranging from 1.3% in the Southwest region to 10.8% in the Toronto–West region.

Exhibit 2.14b: In 2010/11, the dominant discharge destination for 45.4% of stroke/TIA patients with moderate to severe functional impairment (modified Rankin score of 3–5) was inpatient rehabilitation. One in five stroke/TIA patients (20.4%) with a moderate to severe functional impairment were discharged to long-term care (LTC) or complex continuing care (CCC); 11.7% were discharged home with CCAC support and 10.2% were discharged to another acute care facility. Women with moderate to severe disability were less likely to be discharged to inpatient rehabilitation than men (42.4% vs.

48.8%) and more likely to be discharged to LTC/CCC than men (22.8% vs. 17.7%). Patients with an uncertain stroke type or TIA and with moderate to severe disability had the highest rates of discharge to LTC/CCC compared to other stroke types (36.9% and 26.8%, respectively). Patients admitted to designated stroke centres with moderate to severe disability were more likely to be discharged to inpatient rehabilitation compared to similar patients in non-designated hospitals. Variation across the LHINs in the proportion of stroke/TIA patients with moderate to severe disability discharged to inpatient rehabilitation ranged from 50.7% in the North West LHIN to 35.0% in the Central West LHIN.

Conclusions

Thirty-eight percent of stroke/TIA patients were considered to have moderate to severe functional impairment (modified Rankin score of 3–5), 45.4% were discharged to inpatient rehabilitation and 20.6% were discharged home following an acute stroke/TIA inpatient stay. Among women, 41.8% were considered to have a moderate to severe functional impairment, yet only 42.4% of them were discharged to inpatient rehabilitation following an acute stroke/TIA hospitalization compared to 48.8% of men.

There was wide variation across LHINs in the discharge destination for stroke rehabilitation among patients with mild and moderate to severe disability.

Recommendations

There is a need to establish the level of disability that stroke/TIA patients had prior to their stroke in order to better understand the impact of stroke on functional impairment and the capacity for rehabilitation.

The OSN's collaboration with ECHO: Improving Women's Health in Ontario (an agency of the Ministry of Health and Long-Term Care) will advance our understanding of the rehabilitation needs, potential and setting for the almost two-thirds of women considered to have moderate to severe disability upon discharge from an acute stroke/TIA hospitalization.

Standardization of patient assessment is needed to ensure that an appropriate rehabilitation site is selected for optimal functional recovery.

Exhibit 2.15: In 2008/09, acute care hospitals in Ontario started to implement AlphaFIM, a standardized assessment tool used to evaluate the disability and functional status of patients in acute care 3–5 days following stroke admission. It is designed to objectively measure burden of care and assist in determining patient discharge destination following acute treatment. In the 2010/11 OSA, we were able to capture over 2,000 charts containing AlphaFIM scores.

The Stroke Reference Panel recommends completion of the AlphaFIM instrument by day 3 from admission. On average, it was completed 5.3 days after inpatient admission (median 3.7 days). The proportion of patients assessed by day 3 of inpatient admission was 35.9%. Among women, 33.9% were assessed by day 3 compared to 37.8% of men.

The mean total AlphaFIM score was 69.4 (median 72.1). Among these patients, 43.8% were considered to have mild disability with a mean AlphaFIM of 100.7, 31.3% moderate disability with a mean AlphaFIM of 60.3, and 24.9% severe disability with a mean AlphaFIM of 25.8. Among women, 40.0% were considered to have mild disability compared to 47.5% of men, and 28.4% had severe disability compared to 21.6% of men; no difference was observed between women and men considered to have moderate disability (31.6% vs. 31.0%). Almost half of the women (49.3%) were assessed to need three or more hours of help compared to 43.9% of men. Among these patients, 22.5% were assessed not to need help; this included one in five women and one in four men.

Forty-eight percent of patients whose functional ability was assessed were documented to be discharged to inpatient rehabilitation (46.9% of women and 49.0% of men). Thirty-eight percent of mildly disabled stroke patients, 35.8% of severely disabled stroke patients and 69.8% of moderately disabled stroke patients were discharged to inpatient rehabilitation. Of the mildly disabled group, 31.6% were discharged home without services and 12.7% received outpatient services. Among severely disabled stroke patients, 28.0% were discharged to long-term care or complex continuing care facilities and 20.2% died in acute care.

Conclusions

Among stroke patients whose functional ability was assessed using the AlphaFIM instrument, 48.0% were discharged to inpatient rehabilitation; this was substantially higher than the overall provincial average of inpatient rehabilitation (30.7%). This suggests that there is a bias toward completing the AlphaFIM for stroke patients who are candidates for rehabilitation, rather than for all stroke patients as was initially intended in the implementation. In addition, many hospitals indicated they had implemented AlphaFIM (see Appendix D), yet we were able to capture data for only 47 of the 86 hospitals, suggesting documentation is not readily available for chart abstraction.

Recommendations

The OSN regions should continue to support the use of the AlphaFIM for all stroke patients within 3 days of admission. They should work with their hospitals to ensure that scores are documented and remain in the chart to support the Stroke Reference Group's recommendation of administering the AlphaFIM on day 3 to facilitate decision-making on patient discharge to inpatient rehabilitation.

The OSN will continue to work with CIHI to have AlphaFIM data routinely collected in the Discharge Abstract Database.

Exhibit 2.1

Number and percentage of adult patients¹ admitted to acute care hospitals for stroke or transient ischemic attack, in Ontario and by sex and age group, 2003/04 and 2008/09–2010/11

Characteristic		Patients, n (%)			
		2003/04	2008/09	2009/10	2010/11
Ontario		15,731	15,107	15,347	15,524
Sex	Female	8,010 (50.9)	7,663 (50.7)	7,816 (50.9)	7,881 (50.8)
	Male	7,721 (49.1)	7,444 (49.3)	7,531 (49.1)	7,643 (49.2)
Age	Mean ± SD	73.7 ± 13.0	73.1 ± 13.7	73.2 ± 13.9	73.1 ± 13.9
	Median (IQR)	76 (67-83)	76 (65-83)	76 (64-84)	76 (64-84)
Age group	18-45	549 (3.5)	611 (4.0)	611 (4.0)	612 (3.9)
	46-65	3,022 (19.2)	3,401 (22.5)	3,534 (23.0)	3,639 (23.4)
	66-75	3,840 (24.4)	3,346 (22.1)	3,265 (21.3)	3,364 (21.7)
	76-85	5,708 (36.3)	5,101 (33.8)	5,016 (32.7)	4,983 (32.1)
	>85	2,612 (16.6)	2,648 (17.5)	2,921 (19.0)	2,936 (18.8)
Female age	Mean ± SD	75.8 ± 13.0	75.3 ± 13.7	75.4 ± 14.0	75.3 ± 13.9
	Median (IQR)	79 (70-85)	79 (68-85)	79 (68-86)	79 (67-85)
Female age group	18-45	264 (3.3)	282 (3.7)	301 (3.9)	291 (3.7)
	46-65	1,196 (14.9)	1,327 (17.3)	1,391 (17.8)	1,460 (18.5)
	66-75	1,681 (21.0)	1,487 (19.4)	1,474 (18.9)	1,511 (19.2)
	76-85	3,076 (38.4)	2,778 (36.3)	2,680 (34.3)	2,653 (33.7)
	>85	1,793 (22.4)	1,789 (23.3)	1,970 (25.2)	1,966 (24.9)
Male age	Mean ± SD	71.6 ± 12.7	70.8 ± 13.3	70.9 ± 13.5	70.8 ± 13.5
	Median (IQR)	74 (64-81)	73 (62-81)	73 (62-81)	73 (62-81)
Male age group	18-45	285 (3.7)	329 (4.4)	310 (4.1)	321 (4.2)
	46-65	1,826 (23.6)	2,074 (27.9)	2,143 (28.5)	2,179 (28.5)
	66-75	2,159 (28.0)	1,859 (25.0)	1,791 (23.8)	1,853 (24.2)
	76-85	2,632 (34.1)	2,323 (31.2)	2,336 (31.0)	2,330 (30.5)
	>85	819 (10.6)	859 (11.5)	951 (12.6)	960 (12.6)

Data source: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years.

Exclusion criteria: Patients with elective admissions.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

SD = standard deviation; IQR = interquartile range (25th–75th percentile)

Exhibit 2.2

Number and percentage of adult patients¹ admitted to acute care hospitals for stroke or transient ischemic attack, in Ontario and by sex, stroke type, OSS region and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	Patients, n (%)															
	2003/04				2008/09				2009/10				2010/11			
	All	Regional Stroke Centre	District Stroke Centre	Non-Designated	All	Regional Stroke Centre	District Stroke Centre	Non-Designated	All	Regional Stroke Centre	District Stroke Centre	Non-Designated	All	Regional Stroke Centre	District Stroke Centre	Non-Designated
Ontario	15,731	4,009	2,925	8,797	15,107	4,643	3,039	7,425	15,347	4,883	3,215	7,249	15,524	5,076	3,283	7,165
Stroke Type																
Intracerebral hemorrhage	All 1,691 (10.7)	579 (14.4)	293 (10.0)	819 (9.3)	1,521 (10.1)	639 (13.8)	249 (8.2)	633 (8.5)	1,629 (10.6)	723 (14.8)	294 (9.1)	612 (8.4)	1,524 (9.8)	635 (12.5)	282 (8.6)	607 (8.5)
	Female 839 (49.6)	260 (44.9)	151 (51.5)	428 (52.3)	748 (49.2)	309 (48.4)	117 (47.0)	322 (50.9)	787 (48.3)	327 (45.2)	148 (50.3)	312 (51.0)	712 (46.7)	296 (46.6)	132 (46.8)	284 (46.8)
Ischemic stroke	All 5,640 (35.9)	1,720 (42.9)	1,047 (35.8)	2,873 (32.7)	6,461 (42.8)	2,234 (48.1)	1,277 (42.0)	2,950 (39.7)	6,816 (44.4)	2,467 (50.5)	1,420 (44.2)	2,929 (40.4)	7,880 (50.8)	2,778 (54.7)	1,798 (54.8)	3,304 (46.1)
	Female 2,756 (48.9)	806 (46.9)	534 (51.0)	1,416 (49.3)	3,213 (49.7)	1,085 (48.6)	599 (46.9)	1,529 (51.8)	3,407 (50.0)	1,189 (48.2)	713 (50.2)	1,505 (51.4)	3,937 (50.0)	1,286 (46.3)	926 (51.5)	1,725 (52.2)
Subarachnoid hemorrhage	All 584 (3.7)	434 (10.8)	50 (1.7)	100 (1.1)	685 (4.5)	492 (10.6)	70 (2.3)	123 (1.7)	690 (4.5)	537 (11.0)	53 (1.6)	100 (1.4)	738 (4.8)	563 (11.1)	59 (1.8)	116 (1.6)
	Female 357 (61.1)	272 (62.7)	27 (54.0)	58 (58.0)	406 (59.3)	288 (58.5)	41 (58.6)	77 (62.6)	406 (58.8)	318 (59.2)	31 (58.5)	57 (57.0)	456 (61.8)	359 (63.8)	32 (54.2)	65 (56.0)
Transient ischemic attack	All 2,670 (17.0)	494 (12.3)	525 (17.9)	1,651 (18.8)	2,666 (17.6)	634 (13.7)	592 (19.5)	1,440 (19.4)	2,720 (17.7)	633 (13.0)	630 (19.6)	1,457 (20.1)	2,763 (17.8)	697 (13.7)	676 (20.6)	1,390 (19.4)
	Female 1,382 (51.8)	249 (50.4)	262 (49.9)	871 (52.8)	1,381 (51.8)	325 (51.3)	305 (51.5)	751 (52.2)	1,438 (52.9)	331 (52.3)	333 (52.9)	774 (53.1)	1,458 (52.8)	370 (53.1)	350 (51.8)	738 (53.1)
Unable to determine ²	All 5,146 (32.7)	782 (19.5)	1,010 (34.5)	3,354 (38.1)	3,774 (25.0)	644 (13.9)	851 (28.0)	2,279 (30.7)	3,492 (22.8)	523 (10.7)	818 (25.4)	2,151 (29.7)	2,619 (16.9)	403 (7.9)	468 (14.3)	1,748 (24.4)
	Female 2,676 (52.0)	385 (49.2)	528 (52.3)	1,763 (52.6)	1,915 (50.7)	335 (52.0)	446 (52.4)	1,134 (49.8)	1,778 (50.9)	266 (50.9)	390 (47.7)	1,122 (52.2)	1,318 (50.3)	189 (46.9)	248 (53.0)	881 (50.4)
Ontario Stroke System Region																
Central East	2,182 (13.9)	207 (5.2)	782 (26.7)	1,193 (13.6)	2,070 (13.7)	217 (4.7)	783 (25.8)	1,070 (14.4)	2,068 (13.5)	228 (4.7)	822 (25.6)	1,018 (14.0)	2,061 (13.3)	227 (4.5)	804 (24.5)	1,030 (14.4)
Central South	2,824 (18.0)	427 (10.7)	558 (19.1)	1,839 (20.9)	2,561 (17.0)	471 (10.1)	726 (23.9)	1,364 (18.4)	2,687 (17.5)	503 (10.3)	815 (25.3)	1,369 (18.9)	2,735 (17.6)	570 (11.2)	854 (26.0)	1,311 (18.3)
East – Champlain	1,265 (8.0)	362 (9.0)	110 (3.8)	793 (9.0)	1,167 (7.7)	485 (10.4)	116 (3.8)	566 (7.6)	1,221 (8.0)	559 (11.4)	113 (3.5)	549 (7.6)	1,269 (8.2)	581 (11.4)	159 (4.8)	529 (7.4)
Northeast	1,054 (6.7)	335 (8.4)	405 (13.8)	314 (3.6)	1,066 (7.1)	309 (6.7)	463 (15.2)	294 (4.0)	1,033 (6.7)	311 (6.4)	415 (12.9)	307 (4.2)	1,010 (6.5)	305 (6.0)	425 (12.9)	280 (3.9)
Northwest	400 (2.5)	277 (6.9)	n/a	123 (1.4)	452 (3.0)	323 (7.0)	n/a	129 (1.7)	442 (2.9)	334 (6.8)	n/a	108 (1.5)	436 (2.8)	318 (6.3)	n/a	118 (1.6)
South East	756 (4.8)	283 (7.1)	144 (4.9)	329 (3.7)	632 (4.2)	297 (6.4)	95 (3.1)	240 (3.2)	624 (4.1)	278 (5.7)	106 (3.3)	240 (3.3)	673 (4.3)	305 (6.0)	132 (4.0)	236 (3.3)
Southwest	2,491 (15.8)	467 (11.6)	926 (31.7)	1,098 (12.5)	2,133 (14.1)	470 (10.1)	856 (28.2)	807 (10.9)	2,362 (15.4)	605 (12.4)	944 (29.4)	813 (11.2)	2,234 (14.4)	608 (12.0)	909 (27.7)	717 (10.0)
Toronto – North & East	1,029 (6.5)	324 (8.1)	n/a	705 (8.0)	1,130 (7.5)	436 (9.4)	n/a	694 (9.3)	1,118 (7.3)	452 (9.3)	n/a	666 (9.2)	1,241 (8)	514 (10.1)	n/a	727 (10.1)
Toronto – Southeast	865 (5.5)	269 (6.7)	n/a	596 (6.8)	868 (5.7)	352 (7.6)	n/a	516 (6.9)	849 (5.5)	354 (7.2)	n/a	495 (6.8)	836 (5.4)	366 (7.2)	n/a	470 (6.6)
Toronto – West	1,288 (8.2)	477 (11.9)	n/a	811 (9.2)	1,299 (8.6)	617 (13.3)	n/a	682 (9.2)	1,235 (8.0)	606 (12.4)	n/a	629 (8.7)	1,260 (8.1)	618 (12.2)	n/a	642 (9.0)
West GTA	1,577 (10.0)	581 (14.5)	n/a	996 (11.3)	1,729 (11.4)	666 (14.3)	n/a	1,063 (14.3)	1,708 (11.1)	653 (13.4)	n/a	1,055 (14.6)	1,769 (11.4)	664 (13.1)	n/a	1,105 (15.4)
Local Health Integration Network																
1. Erie St. Clair	1,092 (6.9)	n/a	728 (24.9)	364 (4.1)	923 (6.1)	n/a	642 (21.1)	281 (3.8)	992 (6.5)	n/a	738 (23.0)	254 (3.5)	893 (5.8)	n/a	703 (21.4)	190 (2.7)
2. South West	1,399 (8.9)	467 (11.6)	198 (6.8)	734 (8.3)	1,210 (8.0)	470 (10.1)	214 (7.0)	526 (7.1)	1,370 (8.9)	605 (12.4)	206 (6.4)	559 (7.7)	1,341 (8.6)	608 (12.0)	206 (6.3)	527 (7.4)
3. Waterloo Wellington	721 (4.6)	n/a	199 (6.8)	522 (5.9)	714 (4.7)	n/a	349 (11.5)	365 (4.9)	709 (4.6)	n/a	362 (11.3)	347 (4.8)	726 (4.7)	n/a	383 (11.7)	343 (4.8)
4. Hamilton Niagara Haldimand Brant	2,103 (13.4)	427 (10.7)	359 (12.3)	1,317 (15.0)	1,847 (12.2)	471 (10.1)	377 (12.4)	999 (13.5)	1,978 (12.9)	503 (10.3)	453 (14.1)	1,022 (14.1)	2,009 (12.9)	570 (11.2)	471 (14.3)	968 (13.5)
5. Central West	559 (3.6)	n/a	n/a	559 (6.4)	558 (3.7)	n/a	n/a	558 (7.5)	573 (3.7)	n/a	n/a	573 (7.9)	616 (4.0)	n/a	n/a	616 (8.6)
6. Mississauga Halton	1,018 (6.5)	581 (14.5)	n/a	437 (5.0)	1,171 (7.8)	666 (14.3)	n/a	505 (6.8)	1,135 (7.4)	653 (13.4)	n/a	482 (6.6)	1,153 (7.4)	664 (13.1)	n/a	489 (6.8)
7. Toronto Central	1,674 (10.6)	1,070 (26.7)	n/a	604 (6.9)	1,903 (12.6)	1,405 (30.3)	n/a	498 (6.7)	1,911 (12.5)	1,412 (28.9)	n/a	499 (6.9)	1,950 (12.6)	1,498 (29.5)	n/a	452 (6.3)
8. Central	1,376 (8.7)	n/a	249 (8.5)	1,127 (12.8)	1,358 (9.0)	n/a	294 (9.7)	1,064 (14.3)	1,289 (8.4)	n/a	261 (8.1)	1,028 (14.2)	1,361 (8.8)	n/a	286 (8.7)	1,075 (15.0)
9. Central East	1,612 (10.2)	n/a	473 (16.2)	1,139 (12.9)	1,459 (9.7)	n/a	434 (14.3)	1,025 (13.8)	1,449 (9.4)	n/a	508 (15.8)	941 (13.0)	1,458 (9.4)	n/a	470 (14.3)	988 (13.8)
10. South East	756 (4.8)	283 (7.1)	144 (4.9)	329 (3.7)	632 (4.2)	297 (6.4)	95 (3.1)	240 (3.2)	624 (4.1)	278 (5.7)	106 (3.3)	240 (3.3)	673 (4.3)	305 (6.0)	132 (4.0)	236 (3.3)
11. Champlain	1,265 (8.0)	362 (9.0)	110 (3.8)	793 (9.0)	1,167 (7.7)	485 (10.4)	116 (3.8)	566 (7.6)	1,221 (8.0)	559 (11.4)	113 (3.5)	549 (7.6)	1,269 (8.2)	581 (11.4)	159 (4.8)	529 (7.4)
12. North Simcoe Muskoka	702 (4.5)	207 (5.2)	60 (2.1)	435 (4.9)	647 (4.3)	217 (4.7)	55 (1.8)	375 (5.1)	621 (4.0)	228 (4.7)	53 (1.6)	340 (4.7)	629 (4.1)	227 (4.5)	48 (1.5)	354 (4.9)
13. North East	1,054 (6.7)	335 (8.4)	405 (13.8)	314 (3.6)	1,066 (7.1)	309 (6.7)	463 (15.2)	294 (4.0)	1,033 (6.7)	311 (6.4)	415 (12.9)	307 (4.2)	1,010 (6.5)	305 (6.0)	425 (12.9)	280 (3.9)
14. North West	400 (2.5)	277 (6.9)	n/a	123 (1.4)	452 (3.0)	323 (7.0)	n/a	129 (1.7)	442 (2.9)	334 (6.8)	n/a	108 (1.5)	436 (2.8)	318 (6.3)	n/a	118 (1.6)

Data source: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2003/04–2010/11.

Inclusion criteria: Patients aged ≥18 years.

Exclusion criteria: Patients with elective admissions.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Unable to determine: stroke, not specified as hemorrhagic or infarction.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Female rows display the proportion of females relative to "All" for the given subgroup.

(3) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

n/a = not applicable

Exhibit 2.3

Age- and sex-adjusted inpatient admission rates for adults¹ with stroke or transient ischemic attack per 1,000 LHIN population aged 18 and older, in Ontario and by Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	Age- and Sex-Adjusted Rate, % (n)			
	2003/04	2008/09	2009/10	2010/11
Provincial Rate²	1.7 (15,714)	1.5 (15,092)	1.5 (15,337)	1.5 (15,513)
Standardized Rate³	1.7 (15,714)	1.4 (15,092)	1.4 (15,337)	1.4 (15,513)
Local Health Integration Network²				
1. Erie St. Clair	2.2 (1,152)	1.7 (951)	1.9 (1,043)	1.7 (939)
2. South West	1.7 (1,321)	1.4 (1,137)	1.6 (1,310)	1.5 (1,266)
3. Waterloo Wellington	1.6 (783)	1.5 (780)	1.4 (765)	1.4 (790)
4. Hamilton Niagara Haldimand Brant	1.8 (2,088)	1.5 (1,838)	1.5 (1,938)	1.6 (2,016)
5. Central West	1.7 (659)	1.6 (748)	1.5 (749)	1.6 (783)
6. Mississauga Halton	1.6 (933)	1.5 (1,041)	1.4 (996)	1.3 (1,016)
7. Toronto Central	1.5 (1,360)	1.5 (1,337)	1.4 (1,307)	1.4 (1,293)
8. Central	1.5 (1,496)	1.4 (1,617)	1.3 (1,558)	1.3 (1,649)
9. Central East	1.6 (1,779)	1.4 (1,662)	1.4 (1,693)	1.4 (1,704)
10. South East	1.6 (736)	1.4 (656)	1.4 (651)	1.5 (717)
11. Champlain	1.4 (1,251)	1.2 (1,148)	1.2 (1,182)	1.3 (1,244)
12. North Simcoe Muskoka	2.0 (693)	1.6 (629)	1.6 (626)	1.6 (625)
13. North East	2.1 (1,068)	2.1 (1,100)	2.1 (1,071)	2.0 (1,039)
14. North West	2.0 (395)	2.2 (448)	2.3 (448)	2.2 (432)

Data sources: Canadian Institute for Health Information, National Ambulatory Care Reporting System (NACRS), 2003/04–2010/11; Statistics Canada, Ontario intercensal population estimate, 2003.

Inclusion criteria: All patients aged ≥18 years with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack.

Exclusion criteria: Patients with a scheduled emergency department visit.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Age- and sex-adjusted rate using each year's Ontario population as the standard.

³ Age- and sex-adjusted rate using the 2003/04 Ontario population as the standard.

Notes:

(1) Population-based analysis (i.e., the location of the patient's residence is used to report regional performance).

(2) Excludes patients with missing postal codes.

(3) Excludes all NACRS records with ICD codes that include the prefix "Q" (suspected, questionable diagnoses) starting in 2008/09.

(4) Indicates a significant difference from the provincial rate.

Exhibit 2.4

Number and percentage of adult stroke or transient ischemic attack patients admitted to an acute care hospital and treated on a stroke unit¹ at any time during their stay, in Ontario and by sex, OSS region, OSS classification and Local Health Integration Network, 2002/03, 2004/05, 2008/09 and 2010/11

Group/Subgroup	Patients, n (%)			
	2002/03	2004/05	2008/09	2010/11
Ontario	446 (2.7)	2,814 (18.6)	4,324 (30.3)	4,890 (38.3)
Female	-	-	-	2,453 (38.6)
Male	-	-	-	2,437 (37.9)
Ontario Stroke System Region				
Central East	-	141 (6.5)	209 (12.2)	603 (36.5)
Central South	144 (5.3)	521 (19.0)	484 (20.4)	703 (30.3)
East – Champlain	-	131 (11.1)	496 (42.0)	545 (52.1)
Northeast	-	133 (12.9)	333 (33.0)	309 (41.4)
Northwest	-	120 (32.0)	294 (66.7)	244 (70.1)
South East	-	106 (15.5)	231 (46.1)	263 (47.3)
Southwest	84 (3.4)	451 (21.2)	892 (43.5)	955 (51.3)
Toronto – North & East	135 (10.9)	462 (35.8)	333 (30.5)	465 (45.5)
Toronto – Southeast	-	18 (2.4)	238 (27.8)	192 (25.7)
Toronto – West	56 (3.9)	227 (19.1)	283 (22.8)	219 (22.0)
West GTA	27 (1.7)	504 (31.4)	530 (29.0)	390 (26.4)
Ontario Stroke System Classification				
Regional stroke centre	117 (3.5)	1,700 (54.0)	2,687 (63.0)	2,743 (63.9)
District stroke centre	54 (1.7)	781 (23.9)	1,302 (40.1)	1,745 (63.6)
Non-designated	275 (2.8)	333 (3.8)	334 (4.9)	398 (7.2)
Telestroke ²	-	-	-	**
Local Health Integration Network				
1. Erie St. Clair	-	210 (23.1)	445 (53.8)	459 (61.3)
2. South West	84 (6.4)	241 (19.7)	448 (36.6)	497 (44.6)
3. Waterloo Wellington	45 (6.7)	232 (30.7)	205 (30.2)	271 (43.9)
4. Hamilton Niagara Haldimand Brant	99 (4.8)	289 (14.5)	278 (16.5)	431 (25.4)
5. Central West	9 (1.5)	30 (5.6)	-	-
6. Mississauga Halton	18 (1.9)	474 (44.3)	530 (42.0)	390 (40.2)
7. Toronto Central	-	474 (27.1)	670 (35.3)	591 (35.8)
8. Central	56 (4.2)	233 (17.4)	61 (4.9)	435 (40.5)
9. Central East	135 (7.3)	16 (1.0)	194 (16.3)	353 (28.4)
10. South East	-	106 (14.8)	231 (46.1)	263 (47.3)
11. Champlain	-	131 (11.3)	496 (42.0)	545 (52.1)
12. North Simcoe Muskoka	-	125 (17.3)	139 (24.5)	101 (22.4)
13. North East	-	133 (12.9)	333 (33.0)	309 (41.4)
14. North West	-	120 (32.0)	294 (66.7)	244 (70.1)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2002/03, 2004/05, 2008/09 and 2010/11.

Inclusion criteria: All patients aged ≥18 years admitted to an acute care facility in Ontario with a final diagnosis of stroke or transient ischemic attack.

Exclusion criteria: Patients taken directly to an operating room from the emergency department.

¹ A stroke unit is defined as a specialized, geographically-located hospital unit with a dedicated stroke team and stroke resources (e.g., care pathway, educational materials, monitored beds). The unit does not need to have all of these resources nor does it have to be exclusive to stroke patients, but it must be in one location in the hospital.

² Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) This indicator measures care on a stroke unit/cluster occurring at any time during hospital admission. This differs from the "stroke unit" indicator measured in the 2002/03 audit, where only the initial admission to a stroke unit was captured, rather than stroke unit care at any point in time.

(3) North York General, Southlake Regional and York Central hospitals were not considered to have a stroke unit at the time of abstraction for the 2008/09 audit. Timmins and District, Bluewater Health-Sarnia and Glengarry Memorial hospitals established stroke units in 2010/11 and were not considered to have a stroke unit at the time of abstraction for the 2010/11 audit.

(4) Cells in which there were no reported/available data are marked with a hyphen (-).

(5) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(6) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 2.5a

Inpatient length of stay for adults with stroke or transient ischemic attack, in Ontario and by sex, stroke type, OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	2003/04			2008/09			2009/10							
	No. of Patients ¹	Total Length of Stay		No. of Patients ¹	Total Length of Stay		No. of Patients ¹	Total Length of Stay		Acute Length of Stay		ALC ² Length of Stay		Proportion of ALC ² Days to Total LOS (%)
		Mean (Days)	Median (Days)		Mean (Days)	Median (Days)		Mean (Days)	Median (Days)	Mean (Days)	Median (Days)	Mean (Days)	Median (Days)	
Ontario	15,731	12.5	7	15,107	13.0	6	15,347	12.6	6	8.5	5	4.1	0	32.7
Female	8,010	13.0	7	7,663	13.7	7	7,816	13.0	7	8.7	6	4.2	0	32.7
Male	7,721	12.0	6	7,444	12.3	6	7,531	12.1	6	8.2	5	4.0	0	32.7
Stroke Type														
Intracerebral hemorrhage	1,691	13.8	6	1,521	15.5	7	1,629	14.3	7	9.7	6	4.6	0	32.1
Ischemic stroke	10,786	14.2	8	10,235	14.6	8	10,308	14.3	7	9.2	6	5.1	0	35.8
Subarachnoid hemorrhage	584	15.0	9	685	15.1	10	690	14.0	10	12.7	9	1.4	0	9.7
Transient ischemic attack	2,670	4.7	3	2,666	5.0	3	2,720	4.7	3	4.0	3	0.7	0	15.0
Ontario Stroke System Region														
Central East	2,182	11.9	6	2,070	12.2	7	2,068	12.4	7	8.2	5	4.2	0	33.7
Central South	2,824	12.8	7	2,561	13.0	6	2,687	12.0	6	7.3	5	4.7	0	38.8
East – Champlain	1,265	13.3	7	1,167	15.3	7	1,221	17.5	8	10.8	7	6.7	0	38.2
Northeast	1,054	12.7	6	1,066	13.3	5	1,033	12.7	5	7.5	5	5.1	0	40.6
Northwest	400	10.9	6	452	9.2	6	442	9.8	7	7.5	6	2.3	0	23.1
South East	756	12.4	6	632	15.9	7	624	14.2	6	8.0	5	6.2	0	43.5
Southwest	2,491	9.5	6	2,133	10.1	6	2,362	10.3	6	7.8	5	2.4	0	23.5
Toronto – North & East	1,029	14.2	8	1,130	13.5	6	1,118	12.5	6	8.8	6	3.7	0	29.8
Toronto – Southeast	865	13.7	8	868	14.0	8	849	13.2	8	9.3	6	3.9	0	29.3
Toronto – West	1,288	17.4	9	1,299	16.1	8	1,235	15.5	7	10.9	6	4.6	0	29.6
West GTA	1,577	12.0	7	1,729	12.6	7	1,708	11.1	6	8.3	6	2.8	0	25.3
Ontario Stroke System Classification														
Regional stroke centre	4,009	14.3	7	4,643	14.4	7	4,883	13.8	7	10.0	7	3.8	0	27.4
District stroke centre	2,925	10.6	6	3,039	11.1	6	3,215	10.8	6	7.2	5	3.7	0	33.9
Non-designated	8,797	12.4	7	7,425	12.9	6	7,249	12.5	6	8.0	5	4.5	0	36.2
Local Health Integration Network														
1. Erie St. Clair	1,092	8.5	6	923	8.7	6	992	9.1	6	7.4	6	1.7	0	19.0
2. South West	1,399	10.3	6	1,210	11.2	5	1,370	11.1	5	8.2	5	2.9	0	26.2
3. Waterloo Wellington	721	11.5	6	714	13.2	6	709	10.3	5	6.1	5	4.3	0	41.1
4. Hamilton Niagara Haldimand Brant	2,103	13.3	7	1,847	13.0	6	1,978	12.6	6	7.8	5	4.8	0	38.2
5. Central West	559	14.0	8	558	12.8	7	573	11.4	6	7.5	5	3.9	0	34.0
6. Mississauga Halton	1,018	11.0	6.5	1,171	12.5	7	1,135	11.0	6	8.7	6	2.3	0	20.8
7. Toronto Central	1,674	15.7	9	1,903	15.2	8	1,911	12.9	7	9.6	6	3.3	0	25.8
8. Central	1,376	15.6	9	1,358	14.6	7	1,289	14.3	7	9.4	6	4.9	0	34.5
9. Central East	1,612	11.8	7	1,459	12.3	7	1,449	13.1	6	8.4	6	4.7	0	35.6
10. South East	756	12.4	6	632	15.9	7	624	14.2	6	8.0	5	6.2	0	43.5
11. Champlain	1,265	13.3	7	1,167	15.3	7	1,221	17.5	8	10.8	7	6.7	0	38.2
12. North Simcoe Muskoka	702	11.1	5	647	10.7	6	621	12.7	6	9.0	5	3.6	0	28.7
13. North East	1,054	12.7	6	1,066	13.3	5	1,033	12.7	5	7.5	5	5.1	0	40.6
14. North West	400	10.9	6	452	9.2	6	442	9.8	7	7.5	6	2.3	0	23.1

/Continued

Group/Subgroup	2010/11							
	No. of Patients ¹	Total Length of Stay		Acute Length of Stay		ALC ² Length of Stay		Proportion of ALC ² Days to Total LOS (%)
		Mean (Days)	Median (Days)	Mean (Days)	Median (Days)	Mean (Days)	Median (Days)	
Ontario	15,524	12.1	6	8.2	5	4.0	0	32.5
Female	7,881	12.2	6	8.3	6	3.9	0	32.1
Male	7,643	12.1	6	8.1	5	4.0	0	33.0
Stroke Type								
Intracerebral hemorrhage	1,524	16.8	7	10.3	6	6.4	0	38.3
Ischemic stroke	10,499	13.3	7	8.7	6	4.6	0	34.4
Subarachnoid hemorrhage	738	14.8	10	12.9	9.5	1.8	0	12.3
Transient ischemic attack	2,763	4.6	3	3.8	3	0.8	0	17.9
Ontario Stroke System Region								
Central East	2,061	10.1	5	7.1	5	3.0	0	29.5
Central South	2,735	11.3	6	7.2	5	4.1	0	36.1
East – Champlain	1,269	14.6	7	9.2	6	5.4	0	36.7
Northeast	1,010	11.5	5	7.2	4	4.3	0	37.4
Northwest	436	12.5	7	7.1	5	5.3	0	42.8
South East	673	12.6	6	8.3	5	4.3	0	34.1
Southwest	2,234	10.0	5	7.8	5	2.3	0	22.7
Toronto – North & East	1,241	13.9	6	8.9	5	5.0	0	35.8
Toronto – Southeast	836	12.2	7	9.1	6	3.1	0	25.4
Toronto – West	1,260	18.4	8	11.6	7	6.8	0	37.1
West GTA	1,769	11.0	6	8.1	6	2.9	0	26.2
Ontario Stroke System Classification								
Regional stroke centre	5,076	12.9	7	9.5	6	3.4	0	26.4
District stroke centre	3,283	9.5	5	6.8	5	2.7	0	28.5
Non-designated	7,165	12.8	6	7.9	5	4.9	0	38.3
Local Health Integration Network								
1. Erie St. Clair	893	11.3	7	8.2	6	3.1	0	27.3
2. South West	1,341	9.2	5	7.4	4	1.7	0	19.0
3. Waterloo Wellington	726	9.4	5	5.9	4	3.5	0	36.9
4. Hamilton Niagara Haldimand Brant	2,009	12.0	6	7.7	5	4.3	0	35.9
5. Central West	616	9.3	6	6.5	5	2.8	0	29.9
6. Mississauga Halton	1,153	12.0	7	9.0	6	3.0	0	24.6
7. Toronto Central	1,950	13.8	7	9.8	6	4.0	0	28.8
8. Central	1,361	15.9	7	9.8	6	6.1	0	38.1
9. Central East	1,458	11.4	6	7.7	5	3.7	0	32.5
10. South East	673	12.6	6	8.3	5	4.3	0	34.1
11. Champlain	1,269	14.6	7	9.2	6	5.4	0	36.7
12. North Simcoe Muskoka	629	9.9	5	6.5	4	3.4	0	34.0
13. North East	1,010	11.5	5	7.2	4	4.3	0	37.4
14. North West	436	12.5	7	7.1	5	5.3	0	42.8

Data source: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2003/04–2010/11.

Inclusion criteria: All stroke and TIA patients aged ≥18 years admitted to an acute care facility in Ontario for stroke management.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² A patient is designated Alternate Level of Care (ALC) by a physician or his/her delegate when the patient is occupying a bed in a hospital and does not require the intensity of resources/services provided in the current care setting (acute, complex continuing care, mental health or rehabilitation). The ALC wait period starts at the time of designation and ends at the time of discharge/transfer to a discharge destination (or when the patient's needs or condition changes and the designation of ALC no longer applies). The standardized provincial ALC definition was implemented across all acute care facilities in Ontario on July 1, 2009.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

Exhibit 2.5b

Inpatient length of stay for adults with stroke or transient ischemic attack who had at least one Alternate Level of Care (ALC) day, in Ontario and by sex, stroke type, OSS region, OSS classification and Local Health Integration Network, 2009/10–2010/11

Group/Subgroup	2009/10								2010/11							
	No. of Patients ¹	Total Length of Stay		Acute Length of Stay		ALC ² Length of Stay		Proportion of ALC ² Days to Total Length of Stay (%)	No. of Patients ¹	Total Length of Stay		Acute Length of Stay		ALC ² Length of Stay		Proportion of ALC ² Days to Total Length of Stay (%)
		Mean (Days)	Median (Days)	Mean (Days)	Median (Days)	Mean (Days)	Median (Days)			Mean (Days)	Median (Days)	Mean (Days)	Median (Days)	Mean (Days)	Median (Days)	
Ontario	3,665	30.0	17	12.8	8	17.2	7	57.3	3,584	30.3	17	13.2	9	17.1	6	56.5
Female	1,971	29.5	17	12.6	9	16.8	7	57.1	1,913	28.6	17	12.5	9	16.1	7	56.3
Male	1,694	30.7	16	13.1	8	17.6	6	57.4	1,671	32.2	17	14.0	9	18.3	6	56.6
Stroke Type																
Intracerebral hemorrhage	438	33.2	21	16.1	11	17.1	7	51.5	412	41.9	24	18.1	12	23.8	7	56.7
Ischemic stroke	2,990	29.9	16	12.3	8	17.6	7	59.0	2,945	28.6	16	12.3	8	16.2	6	56.9
Subarachnoid hemorrhage	88	34.7	24.5	24.1	18	10.6	6	30.6	93	39.0	28	24.6	21	14.4	6	36.8
Transient ischemic attack	149	20.9	13	8.1	6	12.9	6	61.4	134	25.9	12	8.8	6	17.1	6	66.2
Ontario Stroke System Region																
Central East	614	26.0	14	12.0	8	14.1	6	54.0	421	26.8	17	12.3	9	14.5	6	54.2
Central South	743	26.5	14	9.7	7	16.8	7	63.4	732	25.8	15	10.5	8	15.3	6	59.3
East – Champlain	283	47.8	30	19.1	14	28.8	12	60.2	258	43.0	25.5	16.6	13	26.4	9	61.3
Northeast	201	40.1	17	13.7	8	26.4	7	65.8	190	35.9	15.5	13.0	8	22.9	7	63.8
Northwest	127	16.8	15	8.9	8	7.9	5	46.9	143	26.9	16	10.6	8	16.3	7	60.6
South East	131	42.6	20	13.2	9	29.4	6	69.1	150	32.2	15	12.9	8.5	19.3	6	59.9
Southwest	421	25.2	16	11.6	8	13.5	7	53.8	352	27.1	20	12.7	9	14.5	8	53.3
Toronto – North & East	234	32.8	18	15.1	10	17.8	6	54.1	286	37.1	18	15.6	10	21.5	6	58.0
Toronto – Southeast	214	28.0	17	12.7	9	15.3	7	54.7	220	24.5	16	12.7	8	11.8	6	48.1
Toronto – West	341	33.3	21	16.8	11	16.6	7	49.7	422	39.1	21.5	18.7	11.5	20.4	7	52.2
West GTA	356	26.6	16	13.1	7	13.5	6	50.9	410	23.6	14	11.2	7	12.5	5	52.8
Ontario Stroke System Classification																
Regional stroke centre	992	35.2	22	16.6	12	18.6	7	52.8	1,010	33.1	20	16.0	11	17.2	6	51.8
District stroke centre	841	24.8	13	10.8	7	14.0	6	56.4	735	22.6	14	10.5	8	12.2	6	53.7
Non-designated	1,832	29.6	16	11.7	8	17.9	7	60.4	1,839	31.8	17	12.7	8	19.0	7	59.9
Local Health Integration Network																
1. Erie St. Clair	201	18.1	15	9.6	7	8.6	6	47.3	189	27.3	21	12.7	9	14.6	8	53.5
2. South West	220	31.6	19	13.5	9	18.1	7.5	57.2	163	26.9	19	12.6	8	14.3	8	53.1
3. Waterloo Wellington	212	23.2	15	9.0	7	14.2	7	61.3	201	21.8	14	9.3	8	12.5	6	57.3
4. Hamilton Niagara Haldimand Brant	531	27.8	14	10.0	7	17.8	7	64.2	531	27.3	15	11.0	8	16.4	6	59.9
5. Central West	192	23.0	15	11.5	7	11.6	7	50.3	206	17.5	13	9.2	6	8.3	5	47.4
6. Mississauga Halton	164	30.7	18	14.9	9	15.8	6	51.4	204	29.7	15	13.1	8	16.7	6	56.0
7. Toronto Central	508	26.2	18	13.7	9	12.5	6	47.7	544	29.3	17	15.1	9	14.2	5	48.6
8. Central	402	30.0	15.5	14.2	9	15.8	5	52.7	441	35.2	20	16.6	11	18.7	7	53.0
9. Central East	332	34.0	16.5	13.8	8	20.3	7	59.6	236	36.6	19	13.7	10	22.9	7	62.7
10. South East	131	42.6	20	13.2	9	29.4	6	69.1	150	32.2	15	12.9	8.5	19.3	6	59.9
11. Champlain	283	47.8	30	19.1	14	28.8	12	60.2	258	43.0	25.5	16.6	13	26.4	9	61.3
12. North Simcoe Muskoka	161	26.8	17	12.8	8	14.0	7	52.3	128	28.9	18.5	12.4	9	16.5	8	57.1
13. North East	201	40.1	17	13.7	8	26.4	7	65.8	190	35.9	15.5	13.0	8	22.9	7	63.8
14. North West	127	16.8	15	8.9	8	7.9	5	46.9	143	26.9	16	10.6	8	16.3	7	60.6

Data source: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2003/04–2010/11.

Inclusion criteria: All stroke and TIA patients aged ≥18 years admitted to an acute care facility in Ontario for stroke management with ≥1 Alternate Level of Care (ALC) day during admission for an index stroke/TIA event.

¹ Based on unique patients (i.e., does not include multiple patient-visits)

² A patient is designated ALC by a physician or his/her delegate when the patient is occupying a bed in a hospital and does not require the intensity of resources/services provided in the current care setting (acute, complex continuing care, mental health or rehabilitation). The ALC wait period starts at the time of designation and ends at the time of discharge/transfer to a discharge destination (or when the patient's needs or condition changes and the designation of ALC no longer applies). The standardized provincial ALC definition was implemented across all acute care facilities in Ontario on July 1, 2009.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

Exhibit 2.6

Number and percentage of adult patients with documentation that an initial dysphagia screening¹ was performed during admission to acute care, in Ontario and by sex, OSS region, OSS classification and Local Health Integration Network, 2002/03, 2004/05, 2008/09 and 2010/11

Group/Subgroup	Patients, n (%)			
	2002/03	2004/05	2008/09	2010/11
Ontario	5,919 (47.9)	6,163 (53.3)	7,039 (62.3)	6,684 (64.8)
Female	-	-	-	3,301 (65.2)
Male	-	-	-	3,382 (64.4)
Ontario Stroke System Region				
Central East	761 (50.8)	821 (51.0)	860 (65.1)	901 (68.0)
Central South	1,175 (60.3)	1,176 (58.0)	1,067 (57.6)	1,090 (60.9)
East – Champlain	591 (47.2)	452 (51.8)	697 (72.5)	595 (67.0)
Northeast	269 (35.7)	177 (26.8)	333 (57.1)	327 (64.8)
Northwest	75 (29.0)	108 (46.4)	274 (88.3)	233 (88.9)
South East	157 (26.0)	277 (48.5)	293 (62.6)	272 (57.6)
Southwest	648 (33.4)	869 (53.4)	998 (58.5)	876 (58.2)
Toronto – North & East	477 (48.6)	594 (57.2)	383 (44.5)	480 (56.5)
Toronto – Southeast	472 (58.6)	363 (55.3)	424 (60.9)	392 (64.3)
Toronto – West	621 (53.4)	527 (52.8)	784 (73.6)	665 (77.2)
West GTA	673 (58.1)	799 (63.1)	926 (62.6)	852 (68.2)
Ontario Stroke System Classification				
Regional stroke centre	1,516 (54.9)	1,532 (58.7)	2,331 (65.0)	2,475 (69.4)
District stroke centre	1,047 (45.6)	1,345 (57.3)	1,716 (69.5)	1,635 (74.7)
Non-designated	3,356 (45.9)	3,286 (49.8)	2,992 (57.0)	2,493 (56.8)
Telestroke ²	-	-	-	81 (47.9)
Local Health Integration Network				
1. Erie St. Clair	324 (35.9)	444 (61.2)	383 (55.7)	357 (59.5)
2. South West	324 (31.2)	425 (47.2)	615 (60.3)	519 (57.4)
3. Waterloo Wellington	209 (45.2)	315 (61.0)	315 (56.7)	324 (67.7)
4. Hamilton Niagara Haldimand Brant	966 (65.1)	861 (56.9)	751 (57.9)	766 (58.4)
5. Central West	252 (57.1)	264 (59.5)	336 (69.1)	257 (64.0)
6. Mississauga Halton	421 (58.7)	535 (65.0)	591 (59.5)	596 (70.2)
7. Toronto Central	842 (54.6)	836 (55.9)	1,009 (63.9)	934 (69.6)
8. Central	505 (49.6)	558 (52.8)	591 (59.0)	525 (58.7)
9. Central East	775 (55.4)	688 (52.8)	552 (56.9)	731 (68.3)
10. South East	157 (25.3)	289 (48.6)	293 (62.6)	272 (57.6)
11. Champlain	591 (47.8)	440 (51.9)	697 (72.5)	595 (67.0)
12. North Simcoe Muskoka	209 (42.8)	243 (49.8)	300 (75.7)	248 (72.9)
13. North East	269 (35.7)	177 (26.8)	333 (57.1)	327 (64.8)
14. North West	75 (29.0)	108 (46.4)	274 (88.3)	233 (88.9)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2002/03, 2004/05, 2008/09 and 2010/11.

Inclusion criteria: All patients age ≥18 years admitted to an acute care facility in Ontario with a final diagnosis of stroke.

Exclusion criteria: Patients with a diagnosis of transient ischemic attack; patients who were unconscious at the time of initial assessment while in hospital.

¹ A speech language pathology assessment or swallowing screen performed within 72 hours of arrival at hospital. This includes bedside assessments done by health care providers (e.g., nurses) or standardized swallowing screening tests (e.g., TOR-BSST).

² Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

(3) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(4) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 2.7

Risk-adjusted in-hospital complication rates for pneumonia among adult patients¹ with stroke or transient ischemic attack, in Ontario and by OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	2003/04			2008/09			2009/10			2010/11		
	n	N	Adjusted Rate ² (%)	n	N	Adjusted Rate ² (%)	n	N	Adjusted Rate ² (%)	n	N	Adjusted Rate ² (%)
Ontario	298	15,731	1.9	256	15,107	1.7	277	15,347	1.8	326	15,524	2.1
Ontario Stroke System Region												
Central East	42	2,182	2.2	23	2,070	1.2	38	2,068	2.1	30	2,061	1.6
Central South	44	2,824	1.6	33	2,561	1.3	57	2,687	2.1	73	2,735	2.7
East – Champlain	24	1,265	1.9	29	1,167	2.4	34	1,221	2.6	34	1,269	2.6
Northeast	9	1,054	1.0	10	1,066	1.1	11	1,033	1.3	**	1,010	0.4
Northwest	**	400	0.8	6	452	1.6	7	442	1.8	14	436	3.7
South East	14	756	1.8	10	632	1.6	**	624	0.8	8	673	1.2
Southwest	44	2,491	1.8	32	2,133	1.5	28	2,362	1.2	32	2,234	1.5
Toronto – North & East	30	1,029	2.7	16	1,130	1.4	20	1,118	1.8	37	1,241	3.1
Toronto – Southeast	13	865	1.3	19	868	1.9	20	849	1.9	27	836	2.5
Toronto – West	41	1,288	2.8	41	1,299	2.8	27	1,235	1.9	41	1,260	2.7
West GTA	34	1,577	2.0	37	1,729	2.2	30	1,708	1.8	27	1,769	1.4
Ontario Stroke System Classification												
Regional stroke centre	122	4,009	2.4	137	4,643	2.6	146	4,883	2.4	192	5,076	3.0
District stroke centre	47	2,925	1.7	36	3,039	1.3	39	3,215	1.4	38	3,283	1.3
Non-designated	129	8,797	1.6	83	7,425	1.2	92	7,249	1.5	96	7,165	1.5
Local Health Integration Network												
1. Erie St. Clair	16	1,092	1.6	14	923	1.6	11	992	1.2	14	893	1.7
2. South West	28	1,399	1.9	18	1,210	1.5	17	1,370	1.2	18	1,341	1.3
3. Waterloo Wellington	9	721	1.4	**	714	0.7	9	709	1.5	11	726	1.9
4. Hamilton Niagara Haldimand Brant	35	2,103	1.7	28	1,847	1.5	48	1,978	2.3	62	2,009	3.0
5. Central West	13	559	2.3	11	558	2.1	10	573	2.0	**	616	0.2
6. Mississauga Halton	21	1,018	1.9	26	1,171	2.2	20	1,135	1.7	26	1,153	2.1
7. Toronto Central	60	1,674	2.8	62	1,903	2.8	47	1,911	1.9	79	1,950	3.2
8. Central	33	1,376	2.4	22	1,358	1.7	29	1,289	2.4	36	1,361	2.8
9. Central East	30	1,612	2.0	12	1,459	0.9	18	1,449	1.4	12	1,458	0.9
10. South East	14	756	1.8	10	632	1.6	**	624	0.8	8	673	1.2
11. Champlain	24	1,265	1.9	29	1,167	2.4	34	1,221	2.6	34	1,269	2.6
12. North Simcoe Muskoka	**	702	0.6	**	647	0.5	11	621	2.0	8	629	1.5
13. North East	9	1,054	1.0	10	1,066	1.1	11	1,033	1.3	**	1,010	0.4
14. North West	**	400	0.8	6	452	1.6	7	442	1.8	14	436	3.7

Data source: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2003/04–2010/11.

Inclusion criteria: All stroke and TIA patients aged ≥18 years admitted to an acute care facility in Ontario for stroke management.

Exclusion criteria: Patients with elective admissions.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Rates are adjusted for age, sex and stroke type, using each year's Ontario population as the standard.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

Exhibit 2.8a

Discharge destination of adult patients¹ with stroke or transient ischemic attack alive at discharge following an acute hospitalization, in Ontario and by sex, stroke type, OSS classification, OSS region and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	Year	Sample Size	Acute Care	Complex Continuing Care	Home with Services	Home Without Services	Long-Term Care ²	Rehabilitation	Other ³
		Patients, n (%)							
Ontario	2003/04	13,237	603 (4.6)	1,167 (8.8)	1,468 (11.1)	5,924 (44.8)	1,127 (8.5)	2,709 (20.5)	239 (1.8)
	2008/09	12,968	755 (5.8)	925 (7.1)	1,851 (14.3)	5,413 (41.7)	965 (7.4)	2,895 (22.3)	164 (1.3)
	2009/10	13,309	838 (6.3)	970 (7.3)	1,905 (14.3)	5,460 (41.0)	935 (7.0)	3,020 (22.7)	181 (1.4)
	2010/11	13,641	902 (6.6)	932 (6.8)	1,880 (13.8)	5,568 (40.8)	927 (6.8)	3,259 (23.9)	173 (1.3)
Female	2003/04	6,682	294 (4.4)	662 (9.9)	846 (12.7)	2,720 (40.7)	738 (11.0)	1,321 (19.8)	101 (1.5)
	2008/09	6,458	339 (5.2)	514 (8.0)	1,043 (16.2)	2,449 (37.9)	644 (10.0)	1,400 (21.7)	69 (1.1)
	2009/10	6,701	420 (6.3)	537 (8.0)	1,129 (16.8)	2,448 (36.5)	631 (9.4)	1,456 (21.7)	80 (1.2)
	2010/11	6,876	453 (6.6)	541 (7.9)	1,065 (15.5)	2,548 (37.1)	617 (9.0)	1,576 (22.9)	76 (1.1)
Male	2003/04	6,555	309 (4.7)	505 (7.7)	622 (9.5)	3,204 (48.9)	389 (5.9)	1,388 (21.2)	138 (2.1)
	2008/09	6,510	416 (6.4)	411 (6.3)	808 (12.4)	2,964 (45.5)	321 (4.9)	1,495 (23.0)	95 (1.5)
	2009/10	6,608	418 (6.3)	433 (6.6)	776 (11.7)	3,012 (45.6)	304 (4.6)	1,564 (23.7)	101 (1.5)
	2010/11	6,765	449 (6.6)	391 (5.8)	815 (12.0)	3,020 (44.6)	310 (4.6)	1,683 (24.9)	97 (1.4)
Stroke Type									
Intracerebral hemorrhage	2003/04	1,030 (7.8)	136 (13.2)	108 (10.5)	99 (9.6)	298 (28.9)	108 (10.5)	254 (24.7)	27 (2.6)
	2008/09	1,005 (7.7)	146 (14.5)	116 (11.5)	103 (10.2)	269 (26.8)	96 (9.6)	264 (26.3)	11 (1.1)
	2009/10	1,094 (8.2)	173 (15.8)	136 (12.4)	104 (9.5)	274 (25.0)	71 (6.5)	322 (29.4)	14 (1.3)
	2010/11	1,069 (7.8)	152 (14.2)	114 (10.7)	106 (9.9)	271 (25.4)	95 (8.9)	306 (28.6)	25 (2.3)
Ischemic stroke	2003/04	9,111 (68.8)	330 (3.6)	999 (11.0)	1,038 (11.4)	3,352 (36.8)	892 (9.8)	2,337 (25.7)	163 (1.8)
	2008/09	8,792 (67.8)	477 (5.4)	736 (8.4)	1,278 (14.5)	2,916 (33.2)	746 (8.5)	2,523 (28.7)	116 (1.3)
	2009/10	8,978 (67.5)	495 (5.5)	784 (8.7)	1,306 (14.5)	2,959 (33.0)	735 (8.2)	2,561 (28.5)	138 (1.5)
	2010/11	9,246 (67.8)	590 (6.4)	751 (8.1)	1,251 (13.5)	3,036 (32.8)	690 (7.5)	2,811 (30.4)	117 (1.3)
Subarachnoid hemorrhage	2003/04	438 (3.3)	95 (21.7)	11 (2.5)	24 (5.5)	219 (50.0)	**	72 (16.4)	14 (3.2)
	2008/09	513 (4.0)	102 (19.9)	35 (6.8)	43 (8.4)	246 (48.0)	10 (1.9)	64 (12.5)	13 (2.5)
	2009/10	527 (4.0)	126 (23.9)	18 (3.4)	39 (7.4)	257 (48.8)	8 (1.5)	75 (14.2)	**
	2010/11	572 (4.2)	117 (20.5)	23 (4.0)	45 (7.9)	291 (50.9)	8 (1.4)	81 (14.2)	7 (1.2)
Transient ischemic attack	2003/04	2,658 (20.1)	42 (1.6)	49 (1.8)	307 (11.6)	2,055 (77.3)	124 (4.7)	46 (1.7)	35 (1.3)
	2008/09	2,658 (20.5)	30 (1.1)	38 (1.4)	427 (16.1)	1,982 (74.6)	113 (4.3)	44 (1.7)	24 (0.9)
	2009/10	2,710 (20.4)	44 (1.6)	32 (1.2)	456 (16.8)	1,970 (72.7)	121 (4.5)	62 (2.3)	25 (0.9)
	2010/11	2,754 (20.2)	43 (1.6)	44 (1.6)	478 (17.4)	1,970 (71.5)	134 (4.9)	61 (2.2)	24 (0.9)
Ontario Stroke System Classification									
Regional stroke centre	2003/04	3,383 (25.6)	237 (7.0)	156 (4.6)	330 (9.8)	1,506 (44.5)	252 (7.4)	853 (25.2)	49 (1.4)
	2008/09	3,957 (30.5)	334 (8.4)	218 (5.5)	451 (11.4)	1,688 (42.7)	253 (6.4)	970 (24.5)	43 (1.1)
	2009/10	4,165 (31.3)	393 (9.4)	224 (5.4)	463 (11.1)	1,771 (42.5)	250 (6.0)	1,022 (24.5)	42 (1.0)
	2010/11	4,397 (32.2)	424 (9.6)	145 (3.3)	561 (12.8)	1,836 (41.8)	233 (5.3)	1,157 (26.3)	41 (0.9)
District stroke centre	2003/04	2,465 (18.6)	94 (3.8)	207 (8.4)	277 (11.2)	1,031 (41.8)	164 (6.7)	648 (26.3)	44 (1.8)
	2008/09	2,651 (20.4)	151 (5.7)	209 (7.9)	373 (14.1)	1,027 (38.7)	127 (4.8)	733 (27.6)	31 (1.2)
	2009/10	2,824 (21.2)	192 (6.8)	242 (8.6)	410 (14.5)	1,036 (36.7)	124 (4.4)	771 (27.3)	49 (1.7)
	2010/11	2,950 (21.6)	182 (6.2)	266 (9.0)	330 (11.2)	1,102 (37.4)	140 (4.7)	882 (29.9)	48 (1.6)
Non-designated	2003/04	7,389 (55.8)	272 (3.7)	804 (10.9)	861 (11.7)	3,387 (45.8)	711 (9.6)	1,208 (16.3)	146 (2.0)
	2008/09	6,360 (49.0)	270 (4.2)	498 (7.8)	1,027 (16.1)	2,698 (42.4)	585 (9.2)	1,192 (18.7)	90 (1.4)
	2009/10	6,320 (47.5)	253 (4.0)	504 (8.0)	1,032 (16.3)	2,653 (42.0)	561 (8.9)	1,227 (19.4)	90 (1.4)
	2010/11	6,294 (46.1)	296 (4.7)	521 (8.3)	989 (15.7)	2,630 (41.8)	554 (8.8)	1,220 (19.4)	84 (1.3)

Group/Subgroup	Year	Sample Size	Acute Care	Complex Continuing Care	Home with Services	Home Without Services	Long-Term Care ²	Rehabilitation	Other ³
		Patients, n (%)							
Ontario Stroke System Region									
Central East	2003/04	1,839 (13.9)	53 (2.9)	183 (10.0)	229 (12.5)	824 (44.8)	138 (7.5)	368 (20.0)	44 (2.4)
	2008/09	1,793 (13.8)	89 (5.0)	122 (6.8)	272 (15.2)	700 (39.0)	114 (6.4)	475 (26.5)	21 (1.2)
	2009/10	1,811 (13.6)	104 (5.7)	132 (7.3)	279 (15.4)	654 (36.1)	109 (6.0)	503 (27.8)	30 (1.7)
	2010/11	1,831 (13.4)	130 (7.1)	148 (8.1)	227 (12.4)	683 (37.3)	97 (5.3)	523 (28.6)	23 (1.3)
Central South	2003/04	2,345 (17.7)	95 (4.1)	249 (10.6)	248 (10.6)	1,020 (43.5)	225 (9.6)	476 (20.3)	32 (1.4)
	2008/09	2,193 (16.9)	146 (6.7)	193 (8.8)	352 (16.1)	837 (38.2)	164 (7.5)	470 (21.4)	31 (1.4)
	2009/10	2,310 (17.4)	152 (6.6)	239 (10.3)	369 (16.0)	915 (39.6)	132 (5.7)	472 (20.4)	31 (1.3)
	2010/11	2,415 (17.7)	148 (6.1)	246 (10.2)	343 (14.2)	966 (40.0)	148 (6.1)	534 (22.1)	30 (1.2)
East – Champlain	2003/04	1,051 (7.9)	57 (5.4)	38 (3.6)	112 (10.7)	501 (47.7)	101 (9.6)	219 (20.8)	23 (2.2)
	2008/09	988 (7.6)	87 (8.8)	48 (4.9)	179 (18.1)	362 (36.6)	71 (7.2)	230 (23.3)	11 (1.1)
	2009/10	1,022 (7.7)	68 (6.7)	59 (5.8)	196 (19.2)	357 (34.9)	86 (8.4)	243 (23.8)	13 (1.3)
	2010/11	1,097 (8.0)	77 (7.0)	71 (6.5)	147 (13.4)	440 (40.1)	87 (7.9)	255 (23.2)	20 (1.8)
Northeast	2003/04	908 (6.9)	67 (7.4)	50 (5.5)	96 (10.6)	517 (56.9)	69 (7.6)	90 (9.9)	19 (2.1)
	2008/09	891 (6.9)	60 (6.7)	25 (2.8)	134 (15.0)	478 (53.6)	54 (6.1)	130 (14.6)	10 (1.1)
	2009/10	895 (6.7)	63 (7.0)	24 (2.7)	140 (15.6)	441 (49.3)	48 (5.4)	166 (18.5)	13 (1.5)
	2010/11	890 (6.5)	73 (8.2)	37 (4.2)	111 (12.5)	434 (48.8)	48 (5.4)	166 (18.7)	21 (2.4)
Northwest	2003/04	332 (2.5)	24 (7.2)	67 (20.2)	38 (11.4)	172 (51.8)	9 (2.7)	18 (5.4)	**
	2008/09	411 (3.2)	36 (8.8)	28 (6.8)	42 (10.2)	189 (46.0)	28 (6.8)	82 (20.0)	6 (1.5)
	2009/10	403 (3.0)	41 (10.2)	17 (4.2)	33 (8.2)	168 (41.7)	27 (6.7)	109 (27.0)	8 (2.0)
	2010/11	388 (2.8)	41 (10.6)	22 (5.7)	45 (11.6)	169 (43.6)	15 (3.9)	88 (22.7)	8 (2.1)
South East	2003/04	612 (4.6)	37 (6.0)	37 (6.0)	80 (13.1)	308 (50.3)	32 (5.2)	106 (17.3)	12 (2.0)
	2008/09	531 (4.1)	43 (8.1)	43 (8.1)	83 (15.6)	216 (40.7)	26 (4.9)	112 (21.1)	8 (1.5)
	2009/10	525 (3.9)	46 (8.8)	42 (8.0)	85 (16.2)	225 (42.9)	32 (6.1)	91 (17.3)	**
	2010/11	560 (4.1)	52 (9.3)	48 (8.6)	111 (19.8)	207 (37.0)	32 (5.7)	102 (18.2)	8 (1.4)
Southwest	2003/04	2,143 (16.2)	139 (6.5)	207 (9.7)	248 (11.6)	860 (40.1)	166 (7.7)	492 (23.0)	31 (1.4)
	2008/09	1,834 (14.1)	92 (5.0)	116 (6.3)	311 (17.0)	713 (38.9)	99 (5.4)	475 (25.9)	28 (1.5)
	2009/10	2,031 (15.3)	117 (5.8)	130 (6.4)	337 (16.6)	785 (38.7)	143 (7.0)	481 (23.7)	38 (1.9)
	2010/11	1,939 (14.2)	88 (4.5)	92 (4.7)	334 (17.2)	753 (38.8)	117 (6.0)	535 (27.6)	20 (1.0)
Toronto – North & East	2003/04	832 (6.3)	18 (2.2)	35 (4.2)	105 (12.6)	373 (44.8)	83 (10.0)	200 (24.0)	18 (2.2)
	2008/09	978 (7.5)	56 (5.7)	32 (3.3)	90 (9.2)	469 (48.0)	115 (11.8)	207 (21.2)	9 (0.9)
	2009/10	983 (7.4)	59 (6.0)	28 (2.8)	82 (8.3)	471 (47.9)	103 (10.5)	229 (23.3)	11 (1.1)
	2010/11	1,123 (8.2)	66 (5.9)	37 (3.3)	115 (10.2)	527 (46.9)	113 (10.1)	252 (22.4)	13 (1.2)
Toronto – Southeast	2003/04	742 (5.6)	36 (4.9)	106 (14.3)	73 (9.8)	270 (36.4)	81 (10.9)	150 (20.2)	26 (3.5)
	2008/09	744 (5.7)	34 (4.6)	125 (16.8)	55 (7.4)	319 (42.9)	60 (8.1)	141 (19.0)	10 (1.3)
	2009/10	754 (5.7)	53 (7.0)	92 (12.2)	58 (7.7)	315 (41.8)	53 (7.0)	178 (23.6)	**
	2010/11	739 (5.4)	58 (7.8)	37 (5.0)	58 (7.8)	314 (42.5)	41 (5.5)	223 (30.2)	8 (1.1)
Toronto – West	2003/04	1,060 (8.0)	18 (1.7)	51 (4.8)	124 (11.7)	476 (44.9)	129 (12.2)	247 (23.3)	15 (1.4)
	2008/09	1,114 (8.6)	40 (3.6)	73 (6.6)	183 (16.4)	466 (41.8)	119 (10.7)	215 (19.3)	18 (1.6)
	2009/10	1,074 (8.1)	46 (4.3)	71 (6.6)	165 (15.4)	458 (42.6)	118 (11.0)	194 (18.1)	22 (2.0)
	2010/11	1,099 (8.1)	54 (4.9)	52 (4.7)	167 (15.2)	445 (40.5)	132 (12.0)	238 (21.7)	11 (1.0)
West GTA	2003/04	1,373 (10.4)	59 (4.3)	144 (10.5)	115 (8.4)	603 (43.9)	94 (6.8)	343 (25.0)	15 (1.1)
	2008/09	1,491 (11.5)	72 (4.8)	120 (8.0)	150 (10.1)	664 (44.5)	115 (7.7)	358 (24.0)	12 (0.8)
	2009/10	1,501 (11.3)	89 (5.9)	136 (9.1)	161 (10.7)	671 (44.7)	84 (5.6)	354 (23.6)	6 (0.4)
	2010/11	1,560 (11.4)	115 (7.4)	142 (9.1)	222 (14.2)	630 (40.4)	97 (6.2)	343 (22.0)	11 (0.7)

Group/Subgroup	Year	Sample Size	Acute Care	Complex Continuing Care	Home with Services	Home Without Services	Long-Term Care ²	Rehabilitation	Other ³
		Patients, n (%)							
Local Health Integration Network									
1. Erie St. Clair	2003/04	961 (7.3)	28 (2.9)	43 (4.5)	125 (13.0)	372 (38.7)	84 (8.7)	288 (30.0)	21 (2.2)
	2008/09	814 (6.3)	21 (2.6)	48 (5.9)	128 (15.7)	305 (37.5)	34 (4.2)	266 (32.7)	12 (1.5)
	2009/10	861 (6.5)	21 (2.4)	72 (8.4)	136 (15.8)	336 (39.0)	44 (5.1)	244 (28.3)	8 (0.9)
	2010/11	785 (5.8)	20 (2.5)	48 (6.1)	117 (14.9)	296 (37.7)	36 (4.6)	259 (33.0)	9 (1.1)
2. South West	2003/04	1,182 (8.9)	111 (9.4)	164 (13.9)	123 (10.4)	488 (41.3)	82 (6.9)	204 (17.3)	10 (0.8)
	2008/09	1,020 (7.9)	71 (7.0)	68 (6.7)	183 (17.9)	408 (40.0)	65 (6.4)	209 (20.5)	16 (1.6)
	2009/10	1,170 (8.8)	96 (8.2)	58 (5.0)	201 (17.2)	449 (38.4)	99 (8.5)	237 (20.3)	30 (2.6)
	2010/11	1,154 (8.5)	68 (5.9)	44 (3.8)	217 (18.8)	457 (39.6)	81 (7.0)	276 (23.9)	11 (1.0)
3. Waterloo Wellington	2003/04	588 (4.4)	20 (3.4)	76 (12.9)	70 (11.9)	250 (42.5)	54 (9.2)	113 (19.2)	**
	2008/09	600 (4.6)	43 (7.2)	51 (8.5)	122 (20.3)	202 (33.7)	50 (8.3)	126 (21.0)	6 (1.0)
	2009/10	633 (4.8)	40 (6.3)	75 (11.8)	115 (18.2)	225 (35.5)	41 (6.5)	134 (21.2)	**
	2010/11	653 (4.8)	49 (7.5)	70 (10.7)	92 (14.1)	283 (43.3)	37 (5.7)	113 (17.3)	9 (1.4)
4. Hamilton Niagara Haldimand Brant	2003/04	1,757 (13.3)	75 (4.3)	173 (9.8)	178 (10.1)	770 (43.8)	171 (9.7)	363 (20.7)	27 (1.5)
	2008/09	1,593 (12.3)	103 (6.5)	142 (8.9)	230 (14.4)	635 (39.9)	114 (7.2)	344 (21.6)	25 (1.6)
	2009/10	1,677 (12.6)	112 (6.7)	164 (9.8)	254 (15.1)	690 (41.1)	91 (5.4)	338 (20.2)	28 (1.7)
	2010/11	1,762 (12.9)	99 (5.6)	176 (10.0)	251 (14.2)	683 (38.8)	111 (6.3)	421 (23.9)	21 (1.2)
5. Central West	2003/04	491 (3.7)	15 (3.1)	92 (18.7)	58 (11.8)	213 (43.4)	44 (9.0)	60 (12.2)	9 (1.8)
	2008/09	496 (3.8)	18 (3.6)	69 (13.9)	60 (12.1)	224 (45.2)	60 (12.1)	60 (12.1)	**
	2009/10	513 (3.9)	17 (3.3)	52 (10.1)	78 (15.2)	228 (44.4)	44 (8.6)	94 (18.3)	-
	2010/11	562 (4.1)	26 (4.6)	59 (10.5)	127 (22.6)	194 (34.5)	47 (8.4)	102 (18.1)	7 (1.2)
6. Mississauga Halton	2003/04	882 (6.7)	44 (5.0)	52 (5.9)	57 (6.5)	390 (44.2)	50 (5.7)	283 (32.1)	6 (0.7)
	2008/09	995 (7.7)	54 (5.4)	51 (5.1)	90 (9.0)	440 (44.2)	55 (5.5)	298 (29.9)	7 (0.7)
	2009/10	988 (7.4)	72 (7.3)	84 (8.5)	83 (8.4)	443 (44.8)	40 (4.0)	260 (26.3)	6 (0.6)
	2010/11	998 (7.3)	89 (8.9)	83 (8.3)	95 (9.5)	436 (43.7)	50 (5.0)	241 (24.1)	**
7. Toronto Central	2003/04	1,421 (10.7)	47 (3.3)	81 (5.7)	194 (13.7)	599 (42.2)	149 (10.5)	313 (22.0)	38 (2.7)
	2008/09	1,656 (12.8)	111 (6.7)	165 (10.0)	185 (11.2)	716 (43.2)	136 (8.2)	323 (19.5)	20 (1.2)
	2009/10	1,678 (12.6)	136 (8.1)	144 (8.6)	173 (10.3)	742 (44.2)	125 (7.4)	343 (20.4)	15 (0.9)
	2010/11	1,727 (12.7)	155 (9.0)	66 (3.8)	200 (11.6)	727 (42.1)	110 (6.4)	453 (26.2)	16 (0.9)
8. Central	2003/04	1,098 (8.3)	20 (1.8)	84 (7.7)	105 (9.6)	469 (42.7)	135 (12.3)	270 (24.6)	15 (1.4)
	2008/09	1,172 (9.0)	35 (3.0)	70 (6.0)	151 (12.9)	521 (44.5)	125 (10.7)	257 (21.9)	13 (1.1)
	2009/10	1,143 (8.6)	50 (4.4)	66 (5.8)	160 (14.0)	439 (38.4)	123 (10.8)	278 (24.3)	27 (2.4)
	2010/11	1,201 (8.8)	33 (2.7)	113 (9.4)	130 (10.8)	505 (42.0)	133 (11.1)	266 (22.1)	21 (1.7)
9. Central East	2003/04	1,339 (10.1)	40 (3.0)	174 (13.0)	181 (13.5)	534 (39.9)	107 (8.0)	275 (20.5)	28 (2.1)
	2008/09	1,241 (9.6)	39 (3.1)	90 (7.3)	176 (14.2)	466 (37.6)	115 (9.3)	341 (27.5)	14 (1.1)
	2009/10	1,269 (9.5)	46 (3.6)	80 (6.3)	187 (14.7)	472 (37.2)	109 (8.6)	360 (28.4)	15 (1.2)
	2010/11	1,299 (9.5)	78 (6.0)	74 (5.7)	157 (12.1)	470 (36.2)	107 (8.2)	399 (30.7)	14 (1.1)
10. South East	2003/04	612 (4.6)	37 (6.0)	37 (6.0)	80 (13.1)	308 (50.3)	32 (5.2)	106 (17.3)	12 (2.0)
	2008/09	531 (4.1)	43 (8.1)	43 (8.1)	83 (15.6)	216 (40.7)	26 (4.9)	112 (21.1)	8 (1.5)
	2009/10	525 (3.9)	46 (8.8)	42 (8.0)	85 (16.2)	225 (42.9)	32 (6.1)	91 (17.3)	**
	2010/11	560 (4.1)	52 (9.3)	48 (8.6)	111 (19.8)	207 (37.0)	32 (5.7)	102 (18.2)	8 (1.4)
11. Champlain	2003/04	1,051 (7.9)	57 (5.4)	38 (3.6)	112 (10.7)	501 (47.7)	101 (9.6)	219 (20.8)	23 (2.2)
	2008/09	988 (7.6)	87 (8.8)	48 (4.9)	179 (18.1)	362 (36.6)	71 (7.2)	230 (23.3)	11 (1.1)
	2009/10	1,022 (7.7)	68 (6.7)	59 (5.8)	196 (19.2)	357 (34.9)	86 (8.4)	243 (23.8)	13 (1.3)
	2010/11	1,097 (8.0)	77 (7.0)	71 (6.5)	147 (13.4)	440 (40.1)	87 (7.9)	255 (23.2)	20 (1.8)

Group/Subgroup	Year	Sample Size	Acute Care	Complex Continuing Care	Home with Services	Home Without Services	Long-Term Care ²	Rehabilitation	Other ³
		Patients, n (%)							
12. North Simcoe Muskoka	2003/04	615 (4.6)	18 (2.9)	36 (5.9)	51 (8.3)	341 (55.4)	40 (6.5)	107 (17.4)	22 (3.6)
	2008/09	560 (4.3)	34 (6.1)	27 (4.8)	88 (15.7)	251 (44.8)	32 (5.7)	117 (20.9)	11 (2.0)
	2009/10	532 (4.0)	30 (5.6)	33 (6.2)	64 (12.0)	245 (46.1)	26 (4.9)	123 (23.1)	11 (2.1)
	2010/11	565 (4.1)	42 (7.4)	21 (3.7)	80 (14.2)	267 (47.3)	33 (5.8)	118 (20.9)	**
13. North East	2003/04	908 (6.9)	67 (7.4)	50 (5.5)	96 (10.6)	517 (56.9)	69 (7.6)	90 (9.9)	19 (2.1)
	2008/09	891 (6.9)	60 (6.7)	25 (2.8)	134 (15.0)	478 (53.6)	54 (6.1)	130 (14.6)	10 (1.1)
	2009/10	895 (6.7)	63 (7.0)	24 (2.7)	140 (15.6)	441 (49.3)	48 (5.4)	166 (18.5)	13 (1.5)
	2010/11	890 (6.5)	73 (8.2)	37 (4.2)	111 (12.5)	434 (48.8)	48 (5.4)	166 (18.7)	21 (2.4)
14. North West	2003/04	332 (2.5)	24 (7.2)	67 (20.2)	38 (11.4)	172 (51.8)	9 (2.7)	18 (5.4)	**
	2008/09	411 (3.2)	36 (8.8)	28 (6.8)	42 (10.2)	189 (46.0)	28 (6.8)	82 (20.0)	6 (1.5)
	2009/10	403 (3.0)	41 (10.2)	17 (4.2)	33 (8.2)	168 (41.7)	27 (6.7)	109 (27.0)	8 (2.0)
	2010/11	388 (2.8)	41 (10.6)	22 (5.7)	45 (11.6)	169 (43.6)	15 (3.9)	88 (22.7)	8 (2.1)

Data source: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years discharged alive from an acute care hospital in Ontario with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack.

Exclusion criteria: Patients with elective admissions.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Includes long-term care nursing homes and long-term care homes for the aged.

³ Includes palliative care.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

(3) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

Calculation of stroke patient discharge disposition from acute care

Discharge Disposition	Coding Algorithm
Dead	Discharge disposition = 07
Rehabilitation	Discharge disposition = 01, 02 or 03 AND InstTyp = 02 or 07
Long-term care nursing home	Discharge disposition = 01, 02 or 03 AND InstTyp = 04
Long-term care home for the aged	Discharge disposition = 01, 02 or 03 AND InstTyp = 09
Complex continuing care	Discharge disposition = 01, 02 or 03 AND InstTyp = 03
Acute care	Discharge disposition = 01 AND InstTyp = 01
Home with support services	Discharge disposition = 04
Home without support services	Discharge disposition = 05
Palliative care	Discharge disposition = 03
Other	All other codes

Exhibit 2.8b

Referral to secondary stroke prevention services among adult patients with stroke or transient ischemic attack, in Ontario and by sex, stroke type, OSS region, OSS classification and Local Health Integration Network, 2008/09 and 2010/11

Group/Subgroup	Referred to SPC ¹			
	2008/09		2010/11	
	From ED ²	From ED or Inpatient Care ³	From ED ²	From ED or Inpatient Care ³
	Patients, n (%)			
Ontario	4,178 (57.2)	7,589 (37.5)	4,247 (72.4)	8,447 (54.3)
Female	2,079 (56.7)	3,698 (36.4)	2,026 (70.8)	3,927 (51.5)
Male	2,100 (57.7)	3,891 (38.5)	2,221 (73.9)	4,520 (57.0)
Stroke Type				
Intracerebral hemorrhage	6 (10.0)	222 (19.0)	16 (53.1)	268 (36.6)
Ischemic stroke	791 (56.6)	3,085 (31.3)	810 (73.0)	3,632 (46.7)
Subarachnoid hemorrhage	6 (7.8)	39 (6.6)	**	193 (50.5)
Transient ischemic attack	2,890 (62.3)	3,611 (53.9)	3,407 (72.6)	4,336 (65.5)
Uncertain stroke type	485 (43.0)	631 (32.3)	9 (32.8)	18 (31.8)
Ontario Stroke System Region				
Central East	682 (47.5)	911 (29.6)	703 (68.1)	1,087 (47.3)
Central South	813 (60.1)	1,196 (34.8)	812 (71.1)	1,425 (50.0)
East – Champlain	628 (69.7)	1,079 (55.6)	576 (80.5)	975 (62.0)
Northeast	131 (42.0)	341 (29.0)	120 (44.4)	349 (39.4)
Northwest	24 (32.1)	229 (47.4)	49 (63.6)	235 (62.0)
South East	189 (56.2)	293 (33.4)	154 (72.9)	289 (54.1)
Southwest	632 (60.7)	924 (31.3)	764 (72.3)	1,269 (57.3)
Toronto – North & East	107 (31.6)	393 (29.4)	218 (88.2)	754 (66.1)
Toronto – Southeast	281 (67.0)	552 (47.1)	224 (69.2)	607 (63.1)
Toronto – West	153 (47.2)	512 (35.4)	118 (63.5)	564 (54.0)
West GTA	540 (69.8)	1,159 (49.1)	510 (84.2)	893 (53.3)
Ontario Stroke System Classification				
Regional stroke centre	988 (77.4)	2,734 (55.1)	1,097 (85.2)	3,130 (69.2)
District stroke centre	1,010 (64.5)	1,705 (37.0)	926 (73.2)	1,715 (52.6)
Non-designated	2,180 (48.9)	3,150 (29.5)	2,141 (67.1)	3,482 (46.3)
Telestroke ⁴	-	-	83 (66.9)	121 (46.0)
Local Health Integration Network				
1. Erie St. Clair	343 (73.6)	516 (39.4)	390 (81.7)	597 (66.0)
2. South West	289 (50.2)	408 (24.8)	374 (64.5)	673 (51.3)
3. Waterloo Wellington	194 (46.6)	264 (26.5)	234 (63.8)	392 (47.3)
4. Hamilton Niagara Haldimand Brant	619 (66.2)	932 (38.2)	578 (74.5)	1,033 (51.1)
5. Central West	218 (66.0)	333 (38.5)	213 (83.3)	308 (47.7)
6. Mississauga Halton	322 (72.6)	826 (55.2)	297 (84.8)	585 (56.9)
7. Toronto Central	399 (68.6)	1,203 (53.2)	369 (83.9)	1,408 (75.5)
8. Central	203 (30.7)	294 (16.2)	366 (85.0)	692 (52.0)
9. Central East	445 (51.2)	639 (31.1)	426 (63.8)	714 (43.4)
10. South East	189 (56.2)	293 (33.4)	154 (72.9)	289 (54.1)
11. Champlain	628 (69.7)	1,079 (55.6)	576 (80.5)	975 (62.0)
12. North Simcoe Muskoka	176 (43.4)	231 (25.7)	103 (40.6)	197 (32.6)
13. North East	131 (42.0)	341 (29.0)	120 (44.4)	349 (39.4)
14. North West	24 (32.1)	229 (47.4)	49 (63.6)	235 (62.0)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2008/09 and 2010/11.

Inclusion criteria: All patients aged ≥18 years discharged alive from acute care with a final diagnosis of stroke or transient ischemic attack discharged alive.

Exclusion criteria: Patients discharged to another acute facility.

¹ Secondary stroke prevention clinic.

² Among patients discharged directly from ED.

³ Among patients discharged from ED or inpatient care.

⁴ Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Referral to SPCs was unavailable prior to the 2008/09 data.

(3) Cells in which there were no reported/available data are marked with a hyphen (-).

(4) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(5) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 2.9

Number and percentage of adult ischemic stroke patients without atrial fibrillation who received carotid imaging while in hospital or had an appointment booked for carotid imaging prior to hospital discharge, in Ontario and by sex, OSS region, OSS classification and Local Health Integration Network 2002/03, 2004/05, 2008/09 and 2010/11

Group/Subgroup	2002/03		2004/05		2008/09		2010/11	
	Patients, n (%)							
	Imaging Received ¹	Imaging Booked ²	Imaging Received ¹	Imaging Booked ²	Imaging Received ¹	Imaging Booked ²	Imaging Received ¹	Imaging Booked ²
Ontario	3,879 (50.3)	463 (12.1)	4,188 (58.4)	400 (13.4)	5,209 (74.7)	302 (17.2)	4,982 (78.7)	203 (15.1)
Female	-	-	-	-	-	-	2,246 (77.0)	111 (16.6)
Male	-	-	-	-	-	-	2,736 (80.2)	92 (13.6)
Ontario Stroke System Region								
Central East	425 (47.3)	52 (11.0)	477 (47.5)	71 (13.5)	541 (63.5)	84 (27.1)	630 (75.4)	39 (19.0)
Central South	509 (53.4)	70 (15.8)	700 (58.1)	71 (14.1)	735 (70.8)	37 (12.3)	804 (71.5)	51 (16.0)
East – Champlain	353 (45.7)	72 (17.1)	282 (54.1)	6 (2.5)	428 (71.5)	31 (17.9)	399 (78.6)	20 (18.6)
Northeast	294 (56.4)	59 (26.0)	279 (61.9)	26 (15.1)	235 (64.8)	33 (25.5)	272 (84.5)	6 (12.3)
Northwest	113 (65.7)	**	78 (57.8)	9 (15.8)	156 (73.1)	**	152 (85.4)	-
South East	185 (48.6)	9 (4.6)	186 (52.8)	36 (21.7)	238 (90.5)	-	229 (78.7)	11 (17.0)
Southwest	582 (40.9)	116 (13.8)	606 (55.7)	112 (23.2)	779 (74.5)	76 (28.7)	688 (76.3)	38 (18.0)
Toronto – North & East	387 (54.4)	45 (13.9)	378 (68.5)	12 (6.9)	459 (85.0)	6 (7.8)	409 (79.6)	24 (23.2)
Toronto – Southeast	230 (51.9)	10 (4.7)	224 (62.6)	6 (4.5)	267 (70.1)	-	315 (85.7)	7 (12.7)
Toronto – West	400 (62.4)	10 (4.1)	391 (60.4)	15 (5.9)	496 (79.9)	13 (10.4)	427 (83.3)	**
West GTA	401 (50.1)	18 (4.5)	587 (68.6)	36 (13.4)	873 (83.0)	20 (10.9)	657 (84.9)	**
Ontario Stroke System Classification								
Regional stroke centre	979 (67.5)	18 (3.8)	954 (68.3)	45 (10.2)	1,589 (83.0)	33 (10.0)	1,644 (86.7)	32 (12.8)
District stroke centre	834 (54.7)	147 (21.3)	1,010 (62.7)	103 (17.1)	1,251 (78.4)	56 (16.3)	1,097 (80.2)	34 (12.6)
Non-designated	2,066 (43.6)	298 (11.1)	2,224 (53.5)	252 (13.0)	2,368 (68.5)	214 (19.6)	2,167 (73.8)	130 (16.8)
Telestroke ³	-	-	-	-	-	-	74 (59.2)	7 (13.7)
Local Health Integration Network								
1. Erie St. Clair	378 (56.9)	44 (15.4)	335 (61.6)	39 (18.7)	400 (82.0)	29 (33.3)	304 (81.3)	**
2. South West	204 (26.9)	72 (13.0)	271 (49.8)	73 (26.7)	379 (68.0)	47 (26.4)	384 (72.8)	34 (24.0)
3. Waterloo Wellington	157 (51.0)	23 (15.2)	221 (70.6)	23 (25.0)	280 (74.9)	13 (14.2)	267 (83.0)	12 (21.2)
4. Hamilton Niagara Haldimand Brant	352 (54.6)	47 (16.0)	479 (53.7)	48 (11.6)	455 (68.5)	24 (11.4)	537 (66.9)	40 (14.9)
5. Central West	180 (50.0)	-	198 (62.3)	12 (10.0)	292 (84.7)	14 (26.0)	246 (88.3)	**
6. Mississauga Halton	221 (50.1)	18 (8.2)	389 (72.3)	24 (16.1)	581 (82.1)	6 (4.6)	411 (82.9)	**
7. Toronto Central	498 (66.9)	10 (4.1)	570 (72.5)	21 (9.7)	643 (76.1)	19 (9.6)	673 (87.4)	14 (14.0)
8. Central	432 (61.8)	26 (9.7)	350 (55.7)	29 (10.4)	540 (83.8)	7 (6.4)	473 (82.4)	14 (13.7)
9. Central East	359 (35.3)	81 (12.3)	357 (43.1)	34 (7.2)	440 (69.7)	43 (22.4)	484 (73.1)	25 (14.1)
10. South East	195 (49.2)	9 (4.5)	204 (55.1)	36 (21.7)	238 (90.5)	-	229 (78.7)	11 (17.0)
11. Champlain	343 (45.3)	72 (17.3)	264 (52.5)	6 (2.5)	428 (71.5)	31 (17.9)	399 (78.6)	20 (18.6)
12. North Simcoe Muskoka	153 (65.7)	-	193 (60.5)	20 (15.9)	140 (51.1)	35 (26.0)	151 (67.6)	20 (27.3)
13. North East	294 (56.4)	59 (26.0)	279 (61.9)	26 (15.1)	235 (64.8)	33 (25.5)	272 (84.5)	6 (12.3)
14. North West	113 (65.7)	**	78 (57.8)	9 (15.8)	156 (73.1)	**	152 (85.4)	-

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2002/03, 2004/05, 2008/09 and 2010/11.

Inclusion criteria: All ischemic stroke patients aged ≥18 years without atrial fibrillation admitted as an inpatient in any acute care facility in Ontario (N = 7,718 in 2002/03, 7,169 in 2004/05, 6,969 in 2008/09 and 6,327 in 2010/11).

¹ All patients who received carotid imaging during their hospital stay (i.e., prior to discharge).

² All patients who did not undergo carotid imaging during their hospital stay but had an appointment booked for carotid imaging after discharge (N = 3,839 in 2002/03, 2,981 in 2004/05, 1,760 in 2008/09 and 1,345 in 2010/11).

³ Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

(3) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(4) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 2.10

Time to carotid intervention within six months of hospitalization for adults with stroke or transient ischemic attack, in Ontario and by sex, OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	2003/04			2008/09			2009/10			2010/11		
	Patients ¹ (n)	Mean Time (Days)	Median Time (Days)	Patients ¹ (n)	Mean Time (Days)	Median Time (Days)	Patients ¹ (n)	Mean Time (Days)	Median Time (Days)	Patients ¹ (n)	Mean Time (Days)	Median Time (Days)
Ontario	419	61.8	51	454	42.7	26	518	38.8	22	483	31.8	18
Female	132	64.5	53.5	144	39.0	24.5	174	36.5	14.5	133	30.7	18
Male	287	60.5	50	310	44.4	27.5	344	39.9	24	350	32.2	17
Ontario Stroke System Region												
Central East	63	64.1	58	90	42.0	20	84	40.5	24	61	31.0	14
Central South	59	84.9	76	69	53.4	38	75	47.3	29	76	38.9	24.5
East – Champlain	42	57.7	43.5	48	55.7	37.5	41	50.2	31	43	16.5	10
Northeast	37	73.4	65	34	47.8	28	37	49.3	37	42	36.1	24
Northwest	11	52.0	21	10	36.1	19.5	18	38.3	25	16	30.6	25
South East	27	52.8	41	19	29.3	15	31	38.1	25	37	35.5	12
Southwest	67	57.3	48	72	43.8	35	79	46.2	31	70	42.3	24.5
Toronto – North & East	22	51.9	36.5	18	38.8	16.5	28	24.0	10.5	26	22.0	7.5
Toronto – Southeast	17	63.6	60	10	46.2	17.5	24	30.1	15	19	24.1	17
Toronto – West	28	59.1	43	27	23.9	21	33	23.6	10	20	33.3	13
West GTA	46	42.9	33	57	30.5	16	68	22.9	14	73	24.7	13
Ontario Stroke System Classification												
Regional stroke centre	140	49.7	34	159	24.8	12	207	28.3	13	188	19.7	10
District stroke centre	78	58.1	48.5	112	46.9	35.5	110	42.1	23.5	103	35.5	22
Non-designated	201	71.6	67	183	55.7	37	201	47.7	33	192	41.6	26
Local Health Integration Network												
1. Erie St. Clair	26	44.1	26	41	42.9	29	42	46.3	25	37	39.5	23
2. South West	41	65.7	51	31	45.1	40	37	46.1	40	33	45.5	27
3. Waterloo Wellington	16	83.0	87.5	25	48.6	32	21	48.6	36	19	23.0	12
4. Hamilton Niagara Haldimand Brant	43	85.7	76	44	56.2	41.5	54	46.7	28	57	44.2	27
5. Central West	11	62.5	56	11	60.6	46	8	41.0	26.5	16	31.6	20.5
6. Mississauga Halton	35	36.8	28	46	23.4	14	60	20.5	12	57	22.8	12
7. Toronto Central	46	59.9	35	36	18.4	11.5	62	17.2	7.5	44	17.9	8
8. Central	29	59.7	53	37	28.4	21	33	41.2	23	32	33.0	16
9. Central East	32	59.9	53	34	58.3	48.5	41	38.8	23	27	44.3	30
10. South East	27	52.8	41	19	29.3	15	31	38.1	25	37	35.5	12
11. Champlain	42	57.7	43.5	48	55.7	37.5	41	50.2	31	43	16.5	10
12. North Simcoe Muskoka	23	65.7	58	38	49.8	13	33	47.2	34	23	23.7	7
13. North East	37	73.4	65	34	47.8	28	37	49.3	37	42	36.1	24
14. North West	11	52.0	21	10	36.1	19.5	18	38.3	25	16	30.6	25

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2003/04–2010/11, and National Ambulatory Care Reporting System (NACRS), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years who visited or were admitted to any acute care hospital for stroke or transient ischemic attack who underwent carotid revascularization through carotid endarterectomy or carotid stenting within 6 months of the index acute stroke/TIA hospital admission date, starting in 2003.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility where the index stroke event occurred is used to report regional performance).

(2) Degree of stenosis in patients requiring carotid revascularization is unavailable in administrative databases.

(3) SubLHIN planning area data not included as most carotid endarterectomies and carotid stenting are done at the 11 regional and enhanced district stroke centres.

(4) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

Exhibit 2.11

Number and percentage of adult patients with ischemic stroke or transient ischemic attack who were prescribed three recommended secondary prevention medications¹ upon discharge from acute care, in Ontario and by sex, OSS region, OSS classification and Local Health Integration Network, 2002/03, 2004/05, 2008/09 and 2010/11

Group/Subgroup	2002/03	2004/05	2008/09	2010/11
	Patients, n (%)			
Ontario	7,690 (19.9)	13,270 (37.3)	17,240 (52.1)	8,145 (51.4)
Female	-	-	-	3,854 (49.6)
Male	-	-	-	4,291 (53.2)
Ontario Stroke System Region				
Central East	814 (14.4)	2,004 (39.6)	2,454 (51.8)	1,131 (47.9)
Central South	1,722 (27.3)	2,332 (36.1)	2,871 (48.1)	1,268 (42.6)
East – Champlain	766 (17.3)	1,194 (36.2)	1,842 (55.7)	842 (56.1)
Northeast	438 (17.4)	708 (32.7)	1,010 (50.0)	511 (57.7)
Northwest	242 (24.7)	244 (26.3)	471 (57.2)	224 (60.2)
South East	372 (22.2)	674 (39.9)	657 (68.4)	367 (58.2)
Southwest	1,432 (24.5)	1,794 (36.3)	2,647 (54.9)	1,288 (50.7)
Toronto – North & East	468 (15.9)	828 (30.9)	1,146 (51.0)	561 (54.0)
Toronto – Southeast	202 (11.4)	782 (40.0)	938 (50.5)	452 (53.1)
Toronto – West	704 (27.4)	1,042 (41.1)	1,158 (54.6)	541 (57.8)
West GTA	530 (13.3)	1,668 (43.6)	2,047 (48.4)	960 (54.9)
Ontario Stroke System Classification				
Regional stroke centre	1,746 (25.6)	2,706 (42.7)	4,356 (56.8)	2,456 (57.2)
District stroke centre	1,480 (20.4)	2,512 (35.8)	4,423 (56.4)	1,891 (53.1)
Non-designated	4,464 (18.2)	8,052 (36.3)	8,461 (48.1)	3,662 (47.7)
Telestroke ²	-	-	-	135 (44.4)
Local Health Integration Network				
1. Erie St. Clair	964 (34.4)	904 (42.8)	1,262 (59.2)	542 (50.0)
2. South West	458 (15.4)	858 (30.7)	1,384 (51.4)	746 (51.2)
3. Waterloo Wellington	344 (18.7)	546 (27.5)	845 (46.7)	366 (41.2)
4. Hamilton Niagara Haldimand Brant	1,336 (30.0)	1,842 (41.0)	2,026 (48.7)	902 (43.2)
5. Central West	292 (19.2)	536 (36.2)	733 (47.4)	388 (58.7)
6. Mississauga Halton	278 (12.3)	1,094 (45.1)	1,314 (49.0)	572 (52.6)
7. Toronto Central	598 (18.7)	1,260 (44.0)	1,871 (55.2)	963 (59.0)
8. Central	738 (19.1)	1,248 (34.8)	1,608 (53.4)	623 (48.6)
9. Central East	636 (14.1)	1,514 (35.9)	1,441 (48.2)	808 (49.0)
10. South East	428 (22.5)	722 (40.7)	657 (68.4)	367 (58.2)
11. Champlain	688 (16.5)	1,140 (36.0)	1,842 (55.7)	842 (56.1)
12. North Simcoe Muskoka	196 (12.4)	616 (41.9)	777 (49.3)	290 (46.7)
13. North East	474 (18.3)	750 (33.5)	1,010 (50.0)	511 (57.7)
14. North West	260 (25.8)	240 (26.0)	471 (57.2)	224 (60.2)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2002/03, 2004/05, 2008/09 and 2010/11.

Inclusion criteria: All patients aged ≥18 years discharged alive from the emergency department or inpatient care with a final diagnosis of ischemic stroke or transient ischemic attack.

¹ Includes antiplatelet, lipid-lowering and anti-hypertensive therapies.

² Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Patients with contraindications to any secondary prevention medications were not excluded from this analysis.

(3) For patients with atrial fibrillation, anticoagulant therapy (prescribed or recommended) was included as an appropriate secondary prevention medication in lieu of an antiplatelet therapy.

(4) Cells in which there were no reported/available data are marked with a hyphen (-).

(5) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(6) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 2.12

Number and percentage of adult patients with ischemic stroke and atrial fibrillation¹ who were prescribed or recommended anticoagulant therapy on discharge from acute care, in Ontario and by sex, OSS region, OSS classification and Local Health Integration Network, 2002/03, 2004/05, 2008/09 and 2010/11

Group/Subgroup	2002/03	2004/05	2008/09	2010/11
	Patients, n (%)			
Ontario	2,285 (66.8)	2,264 (72.1)	2,399 (73.8)	2,400 (72.1)
Female	-	-	-	1,286 (70.9)
Male	-	-	-	1,113 (73.4)
Ontario Stroke System Region				
Central East	251 (49.4)	290 (62.5)	318 (73.2)	372 (75.6)
Central South	459 (69.8)	427 (76.0)	483 (77.1)	394 (62.9)
East – Champlain	340 (73.1)	263 (83.0)	210 (73.9)	263 (80.4)
Northeast	87 (65.9)	121 (61.7)	134 (74.3)	132 (75.4)
Northwest	56 (53.8)	97 (85.1)	97 (86.9)	57 (72.2)
South East	66 (71.7)	148 (82.7)	75 (85.6)	101 (71.5)
Southwest	284 (56.7)	283 (78.8)	337 (63.7)	383 (70.3)
Toronto – North & East	207 (85.2)	204 (63.0)	177 (71.8)	173 (83.3)
Toronto – Southeast	121 (81.2)	118 (72.4)	122 (63.8)	108 (66.0)
Toronto – West	211 (79.0)	168 (85.3)	190 (72.2)	139 (72.3)
West GTA	203 (67.7)	145 (54.7)	257 (86.9)	278 (73.0)
Ontario Stroke System Classification				
Regional stroke centre	551 (80.2)	422 (78.7)	714 (76.9)	816 (76.2)
District stroke centre	391 (64.6)	493 (75.2)	565 (73.9)	554 (69.1)
Non-designated	1,343 (63.1)	1,349 (69.3)	1,119 (72.0)	997 (70.7)
Telestroke ²	-	-	-	33 (68.7)
Local Health Integration Network				
1. Erie St. Clair	123 (54.2)	128 (84.8)	132 (65.0)	159 (70.5)
2. South West	153 (59.8)	149 (76.0)	204 (62.9)	224 (70.1)
3. Waterloo Wellington	104 (61.9)	91 (69.5)	137 (84.6)	102 (63.6)
4. Hamilton Niagara Haldimand Brant	352 (72.1)	327 (76.4)	345 (74.4)	292 (62.6)
5. Central West	36 (45.6)	54 (47.4)	80 (93.5)	89 (73.1)
6. Mississauga Halton	153 (77.3)	125 (65.4)	177 (84.2)	189 (72.9)
7. Toronto Central	264 (82.2)	173 (74.6)	305 (75.8)	248 (73.1)
8. Central	255 (70.2)	270 (67.5)	238 (71.3)	203 (78.3)
9. Central East	210 (64.6)	251 (64.9)	185 (68.3)	261 (75.4)
10. South East	70 (62.5)	154 (83.2)	75 (85.6)	101 (71.5)
11. Champlain	323 (70.8)	243 (81.8)	210 (73.9)	263 (80.4)
12. North Simcoe Muskoka	90 (50.0)	67 (64.4)	78 (61.5)	80 (71.9)
13. North East	96 (67.6)	135 (64.3)	134 (74.3)	132 (75.4)
14. North West	56 (53.8)	97 (85.1)	97 (86.9)	57 (72.2)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2002/03, 2004/05, 2008/09 and 2010/11.

Inclusion criteria: All patients aged ≥18 years discharged alive from the emergency department or inpatient care with a final diagnosis of ischemic stroke.

¹ Includes patients with a past history or new onset of atrial fibrillation any time during their hospital stay.

² Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Patients with contraindications to warfarin were not excluded from this analysis.

(3) In 2002/03, 2004/05 and 2008/09, includes warfarin therapy only.

(4) Cells in which there were no reported/available data are marked with a hyphen (-).

(5) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(6) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 2.13

Degree of functional ability of adult patients with stroke or transient ischemic attack at discharge (modified Rankin score), in Ontario and by sex, stroke type, OSS region, OSS classification and Local Health Integration Network, 2010/11

Group/Subgroup	Modified Rankin Score							
	0	1	2	3	4	5	0-2	3-5
Patients, n (%)								
Ontario	4,991 (30.2)	2,758 (16.7)	2,448 (14.8)	2,713 (16.4)	2,923 (17.7)	715 (4.3)	10,198 (61.6)	6,351 (38.4)
Female	2,361 (29.2)	1,279 (15.8)	1,072 (13.2)	1,469 (18.1)	1,515 (18.7)	403 (5.0)	4,712 (58.2)	3,388 (41.8)
Male	2,630 (31.1)	1,479 (17.5)	1,377 (16.3)	1,244 (14.7)	1,408 (16.7)	312 (3.7)	5,486 (64.9)	2,964 (35.1)
Stroke Type								
Intracerebral hemorrhage	50 (5.4)	95 (10.2)	139 (14.9)	189 (20.2)	328 (35.1)	133 (14.3)	285 (30.4)	651 (69.6)
Ischemic stroke	611 (6.9)	1,520 (17.2)	1,755 (19.8)	2,071 (23.4)	2,367 (26.8)	523 (5.9)	3,886 (43.9)	4,961 (56.1)
Subarachnoid hemorrhage	93 (20.5)	103 (22.6)	78 (17.2)	65 (14.3)	83 (18.3)	33 (7.2)	274 (60.3)	181 (39.7)
Transient ischemic attack	4,231 (67.7)	1,027 (16.4)	460 (7.4)	379 (6.1)	130 (2.1)	21 (0.3)	5,718 (91.5)	530 (8.5)
Uncertain	6 (10.0)	13 (19.8)	15 (24.1)	10 (15.1)	15 (23.4)	**	34 (53.9)	29 (46.1)
Ontario Stroke System Region								
Central East	823 (36.0)	406 (17.7)	280 (12.2)	324 (14.1)	382 (16.7)	73 (3.2)	1,508 (65.9)	779 (34.1)
Central South	740 (24.8)	661 (22.1)	496 (16.6)	431 (14.4)	481 (16.1)	177 (5.9)	1,897 (63.5)	1,089 (36.5)
East – Champlain	445 (27.4)	305 (18.8)	377 (23.2)	327 (20.1)	163 (10.0)	8 (0.5)	1,127 (69.4)	498 (30.6)
Northeast	344 (36.2)	157 (16.6)	120 (12.7)	184 (19.4)	116 (12.2)	28 (2.9)	621 (65.4)	328 (34.6)
Northwest	141 (35.3)	48 (12.0)	58 (14.5)	73 (18.3)	61 (15.3)	18 (4.5)	247 (61.9)	152 (38.1)
South East	212 (31.3)	122 (18.0)	89 (13.1)	103 (15.2)	127 (18.7)	24 (3.6)	423 (62.4)	254 (37.6)
Southwest	860 (32.0)	387 (14.4)	414 (15.4)	375 (13.9)	567 (21.0)	90 (3.3)	1,661 (61.7)	1,032 (38.3)
Toronto – North & East	304 (26.9)	142 (12.6)	204 (18.1)	183 (16.2)	221 (19.6)	74 (6.6)	651 (57.6)	479 (42.4)
Toronto – Southeast	351 (35.7)	91 (9.3)	124 (12.6)	187 (19.0)	200 (20.4)	30 (3.1)	567 (57.6)	418 (42.4)
Toronto – West	126 (13.4)	130 (13.9)	138 (14.8)	248 (26.5)	207 (22.1)	88 (9.4)	394 (42.1)	543 (57.9)
West GTA	645 (34.3)	309 (16.4)	147 (7.8)	277 (14.7)	398 (21.2)	104 (5.6)	1,101 (58.5)	780 (41.5)
Ontario Stroke System Classification								
Regional stroke centre	1,329 (26.6)	796 (15.9)	820 (16.4)	814 (16.3)	973 (19.5)	262 (5.3)	2,944 (58.9)	2,050 (41.1)
District stroke centre	1,005 (27.8)	655 (18.2)	515 (14.3)	548 (15.2)	757 (21.0)	127 (3.5)	2,174 (60.3)	1,433 (39.7)
Non-designated	2,552 (33.4)	1,251 (16.4)	1,075 (14.1)	1,281 (16.8)	1,159 (15.2)	319 (4.2)	4,878 (63.9)	2,759 (36.1)
Telestroke ¹	106 (34.2)	56 (18.1)	39 (12.6)	69 (22.3)	33 (10.6)	7 (2.3)	201 (64.8)	109 (35.2)
Local Health Integration Network								
1. Erie St. Clair	370 (32.8)	166 (14.7)	162 (14.4)	156 (13.8)	252 (22.4)	22 (1.9)	698 (61.9)	430 (38.1)
2. South West	490 (31.3)	221 (14.1)	252 (16.1)	219 (14.0)	314 (20.1)	68 (4.4)	963 (61.5)	602 (38.5)
3. Waterloo Wellington	299 (34.4)	163 (18.8)	106 (12.2)	140 (16.2)	134 (15.4)	27 (3.1)	568 (65.4)	301 (34.6)
4. Hamilton Niagara Haldimand Brant	441 (20.8)	498 (23.5)	391 (18.5)	291 (13.7)	347 (16.4)	150 (7.1)	1,329 (62.8)	788 (37.2)
5. Central West	269 (39.2)	112 (16.3)	43 (6.2)	108 (15.8)	122 (17.7)	33 (4.8)	423 (61.7)	263 (38.3)
6. Mississauga Halton	376 (31.5)	197 (16.5)	104 (8.7)	169 (14.1)	276 (23.1)	72 (6.0)	678 (56.7)	517 (43.3)
7. Toronto Central	482 (26.0)	225 (12.2)	292 (15.8)	346 (18.7)	377 (20.4)	129 (7.0)	999 (54.0)	851 (46.0)
8. Central	389 (31.6)	160 (13.0)	175 (14.3)	236 (19.2)	207 (16.8)	62 (5.0)	724 (58.9)	505 (41.1)
9. Central East	509 (30.7)	270 (16.3)	214 (12.9)	286 (17.3)	342 (20.6)	36 (2.2)	993 (59.9)	664 (40.1)
10. South East	212 (31.3)	122 (18.0)	89 (13.1)	103 (15.2)	127 (18.7)	24 (3.6)	423 (62.4)	254 (37.6)
11. Champlain	445 (27.4)	305 (18.8)	377 (23.2)	327 (20.1)	163 (10.0)	8 (0.5)	1,127 (69.4)	498 (30.6)
12. North Simcoe Muskoka	225 (37.3)	114 (19.0)	65 (10.8)	75 (12.4)	85 (14.2)	38 (6.4)	404 (67.1)	198 (32.9)
13. North East	344 (36.2)	157 (16.6)	120 (12.7)	184 (19.4)	116 (12.2)	28 (2.9)	621 (65.4)	328 (34.6)
14. North West	141 (35.3)	48 (12.0)	58 (14.5)	73 (18.3)	61 (15.3)	18 (4.5)	247 (61.9)	152 (38.1)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged ≥18 years discharged alive from acute care with a final diagnosis of stroke or transient ischemic attack (N = 16,549).

Exclusion criteria: Patients with a missing modified Rankin score or postal code.

¹ Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(3) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 2.14a

Discharge destinations among adult patients with stroke or transient ischemic attack discharged with modified Rankin scores of 0–2, in Ontario and by sex, stroke type, OSS region, OSS classification and Local Health Integration Network, 2010/11

Group/Subgroup	Home Without Services	Home with CCAC Services	Home with Outpatient Rehabilitation	Acute Care	Inpatient Rehabilitation	Long-term Care/ Complex Continuing Care
	Patients, n (%)					
Ontario	7,998 (78.4)	912 (8.9)	463 (4.5)	163 (1.6)	396 (3.9)	122 (1.2)
Female	3,595 (76.3)	457 (9.7)	183 (3.9)	78 (1.7)	196 (4.2)	88 (1.9)
Male	4,403 (80.3)	455 (8.3)	280 (5.1)	84 (1.5)	200 (3.6)	34 (0.6)
Stroke Type						
Intracerebral hemorrhage	173 (60.7)	31 (11.1)	27 (9.4)	15 (5.2)	39 (13.7)	-
Ischemic stroke	2,471 (63.6)	568 (14.6)	376 (9.7)	73 (1.9)	343 (8.8)	35 (0.9)
Subarachnoid hemorrhage	205 (74.9)	22 (8.0)	8 (2.8)	33 (12.0)	6 (2.3)	-
Transient ischemic attack	5,122 (89.6)	287 (5.0)	51 (0.9)	42 (0.7)	8 (0.1)	85 (1.5)
Uncertain stroke type	26 (76.6)	**	**	-	-	**
Ontario Stroke System Region						
Central East	1,195 (79.2)	127 (8.4)	61 (4.1)	25 (1.6)	70 (4.6)	8 (0.5)
Central South	1,463 (77.1)	181 (9.6)	99 (5.2)	23 (1.2)	71 (3.7)	21 (1.1)
East – Champlain	888 (78.7)	44 (3.9)	31 (2.8)	22 (2.0)	46 (4.0)	43 (3.9)
Northeast	485 (78.2)	47 (7.5)	42 (6.8)	7 (1.1)	25 (4.0)	12 (1.9)
Northwest	167 (67.6)	18 (7.3)	38 (15.4)	8 (3.2)	13 (5.3)	**
South East	323 (76.4)	52 (12.4)	15 (3.5)	11 (2.6)	10 (2.4)	**
Southwest	1,360 (81.9)	206 (12.4)	30 (1.8)	11 (0.7)	22 (1.3)	9 (0.6)
Toronto – North & East	480 (73.7)	60 (9.3)	52 (8.0)	6 (0.9)	52 (7.9)	**
Toronto – Southeast	482 (85.1)	52 (9.2)	7 (1.3)	9 (1.6)	8 (1.4)	**
Toronto – West	255 (64.7)	53 (13.3)	30 (7.5)	14 (3.6)	43 (10.8)	**
West GTA	900 (81.8)	73 (6.6)	56 (5.1)	26 (2.3)	38 (3.4)	13 (1.2)
Ontario Stroke System Classification						
Regional stroke centre	2,222 (75.5)	278 (9.4)	160 (5.4)	79 (2.7)	149 (5.1)	23 (0.8)
District stroke centre	1,658 (76.3)	162 (7.5)	132 (6.1)	34 (1.6)	118 (5.4)	25 (1.2)
Non-designated	3,963 (81.2)	456 (9.4)	163 (3.3)	43 (0.9)	121 (2.5)	73 (1.5)
Telestroke ¹	155 (77.1)	16 (8.0)	7 (3.5)	6 (3.0)	8 (4.0)	**
Local Health Integration Network						
1. Erie St. Clair	587 (84.0)	67 (9.6)	10 (1.5)	-	14 (2.0)	6 (0.9)
2. South West	773 (80.3)	139 (14.4)	20 (2.0)	11 (1.1)	8 (0.8)	**
3. Waterloo Wellington	448 (78.8)	51 (9.0)	14 (2.5)	10 (1.8)	13 (2.2)	12 (2.0)
4. Hamilton Niagara Haldimand Brant	1,015 (76.3)	130 (9.8)	85 (6.4)	13 (1.0)	58 (4.4)	9 (0.7)
5. Central West	338 (79.8)	36 (8.5)	26 (6.2)	-	16 (3.9)	7 (1.5)
6. Mississauga Halton	562 (83.0)	36 (5.4)	30 (4.4)	26 (3.8)	21 (3.1)	6 (0.9)
7. Toronto Central	766 (76.6)	102 (10.2)	40 (4.0)	23 (2.3)	63 (6.3)	**
8. Central	559 (77.2)	43 (6.0)	55 (7.6)	10 (1.3)	56 (7.7)	**
9. Central East	755 (76.0)	109 (11.0)	45 (4.5)	15 (1.5)	50 (5.1)	**
10. South East	323 (76.4)	52 (12.4)	15 (3.5)	11 (2.6)	10 (2.4)	**
11. Champlain	888 (78.7)	44 (3.9)	31 (2.8)	22 (2.0)	46 (4.0)	43 (3.9)
12. North Simcoe Muskoka	332 (82.2)	37 (9.2)	11 (2.7)	7 (1.7)	**	**
13. North East	485 (78.2)	47 (7.5)	42 (6.8)	7 (1.1)	25 (4.0)	12 (1.9)
14. North West	167 (67.6)	18 (7.3)	38 (15.4)	8 (3.2)	13 (5.3)	**

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged ≥18 years discharged alive from acute care with a final diagnosis of stroke or transient ischemic attack and a modified Rankin score of 0–2 (N=10,198).

Exclusion criteria: Patients with a missing modified Rankin score or postal code.

¹ Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

- (1) Population-based analysis (i.e., the location of the patient's residence is used to report regional performance).
- (2) Percentages add to more than 100% as patients discharged home and with services could select both options (outpatient rehabilitation and Community Care Access Centre), and referral to SPC was a separate data field.
- (3) Cells in which there were no reported/available data are marked with a hyphen (-).
- (4) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.
- (5) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 2.14b

Discharge destinations among adult patients with stroke or transient ischemic attack discharged with modified Rankin scores of 3–5, in Ontario and by sex, stroke type, OSS region, OSS classification and Local Health Integration Network, 2010/11

Group/Subgroup	Home Without Services	Home with CCAC	Home with Outpatient Rehabilitation	Acute Care	Inpatient Rehabilitation	Long-term Care/Complex Continuing Care
	Patients, n (%)					
Ontario	359 (5.6)	745 (11.7)	207 (3.3)	645 (10.2)	2,881 (45.4)	1,297 (20.4)
Female	192 (5.7)	411 (12.1)	78 (2.3)	313 (9.2)	1,436 (42.4)	772 (22.8)
Male	167 (5.6)	334 (11.3)	129 (4.3)	332 (11.2)	1,445 (48.8)	526 (17.7)
Stroke Type						
Intracerebral hemorrhage	13 (2.0)	54 (8.3)	16 (2.5)	118 (18.1)	285 (43.8)	159 (24.4)
Ischemic stroke	231 (4.7)	526 (10.6)	180 (3.6)	420 (8.5)	2,490 (50.2)	975 (19.7)
Subarachnoid hemorrhage	10 (5.3)	15 (8.1)	**	77 (42.8)	62 (34.4)	11 (5.9)
Transient ischemic attack	104 (19.6)	147 (27.8)	7 (1.3)	19 (3.5)	41 (7.8)	142 (26.8)
Uncertain stroke type	**	**	-	10 (35.7)	**	11 (36.9)
Ontario Stroke System Region						
Central East	37 (4.7)	55 (7.0)	18 (2.4)	83 (10.7)	425 (54.6)	129 (16.6)
Central South	75 (6.9)	126 (11.6)	29 (2.7)	80 (7.4)	461 (42.3)	245 (22.5)
East – Champlain	44 (8.9)	40 (8.1)	7 (1.3)	30 (6.0)	198 (39.8)	148 (29.8)
Northeast	22 (6.8)	48 (14.7)	23 (7.0)	34 (10.3)	138 (42.2)	59 (18.0)
Northwest	**	13 (8.6)	8 (5.3)	19 (12.5)	77 (50.7)	24 (15.8)
South East	9 (3.6)	25 (9.7)	7 (2.7)	48 (18.9)	110 (43.3)	55 (21.8)
Southwest	63 (6.1)	138 (13.3)	23 (2.2)	93 (9.0)	497 (48.2)	177 (17.1)
Toronto – North & East	25 (5.2)	48 (10.1)	16 (3.3)	50 (10.5)	217 (45.4)	105 (22.0)
Toronto – Southeast	7 (1.6)	24 (5.7)	11 (2.6)	69 (16.6)	231 (55.2)	67 (16.1)
Toronto – West	21 (3.9)	106 (19.5)	26 (4.8)	37 (6.8)	225 (41.4)	121 (22.3)
West GTA	52 (6.7)	123 (15.8)	39 (5.0)	101 (12.9)	302 (38.7)	166 (21.3)
Ontario Stroke System Classification						
Regional stroke centre	102 (5.0)	212 (10.3)	60 (2.9)	339 (16.5)	925 (45.1)	362 (17.6)
District stroke centre	65 (4.5)	119 (8.3)	42 (3.0)	134 (9.3)	762 (53.2)	242 (16.9)
Non-designated	186 (6.7)	402 (14.6)	103 (3.7)	153 (5.6)	1,155 (41.8)	665 (24.1)
Telestroke ¹	6 (5.5)	13 (11.9)	**	19 (17.4)	39 (35.8)	29 (26.6)
Local Health Integration Network						
1. Erie St. Clair	33 (7.7)	48 (11.2)	9 (2.1)	28 (6.5)	217 (50.5)	75 (17.4)
2. South West	30 (5.0)	89 (14.8)	14 (2.3)	65 (10.8)	280 (46.4)	102 (16.9)
3. Waterloo Wellington	17 (5.7)	27 (9.0)	15 (4.8)	25 (8.2)	142 (47.3)	45 (15.1)
4. Hamilton Niagara Haldimand Brant	58 (7.3)	99 (12.6)	15 (1.9)	56 (7.0)	318 (40.4)	200 (25.3)
5. Central West	13 (5.0)	72 (27.5)	10 (3.8)	20 (7.5)	92 (35.0)	59 (22.5)
6. Mississauga Halton	39 (7.5)	51 (9.8)	29 (5.6)	81 (15.7)	210 (40.6)	107 (20.7)
7. Toronto Central	27 (3.1)	95 (11.2)	24 (2.8)	134 (15.8)	411 (48.3)	138 (16.3)
8. Central	34 (6.7)	74 (14.7)	29 (5.7)	26 (5.1)	202 (40.0)	121 (24.0)
9. Central East	18 (2.8)	46 (6.9)	8 (1.1)	56 (8.5)	405 (61.0)	114 (17.2)
10. South East	9 (3.6)	25 (9.7)	7 (2.7)	48 (18.9)	110 (43.3)	55 (21.8)
11. Champlain	44 (8.9)	40 (8.1)	7 (1.3)	30 (6.0)	198 (39.8)	148 (29.8)
12. North Simcoe Muskoka	10 (5.1)	18 (8.8)	11 (5.8)	24 (12.1)	80 (40.4)	49 (24.8)
13. North East	22 (6.8)	48 (14.7)	23 (7.0)	34 (10.3)	138 (42.2)	59 (18.0)
14. North West	**	13 (8.6)	8 (5.3)	19 (12.5)	77 (50.7)	24 (15.8)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged ≥18 years discharged alive from acute care with a final diagnosis of stroke or transient ischemic attack and a modified Rankin score of 3–5 (N=6,351).

Exclusion criteria: Patients with a missing modified Rankin score or postal code.

¹ Non-designated centres (n=7). The remaining 10 Telestroke sites include one regional and nine district stroke centres.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Population-based analysis (i.e., the location of the patient's residence is used to report regional performance).

(2) Percentages add to more than 100% as patients discharged home and with services could select both options (outpatient rehabilitation and Community Care Access Centres), and referral to SPC was a separate data field.

(3) Cells in which there were no reported/available data are marked with a hyphen (-).

(4) See Appendix D for a list of hospitals classified as Telestroke, regional and district stroke centres by the OSS.

(5) See Appendix J for the Ontario Stroke Audit sample sizes.

Exhibit 2.15

Characteristics of adult stroke patients who received AlphaFIM assessments, in Ontario and by sex and stroke severity, 2010/11

Characteristics	All	Female	Male	AlphaFIM Score		
				Mild (80+)	Moderate (40–79)	Severe (<40)
Ontario	2,201	1,070	1,131	926	661	525
Age, mean (median)	73.3 (75.4)	76.0 (78.5)	70.7 (72.3)	69.0 (70.5)	75.5 (77.7)	77.7 (79.7)
Patients independent prior to AlphaFIM, n (%)	1,518 (69.8)	658 (62.6)	860 (76.5)	758 (83.1)	426 (65.0)	269 (51.6)
Time to AlphaFIM						
Mean time from inpatient admission to AlphaFIM (days)	5.3	5.4	5.3	4.3	6.2	6.1
Median time from inpatient admission to AlphaFIM (days)	3.7	3.7	3.7	3.3	4.1	4.0
Patients who received AlphaFIM within 3 days of inpatient admission, n (%)	790 (35.9)	362 (33.9)	427 (37.8)	408 (44.1)	199 (30.2)	159 (30.2)
AlphaFIM Score, mean (median)						
AlphaFIM motor score	45.8 (45.9)	43.6 (41.4)	47.8 (48.5)	70.2 (71.9)	36.4 (35.4)	14.9 (13.0)
AlphaFIM cognitive score	23.5 (24.9)	22.7 (23.0)	24.3 (25.8)	30.5 (32.0)	23.9 (23.4)	10.9 (7.0)
AlphaFIM total score	69.4 (72.1)	66.4 (67.7)	72.3 (76.2)	100.7 (101.2)	60.3 (60.2)	25.8 (22.4)
AlphaFIM Score Distribution, n (%)						
Mild (80+)	926 (43.8)	411 (40.0)	515 (47.5)	n/a	n/a	n/a
Moderate (40–79)	661 (31.3)	325 (31.6)	336 (31.0)	n/a	n/a	n/a
Severe (<40)	525 (24.9)	291 (28.4)	234 (21.6)	n/a	n/a	n/a
AlphaFIM Help Needed (hours), n (%)						
<1 hour	172 (7.8)	72 (6.7)	101 (8.9)	653 (70.5)	7 (1.0)	**
1-2 hours	202 (9.2)	95 (8.9)	107 (9.4)	197 (21.3)	**	-
2-3 hours	188 (8.5)	95 (8.9)	92 (8.2)	49 (5.3)	133 (20.1)	**
>3 hours	1,025 (46.6)	528 (49.3)	497 (43.9)	**	499 (75.5)	512 (97.5)
None	496 (22.5)	222 (20.7)	274 (24.2)	486 (52.5)	**	**
Not documented	119 (5.4)	58 (5.4)	61 (5.4)	21 (2.2)	20 (3.1)	10 (1.9)
Discharge Destination, n (%)						
Home without services	317 (50.7)	133 (49.5)	184 (51.6)	293 (31.6)	6 (0.9)	**
Home with CCAC support	204 (32.7)	96 (35.7)	108 (30.4)	130 (14.0)	49 (7.4)	20 (3.8)
Home with outpatient rehabilitation	137 (21.9)	50 (18.5)	87 (24.4)	118 (12.7)	12 (1.8)	**
Acute care facility	111 (5.0)	56 (5.2)	55 (4.9)	21 (2.2)	40 (6.1)	46 (8.7)
Inpatient rehabilitation	1,056 (48.0)	501 (46.9)	554 (49.0)	354 (38.2)	462 (69.8)	188 (35.8)
Long-term care/complex continuing care	238 (10.8)	141 (13.2)	96 (8.5)	16 (1.7)	67 (10.2)	147 (28.0)
Other	53 (2.4)	37 (3.5)	16 (1.4)	21 (2.2)	17 (2.5)	14 (2.7)
Deceased	119 (5.4)	66 (6.1)	53 (4.7)	**	12 (1.8)	106 (20.2)

Data source: Registry of the Canadian Stroke Network, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged ≥18 years discharged alive from acute care with a final diagnosis of stroke or transient ischemic attack.

Exclusion criteria: Patients with missing AlphaFIM scores.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

(3) See Appendix D for a list of hospitals that use AlphaFIM.

(4) See Appendix J for the Ontario Stroke Audit sample sizes.

n/a = not applicable

3. Rehabilitation, Complex Continuing Care and Long-Term Care

Inpatient Rehabilitation Admissions

Findings

Exhibit 3.1: More than 70% of stroke patients receiving inpatient rehabilitation were over 65 years of age (median 74 years). Women accounted for 47.9% of stroke patients receiving inpatient rehabilitation, and their median age was 77 years compared to 72 years for men.

The median number of days from onset to admission declined from 13 in 2003/04 to 10 in 2010/11 ($p < 0.0001$). The benchmark is 7.0 days. The median total length of stay in rehabilitation decreased from 31 days in 2009/10 to 27 days in 2010/11 with minimal differences between men and women. In 2010/11, ALC days among inpatient rehabilitation patients represented 6.3% of their total length of stay.

The median admission FIM score increased from 76 in 2003/04 to 78 in 2010/11, and median FIM efficiency increased from 0.6 in 2003/04 to 0.8 in 2010/11, showing that patient functional improvements occurred in less time. Women had a slightly lower admission FIM score compared to men (77 vs. 80 median), yet had the same FIM efficiency rate (0.8 median).

Provincially, approximately 73.4% of patients went home (with or without services) after discharge from inpatient rehabilitation. Among women, 70.4% went home (with or without services) compared to 76.2% of men.

There was an increase in the proportion of patients discharged home with and without services: 72.3% in 2003/04 compared to 73.4% in 2010/11. There was a decrease in the proportion of patients discharged to long-term care, from 13.5% in 2003/04 to 9.7% in 2010/11. There was an increase in the proportion of patients being discharged back into acute facilities, from 5.8% in 2003/04 to 7.5% in 2010/11. Similar patterns were observed for men and women.

Conclusions

The reduction in the median length of stay in inpatient rehabilitation is a positive trend. A decrease of 3 days (median) translates into 10,224 acute bed-days saved since 2003/04. The FIM efficiency increased over time; however, admission FIM scores increased, suggesting mild to moderate stroke patients were accessing inpatient rehabilitation. It is important to note that the pressure to decrease length of stay may have negatively influenced access to inpatient rehabilitation for

patients with severe stroke. The decrease in the proportion of patients discharged to long-term care homes following inpatient rehabilitation (14.9% in 2003/04 to 10.3% in 2010/11) may reflect the trend of admitting patients with higher FIM scores.

It is also positive that the number of stroke patients discharged to the community increased, but this may be due to the fact that patients with less severe stroke were gaining access to rehabilitation.

With the aging of the population and increasing numbers of patients with more comorbidities and earlier time to rehabilitation, it is not surprising that some people would develop complications during rehabilitation and require readmission to acute care.

Recommendations

The OSN should advocate for a provincial standard assessment tool to determine eligibility for stroke rehabilitation as described by Willems et al.¹⁸

The OSN should continue to advocate for access to inpatient rehabilitation for patients with severe stroke.

Stroke Inpatient Rehabilitation Profile by Facility Type

Findings

Exhibit 3.2: Provincially, the median time from stroke onset to inpatient rehabilitation admission decreased by three days from 2003/04 to 2010/11 (from 14 to 11 median days). Freestanding rehabilitation facilities demonstrated the most prominent decline over this time frame (from 20 to 14 median days), which may explain the increase in the number of patients admitted to freestanding inpatient rehabilitation facilities over the same time period. Integrated rehabilitation within acute care hospitals commenced four days earlier than for freestanding rehabilitation facilities in 2010/11 (10 vs. 14 median days).

The freestanding facilities decreased the median length of stay by 14.5 days over the eight years, from 47.5 days to 33 days; at the same time, a 4-point increase in the admission total FIM score was observed in freestanding facilities (median 75 in 2003/04 to 79 in 2010/11). Integrated rehabilitation facilities experienced a minimal decrease in length of stay (from 29 to 27 median days) that may be explained by the greater proportion of patients over 85 years of age seen in integrated rehabilitation facilities, as well as only a 3-point increase in median admission total FIM score (74 to 77).

Provincially, the proportion of severely disabled stroke patients in inpatient rehabilitation facilities decreased from 37.6% in 2003/04 to 31.2% by 2010/11. Over the same period, the proportion of severely disabled stroke patients decreased from 34.2% to 26.5% in freestanding facilities and from 38.8% to 33.3% in integrated facilities. The benchmark is 46.9% of inpatient rehabilitation patients have severe disability, based on 2010/11 data.

Provincially, the proportion of mildly disabled stroke patients admitted to inpatient rehabilitation facilities decreased from 21.9% in 2003/04 to 19.6% in 2010/11; however, the proportion admitted to freestanding facilities rose from 15.2% in 2003/04 to 17.5% in 2010/11. Among the integrated rehabilitation facilities, the proportion of both mildly and severely disabled stroke patients decreased, but the proportion of moderately severe stroke patients dramatically increased (from 36.7% in 2003/04 to 46.3% in 2010/11).

Conclusions

It is a positive trend that patients were being admitted to inpatient rehabilitation more quickly and that freestanding rehabilitation facilities made the greatest improvement in admitting stroke patients earlier over the eight years. The freestanding rehabilitation facilities took longer to admit patients from stroke onset (median 14 days) and had longer lengths of stay (33 days) compared to the integrated rehabilitation facilities (10 days and 27 days, respectively). This may be explained by the higher proportion of mildly disabled stroke patients in integrated rehabilitation facilities (20.5% vs. 17.5% in freestanding facilities), as well as the lower proportion of patients with moderate to severe disability, (79.6% vs. 82.5% in freestanding facilities).

An increase provincially in the proportion of moderately disabled stroke patients in inpatient rehabilitation (from 40.5% in 2003/04 to 49.3% in 2010/11) is of concern as it corresponded with a dramatic decrease in the proportion of patients considered to have a severe disability (from 37.6% in 2003/04 to 31.2% in 2010/10). A small decrease was observed among the proportion of mildly disabled stroke patients receiving inpatient rehabilitation over the same time (from 21.9% in 2003/04 to 19.6% in 2010/11), and these trends may explain the observed decrease in rehabilitation length of stay.

Recommendations

It is recommended that rehabilitation programs work collaboratively with providers of acute stroke care to move appropriate individuals to rehabilitation as soon as they are

medically stable and that the OSN continue its work to implement a standard rehabilitation assessment tool across the province.

This data should continue to inform the work of the Emergency Department ALC–Stroke Reference Group.

Rehabilitation programs should strive to maintain the rate of discharge to the community while increasing the proportion of patients with complex and severe stroke-related disability admitted to inpatient rehabilitation.

Degree of Disability in Stroke Inpatient Rehabilitation and Discharge Destinations Across Local Health Integration Networks and OSS Regions

Findings

Exhibit 3.3: There was a 17.0% relative decrease in the proportion of severely disabled stroke patients admitted to inpatient rehabilitation facilities over the eight years, a 21.9% relative increase in admissions of moderately disabled patients, and a 10.5% relative decrease in the proportion of mildly disabled stroke patients admitted into inpatient rehabilitation. Wide variation existed in stroke severity profiles among inpatient rehabilitation patients across the OSS regions and the Local Health Integration Networks (LHINs). Across LHINs in 2010/11, the proportions of stroke patients varied from 11.8% to 31.6% for the mildly disabled, 36.6% to 62.6% for the moderately disabled, and 21.2% to 39.8% for the severely disabled. The proportion of severely disabled patients admitted to inpatient rehabilitation ranged from 21.2% in the Central West LHIN to 39.8% in the Erie St. Clair and South West LHINs. There were minimal differences in the stroke severity profiles of men and women between 2008/09 and 2010/11; women had a higher prevalence of severe disability.

Exhibit 3.4: Provincially between 2008/09 and 2010/11, admission to inpatient rehabilitation remained stable at approximately 31%; however, there was wide variation both within and across the LHINs. In 2010/11, the Erie St. Clair LHIN had the highest rate of admissions into inpatient rehabilitation following an acute stroke hospitalization (38.7%) and the Mississauga Halton LHIN had the lowest (23.7%). The benchmark rate is 42.3%, based on 2010/11 data.

In 2010/11, 3,337 patients were admitted into inpatient rehabilitation following an acute stroke hospitalization; 24% of their total acute length of stay was considered to be ALC. Forty-two percent of the patients had at least one ALC day; the median was six ALC days (data not shown). There was also

wide variation in the time from stroke onset to inpatient rehabilitation admission (from a median of 8 to 15 days in 2010/11) and in mean FIM efficiency scores (from 0.7 to 1.4 in 2010/11). Rehabilitation length of stay decreased in most LHINs. There was very little difference in inpatient length of stay between men and women.

Provincially, in 2010/11 the proportion of severely disabled stroke patients admitted to inpatient rehabilitation was 31.7%. This varied from 22.6% in the Central West LHIN to 42.6% in the Erie St Clair LHIN. Across LHINs,^j the proportion discharged to long-term care varied from 5.4% in the North East LHIN to 17.6% in the South West LHIN.

The proportion of stroke patients with mild disability being admitted into inpatient rehabilitation in Ontario was 20.3%; across the LHINs, this varied from 11.3% in the Mississauga Halton LHIN to 31.4% in the Waterloo Wellington LHIN.

Exhibit 3.5: FIM efficiency (i.e., the gain in functional abilities per day) improved over time for all patient groups. In 2010/11, the overall median FIM efficiency was 0.9; the benchmark is 1.1. Between 2003/04 and 2010/11, the median FIM efficiency rose from 0.7 to 0.8 for mildly disabled patients, from 0.6 to 0.8 for moderately disabled patients, and from 0.4 to 0.6 for severely disabled patients. Integrated rehabilitation facilities had higher FIM efficiency overall than freestanding facilities but lower FIM efficiency for severely disabled patients in 2010/11 (median 0.6 vs. 0.7); however, integrated facilities admitted a greater number of severely disabled patients than freestanding facilities. For moderately disabled stroke patients admitted to integrated rehabilitation, the median FIM efficiency score was 0.9 compared to 0.7 for patients in freestanding facilities. Between men and women, there was little difference in FIM efficiency for all levels of stroke severity.

Exhibit 3.6: Between, 2003/04 and 2010/11, the median length of stay in inpatient rehabilitation decreased across all levels of disability declining from 18 to 16 days, 35 to 28 days and 50 to 42 days for mild, moderate and severely disabled stroke patients, respectively. Overall, the total length of stay was approximately one month (mean 31.5 days; median 28 days).

Conclusions

Even patients with severe stroke had a reasonable median length of stay of 42 days in 2010/11, which supports the recommendation that those with severe stroke should be granted access to inpatient rehabilitation for at least a trial period. By comparison, stroke patients admitted to complex continuing care facilities had median lengths of stay of close to 57 days (mean length of stay, 84.4 days), which suggests that inpatient rehabilitation facilities are likely the preferred setting for efficient severe stroke rehabilitation.

It is important to note that, proportionately, more women than men experience stroke (see Exhibit 1.1), but fewer women are admitted to rehabilitation. Also, women tend to have more severe strokes than men as their average age is higher at onset. This could have implications for admission to long-term care and for readmission rates.

Recommendations

Inpatient rehabilitation contributes substantially to improved patient function and independence, as measured by improved FIM scores during the rehabilitation stay. Patients with severe stroke who have reasonable rehabilitation potential should be admitted to inpatient rehabilitation programs.

It is recommended that the OSN partner with ECHO: Improving Women's Health in Ontario, an agency of the provincial government, to investigate differences between male and female stroke patients. The proportion of women admitted into inpatient rehabilitation warrants investigation.

Findings

Exhibit 3.7: More men were discharged home (with or without services) following inpatient rehabilitation than women (75.1% vs. 69.5%). Women were discharged with a lower FIM score (median 107 vs. 109 in men), were more likely to be discharged to long-term care (11.0% vs. 8.3% of men), and were less likely to be discharged back to acute care (7.3% vs. 7.7% of men).

^j Includes only LHINs that discharged at least 25 patients to long-term care homes.

Conclusions

Overall, there was a decrease in inpatient rehabilitation total length of stay, along with a corresponding decrease in the percentage of severely disabled stroke patients admitted and an increase in the percentage of moderately disabled stroke patients admitted. Furthermore, the decrease in the percentage of patients being discharged to long-term care following inpatient rehabilitation may reflect this change in severity profile that has been observed over the past eight years. Even patients with severe stroke had a reasonable median length of stay of 42 days in 2010/11, which supports access to inpatient rehabilitation for those with severe stroke for at least a trial period of inpatient rehabilitation. By comparison, stroke patients admitted to complex continuing care facilities had a median length of stay of 57 days (84.4 mean days), which suggests that inpatient rehabilitation facilities are likely the preferred setting for efficient severe stroke rehabilitation (see Exhibit 3.8a).

It is important to note that proportionately more women than men experience stroke (see Exhibit 1.1) but fewer women are admitted to rehabilitation. Also, women tend to have more severe strokes than men as their average age is higher at onset. This could have implications for admission to long-term care and readmission rates.

Recommendations

Inpatient rehabilitation contributes substantially to improved patient functioning and independence, as measured by increased FIM scores during the rehabilitation stay. Patients with severe stroke who have reasonable rehabilitation potential should be admitted to inpatient rehabilitation programs.

The difference in the proportion of women admitted into inpatient rehabilitation warrants investigation. It is recommended that the OSN investigate the sex difference in partnership with ECHO: Improving Women's Health in Ontario.

Wide variations in the stroke severity profile across LHINs and in time to admission into inpatient rehabilitation signal a need for provincial standards for eligibility criteria, therapeutic intensity and discharge criteria (AlphaFIM).

Provincial Complex Continuing Care Profile of Stroke/TIA Patients

Findings

Exhibit 3.8a: In 2009/10, 1,227 patients were admitted to complex continuing care (CCC) following an acute stroke/TIA hospitalization; 55.1% of these were women. The median age was 79 years making this group five years older (median) than stroke patients going into inpatient rehabilitation. The overall acute length of stay in acute care for these patients was 16 median days, 10 days longer than the general acute stroke population. These patients had a median time of 3 acute ALC days (mean 9 ALC days) in 2009/10, and the median time from acute admission to CCC admission was 31 days, three times longer than patients going into inpatient rehabilitation.

Seventeen percent of patients were diagnosed with either dementia or Alzheimer's.

In 2009/10, the median CCC length of stay was almost two months (57 days), and this has remained relatively stable over the past three years. Approximately 30% of patients were discharged to long-term care, 18.5% were discharged home with services and 10.4% were discharged home without services. Consistently, approximately 12% of patients in CCC were discharged back to inpatient acute care and approximately 14% died.

Exhibit 3.8b: Over half of the complex continuing care (CCC) cohort (52.4%) was considered to be cognitively impaired (the Cognitive Performance Scale score was ≥ 3). The overall prevalence of possible depression as measured by the Depression Rating Scale on the RAI-MDS decreased from 19.5% in 2007/08 to 17.1% in 2009/10. The proportion of stroke patients considered to be socially engaged in activities in their facility increased slightly over time (from 35.6% in 2007/08 to 38.6% in 2009/10). On the Activities of Daily Living (ADL, long form) scale of 0–28, stroke patients admitted to CCC scored high (median 20), indicating greater difficulty performing these activities. This remained consistent from 2007/08 to 2009/10.

The majority of the cohort was considered to have no pain or mild pain, and there was minimal change in pain level among patients with a follow-up assessment within three months of the initial assessment, suggesting pain had little impact on rehabilitation duration or intensity.

Stroke patients admitted into complex continuing care following an acute stroke received less than 30 minutes per day of each available rehabilitation therapy (speech, occupational, physical or recreational).^k Respectively, 41.5%, 78.4%, 87.1% and 35.9% of patients received speech, occupational, physical and recreational therapy in 2010/11.

Among the 2009/10 patients who stayed in CCC long enough to receive a three-month follow-up assessment (N=324), the majority (83.9%) either improved or experienced no change in their status. On admission to CCC, there was a decrease in the proportion of patients whose overall change in care needs (i.e., self-sufficiency) was assessed to have deteriorated compared to 90 days earlier (from 70.2% in 2007/08 to 61.0% in 2009/10). In 2009/10, among those patients with follow-up assessments at three months from the initial assessment, almost half (48.1%) were assessed to have experienced no change in their overall care needs (self-sufficiency), and just over one-third (35.8%) improved their level of self-sufficiency. Caution must be exercised in interpreting these findings due to the medical/functional complexity of this cohort (i.e., the stroke/TIA may not have been related to the change in overall care needs).

Provincial Long-Term Care Home Profile

Findings

Exhibit 3.9a: Among patients discharged from an acute stroke/TIA inpatient hospitalization in 2009/10, 679 were admitted to long-term care (LTC) within 6 months of the acute stroke/TIA. Women represented 63.0% of these patients, and approximately one in five (20.6%) of the patients were residing in a long-term care facility prior to their acute stroke hospitalization. Thirty-seven percent of the patients were diagnosed with either dementia or Alzheimer's.

The median age of stroke patients admitted to LTC homes following a stroke was 82 years in 2009/10, approximately 8 years older than the median age of the 2010/11 cohort of stroke patients going into inpatient rehabilitation following an acute stroke.

Among acute stroke/TIA patients discharged to long-term care, the median inpatient length of stay in stroke acute care was 18 days; three times longer than the provincial median inpatient length of stay in stroke acute care of 6 days. The median number of acute ALC days among stroke/TIA patients going

into LTC following an acute stroke hospitalization was 3 days (the mean was 19 days). The median time from acute admission to LTC was 84 days for patients not originally from LTC and only 13.5 days for those originally from LTC. In 2010/11, the most common discharge destination for stroke patients in LTC was inpatient acute care (37.4%), followed by death (24.3%) and another LTC home (19.9%).

Exhibit 3.9b: Over half of the LTC stroke patients (51.4%) were considered to be cognitively impaired (had a Cognitive Performance Scale score of ≥ 3). There was a greater prevalence of depression at 6 months (31.3% vs. 26.3% at initial assessment), with over half of these residents receiving antidepressant medication. There was an improvement in social engagement at 6 months (38.0% vs. 31.3% at initial assessment). There was a slight decrease in the percentage of patients with moderate to severe cognitive impairment over 6 months (59.8% vs. 57.0%).

In 2009/10, LTC patients received, on average, 5–10 minutes of therapy (occupational, physical or recreational) per day.^k The majority of patients received physical therapy (60.7%); 10.3% received recreational therapy, 4.4% occupational therapy and 1.0% speech therapy.

Conclusions

This is the first report on stroke/TIA patients discharged to CCC and LTC facilities following an acute stroke/TIA inpatient hospitalization in Ontario. This information will assist the OSS LTC/Community Specialists/Coordinators to develop priorities for the stroke/LTC/CCC client group.

These patients were typically 80 years of age and female, and in both CCC and LTC settings, over half of the patients were considered to be cognitively impaired. The amount of rehabilitation services provided to stroke/TIA patients was minimal at less than 30 minutes per day. This does not meet stroke rehabilitation best practice recommendations of three hours per day.⁷ Among stroke patients admitted into CCC, the overall change in care/rehabilitation needs on follow-up demonstrated that fewer patients deteriorated and more patients scored “improved” or “no change.” Taking into account the amount of therapy received and the discharge destinations of patients in CCC, it appears the CCC setting is not preferable for the rehabilitation of patients with the potential to return home.

^k It is assumed that therapy was offered five days per week and may have been provided in individual or small-group settings.

Compared to patients in LTC facilities, stroke/TIA patients in CCC were younger (median age 79 compared to 82 in LTC) and less likely to be female (55.1% vs. 63.0% in LTC). Although the stroke patients in these two settings were very similar in terms of their degree of independence (median ADL score) and pain and cognitive impairment (CPS score ≥ 3), patients in LTC had much less access to rehabilitation services. The higher prevalence of dementia and Alzheimer's in LTC homes (36.9% compared to 17.2% in CCC facilities) may explain this difference.

The availability of acute stroke units and inpatient rehabilitation services within regions influences how CCC beds are utilized. CCC services vary across the province in terms of program models, rehabilitation resources, client profile and bed accessibility. A greater understanding is required of this variability and of the roles of CCC and LTC within the continuum of stroke care.

Given that 20.6% of stroke/TIA patients who went into LTC following an acute stroke hospitalization were prior LTC residents, and that rehabilitation services are minimal within LTC facilities, there is a concern that rehabilitation needs may not have been assessed.

Compared to the general LTC population, the cohort of LTC residents with a stroke/TIA acute hospitalization had a higher proportion of discharges back into that setting (37.4% compared to 15.3%, an almost 2.5-fold increase).¹⁹ This suggests the need for an examination of the LTC system's infrastructure and its ability to effectively support these residents pre- and post-stroke to avoid hospital readmissions. In addition, an investigation into the period before hospitalization and/or death is warranted to determine if there were predictors of this trajectory. This information could assist the LTC sector in more effectively resourcing their facilities to avoid hospital readmissions and support palliative and end-of-life care.

Recommendations

The OSN should advance its work with the ER/ALC Rehab/CCC Expert Panel to advocate for provincial data collection of standardized measurements of rehabilitation outcomes (i.e., FIM scores) to evaluate stroke rehabilitation. Standard measurement of the intensity of rehabilitation provided in CCC facilities is needed if these settings are to be considered rehabilitation. It is not known how many of the cohort received low-intensity, long-duration rehabilitation services in CCC. Approximately 13.8% of the stroke/TIA patients in CCC had a stay in inpatient rehabilitation prior to their CCC admission (data not shown).

Consideration of the prevalence of dementia and Alzheimer's and other comorbidities that may impact rehabilitation expectations/goals is needed. Further exploration of geographical variation in the provision of rehabilitation, including social work and accessibility to psychological counselling, is also needed.

Further evaluation is required to better understand the factors contributing to the high prevalence of acute care readmissions and the high number of ALC days among stroke patients in LTC homes.

Consistent screening for post-stroke depression in acute care and across the care continuum using a validated tool is needed. Further research is required to better understand post-stroke depression and its treatment, as well as patient access to specialized mental health services in CCC and LTC settings and across the care continuum.

The OSN needs to work with the LTC sector and ECHO: Improving Women's Health in Ontario to better understand what is needed to ensure that full rehabilitation potential is realized, to determine the trajectories of stroke patients residing in LTC homes, and to develop appropriate infrastructure and services to meet the needs of stroke patients in LTC.

Exhibit 3.1

Characteristics of adult stroke patients in inpatient rehabilitation, in Ontario and by sex, 2003/04 and 2008/09–2010/11

Characteristic	2003/04			2008/09			2009/10			2010/11		
	2,979	1,410	1,569	3,256	1,514	1,742	3,351	1,551	1,800	3,408	1,633	1,775
Ontario												
Patient Age^{1,2}	All	Female	Male	All	Female	Male	All	Female	Male	All	Female	Male
Mean	71.3	73.2	69.6	71.2	73.5	69.2	71.4	73.6	69.4	71.9	73.8	70.2
Median	74	76	72	73	76	71	74	77	71	74	77	72
Age Group (in Years), n (%)												
18–45	111 (3.7)	54 (3.8)	57 (3.6)	115 (3.5)	59 (3.9)	56 (3.2)	134 (4.0)	60 (3.9)	74 (4.1)	128 (3.8)	66 (4.0)	62 (3.5)
46–65	719 (24.1)	266 (18.9)	453 (28.9)	885 (27.2)	294 (19.4)	591 (33.9)	911 (27.2)	324 (20.9)	587 (32.6)	870 (25.5)	327 (20.0)	543 (30.6)
66–75	834 (28.0)	357 (25.3)	477 (30.4)	849 (26.1)	361 (23.8)	488 (28.0)	842 (25.1)	353 (22.8)	489 (27.2)	838 (24.6)	366 (22.4)	472 (26.6)
76–85	1,021 (34.3)	544 (38.6)	477 (30.4)	1,040 (31.9)	558 (36.9)	482 (27.7)	1,017 (30.3)	530 (34.2)	487 (27.1)	1,121 (32.9)	584 (35.8)	537 (30.3)
>85	294 (9.9)	189 (13.4)	105 (6.7)	367 (11.3)	242 (16.0)	125 (7.2)	447 (13.3)	284 (18.3)	163 (9.1)	451 (13.2)	290 (17.8)	161 (9.1)
Days from Onset to Admission												
Mean ± SD	20.6 ± 46.9	22.0 ± 62.0	19.3 ± 26.8	18.6 ± 57.9	16.8 ± 22.8	20.1 ± 76.2	18.5 ± 64.1	17.2 ± 21.6	19.7 ± 85.2	15.3 ± 21.4	14.9 ± 17.7	15.7 ± 24.3
Median (IQR)	13 (7–22)	13 (7–22)	13 (7–23)	11 (7–18)	11 (7–18)	11 (7–19)	11 (7–18)	12 (7–19)	11 (7–18)	10 (7–17)	10 (7–17)	10 (6–17)
Admission FIM Score, mean (median)												
Total motor FIM score	49.3 (50)	47.9 (48)	50.5 (51)	50.1 (51)	49.3 (50)	50.7 (52)	50.1 (51)	48.6 (50)	51.5 (52)	51.0 (52)	49.8 (51)	52.2 (53)
Total cognitive FIM score	25.4 (27)	25.8 (28)	25.1 (27)	25.5 (27)	25.7 (27)	25.3 (27)	25.4 (27)	25.2 (26)	25.5 (27)	25.4 (26)	25.4 (26)	25.4 (26)
Total FIM score	74.7 (76)	73.7 (75)	75.6 (77)	75.5 (78)	75.0 (77)	76.0 (79)	75.6 (77)	73.8 (76)	77.1 (79)	76.4 (78)	75.2 (77)	77.5 (80)
Discharge FIM Score, mean (median)												
Total motor FIM score	69.6 (77)	68.5 (76)	70.5 (78)	71.0 (78)	69.7 (77)	72.1 (79)	71.0 (77)	69.5 (76)	72.3 (79)	72.1 (78)	70.7 (77)	73.4 (79)
Total cognitive FIM score	28.3 (30)	28.4 (30)	28.1 (30)	28.3 (30)	28.4 (30)	28.2 (30)	28.3 (30)	28.1 (30)	28.5 (30)	28.4 (30)	28.4 (30)	28.4 (30)
Total FIM score	97.8 (106)	96.9 (105)	98.7 (107)	99.3 (107)	98.1 (106)	100.3 (108)	99.3 (107)	97.6 (105)	100.8 (108)	100.5 (107)	99.1 (106)	101.8 (109)
Change in FIM Score from Admission to Discharge, mean (median)												
Total motor FIM score	19.4 (18)	19.6 (19)	19.2 (18)	19.9 (19)	19.4 (19)	20.3 (19)	19.9 (19)	19.8 (19)	20.0 (19)	19.6 (18)	19.5 (19)	19.6 (18)
Total cognitive FIM score	2.5 (1)	2.4 (1)	2.7 (2)	2.6 (2)	2.5 (2)	2.7 (2)	2.6 (2)	2.6 (1)	2.7 (2)	2.6 (2)	2.6 (2)	2.6 (2)
Total FIM score	21.9 (21)	22.0 (21)	21.8 (20)	22.5 (22)	21.9 (21)	23.0 (22)	22.5 (21)	22.4 (22)	22.6 (21)	22.1 (21)	22.1 (21)	22.2 (20)
Improvement in functional status ⁴ , %	26.9	27.5	26.0	27.3	26.7	27.8	27.3	27.8	27.0	25.8	26.9	25.0
Total length of stay ⁵ in days in inpatient rehabilitation, mean (median)	37.6 (31)	36.6 (30)	38.4 (32)	36.0 (30)	35.7 (30)	36.3 (30)	36.0 (30)	35.5 (30)	36.5 (30)	31.4 (27)	31.4 (28)	31.5 (27)
Active length of stay ⁵ in days in inpatient rehabilitation, mean (median)	37.8 (32)	36.7 (31)	38.8 (33)	35.4 (30)	35.0 (30)	35.8 (30)	34.2 (29)	34.2 (29)	34.3 (29.5)	30.1 (27)	29.8 (27)	30.4 (27)
Proportion of ALC ⁶ days to total length of stay in inpatient rehab, %	-	-	-	-	-	-	6.6	5.5	7.6	6.3	6.9	5.7
FIM efficiency ⁷ in inpatient rehabilitation, mean (median)	0.8 (0.6)	0.8 (0.6)	0.8 (0.6)	0.9 (0.7)	0.9 (0.7)	0.9 (0.7)	0.9 (0.7)	0.9 (0.7)	0.9 (0.7)	0.9 (0.8)	0.9 (0.8)	0.9 (0.8)
Discharge Destination Following Inpatient Rehabilitation, %												
Home without services	29.1	23.5	34.3	27.1	23.0	30.7	29.6	25.5	33.1	32.1	27.9	36.0
Home with services	43.2	44.4	42.1	45.2	46.1	44.3	43.6	42.5	44.5	41.3	42.5	40.2
Other community services	5.3	6.7	4.1	6.0	7.8	4.3	6.2	8.4	4.2	7.5	9.1	6.0
Long-term care	13.5	15.5	11.6	10.4	11.5	9.4	10.2	12.0	8.6	9.7	11.1	8.5
Acute care	5.8	6.2	5.4	7.6	7.9	7.4	8.1	9.4	7.0	7.5	7.3	7.7
Deceased	0.8	1.3	0.3	0.5	0.5	0.4	0.3	0.3	0.4	0.6	0.8	0.5
Unavailable/unknown	2.4	2.5	2.3	3.3	3.2	3.4	2.1	1.9	2.3	1.2	1.3	1.1

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD) and the National Rehabilitation Reporting System (NRS), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years with a diagnosis of stroke (using ICD-10 codes) discharged from an acute care hospital who were admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database in the same fiscal year.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Based on stroke patients discharged from acute care hospitals in the CIHI-DAD in 2003/04 to 2009/10.

³ Length of stay (LOS) refers to the total time spent in inpatient rehabilitation and is calculated using the admission and discharge dates in the NRS database (LOS = discharge date – admission date).

⁴ Relative improvement in median total FIM score from admission to discharge.

⁵ Active LOS excludes days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care).

⁶ A patient is designated Alternate Level of Care (ALC) by a physician or his/her delegate when the patient is occupying a bed in a hospital and does not require the intensity of resources/services provided in the current care setting (acute, complex continuing care, mental health or rehabilitation). The ALC wait period starts at the time of designation and ends at the time of discharge/transfer to a discharge destination (or when the patient's needs or condition changes and the designation of ALC no longer applies). The standardized provincial ALC definition was implemented across all acute care facilities in Ontario on July 1, 2009. The number of ALC days is calculated using the total length of stay and the active length of stay in the NRS database (ALC = total LOS – active LOS).

⁷ FIM efficiency is the change in total FIM score divided by total length of stay; it provides information on the average amount of functional recovery per day of inpatient rehabilitation.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

SD = standard deviation; IQR = interquartile range (25th–75th percentile); FIM = Functional Independence Measurement

Exhibit 3.2

Characteristics of adult stroke patients in inpatient rehabilitation, in Ontario and by facility type¹, 2003/04 and 2008/09–2010/11

Characteristic	2003/04			2008/09			2009/10			2010/11		
	Ontario	Freestanding ¹	Integrated ¹	Ontario	Freestanding ¹	Integrated ¹	Ontario	Freestanding ¹	Integrated ¹	Ontario	Freestanding ¹	Integrated ¹
Facilities, n	62	11	51	66	12	54	64	13	51	62	11	51
Patients ² , n	3,012	824	2,188	3,738	1,081	2,657	3,860	1,102	2,758	3,548	1,092	2,456
Female, n (%)	1,447 (48.0)	372 (45.1)	1,075 (49.1)	1,763 (47.2)	488 (45.1)	1,275 (48.0)	1,777 (46.0)	511 (46.4)	1,266 (45.9)	1,680 (47.4)	516 (47.3)	1,164 (47.4)
Age Group (in Years), n (%)												
18–45	123 (4.1)	40 (4.9)	83 (3.8)	155 (4.1)	63 (5.8)	92 (3.5)	163 (4.2)	46 (4.2)	117 (4.2)	149 (4.2)	51 (4.7)	98 (4.0)
46–65	693 (23.0)	217 (26.3)	476 (21.8)	986 (26.4)	317 (29.3)	669 (25.2)	1,044 (27.0)	320 (29.0)	724 (26.3)	907 (25.6)	287 (26.3)	620 (25.2)
66–75	836 (27.8)	231 (28.0)	605 (27.7)	965 (25.8)	267 (24.7)	698 (26.3)	966 (25.0)	273 (24.8)	693 (25.1)	872 (24.6)	274 (25.1)	598 (24.3)
76–85	1,048 (34.8)	268 (32.5)	780 (35.6)	1,203 (32.2)	329 (30.4)	874 (32.9)	1,190 (30.8)	335 (30.4)	855 (31.0)	1,164 (32.8)	357 (32.7)	807 (32.9)
>85	312 (10.4)	68 (8.3)	244 (11.2)	429 (11.5)	105 (9.7)	324 (12.2)	497 (12.9)	128 (11.6)	369 (13.4)	456 (12.9)	123 (11.3)	333 (13.6)
Days from Onset to Admission												
Mean ± SD	30.5 ± 242.1	37.1 ± 69.1	28.0 ± 280.9	23.9 ± 89.1	27.5 ± 51.4	22.4 ± 100.4	23.1 ± 53.9	29.5 ± 62.7	20.6 ± 49.8	20.0 ± 40.9	25.5 ± 53.9	17.6 ± 33.3
Median (IQR)	14 (8–26)	20 (13–36.5)	12 (7–23)	12 (8–22)	16 (11–26)	11 (7–20)	12 (8–22)	16 (10–27)	11 (7–20)	11 (7–19)	14 (9–23)	10 (6–17)
Days from Ready for Admission to Admission												
Mean ± SD	4.0 ± 7.9	7.1 ± 12.1	3.0 ± 5.6	2.6 ± 6.1	3.4 ± 5.9	2.3 ± 6.2	2.7 ± 5.5	3.7 ± 6.3	2.2 ± 5.0	2.8 ± 8.8	3.9 ± 7.5	2.1 ± 9.4
Median (IQR)	1 (0–5)	3 (1–8)	1 (0–4)	1 (0–3)	1 (1–4)	0 (0–2)	1 (0–3)	2 (1–4)	0 (0–2)	1 (0–3)	1 (1–4)	0 (0–2)
Disability, n (%)												
Mild ³	660 (21.9)	125 (15.2)	535 (24.5)	752 (20.1)	187 (17.3)	565 (21.3)	761 (19.7)	184 (16.7)	577 (20.9)	694 (19.6)	191 (17.5)	503 (20.5)
Moderate ⁴	1,220 (40.5)	417 (50.6)	803 (36.7)	1,744 (46.7)	585 (54.1)	1,159 (43.6)	1,815 (47.0)	628 (57.0)	1,187 (43.0)	1,748 (49.3)	612 (56.0)	1,136 (46.3)
Severe ⁵	1,132 (37.6)	282 (34.2)	850 (38.8)	1,242 (33.2)	309 (28.6)	933 (35.1)	1,284 (33.3)	290 (26.3)	994 (36.0)	1,106 (31.2)	289 (26.5)	817 (33.3)
Length of Stay⁶ (Days)												
Mean ± SD	41.3 ± 30.4	52.8 ± 31.2	37.0 ± 29.0	37.7 ± 26.2	43.4 ± 26.0	35.4 ± 25.9	37.5 ± 28.6	41.9 ± 31.9	35.7 ± 27.0	33.3 ± 23.8	37.2 ± 23.8	31.6 ± 23.5
Median (IQR)	35 (19–56)	47.5 (34–66)	29 (15–50)	32 (19–50)	38 (28–55)	29 (15–49)	31.5 (19–48.5)	35 (25–50)	29 (17–48)	28 (17–42)	33 (22–44)	27 (15–42)
Total Patient Days Past Trim Point												
Mean ± SD	28.0 ± 38.6	29.3 ± 49.3	26.7 ± 24.1	20.9 ± 29.8	25.5 ± 41.6	17.9 ± 17.9	41.9 ± 64.4	69.0 ± 86.6	29.5 ± 47.2	29.4 ± 29.2	27.7 ± 27.6	30.7 ± 30.9
Median (IQR)	16 (6–31)	14 (6–24)	22 (8–42)	12 (5–25)	10 (6–23)	12 (5–27)	19 (6–46)	36 (13–88)	12.5 (5–26)	18 (8.5–46)	20 (7–46)	17 (11–33)
Admission Total FIM score												
Mean ± SD	73.6 ± 24.7	74.7 ± 22.8	73.2 ± 25.4	75.4 ± 23.2	77.4 ± 22.5	74.6 ± 23.5	75.2 ± 23.4	77.1 ± 23.2	74.5 ± 23.4	76.2 ± 23.1	77.3 ± 23.1	75.7 ± 23.0
Median (IQR)	75 (56–93)	75 (59–91)	74 (55–94)	77 (59–93)	79 (61–95)	76 (57–92)	77 (59–93)	80 (61–94)	76 (58–92)	78 (60–93.5)	79 (61–95)	77 (59–93)
Discharge Total FIM score												
Mean ± SD	96.1 ± 25.2	98.5 ± 22.8	95.2 ± 26.0	99.2 ± 23.0	101.8 ± 19.8	98.1 ± 24.1	99.1 ± 22.5	100.6 ± 21.3	98.4 ± 22.9	99.8 ± 21.8	102.2 ± 18.9	98.8 ± 22.8
Median (IQR)	105 (83–115)	106 (88.5–115)	104 (81–115)	107 (89–116)	107 (93–116)	107 (87–115)	107 (90–115)	107 (93–116)	106 (88–115)	107 (91–115)	108 (94–116)	106 (89–115)
FIM Efficiency⁷												
Mean ± SD	0.7 ± 0.9	0.5 ± 0.4	0.8 ± 1.1	0.9 ± 1.1	0.6 ± 0.5	0.9 ± 1.2	0.8 ± 0.8	0.6 ± 0.5	0.9 ± 0.9	0.9 ± 0.8	0.7 ± 0.5	0.9 ± 0.9
Rehabilitation Discharge Destination, n (%)												
Home without services	682 (23.5)	281 (35.0)	401 (19.1)	952 (26.6)	400 (38.1)	552 (21.8)	1,063 (28.6)	448 (41.8)	615 (23.3)	1,039 (30.3)	487 (45.3)	552 (23.4)
Home with services	1,346 (46.4)	311 (38.8)	1,035 (49.3)	1,654 (46.2)	382 (36.3)	1,272 (50.3)	1,655 (44.6)	366 (34.2)	1,289 (48.8)	1,477 (43.1)	340 (31.6)	1,137 (48.3)
Other community services	172 (5.9)	51 (6.4)	121 (5.8)	215 (6.0)	58 (5.5)	157 (6.2)	230 (6.2)	46 (4.3)	184 (7.0)	260 (7.6)	66 (6.1)	194 (8.2)
Long-term care	432 (14.9)	117 (14.6)	315 (15.0)	383 (10.7)	128 (12.2)	255 (10.1)	398 (10.7)	125 (11.7)	273 (10.3)	353 (10.3)	108 (10.0)	245 (10.4)
Acute care	212 (7.3)	41 (5.1)	171 (8.1)	303 (8.5)	60 (5.7)	243 (9.6)	344 (9.3)	85 (7.9)	259 (9.8)	275 (8)	74 (6.9)	201 (8.5)
Deceased	12 (0.4)	**	11 (0.5)	-	-	-	-	-	-	-	-	-
Missing/unavailable/unknown	47 (1.6)	-	47 (2.2)	71 (2.0)	23 (2.2)	48 (1.9)	24 (0.6)	**	23 (0.9)	25 (0.7)	-	25 (1.1)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database.

Exclusion criteria: Patients discharged from one facility and admitted to another within 24 hours (N = 123 in 2003/04, 124 in 2008/09, 110 in 2009/10 and 66 in 2010/11).

¹ Freestanding and integrated facilities are termed Specialty and General facilities, respectively, in the NRS database. The only freestanding rehabilitation facility that is part of a general hospital is located at Windsor Regional Hospital.

² Based on unique patients (i.e., does not include multiple patient-visits).

³ Mild disability includes Rehabilitation Patient Groups (RPGs) 1150 and 1160.

⁴ Moderate disability includes RPGs 1120, 1130 and 1140.

⁵ Severe disability includes RPGs 1100 and 1110.

⁶ Length of stay (LOS) refers to the total time spent in inpatient rehabilitation and is calculated using the admission and discharge dates in the NRS database (LOS = discharge date – admission date).

⁷ FIM efficiency is the change in total FIM score divided by total length of stay; it provides information on the average amount of functional recovery per day of inpatient rehabilitation.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

SD = standard deviation; IQR = interquartile range (25th–75th percentile); FIM = Functional Independence Measurement

Exhibit 3.3

Adult admissions to inpatient rehabilitation by stroke severity, in Ontario and by sex, OSS region and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	2003/04 (N=3,012)			2008/09 (N=3,738)			2009/10 (N=3,860)			2010/11 (N=3,548)		
	Admissions by Stroke Severity, n (%)											
	Mild ¹	Moderate ²	Severe ³	Mild ¹	Moderate ²	Severe ³	Mild ¹	Moderate ²	Severe ³	Mild ¹	Moderate ²	Severe ³
Ontario⁴	660 (21.9)	1,220 (40.5)	1,132 (37.6)	752 (20.1)	1,744 (46.7)	1,242 (33.2)	761 (19.7)	1,815 (47.0)	1,284 (33.3)	694 (19.6)	1,748 (49.3)	1,106 (31.2)
Female	320 (22.1)	589 (40.7)	538 (37.2)	353 (20.0)	802 (45.5)	608 (34.5)	323 (18.2)	833 (46.9)	621 (34.9)	311 (18.5)	833 (49.6)	536 (31.9)
Male	340 (21.7)	631 (40.3)	594 (38.0)	399 (20.2)	942 (47.7)	634 (32.1)	438 (21.0)	982 (47.1)	663 (31.8)	383 (20.5)	915 (49.0)	570 (30.5)
Ontario Stroke System Region												
Central East	84 (22.6)	131 (35.3)	156 (42.0)	116 (21.6)	201 (37.4)	220 (41.0)	108 (18.9)	218 (38.2)	244 (42.8)	101 (20.2)	212 (42.5)	186 (37.3)
Central South	116 (21.3)	230 (42.3)	198 (36.4)	112 (17.9)	311 (49.8)	202 (32.3)	99 (15.9)	304 (48.8)	220 (35.3)	99 (16.2)	308 (50.5)	203 (33.3)
East – Champlain	63 (20.5)	126 (40.9)	119 (38.6)	83 (24.7)	166 (49.4)	87 (25.9)	81 (23.8)	165 (48.4)	95 (27.9)	64 (21.3)	159 (52.8)	78 (25.9)
Northeast	19 (18.4)	47 (45.6)	37 (35.9)	24 (15.7)	64 (41.8)	65 (42.5)	43 (20.8)	80 (38.6)	84 (40.6)	43 (20.9)	107 (51.9)	56 (27.2)
Northwest	8 (22.2)	12 (33.3)	16 (44.4)	20 (19.0)	40 (38.1)	45 (42.9)	21 (17.4)	58 (47.9)	42 (34.7)	25 (23.1)	51 (47.2)	32 (29.6)
South East	15 (11.2)	66 (49.3)	53 (39.6)	35 (22.6)	66 (47.1)	47 (30.3)	20 (13.4)	82 (55.0)	47 (31.5)	32 (23.0)	56 (40.3)	51 (36.7)
Southwest	126 (21.2)	212 (35.8)	255 (43.0)	119 (18.6)	263 (41.1)	258 (40.3)	120 (17.9)	295 (44.0)	256 (38.2)	134 (21.2)	247 (39.0)	252 (39.8)
Toronto – North & East	44 (25.4)	72 (41.6)	57 (32.9)	50 (32.1)	77 (49.4)	29 (18.6)	50 (35.7)	73 (52.1)	17 (12.1)	64 (36.8)	90 (51.7)	20 (11.5)
Toronto – Southeast	67 (29.0)	99 (42.9)	65 (28.1)	69 (20.8)	191 (57.7)	71 (21.5)	100 (27.7)	190 (52.6)	71 (19.7)	65 (20.7)	185 (58.9)	64 (20.4)
Toronto – West	41 (21.6)	113 (59.5)	36 (18.9)	42 (21.5)	111 (56.9)	42 (21.5)	26 (17.0)	95 (62.1)	32 (20.9)	15 (9.5)	98 (62.0)	45 (28.5)
West GTA	77 (23.4)	112 (34.0)	140 (42.6)	82 (16.2)	247 (48.9)	176 (34.9)	93 (17.7)	255 (48.7)	176 (33.6)	52 (12.8)	235 (57.9)	119 (29.3)
Local Health Integration Network												
1. Erie St. Clair	63 (23.4)	85 (31.6)	121 (45.0)	52 (17.2)	124 (40.9)	127 (41.9)	50 (16.2)	149 (48.4)	109 (35.4)	63 (22.6)	105 (37.6)	111 (39.8)
2. South West	63 (19.4)	127 (39.2)	134 (41.4)	67 (19.9)	139 (41.2)	131 (38.9)	70 (19.3)	146 (40.2)	147 (40.5)	71 (20.1)	142 (40.1)	141 (39.8)
3. Waterloo Wellington	35 (27.1)	54 (41.9)	40 (31.0)	48 (30.8)	69 (44.2)	39 (25.0)	44 (25.6)	84 (48.8)	44 (25.6)	44 (26.2)	78 (46.4)	46 (27.4)
4. Hamilton Niagara Haldimand Brant	62 (17.2)	157 (43.6)	141 (39.2)	64 (13.6)	242 (51.6)	163 (34.8)	55 (12.2)	220 (48.8)	176 (39.0)	55 (12.4)	230 (52.0)	157 (35.5)
5. Central West	**	**	**	23 (30.3)	39 (51.3)	14 (18.4)	25 (24.8)	56 (55.4)	20 (19.8)	17 (17.2)	61 (61.6)	21 (21.2)
6. Mississauga Halton	71 (24.9)	94 (33.0)	120 (42.1)	49 (15.0)	145 (44.5)	132 (40.5)	56 (18.1)	127 (41.0)	127 (41.0)	24 (11.8)	106 (52.0)	74 (36.3)
7. Toronto Central	104 (22.9)	223 (49.0)	128 (28.1)	106 (17.6)	358 (59.6)	137 (22.8)	124 (20.6)	350 (58.0)	129 (21.4)	85 (15.6)	342 (62.6)	119 (21.8)
8. Central	58 (26.9)	97 (44.9)	61 (28.2)	86 (34.7)	91 (36.7)	71 (28.6)	80 (29.9)	100 (37.3)	88 (32.8)	79 (31.6)	115 (46.0)	56 (22.4)
9. Central East	73 (27.5)	90 (34.0)	102 (38.5)	77 (22.4)	134 (39.0)	133 (38.7)	56 (17.5)	144 (45.0)	120 (37.5)	57 (17.8)	148 (46.1)	116 (36.1)
10. South East	15 (11.2)	66 (49.3)	53 (39.6)	35 (22.6)	73 (47.1)	47 (30.3)	20 (13.4)	82 (55.0)	47 (31.5)	32 (23.0)	56 (40.3)	51 (36.7)
11. Champlain	63 (20.5)	126 (40.9)	119 (38.6)	83 (24.7)	166 (49.4)	87 (25.9)	81 (23.8)	165 (48.4)	95 (27.9)	64 (21.3)	159 (52.8)	78 (25.9)
12. North Simcoe Muskoka	21 (18.4)	38 (33.3)	55 (48.2)	18 (14.0)	60 (46.5)	51 (39.5)	36 (24.7)	54 (37.0)	56 (38.4)	35 (26.7)	48 (36.6)	48 (36.6)
13. North East	19 (18.4)	47 (45.6)	37 (35.9)	24 (15.7)	64 (41.8)	65 (42.5)	43 (20.8)	80 (38.6)	84 (40.6)	43 (20.9)	107 (51.9)	56 (27.2)
14. North West	8 (22.2)	12 (33.3)	16 (44.4)	20 (19.0)	40 (38.1)	45 (42.9)	21 (17.4)	58 (47.9)	42 (34.7)	25 (23.1)	51 (47.2)	32 (29.6)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database.

Exclusion criteria: Patients discharged from one facility and admitted to another within 24 hours (N = 123 in 2003/04, 124 in 2008/09, 110 in 2009/10 and 66 in 2010/11).

¹ Mild disability includes Rehabilitation Patient Groups (RPGs) 1150 and 1160.

² Moderate disability includes RPGs 1120, 1130 and 1140.

³ Severe disability includes RPGs 1100 and 1110.

⁴ Based on unique patients (i.e., does not include multiple patient-visits).

** Cell value suppressed for reasons of privacy and confidentiality.

Note:

Facility-based analysis (i.e., the location of the facility is used to report regional performance).

Exhibit 3.4

Characteristics and outcomes of adult stroke patients¹ in inpatient rehabilitation, in Ontario and by Local Health Integration Network, 2003/04 and 2008/09–2010/11

Characteristics and Outcomes for 2003/04		Ontario	Erie St. Clair	South West	Waterloo Wellington	Hamilton Niagara Haldimand Brant	Central West	Mississauga Halton	Toronto Central	Central	Central East	South East	Champlain	North Simcoe Muskoka	North East	North West
Patients Discharged Alive from Acute Care in 2003/04		10,567	814	906	505	1,329	509	677	987	1,019	1,262	447	831	420	646	215
Admission to Inpatient Rehabilitation ¹ , n (%)	All	2,932 (27.7)	305 (37.5)	256 (28.3)	116 (23.0)	400 (30.1)	118 (23.2)	245 (36.2)	276 (28.0)	303 (29.7)	274 (21.7)	127 (28.4)	258 (31.0)	118 (28.1)	105 (16.3)	31 (14.4)
	Female	1,389 (26.2)	160 (36.1)	110 (25.3)	56 (20.3)	199 (29.2)	52 (20.5)	118 (35.9)	131 (26.8)	143 (27.6)	113 (17.9)	72 (32.9)	112 (27.3)	62 (32.1)	50 (16.0)	11 (10.1)
	Male	1,543 (29.3)	145 (39.1)	146 (30.9)	60 (26.2)	201 (31.1)	66 (25.9)	127 (36.5)	145 (29.1)	160 (31.9)	161 (25.6)	55 (24.1)	146 (34.8)	56 (24.7)	55 (16.5)	20 (18.9)
Days from Stroke Onset to Inpatient Rehabilitation Admission, mean (median)	All	20.7 (13)	13.8 (8)	26.9 (13)	27.1 (13)	22.8 (13)	16.2 (13)	11.8 (8)	20.3 (15)	21.4 (15)	15.6 (10)	31.5 (15)	27.3 (19)	14.7 (8.5)	20.8 (15)	36.2 (28)
	Female	22.0 (13)	12.2 (8)	37.7 (14)	32.5 (12)	26.8 (12.5)	16.9 (13)	11.0 (8)	18.1 (15)	23.0 (15)	15.9 (11)	29.4 (15)	29.4 (19)	13.4 (8.5)	20.9 (15.5)	43.6 (42)
	Male	19.4 (13)	15.5 (8)	18.6 (13)	22.2 (15.5)	18.8 (13)	15.6 (13)	12.6 (8)	22.3 (17)	19.9 (14)	15.5 (10)	34.3 (16)	25.7 (19)	16.1 (8.5)	20.8 (15)	32.2 (22.5)
Disability, n (%)	Mild	663 (23.1)	69 (26.5)	54 (21.3)	38 (33.6)	81 (20.4)	33 (28.0)	56 (23.1)	73 (26.7)	76 (25.4)	70 (25.7)	15 (12.0)	50 (19.4)	23 (19.7)	19 (18.1)	6 (20.0)
	Moderate	1,166 (40.7)	80 (30.8)	95 (37.4)	47 (41.6)	179 (45.0)	49 (41.5)	83 (34.3)	131 (48.0)	128 (42.8)	107 (39.3)	63 (50.4)	105 (40.7)	39 (33.3)	50 (47.6)	10 (33.3)
	Severe	1,035 (36.1)	111 (42.7)	105 (41.3)	28 (24.8)	138 (34.7)	36 (30.5)	103 (42.6)	69 (25.3)	95 (31.8)	95 (34.9)	47 (37.6)	103 (39.9)	55 (47.0)	36 (34.3)	14 (46.7)
Functional Independence Measurement Score, mean (median)	Admission FIM score	74.7 (76)	70.3 (72.5)	74.6 (76.5)	82.6 (84)	74.4 (74)	79.8 (80.5)	69.8 (70.5)	79.2 (80)	77.3 (79)	75.0 (78)	74.1 (73)	73.3 (73)	68.0 (67)	75.1 (78)	73.5 (78)
	Discharge FIM score	97.9 (106)	89.0 (99)	95.3 (106)	103.6 (107)	97.2 (102)	105.8 (112)	95.0 (102.5)	103.0 (110)	101.2 (107.5)	101.5 (111)	97.8 (106)	98.1 (107.5)	91.5 (108)	96.6 (106)	97.6 (110)
	Change in FIM score	22.0 (21)	17.9 (16)	19.9 (17)	20.7 (20)	22.3 (21.5)	23.6 (21)	24.1 (23)	22.3 (21)	22.5 (22)	24.6 (22)	23.5 (22)	23.0 (21.5)	22.5 (24)	19.0 (16)	20.2 (18)
	FIM efficiency ²	0.8 (0.6)	1.0 (0.7)	0.6 (0.5)	1.0 (0.5)	0.8 (0.7)	0.8 (0.7)	1.2 (0.9)	0.7 (0.6)	0.8 (0.7)	0.9 (0.7)	0.6 (0.5)	0.5 (0.4)	1.0 (0.9)	0.5 (0.4)	0.4 (0.4)
	Relative change (%)	36.0 (27.0)	30.0 (20.5)	33.2 (24.1)	29.5 (23.0)	37.0 (27.9)	35.4 (25.0)	44.7 (31.0)	33.3 (25.0)	33.9 (27.5)	44.7 (28.0)	34.3 (29.7)	37.2 (29.5)	37.0 (29.7)	33.0 (19.4)	30.9 (23.9)
Discharge Destination Following Inpatient Rehabilitation, n (%)	Home without services	756 (29.2)	38 (17.2)	73 (30.7)	18 (16.8)	112 (32.8)	41 (37.3)	75 (33.5)	94 (39.3)	89 (31.6)	58 (23.0)	26 (22.6)	74 (32.2)	20 (18.3)	31 (29.8)	7 (33.3)
	Home with services	1,121 (43.2)	105 (47.5)	93 (39.1)	55 (51.4)	136 (39.9)	48 (43.6)	108 (48.2)	81 (33.9)	125 (44.3)	127 (50.4)	59 (51.3)	89 (38.7)	44 (40.4)	38 (36.5)	13 (61.9)
	Other community services	136 (5.2)	11 (5.0)	7 (2.9)	11 (10.3)	22 (6.5)	**	7 (3.1)	16 (6.7)	16 (5.7)	11 (4.4)	**	18 (7.8)	7 (6.4)	**	-
	Long-term care	349 (13.5)	37 (16.7)	47 (19.7)	12 (11.2)	50 (14.7)	12 (10.9)	27 (12.1)	31 (13.0)	37 (13.1)	27 (10.7)	17 (14.8)	31 (13.5)	6 (5.5)	15 (14.4)	-
	Acute care	149 (5.7)	13 (5.9)	10 (4.2)	6 (5.6)	15 (4.4)	6 (5.5)	6 (2.7)	11 (4.6)	13 (4.6)	17 (6.7)	7 (6.1)	16 (7.0)	13 (11.9)	15 (14.4)	**
Length of Stay ³ in Days, mean (median)	All	37.8 (31)	24.4 (15)	42.1 (33)	43.8 (29.5)	34.4 (29)	37.4 (35)	29.9 (24)	39.0 (35)	34.6 (31)	40.2 (33)	51.0 (41)	54.1 (56)	25.6 (22)	41.9 (35)	71.7 (68)
	Female	36.8 (30)	22.7 (14)	37.4 (27)	39.5 (26)	34.1 (30)	41.5 (38)	31.3 (26)	41.4 (38)	35.7 (34)	36.9 (30)	50.4 (36)	54.1 (57.5)	28.4 (22)	37.8 (30)	59.1 (66)
	Male	38.7 (32)	26.2 (17)	45.7 (37)	47.8 (30.5)	34.7 (28.5)	34.2 (30)	28.6 (21)	36.8 (34)	33.6 (30)	42.4 (34)	51.7 (46)	54.1 (56)	22.7 (21)	45.6 (42)	78.3 (69)

Characteristics and Outcomes for 2008/09		Ontario	Erie St. Clair	South West	Waterloo Wellington	Hamilton Niagara Haldimand Brant	Central West	Mississauga Halton	Toronto Central	Central	Central East	South East	Champlain	North Simcoe Muskoka	North East	North West
Patients Discharged Alive from Acute Care in 2008/09		10,301	671	729	564	1,252	551	736	930	1,125	1,177	464	793	415	609	285
Admission to Inpatient Rehabilitation ¹ , n (%)	All	3,209 (31.2)	271 (40.4)	248 (34.0)	155 (27.5)	409 (32.7)	130 (23.6)	252 (34.2)	289 (31.1)	317 (28.2)	382 (32.5)	127 (27.4)	266 (33.5)	124 (29.9)	149 (24.5)	90 (31.6)
	Female	1,493 (29.4)	125 (38.9)	118 (32.1)	77 (28.1)	194 (30.6)	63 (22.9)	124 (35.1)	136 (28.8)	144 (26.1)	167 (29.1)	64 (27.4)	127 (30.2)	56 (28.3)	61 (22.3)	37 (28.2)
	Male	1,716 (32.8)	146 (41.7)	130 (36.0)	78 (26.9)	215 (34.7)	67 (24.3)	128 (33.4)	153 (33.4)	173 (30.1)	215 (35.6)	63 (27.4)	139 (37.3)	68 (31.3)	88 (26.2)	53 (34.4)
Days from Stroke Onset to Inpatient Rehabilitation Admission, mean (median)	All	18.6 (11)	14.9 (8)	16.6 (11)	16.0 (10)	16.9 (12)	50.9 (16)	15.2 (8)	19.9 (12)	17.2 (12)	14.0 (10)	21.2 (16)	23.0 (14)	18.2 (10)	17.6 (13)	17.5 (14)
	Female	16.8 (11)	11.9 (8)	15.3 (11)	15.9 (10)	15.8 (12)	27.7 (16)	14.1 (8)	17.0 (12)	15.9 (12)	13.5 (11)	22.3 (16)	23.5 (14)	20.3 (11)	15.5 (12)	17.0 (13)
	Male	20.2 (11.5)	17.5 (8)	17.8 (11)	16.1 (10)	17.8 (12)	72.7 (15)	16.3 (7)	22.4 (13)	18.3 (12)	14.3 (10)	12.0 (16)	22.6 (14)	16.5 (10)	19.1 (13)	17.8 (15)
Disability, n (%)	Mild	664 (21.0)	47 (18.6)	47 (19.0)	50 (32.9)	60 (14.8)	32 (25.0)	40 (16.1)	56 (19.7)	84 (26.9)	93 (24.7)	28 (22.0)	66 (25.0)	17 (14.3)	25 (16.9)	19 (21.1)
	Moderate	1,449 (45.9)	95 (37.5)	97 (39.1)	67 (44.1)	219 (53.9)	70 (54.7)	105 (42.3)	156 (54.9)	144 (46.2)	154 (41.0)	62 (48.8)	133 (50.4)	53 (44.5)	64 (43.2)	30 (33.3)
	Severe	1,042 (33.0)	111 (43.9)	104 (41.9)	35 (23.0)	127 (31.3)	26 (20.3)	103 (41.5)	72 (25.4)	84 (26.9)	129 (34.3)	37 (29.1)	65 (24.6)	49 (41.2)	59 (39.9)	41 (45.6)
Functional Independence Measurement Score, mean (median)	Admission FIM score	75.5 (78)	71.3 (72)	72.3 (74.5)	82.6 (85.5)	72.7 (74)	80.1 (80)	69.9 (70.5)	78.9 (81)	79.3 (81)	75.2 (77.5)	78.8 (80)	82.2 (84)	70.8 (74)	73.1 (78)	68.4 (69.5)
	Discharge FIM score	99.3 (107.5)	91.4 (98)	95.8 (108)	103.6 (109)	99.2 (108)	104.6 (110)	99.1 (104)	100.3 (107)	100.0 (108)	97.5 (106)	102.4 (111)	104.9 (112)	101.6 (111)	96.2 (104)	99.7 (110)
	Change in FIM score	22.5 (22)	19.4 (17)	21.9 (21)	21.4 (19)	25.5 (27)	23.8 (24)	26.2 (25)	20.8 (20)	19.8 (20)	21.6 (20.5)	23.1 (25)	22.7 (20)	25.4 (25)	22.3 (21)	26.5 (25)
	FIM efficiency ²	0.9 (0.7)	1.2 (0.7)	0.6 (0.6)	1.1 (0.7)	0.9 (0.8)	0.8 (0.6)	1.4 (1.1)	0.6 (0.6)	0.8 (0.7)	0.9 (0.7)	0.6 (0.6)	0.7 (0.6)	1.1 (0.8)	0.9 (0.6)	0.9 (0.7)
	Relative change (%)	35.3 (27.3)	32.8 (24.6)	35.5 (27.5)	31.4 (23.9)	41.2 (35.6)	36.0 (29.2)	42.0 (32.3)	30.1 (25.1)	27.5 (24.5)	35.8 (24.6)	32.6 (30.6)	34.3 (25.2)	40.1 (31.7)	37.7 (28.0)	45.3 (32.9)
Discharge Destination Following Inpatient Rehabilitation, n (%)	Home without services	801 (27.3)	34 (14.2)	92 (39.7)	37 (29.4)	102 (26.2)	23 (18.9)	26 (10.8)	102 (37.5)	86 (29.0)	72 (21.4)	46 (38.0)	95 (38.6)	37 (37.0)	23 (17.0)	26 (34.2)
	Home with services	1322 (45.1)	108 (45.2)	58 (25.0)	63 (50.0)	193 (49.5)	80 (65.6)	160 (66.4)	104 (38.2)	138 (46.5)	176 (52.4)	53 (43.8)	68 (27.6)	30 (30.0)	64 (47.4)	27 (35.5)
	Other community services	173 (5.9)	18 (7.5)	16 (6.9)	15 (11.9)	29 (7.4)	**	6 (2.5)	14 (5.1)	15 (5.1)	11 (3.3)	**	30 (12.2)	**	**	**
	Long-term care	303 (10.3)	21 (8.8)	31 (13.4)	6 (4.8)	39 (10.0)	9 (7.4)	30 (12.4)	40 (14.7)	33 (11.1)	41 (12.2)	10 (8.3)	19 (7.7)	8 (8.0)	11 (8.1)	**
	Acute care	224 (7.6)	11 (4.6)	32 (13.8)	**	23 (5.9)	7 (5.7)	19 (7.9)	6 (2.2)	19 (6.4)	13 (3.9)	7 (5.8)	19 (7.7)	20 (20.0)	30 (22.2)	13 (17.1)
Length of Stay ³ in Days, mean (median)	All	36.1 (30)	30.8 (20)	37.5 (33)	32.6 (27)	36.4 (29.5)	38.8 (37)	30.5 (23)	38.0 (34)	32.5 (29)	32.4 (28)	47.6 (39)	42.8 (42)	32.1 (25)	40.2 (31)	50.1 (44)
	Female	35.8 (30)	29.7 (21)	39.5 (35)	35.1 (28.5)	37.1 (29)	38.1 (40)	30.0 (21)	34.8 (34)	31.0 (29)	33.6 (28)	46.8 (39)	40.1 (34.5)	33.8 (28)	40.1 (31)	47.3 (46)
	Male	36.4 (30)	31.7 (18)	35.7 (28.5)	30.2 (24)	35.8 (32)	39.5 (35)	30.9 (23)	40.9 (35)	33.6 (30)	31.5 (28)	48.4 (40)	45.2 (45.5)	30.8 (24)	40.3 (32)	52.0 (43)

Characteristics and Outcomes for 2009/10		Ontario	Erie St. Clair	South West	Waterloo Wellington	Hamilton Niagara Haldimand Brant	Central West	Mississauga Halton	Toronto Central	Central	Central East	South East	Champlain	North Simcoe Muskoka	North East	North West
Patients Discharged Alive from Acute Care in 2009/10		10,591	726	900	536	1,289	551	709	915	1,125	1,200	437	847	415	647	294
Admission to Inpatient Rehabilitation ¹ , n (%)	All	3,285 (31.0)	267 (36.8)	271 (30.1)	163 (30.4)	380 (29.5)	141 (25.6)	248 (35.0)	264 (28.9)	333 (29.6)	397 (33.1)	124 (28.4)	263 (31.1)	136 (32.8)	187 (28.9)	111 (37.8)
	Female	1,515 (28.8)	114 (33.1)	131 (28.5)	83 (29.4)	173 (26.6)	50 (20.1)	114 (33.4)	125 (26.8)	152 (26.8)	186 (30.3)	51 (23.4)	135 (30.7)	64 (31.7)	80 (26.8)	57 (43.2)
	Male	1,770 (33.2)	153 (40.1)	140 (31.8)	80 (31.5)	207 (32.4)	91 (30.1)	134 (36.4)	139 (31.0)	181 (32.5)	211 (36.0)	73 (33.3)	128 (31.4)	72 (33.8)	107 (30.7)	54 (33.3)
Days from Stroke Onset to Inpatient Rehabilitation Admission, mean (median)	All	18.6 (11)	14.4 (10)	17.3 (10)	16.8 (11)	28.8 (11)	22.4 (14)	13.1 (8)	17.2 (12)	16.5 (12)	13.7 (9)	20.0 (12)	25.2 (15)	16.5 (12)	20.3 (12)	16.9 (13)
	Female	17.3 (12)	14.2 (11)	18.8 (10)	17.5 (11)	17.2 (12)	16.5 (12)	15.1 (8.5)	17.3 (13)	15.5 (13)	14.7 (11)	18.0 (13)	25.0 (15)	18.0 (11.5)	17.4 (12)	17.3 (14)
	Male	19.8 (11)	14.5 (10)	15.9 (10)	16.0 (11)	38.5 (11)	25.6 (15)	11.3 (8)	17.2 (11)	17.3 (11)	12.8 (9)	21.4 (12)	25.5 (16)	15.2 (12.5)	22.5 (12)	16.5 (13)
Disability, n (%)	Mild	674 (20.7)	47 (18.8)	54 (20.0)	38 (23.5)	50 (13.2)	31 (22.0)	49 (19.9)	55 (21.1)	87 (26.6)	90 (22.7)	18 (14.5)	57 (21.8)	34 (25.4)	45 (24.1)	19 (17.3)
	Moderate	1,513 (46.6)	118 (47.2)	110 (40.7)	79 (48.8)	191 (50.3)	72 (51.1)	97 (39.4)	152 (58.2)	141 (43.1)	180 (45.5)	69 (55.6)	131 (50.0)	52 (38.8)	70 (37.4)	51 (46.4)
	Severe	1,063 (32.7)	85 (34.0)	106 (39.3)	45 (27.8)	139 (36.6)	38 (27.0)	100 (40.7)	54 (20.7)	99 (30.3)	126 (31.8)	37 (29.8)	74 (28.2)	48 (35.8)	72 (38.5)	40 (36.4)
Functional Independence Measurement Score, mean (median)	Admission FIM score	75.5 (77)	74.3 (73.5)	75.4 (77)	78.6 (80)	70.9 (75)	80.4 (80)	70.7 (72)	81.0 (83)	77.0 (80)	74.5 (75)	78.1 (79)	78.3 (79)	74.9 (78.5)	75.3 (75)	71.9 (74)
	Discharge FIM score	99.3 (107)	94.9 (103)	99.9 (109)	99.6 (106.5)	98.7 (106)	101.2 (108)	97.7 (105)	103.8 (11)	99.5 (108)	97.3 (105)	99.4 (107)	100.6 (107)	105.4 (112)	97.2 (106)	102.1 (110)
	Change in FIM score	22.6 (22)	20.3 (20)	23.8 (21)	20.2 (20)	25.9 (25)	20.2 (20)	24.4 (23)	21.5 (20)	22.2 (23)	22.6 (22)	21.2 (19)	21.6 (20)	24.5 (20.5)	21.0 (19)	24.2 (22)
	FIM efficiency ²	0.8 (0.7)	0.9 (0.7)	0.9 (0.8)	0.7 (0.7)	1.0 (0.8)	0.6 (0.5)	1.2 (1.0)	0.7 (0.6)	0.9 (0.7)	0.9 (0.7)	0.6 (0.5)	0.7 (0.6)	0.9 (0.8)	0.7 (0.5)	0.7 (0.6)
	Relative change (%)	35.7 (27.3)	32.6 (27.2)	37.2 (28.7)	29.1 (23.1)	44.2 (32.9)	28.0 (25.6)	39.7 (33.3)	32.5 (23.2)	33.6 (27.1)	36.1 (29.0)	32.6 (24.1)	32.7 (25.4)	41.1 (24.7)	36.2 (23.2)	41.5 (28.0)
Discharge Destination Following Inpatient Rehabilitation, n (%)	Home without services	909 (29.8)	40 (16.7)	129 (50.6)	24 (15.5)	92 (26.3)	32 (23.7)	35 (14.8)	129 (52.0)	107 (35.8)	81 (21.3)	26 (22.4)	99 (39.4)	53 (44.5)	27 (15.0)	35 (38.5)
	Home with services	1,325 (43.4)	110 (45.8)	62 (24.3)	86 (55.5)	171 (48.9)	83 (61.5)	138 (58.5)	69 (27.8)	125 (41.8)	180 (47.4)	62 (53.4)	82 (32.7)	25 (21.0)	100 (55.6)	32 (35.2)
	Other community services	186 (6.1)	20 (8.3)	16 (6.3)	15 (9.7)	41 (11.7)	**	19 (8.1)	10 (4.0)	9 (3.0)	19 (5.0)	**	23 (9.2)	**	7 (3.9)	-
	Long-term care	312 (10.2)	28 (11.7)	27 (10.6)	16 (10.3)	29 (8.3)	16 (11.9)	24 (10.2)	25 (10.1)	35 (11.7)	64 (16.8)	12 (10.3)	7 (2.8)	13 (10.9)	14 (7.8)	**
	Acute care	247 (8.1)	14 (5.8)	20 (7.8)	12 (7.7)	15 (4.3)	**	18 (7.6)	14 (5.6)	21 (7.0)	12 (3.2)	12 (10.3)	30 (12.0)	26 (21.8)	31 (17.2)	20 (22.0)
Length of Stay ³ in Days, mean (median)	All	36.1 (30)	29.3 (24)	34.1 (30)	35.6 (30)	37.9 (29)	42.7 (41)	31.9 (26)	38.1 (33)	34.0 (29)	33.0 (30)	42.4 (42)	38.6 (34)	35.0 (26.5)	43.6 (32)	42.7 (37)
	Female	35.7 (30)	27.4 (22)	31.1 (27)	35.8 (32)	36.1 (30)	43.9 (37)	33.9 (25.5)	39.4 (37)	36.0 (29)	33.1 (29)	43.3 (44)	39.2 (34)	34.1 (27)	38.7 (27.5)	40.9 (38)
	Male	36.5 (30)	30.6 (27)	37.0 (33)	35.4 (28)	39.5 (29)	42.1 (42)	30.3 (26)	36.8 (32)	32.3 (29)	32.9 (30)	41.7 (37)	38.0 (34)	35.9 (23)	47.2 (37)	44.7 (35.5)

Characteristics and Outcomes for 2010/11		Ontario	Erie St. Clair	South West	Waterloo Wellington	Hamilton Niagara Haldimand Brant	Central West	Mississauga Halton	Toronto Central	Central	Central East	South East	Champlain	North Simcoe Muskoka	North East	North West
Patients Discharged Alive from Acute Care in 2010/11		10,878	667	850	548	1,389	588	754	935	1,214	1,256	497	878	416	610	276
Admission to Inpatient Rehabilitation ¹ , n (%)	All	3,337 (30.7)	258 (38.7)	303 (35.6)	161 (29.4)	453 (32.6)	148 (25.2)	179 (23.7)	294 (31.4)	301 (24.8)	420 (33.4)	146 (29.4)	265 (30.2)	116 (27.9)	196 (32.1)	97 (35.1)
	Female	1,598 (29.5)	142 (40.6)	159 (37.1)	75 (25.9)	214 (31.3)	58 (21.2)	81 (21.1)	148 (31.6)	128 (22.1)	194 (30.5)	70 (28.7)	137 (30.6)	56 (28.0)	93 (31.1)	43 (32.8)
	Male	1,739 (31.8)	116 (36.6)	144 (34.2)	86 (33.3)	239 (33.9)	90 (28.7)	98 (26.4)	146 (31.3)	173 (27.2)	226 (36.5)	76 (30.0)	128 (29.7)	60 (27.8)	103 (33.1)	54 (37.2)
Days from Stroke Onset to Inpatient Rehabilitation Admission, mean (median)	All	15.4 (10)	13.1 (9)	13.7 (8)	17.4 (11)	15.5 (11)	17.4 (14)	13.7 (8)	14.9 (11)	16.1 (11)	10.6 (8)	18.1 (13)	23.8 (13)	12.0 (8)	15.8 (12)	18.0 (15)
	Female	15.0 (11)	12.8 (9)	12.6 (8)	17.0 (10)	15.5 (11)	15.5 (14)	11.1 (9)	13.6 (12)	15.7 (12)	9.9 (8)	16.8 (13)	25.8 (14)	13.6 (10)	15.8 (11)	18.9 (16)
	Male	15.8 (10)	13.5 (9)	15.0 (8)	17.8 (11)	15.4 (10)	18.7 (14)	15.9 (8)	16.3 (10)	16.5 (11)	11.2 (8)	19.3 (12)	21.7 (12.5)	10.4 (6)	15.8 (13)	17.4 (14)
Disability, n (%)	Mild	667 (20.3)	54 (21.5)	56 (18.8)	50 (31.4)	71 (15.8)	26 (17.8)	20 (11.3)	49 (17.0)	80 (26.9)	71 (17.4)	29 (20.1)	56 (21.3)	34 (29.6)	47 (24.0)	24 (24.7)
	Moderate	1,578 (48.0)	90 (35.9)	125 (41.9)	61 (38.4)	229 (51.0)	87 (59.6)	94 (53.1)	171 (59.4)	149 (50.2)	196 (47.9)	61 (42.4)	135 (51.3)	42 (36.5)	95 (48.5)	43 (44.3)
	Severe	1,044 (31.7)	107 (42.6)	117 (39.3)	48 (30.2)	149 (33.2)	33 (22.6)	63 (35.6)	68 (23.6)	68 (22.9)	142 (34.7)	54 (37.5)	72 (27.4)	39 (33.9)	54 (27.6)	30 (30.9)
Functional Independence Measurement Score, mean (median)	Admission FIM score	76.2 (78)	70.3 (72)	74.8 (76.5)	78.9 (81)	73.8 (76)	79.1 (78.5)	72.4 (73)	80.4 (81.5)	80.0 (82)	73.5 (76)	74.3 (76.5)	79.2 (81)	74.7 (80)	82.1 (86)	76.5 (82)
	Discharge FIM score	100.4 (107)	92.2 (102)	97.3 (106)	101.5 (108)	103.2 (108)	103.2 (108)	97.7 (101)	103.7 (108)	101.6 (107)	95.9 (103)	99.4 (108)	103.2 (108)	104.9 (112.5)	102.8 (112.5)	108.6 (115)
	Change in FIM score	22.2 (21)	20.7 (20)	21.5 (19)	20.6 (21)	26.8 (26)	23.0 (24)	22.6 (22)	21.1 (19)	20.3 (19)	21.4 (20)	24.7 (24)	21.6 (19)	24.8 (23)	19.3 (16)	24.5 (22)
	FIM efficiency ²	0.9 (0.8)	0.8 (0.7)	0.9 (0.8)	0.8 (0.8)	1.0 (0.9)	0.7 (0.6)	1.1 (0.9)	0.7 (0.6)	0.8 (0.7)	1.1 (0.9)	0.8 (0.6)	0.9 (0.7)	1.4 (0.9)	0.8 (0.6)	0.8 (0.7)
	Relative change (%)	34.6 (26.0)	38.3 (25.8)	35.1 (24.7)	28.7 (25.5)	44.3 (31.4)	32.8 (29.7)	34.1 (27.2)	30.5 (23.4)	29.2 (23)	33.2 (25.1)	38.4 (33.5)	31.9 (24.9)	37.0 (27.2)	29.7 (19.4)	39.6 (24.2)
Discharge Destination Following Inpatient Rehabilitation, n (%)	Home without services	919 (32.3)	50 (22.2)	113 (44.1)	26 (17.7)	104 (26.3)	33 (27.0)	15 (9.8)	124 (50.4)	118 (44.4)	96 (27.6)	30 (26.3)	100 (44.8)	45 (45.9)	47 (28.1)	18 (21.4)
	Home with services	1,172 (41.2)	101 (44.9)	63 (24.6)	73 (49.7)	207 (52.3)	65 (53.3)	90 (58.8)	70 (28.5)	106 (39.8)	149 (42.8)	51 (44.7)	53 (23.8)	25 (25.5)	75 (44.9)	44 (52.4)
	Other community services	209 (7.3)	24 (10.7)	13 (5.1)	20 (13.6)	25 (6.3)	**	15 (9.8)	15 (6.1)	8 (3.0)	32 (9.2)	13 (11.4)	25 (11.2)	7 (7.1)	**	**
	Long-term care	279 (9.8)	30 (13.3)	45 (17.6)	13 (8.8)	32 (8.1)	14 (11.5)	13 (8.5)	25 (10.2)	19 (7.1)	37 (10.6)	10 (8.8)	21 (9.4)	7 (7.1)	9 (5.4)	**
	Acute care	214 (7.5)	8 (3.6)	20 (7.8)	14 (9.5)	23 (5.8)	6 (4.9)	19 (12.4)	9 (3.7)	13 (4.9)	16 (4.6)	9 (7.9)	19 (8.5)	14 (14.3)	30 (18.0)	14 (16.7)
Length of Stay ³ in Days, mean (median)	All	31.7 (28)	30.4 (27)	30.1 (27)	34.6 (28)	32.1 (28)	38.4 (36)	26.3 (22.5)	35.8 (30)	30.7 (28)	26.1 (23)	41.1 (41)	30.8 (27)	25.5 (20)	32.8 (27)	41.3 (35)
	Female	31.6 (28)	28.5 (24)	29.9 (28)	34.0 (27)	31.5 (28)	40.2 (39.5)	25.6 (21.5)	37.1 (31)	30.8 (28)	26.5 (23)	41.7 (36.5)	32.9 (31.5)	27.3 (18)	31.7 (22)	38.7 (35)
	Male	31.7 (27)	32.7 (29)	30.3 (25)	35.2 (28)	32.7 (28)	37.3 (35)	26.9 (25.5)	34.6 (29)	30.6 (27.5)	25.7 (21.5)	40.5 (42)	28.5 (24)	23.8 (20)	33.9 (30)	43.4 (32)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD) and National Rehabilitation Reporting System (NRS), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years with a diagnosis of stroke excluding transient ischemic attack (using ICD-10 codes) discharged from an acute care hospital, admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database; patients had rehabilitation assessments completed in the same fiscal year as the acute facility discharge.

Notes:

(1) Population-based analysis (i.e., the location of the patient's residence is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

¹ Based on unique patients (i.e., does not include multiple patient-visits) that were discharged alive from acute stroke/TIA hospitalization and were admitted to inpatient rehabilitation.

² FIM efficiency is the change in total FIM score divided by total length of stay; it provides information on the average amount of functional recovery per day of inpatient rehabilitation.

³ Length of stay (LOS) refers to the total time spent in inpatient rehabilitation and is calculated using the admission and discharge dates in the NRS database (LOS = discharge date - admission date).

** Cell value suppressed for reasons of privacy and confidentiality.

Exhibit 3.5

Functional Independence Measurement efficiency¹ of adult stroke patients by Rehabilitation Patient Group, in Ontario and by type of inpatient rehabilitation facility, 2003/04 and 2008/09–2010/11

Rehabilitation Patient Group	2003/04									2008/09								
	Ontario ² (N=3,012)			Freestanding ³ (n=824)			Integrated ³ (n=2,188)			Ontario ² (N=3,738)			Freestanding ³ (n=1,081)			Integrated ³ (n=2,657)		
	n	Mean (Median)	IQR	n	Mean (Median)	IQR	n	Mean (Median)	IQR	n	Mean (Median)	IQR	n	Mean (Median)	IQR	n	Mean (Median)	IQR
1150	428	1.1 (0.8)	(0.5–1.4)	76	0.6 (0.6)	(0.4–0.7)	352	1.2 (0.9)	(0.6–1.6)	507	1.2 (0.9)	(0.5–1.5)	112	0.8 (0.6)	(0.4–0.9)	395	1.3 (1.0)	(0.6–1.7)
1160	232	0.5 (0.4)	(0.2–0.7)	49	0.4 (0.3)	(0.1–0.4)	183	0.6 (0.5)	(0.2–0.8)	245	0.6 (0.4)	(0.2–0.8)	75	0.4 (0.3)	(0.2–0.6)	170	0.7 (0.5)	(0.2–1.0)
Total Mild Disability ⁴	660	0.9 (0.7)	(0.4–1.2)	125	0.5 (0.5)	(0.2–0.7)	535	1.0 (0.7)	(0.4–1.3)	752	1.0 (0.7)	(0.4–1.3)	187	0.6 (0.5)	(0.3–0.8)	565	1.1 (0.8)	(0.4–1.5)
Total Mild – Female	320	1.0 (0.7)	(0.4–1.4)	44	0.6 (0.5)	(0.3–0.7)	276	1.1 (0.8)	(0.5–1.5)	353	1.0 (0.8)	(0.4–1.3)	77	0.6 (0.5)	(0.3–0.7)	276	1.1 (0.9)	(0.4–1.5)
Total Mild – Male	340	0.8 (0.6)	(0.3–1.0)	81	0.5 (0.4)	(0.2–0.6)	259	0.9 (0.7)	(0.4–1.1)	399	1.0 (0.7)	(0.4–1.3)	110	0.7 (0.6)	(0.3–0.9)	289	1.1 (0.8)	(0.5–1.4)
1120	624	0.8 (0.7)	(0.4–1.1)	198	0.6 (0.6)	(0.4–0.8)	426	0.9 (0.8)	(0.4–1.2)	772	1.1 (0.8)	(0.5–1.2)	221	0.8 (0.7)	(0.5–0.9)	551	1.2 (0.8)	(0.5–1.4)
1130	377	0.6 (0.5)	(0.3–0.9)	152	0.4 (0.4)	(0.2–0.6)	225	0.8 (0.6)	(0.3–1.1)	572	0.7 (0.6)	(0.3–1.0)	216	0.6 (0.5)	(0.3–0.9)	356	0.8 (0.7)	(0.4–1.1)
1140	219	0.7 (0.6)	(0.3–0.9)	67	0.5 (0.5)	(0.3–0.6)	152	0.8 (0.7)	(0.3–1.0)	400	0.9 (0.7)	(0.4–1.1)	148	0.6 (0.6)	(0.3–0.8)	252	1.1 (0.8)	(0.4–1.4)
Total Moderate Disability ⁵	1,220	0.7 (0.6)	(0.3–1.0)	417	0.5 (0.5)	(0.3–0.7)	803	0.9 (0.7)	(0.4–1.2)	1,744	0.9 (0.7)	(0.4–1.1)	585	0.7 (0.6)	(0.4–0.9)	1,159	1.1 (0.8)	(0.4–1.3)
Total Moderate – Female	589	0.7 (0.6)	(0.3–0.9)	205	0.5 (0.5)	(0.3–0.7)	384	0.8 (0.7)	(0.4–1.2)	802	0.9 (0.7)	(0.4–1.1)	276	0.7 (0.6)	(0.4–0.9)	526	1.0 (0.8)	(0.4–1.3)
Total Moderate – Male	631	0.8 (0.6)	(0.3–1.0)	212	0.5 (0.5)	(0.3–0.7)	419	0.9 (0.7)	(0.3–1.2)	942	0.9 (0.7)	(0.4–1.1)	309	0.6 (0.6)	(0.3–0.8)	633	1.1 (0.8)	(0.4–1.3)
1100	335	0.6 (0.5)	(0.2–0.7)	94	0.5 (0.5)	(0.3–0.7)	241	0.7 (0.5)	(0.2–0.8)	402	0.7 (0.6)	(0.3–0.9)	101	0.5 (0.5)	(0.3–0.8)	301	0.7 (0.6)	(0.3–1.0)
1110	797	0.5 (0.4)	(0.2–0.8)	188	0.4 (0.4)	(0.2–0.6)	609	0.6 (0.5)	(0.2–0.8)	840	0.7 (0.5)	(0.2–0.9)	208	0.6 (0.5)	(0.3–0.8)	632	0.7 (0.5)	(0.2–0.9)
Total Severe Disability ⁶	1,132	0.6 (0.4)	(0.2–0.7)	282	0.5 (0.4)	(0.2–0.6)	850	0.6 (0.5)	(0.2–0.8)	1,242	0.7 (0.5)	(0.3–0.9)	309	0.5 (0.5)	(0.3–0.8)	933	0.7 (0.5)	(0.2–0.9)
Total Severe – Female	538	0.6 (0.5)	(0.2–0.8)	123	0.5 (0.5)	(0.2–0.7)	415	0.7 (0.5)	(0.2–0.9)	608	0.6 (0.5)	(0.2–0.9)	135	0.6 (0.5)	(0.3–0.9)	473	0.7 (0.5)	(0.2–0.9)
Total Severe – Male	594	0.5 (0.4)	(0.2–0.7)	159	0.4 (0.4)	(0.2–0.6)	435	0.5 (0.4)	(0.2–0.8)	634	0.7 (0.5)	(0.3–0.9)	174	0.5 (0.5)	(0.3–0.8)	460	0.7 (0.6)	(0.3–1.0)

Rehabilitation Patient Group	2009/10									2010/11								
	Ontario ² (N=3,860)			Freestanding ³ (n=1,102)			Integrated ³ (n=2,758)			Ontario ² (N=3,548)			Freestanding ³ (n=1,092)			Integrated ³ (n=2,456)		
	n	Mean (Median)	IQR	n	Mean (Median)	IQR	n	Mean (Median)	IQR	n	Mean (Median)	IQR	n	Mean (Median)	IQR	n	Mean (Median)	IQR
1150	506	1.2 (0.9)	(0.6–1.4)	116	0.8 (0.7)	(0.5–1.0)	390	1.3 (1.0)	(0.6–1.5)	448	1.1 (0.9)	(0.6–1.5)	116	0.9 (0.8)	(0.5–1.2)	332	1.2 (1.0)	(0.7–1.6)
1160	255	0.6 (0.5)	(0.2–0.8)	68	0.4 (0.3)	(0.2–0.6)	187	0.6 (0.5)	(0.2–0.9)	246	0.6 (0.5)	(0.2–0.8)	75	0.4 (0.4)	(0.2–0.6)	171	0.6 (0.5)	(0.3–1.0)
Total Mild Disability ⁴	761	1.0 (0.8)	(0.4–1.2)	184	0.7 (0.6)	(0.4–0.9)	577	1.1 (0.8)	(0.5–1.4)	694	0.9 (0.8)	(0.5–1.3)	191	0.7 (0.6)	(0.4–1.0)	503	1.0 (0.8)	(0.5–1.4)
Total Mild – Female	323	1.0 (0.8)	(0.5–1.2)	80	0.7 (0.6)	(0.4–0.9)	243	1.0 (0.9)	(0.5–1.4)	311	1.0 (0.8)	(0.5–1.3)	79	0.8 (0.7)	(0.4–1.0)	232	1.0 (0.9)	(0.5–1.4)
Total Mild – Male	438	1.0 (0.8)	(0.4–1.2)	104	0.6 (0.6)	(0.3–0.9)	334	1.1 (0.8)	(0.4–1.4)	383	0.9 (0.8)	(0.4–1.2)	112	0.7 (0.6)	(0.3–1.0)	271	1.0 (0.8)	(0.5–1.4)
1120	820	0.9 (0.8)	(0.5–1.2)	228	0.7 (0.7)	(0.4–0.9)	592	1.0 (0.8)	(0.5–1.3)	799	1.0 (0.9)	(0.5–1.3)	249	0.8 (0.7)	(0.4–1.1)	550	1.1 (0.9)	(0.5–1.4)
1130	595	0.7 (0.6)	(0.3–1.0)	243	0.6 (0.6)	(0.3–0.9)	352	0.8 (0.6)	(0.3–1.1)	582	0.8 (0.7)	(0.4–1.0)	248	0.7 (0.6)	(0.4–0.9)	334	0.8 (0.8)	(0.4–1.1)
1140	400	0.8 (0.7)	(0.4–1.0)	157	0.6 (0.6)	(0.4–0.8)	243	0.9 (0.7)	(0.4–1.3)	367	0.8 (0.7)	(0.4–1.1)	115	0.7 (0.6)	(0.4–0.9)	252	0.9 (0.8)	(0.4–1.2)
Total Moderate Disability ⁵	1,815	0.8 (0.7)	(0.4–1.1)	628	0.6 (0.6)	(0.4–0.9)	1,187	0.9 (0.8)	(0.4–1.2)	1,748	0.9 (0.8)	(0.4–1.1)	612	0.7 (0.7)	(0.4–0.9)	1,136	1.0 (0.9)	(0.5–1.3)
Total Moderate – Female	833	0.8 (0.7)	(0.4–1.1)	296	0.6 (0.6)	(0.4–0.9)	537	0.9 (0.8)	(0.4–1.2)	833	0.9 (0.8)	(0.5–1.1)	292	0.7 (0.7)	(0.4–0.9)	541	1.0 (0.9)	(0.5–1.3)
Total Moderate – Male	982	0.9 (0.7)	(0.4–1.1)	332	0.7 (0.6)	(0.4–0.8)	650	1.0 (0.8)	(0.4–1.2)	915	0.9 (0.8)	(0.4–1.2)	320	0.7 (0.6)	(0.4–1.0)	595	1.0 (0.9)	(0.5–1.3)
1100	430	0.8 (0.6)	(0.3–1.0)	93	0.7 (0.6)	(0.3–0.8)	337	0.8 (0.6)	(0.3–1.0)	367	0.8 (0.7)	(0.4–1.1)	100	0.8 (0.8)	(0.4–1.0)	267	0.8 (0.7)	(0.3–1.1)
1110	854	0.6 (0.5)	(0.2–0.9)	197	0.6 (0.5)	(0.2–0.8)	657	0.6 (0.5)	(0.2–1.0)	739	0.7 (0.6)	(0.3–1.0)	189	0.7 (0.6)	(0.4–0.9)	550	0.7 (0.6)	(0.2–1.0)
Total Severe Disability ⁶	1,284	0.7 (0.5)	(0.3–0.9)	290	0.6 (0.5)	(0.2–0.8)	994	0.7 (0.6)	(0.3–1.0)	1,106	0.7 (0.6)	(0.3–1.0)	289	0.7 (0.7)	(0.4–1.0)	817	0.7 (0.6)	(0.3–1.1)
Total Severe – Female	621	0.7 (0.6)	(0.3–1.0)	135	0.7 (0.6)	(0.3–0.9)	486	0.7 (0.5)	(0.2–1.0)	536	0.7 (0.6)	(0.3–1.0)	145	0.7 (0.7)	(0.3–1.0)	391	0.6 (0.5)	(0.2–1.0)
Total Severe – Male	663	0.6 (0.5)	(0.3–0.9)	155	0.5 (0.5)	(0.2–0.8)	508	0.7 (0.6)	(0.3–1.0)	570	0.8 (0.7)	(0.3–1.1)	144	0.7 (0.7)	(0.4–1.0)	426	0.8 (0.7)	(0.3–1.1)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database.

Exclusion criteria: Patients discharged from one facility and admitted to another within 24 hours (N = 123 in 2003/04, 124 in 2008/09, 110 in 2009/10 and 66 in 2010/11).

¹ FIM efficiency is the change in total FIM score divided by total length of stay; it provides information on the average amount of functional recovery per day of inpatient rehabilitation.

² Based on unique patients (i.e., does not include multiple patient-visits).

³ Freestanding and integrated facilities are termed Specialty and General facilities, respectively, in the NRS database. The only freestanding rehabilitation facility that is part of a general hospital is located at Windsor Regional Hospital.

⁴ Mild disability includes RPGs 1150 and 1160.

⁵ Moderate disability includes RPGs 1120, 1130 and 1140.

⁶ Severe disability includes RPGs 1100 and 1110.

Note:

Facility-based analysis (i.e., the location of the facility is used to report regional performance).

IQR = interquartile range (25th–75th percentile)

Exhibit 3.6

Number of adult stroke patients by Rehabilitation Patient Group and their length of stay¹, in Ontario and by type of inpatient rehabilitation facility, 2003/04 and 2008/09–2010/11

Rehabilitation Patient Group	2003/04									2008/09								
	Ontario ² (N=3,012)			Freestanding ³ (n=824)			Integrated ³ (n=2,188)			Ontario ² (N=3,738)			Freestanding ³ (n=1,081)			Integrated ³ (n=2,657)		
	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR
1150	428	24.9 (21)	(13–33)	76	37.0 (35)	(23.5–44.5)	352	22.2 (18)	(12–29)	507	25.5 (22)	(14–34)	112	31.5 (29.5)	(22–37.5)	395	23.8 (20)	(11–31)
1160	232	19.0 (15)	(9–24)	49	30.5 (28)	(17–40)	183	15.9 (13)	(8–21)	245	18.1 (15)	(9–23)	75	24.9 (21)	(15–30)	170	15.1 (13)	(7–20)
Total Mild Disability⁴	660	22.8 (18)	(11–30)	125	34.4 (30)	(22–44)	535	20.1 (16)	(9–26)	752	23.0 (20)	(12–30)	187	28.8 (26)	(18–36)	565	21.1 (17)	(9–28)
1120	624	43.6 (39)	(25–55)	198	56.7 (49)	(37–66)	426	37.5 (34)	(21–50)	772	38.6 (35.5)	(23–50)	221	43.4 (41)	(30–51)	551	36.7 (33)	(20–49)
1130	377	35.6 (33)	(20–45)	152	44.5 (42)	(31.5–54)	225	29.5 (25)	(15–38)	572	34.5 (30)	(21–42)	216	39.6 (36)	(28–45)	356	31.4 (27)	(17–40)
1140	219	30.5 (28)	(17–38)	67	39.3 (35)	(28–43)	152	26.6 (24)	(14–34.5)	400	26.8 (24)	(15–36)	148	33.8 (31.5)	(23–42)	252	22.7 (20)	(12–30.5)
Total Moderate Disability⁵	1,220	38.7 (35)	(22–49)	417	49.5 (43)	(34–62)	803	33.2 (29)	(17–43)	1,744	34.5 (31)	(20–44)	585	39.6 (36)	(28–48)	1,159	32.0 (28)	(16–42)
1100	335	67.1 (62)	(40–86)	94	74.8 (67.5)	(56–88)	241	64.1 (59)	(33–86)	402	59.1 (56)	(38–77)	101	67.2 (64)	(44–84)	301	56.3 (54)	(34–75)
1110	797	49.8 (46)	(28–68)	188	61.2 (58)	(42–76)	609	46.3 (42)	(24–63)	840	47.0 (43.5)	(25–63)	208	55.5 (51)	(35–67.5)	632	44.2 (41)	(21.5–61)
Total Severe Disability⁶	1,132	54.9 (50)	(30.5–73)	282	65.7 (62)	(48–80)	850	51.3 (45)	(27–70)	1,242	50.9 (49)	(28–68)	309	59.3 (56)	(41–72)	933	48.1 (45)	(25–65)

Rehabilitation Patient Group	2009/10									2010/11								
	Ontario ² (N=3,860)			Freestanding ³ (n=1,102)			Integrated ³ (n=2,758)			Ontario ² (N=3,548)			Freestanding ³ (n=1,092)			Integrated ³ (n=2,456)		
	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR	n	No. of Days, Mean (Median)	IQR
1150	506	23.3 (21)	(13–30)	116	28.0 (28)	(20.5–33.5)	390	21.9 (18)	(12–27)	448	21.3 (19)	(13–28)	116	23.4 (23)	(16.5–28)	332	20.5 (16.5)	(12–27)
1160	255	17.4 (15)	(9–22)	68	20.7 (17)	(13–28.5)	187	16.2 (14)	(8–20)	246	15.1 (14)	(8–20)	75	16.3 (15)	(10–21)	171	14.6 (13)	(7–19)
Total Mild Disability⁴	761	21.3 (18)	(12–28)	184	25.3 (24.5)	(16–32)	577	20.1 (16)	(10–25)	694	19.1 (16)	(11–26)	191	20.7 (20)	(14–27)	503	18.5 (15)	(10–24)
1120	820	38.7 (34)	(23–48)	228	45.9 (39.5)	(31–51.5)	592	35.9 (32)	(21–45)	799	35.1 (33)	(22–42)	249	41.3 (37)	(29–47)	550	32.3 (29)	(19–41)
1130	595	31.8 (29)	(20–42)	243	35.3 (32)	(26–42)	352	29.4 (26)	(16–38)	582	29.2 (27.5)	(17–37)	248	33.0 (30)	(23–37.5)	334	26.3 (23)	(14–34)
1140	400	27.1 (25)	(16–35)	157	30.6 (30)	(21–39)	243	24.8 (21)	(14–32)	367	24.1 (22)	(15–31)	115	27.0 (27)	(21–32)	252	22.8 (20)	(13–29.5)
Total Moderate Disability⁵	1,815	33.9 (30)	(21–42)	628	38.0 (35)	(27–44)	1,187	31.7 (28)	(18–42)	1,748	30.8 (28)	(18–38)	612	35.3 (32)	(25–41)	1,136	28.4 (25)	(15–37)
1100	430	59.8 (54.5)	(36–77)	93	70.8 (67)	(43–85)	337	56.7 (51)	(35–73)	367	53.1 (48)	(35–65)	100	58.2 (56)	(40.5–66.5)	267	51.2 (46)	(31–65)
1110	854	48.4 (43)	(28–61)	197	56.3 (51)	(32–68)	657	46.0 (42)	(26–58)	739	42.6 (39)	(26–54)	189	49.2 (43)	(32–56)	550	40.4 (36)	(22–51)
Total Severe Disability⁶	1,284	52.2 (46)	(30–66)	290	60.9 (55)	(33–74)	994	49.7 (44)	(29–63)	1,106	46.1 (42)	(28–58)	289	52.3 (48)	(35–60)	817	43.9 (40)	(25–56)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database.

Exclusion criteria: Patients discharged from one facility and admitted to another within 24 hours (N = 123 in 2003/04, 124 in 2008/09, 110 in 2009/10 and 66 in 2010/11).

¹ Length of stay (LOS) refers to the total time spent in inpatient rehabilitation and is calculated using the admission and discharge dates in the NRS database (LOS = discharge date – admission date).

² Based on unique patients (i.e., does not include multiple patient-visits).

³ Freestanding and Integrated facilities are termed Specialty and General facilities, respectively, in the NRS database. The only freestanding rehabilitation facility that is part of a general hospital is located at Windsor Regional Hospital.

⁴ Mild disability includes RPGs 1150 and 1160.

⁵ Moderate disability includes RPGs 1120, 1130 and 1140.

⁶ Severe disability includes RPGs 1100 and 1110.

Notes:

Facility-based analysis (i.e., the location of the facility is used to report regional performance).

IQR = interquartile range (25th–75th percentile).

Exhibit 3.7

Characteristics of adult stroke patients in inpatient rehabilitation, in Ontario and by sex and OSS region, 2003/04 and 2008/09–2010/11

Group/Subgroup	Admission to Rehabilitation ¹ (N)	Days from Stroke Onset to Admission, Mean (Median)	Admission FIM Score, Mean (Median)	Discharge FIM Score, Mean (Median)	Change in FIM Score, Mean (Median)	FIM Efficiency ² , Mean (Median)	Length of Stay ³ , Mean (Median)	Home Without Services ⁴ , n (%)	Home with Services ⁴ , n (%)	Other Community Services ⁴ , n (%)	Long-Term Care Facility ⁴ , n (%)	Acute Care Facility ⁴ , n (%)	Deceased ⁴ , n (%)	Unavailable/Unknown ⁴ , n (%)
2003/04														
Ontario ⁵	3,081	21.2 (13)	74.8 (76)	97.9 (107)	21.9 (21)	0.8 (0.6)	38.0 (31)	799 (29.5)	1,165 (43.0)	143 (5.3)	364 (13.4)	157 (5.8)	20 (0.7)	63 (2.3)
Female	1,457	22.5 (13)	73.8 (75)	96.8 (105.5)	21.9 (21)	0.8 (0.6)	36.8 (30)	307 (23.8)	572 (44.3)	85 (6.6)	199 (15.4)	80 (6.2)	16 (1.2)	31 (2.4)
Male	1,624	20.1 (13)	75.8 (78)	98.9 (107)	21.8 (20)	0.8 (0.6)	39.1 (32)	492 (34.6)	593 (41.7)	58 (4.1)	165 (11.6)	77 (5.4)	**	32 (2.3)
Ontario Stroke System Region														
Central East	367	14.6 (10)	72.6 (75)	97.7 (109)	23.5 (22)	0.9 (0.7)	33.3 (27)	63 (18.8)	166 (49.6)	20 (6.0)	34 (10.1)	30 (9.0)	**	19 (5.7)
Central South	584	24.0 (13)	76.6 (76.5)	99.6 (105)	22.2 (22)	0.8 (0.6)	37.6 (30)	148 (28.9)	222 (43.4)	37 (7.2)	70 (13.7)	24 (4.7)	**	7 (1.4)
East – Champlain	270	27.0 (19)	73.7 (74)	98.2 (107.5)	23.0 (22)	0.5 (0.4)	53.4 (56)	77 (32.1)	93 (38.8)	19 (7.9)	32 (13.3)	17 (7.1)	**	**
Northeast	108	21.5 (15)	75.8 (78)	96.4 (106)	18.1 (16)	0.5 (0.4)	40.9 (33.5)	30 (28.3)	39 (36.8)	**	15 (14.2)	17 (16.0)	**	-
Northwest	32	36.0 (28)	72.9 (73)	97.6 (110)	20.2 (18)	0.4 (0.4)	71.7 (68)	7 (33.3)	13 (61.9)	-	-	**	-	-
South East	138	34.4 (16)	74.5 (73)	97.4 (106)	22.9 (22)	0.5 (0.4)	55.4 (41.5)	27 (22.1)	63 (51.6)	**	19 (15.6)	6 (4.9)	**	-
Southwest	603	20.6 (11)	71.7 (74)	91.7 (103)	19.1 (17)	0.8 (0.5)	32.6 (24)	114 (23.3)	211 (43.1)	19 (3.9)	90 (18.4)	30 (6.1)	6 (1.2)	19 (3.9)
Toronto – North & East	178	19.4 (13)	77.3 (78)	99.7 (106)	21.0 (20)	0.7 (0.6)	35.6 (32)	46 (27.5)	61 (36.5)	10 (6.0)	21 (12.6)	13 (7.8)	-	16 (9.6)
Toronto – Southeast	206	24.8 (17)	79.8 (83)	103.6 (114)	22.8 (22)	0.7 (0.5)	44.4 (35)	60 (31.4)	89 (46.6)	8 (4.2)	24 (12.6)	8 (4.2)	**	**
Toronto – West	213	20.1 (14)	80.6 (82)	105.9 (109)	24.5 (22)	0.8 (0.7)	37.4 (38)	104 (56.2)	53 (28.6)	8 (4.3)	17 (9.2)	**	-	-
West GTA	382	13.9 (9)	72.8 (73)	97.3 (104)	22.6 (22)	1.1 (0.8)	29.9 (25)	123 (35.9)	155 (45.2)	14 (4.1)	42 (12.2)	8 (2.3)	**	-
2008/09														
Ontario ⁵	3,363	19.5 (12)	75.6 (78)	99.3 (108)	22.5 (21)	0.9 (0.7)	36.3 (30)	845 (27.5)	1,379 (44.9)	184 (6.0)	314 (10.2)	233 (7.6)	14 (0.5)	99 (3.2)
Female	1,564	17.6 (11)	75.2 (77)	98.2 (107)	21.9 (21)	0.9 (0.7)	35.9 (30)	339 (23.6)	660 (45.9)	112 (7.8)	164 (11.4)	112 (7.8)	7 (0.5)	44 (3.1)
Male	1,799	21.0 (12)	76.1 (79)	100.3 (109)	23.0 (22)	0.9 (0.7)	36.6 (30)	506 (31.0)	719 (44.1)	72 (4.4)	150 (9.2)	121 (7.4)	7 (0.4)	55 (3.4)
Ontario Stroke System Region														
Central East	510	15.1 (10)	72.4 (74)	97.2 (108)	23.1 (24)	1.0 (0.8)	33.1 (28)	86 (19.2)	241 (53.7)	25 (5.6)	46 (10.2)	44 (9.8)	**	**
Central South	562	18.0 (11)	74.9 (77)	99.8 (108)	24.4 (24)	1.0 (0.8)	35.3 (29)	136 (26.5)	254 (49.4)	43 (8.4)	48 (9.3)	28 (5.4)	**	**
East – Champlain	278	23.9 (14)	82.7 (84)	105.3 (112)	22.5 (20)	0.6 (0.5)	42.7 (42)	102 (39.4)	70 (27.0)	33 (12.7)	19 (7.3)	20 (7.7)	**	13 (5.0)
Northeast	146	17.9 (13.5)	75.4 (79)	97.1 (105)	21.0 (20)	0.8 (0.5)	40.0 (31)	27 (20.3)	61 (45.9)	**	11 (8.3)	27 (20.3)	-	**
Northwest	99	17.9 (14)	69.2 (71)	100.9 (110)	26.6 (25)	0.8 (0.7)	50.4 (44)	30 (35.3)	31 (36.5)	**	**	14 (16.5)	-	**
South East	133	22.0 (16)	79.7 (81)	102.8 (112)	22.7 (23.5)	0.6 (0.5)	49.6 (40)	48 (38.1)	56 (44.4)	**	11 (8.7)	7 (5.6)	**	-
Southwest	560	16.1 (10)	71.7 (73)	94.0 (104)	21.0 (19)	0.9 (0.7)	33.9 (27)	135 (26.7)	182 (36.0)	35 (6.9)	54 (10.7)	48 (9.5)	**	49 (9.7)
Toronto – North & East	155	15.3 (11)	81.2 (83)	99.8 (105)	17.4 (17)	0.9 (0.7)	27.1 (22)	40 (30.1)	59 (44.4)	8 (6.0)	7 (5.3)	**	-	14 (10.5)
Toronto – Southeast	263	19.3 (13)	81.0 (82)	101.3 (108)	19.7 (18)	0.7 (0.6)	35.1 (30)	88 (35.8)	77 (31.3)	**	56 (22.8)	6 (2.4)	-	14 (5.7)
Toronto – West	189	23.7 (13)	81.9 (84)	103.4 (109)	21.2 (18.5)	0.6 (0.6)	40.6 (38)	91 (50.3)	66 (36.5)	8 (4.4)	11 (6.1)	**	-	-
West GTA	468	27.1 (11)	73.3 (76)	99.8 (105)	24.7 (24)	1.1 (0.8)	33.9 (28)	62 (14.2)	282 (64.7)	16 (3.7)	46 (10.6)	29 (6.7)	-	**

Group/Subgroup	Admission to Rehabilitation ¹ (N)	Days from Stroke Onset to Admission, Mean (Median)	Admission FIM Score, Mean (Median)	Discharge FIM Score, Mean (Median)	Change in FIM Score, Mean (Median)	FIM Efficiency ² , Mean (Median)	Length of Stay ³ , Mean (Median)	Home Without Services ⁴ , n (%)	Home with Services ⁴ , n (%)	Other Community Services ⁴ , n (%)	Long-Term Care Facility ⁴ , n (%)	Acute Care Facility ⁴ , n (%)	Deceased ⁴ , n (%)	Unavailable/Unknown ⁴ , n (%)
2009/10														
Ontario⁵	3,466	19.5 (12)	75.8 (78)	99.5 (107)	22.6 (21)	0.8 (0.7)	36.4 (30)	971 (30.1)	1,397 (43.3)	196 (6.1)	327 (10.1)	260 (8.1)	10 (0.3)	67 (2.1)
Female	1,618	18.6 (12)	73.9 (76)	97.8 (105)	22.6 (22)	0.8 (0.7)	36.2 (30)	397 (26.4)	633 (42.0)	123 (8.2)	180 (12.0)	140 (9.3)	**	29 (1.9)
Male	1,848	20.2 (11)	77.4 (79)	101.0 (108)	22.5 (21)	0.8 (0.7)	36.6 (30)	574 (33.3)	764 (44.4)	73 (4.2)	147 (8.5)	120 (7.0)	6 (0.3)	38 (2.2)
Ontario Stroke System Region														
Central East	540	14.4 (10)	71.9 (73)	97.8 (106)	24.8 (24)	1.0 (0.8)	34.3 (28)	127 (26.3)	219 (45.4)	25 (5.2)	59 (12.2)	51 (10.6)	**	-
Central South	569	28.2 (11)	73.3 (76)	98.5 (106)	24.0 (23)	0.9 (0.8)	38.1 (29)	121 (22.7)	270 (50.7)	61 (11.4)	49 (9.2)	28 (5.3)	**	**
East – Champlain	277	25.8 (15.5)	79.3 (80.5)	101.3 (108)	21.4 (20)	0.7 (0.6)	38.3 (34)	109 (41.6)	83 (31.7)	23 (8.8)	7 (2.7)	30 (11.5)	-	10 (3.8)
Northeast	194	20.2 (13)	75.1 (74.5)	96.8 (106)	20.8 (18)	0.7 (0.5)	42.5 (32)	28 (15.1)	101 (54.3)	6 (3.2)	16 (8.6)	34 (18.3)	**	-
Northwest	122	18.9 (14)	72.7 (77)	103.4 (112)	25.3 (23)	0.7 (0.6)	44.6 (36)	43 (42.2)	35 (34.3)	-	**	20 (19.6)	**	**
South East	128	20.8 (13)	79.6 (80.5)	100.8 (110)	21.2 (20)	0.6 (0.5)	43.1 (43)	21 (17.1)	74 (60.2)	**	12 (9.8)	12 (9.8)	-	-
Southwest	568	15.4 (10)	74.5 (74)	97.4 (106)	22.2 (21)	0.9 (0.7)	31.9 (28)	174 (33.3)	181 (34.6)	36 (6.9)	63 (12.0)	39 (7.5)	**	29 (5.5)
Toronto – North & East	128	15.3 (12)	84.2 (86)	102.1 (107.5)	17.3 (16)	0.8 (0.7)	25.7 (21)	45 (36.6)	45 (36.6)	**	**	**	-	25 (20.3)
Toronto – Southeast	300	15.4 (12)	81.9 (81)	102.5 (110)	20.5 (20)	0.7 (0.7)	33.8 (30)	108 (37.5)	101 (35.1)	7 (2.4)	61 (21.2)	10 (3.5)	**	-
Toronto – West	167	26.6 (15)	80.7 (83)	105.6 (110)	23.4 (22)	0.6 (0.5)	44.8 (41)	112 (71.8)	18 (11.5)	9 (5.8)	10 (6.4)	6 (3.8)	**	-
West GTA	473	16.4 (11)	74.6 (76)	99.2 (105.5)	22.4 (21)	1.0 (0.7)	36.3 (29)	83 (18.4)	270 (60.0)	22 (4.9)	47 (10.4)	26 (5.8)	**	-
2010/11														
Ontario⁵	3,523	16.1 (10)	76.5 (78)	100.6 (108)	22.1 (21)	0.9 (0.8)	31.7 (28)	971 (32.4)	1,240 (41.4)	220 (7.3)	288 (9.6)	225 (7.5)	18 (0.6)	35 (1.2)
Female	1,689	15.7 (11)	75.2 (77)	99.1 (107)	22.1 (21)	0.9 (0.8)	31.9 (28)	410 (28.4)	611 (42.3)	129 (8.9)	159 (11.0)	106 (7.3)	11 (0.8)	18 (1.2)
Male	1,834	16.4 (10)	77.7 (80)	102.0 (109)	22.2 (20.5)	0.9 (0.8)	31.6 (27)	561 (36.1)	629 (40.5)	91 (5.9)	129 (8.3)	119 (7.7)	7 (0.5)	17 (1.1)
Ontario Stroke System Region														
Central East	514	10.7 (7)	72.1 (75)	97.1 (105)	22.9 (21.5)	1.1 (1)	25.3 (20)	123 (28.7)	188 (43.9)	39 (9.1)	36 (8.4)	38 (8.9)	**	-
Central South	636	16.7 (11)	75.1 (78)	102.7 (108)	25.0 (24)	0.9 (0.9)	33.0 (28)	130 (23.3)	290 (52.1)	46 (8.3)	52 (9.3)	34 (6.1)	**	-
East – Champlain	283	23.7 (13)	81.0 (83.5)	104.6 (110)	21.3 (19)	0.9 (0.7)	29.9 (27)	109 (46.0)	57 (24.1)	27 (11.4)	20 (8.4)	19 (8.0)	**	**
Northeast	204	16.5 (12)	81.9 (86)	103.4 (113)	19.7 (17)	0.8 (0.6)	33.1 (27)	50 (28.7)	80 (46.0)	6 (3.4)	7 (4.0)	30 (17.2)	**	-
Northwest	103	18.3 (15)	76.9 (82)	108.6 (115)	24.2 (22)	0.8 (0.7)	40.0 (34)	18 (20.7)	46 (52.9)	**	**	15 (17.2)	-	-
South East	145	19.6 (13)	75.2 (78)	99.1 (107)	23.9 (24)	0.7 (0.6)	43.0 (42.5)	24 (21.6)	55 (49.5)	13 (11.7)	9 (8.1)	9 (8.1)	**	-
Southwest	597	14.6 (9)	72.7 (74)	94.9 (105)	21.1 (20)	0.8 (0.8)	30.6 (26.5)	171 (33.5)	178 (34.8)	38 (7.4)	77 (15.1)	31 (6.1)	**	13 (2.5)
Toronto – North & East	181	12.5 (10)	85.6 (86)	103.9 (109)	17.7 (18)	0.8 (0.7)	27.1 (25)	86 (54.1)	45 (28.3)	**	**	**	-	17 (10.7)
Toronto – Southeast	274	13.4 (11)	82.0 (81.5)	103.3 (110)	20.0 (19)	0.8 (0.7)	31.7 (30)	90 (38.1)	82 (34.7)	17 (7.2)	34 (14.4)	11 (4.7)	**	-
Toronto – West	165	25.2 (15)	78.7 (79)	103.6 (109)	23.1 (20)	0.7 (0.6)	40.7 (35)	107 (73.8)	19 (13.1)	**	12 (8.3)	**	-	-
West GTA	421	16.2 (11)	75.5 (77)	100.2 (104)	22.2 (21)	0.9 (0.7)	33.2 (28)	63 (17.9)	200 (56.8)	21 (6.0)	36 (10.2)	30 (8.5)	**	**

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD) and National Rehabilitation Reporting System (NRS), 2003/04–2010/11.
 Inclusion criteria: All patients aged ≥18 years with a diagnosis of stroke (using ICD-10 codes) discharged from an acute care hospital who were admitted to inpatient rehabilitation and classified as Rehabilitation Client Groups 1 (Stroke) and 2 (Brain Dysfunction) in the NRS database.
¹ Patients discharged from an acute inpatient hospital with a diagnosis of stroke and admitted into an inpatient rehabilitation hospital in the same fiscal year.
² FIM efficiency is the change in total FIM score divided by total length of stay; it provides information on the average amount of functional recovery per day of inpatient rehabilitation.
³ Length of stay (LOS) refers to the total time spent in inpatient rehabilitation and is calculated using the admission and discharge dates in the NRS database (LOS = discharge date – admission date).
⁴ Among patients discharged alive from an acute care facility and admitted to inpatient rehabilitation with a known discharge destination (N = 2,711 in 2003/04, 3,068 in 2008/09, 3,228 in 2009/10 and 2,997 in 2010/11).
⁵ Based on unique patients (i.e., does not include multiple patient-visits).
 ** Cell value suppressed for reasons of privacy and confidentiality.

Notes:
 (1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).
 (2) Cells in which there were no reported/available data are marked with a hyphen (-).
 FIM = Functional Independence Measurement

Exhibit 3.8a

Characteristics of adult stroke patients admitted to complex continuing care following an inpatient discharge for stroke or transient ischemic attack in Ontario, 2007/08–2009/10

Characteristic ¹	2007/08	2008/09	2009/10
Ontario	1,221	1,165	1,227
Female, n (%)	641 (52.5)	626 (53.7)	676 (55.1)
Age, mean (median)	76.6 (79)	76.3 (79)	76.3 (79)
Acute length of stay (days), mean (median)	25.3 (16)	25.1 (16)	23.9 (16)
Acute Alternate Level of Care length of stay (days), mean (median)	10.2 (2)	10.1 (2)	9.3 (3)
Length of stay in complex continuing care (days), mean (median)	99.7 (57)	96.4 (60)	84.4 (57)
Time from acute admission to complex continuing care (days), mean (median)	50.6 (36)	49.5 (36)	45.7 (31)
Patients admitted from long-term care, n (%)	65 (5.3)	57 (4.9)	60 (4.9)
Dementia, n (%)			
Patients with dementia	168 (13.8)	173 (14.8)	182 (14.8)
Patients with Alzheimer's	38 (3.1)	40 (3.4)	29 (2.4)
Discharge Destinations Following Complex Continuing Care, n (%)			
Inpatient acute care	135 (11.1)	139 (11.9)	143 (11.7)
Inpatient continuing care	17 (1.4)	34 (2.9)	18 (1.5)
Home care service	246 (20.1)	233 (20.0)	227 (18.5)
Private home (no home care)	114 (9.3)	106 (9.1)	128 (10.4)
Long-term care home	387 (31.7)	320 (27.5)	352 (28.7)
Retirement home	52 (4.3)	53 (4.5)	51 (4.2)
Deceased	185 (15.2)	162 (13.9)	174 (14.2)
Other	85 (7.0)	118 (10.1)	134 (10.9)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD) and Continuing Care Reporting System, Complex Continuing Care Database (CCRS-CCC), 2007/08–2010/11.

Inclusion criteria: All patients discharged alive following an inpatient stroke/TIA (from CIHI-DAD, 2007/09–2009/10) who appeared in the CCRS-CCC database within 6 months of the acute discharge date.

¹ Based on initial assessment closest to the stroke/TIA inpatient discharge date.

Exhibit 3.8b

Characteristics of adult stroke patients admitted to complex continuing care following an inpatient discharge for stroke or transient ischemic attack in Ontario, 2007/08, 2008/09 or 2009/10 and assessed 3 months after the initial assessment

MDS-RAI Scales	2007/08			2008/09			2009/10		
	All ¹	Initial Assessment Among Patients with 3-Month Follow-up ²	Assessment at 3-Month Follow-up ²	All ¹	Initial Assessment Among Patients with 3-Month Follow-up ²	Assessment at 3-Month Follow-up ²	All ¹	Initial Assessment Among Patients with 3-Month Follow-up ²	Assessment at 3-Month Follow-up ²
Ontario	1,221	347	347	1,165	344	344	1,227	324	324
Depression Rating Scale³									
Score, mean, median (IQR)	1.4, 1 (0–2)	1.5, 1 (0–2)	1.5, 1 (0–2)	1.3, 0 (0–2)	1.4, 1 (0–2)	1.4, 0 (0–2)	1.3, 0 (0–2)	1.4, 0.5 (0–2)	1.4, 1 (0–2)
≥3, n (%)	236 (19.5)	63 (18.5)	66 (19.4)	202 (17.5)	58 (17.0)	74 (21.6)	208 (17.1)	61 (18.9)	58 (18.1)
≥3 and receiving medication, n (%)	99 (41.9)	28 (44.4)	35 (53.0)	100 (49.5)	27 (46.6)	44 (59.5)	93 (44.7)	27 (44.3)	30 (51.7)
Index of Social Engagement⁴									
Score, mean, median (IQR)	2.7, 3 (1–4)	2.5, 2 (1–4)	2.9, 3 (1–5)	2.6, 2 (1–4)	2.6, 2 (1–4)	2.9, 3 (1–4)	2.8, 3 (1–5)	2.8, 3 (1–5)	3.0, 3 (1–5)
≥4, n (%)	435 (35.6)	102 (29.4)	134 (38.6)	416 (35.7)	118 (34.3)	139 (40.4)	474 (38.6)	128 (39.5)	138 (42.6)
Activities of Daily Living⁵									
Score, mean, median (IQR)	18.2, 20 (12–26)	19.7, 21 (15–26)	17.9, 19 (11–26)	18.7, 20 (13–26)	19.7, 21 (15–26)	17.8, 19 (12–24)	18.5, 20 (13–25)	20.4, 21.5 (17–26)	18.5, 20 (12–25)
Cognitive Performance Scale⁶, n (%)									
0–2	568 (46.5)	146 (42.1)	150 (43.2)	529 (45.4)	146 (42.4)	161 (46.8)	584 (47.6)	161 (49.7)	157 (48.5)
3	305 (25.0)	81 (23.3)	81 (23.3)	288 (24.7)	88 (25.6)	85 (24.7)	299 (24.4)	68 (21.0)	73 (22.5)
4–6	348 (28.5)	120 (34.6)	116 (33.4)	348 (29.9)	110 (32.0)	98 (28.5)	344 (28.0)	95 (29.3)	94 (29.0)
Pain Scale⁷, n (%)									
0	456 (37.3)	120 (34.6)	137 (39.5)	445 (38.2)	140 (40.7)	141 (41.0)	494 (40.3)	129 (39.8)	137 (42.3)
1	412 (33.7)	137 (39.5)	116 (33.4)	356 (30.6)	107 (31.1)	109 (31.7)	354 (28.9)	107 (33.0)	106 (32.7)
2	304 (24.9)	79 (22.8)	77 (22.2)	310 (26.6)	83 (24.1)	85 (24.7)	332 (27.1)	78 (24.1)	70 (21.6)
3	49 (4.0)	11 (3.2)	17 (4.9)	54 (4.6)	14 (4.1)	9 (2.6)	47 (3.8)	10 (3.1)	11 (3.4)
Therapy									
Speech therapy received, n (%)	492 (40.3)	173 (49.9)	140 (40.3)	454 (39.0)	152 (44.2)	131 (38.1)	509 (41.5)	155 (47.8)	118 (36.4)
Amount received (minutes) in 7 days, mean (median)	83.6 (60)	80.7 (60)	86.4 (60)	85.3 (60)	90.1 (60)	70.2 (55)	90.1 (60)	85.4 (60)	76.9 (60)
Occupational therapy received, n (%)	932 (76.3)	282 (81.3)	255 (73.5)	881 (75.6)	283 (82.3)	244 (70.9)	962 (78.4)	265 (81.8)	227 (70.1)
Amount received (minutes) in 7 days, mean (median)	121.7 (90)	113.7 (95)	102.6 (90)	117.5 (90)	117.2 (90)	105.3 (85)	123.6 (95)	124.4 (90)	107.5 (90)
Physiotherapy received, n (%)	1,054 (86.3)	308 (88.8)	287 (82.7)	1,016 (87.2)	303 (88.1)	292 (84.9)	1,069 (87.1)	296 (91.4)	275 (84.9)
Amount received (minutes) in 7 days, mean (median)	133.9 (120)	134.8 (120)	116.2 (100)	126.1 (110)	129.7 (120)	122.5 (100)	127.2 (110)	120.0 (100)	104.9 (90)
Recreational therapy received, n (%)	478 (39.1)	138 (39.8)	168 (48.4)	440 (37.8)	131 (38.1)	153 (44.5)	440 (35.9)	127 (39.2)	147 (45.4)
Amount received (minutes) in 7 days, mean (median)	86.2 (60)	78.0 (60)	100.5 (60)	83.2 (60)	76.0 (60)	92.8 (60)	79.0 (50)	80.5 (45)	104.8 (60)
Overall Change in Care Needs⁸, n (%)									
Deteriorated	857 (70.2)	229 (66.0)	58 (16.7)	734 (63.0)	201 (58.4)	55 (16.0)	749 (61.0)	198 (61.1)	52 (16.0)
Improved	143 (11.7)	32 (9.2)	131 (37.8)	154 (13.2)	33 (9.6)	117 (34.0)	181 (14.8)	22 (6.8)	116 (35.8)
No change	221 (18.1)	86 (24.8)	158 (45.5)	277 (23.8)	110 (32.0)	172 (50.0)	297 (24.2)	104 (32.1)	156 (48.1)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD) and Continuing Care Reporting System, Complex Continuing Care Database (CCRS-CCC), 2007/08–2010/11.

Inclusion criteria: All patients discharged alive following an inpatient stroke/TIA (from CIHI-DAD, 2007/09–2009/10) who appeared in the CCRS-CCC database within 6 months of the acute discharge date.

¹ Based on initial assessment closest to the stroke/TIA inpatient discharge date.

² Cohort of residents that experienced an acute stroke/TIA in 2009/10 and had both an initial assessment and a follow-up assessment at 3 months after the initial assessment.

³ Score range is 0–12; a score of 3 or more indicates possible depression.

⁴ Score range is 0–6; a higher score indicates higher social engagement.

⁵ Long form; score range is 0–28; a higher score indicates greater difficulty performing activities.

⁶ Score range is 0–6; a higher score indicates more severe cognitive impairment.

⁷ Score range is 0–3; a higher score indicates more pain.

⁸ Resident's overall level of self-sufficiency has changed significantly compared to status of 90 days ago (or since last assessment if less than 90 days).

Notes:

(1) Population-based analysis (i.e., the location of the patient's residence is used to report regional performance).

(2) Therapy may include individual sessions and group sessions of one therapist to four patients for occupational therapy and physiotherapy, and one therapist to eight patients for recreational therapy.

MDS-RAI = Minimum Data Set-Resident Assessment Instrument

Exhibit 3.9a

Characteristics of adult stroke patients admitted to long-term care following an inpatient discharge for stroke or transient ischemic attack in Ontario, 2009/10

Characteristic ¹	2009/10
Ontario	679
Female, n (%)	428 (63.0)
Age, mean (median)	81.3 (82)
Long-term care residents prior to stroke hospitalization, n (%)	140 (20.6)
Acute length of stay (days), mean (median)	33.4 (18)
Acute Alternate Level of Care length of stay (days), mean (median)	19.0 (3)
Time from Acute Admission to Long-Term Care (days), mean (median)	
Patient not originally from long-term care	97.7 (84)
Patients originally from long-term care	32.1 (13.5)
Dementia, n (%)	
Patients with dementia	206 (30.3)
Patients with Alzheimer's	44 (6.6)
Discharge Destinations Following Long-Term Care, n (%)	
Inpatient acute care	254 (37.4)
Inpatient continuing care	15 (2.2)
Home care service	18 (2.7)
Private home (no home care)	60 (8.8)
Long-term care home	135 (19.9)
Retirement home	16 (2.4)
Deceased	165 (24.3)
Other ²	16 (2.4)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2009/10, and Continuing Care Reporting System, Long-Term Care Database (CCRS-LTC), 2010/11.

Inclusion criteria: All patients discharged alive following an inpatient stroke or transient ischemic attack (CIHI-DAD, 2009/10) who appeared in the CCRS-LTC database within 6 months of the acute discharge date.

¹ Based on initial assessment closest to the stroke/TIA inpatient discharge date.

² Includes ambulatory health service, inpatient psychiatric care and inpatient rehabilitation (general and special).

Exhibit 3.9b

Characteristics of long-term care residents who had a hospital discharge for stroke or transient ischemic attack in Ontario in 2009/10 and an assessment six months after their initial assessment

MDS-RAI Scales	2009/10		
	All ¹	Initial Assessment Among Cohort with 6-Month Follow-up ²	Assessment at 6-Month Follow-up ²
Ontario	679	179	179
Depression Rating Scale³			
Score, mean, median (IQR)	1.6, 1 (0–2)	1.7, 1 (0–3)	2.2, 2 (0–3)
≥3, n (%)	154 (22.7)	47 (26.3)	56 (31.3)
≥3 and receiving antidepressant medication, n (%)	75 (48.7)	20 (42.6)	33 (58.9)
Index of Social Engagement⁴			
≥4, n (%)	211 (31.1)	56 (31.3)	68 (38.0)
Activities of Daily Living⁵			
Score, mean, median (IQR)	18.2, 20 (12–26)	18.1, 19 (12–25)	17.9, 19 (12–25)
Cognitive Performance Scale⁶, n (%)			
0–2	330 (48.6)	72 (40.2)	77 (43.0)
3	161 (23.7)	56 (31.3)	50 (27.9)
4–6	188 (27.7)	51 (28.5)	52 (29.1)
Pain Scale⁷, n (%)			
0	383 (56.4)	103 (57.5)	102 (57.0)
1	166 (24.4)	52 (29.1)	53 (29.6)
2	107 (15.8)	18 (10.1)	15 (8.4)
3	23 (3.4)	6 (3.4)	9 (5.0)
Therapy			
Speech therapy received, n (%)	7 (1.0)	**	-
Amount received (minutes) in 7 days, mean, median	**	**	-
Occupational therapy received, n (%)	30 (4.4)	7 (3.9)	11 (6.1)
Amount received (minutes) in 7 days, mean, median (IQR)	34.3, 30 (20–40)	27.9, 30 (15–30)	29.1, 30 (15–30)
Physiotherapy received, n (%)	412 (60.7)	111 (62.0)	155 (86.6)
Amount received (minutes) in 7 days, mean, median (IQR)	54.6, 45 (30–55)	47.5, 45 (30–45)	47.4, 45 (30–60)
Recreational therapy received, n (%)	70 (10.3)	13 (7.3)	19 (10.6)
Amount received (minutes) in 7 days, mean, median (IQR)	70.6, 60 (25–100)	63.1, 60 (30–105)	72.2, 45 (15–83)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2009/10, and Continuing Care Reporting System, Long-Term Care Database (CCRS-LTC), 2010/11.

Inclusion criteria: All patients discharged alive following an inpatient stroke or transient ischemic attack (from CIHI-DAD, 2009/10) who appeared in the CCRS-LTC database within 6 months of the acute discharge date.

¹ Based on initial assessment closest to the stroke/TIA inpatient discharge date.

² Cohort of residents that experienced an acute stroke/TIA in 2009/10 and had an initial assessment and a follow-up assessment 6 months after the initial assessment. Initial assessment is to be done within 14 days of admission into the LTC facility. For patients who were LTC residents prior to the stroke/TIA acute hospitalization, the 6-month assessment was after the stroke hospitalization and the initial assessment was within 14 days of their admission into the LTC facility.

³ Score range is 0–12; a score of 3 or more indicates possible depression.

⁴ Score range is 0–6; a higher score indicates higher social engagement.

⁵ Long form; score range is 0–28; a higher score indicates greater difficulty performing activities.

⁶ Score range is 0–6; a higher score indicates more severe cognitive impairment.

⁷ Score range is 0–3; a higher score indicates more pain.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Cells in which there were no reported/available data are marked with a hyphen (-).

(2) Therapy may include individual sessions and group sessions of one therapist to four patients for occupational therapy and physiotherapy, and one therapist to eight patients for recreational therapy.

MDS-RAI = Minimum Data Set–Resident Assessment Instrument; IQR = interquartile range (25th–75th percentile)

4. Home Care Services

Community Care Access Centre Services

Findings

Exhibit 4.1: There was an increase in the number of Ontario stroke patients receiving CCAC rehabilitation services within 60 days of an acute stroke inpatient stay, but the proportion remained stable at 57.6%. The median time for a CCAC to provide home-based rehabilitation was 15 days following discharge from an acute stroke/TIA hospitalization, with no difference by patient sex. This ranged from a median time of 10 days in the Central West LHIN to 24.5 days in the South East LHIN.

Exhibit 4.2: Over a two-month period following an inpatient stay for acute stroke/TIA, the median number of nursing visits remained fairly stable over time (10 visits). Personal support hours decreased from a median of 13 hours in 2006/07 to 10 hours in 2008/09. Many LHINs did not provide personal support services to stroke patients. The average number of rehabilitation service visits (occupational therapy, physiotherapy, speech therapy or social work) per client over 60 days declined from 4.4 visits in 2006/07 to 3.9 visits in 2008/09. The benchmark is an average of 6.8 rehabilitation visits. Psychological services were discontinued after 2007/08.

Conclusions

Based on best practice recommendations, the number of rehabilitation visits per client is insufficient. It is concerning, given the prevalence of depression among stroke survivors, that CCAC-based psychological services were delivered across the province until 2007/08 but are no longer available. According to the results of the South East LHIN community-based enhanced rehabilitation initiative, the mean time for a CCAC-based rehabilitation service was five days for patients referred to the initiative, and patients received 12 rehabilitation visits, on average, over a 60-day period.

Recommendations

The OSN should continue to support initiatives such as those in the Southeast OSS region that investigate whether CCAC-based rehabilitation can provide best practice stroke care. There is a need for provincial standards for community-based rehabilitation. The results of the South East LHIN community-based enhanced rehabilitation initiative should be examined to look at standard measures of functional improvements and long-term outcomes achieved through this program.

Exhibit 4.1

Time to Community Care Access Centre rehabilitation services provided to adult home care clients (active and new) following an acute hospitalization for stroke, in Ontario and by sex and Local Health Integration Network, 2006/07–2008/09

Group/Subgroup	2006/07				2007/08				2008/09			
	No. of Clients with Stroke ¹	Rehabilitation Services (Physiotherapy, Occupational Therapy, Speech Therapy or Social Work)			No. of Clients with Stroke ¹	Rehabilitation Services (Physiotherapy, Occupational Therapy, Speech Therapy or Social Work)			No. of Clients with Stroke ¹	Rehabilitation Services (Physiotherapy, Occupational Therapy, Speech Therapy or Social Work)		
		No. of clients ¹	Mean no. of days to first service	Median no. of days to first service		No. of clients ¹	Mean no. of days to first service	Median no. of days to first service		No. of clients ¹	Mean no. of days to first service	Median no. of days to first service
Ontario	5,860	3,394	20.8	16	5,957	3,430	20.2	14	6,094	3,515	20.5	15
Female	3,231	1,852	20.6	15	3,297	1,873	19.8	14	3,339	1,861	20.4	15
Male	2,629	1,542	20.9	16	2,660	1,557	20.7	15	2,755	1,654	20.7	15
Local Health Integration Network												
1. Erie St. Clair	366	185	18.2	12	387	206	19.3	12.5	376	200	18.7	13.5
2. South West	563	302	19.8	14	571	311	18.8	13	555	312	18.9	13
3. Waterloo Wellington	341	198	23.5	21	357	217	20.2	14	429	243	18.1	12
4. Hamilton Niagara Haldimand Brant	821	553	19.4	14	839	536	18.8	11.5	732	458	21.6	17
5. Central West	318	188	21.2	16	328	222	19.3	13	323	213	17.7	10
6. Mississauga Halton	390	267	20.7	17	451	283	22.2	19	475	318	17.6	13
7. Toronto Central	430	235	19.7	12	502	250	18.8	12	585	292	21.8	15
8. Central	612	370	20.3	16	604	383	21.1	16	679	483	19.5	14
9. Central East	657	385	21.0	15	595	358	20.8	15.5	628	384	20.9	15
10. South East ²	224	137	23.1	19	243	140	22.6	19	230	134	26.2	24.5
11. Champlain	321	158	26.9	26	362	192	21.9	16.5	328	161	22.9	21
12. North Simcoe Muskoka	240	96	22.3	19	255	90	23.1	19	262	91	24.3	23
13. North East	372	212	22.7	20	341	170	21.6	18	376	152	26.1	21
14. North West	155	93	14.3	9	122	72	15.7	6.5	116	74	22.5	16.5
LHIN unknown	50	15	18.3	14	-	-	-	-	-	-	-	-

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2006/07–2008/09; Ontario Ministry of Health and Long-Term Care, Home Care Database, 2006/07–2009/10.

Inclusion criteria: All clients aged ≥18 years discharged from an acute care facility in 2006/07, 2007/08, or 2008/09 with a stroke-related diagnosis (based on ICD-10 codes) who received home care services within 60 days of discharge. Active clients included those receiving home care services 90 days before admission to acute care (N = 1,758, 1,689 and 1,709, respectively). New clients included those not receiving home care services 90 days before hospitalization for acute stroke (N = 4,102, 4,268 and 4,385, respectively).

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² The Home Care Database did not include data related to the community rehabilitation therapy enhancement initiative in the South East LHIN in 2009/10. This initiative allowed rehabilitation services to be provided in a mean of 5 days.

Notes:

(1) LHIN-based analysis (i.e., the patient's LHIN is used to report regional performance).

(2) Calculated time in days to first CCAC rehabilitation visit was based on subtracting the acute stroke/TIA discharge date from the first CCAC rehabilitation service date.

(3) Cells in which there were no reported/available data are marked with a hyphen (-).

Exhibit 4.2

Community Care Access Centre support services provided to adult home care clients¹ (active and new) within 60 days following an acute hospitalization for stroke, in Ontario and by sex and Local Health Integration Network, 2006/07–2009/10

2006/07–2007/08

Group/Subgroup	No. of Clients with Stroke ¹	Nursing			Personal Support			Personal Support and Homemaker Services			Occupational Therapy (OT)		
		No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of hours per client	Median no. of hours per client	No. of clients ¹	Mean no. of hours per client	Median no. of hours per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client
Ontario	5,860	1,509	10.2	7	466	21.3	13	1,540	19.9	12	2,330	2.8	2
Female	3,231	779	10.2	7	300	21.4	13	994	20.0	12	1,266	2.8	2
Male	2,629	730	10.2	7	166	21.0	12	546	19.7	11	1,064	2.8	2
Local Health Integration Network													
1. Erie St. Clair	366	182	11.1	6	110	17.8	14	-	-	-	133	2.5	2
2. South West	563	183	10.1	6	125	20.3	10	96	20.4	12	224	2.2	2
3. Waterloo Wellington	341	48	8.4	7	9	32.3	14	93	22.7	16	152	2.8	2
4. Hamilton Niagara Haldimand Brant	821	171	10.3	6	-	-	-	265	20.5	12	409	2.3	2
5. Central West	318	63	10.2	6	6	15.0	8.5	85	21.5	13	136	3.6	3
6. Mississauga Halton	390	57	11.2	6	-	-	-	130	21.5	11	206	3.4	3
7. Toronto Central	430	98	9.2	6.5	-	-	-	152	15.1	9	157	3.3	3
8. Central	612	127	11.1	7	**	7.0	7	197	17.7	11	221	3.8	3
9. Central East	657	173	10.2	8	26	33.1	23.5	243	18.8	12	249	3.2	3
10. South East	224	69	12.7	9	**	3.0	3	77	25.0	15	94	2.1	2
11. Champlain	321	94	8.0	6	62	18.6	11	78	22.4	11.5	90	2.6	2
12. North Simcoe Muskoka	240	84	9.2	7	49	17.0	9	21	14.5	8	58	2.6	2
13. North East	372	111	10.0	7	74	27.9	13.5	65	16.7	14	122	2.0	2
14. North West	155	41	8.5	6	-	-	-	35	28.9	14	67	2.0	2
LHIN unknown	50	8	18.0	8	**	38.7	42	**	21.0	23	12	2.2	2

Group/Subgroup	Physiotherapy (PT)			Speech Therapy (ST)			Social Work (SW)			Psychological Services			Rehabilitation Services (OT, PT, ST or SW)		
	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client
Ontario	1,561	3.8	3	668	3.0	2	168	2.6	2	21	3.4	3	3,394	4.4	3
Female	858	3.8	3	348	2.9	2	85	2.4	2	13	3.0	2	1,852	4.4	3
Male	703	3.7	3	320	3.0	2	83	2.7	2	8	4.1	4.5	1,542	4.4	3
Local Health Integration Network															
1. Erie St. Clair	102	5.4	4	30	3.9	3	7	1.9	2	-	-	-	185	5.5	4
2. South West	139	3.3	3	51	2.9	2	21	2.6	2	-	-	-	302	3.8	3
3. Waterloo Wellington	70	3.8	3	32	3.2	2.5	18	2.4	1.5	-	-	-	198	4.2	3
4. Hamilton Niagara Haldimand Brant	292	3.7	3	103	3.3	3	18	2.2	1.5	-	-	-	553	4.4	3
5. Central West	90	4.6	4.5	35	3.3	3	8	3.3	2.5	**	4.0	4	188	5.6	4
6. Mississauga Halton	121	4.6	4	43	3.1	2	**	2.0	2	**	2.5	2	267	5.2	4
7. Toronto Central	90	3.3	3	58	3.1	2.5	6	2.5	2.5	8	3.4	2.5	235	4.3	3
8. Central	126	4.2	4	99	3.0	2	10	2.7	1.5	**	4.3	4	370	4.6	3
9. Central East	180	3.4	3	64	2.4	2	16	3.2	3	**	3.6	2	385	4.2	3
10. South East	61	3.3	3	26	2.2	2	11	2.3	2	-	-	-	137	3.6	3
11. Champlain	80	3.2	3	29	2.0	2	**	1.0	1	-	-	-	158	3.5	3
12. North Simcoe Muskoka	42	3.3	3	21	2.4	2	30	2.7	2	-	-	-	96	4.3	4
13. North East	117	3.1	3	64	3.1	2	17	2.7	2	-	-	-	212	4.0	3
14. North West	45	3.6	4	12	2.3	1.5	**	4.0	4	-	-	-	93	3.6	2
LHIN unknown	6	3.7	2	**	3.0	3	-	-	-	-	-	-	15	3.4	3

2007/08–2008/09

Group/Subgroup	No. of Clients with Stroke ¹	Nursing			Personal Support			Personal Support and Homemaker Services			Occupational Therapy (OT)		
		No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of hours per client	Median no. of hours per client	No. of clients ¹	Mean no. of hours per client	Median no. of hours per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client
Ontario	5,957	1,477	10.1	6	20.3	12	1,568	20.2	11	2,438	2.6	2	
Female	3,297	810	10.1	6	21.3	12	1,014	20.1	11	1,310	2.6	2	
Male	2,660	667	10.1	6	18.5	13	554	20.2	12	1,128	2.5	2	
Local Health Integration Network													
1. Erie St. Clair	387	184	7.9	5	22.0	14	-	-	-	134	2.4	2	
2. South West	571	157	7.9	5	16.2	8	35	17.1	12	239	2.3	2	
3. Waterloo Wellington	357	44	11.5	8.5	27.6	14	78	26.7	15.5	170	2.3	2	
4. Hamilton Niagara Haldimand Brant	839	156	9.3	5.5	-	-	313	20.1	12	391	2.3	2	
5. Central West	328	65	10.8	7	-	-	100	18.3	10.5	175	3.0	3	
6. Mississauga Halton	451	45	13.2	6	-	-	132	17.6	10	238	2.9	3	
7. Toronto Central	502	96	14.6	8	-	-	177	16.5	9	175	2.5	2	
8. Central	604	124	12.1	7	-	-	246	19.1	11	257	3.2	3	
9. Central East	595	193	11.3	8	15.5	12	218	21.9	12	231	2.8	3	
10. South East	243	66	12.0	6	**	51	79	26.4	15	101	2.1	2	
11. Champlain	362	93	10.7	7	20.8	9	70	26.0	11	115	2.4	2	
12. North Simcoe Muskoka	255	86	8.9	6.5	20.5	13.5	18	22.0	10.5	50	2.2	2	
13. North East	341	123	8.2	6	23.7	15	61	14.4	11	112	2.0	1	
14. North West	122	45	6.1	5	-	-	41	22.4	12	50	1.9	2	

Group/Subgroup	Physiotherapy (PT)			Speech Therapy (ST)			Social Work (SW)			Psychological Services			Rehabilitation Services (OT, PT, ST or SW)		
	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client
Ontario	1,550	3.6	3	691	2.9	2	153	2.7	2	-	-	-	3,430	4.1	3
Female	824	3.6	3	397	2.8	2	76	2.5	2	-	-	-	1,873	4.1	3
Male	726	3.5	3	294	3.0	2	77	2.8	2	-	-	-	1,557	4.2	3
Local Health Integration Network															
1. Erie St. Clair	119	4.3	3	41	3.4	3	6	1.8	2	-	-	-	206	4.8	3
2. South West	140	3.2	3	56	2.8	2	16	2.4	2	-	-	-	311	3.8	3
3. Waterloo Wellington	82	3.7	3	46	3.2	3	16	2.8	2	-	-	-	217	4.1	3
4. Hamilton Niagara Haldimand Brant	288	3.4	3	95	3.1	3	20	2.3	2	-	-	-	536	4.2	3
5. Central West	92	4.9	5	50	2.9	3	8	4.6	5	-	-	-	222	5.2	4
6. Mississauga Halton	115	3.9	4	51	2.4	2	6	2.3	2	-	-	-	283	4.5	4
7. Toronto Central	93	3.3	3	62	3.5	3	9	3.6	2	-	-	-	250	3.9	3
8. Central	135	3.6	3	97	2.9	2	8	2.9	3	-	-	-	383	4.2	4
9. Central East	171	3.6	3	60	2.4	2	14	3.2	2.5	-	-	-	358	4.1	3
10. South East	69	2.8	2	20	2.3	2	10	1.5	1	-	-	-	140	3.3	3
11. Champlain	97	3.3	3	43	1.9	1	7	2.9	3	-	-	-	192	3.7	3
12. North Simcoe Muskoka	30	3.3	2.5	25	3.6	3	14	2.0	2	-	-	-	90	3.6	2
13. North East	88	3.4	2	33	3.1	3	13	3.1	2	-	-	-	170	3.9	3
14. North West	31	3.7	3	12	2.3	2	6	2.5	2	-	-	-	72	3.5	2

2008/09–2009/10

Group/Subgroup	No. of Clients with Stroke ¹	Nursing			Personal Support			Personal Support and Homemaker Services			Occupational Therapy (OT)		
		No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of hours per client	Median no. of hours per client	No. of clients ¹	Mean no. of hours per client	Median no. of hours per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client
Ontario	6,094	1,460	10.4	7	391	18.7	10	1,782	20.6	12	2,460	2.5	2
Female	3,339	748	10.3	7	254	19.5	11	1,149	21.1	12	1,308	2.5	2
Male	2,755	712	10.5	7	137	17.2	10	633	19.7	12	1,152	2.4	2
Local Health Integration Network													
1. Erie St. Clair	376	162	7.0	4.5	49	13.6	11	91	19.7	10	131	2.6	2
2. South West	555	145	7.8	6	141	15.9	9	40	23.1	13	232	2.0	2
3. Waterloo Wellington	429	45	9.0	6	-	-	-	100	24.4	15	192	2.4	2
4. Hamilton Niagara Haldimand Brant	732	142	12.0	8	-	-	-	276	22.1	13	318	2.3	2
5. Central West	323	53	12.8	9	-	-	-	104	18.2	10.5	160	2.9	3
6. Mississauga Halton	475	78	12.0	5	-	-	-	130	23.9	10.5	256	3.1	3
7. Toronto Central	585	104	15.2	8	-	-	-	203	16.4	9	196	2.4	2
8. Central	679	129	11.9	8	**	5.5	5.5	263	17.4	9	312	2.7	2
9. Central East	628	206	11.5	9	**	13.5	10.5	278	21.5	13	259	2.7	2
10. South East ²	230	55	9.0	5	**	7.0	7	48	30.0	14	106	2.1	2
11. Champlain	328	87	10.4	7	55	21.3	12	89	21.4	14	97	2.5	2
12. North Simcoe Muskoka	262	92	8.6	7	70	26.3	15	-	-	-	58	2.2	2
13. North East	376	132	8.8	6.5	69	18.9	10	119	18.2	13	89	1.9	1
14. North West	116	30	10.5	8	-	-	-	41	25.6	11	54	1.8	2

Group/Subgroup	Physiotherapy (PT)			Speech Therapy (ST)			Social Work (SW)			Psychological Services			Rehabilitation Services (OT, PT, ST or SW)		
	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client	No. of clients ¹	Mean no. of visits per client	Median no. of visits per client
Ontario	1,539	3.4	3	733	2.7	2	163	2.5	2	-	-	-	3,515	3.9	3
Female	806	3.5	3	390	2.7	2	76	2.6	2	-	-	-	1,861	4.0	3
Male	733	3.3	3	343	2.8	2	87	2.4	2	-	-	-	1,654	3.9	3
Local Health Integration Network															
1. Erie St. Clair	107	3.9	3	45	3.2	2	8	1.5	1	-	-	-	200	4.5	3
2. South West	126	3.1	3	68	2.8	2	22	2.6	2	-	-	-	312	3.5	3
3. Waterloo Wellington	118	3.7	3	36	3.2	3	12	2.8	2	-	-	-	243	4.3	3
4. Hamilton Niagara Haldimand Brant	219	3.3	3	75	2.7	2	11	2.8	3	-	-	-	458	3.7	3
5. Central West	113	4.1	4	49	3.2	3	9	2.1	2	-	-	-	213	5.2	4
6. Mississauga Halton	124	4.3	4	48	2.7	2	8	2.8	2	-	-	-	318	4.6	4
7. Toronto Central	105	3.0	3	71	2.7	2	11	1.8	2	-	-	-	292	3.4	3
8. Central	175	3.3	3	151	2.7	2	22	2.6	2	-	-	-	483	3.9	3
9. Central East	185	3.2	3	75	2.5	1	23	2.3	2	-	-	-	384	4.0	3
10. South East ²	50	3.1	3	20	1.9	1	9	2.9	3	-	-	-	134	3.3	2
11. Champlain	71	2.9	2	28	2.2	1.5	7	2.9	3	-	-	-	161	3.3	2
12. North Simcoe Muskoka	30	3.2	2.5	30	3.5	3	7	1.9	2	-	-	-	91	3.7	2
13. North East	78	3.1	2.5	26	2.2	1	11	3.5	2	-	-	-	152	3.3	3
14. North West	38	3.4	3	11	1.6	1	**	1.7	2	-	-	-	74	3.4	2.5

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2006/07–2008/09; Ontario Ministry of Health and Long-Term Care, Home Care Database, 2006/07–2009/10.

Inclusion criteria: All clients aged ≥18 years discharged from an acute care facility in 2006/07, 2007/08 or 2008/09 with a stroke-related diagnosis (based on ICD-10 codes) who received home care services within 60 days of discharge. Patients were followed for 60 days from time of first CCAC service received within 60 days of hospitalization for acute stroke or transient ischemic attack.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² The Home Care Database did not include data related to the community rehabilitation therapy enhancement initiative in the South East LHIN in 2009/10. This initiative provided, on average, 12 rehabilitation services per patient over a 60-day period.

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) LHIN-based analysis (i.e., the patient's LHIN is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

5. Patient Outcomes

Age- and Sex-Adjusted, Non-Elective Revisit/Readmission Rates at 30 and 90 Days

Findings

Exhibit 5.1: Following the first emergency department visit or inpatient admission for stroke/TIA, the rate of another stroke-related revisit or readmission within 30 days remained fairly constant from 2003/04 onward, reaching 4.9% in 2009/10. Consistently, TIA patients had the highest rate of stroke-related revisits or readmissions (6.5%) in 2009/10. In 2009/10, regional stroke centres had the lowest rate of revisits or readmissions (4.0%), followed by district stroke centres (5.1%) and non-designated centres (5.2%). There was much variability across LHINs, with the lowest revisit/readmission rate in the North West LHIN (3.8%) and the highest in the Waterloo Wellington LHIN (6.2%).

Exhibit 5.2: Following the first emergency department visit or inpatient admission for stroke/TIA, the rate of another admission within 90 days decreased slightly between 2003/04 and 2009/10, 7.0% to 6.6% ($p=0.007$). There was a modest decrease in 90-day stroke/TIA-related revisits/readmissions among patients with intracerebral hemorrhagic strokes over time (from 5.4% in 2003/04 to 4.6% in 2009/10, $p=0.04$). Ninety-day stroke/TIA-related revisit/readmission rates among patients with ischemic strokes remained close to 6.0%. Among TIA patients there was a modest decrease from 8.9% in 2003/04 to 8.3% in 2009/10 ($p=0.10$). TIA patients consistently had the highest rate of revisits/readmissions. Regional stroke centres had the lowest rate of 90-day stroke/TIA related revisits or readmissions (5.7%), followed by district stroke centres at 6.8% in 2009/10. Non-designated centres consistently had the highest rates of readmission within 90 days (7.1% in 2009/10). Modest variation existed across the LHINs. In 2009/10, readmissions related to stroke/TIA varied from 8.1% in the North East LHIN to 5.8% in the North West and Hamilton Niagara Haldimand Brant LHINs.

Conclusions and Recommendations

The overall decline in 90-day readmission rates may be related to the growing number of secondary stroke prevention clinics across the province. Improved access to these clinics may have reduced the 30-day revisit/readmission rates for stroke. The most dramatic decline in readmissions was observed among hemorrhagic stroke patients. While patients with a TIA index visit or hospitalization also saw a decline in 30- and 90-day

stroke/TIA readmission rates over the seven years, TIA patients have the highest rates of 30- and 90-day revisits/readmissions for stroke/TIA, 6.5% and 8.3% respectively, similar to the results of Gladstone et al. in 2000.⁵

The OSN should develop a risk-adjusted model to allow for better comparisons across facilities and regions. Access to rapid TIA assessment clinics or secondary prevention clinics may reduce the readmission rate among TIA patients. The OSN's call for proposals to investigate the system management of TIA patients may lead to a better understanding of the high revisit/readmission rates for TIA compared to other stroke types.

Age- and Sex-Adjusted All-Cause Readmission Rates at 30 Days

Findings

Exhibit 5.3: Following the first emergency department visit or inpatient admission for stroke/TIA, the rate of another non-elective inpatient admission for any cause within 30 days declined in Ontario, from 8.8% in 2003/04 to 8.0% in 2009/10 ($p=0.0002$); this is much lower than the 12% observed by Gladstone et al.⁵ A decrease in all-cause 30-day readmission rates occurred across all stroke types. In 2009/10, ischemic stroke had the highest rate of all-cause non-elective readmissions within 30 days of the acute stroke discharge (8.2%). Regional stroke centres had the highest all-cause readmission rates in 2009/10 (8.3%) followed closely by non-designated hospitals (8.2%); district stroke centres saw a steady and dramatic decline, from 8.7% in 2003/04 to 7.2% in 2009/10 ($p=0.0006$).

Conclusions and Recommendations

This indicator will be part of the 2012/13 Hospital Service Accountability Agreement as an explanatory indicator. The OSN remains engaged with the LHIN Health System Indicator Steering Committee and its Technical Working Group to provide advice on stroke centre impact on this outcome. Given that readmission rates are not adjusted for patient stroke severity, comorbidities and residence, the OSN needs to develop risk-adjustment models for future reports. District stroke centre performance may offer TIA/ischemic stroke practice patterns that can be shared to improve performance across all hospitals.

Risk-Adjusted Mortality Rates

Findings

Exhibit 5.4: Ontario's in-hospital risk-adjusted mortality rate among admitted stroke/TIA patients decreased from 14.4% in 2003/04 to 11.4% in 2010/11 ($p<0.0001$). District stroke centres

experienced the greatest decline in in-hospital mortality, from 15.6% in 2003/04 to 10.4% in 2010/11, and in 2010/11 the mortality rate was statistically significantly lower than the provincial rate of 11.4%. Across Local Health Integration Networks, in-hospital mortality rates in 2010/11 varied substantially, ranging from 8.5% in the Central West LHIN to 15.0% in the North East LHIN. Improvements were observed in most LHINs in 2010/11.

Exhibit 5.5: Between 2003/04 and 2009/10, there was a 10.6% relative decrease in the 30-day risk-adjusted mortality rate among patients admitted for stroke or TIA in Ontario. In 2003/04, the 30-day risk-adjusted mortality rate among admitted stroke/TIA patients was 16.0%; in 2009/10, the rate was 14.3%. Regional stroke centres had the lowest 30-day risk-adjusted mortality rate (13.5%) compared to district and non-designated centres (15.6% for both). There was considerable variation across LHINs, ranging from 11.9% in the North West LHIN to 17.9% in the Erie St. Clair LHIN in 2009/10.

Exhibit 5.6: Provincially, the risk-adjusted mortality rate one year following stroke/TIA declined from 28.2% in 2003/04 to 25.7% in 2009/10 ($p < 0.0001$). Decreases were observed across most regions and LHINs. In 2009/10, the regional stroke centres had the lowest one-year risk-adjusted mortality rate; this was significantly lower than the provincial rate (24.6% vs. 25.7%) There was no difference in one-year mortality rates between patients seen at district stroke centres and non-designated hospitals (26.5% and 26.7%, respectively).

Conclusions and Recommendations

Between 2003/04 and 2010/11, in-hospital and 30-day risk-adjusted mortality rates in Ontario experienced relative declines of 20.8% and 10.6%, respectively. This degree of decline in six years exceeds the 9% decline in in-hospital stroke fatality rates that Tu et al.²⁰ found over an earlier 10-year period (1994–2004). This decline may be partially explained by the decrease in inpatient length of stay. The in-hospital risk-adjusted mortality rate in Ontario in 2010/11 was 11.4%. Designated stroke centres (regional and district) had lower in-hospital mortality rates (11.8% and 10.4%, respectively) than non-designated hospitals (12.8%). Stroke/TIA patients had better immediate outcomes when cared for in designated stroke centres. The 30-day and one-year risk-adjusted mortality rates were no different for district stroke centres and non-designated hospitals. Regional stroke centres had the lowest 30-day and one-year risk-adjusted mortality rates, 13.5% and 24.6% respectively. A better understanding of why district stroke centres did not have sustained improved outcomes is needed.

Exhibit 5.1

Age- and sex-adjusted revisit or readmission rates within 30 days following a stroke or transient ischemic attack, in Ontario and by stroke type, OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2007/08–2009/10

Group/Subgroup	30-Day Revisit/Readmission Rate							
	2003/04		2007/08		2008/09		2009/10	
	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)
Ontario²	5.0	5.0 (4.7–5.2)	4.8	4.8 (4.6–5.1)	4.7	4.7 (4.4–5.0)	4.9	4.9 (4.6–5.1)
Stroke Type								
Intracerebral hemorrhage	3.7	3.7 (2.5–4.9)	3.2	3.2 (2–4.3)	3.0	3.0 (1.9–4.1)	3.5	3.4 (2.4–4.5)
Ischemic stroke	4.0	4.0 (3.6–4.4)	4.0	4.0 (3.6–4.3)	3.8	3.8 (3.4–4.2)	4.0	4.0 (3.6–4.4)
Subarachnoid hemorrhage	5.1	5.1 (3.4–6.7)	4.6	4.4 (2.9–6.0)	3.2	3.2 (1.7–4.8)	3.7	3.7 (2.1–5.2)
Transient ischemic attack	6.7	6.7 (6.3–7.2)	6.5	6.6 (6.1–7.0)	6.4	6.4 (6.0–6.9)	6.5	6.5 (6.1–7.0)
Ontario Stroke System Region								
Central East	5.9	5.9 (5.2–6.7)	5.3	5.3 (4.6–6.0)	5.0	5.0 (4.3–5.7)	5.6	5.6 (4.9–6.4)
Central South	4.7	4.7 (4.0–5.4)	4.5	4.5 (3.8–5.2)	4.6	4.7 (4.0–5.3)	4.6	4.6 (3.9–5.3)
East – Champlain	5.4	5.4 (4.5–6.3)	5.3	5.3 (4.4–6.2)	5.4	5.4 (4.5–6.3)	5.0	5.0 (4.1–5.9)
Northeast	4.9	4.9 (3.8–6.0)	4.8	4.8 (3.6–5.9)	4.1	4.1 (3.0–5.2)	6.0	6.0 (4.8–7.1)
Northwest	4.1	4.1 (2.3–5.9)	5.2	5.2 (3.4–6.9)	3.3	3.2 (1.5–5.0)	3.8	3.8 (2.0–5.5)
South East	5.7	5.7 (4.5–7.0)	5.4	5.5 (4.2–6.7)	3.8	3.9 (2.5–5.2)	4.3	4.3 (3.0–5.6)
Southwest	4.8	4.8 (4.0–5.5)	4.9	4.9 (4.2–5.7)	4.7	4.7 (4.0–5.5)	5.0	5.0 (4.3–5.7)
Toronto – North & East	4.4	4.4 (3.3–5.5)	3.7	3.8 (2.7–4.8)	4.6	4.6 (3.6–5.6)	4.1	4.1 (3.1–5.2)
Toronto – Southeast	4.8	4.8 (3.6–6.0)	4.8	4.7 (3.5–6.0)	3.8	3.8 (2.6–4.9)	3.8	3.8 (2.6–4.9)
Toronto – West	3.7	3.7 (2.6–4.7)	5.9	5.9 (4.9–6.9)	5.0	5.0 (4.0–6.0)	5.8	5.8 (4.8–6.8)
West GTA	5.1	5.1 (4.3–6.0)	4.0	4.0 (3.1–4.8)	5.2	5.2 (4.4–6.1)	4.2	4.2 (3.4–5.0)
Ontario Stroke System Classification								
Regional stroke centre	4.3	4.3 (3.7–4.9)	4.4	4.4 (3.8–4.9)	4.3	4.2 (3.7–4.8)	4.0	4.0 (3.5–4.5)
District stroke centre	5.0	5.0 (4.3–5.7)	4.6	4.6 (4.0–5.2)	4.0	4.0 (3.3–4.6)	5.1	5.1 (4.5–5.7)
Non-designated	5.2	5.2 (4.8–5.6)	5.2	5.2 (4.8–5.6)	5.2	5.2 (4.9–5.6)	5.2	5.2 (4.9–5.6)
Local Health Integration Network								
1. Erie St. Clair	4.9	4.9 (3.8–6.0)	4.0	4.0 (2.9–5.2)	4.2	4.2 (3.1–5.3)	4.9	4.9 (3.8–6.0)
2. South West	4.7	4.7 (3.7–5.7)	5.5	5.5 (4.6–6.5)	5.2	5.2 (4.2–6.1)	5.1	5.1 (4.2–6.1)
3. Waterloo Wellington	4.5	4.5 (3.2–5.9)	5.2	5.2 (3.8–6.5)	5.0	5.0 (3.7–6.3)	6.2	6.2 (5.0–7.4)
4. Hamilton Niagara Haldimand Brant	4.7	4.7 (3.9–5.5)	4.2	4.2 (3.4–5.0)	4.5	4.5 (3.7–5.3)	3.9	3.9 (3.1–4.7)
5. Central West	5.4	5.4 (3.9–6.8)	3.4	3.4 (1.9–4.8)	5.6	5.6 (4.2–7.0)	4.3	4.3 (2.9–5.7)
6. Mississauga Halton	5.0	5.0 (3.9–6.1)	4.3	4.3 (3.2–5.4)	5.0	5.0 (4.0–6.1)	4.2	4.2 (3.1–5.2)
7. Toronto Central	3.9	3.9 (3.0–4.8)	5.1	5.1 (4.3–5.9)	4.2	4.2 (3.4–5.0)	4.9	4.9 (4.1–5.7)
8. Central	5.0	5.0 (4.0–6.0)	4.3	4.3 (3.4–5.3)	4.9	4.9 (4.0–5.8)	5.3	5.3 (4.4–6.3)
9. Central East	5.6	5.6 (4.8–6.5)	5.8	5.9 (5.0–6.8)	5.2	5.2 (4.3–6.0)	5.1	5.1 (4.2–6.0)
10. South East	5.7	5.7 (4.5–7.0)	5.4	5.5 (4.2–6.7)	3.8	3.9 (2.5–5.2)	4.3	4.3 (3.0–5.6)
11. Champlain	5.4	5.4 (4.5–6.3)	5.3	5.3 (4.4–6.2)	5.4	5.4 (4.5–6.3)	5.0	5.0 (4.1–5.9)
12. North Simcoe Muskoka	5.6	5.6 (4.2–6.9)	4.4	4.4 (3.1–5.8)	4.5	4.5 (3.1–5.9)	5.1	5.1 (3.7–6.5)
13. North East	4.9	4.9 (3.8–6.0)	4.8	4.8 (3.6–5.9)	4.1	4.1 (3.0–5.2)	6.0	6.0 (4.8–7.1)
14. North West	4.1	4.1 (2.3–5.9)	5.2	5.2 (3.4–6.9)	3.3	3.2 (1.5–5.0)	3.8	3.8 (2.0–5.5)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD) and National Ambulatory Care Reporting System (NACRS); 2003/04–2009/10.

Inclusion criteria: All patients aged ≥18 years readmitted to an emergency department or acute inpatient setting with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack within 30 days of the initial stroke or TIA event in each year.

Exclusion criteria: Patients with an elective admission, scheduled emergency department visit or transfer within a facility or between facilities within 24 hours.

¹ Indirect standardization based on an age-sex regression model was used to calculate rates.

² Based on unique patients (i.e., does not include multiple patient-visits).

Notes:

(1) No washout periods were applied; for example, if a patient's first hospitalization for stroke had a discharge date of March 31, 2005 (FY 2004/05), followed by another hospitalization for stroke/TIA on April 1, 2005 (FY 2005/06), the April 1 hospitalization would be considered the first hospitalization in 2005/06 and not a readmission related to the hospitalization in 2004/05.

(2) Facility-based analysis (i.e., the location of the facility was used to report regional performance).

(3) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

(4) Indicates a significant difference from the provincial rate at the $p < 0.0001$ level. Significance is based on the 95% confidence interval falling entirely above or below the provincial rate.

CI = confidence interval (5th–95th percentile).

Exhibit 5.2

Age- and sex-adjusted revisit or readmission rates within 90 days following a stroke or transient ischemic attack, in Ontario and by stroke type, OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2007/08–2009/10

Group/Subgroup	90-Day Revisit/Readmission Rate							
	2003/04		2007/08		2008/09		2009/10	
	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)
Ontario²	7.0	7.0 (6.6–7.3)	6.7	6.7 (6.4–7.1)	6.4	6.4 (6.1–6.7)	6.6	6.6 (6.3–7.0)
Stroke Type								
Intracerebral hemorrhage	5.3	5.4 (4.0–6.8)	4.7	4.6 (3.3–6.0)	4.3	4.3 (3.0–5.6)	4.6	4.6 (3.3–5.8)
Ischemic stroke	6.0	6.0 (5.6–6.5)	5.6	5.6 (5.2–6.1)	5.6	5.6 (5.2–6.0)	5.9	5.9 (5.5–6.3)
Subarachnoid hemorrhage	5.8	6.0 (4.0–8.0)	5.8	5.8 (4.0–7.7)	4.0	4.2 (2.4–6.0)	4.0	4.1 (2.3–5.9)
Transient ischemic attack	8.9	8.9 (8.3–9.4)	8.9	8.9 (8.3–9.4)	8.2	8.2 (7.6–8.7)	8.3	8.3 (7.8–8.8)
Ontario Stroke System Region								
Central East	8.1	8.0 (7.2–8.9)	7.2	7.2 (6.3–8.0)	7.0	7.0 (6.2–7.8)	7.6	7.6 (6.8–8.5)
Central South	6.8	6.8 (6.0–7.6)	6.3	6.3 (5.5–7.1)	6.1	6.1 (5.3–6.9)	6.4	6.4 (5.6–7.2)
East – Champlain	7.1	7.1 (6.0–8.1)	7.6	7.6 (6.6–8.7)	6.5	6.5 (5.4–7.5)	6.6	6.6 (5.6–7.7)
Northeast	6.8	6.8 (5.5–8.1)	7.5	7.4 (6.1–8.8)	5.8	5.8 (4.5–7.1)	8.1	8.1 (6.8–9.4)
Northwest	6.4	6.4 (4.3–8.5)	7.3	7.3 (5.2–9.4)	5.8	5.8 (3.8–7.8)	5.8	5.8 (3.8–7.9)
South East	7.2	7.2 (5.7–8.7)	7.7	7.7 (6.2–9.2)	5.6	5.6 (4.1–7.1)	6.0	6.0 (4.4–7.5)
Southwest	6.9	6.9 (6.0–7.7)	6.9	6.9 (6.1–7.8)	6.6	6.6 (5.8–7.4)	6.8	6.8 (6.0–7.6)
Toronto – North & East	6.3	6.3 (4.9–7.6)	5.0	5.0 (3.7–6.3)	6.2	6.2 (5.0–7.4)	5.7	5.7 (4.4–6.9)
Toronto – Southeast	6.4	6.5 (5.0–7.9)	6.3	6.3 (4.9–7.7)	5.8	5.8 (4.4–7.2)	5.8	5.8 (4.5–7.2)
Toronto – West	5.9	5.9 (4.7–7.1)	7.6	7.6 (6.4–8.8)	6.5	6.5 (5.4–7.7)	7.0	7.0 (5.9–8.2)
West GTA	7.3	7.3 (6.3–8.4)	5.5	5.5 (4.4–6.5)	6.9	6.9 (6.0–7.9)	5.9	5.9 (4.9–6.9)
Ontario Stroke System Classification								
Regional stroke centre	6.1	6.2 (5.5–6.9)	6.4	6.4 (5.7–7.0)	5.9	5.9 (5.3–6.5)	5.7	5.7 (5.1–6.3)
District stroke centre	7.4	7.4 (6.6–8.2)	6.5	6.5 (5.7–7.2)	5.4	5.4 (4.7–6.2)	6.8	6.8 (6.1–7.5)
Non-designated	7.2	7.2 (6.7–7.6)	7.0	7.0 (6.6–7.5)	7.0	7.0 (6.6–7.5)	7.1	7.1 (6.6–7.5)
Local Health Integration Network								
1. Erie St. Clair	7.7	7.7 (6.4–9.0)	6.1	6.1 (4.7–7.4)	5.9	5.8 (4.6–7.1)	7.0	7.0 (5.7–8.2)
2. South West	6.2	6.2 (5.0–7.4)	7.6	7.6 (6.4–8.7)	7.2	7.2 (6.1–8.3)	6.7	6.7 (5.6–7.7)
3. Waterloo Wellington	6.5	6.5 (4.9–8.1)	6.9	6.9 (5.3–8.5)	6.2	6.2 (4.7–7.7)	7.8	7.8 (6.4–9.3)
4. Hamilton Niagara Haldimand Brant	6.9	6.9 (6.0–7.8)	6.1	6.1 (5.2–7.0)	6.1	6.1 (5.2–7.0)	5.8	5.8 (4.9–6.7)
5. Central West	7.7	7.8 (6.1–9.5)	4.4	4.4 (2.6–6.1)	7.6	7.7 (6.1–9.3)	5.9	5.9 (4.3–7.6)
6. Mississauga Halton	7.1	7.1 (5.8–8.4)	6.1	6.1 (4.8–7.4)	6.5	6.5 (5.3–7.7)	5.9	5.9 (4.7–7.1)
7. Toronto Central	5.7	5.7 (4.7–6.8)	6.7	6.7 (5.7–7.7)	6.1	6.1 (5.2–7.1)	6.4	6.4 (5.5–7.3)
8. Central	7.2	7.2 (6.0–8.3)	6.0	6.0 (4.9–7.1)	6.8	6.7 (5.7–7.8)	7.2	7.2 (6.1–8.3)
9. Central East	7.5	7.5 (6.5–8.5)	7.2	7.3 (6.2–8.3)	6.8	6.8 (5.8–7.8)	6.7	6.7 (5.7–7.7)
10. South East	7.2	7.2 (5.7–8.7)	7.7	7.7 (6.2–9.2)	5.6	5.6 (4.1–7.1)	6.0	6.0 (4.4–7.5)
11. Champlain	7.1	7.1 (6.0–8.1)	7.6	7.6 (6.6–8.7)	6.5	6.5 (5.4–7.5)	6.6	6.6 (5.6–7.7)
12. North Simcoe Muskoka	8.1	8.1 (6.5–9.6)	6.8	6.8 (5.2–8.3)	6.9	6.8 (5.3–8.4)	7.8	7.8 (6.2–9.4)
13. North East	6.8	6.8 (5.5–8.1)	7.5	7.4 (6.1–8.8)	5.8	5.8 (4.5–7.1)	8.1	8.1 (6.8–9.4)
14. North West	6.4	6.4 (4.3–8.5)	7.3	7.3 (5.2–9.4)	5.8	5.8 (3.8–7.8)	5.8	5.8 (3.8–7.9)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD) and National Ambulatory Care Reporting System (NACRS), 2003/04–2009/10.

Inclusion criteria: All patients aged ≥18 years readmitted to an emergency department or acute inpatient setting with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack within 90 days of the initial stroke or TIA event in each year.

Exclusion criteria: Patients with an elective admission, scheduled emergency department visit or transfer within a facility or between facilities within 24 hours.

¹ Indirect standardization based on an age-sex regression model was used to calculate rates.

² Based on unique patients (i.e., does not include multiple patient-visits).

Notes:

(1) No washout periods were applied; for example, if a patient's first hospitalization for stroke had a discharge date of March 31, 2005 (FY 2004/05), followed by another hospitalization for stroke/TIA on April 1, 2005 (FY 2005/06), the April 1 hospitalization would be considered the first hospitalization in 2005/06 and not a readmission related to the hospitalization in 2004/05.

(2) Facility-based analysis (i.e., the location of the facility was used to report regional performance).

(3) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

(4) Indicates a significant difference from the provincial rate at the $p < 0.0001$ level. Significance is based on the 95% confidence interval falling entirely above or below the provincial rate.

CI = confidence interval (5th–95th percentile).

Exhibit 5.3

Age- and sex-adjusted all-cause readmission rates within 30 days following a stroke or transient ischemic attack, in Ontario and by stroke type, OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2007/08–2009/10

Group/Subgroup	30-Day All-Cause Readmission Rate							
	2003/04		2007/08		2008/09		2009/10	
	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)
Ontario²	8.9	8.8 (8.5–9.2)	8.3	8.3 (7.9–8.7)	8.3	8.3 (7.9–8.7)	8.0	8.0 (7.7–8.4)
Stroke Type								
Intracerebral hemorrhage	7.8	8.0 (6.4–9.6)	8.1	8.2 (6.8–9.7)	8.3	8.5 (7.0–9.9)	7.4	7.5 (6.2–8.9)
Ischemic stroke	9.0	8.9 (8.4–9.4)	8.4	8.3 (7.8–8.8)	8.4	8.3 (7.8–8.8)	8.3	8.2 (7.8–8.7)
Subarachnoid hemorrhage	8.4	9.9 (7.5–12.3)	6.9	7.9 (5.7–10.0)	7.3	8.5 (6.3–10.6)	6.7	7.5 (5.4–9.6)
Transient ischemic attack	8.9	8.9 (8.3–9.5)	8.4	8.4 (7.8–9.0)	8.2	8.2 (7.6–8.8)	7.9	7.9 (7.3–8.5)
Ontario Stroke System Region								
Central East	9.4	9.3 (8.3–10.3)	7.8	7.7 (6.8–8.7)	8.7	8.6 (7.7–9.5)	8.2	8.1 (7.2–9.0)
Central South	8.1	8.0 (7.2–8.9)	8.5	8.4 (7.6–9.3)	8.1	8.1 (7.2–8.9)	7.3	7.3 (6.4–8.1)
East – Champlain	8.4	8.4 (7.2–9.6)	6.9	6.9 (5.8–8.1)	7.0	7.0 (5.9–8.2)	7.3	7.3 (6.2–8.5)
Northeast	10.4	10.5 (9.1–12.0)	10.5	10.6 (9.1–12.1)	8.3	8.3 (6.9–9.8)	9.2	9.2 (7.8–10.7)
Northwest	5.9	5.9 (3.5–8.2)	8.6	8.6 (6.3–10.9)	9.9	10.0 (7.7–12.2)	9.6	9.6 (7.4–11.8)
South East	8.3	8.2 (6.6–9.9)	7.1	7.0 (5.4–8.7)	7.9	7.9 (6.2–9.6)	5.7	5.6 (4.0–7.3)
Southwest	9.2	9.2 (8.2–10.2)	8.4	8.3 (7.4–9.3)	8.6	8.6 (7.6–9.5)	7.8	7.8 (6.9–8.7)
Toronto – North & East	9.0	8.9 (7.5–10.4)	7.9	7.8 (6.4–9.2)	8.6	8.5 (7.1–9.8)	8.1	8.0 (6.7–9.3)
Toronto – Southeast	8.2	8.4 (6.7–10.0)	7.7	7.8 (6.2–9.4)	7.1	7.2 (5.7–8.8)	7.9	8.1 (6.6–9.6)
Toronto – West	9.5	9.7 (8.3–11.1)	9.3	9.5 (8.1–10.8)	8.4	8.5 (7.2–9.8)	10.1	10.2 (8.9–11.5)
West GTA	9.2	9.3 (8.1–10.4)	9.1	9.2 (8.0–10.3)	8.8	8.9 (7.8–9.9)	8.6	8.6 (7.6–9.7)
Ontario Stroke System Classification								
Regional stroke centre	7.9	8.1 (7.4–8.9)	7.9	8.0 (7.3–8.8)	7.7	7.8 (7.1–8.5)	8.2	8.3 (7.7–9.0)
District stroke centre	8.7	8.7 (7.8–9.6)	7.8	7.8 (7.0–8.6)	7.6	7.6 (6.8–8.4)	7.2	7.2 (6.4–8.0)
Non-designated	9.3	9.2 (8.7–9.7)	8.7	8.6 (8.1–9.1)	8.9	8.8 (8.3–9.3)	8.3	8.2 (7.7–8.7)
Local Health Integration Network								
1. Erie St. Clair	9.6	9.6 (8.2–11.1)	9.1	9.0 (7.5–10.5)	9.4	9.4 (8.0–10.8)	8.3	8.3 (6.9–9.7)
2. South West	8.9	8.8 (7.5–10.1)	7.9	7.8 (6.6–9.1)	8.0	7.9 (6.7–9.2)	7.4	7.4 (6.2–8.5)
3. Waterloo Wellington	6.9	6.9 (5.1–8.6)	8.5	8.5 (6.8–10.2)	7.3	7.3 (5.6–8.9)	6.6	6.6 (5.0–8.2)
4. Hamilton Niagara Haldimand Brant	8.5	8.5 (7.4–9.5)	8.4	8.4 (7.4–9.4)	8.4	8.4 (7.4–9.4)	7.6	7.5 (6.5–8.6)
5. Central West	10.2	10.3 (8.4–12.2)	10.8	10.8 (8.9–12.7)	9.5	9.7 (7.9–11.5)	8.2	8.3 (6.5–10.1)
6. Mississauga Halton	8.5	8.7 (7.2–10.1)	8.2	8.2 (6.8–9.6)	8.3	8.4 (7.0–9.7)	8.8	8.8 (7.5–10.1)
7. Toronto Central	8.8	9.0 (7.8–10.2)	7.9	8.0 (6.9–9.1)	7.2	7.4 (6.3–8.5)	9.2	9.3 (8.3–10.4)
8. Central	8.9	8.8 (7.5–10.1)	7.8	7.8 (6.6–9.0)	9.9	9.9 (8.7–11.0)	8.7	8.6 (7.4–9.8)
9. Central East	9.6	9.5 (8.4–10.6)	8.4	8.3 (7.2–9.4)	7.8	7.7 (6.6–8.8)	7.6	7.5 (6.4–8.6)
10. South East	8.3	8.2 (6.6–9.9)	7.1	7.0 (5.4–8.7)	7.9	7.9 (6.2–9.6)	5.7	5.6 (4.0–7.3)
11. Champlain	8.4	8.4 (7.2–9.6)	6.9	6.9 (5.8–8.1)	7.0	7.0 (5.9–8.2)	7.3	7.3 (6.2–8.5)
12. North Simcoe Muskoka	9.6	9.5 (7.7–11.2)	8.8	8.7 (7.0–10.4)	9.4	9.2 (7.5–11.0)	8.7	8.7 (6.9–10.4)
13. North East	10.4	10.5 (9.1–12.0)	10.5	10.6 (9.1–12.1)	8.3	8.3 (6.9–9.8)	9.2	9.2 (7.8–10.7)
14. North West	5.9	5.9 (3.5–8.2)	8.6	8.6 (6.3–10.9)	9.9	10.0 (7.7–12.2)	9.6	9.6 (7.4–11.8)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD) and National Ambulatory Care Reporting System (NACRS), 2003/04–2009/10.

Inclusion criteria: All patients aged ≥18 years readmitted for any cause to an acute inpatient setting within 30 days of initial stroke (ischemic or hemorrhagic) or transient ischemic attack event in each year.

Exclusion criteria: Patients with an elective admission or transfer within a facility or between facilities within 24 hours of discharge from the emergency department or inpatient care.

¹ Indirect standardization based on an age-sex regression model was used to calculate rates.

² Based on unique patients (i.e., does not include multiple patient-visits).

Notes:

(1) No washout periods were applied; for example, if a patient's first hospitalization for stroke had a discharge date of March 31, 2005 (FY 2004/05), followed by another hospitalization for stroke/TIA on April 1, 2005 (FY 2005/06), the April 1 hospitalization would be considered the first hospitalization in 2005/06 and not a readmission related to the hospitalization in 2004/05.

(2) Facility-based analysis (i.e., the location of the facility was used to report regional performance).

(3) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

(4) Indicates a significant difference from the provincial rate at the $p < 0.0001$ level. Significance is based on the 95% confidence interval falling entirely above or below the provincial rate.

CI = confidence interval (5th–95th percentile).

Exhibit 5.4

Risk-adjusted in-hospital mortality rates among adult patients following a stroke or transient ischemic attack, in Ontario and by OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Group/Subgroup	In-hospital Mortality Rate							
	2003/04		2008/09		2009/10		2010/11	
	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)
Ontario²	15.9	14.4 (13.9–14.9)	14.2	13.1 (12.6–13.6)	13.3	12.2 (11.7–12.7)	12.1	11.4 (10.9–11.9)
Ontario Stroke System Region								
Central East	15.7	15.5 (14.1–16.9)	13.4	13.4 (12.0–14.8)	12.4	12.7 (11.3–14.1)	11.2	11.6 (10.2–12.9)
Central South	17.0	16.3 (15.1–17.5)	14.4	13.4 (12.2–14.5)	14.0	12.9 (11.7–14.0)	11.7	11.4 (10.2–12.5)
East – Champlain	16.9	15.8 (14.0–17.5)	15.3	13.8 (12.1–15.5)	16.3	14.5 (12.8–16.2)	13.6	12.2 (10.7–13.8)
Northeast	13.9	16.9 (14.6–19.1)	16.4	18.9 (16.8–20.9)	13.4	15.6 (13.5–17.7)	11.9	15.0 (12.9–17.2)
Northwest	17.0	19.1 (15.6–22.6)	9.1	10.2 (7.1–13.4)	8.8	9.7 (6.6–12.7)	11.0	12.2 (9.2–15.2)
South East	19.1	20.0 (17.6–22.5)	16.0	14.1 (11.8–16.4)	15.9	14.9 (12.5–17.3)	16.8	14.6 (12.4–16.7)
Southwest	14.0	14.0 (12.7–15.4)	14.0	14.1 (12.7–15.4)	14.0	13.9 (12.7–15.2)	13.2	13.1 (11.9–14.4)
Toronto – North & East	19.1	16.0 (14.1–17.8)	13.5	13.5 (11.7–15.4)	12.1	12.0 (10.1–13.8)	9.5	10.2 (8.4–11.9)
Toronto – Southeast	14.2	13.5 (11.3–15.7)	14.3	13.5 (11.4–15.6)	11.2	10.6 (8.5–12.7)	11.6	11.3 (9.2–13.3)
Toronto – West	17.7	16.4 (14.7–18.2)	14.2	13.0 (11.3–14.6)	13.0	12.9 (11.1–14.6)	12.8	11.5 (9.9–13.1)
West GTA	12.9	12.1 (10.5–13.7)	13.8	14.0 (12.5–15.6)	12.1	11.9 (10.5–13.4)	11.8	11.1 (9.7–12.4)
Ontario Stroke System Classification								
Regional stroke centre	15.6	14.1 (13.2–15.1)	14.8	12.9 (12.1–13.8)	14.7	12.5 (11.7–13.3)	13.4	11.8 (11.0–12.6)
District stroke centre	15.7	15.6 (14.4–16.8)	12.8	12.9 (11.8–14.1)	12.2	12.4 (11.3–13.5)	10.1	10.4 (9.3–11.5)
Non-designated	16.0	16.1 (15.4–16.8)	14.3	14.9 (14.2–15.7)	12.8	13.8 (13.0–14.5)	12.2	12.8 (12.1–13.6)
Local Health Integration Network								
1. Erie St. Clair	12.0	12.8 (10.7–14.9)	11.8	12.6 (10.4–14.8)	13.2	14.6 (12.5–16.7)	12.1	12.4 (10.3–14.4)
2. South West	15.5	14.9 (13.2–16.6)	15.7	15.1 (13.3–16.8)	14.6	13.5 (12.0–15.1)	13.9	13.6 (12–15.3)
3. Waterloo Wellington	18.5	17.7 (15.3–20.1)	16.0	14.5 (12.3–16.8)	10.7	10.6 (8.3–13.0)	10.1	10.7 (8.4–13.0)
4. Hamilton Niagara Haldimand Brant	16.5	15.8 (14.4–17.2)	13.8	12.9 (11.5–14.3)	15.2	13.6 (12.3–14.9)	12.3	11.6 (10.3–12.9)
5. Central West	12.2	11.2 (8.5–13.9)	11.1	10.7 (8.1–13.3)	10.5	11.2 (8.5–13.9)	8.8	8.5 (6.1–10.8)
6. Mississauga Halton	13.4	12.7 (10.7–14.6)	15.0	15.7 (13.8–17.6)	13.0	12.2 (10.5–14.0)	13.4	12.4 (10.7–14.1)
7. Toronto Central	15.1	13.9 (12.3–15.4)	13.0	11.6 (10.3–13.0)	12.2	11.0 (9.7–12.4)	11.4	10.5 (9.2–11.8)
8. Central	20.2	17.7 (16.1–19.4)	13.7	14.5 (12.7–16.3)	11.3	12.8 (10.9–14.6)	11.8	12.9 (11.2–14.6)
9. Central East	16.9	15.2 (13.7–16.7)	14.9	14.9 (13.2–16.5)	12.4	12.8 (11.2–14.5)	10.9	10.9 (9.3–12.4)
10. South East	19.1	20.0 (17.6–22.5)	16.0	14.1 (11.8–16.4)	15.9	14.9 (12.5–17.3)	16.8	14.6 (12.4–16.7)
11. Champlain	16.9	15.8 (14.0–17.5)	15.3	13.8 (12.1–15.5)	16.3	14.5 (12.8–16.2)	13.6	12.2 (10.7–13.8)
12. North Simcoe Muskoka	12.4	15.5 (12.6–18.3)	13.5	13.1 (10.6–15.5)	14.3	13.8 (11.4–16.2)	10.2	11.0 (8.5–13.5)
13. North East	13.9	16.9 (14.6–19.1)	16.4	18.9 (16.8–20.9)	13.4	15.6 (13.5–17.7)	11.9	15.0 (12.9–17.2)
14. North West	17.0	19.1 (15.6–22.6)	9.1	10.2 (7.1–13.4)	8.8	9.7 (6.6–12.7)	11.0	12.2 (9.2–15.2)

Data source: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2003/04–2010/11.

Inclusion criteria: All patients aged ≥18 years who died in an inpatient setting of an acute care hospital in Ontario with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack starting in each fiscal year.

¹ Adjusted rate is the observed death rate adjusted for risk [age + sex + ambulance arrival + atrial fibrillation + stroke/TIA + (coronary artery disease or PCI or CABG) + (carotid disease or CEA/CES) + diabetes + hypertension + peripheral vascular disease + hyperlipidemia + stroke type]

² Based on unique patients (i.e., does not include multiple patient-visits).

Notes:

(1) No washout periods were applied; for example, if a patient's first hospitalization for stroke had a discharge date of March 31, 2005 (FY 2004/05), followed by another hospitalization for stroke/TIA on April 1, 2005 (FY 2005/06), the April 1 hospitalization would be considered the first hospitalization in 2005/06 and not a readmission related to the hospitalization in 2004/05.

(2) Facility-based analysis (i.e., the location of the facility was used to report regional performance).

(3) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

(4) Indicates a significant difference from the provincial rate at the p<0.0001 level. Significance is based on the 95% confidence interval falling entirely above or below the provincial rate.

CI = confidence interval (5th–95th percentile).

Exhibit 5.5

Risk-adjusted mortality rates at 30 days following a stroke or transient ischemic attack, in Ontario and by OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2007/08–2009/10

Group/Subgroup	30-Day Mortality Rate							
	2003/04		2007/08		2008/09		2009/10	
	Observed Rate %	Adjusted Rate ¹ % (CI)	Observed Rate %	Adjusted Rate ¹ % (CI)	Observed Rate %	Adjusted Rate ¹ % (CI)	Observed Rate %	Adjusted Rate ¹ % (CI)
Ontario²	17.0	16.0 (15.5–16.5)	16.6	15.5 (15.0–16.0)	15.6	14.8 (14.3–15.4)	15.1	14.3 (13.8–14.8)
Ontario Stroke System Region								
Central East	17.4	17.0 (15.5–18.4)	17.4	17.0 (15.5–18.4)	14.2	14.1 (12.7–15.5)	13.6	13.9 (12.4–15.3)
Central South	17.7	16.9 (15.6–18.1)	17.3	16.9 (15.6–18.2)	16.8	15.9 (14.6–17.1)	17.0	15.7 (14.5–16.9)
East – Champlain	18.3	17.1 (15.3–18.9)	16.7	14.6 (12.9–16.2)	16.7	15.3 (13.5–17.1)	17.1	15.3 (13.6–17.1)
Northeast	14.3	17.0 (14.7–19.4)	15.0	18.1 (15.8–20.5)	16.5	18.8 (16.7–21.0)	14.6	17.0 (14.8–19.1)
Northwest	18.3	20.4 (16.8–24.0)	13.9	15.9 (12.7–19.2)	12.4	14.4 (11.1–17.7)	10.6	11.9 (8.7–15.1)
South East	19.6	20.2 (17.7–22.8)	19.0	16.7 (14.4–19.0)	17.3	15.2 (12.8–17.7)	18.9	17.8 (15.3–20.3)
Southwest	16.9	16.9 (15.6–18.3)	17.7	17.0 (15.6–18.4)	15.8	15.9 (14.5–17.3)	16.2	16.1 (14.8–17.4)
Toronto – North & East	18.6	16.6 (14.6–18.5)	14.5	14.1 (12.2–16.0)	14.6	15.3 (13.3–17.3)	13.2	13.2 (11.3–15.2)
Toronto – Southeast	15.8	15.2 (12.9–17.4)	15.4	13.9 (11.7–16.0)	15.9	15.4 (13.2–17.6)	13.2	12.8 (10.6–14.9)
Toronto – West	16.6	15.9 (14.0–17.7)	16.2	14.8 (13.1–16.6)	14.7	14.0 (12.2–15.7)	13.4	13.6 (11.7–15.4)
West GTA	14.7	13.7 (12.1–15.4)	16.0	15.1 (13.5–16.7)	15.2	15.6 (14.0–17.2)	14.0	13.9 (12.3–15.4)
Ontario Stroke System Classification								
Regional stroke centre	16.0	14.6 (13.6–15.7)	15.4	13.5 (12.6–14.5)	15.8	14.2 (13.3–15.1)	15.5	13.5 (12.6–14.3)
District stroke centre	17.5	17.3 (16.0–18.5)	17.7	17.8 (16.6–19.0)	15.3	15.5 (14.3–16.7)	15.4	15.6 (14.5–16.8)
Non-designated	17.3	17.4 (16.7–18.1)	16.9	16.9 (16.1–17.6)	15.5	16.3 (15.5–17.1)	14.6	15.6 (14.8–16.4)
Local Health Integration Network								
1. Erie St. Clair	15.0	15.9 (13.8–18.1)	18.3	18.1 (15.9–20.2)	14.5	15.7 (13.4–17.9)	16.1	17.9 (15.7–20.0)
2. South West	18.3	17.7 (15.9–19.4)	17.2	16.2 (14.5–18.0)	16.8	16.0 (14.2–17.9)	16.3	15.1 (13.4–16.7)
3. Waterloo Wellington	18.7	17.9 (15.4–20.3)	17.9	17.0 (14.6–19.5)	17.4	16.1 (13.7–18.4)	15.5	15.4 (13.0–17.8)
4. Hamilton Niagara Haldimand Brant	17.3	16.5 (15.1–18.0)	17.1	16.9 (15.4–18.3)	16.6	15.8 (14.3–17.2)	17.5	15.8 (14.5–17.2)
5. Central West	15.6	14.3 (11.6–17.0)	17.3	15.9 (13.3–18.5)	14.0	13.3 (10.6–15.9)	11.7	12.5 (9.7–15.4)
6. Mississauga Halton	14.2	13.4 (11.3–15.4)	15.2	14.6 (12.6–16.6)	15.8	16.9 (14.9–18.9)	15.2	14.4 (12.6–16.3)
7. Toronto Central	15.0	14.2 (12.6–15.8)	15.8	14.0 (12.5–15.4)	14.2	13.3 (11.9–14.7)	13.6	12.7 (11.3–14.1)
8. Central	20.4	17.8 (16.1–19.4)	16.2	16.0 (14.2–17.7)	14.4	15.4 (13.5–17.2)	12.7	14.2 (12.3–16.1)
9. Central East	18.6	17.4 (15.8–19.0)	16.9	16.5 (14.8–18.3)	15.6	15.8 (14.0–17.5)	13.4	13.8 (12.1–15.6)
10. South East	19.6	20.2 (17.7–22.8)	19.0	16.7 (14.4–19.0)	17.3	15.2 (12.8–17.7)	18.9	17.8 (15.3–20.3)
11. Champlain	18.3	17.1 (15.3–18.9)	16.7	14.6 (12.9–16.2)	16.7	15.3 (13.5–17.1)	17.1	15.3 (13.6–17.1)
12. North Simcoe Muskoka	13.0	15.8 (12.9–18.6)	15.5	15.6 (12.9–18.2)	14.7	14.0 (11.5–16.5)	14.7	14.0 (11.5–16.5)
13. North East	14.3	17.0 (14.7–19.4)	15.0	18.1 (15.8–20.5)	16.5	18.8 (16.7–21.0)	14.6	17.0 (14.8–19.1)
14. North West	18.3	20.4 (16.8–24.0)	13.9	15.9 (12.7–19.2)	12.4	14.4 (11.1–17.7)	10.6	11.9 (8.7–15.1)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2003/04–2009/10; Ontario Ministry of Health and Long-Term Care, Registered Persons Database (RBD); 2003/04–2009/10.

Inclusion criteria: All patients aged ≥ 18 years who died either in hospital or following discharge within 30 days of admission to an inpatient setting of an acute care hospital with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack, starting in each fiscal year.

¹ Adjusted rate is the observed death rate adjusted for risk [age + sex + ambulance arrival + atrial fibrillation + stroke/TIA + (coronary artery disease or PCI or CABG) + (carotid disease or CEA/CES) + diabetes + hypertension + peripheral vascular disease + hyperlipidemia + stroke type]

² Based on unique patients (i.e., does not include multiple patient-visits).

Notes:

(1) No washout periods were applied; for example, if a patient's first hospitalization for stroke had a discharge date of March 31, 2005 (FY 2004/05), followed by another hospitalization for stroke/TIA on April 1, 2005 (FY 2005/06), the April 1 hospitalization would be considered the first hospitalization in 2005/06 and not a readmission related to the hospitalization in 2004/05.

(2) Facility-based analysis (i.e., the location of the facility was used to report regional performance).

(3) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

(4) Indicates a significant difference from the provincial rate at the $p < 0.0001$ level. Significance is based on the 95% confidence interval falling entirely above or below the provincial rate.

CI = confidence interval (5th–95th percentile).

Exhibit 5.6

Risk-adjusted mortality rates at one year following a stroke or transient ischemic attack, in Ontario and by OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2007/08–2009/10

Group/Subgroup	One-Year Mortality Rate							
	2003/04		2007/08		2008/09		2009/10	
	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)	Observed %	Adjusted ¹ % (CI)
Ontario²	29.0	28.2 (27.6–28.8)	27.4	26.6 (26.0–27.3)	26.5	26.1 (25.5–26.8)	26.1	25.7 (25.0–26.3)
Ontario Stroke System Region								
Central East	30.4	29.3 (27.6–31.0)	28.6	27.8 (26.0–29.5)	26.2	25.5 (23.8–27.2)	25.8	25.6 (23.9–27.3)
Central South	31.0	29.9 (28.4–31.4)	28.5	28.2 (26.7–29.7)	27.9	26.5 (25.0–28.0)	28.1	26.7 (25.3–28.2)
East – Champlain	30.4	29.2 (27.0–31.4)	28.8	26.4 (24.3–28.4)	27.3	25.5 (23.3–27.7)	28.5	26.3 (24.2–28.5)
Northeast	26.5	30.5 (27.7–33.2)	23.9	27.8 (25.0–30.5)	26.6	29.7 (27.1–32.3)	24.8	27.4 (24.8–30.0)
Northwest	29.5	32.5 (28.2–36.8)	20.0	22.8 (18.9–26.8)	22.1	24.5 (20.6–28.5)	21.5	24.1 (20.1–28.1)
South East	31.5	32.0 (29.0–35.0)	28.3	25.7 (22.9–28.5)	27.7	25.4 (22.4–28.3)	29.2	27.8 (24.7–30.9)
Southwest	27.9	28.1 (26.4–29.7)	29.3	28.4 (26.8–30.1)	26.9	26.5 (24.8–28.2)	27.5	27.0 (25.4–28.6)
Toronto – North & East	29.0	26.6 (24.2–29.0)	25.3	25.4 (23.1–27.8)	25.7	26.1 (23.8–28.5)	23.9	24.2 (21.8–26.5)
Toronto – Southeast	25.3	25.5 (22.7–28.3)	27.3	27.7 (25.0–30.5)	26.3	26.5 (23.7–29.2)	24.3	25.0 (22.2–27.7)
Toronto – West	29.4	29.3 (27.1–31.6)	26.3	26.1 (23.9–28.3)	25.4	24.9 (22.7–27.0)	24.7	25.7 (23.4–28)
West GTA	26.4	26.1 (24.1–28.1)	26.6	26.3 (24.3–28.2)	25.9	26.6 (24.6–28.5)	24.1	24.3 (22.4–26.1)
Ontario Stroke System Classification								
Regional stroke centre	27.0	27.0 (25.7–28.2)	25.0	24.5 (23.3–25.6)	25.1	24.1 (23.0–25.3)	25.8	24.6 (23.5–25.7)
District stroke centre	29.2	28.8 (27.4–30.3)	28.1	28.1 (26.7–29.6)	25.7	25.5 (24.1–27.0)	26.4	26.5 (25.1–27.9)
Non-designated	29.9	29.5 (28.7–30.4)	28.6	28.3 (27.4–29.2)	27.7	27.8 (26.9–28.7)	26.2	26.7 (25.8–27.7)
Local Health Integration Network								
1. Erie St. Clair	26.8	27.9 (25.4–30.5)	30.6	29.7 (27.2–32.2)	25.9	26.4 (23.7–29.0)	28.3	30.0 (27.4–32.5)
2. South West	28.7	28.2 (26.0–30.3)	28.4	27.5 (25.4–29.7)	27.6	26.5 (24.3–28.7)	26.9	25.1 (23.1–27.1)
3. Waterloo Wellington	32.3	30.4 (27.5–33.3)	28.6	27.4 (24.4–30.3)	28.9	26.4 (23.6–29.2)	26.8	26.3 (23.4–29.1)
4. Hamilton Niagara Haldimand Brant	30.5	29.7 (28.0–31.4)	28.5	28.5 (26.7–30.3)	27.6	26.5 (24.7–28.3)	28.6	26.9 (25.2–28.6)
5. Central West	26.8	26.1 (22.8–29.5)	29.4	28.0 (24.9–31.2)	25.6	24.9 (21.6–28.2)	22.2	23.4 (20.0–26.8)
6. Mississauga Halton	26.1	26.0 (23.5–28.6)	25.0	25.2 (22.8–27.7)	26.1	27.4 (25.0–29.8)	25.0	24.7 (22.4–26.9)
7. Toronto Central	26.6	27.1 (25.1–29.1)	25.4	25.4 (23.5–27.2)	24.3	24.0 (22.2–25.7)	23.9	24.1 (22.4–25.9)
8. Central	33.1	29.5 (27.5–31.5)	27.0	26.7 (24.6–28.8)	26.1	26.5 (24.3–28.6)	24.6	26.2 (24.0–28.5)
9. Central East	30.2	28.3 (26.4–30.2)	29.7	29.1 (27.0–31.1)	27.8	27.3 (25.3–29.4)	25.8	25.8 (23.7–27.8)
10. South East	31.5	32.0 (29.0–35.0)	28.3	25.7 (22.9–28.5)	27.7	25.4 (22.4–28.3)	29.2	27.8 (24.7–30.9)
11. Champlain	30.4	29.2 (27.0–31.4)	28.8	26.4 (24.3–28.4)	27.3	25.5 (23.3–27.7)	28.5	26.3 (24.2–28.5)
12. North Simcoe Muskoka	24.5	27.3 (24.0–30.6)	26.7	26.5 (23.4–29.6)	26.1	24.8 (21.9–27.8)	26.6	25.2 (22.2–28.3)
13. North East	26.5	30.5 (27.7–33.2)	23.9	27.8 (25.0–30.5)	26.6	29.7 (27.1–32.3)	24.8	27.4 (24.8–30.0)
14. North West	29.5	32.5 (28.2–36.8)	20.0	22.8 (18.9–26.8)	22.1	24.5 (20.6–28.5)	21.5	24.1 (20.1–28.1)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database, 2003/04–2009/10; Ontario Ministry of Health and Long-Term Care, Registered Persons Database (RPDB), 2003/04–2009/10.

Inclusion criteria: All patients aged ≥18 years who died either in hospital or following discharge within 365 days of admission to an inpatient setting of an acute care hospital with a diagnosis of stroke (ischemic or hemorrhagic) or transient ischemic attack, starting in each fiscal year.

¹ Adjusted rate is the observed death rate adjusted for risk [age + sex + ambulance arrival + atrial fibrillation + stroke/TIA + (coronary artery disease or PCI or CABG) + (carotid disease or CEA/CES) + diabetes + hypertension + peripheral vascular disease + hyperlipidemia + stroke type]

² Based on unique patients (i.e., does not include multiple patient-visits).

Notes:

(1) No washout periods were applied; for example, if a patient's first hospitalization for stroke had a discharge date of March 31, 2005 (FY 2004/05), followed by another hospitalization for stroke/TIA on April 1, 2005 (FY 2005/06), the April 1 hospitalization would be considered the first hospitalization in 2005/06 and not a readmission related to the hospitalization in 2004/05.

(2) Facility-based analysis (i.e., the location of the facility was used to report regional performance).

(3) See Appendix D for a list of hospitals classified as regional and district stroke centres by the OSS.

(4) Indicates a significant difference from the provincial rate at the $p < 0.0001$ level. Significance is based on the 95% confidence interval falling entirely above or below the provincial rate.

CI = confidence interval (5th–95th percentile).

List of Exhibits – Paediatric Stroke

6. Paediatric Care and Outcomes

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Findings and Exhibits – Paediatric Stroke

6. Paediatric Care and Outcomes

Background and Purpose

Previously reported childhood stroke incidence rates have ranged widely from 2 to 13 per 100,000 children per year, supporting a need for more robust paediatric stroke data.^{21, 22} In Ontario to date, no funding has been provided to enhance dedicated stroke care. Incidence, indicators of care and outcomes are poorly characterized for childhood stroke.

Providing accurate estimates for annual paediatric stroke volumes in Ontario has been a challenging task. Capturing incidence rates is dependent on the accuracy of coding systems within the hospitals. Some children are managed in paediatric institutions, and older children may be treated at larger adult centres.

The 2011 Ontario Stroke Evaluation Report relied on health administrative databases and ICD-coded diagnoses to assess paediatric stroke care across the province. With the latest data included in this report, for the first time we are able to assess the validity of the ICD-10 codes in identifying paediatric strokes among Ontario health care institutions. The paediatric stroke data presented in Exhibits 6.1 to 6.7 are based on stroke patients identified using ICD-10-CA code searches (see Appendix C) in any of the diagnostic code fields contained in the Canadian Institute for Health Information's Discharge Abstract Database (CIHI-DAD) and National Ambulatory Care Reporting System (NACRS). Each case underwent on-site chart review, and the stroke diagnosis was validated. A paediatric registered nurse confirmed stroke diagnoses in four paediatric hospitals, and Ontario Stroke Registry chart abstractors validated cases seen at all other acute care facilities.

Characteristics of Paediatric Patients

Findings

Exhibit 6.1: In 2010/11, the incidence of paediatric stroke/TIA (including cerebral sinovenous thrombosis [CSV T] without infarct and based on 478 screened charts and 163 confirmed stroke/TIA diagnoses) was 5.9 per 100,000 LHIN population¹ under the age of 17. In Ontario, the incidence of ischemic stroke is 3.3 per 100,000 children per year, which is 1.4 times higher than the best prior epidemiological rate.²³ The incidence of hemorrhagic stroke was 1.8 per 100,000 paediatric LHIN population, and other cerebrovascular diagnoses were 0.8 per 100,000 paediatric LHIN population. Of the 163 confirmed stroke/TIA diagnoses, 145 paediatric stroke/TIA patients were captured in the audit, and 18 CSV T patients with evidence of a brain clot were excluded due to no evidence of infarct.

Mean patient age was 6.4 years. Among the patients, 17.2% were aged 0–28 days, 17.2% were 29 days–<1 year, 21.4% were 1–6 years, 17.2% were 7–12 years, and 26.9% were 13–17 years. A male predominance of 51.0% was observed, which is consistent with the current literature.²⁴ Paediatric stroke risk factors were diverse, including cardiac disease (23.3%), acute head and neck infection (11.7%), acute head and neck trauma (8.3%), acute systemic illness, including frequent infection with fever (18.3%) and genetic syndrome (8.3%). “Other” risk factors, such as vascular abnormalities/malformations, prothrombotic (blood clotting) disorder, sickle-cell disease, and maternal gestational and delivery conditions, were seen in 30.8% of paediatric patients. Less than 1% of paediatric stroke patients had traditional adult stroke risk factors (e.g., hypertension, atrial fibrillation). Only 22.3% of confirmed paediatric stroke cases were identified in facilities other than paediatric hospitals.

¹ The estimated Ontario population aged 17 years or younger in 2010 was 2,744,039. Source: IntelliHealth Ontario, LHIN population estimates (2010/11) from Statistics Canada (2010/11) and Ontario Ministry of Finance (2010/11).

Fifty-one percent of paediatric patients were considered to be independent at the time of the stroke event. Among those not considered independent, 20.0% were primarily neonatal strokes. Paediatric stroke/TIA patients' initial symptoms included weakness (31.0%), seizure (38.6%) and headache (29.7%), similar to the initial symptoms found in adult stroke/TIA patients. Twenty-eight percent of paediatric stroke/TIA cases were considered in-hospital strokes. Among confirmed paediatric stroke cases, arterial ischemic stroke was the most prevalent stroke type (42.1%), followed by hemorrhagic stroke (33.8%), CSVT (8.3%) and TIA (5.5%).

Conclusions and Recommendations

We estimate that the incidence of paediatric stroke cases treated in Ontario acute care hospitals is 5.9 per 100,000 LHIN population aged less than 18 years. The incidence of paediatric stroke is striking and has exceeded prior North American estimates. Data on paediatric stroke should continue to be collected as part of provincial data in future Ontario Stroke Registry/SEQC activities. Neonatal strokes account for 17.2% of documented paediatric strokes; however, neonatal strokes are often missed due to lack of coding. An audit of neonatal intensive care unit (NICU) records or the inclusion of a radiology string search with the ICD-10 code search is recommended to capture neonatal strokes that are only documented in radiology records. Additionally, although the ICD-10 code for CSVT without infarct was used to identify paediatric stroke/TIA patients, many cases were excluded at the time of abstraction. This confirms the importance of another refinement to ICD-10 codes to identify stroke/TIA in children. The addition of the paediatric adaptation of the NIH Stroke Scale (PedNIHSS) as a data element for chart abstraction is recommended to measure acute severity; this will further enhance our understanding of paediatric discharge status. Targets for best practice stroke guidelines¹⁰ implementation should include paediatrics in best practice care planning, as the majority of paediatric strokes occur in hospitals that have stroke expertise and are part of a regional stroke centre.

Imaging: At the ED and During Admission

Findings

Exhibit 6.2: Among children with a suspected stroke/TIA, nearly half (44.6%) were not imaged within 24 hours of their arrival in the emergency department. Among children who did not experience in-hospital stroke (N=105), the median time from Last Seen Normal to arrival at the ED was 8.3 hours, with a wide range across the province (1.8–40.9 hours). Almost one in three patients who had neuroimaging was

considered normal, yet only 10.3% were classified with an Unable to Determine diagnosis, and 5.5% were diagnosed with TIA. The majority (70.4%) of paediatric ischemic stroke patients had their carotid imaging done during their hospital stay.

Conclusions and Recommendations

A major, preventable gap exists in timely diagnosis (and urgent treatment) of paediatric stroke/TIA patients that is often due to imaging delays. This may explain the high percentage of the Unable to Determine diagnosis on discharge (10.3%), a diagnosis that is much lower in adults (3.6%). A “false” imaging report of normal (an abnormal scan initially read as normal) necessitates dual sequential imaging that causes delay and unnecessary radiation exposure. This can potentially be due to the insensitivity of CT scans, supporting the case for the “MRI first and only” test in children.

Inpatient Admission

Findings

Exhibit 6.3: Of paediatric patients seen at the ED, 89.7% were confirmed with acute stroke/TIA, and of these, 96.2% were admitted to inpatient care. Fifty-four percent of patients were admitted to the ICU, 20.8% to the medical ward, 14.4% to the neurology department and 9.6% to other locations in the hospital. Of 125 patients admitted to Ontario hospitals, 56.8% were seen at The Hospital for Sick Children in Toronto, 24.0% at other paediatric facilities and 19.2% at other acute care facilities. Only 30.6% of paediatric patients were seen by a specialized stroke team; over half of stroke patients at The Hospital for Sick Children were seen by a stroke team. Twenty-four patients (19.2%) were seen at other acute care facilities, and less than 1% were admitted to a stroke unit or seen by a stroke team. Children admitted to other paediatric hospitals were not seen by a stroke team despite the fact that three-quarters of these centres were considered to be regional stroke centres. Only 1% of patients had swallowing studies to confirm safety of feeding (data not shown).

Conclusions and Recommendations

Over half (53.6%) of paediatric stroke patients were admitted to the ICU and less than 1% had part of their stay on a stroke unit (compared to 38.3% of adult stroke patients). The Hospital for Sick Children admitted 56.8% of paediatric stroke inpatients in Ontario, but only 50.7% were seen by a specialized stroke team. The lack of paediatric stroke teams at the other four paediatric hospitals underlines the importance of providing more physician/nurse training and the implementation of standardized paediatric stroke pathways

(based on CSS best practice guidelines⁶). Provincial programs such as Telestroke may provide additional opportunities for physicians/nurses to obtain advice on stroke management. There is also an urgent need for standardized dysphagia screening for paediatric stroke patients.

Antithrombotic Therapy

Findings

Exhibit 6.4: No patients were given thrombolysis (tPA) intervention during 2010/11. Fifty-six percent of paediatric ischemic stroke/TIA patients were given antithrombotic treatment during their hospital stay (16.9% antiplatelet only and 26.0% anticoagulation only). Seventeen percent of patients with cardiac risk factors and 39.0% of patients aged 29 days to 17 years (non-neonates) were not treated despite multiple guidelines recommending antithrombotic treatment during the acute phase. Thirty percent of paediatric ischemic stroke/TIA patients were discharged on antiplatelet medication.

Conclusions and Recommendations

Despite paediatric stroke recurrence rates of 10–25% (50% when no antithrombotic treatment was given),²⁵ most children aged 29 days to 17 years (non-neonates) were not treated with appropriate preventive medication in hospital or at discharge. Non-treatment of 16.9% of cardiac patients and 39.0% of non-neonates demonstrates gaps in guideline-recommended antithrombotic treatment. It is recommended that anticoagulation at discharge data should be captured for all paediatric patients.

Discharge: Neurological Status and Destination

Findings

Exhibit 6.5.1: Seventy-four percent of admitted paediatric stroke/TIA patients had a modified Rankin score at discharge. Over 53.8% of paediatric stroke patients were considered to have moderate to severe function impairment. Among males, 57.8% were considered to have moderate to severe final impairment compared to 50.0% of females. This is the opposite of the adult stroke population. Patients of The Hospital for Sick Children were 1.5 times more likely than patients of other paediatric hospitals to have a discharge modified Rankin score of 3–5. Patients of The Hospital for Sick Children were generally more complex patients as reflected in their higher rates of comorbidities (e.g., cardiac disease).

Exhibit 6.5.2: Overall, 66.9% of paediatric stroke/TIA patients were discharged home, 16.5% were discharged to another acute care facility and 16.5% were discharged to inpatient

rehabilitation. Of the patients discharged home, 39.5% were referred to Community Care Access Centres, 37.0% were referred to outpatient rehabilitation and 44.4% went home without any services. Discharge destinations varied across facilities; only 59.4% of patients from The Hospital for Sick Children were discharged home compared to 89.7% of patients from all other paediatric facilities. Among patients seen at all other acute care facilities, only 35.7% were transferred to another acute care facility.

Exhibit 6.5.3: The majority (88.4%) of patients with symptoms ranging from none to slight disability (modified Rankin score of 0–2) were discharged home. Twenty-one percent were discharged home with CCAC support, 18.4% were discharged home with outpatient rehabilitation and 67.5% were referred to a secondary stroke prevention clinic. Over half (56.0%) of patients with moderate to severe disability (score of 3–5) were seen at The Hospital for Sick Children. About half of patients in Ontario with a score of 3–5 were discharged home, and half were transferred to either acute care (12.0%) or inpatient rehabilitation (38.0%). Among these patients, 84.4% were referred to a secondary stroke prevention clinic on discharge.

Conclusions and Recommendations

Because over half of children with stroke or TIA had moderate to severe disability at discharge, surveillance for emerging and late deficits is important, especially since children “grow” into deficits as they mature. One in five children with moderate to severe disability were discharged home without rehabilitation services in place. This represents a significant gap in rehabilitation provisions. Twenty-four percent of all paediatric stroke patients were not referred to a secondary stroke prevention clinic.

The paediatric adaptation of the modified Rankin Scale is Ped-mRS.²⁶ This substitution will avoid a scoring deficit for lack of “independence,” which is normal for the young.

Summary

These data represent the first and only geographic all-hospital paediatric stroke data. While underestimates are present, the high incidence of 6 strokes per 100,000 children per year represents an important finding. Implementation of Ontario-wide paediatric stroke initiatives, as supported by the OSN Board of Directors, will build upon these data and use them in planning for needs assessments, implementation strategies for best practice guidelines and modifiable gaps in patient care.

Exhibit 6.1

Characteristics of paediatric stroke or transient ischemic attack patients¹, 2010/11

Characteristics	Patients, n (%)					
	All	Female	Male	Hospital for Sick Children	Other Paediatric Hospitals ²	Other Adult Hospitals ³
Audit Sample	145	71	74	74	32	39
Age, mean, median	6.4, 5.0	7.6, 7.0	5.3, 1.5	5.4, 3.0	7.1, 6.5	7.8, 9.0
Inhospital stroke	40 (27.6)	22 (31.0)	18 (24.3)	27 (36.5)	**	9 (23.1)
Independent ⁴	61 (50.8)	30 (53.6)	31 (48.4)	28 (43.1)	16 (61.5)	17 (58.6)
Time from symptom onset to ED arrival (hours), mean, median	29.2, 8.3	26.6, 7.0	31.5, 9.0	34.7, 9.5	21.9, 2.3	27.4, 10.9
Age Group						
0–28 days	25 (17.2)	10 (14.1)	15 (20.3)	13 (17.6)	**	9 (23.1)
29 days–<1 year	25 (17.2)	10 (14.1)	15 (20.3)	14 (18.9)	**	6 (15.4)
1–6 years	31 (21.4)	15 (21.1)	16 (21.6)	19 (25.7)	8 (25.0)	**
7–12 years	25 (17.2)	14 (19.7)	11 (14.9)	14 (18.9)	8 (25.0)	**
13–17 years	39 (26.9)	22 (31.0)	17 (23.0)	14 (18.9)	8 (25.0)	17 (43.6)
Risk Factors						
Prior stroke/transient ischemic attack	9 (7.5)	6 (10.7)	**	**	**	**
Cardiac disease	28 (23.3)	18 (32.1)	10 (15.6)	24 (36.9)	-	**
Acute head and neck infection	14 (11.7)	**	9 (14.1)	10 (15.4)	**	-
Acute head and neck trauma	10 (8.3)	**	7 (10.9)	**	**	**
Acute systemic illness	22 (18.3)	10 (17.9)	12 (18.8)	15 (23.1)	**	**
Genetic syndrome	10 (8.3)	**	**	8 (12.3)	**	**
Other ⁵	37 (30.8)	16 (28.6)	21 (32.8)	22 (33.8)	6 (23.1)	9 (31.0)
Initial Symptoms						
Weakness	45 (31.0)	23 (32.4)	22 (29.7)	23 (31.1)	10 (31.3)	12 (30.8)
Seizure	56 (38.6)	22 (31.0)	34 (45.9)	35 (47.3)	11 (34.4)	10 (25.6)
Headache	43 (29.7)	27 (38.0)	16 (21.6)	22 (29.7)	10 (31.3)	11 (28.2)
Final Diagnosis						
Arterial ischemic stroke	61 (42.1)	28 (39.4)	33 (44.6)	36 (48.6)	15 (46.9)	10 (25.6)
Cerebral sinovenous thrombosis ⁶	12 (8.3)	**	8 (10.8)	6 (8.1)	**	**
Intracerebral hemorrhage	39 (26.9)	19 (26.8)	20 (27.0)	20 (27.0)	9 (28.1)	10 (25.6)
Subarachnoid hemorrhage	10 (6.9)	**	**	6 (8.1)	**	-
Transient ischemic attack	8 (5.5)	**	**	**	-	**
Uncertain diagnosis	15 (10.3)	10 (14.1)	**	**	**	10 (25.6)

Data source: Ontario Stroke Registry, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged <18 years admitted to an acute care hospital in Ontario with a diagnosis of stroke or transient ischemic attack.

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Includes Children's Hospital of Eastern Ontario, Hamilton Health Sciences Corporation and London Health Sciences Centre.

³ Includes adult facilities (N=23).

⁴ Patients who are fully independent in all Activities of Daily Living and Instrumental Activities of Daily Living.

⁵ Include vasculopathy, prothrombotic sickle-cell disease and maternal conditions at birth.

⁶ An additional 18 patients with sinovenous clot and no infarct were seen at The Hospital for Sick Children (11) and other paediatric hospitals in Ontario (7)

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

Exhibit 6.2

Number and percentage of paediatric patients¹ who received diagnostic imaging, in Ontario and by sex and facility/type, 2010/11

Group/Subgroup	Patients, n (%)						
	CT or MRI Within 24 Hours ² (N=112)	First Scan Type ³ (N=136)			Scan Result Normal	CT or MRI Before Discharge ⁴ (N=125)	Carotid Imaging Before Discharge ⁵ (N=71)
		CT	MRI	Ultrasound			
Ontario	62 (55.4)	92 (67.6)	32 (23.5)	12 (8.8)	43 (31.6)	125 (100.0)	50 (70.4)
Female	31 (53.4)	41 (63.1)	20 (30.8)	**	22 (33.8)	58 (100.0)	25 (80.6)
Male	31 (57.4)	51 (71.8)	12 (16.9)	8 (11.3)	21 (29.6)	67 (100.0)	25 (62.5)
Facility/Type							
Hospital for Sick Children	35 (54.7)	47 (64.4)	18 (24.7)	8 (11.0)	20 (27.4)	71 (100.0)	33 (82.5)
All other paediatric facilities ⁶	11 (73.3)	26 (83.9)	**	**	11 (35.5)	30 (100.0)	13 (76.5)
All other acute care facilities ⁷	16 (48.5)	19 (59.4)	10 (31.3)	**	12 (37.5)	24 (100.0)	**

Data source: Ontario Stroke Registry, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged <18 years admitted to an acute care hospital in Ontario with a diagnosis of stroke or transient ischemic attack or an uncertain diagnosis (N=125).

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Excludes missing scan times.

³ Among patients with an initial CT, MRI or ultrasound.

⁴ Among admitted patients only.

⁵ Includes only ischemic stroke patients.

⁶ Includes Children's Hospital of Eastern Ontario, Hamilton Health Sciences Corporation and London Health Sciences Centre.

⁷ Includes adult facilities (N=23).

** Cell value suppressed for reasons of privacy and confidentiality.

Note:

Facility-based analysis (i.e., the location of the facility is used to report regional performance).

CT = computed tomography; MRI = magnetic resonance imaging

Exhibit 6.3

Admission destination of paediatric stroke or transient ischemic attack patients¹, in Ontario and by sex and facility/type, 2010/11

Group/Subgroup	Patients, n (%)				
	Intensive Care Unit	Medical Ward	Neurology	Other	Seen by Stroke Team
Ontario	67 (53.6)	26 (20.8)	18 (14.4)	12 (9.6)	38 (30.6)
Female	33 (56.9)	13 (22.4)	8 (13.8)	**	20 (34.5)
Male	34 (50.7)	13 (19.4)	10 (14.9)	8 (11.9)	18 (27.3)
Facility/Type					
Hospital for Sick Children	45 (63.4)	17 (23.9)	9 (12.7)	-	36 (50.7)
All other paediatric facilities ²	14 (46.7)	8 (26.7)	8 (26.7)	-	-
All other acute care facilities ³	8 (33.3)	**	**	12 (50.0)	**

Data source: Ontario Stroke Registry, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged <18 years admitted to inpatient care in an acute care hospital in Ontario with a diagnosis of stroke or transient ischemic attack (N=125).

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Includes Children's Hospital of Eastern Ontario, Hamilton Health Sciences Corporation and London Health Sciences Centre.

³ Includes adult facilities (N=23).

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

Exhibit 6.4

Number and percentage of paediatric ischemic stroke or transient ischemic attack patients¹ who received antithrombotic therapy prescriptions, in Ontario and by sex and facility/type, 2010/11

Group/Subgroup	Patients, n (%)				
	Inhospital Prescription				Antiplatelet Prescribed at Discharge ²
	Antiplatelet Only	Anticoagulant Only	Antiplatelet and Anticoagulant	None	
Ontario	13 (16.9)	20 (26.0)	10 (13.0)	34 (44.2)	23 (29.9)
Female	9 (25.7)	8 (22.9)	**	13 (37.1)	15 (41.7)
Male	**	12 (28.6)	**	21 (50.0)	8 (19.5)
Facility/Type					
Hospital for Sick Children	9 (20.0)	14 (31.1)	9 (20.0)	13 (28.9)	17 (40.5)
All other paediatric facilities ³	**	**	**	9 (52.9)	**
All other acute care facilities ⁴	**	**	-	12 (80.0)	**

Data source: Ontario Stroke Registry, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged <18 years admitted to acute inpatient care in Ontario with a diagnosis of ischemic stroke or transient ischemic attack (N=77).

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Among ischemic stroke/TIA patients discharged alive (N=77)

³ Includes Children's Hospital of Eastern Ontario, Hamilton Health Sciences Corporation and London Health Sciences Centre.

⁴ Includes adult facilities (N=23).

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Cells in which there were no reported/available data are marked with a hyphen (-).

Exhibit 6.5.1

Degree of functional ability of paediatric stroke or transient ischemic attack patients at discharge (modified Rankin score), in Ontario and by sex and facility/type, 2010/11

Group/Subgroup	Patients, n (%)	
	Modified Rankin Score	
	0–2	3–5
Ontario¹	43 (46.2)	50 (53.8)
Female	24 (50.0)	24 (50.0)
Male	19 (42.2)	26 (57.8)
Facility/Type		
Hospital for Sick Children	16 (36.4)	28 (63.6)
All other paediatric facilities²	15 (57.7)	11 (42.3)
All other acute care facilities³	12 (52.2)	11 (47.8)

Data source: Ontario Stroke Registry, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged <18 years discharged alive from acute care with a final diagnosis of stroke or transient ischemic attack and a modified Rankin score (N=93).

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Includes Children's Hospital of Eastern Ontario, Hamilton Health Sciences Corporation and London Health Sciences Centre.

³ Includes adult facilities (N=23).

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Modified Rankin scores of 0–2 indicate no to slight disability, and scores of 3–5 indicate moderate to severe functional impairment.

Exhibit 6.5.2

Discharge destinations of paediatric stroke or transient ischemic attack patients¹, in Ontario and by sex and facility/type, 2010/11

Group/Subgroup	Patients, n (%)				
	Acute Care Facility	Home	Home with Services	Home Without services	Inpatient Rehabilitation
Ontario	20 (16.5)	81 (66.9)	43 (53.1)	36 (44.4)	20 (16.5)
Female	7 (12.3)	39 (68.4)	19 (48.7)	18 (46.2)	11 (19.3)
Male	13 (20.3)	42 (65.6)	24 (57.1)	18 (42.9)	9 (14.1)
Facility/Type					
Hospital for Sick Children	9 (14.1)	38 (59.4)	29 (76.3)	9 (23.7)	17 (26.6)
All other paediatric facilities ²	**	26 (89.7)	13 (50.0)	13 (50.0)	**
All other acute care facilities ³	10 (35.7)	17 (60.7)	**	14 (82.4)	**

Data source: Ontario Stroke Registry, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged <18 years discharged alive from acute care with a final diagnosis of stroke or transient ischemic attack (N=121).

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Includes Children's Hospital of Eastern Ontario, Hamilton Health Sciences Corporation and London Health Sciences Centre.

³ Includes adult facilities (N=23).

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Home with services includes outpatient rehabilitation services and/or Community Care Access Centre services. Home with services and without services is a subset of patients discharged home.

(3) Cells in which there were no reported/available data are marked with a hyphen (-).

Exhibit 6.5.3

Discharge destinations of paediatric stroke or transient ischemic attack patients¹ by modified Rankin score, in Ontario and by sex and facility/type, 2010/11

Group/Subgroup	Patients with Modified Rankin Score 0–2 (N=43) n (%)				Patients with Modified Rankin Score 3–5 (N=50) n (%)					
	Home	Home with Services	Home Without Services	Referred to Stroke Prevention Clinic ²	Home	Home with Services	Home Without Services	Acute Care Facility	Inpatient Rehabilitation	Referred to Stroke Prevention Clinic ²
Ontario	38 (88.4)	11 (28.9)	26 (68.4)	27 (67.5)	25 (50.0)	19 (76.0)	**	6 (12.0)	19 (38.0)	38 (84.4)
Female	23 (95.8)	7 (30.4)	15 (65.2)	15 (65.2)	10 (41.7)	7 (70.0)	**	**	11 (45.8)	20 (87.0)
Male	15 (78.9)	**	11 (73.3)	12 (70.6)	15 (57.7)	12 (80.0)	**	**	8 (30.8)	18 (81.8)
Facility/Type										
Hospital for Sick Children	15 (93.8)	7 (46.7)	8 (53.3)	11 (68.8)	11 (39.3)	11 (100.0)	-	**	16 (57.1)	24 (85.7)
All other paediatric facilities ³	14 (93.3)	**	10 (71.4)	11 (73.3)	9 (81.8)	8 (88.9)	**	-	**	9 (81.8)
All other acute care facilities ⁴	9 (75.0)	-	8 (88.9)	**	**	-	**	**	**	**

Data source: Ontario Stroke Registry, Ontario Stroke Audit (OSA), 2010/11.

Inclusion criteria: All patients aged <18 years discharged alive from acute care with a final diagnosis of stroke or transient ischemic attack and a modified Rankin score (N=93).

¹ Based on unique patients (i.e., does not include multiple patient-visits).

² Secondary stroke prevention clinic. Excludes patients where secondary prevention services did not apply (e.g., transferred to another acute care facility).

³ Includes Children's Hospital of Eastern Ontario, Hamilton Health Sciences Corporation and London Health Sciences Centre.

⁴ Includes adult acute care facilities (N=23).

** Cell value suppressed for reasons of privacy and confidentiality.

Notes:

(1) Facility-based analysis (i.e., the location of the facility is used to report regional performance).

(2) Home with services includes outpatient rehabilitation services and/or Community Care Access Centre services. Home with services and without services is a subset of patients discharged home.

(3) Cells in which there were no reported/available data are marked with a hyphen (-).

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Appendix A:

Stroke Evaluation and Quality Committee (SEQC) Stroke Care Performance Indicators, 2010–2012

No.	Indicator	Exhibit No.	Report Card Indicator No.
Public Awareness and Patient Education			
1	Proportion of patients who sought medical attention within 3.5 hours ¹ of stroke symptom onset	1.5	1
2	Proportion of suspected/confirmed stroke patients who arrived in ED via EMS	1.4	–
Prevention of Stroke			
3(A)	Annual emergency department admissions of stroke/TIA by stroke type (age- and sex- adjusted)	1.1–1.3	–
3(B)	Annual inpatient admission of stroke/TIA by stroke type (age- and sex- adjusted)	2.1–2.3	2
4(A)	Risk-adjusted in-hospital stroke mortality rates	5.4	–
4(B)	Risk-adjusted 30-day stroke mortality rates	5.5	3
4(C)	Risk-adjusted 1-year stroke mortality rates	5.6	–
5(A)	Proportion of ischemic stroke/TIA patients who were prescribed three recommended secondary prevention medications on discharge from acute care	2.11	–
5(B)	Proportion of eligible stroke/TIA patients with atrial fibrillation who were prescribed or recommended anticoagulant therapy on discharge from acute care	2.12	4
6(A)	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge	2.9	5
6(B)	Proportion of ischemic stroke patients without atrial fibrillation who did not undergo carotid imaging in hospital and had an appointment booked before discharge for carotid imaging as an outpatient	2.9	–
Hyperacute/Acute Stroke Management			
7(A)	Proportion of stroke/TIA patients who received a brain CT/MRI within 24 hours of hospital arrival (ED)	1.6	6
7(B)	Proportion of stroke/TIA patients admitted as inpatients who received a brain CT/MRI before discharge	1.6	–
8(A)	Proportion of eligible patients who received acute thrombolytic therapy (tPA)	1.7	7
8(B)	Door-to-needle time: Median time in minutes from patient arrival in the ED to administration of acute thrombolytic agent	1.7	–
9	Number of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay	2.4	8
10	Proportion of ALC days to total length of stay in acute care (Active LOS + ALC)	2.5	10
11	Proportion of stroke patients with documentation that an initial dysphagia screening was performed during admission to acute care	2.6	9
12	Risk-adjusted in-hospital complication rates for pneumonia among stroke/TIA patients	2.7	–
Stroke Rehabilitation			
13	Number of stroke patients treated on a stroke unit at any time during their inpatient rehabilitation stay	–	–
14	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC)	3.1	15
15(A)	Proportion of stroke patients discharged from acute care who received a referral for outpatient/community rehabilitation	–	12
15(B)	Proportion of stroke inpatient rehabilitation patients who received a referral for outpatient/community rehabilitation	–	–
16(A)	Length of time between stroke onset and admission to stroke inpatient rehabilitation	3.7	13
16(B)	Length of time between stroke onset and admission to first CCAC rehabilitation service	4.1	–
16(C)	Access to rehabilitation therapy: Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation	–	14

No.	Indicator	Exhibit No.	Report Card Indicator No.
Stroke Rehabilitation			
17(A)	Length of stay (days) in rehabilitation stratified by RPG (i.e., stratified by admission RPG/FIM)	3.6	–
17(B)	Mean number of rehabilitation visits provided to CCAC patients	4.2	17
17(C)	FIM efficiency for moderate stroke in inpatient rehabilitation (mean)	3.5	16
18	Inpatient rehabilitation admissions by stroke severity (RPG)	3.3	18
19	AlphaFIM assessments	2.15	–
20	Long-term care and complex continuing care patient profiles	3.8, 3.9	–
System Integration			
21	Time to carotid intervention within six months of hospitalization for stroke or transient ischemic attack	2.10	–
22(A)	Proportion of patients discharged alive from acute care to each discharge destination: 1) Home 2) Home with home care 3) Inpatient rehabilitation 4) Complex continuing care 5) Long-term care	2.8	19 ²
22(B)	Proportion of patients discharged alive from acute care and admitted to inpatient rehabilitation	3.4	11
22(C)	Proportion of patients discharged alive from inpatient rehabilitation to each discharge destination: 1) Home 2) Home with home care 3) Acute care facility 4) Complex continuing care 5) Long-term care	3.1, 3.2, 3.4, 3.7	–
23	Degree of functional ability at discharge	2.12–2.14	–
24(A)	Readmission/revisit for stroke or transient ischemic attack within 30 days following an initial stroke-related event	5.1	–
24(B)	Readmission/revisit for stroke or transient ischemic attack within 90 days following an initial stroke-related event	5.2	–
24(C)	Readmission/revisit for stroke or transient ischemic attack within one year following an initial stroke-related event	–	–
24(D)	Readmission for any cause within 30 days following an initial stroke-related event	5.3	20

¹ A window of 2.5 hours was used in the SEQC 2011 report as the tPA window was not expanded to 3.5 hours until 2009/10.

² The Report Card indicator excludes patients that came from long-term care and complex continuing care facilities, but the exhibit does not.

Note:

Regional and facility data for SEQC Report Card indicators 12 and 14 are not included in this report.

Appendix B:

Stroke Evaluation and Quality Committee (SEQC) Stroke Report Cards, 2010/11

The Stroke Evaluation and Quality Committee (SEQC) has provided a Stroke Report Card for Ontario and each of the 14 Local Health Integration Networks. The report cards provide a snapshot of stroke care in Ontario using a subset of 20 indicators, colour coded to performance as follows:

Green: indicates exemplary performance on the indicator, results are \leq a 5% absolute/relative difference from the benchmark;

Yellow: indicates acceptable performance on the indicator, results are at or above the 50th percentile and are $>$ 5% absolute/relative difference from the benchmark;

Red: indicates poor performance, with outcomes below the 50th percentile;

Grey: indicates the benchmark methodology is still in development.

Each LHIN received a copy of their report card along with a one-page interpretation of the data, as provided by the OSS Regional Director and steering committee. The interpretation page outlined areas of success within the LHIN and strategies for addressing areas of poor performance. The LHINs and Regional Directors will work collaboratively to improve stroke care at the LHIN, facility, and individual level.

Ontario Stroke Report Card, 2010/11

Indicator No.	Care Continuum Category	Indicator ¹	Ontario FY 2010/11 (2009/10)	Variance Across LHINs (Min-Max)	Provincial Benchmark ²	High Performer ³	
						SubLHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	42.3% (35.3%)	36.0-51.1%	52.0% (41.5%)	Egin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.5 (1.5)	1.3-2.2	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	14.3 (12.3)	11.9-17.9	14.3 (12.3)	Lakeridge Health - Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	72.1% (69.6%)	62.6-80.4%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	78.7% (74.7%)	66.9-88.3%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	89.6% (86.3%)	78.1-97.3%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	32.4% (29.6%)	8.6-51.7%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	38.3% (30.3%)	0.0-70.1%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	64.8% (62.3%)	57.4-88.9%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	32.5% (-)	19.0-42.8%	14.0% (-)	Halton Healthcare Services - Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	30.7% (30.7%)	23.7-38.7%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	5.9% (4.6%)	2.4-16.1%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	10.0 (12.0)	7.0-15.0	7.0 (7.0)	Grey Bruce Health Services - Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	6.3% (-)	0.0-14.4%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.8 (0.7)	0.5-1.1	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	6.1 (6.5)	4.7-7.6	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	31.2% (31.9%)	21.2-39.8%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	9.8% (10.2%)	4.6-13.0%	4.7% (3.6%)	Manitoulin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	8.0 (8.3)	5.6-9.6	8.0 (8.3)	Kingston General Hospital	10

¹ Facility-based analysis (excluding indicators 1, 2, 11, 12 and 19) for patients aged 18-108. Indicators 1, 4-9 and 12 are based on 2010/11 OSA data; otherwise, CHI data. The 2009/10 report card metric is in brackets. Low rates are desired for indicators 2, 3, 10, 13, 15, 19 and 20.

² Provincial benchmarks were calculated using the ABC methodology, except for indicators 3, 15 and 20 where the provincial rate was used; 2009/10 benchmarks are displayed in brackets. For benchmarking methodology, see Weissman et al. *J Eval Clin Pract.* 1999; 5(3):269-81.

³ High-performing acute facilities include only high-volume institutions (those treating more than 100 strokes per year). High-performing rehabilitation facilities include sites with moderate to high volumes (those admitting more than 42 stroke patients per year).

Local Health Integration Networks

1 Erie St. Clair	4 Hamilton Niagara Haldimand Brant	6 Mississauga Halton	9 Central East	12 North Simcoe Muskoka
2 South West	5 Central West	7 Toronto Central	10 South East	13 North East
3 Waterloo Wellington	8 Central	8 Central	11 Champlain	14 North West

Hospital Service Accountability Agreement indicators, 2010/11

-- Data not available

n/a = Not applicable

Poor Performance¹ Acceptable Performance²
 Exemplary Performance³ Benchmark not available⁴

Erie St. Clair Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						SubLHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	44.8% (43.9%)	43.1–50.8%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.7 (1.9)	1.6–2.0	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	17.9 (10.7)	17.1–25.4	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	70.5% (58.1%)	55.6–100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	81.3% (82.0%)	55.6–100.0%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	88.2% (83.9%)	11.1–96.1%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	27.8% (13.2%)	0.0–40.9%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	61.3% (53.8%)	0.0–87.4%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	59.5% (55.7%)	0.0–100.0%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	27.3% (-)	0.0–42.1%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	38.7% (34.9%)	31.8–52.7%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	2.4% (6.1%)	0.0–4.4%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	9.0 (10.0)	6.0–17.0	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	8.2% (-)	0.0–11.9%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.9 (0.7)	0.7–1.4	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	6.3 (7.8)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	39.8% (35.5%)	14.3–42.2%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	7.7% (9.5%)	4.9–8.6%	4.7% (3.6%)	Manitowlin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	8.3 (9.4)	0.0–10.0	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement indicators, 2010/11

-- Data not available n/a = Not applicable

1 Performance below the 50th percentile.
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 5 Facility-based analysis (excluding indicators 1, 2, 11, 12 and 19) for patients aged 18 to 108. Indicators 1, 4–9 and 12 are based on 2010/11 OSA data; otherwise, CIHI data. The 2009/10 report card metric is in brackets. Low rates are desired for indicators 2, 3, 10, 13, 15, 19 and 20.
 6 Provincial benchmarks were calculated using the ABC methodology, except for indicators 3, 15 and 20 where the provincial rate was used. For benchmarking methodology, see Weisman et al. *J Eval Clin Pract.* 1999; 5(3):269-81.
 7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).



South West Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁶	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						Sub-LHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	51.1% (36.3%)	42.0-67.7%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.5 (1.6)	1.3-1.8	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	15.1 (12.4)	0.0-40.3	14.3 (12.3)	Lakeridge Health - Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	70.1% (60.6%)	0.0-100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	72.8% (68.0%)	0.0-100.0%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	78.1% (71.6%)	0.0-97.1%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	18.9% (27.6%)	0.0-33.3%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	44.6% (36.6%)	0.0-91.9%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	57.4% (60.3%)	0.0-87.8%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	19.0% (-)	0.0-45.9%	14.0% (-)	Haltim Healthcare Services - Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	35.6% (30.4%)	22.9-43.1%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	3.8% (2.0%)	0.0-9.6%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	8.0 (10.0)	6.0-45.0	7.0 (7.0)	Grey Bruce Health Services - Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	7.4% (-)	0.0-16.5%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.9 (0.8)	0.6-3.6	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	5.8 (6.0)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	39.8% (40.1%)	0.0-75.0%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	6.6% (10.1%)	1.5-9.5%	4.7% (3.6%)	Manitowlin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	7.4 (7.9)	0.0-27.9	8.0 (8.3)	Kingston General Hospital	10

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 7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).

Hospital Service Accountability Agreement Indicators, 2010/11

-- Data not available n/a = Not applicable

Poor Performance¹ Acceptable Performance²
 Exemplary Performance³ Benchmark not available⁴

Waterloo Wellington Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						SubLHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke/TIA (per 1,000 population).	44.5% (32.9%)	28.3–49.7%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.4 (1.4)	1.2–1.7	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	15.4 (12.9)	9.8–27.5	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	63.6% (80.3%)	55.4–100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	83.0% (74.9%)	33.3–100.0%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	90.8% (90.1%)	0.0–100.0%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	25.4% (23.5%)	0.0–39.8%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	43.9% (30.2%)	0.0–79.1%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	67.7% (56.7%)	0.0–81.9%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	36.9% (-)	14.5–64.6%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	29.4% (29.5%)	20.5–34.3%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	4.9% (5.2%)	0.0–7.9%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	11.0 (11.0)	9.0–11.0	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	14.4% (-)	4.9–17.9%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.8 (0.7)	0.6–0.9	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	6.9 (7.0)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	27.4% (25.5%)	21.9–72.7%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	13.0% (13.9%)	8.6–15.4%	4.7% (3.6%)	Manitowlin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	6.6 (7.3)	0.0–10.9	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement indicators, 2010/11

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 7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).



Hamilton Niagara Haldimand Brant Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						Sub-LHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	40.9% (38.2%)	34.2-61.6%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.6 (1.5)	1.1-3.6	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	15.8 (13.3)	7.4-29.1	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	62.6% (63.7%)	0.0-100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	66.9% (68.5%)	0.0-81.8%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	87.2% (86.5%)	0.0-96.0%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	31.8% (32.7%)	0.0-56.6%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	25.4% (16.5%)	0.0-63.5%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	58.4% (57.9%)	0.0-84.4%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	35.9% (-)	0.0-60.4%	14.0% (-)	Haltom Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	32.6% (29.3%)	0.0-64.7%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	6.2% (6.1%)	0.0-19.8%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	11.0 (11.0)	7.0-13.0	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	5.4% (-)	0.0-18.3%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.9 (0.9)	0.6-1.5	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	5.5 (5.9)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	35.5% (37.8%)	0.0-46.2%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	12.1% (11.8%)	0.0-20.7%	4.7% (3.6%)	Manitowlin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	7.5 (8.4)	0.0-16.6	8.0 (8.3)	Kingston General Hospital	10

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6 Provincial benchmarks were calculated using the ABC methodology, except for indicators 3, 15 and 20 where the provincial rate was used. For benchmarking methodology, see Weissman et al. / Eval Clin Pract. 1998; 5(3):269-81.
7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).

Hospital Service Accountability Agreement Indicators, 2010/11

-- Data not available n/a = Not applicable

Central West Local Health Integration Network

Poor Performance¹
 Acceptable Performance²
Exemplary Performance³
 Benchmark not available⁴

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						SubLHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	41.7% (24.6%)	33.8–43.1%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.6 (1.5)	1.4–2.0	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	12.5 (11.1)	11.1–15.9	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	73.1% (93.1%)	58.3–86.7%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	88.3% (84.7%)	82.5–93.9%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	97.3% (93.8%)	96.6–97.5%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	8.6% (0.0%)	0.0–18.2%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	0.0% (0.0%)	0.0–0.0%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	64.0% (69.1%)	55.6–70.9%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	29.9% (-)	15.1–35.7%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	25.2% (25.2%)	22.0–33.3%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	8.9% (0.0%)	0.0–25.5%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	15.0 (15.0)	12.0–19.0	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	0.0% (-)	0.0–0.2%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.5 (0.4)	0.0–0.5	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	7.6 (7.9)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	21.2% (16.5%)	15.1–61.5%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	9.2% (13.9%)	5.6–22.8%	4.7% (3.6%)	Manitoulin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	8.3 (9.7)	7.7–9.4	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement indicators, 2010/11

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 7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).



Mississauga Halton Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						Sub-LHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	40.9% (36.5%)	35.9-49.2%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.3 (1.4)	0.9-1.6	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	14.4 (12.7)	12.0-19.0	14.3 (12.3)	Lakeridge Health - Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	72.9% (86.9%)	57.1-100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	82.9% (82.1%)	61.5-90.5%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	95.1% (93.8%)	66.7-97.3%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	51.7% (41.0%)	0.0-64.0%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	40.2% (42.0%)	0.0-68.1%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	70.2% (59.5%)	60.0-71.8%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	24.6% (-)	5.0-40.7%	14.0% (-)	Halton Healthcare Services - Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	23.7% (34.8%)	6.3-33.2%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	6.5% (4.0%)	0.0-11.3%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	8.0 (8.0)	8.0-11.0	7.0 (7.0)	Grey Bruce Health Services - Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	0.3% (-)	0.0-1.9%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	1.0 (1.1)	0.7-1.0	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	5.8 (6.6)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	36.3% (39.0%)	32.4-48.8%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	10.8% (8.0%)	8.0-21.2%	4.7% (3.6%)	Manitowlin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	8.8 (8.4)	4.8-9.6	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement Indicators, 2010/11

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 6 Provincial benchmarks were calculated using the ABC methodology, except for indicators 3, 15 and 20 where the provincial rate was used. For benchmarking methodology, see Weissman et al. / Eval Clin Pract. 1998; 5(3):269-81.
 7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).

Poor Performance¹ Acceptable Performance²
 Exemplary Performance³ Benchmark not available⁴

Toronto Central Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						SubLHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	38.1% (34.3%)	31.8–45.1%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.4 (1.4)	1.1–1.5	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	12.7 (12.1)	9.2–17.0	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	73.1% (71.2%)	60.0–78.8%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	87.4% (76.1%)	75.9–94.6%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	97.1% (95.8%)	95.9–100.0%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	45.5% (41.5%)	0.0–51.2%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	35.8% (35.3%)	0.0–57.7%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	69.6% (63.9%)	54.3–81.6%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	28.8% (-)	11.6–58.1%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	31.4% (29.0%)	25.0–35.9%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	5.2% (3.1%)	1.8–9.2%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	13.0 (14.0)	11.0–15.0	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	7.8% (-)	0.0–12.3%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.6 (0.5)	0.4–0.7	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	4.7 (5.5)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	21.8% (19.8%)	4.2–26.8%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	10.5% (11.8%)	7.4–17.5%	4.7% (3.6%)	Manitoulin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	9.3 (7.4)	0.0–12.9	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement indicators, 2010/11

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Central Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						Sub-LHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	36.0% (24.9%)	27.3–46.9%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.3 (1.3)	1.0–1.7	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	14.2 (10.7)	10.7–23.8	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	78.3% (72.0%)	33.3–87.5%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	82.4% (83.8%)	62.5–100.0%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	94.2% (93.4%)	75.0–98.3%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	23.6% (24.5%)	0.0–52.4%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	40.5% (4.9%)	0.0–68.3%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	58.7% (59.0%)	31.8–86.5%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	38.1% (-)	21.1–49.6%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	24.8% (28.4%)	16.3–38.7%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	8.2% (4.4%)	4.3–14.8%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	10.0 (11.0)	8.0–22.0	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	0.7% (-)	0.0–1.4%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.7 (0.8)	0.6–1.7	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	6.5 (7.0)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	22.4% (31.9%)	9.5–80.0%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	12.8% (10.4%)	7.5–19.4%	4.7% (3.6%)	Manitowlin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	8.6 (9.8)	6.5–11.6	8.0 (8.3)	Kingston General Hospital	10

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7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).

Hospital Service Accountability Agreement Indicators, 2010/11

-- Data not available n/a = Not applicable

Central East Local Health Integration Network

Poor Performance¹ Acceptable Performance²
 Exemplary Performance³ Benchmark not available⁴

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						SubLHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	39.0% (30.7%)	35.4–43.9%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.4 (1.4)	1.3–1.4	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	13.8 (12.4)	5.3–20.7	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	75.4% (59.2%)	41.7–100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	73.1% (69.7%)	16.7–100.0%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	88.2% (83.2%)	22.2–97.5%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	36.8% (22.6%)	0.0–56.6%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	28.4% (16.3%)	0.0–69.9%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	68.3% (56.9%)	16.7–77.7%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	32.5% (-)	0.0–49.2%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	33.4% (32.9%)	23.7–42.4%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	4.7% (3.0%)	3.4–6.0%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	7.0 (9.0)	6.0–12.0	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	3.7% (-)	0.0–17.7%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	1.1 (0.9)	0.8–1.3	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	6.4 (6.2)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	36.1% (34.7%)	21.6–47.4%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	8.7% (10.4%)	6.1–11.5%	4.7% (3.6%)	Manitoulin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	7.5 (7.8)	0.0–29.3	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement indicators, 2010/11

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 7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).



South East Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						Sub-LHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	37.0% (39.9%)	23.0-49.4%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.5 (1.4)	1.0-2.1	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	17.8 (13.5)	0.0-23.3	14.3 (12.3)	Lakeridge Health - Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	71.5% (74.9%)	50.0-100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	78.7% (90.5%)	33.3-100.0%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	81.9% (72.8%)	0.0-96.4%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	43.9% (29.9%)	0.0-60.7%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	47.3% (46.1%)	0.0-76.1%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	57.6% (62.6%)	0.0-71.4%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	34.1% (-)	0.0-40.6%	14.0% (-)	Halton Healthcare Services - Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	29.4% (28.4%)	0.0-60.0%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	4.6% (9.7%)	0.0-27.3%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	13.0 (13.0)	11.0-16.5	7.0 (7.0)	Grey Bruce Health Services - Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	6.9% (-)	2.1-12.1%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.7 (0.6)	0.5-0.9	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	6.7 (6.2)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	36.7% (30.2%)	33.3-50.0%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	11.2% (10.2%)	0.0-54.5%	4.7% (3.6%)	Manitowlin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	5.6 (7.9)	3.2-12.1	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement Indicators, 2010/11

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 7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).

Poor Performance¹ Acceptable Performance²
 Exemplary Performance³ Benchmark not available⁴

Champlain Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						SubLHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	48.4% (39.9%)	42.3–57.8%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.3 (1.2)	1.0–2.3	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	15.3 (12.3)	0.0–63.6	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	80.4% (80.7%)	33.3–100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	78.6% (71.5%)	0.0–100.0%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	92.8% (89.9%)	16.7–98.7%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	31.6% (34.2%)	0.0–47.4%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	52.1% (42.0%)	0.0–87.3%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	67.0% (72.5%)	0.0–88.2%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	36.7% (-)	0.0–72.6%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	30.2% (30.9%)	12.5–49.5%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	3.6% (6.4%)	2.0–7.5%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	13.0 (16.0)	7.0–60.0	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	5.8% (-)	0.0–49.6%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.7 (0.6)	0.1–1.4	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	5.3 (6.1)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	25.9% (25.5%)	0.0–66.7%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	11.6% (10.4%)	2.9–19.3%	4.7% (3.6%)	Manitoulin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	7.3 (7.0)	0.0–12.4	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement indicators, 2010/11

-- Data not available n/a = Not applicable

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 3 Benchmark achieved or performance within 5% absolute/relative difference from the benchmark.
 4 Data not available or benchmark under development.
 5 Facility-based analysis (excluding indicators 1, 2, 11, 12 and 19) for patients aged 18 to 108. Indicators 1, 4–9 and 12 are based on 2010/11 OSA data; otherwise, CHH data. The 2009/10 report card metric is in brackets. Low rates are desired for indicators 2, 3, 10, 13, 15, 19 and 20.
 6 Provincial benchmarks were calculated using the ABC methodology, except for indicators 3, 15 and 20 where the provincial rate was used. For benchmarking methodology, see Weisman et al. *J Eval Clin Pract.* 1999; 5(3):269-81.
 7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).



North Simcoe Muskoka Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						Sub-LHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	41.9% (36.4%)	29.8–67.6%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	1.6 (1.6)	1.4–1.9	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	14.0 (11.2)	10.2–24.6	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	71.9% (60.1%)	55.8–100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	67.6% (51.1%)	30.8–100.0%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	89.9% (82.5%)	76.9–97.2%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	29.1% (37.9%)	0.0–66.7%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	22.4% (24.5%)	0.0–58.4%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	72.9% (75.7%)	45.5–88.2%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	34.0% (-)	19.0–47.8%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	27.9% (32.8%)	15.0–33.5%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	5.7% (3.4%)	0.0–13.1%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	8.0 (14.0)	6.0–11.5	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	4.9% (-)	1.2–7.9%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	1.0 (0.9)	0.8–1.6	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	6.1 (6.5)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	36.6% (39.4%)	17.6–54.5%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	7.6% (8.7%)	5.6–15.5%	4.7% (3.6%)	Manitowlin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	8.7 (9.2)	2.3–12.3	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement Indicators, 2010/11

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 6 Provincial benchmarks were calculated using the ABC methodology, except for indicators 3, 15 and 20 where the provincial rate was used. For benchmarking methodology, see Weissman et al. *J Eval Clin Pract.* 1998; 5(3):269-81.
 7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).

North East Local Health Integration Network

Poor Performance¹
Acceptable Performance²
Exemplary Performance³
Benchmark not available⁴

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						SubLHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	46.4% (42.7%)	0.0-51.9%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	2.0 (2.1)	1.7-3.7	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	17.0 (13.4)	0.0-50.9	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	75.4% (59.6%)	48.4-100.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	84.5% (64.8%)	0.0-100.0%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	80.0% (78.2%)	0.0-94.5%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	25.7% (17.3%)	0.0-75.0%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	41.4% (33.0%)	0.0-90.0%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	64.8% (57.1%)	0.0-100.0%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	37.4% (-)	0.0-70.2%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	32.1% (28.8%)	14.7-40.7%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	9.8% (6.3%)	0.0-22.7%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	12.0 (13.0)	5.0-20.5	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	10.2% (-)	1.6-12.8%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.6 (0.6)	0.6-1.3	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	6.4 (7.6)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	27.2% (38.5%)	22.2-42.9%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	4.6% (4.4%)	0.0-6.6%	4.7% (3.6%)	Manitoulin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	9.2 (8.3)	0.0-32.3	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement indicators, 2010/11

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6 Provincial benchmarks were calculated using the ABC methodology, except for indicators 3, 15 and 20 where the provincial rate was used. For benchmarking methodology, see Weisman et al. *J Eval Clin Pract.* 1999; 5(3):269-81.
7 High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).

Poor Performance¹ Acceptable Performance²
 Exemplary Performance³ Benchmark not available⁴

North West Local Health Integration Network

Indicator No.	Care Continuum Category	Indicator ⁵	LHIN FY 2010/11 (2009/10)	Variance Within LHIN (Min-Max)	Provincial Benchmark ⁶	High Performer ⁷	
						Sub-LHIN/Facility	LHIN
1	Public awareness and patient education	Proportion of patients who arrived at ED less than 3.5 hours from stroke symptom onset.	43.7% (30.3%)	29.6–50.0%	52.0% (41.5%)	Elgin SubLHIN	2, 11
2	Prevention of stroke	Annual age- and sex-adjusted inpatient admission rate for stroke/TIA (per 1,000 population).	2.2 (2.3)	2.1–2.6	1.1 (1.1)	Northwest Mississauga SubLHIN	None
3	Prevention of stroke	Risk-adjusted stroke/TIA mortality rate at 30 days (per 100 patients).	11.9 (10.5)	0.0–30.6	14.3 (12.3)	Lakeridge Health – Bowmanville Site	7
4	Prevention of stroke	Proportion of ischemic stroke/TIA patients with atrial fibrillation prescribed or recommended anticoagulant therapy on discharge from acute care.	72.2% (85.2%)	50.0–75.0%	86.0% (93.6%)	Queensway-Carleton Hospital	None
5	Prevention of stroke	Proportion of ischemic stroke patients without atrial fibrillation who received carotid imaging prior to hospital discharge.	85.4% (73.1%)	0.0–93.5%	92.8% (92.5%)	Markham Stouffville Hospital	5
6	Acute stroke management	Proportion of suspected stroke/TIA patients who received a brain CT/MRI within 24 hours of arrival at ED.	91.0% (81.1%)	0.0–95.3%	97.7% (97.7%)	Cambridge Memorial Hospital	5, 7
7	Acute stroke management	Proportion of ischemic stroke patients who arrived at ED less than 3.5 hours from symptom onset and received acute thrombolytic therapy (tPA) (excluding those with contraindications).	31.5% (11.0%)	0.0–100.0%	61.2% (58.9%)	Trillium Health Centre	None
8	Acute stroke management	Proportion of stroke/TIA patients treated on a stroke unit at any time during their inpatient stay.	70.1% (66.7%)	0.0–87.8%	87.5% (77.3%)	North Bay General Hospital	None
9	Acute stroke management	Proportion of stroke (excluding TIA) patients with a documented initial dysphagia screening performed during admission to acute care.	88.9% (88.3%)	50.0–96.6%	83.7% (87.8%)	Thunder Bay Regional Health Sciences Centre	14
10	Acute stroke management	Proportion of ALC days to total length of stay in acute care.	42.8% (-)	0.0–95.7%	14.0% (-)	Halton Healthcare Services – Oakville Site	2
11	Acute stroke management	Proportion of acute stroke (excluding TIA) patients discharged from acute care and admitted to inpatient rehabilitation.	35.1% (37.6%)	14.8–48.0%	42.3% (40.7%)	Chatham-Kent SubLHIN	1
12	Stroke rehabilitation	Proportion of stroke (excluding TIA) patients discharged from acute care who received a referral for outpatient rehabilitation.	16.1% (7.0%)	8.2–23.5%	12.1% (13.2%)	Burlington SubLHIN	14, 13
13	Stroke rehabilitation	Median number of days between stroke (excluding TIA) onset and admission to stroke inpatient rehabilitation (RCG-1 and RCG-2).	15.0 (14.0)	15.0–15.0	7.0 (7.0)	Grey Bruce Health Services – Owen Sound Site	9
14	Stroke rehabilitation	Rehabilitation therapy staff/bed ratio for inpatient stroke rehabilitation.	-	-	-	-	-
15	Stroke rehabilitation	Proportion of ALC days to total length of stay in inpatient rehabilitation (Active + ALC) (RCG-1).	7.5% (-)	7.5–7.5%	6.3% (-)	Trillium Health Centre	6
16	Stroke rehabilitation	Median FIM efficiency for moderate stroke in inpatient rehabilitation (RCG-1).	0.7 (0.7)	0.7–0.7	1.1 (1.2)	Royal Victoria Hospital	9
17	Stroke rehabilitation	Mean number of CCAC visits provided to stroke/TIA patients in 2008/09 and 2009/10.	4.8 (5.1)	n/a	6.8 (7.6)	n/a	5, 3
18	Stroke rehabilitation	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG = 1100 or 1110) (RCG-1).	29.6% (31.5%)	29.6–29.6%	46.9% (49.4%)	Royal Victoria Hospital	None
19	Re-integration	Proportion of stroke/TIA patients discharged from acute care to LTC/CCC (excluding patients originating from LTC/CCC).	6.6% (5.4%)	2.9–7.8%	4.7% (3.6%)	Manitowlin-Sudbury SubLHIN	13
20	Re-integration	Age- and sex-adjusted readmission rate at 30 days for patients with stroke/TIA for all diagnoses (per 100 patients).	9.6 (10.0)	0.0–40.7	8.0 (8.3)	Kingston General Hospital	10

Hospital Service Accountability Agreement Indicators, 2010/11

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³ Benchmark achieved or performance within 5% absolute/relative difference from the benchmark.
⁴ Data not available or benchmark under development.
⁵ Facility-based analysis (excluding indicators 1, 2, 11, 12 and 19) for patients aged 18 to 108; indicators 1, 4–9 and 12 are based on 2010/11 OSA data; otherwise, CHI data. The 2009/10 report card metric is in brackets. Low rates are desired for indicators 2, 3, 10, 13, 15, 19 and 20.
⁶ Provincial benchmarks were calculated using the ABC methodology, except for indicators 3, 15 and 20 where the provincial rate was used. For benchmarking methodology, see Weissman et al. *J Eval Clin Pract.* 1998; 5(3):269-81.
⁷ High-performing acute sites include high-volume institutions (treating more than 100 strokes per year). High-performing rehabilitation sites include those with moderate volumes (admitting more than 42 stroke patients per year).

Appendix C: ICD-10-CA Codes Used in the Report

Adult ICD-10-CA codes

Category	Code
Stroke Type	
Transient ischemic attack	G45 (excl. G45.4)
Acute stroke	H34.1, I60 (excl. I60.8), I61, I63 (excl. I63.6), I64
Subarachnoid hemorrhage	I60 (excl. I60.8)
Intracerebral hemorrhage	I61
Ischemic stroke	I63 (excl. I63.6), I64, H34.1
Stroke type not specified/undetermined	I64
Inhospital Complications	
Pneumonia	J10.0, J11.0, J12.0–J12.2, J12.8, J12.9, J13, J14, J15.0–J15.9, J16.0, J16.8, J17.0–J17.3, J17.8, J18.0–J18.2, J18.8, J18.9
Vascular Surgery	
Carotid stenting	1JE.50
Carotid endarterectomy	1JE.57, 1JE.87

Ontario Stroke Audit ICD-10-CA codes

Category	Code
Age Group	
Adult	I60 (excl. I60.8), I61, I63 (excl. I63.6), I64, G45 (excl. G45.4), H34.1
Paediatric	I60, I61 (excl. I61.7), I62, I63, I64, I65, I66, I67.0, I67.5–I67.9, I69, G08, G45.9, G81, G97, R47.0, R47.1

Appendix D: Institutional Resources for Stroke¹ in Ontario, 2010/11

Legend
Regional stroke centre: A facility that meets all the requirements of a district stroke centre, plus neurosurgical facilities and interventional radiology.
Enhanced district stroke centre: A facility established to provide leadership integration in the regions of Ontario where the designation of a regional stroke centre cannot be met. Enhanced district stroke centres were established after the 2002/03 audit had been completed. For the purposes of analysis, calculations for these centres were included in the district stroke centre designation.
District stroke centre: A facility with written stroke protocols (e.g., transport and triage, thrombolytic therapy, neuroimaging), clinicians with stroke expertise, and linkages to rehabilitation and secondary prevention.
Non-designated: An acute care hospital that does not fit the definition of a district or regional stroke centre.

Local Health Integration Network/ Institution (Site)	Location	OSS Region	Stroke Unit	CT Scanner	MRI	Telestroke Centre ²	Stroke Prevention Clinic ³	AlphaFIM
Ontario			37*	97	58	17	45**	86
1. Erie St. Clair								
Bluewater Health (Petrolia)	Petrolia	Southwest						
Bluewater Health (Sarnia)	Sarnia	Southwest	X	X	X		X	X
Chatham Kent Health Alliance (Chatham)	Chatham	Southwest	X	X	X		X	X ⁴
Chatham Kent Health Alliance (Sydenham)	Wallaceburg	Southwest						X
Hotel-Dieu Grace Hospital (St. Joseph's) ¹¹	Windsor	Southwest	X	X	X		X	X
Leamington District Memorial Hospital	Leamington	Southwest		X				
Windsor Regional Hospital (Western)	Windsor	Southwest	X ^{5,6}	X	X			X ⁴
2. South West								
Alexandra Hospital	Ingersoll	Southwest						X ⁴
Alexandra Marine & General Hospital	Goderich	Southwest		X		X		X
Clinton Public Hospital	Clinton	Southwest						
Four Counties Health Services Corp.	Newbury	Southwest						X
Grey Bruce Health Services (Lion's Head) ⁷	Lion's Head	Southwest						X
Grey Bruce Health Services (Markdale)	Markdale	Southwest						X
Grey Bruce Health Services (Meaford)	Meaford	Southwest						X
Grey Bruce Health Services (Owen Sound)	Owen Sound	Southwest		X	X		X	X ⁴
Grey Bruce Health Services (Southampton)	Southampton	Southwest						X ⁴
Grey Bruce Health Services (Warton)	Warton	Southwest						X
Hanover & District Hospital	Hanover	Southwest						
Listowel Memorial Hospital	Listowel	Southwest						
London Health Sciences Centre (University)	London	Southwest	X	X	X		X	
London Health Sciences Centre (Victoria)	London	Southwest		X	X			
Seaforth Community Hospital	Seaforth	Southwest						
South Bruce Grey Health Centre (Chesley)	Chesley	Southwest						X ⁴
South Bruce Grey Health Centre (Durham)	Durham	Southwest						X ⁴
South Bruce Grey Health Centre (Kincardine)	Kincardine	Southwest						
South Bruce Grey Health Centre (Walkerton)	Walkerton	Southwest		X				
South Huron Hospital	Exeter	Southwest						
St. Joseph's Health Care (London)	London	Southwest		X	X			
St. Marys Memorial Hospital	St. Marys	Southwest						
St. Thomas-Elgin General Hospital	St. Thomas	Southwest		X				X ⁴
Stratford General Hospital	Stratford	Southwest		X			X	X ⁴
Strathroy Middlesex General Hospital	Strathroy	Southwest		X				X

Local Health Integration Network/ Institution (Site)	Location	OSS Region	Stroke Unit	CT Scanner	MRI	Telestroke Centre ²	Stroke Prevention Clinic ³	AlphaFIM
Tillsonburg District Memorial Hospital	Tillsonburg	Southwest		X				X
Wingham & District Hospital	Wingham	Southwest						
Woodstock General Hospital	Woodstock	Southwest		X	X			X
3. Waterloo Wellington								
Cambridge Memorial Hospital	Cambridge	Central South		X				
Grand River Hospital Corp. (Waterloo)	Kitchener	Central South	X	X	X		X	X
Groves Memorial Community Hospital	Fergus	Central South						
Guelph General Hospital	Guelph	Central South		X	X			
North Wellington Health Care (Mount Forest)	Mount Forest	Central South						
North Wellington Health Care (Palmerston)	Palmerston	Central South						
St. Mary's General Hospital	Kitchener	Central South		X				
4. Hamilton Niagara Haldimand Brant								
Brant Community Health Care System (Brantford)	Brantford	Central South	X ⁶	X	X	X	X	X ⁴
Haldimand War Memorial Hospital	Dunnville	Central South						
Hamilton Health Sciences Corp. (General)	Hamilton	Central South	X	X	X		X	X ⁴
Hamilton Health Sciences Corp. (Juravinski)	Hamilton	Central South		X	X			X
Hamilton Health Sciences Corp. (McMaster)	Hamilton	Central South		X	X			
Joseph Brant Memorial Hospital	Burlington	Central South	X ⁶	X	X			X ⁴
Niagara Health System (Douglas) ⁷	Fort Erie	Central South						
Niagara Health System (Greater Niagara)	Niagara Falls	Central South	X	X	X	X	X	X ⁴
Niagara Health System (Port Colborne) ⁷	Port Colborne	Central South						
Niagara Health System (St. Catharines)	St. Catharines	Central South		X	X			X ⁴
Niagara Health System (Welland County)	Welland	Central South		X				
Norfolk General Hospital	Simcoe	Central South		X			X	X ⁴
St. Joseph's Health Care System (Hamilton)	Hamilton	Central South		X	X		X	X
West Haldimand General Hospital	Hagersville	Central South						
West Lincoln Memorial Hospital	Grimsby	Central South						
5. Central West								
Headwaters Health Care Centre (Dufferin)	Orangeville	West GTA		X				X
William Osler Health Centre (Brampton)	Brampton	West GTA	X ⁶	X	X		X ⁶	
William Osler Health Centre (Etobicoke)	Etobicoke	West GTA	X ⁶	X	X		X ⁶	
6. Mississauga Halton								
Halton Healthcare Services Corp. (Georgetown)	Georgetown	West GTA						X ⁴
Halton Healthcare Services Corp. (Milton)	Milton	West GTA		X				X ⁴
Halton Healthcare Services Corp. (Oakville)	Oakville	West GTA		X	X			X ⁴
Credit Valley Hospital	Mississauga	West GTA	X ⁶	X	X			X
Trillium Health Centre (Mississauga)	Mississauga	West GTA	X	X	X		X	X ⁴
7. Toronto Central								
Hospital for Sick Children	Toronto	Toronto West		X	X		X ⁹	
Mount Sinai Hospital	Toronto	Toronto West		X	X			
St. Joseph's Health Centre	Toronto	Toronto West		X	X			
St. Michael's Hospital	Toronto	Toronto – Southeast	X	X	X		X ⁹	X ⁴
Sunnybrook & Women's College Health Sciences Centre	Toronto	Toronto – North & East	X	X	X		X	X ⁴
Toronto East General Hospital	Toronto	Toronto – Southeast		X	X		X ⁹	

Local Health Integration Network/ Institution (Site)	Location	OSS Region	Stroke Unit	CT Scanner	MRI	Telestroke Centre ²	Stroke Prevention Clinic ³	AlphaFIM
University Health Network (General)	Toronto	Toronto West		X	X			X
University Health Network (Toronto Western)	Toronto	Toronto West	X ⁶	X	X		X	X ⁴
8. Central								
Humber River Regional Hospital (Humber Memorial)	Weston	Toronto West	X ⁶	X				X
Humber River Regional Hospital (York-Finch)	Downsview	Toronto West	X	X	X		X ⁹	
North York General Hospital	Toronto	Toronto – North & East	X	X	X		X ⁹	X ⁴
Southlake Regional Health Centre	Newmarket	Central East	X	X	X		X ⁹	X
Stevenson Memorial Hospital	Alliston (New Tecumseth Township)	Central East		X				X ⁴
York Central Hospital	Richmond Hill	Central East	X	X	X		X ⁹	X ⁴
9. Central East								
Campbellford Memorial Hospital	Campbellford	Central East		X				X
Haliburton Highlands Health Services Corp. (Haliburton)	Haliburton	Central East						
Lakeridge Health Corp. (Bowmanville)	Clarington	Central East		X				X
Lakeridge Health Corp. (Oshawa)	Oshawa	Central East	X	X	X	X	X	X ⁴
Lakeridge Health Corp. (Port Perry)	Port Perry	Central East						X ⁴
Markham Stouffville Hospital (Markham)	Markham	Central East		X	X		X ⁹	
Markham Stouffville Hospital (Uxbridge)	Uxbridge	Central East		X	X			
Northumberland Hills Hospital	Cobourg	Central East		X	X			
Peterborough Regional Health Centre	Peterborough	Central East	X ⁶	X	X	X	X ⁹	X ⁴
Ross Memorial Hospital	Lindsay	Central East		X				X
Rouge Valley Health System (Ajax)	Ajax	Toronto – Southeast		X	X			X
Rouge Valley Health System (Centenary)	Scarborough	Toronto – Southeast		X	X			X
Scarborough Hospital (Birchmount)	Scarborough	Toronto – North & East		X				X
Scarborough Hospital (General)	Scarborough	Toronto – North & East	X	X	X			X ⁴
10. South East								
Brockville General Hospital	Brockville	South East		X			X	
Hotel Dieu Hospital ⁷	Kingston	South East		X				
Kingston General Hospital	Kingston	South East	X	X	X		X	X ⁴
Lennox & Addington County General Hospital	Napanee	South East						X
Perth & Smiths Falls District Hospital (Perth)	Perth	South East		X ¹⁰			X	
Perth & Smiths Falls District Hospital (Smith Falls)	Smith Falls	South East		X ¹⁰				
Quinte Healthcare Corp. (Belleville)	Belleville	South East	X ⁶	X	X	X	X	X ⁴
Quinte Healthcare Corp. (Bancroft)	Bancroft	South East						X
Quinte Healthcare Corp. (Picton)	Picton	South East						X
Quinte Healthcare Corp. (Trenton)	Trenton	South East		X				X
11. Champlain								
Almonte General Hospital	Almonte	East – Champlain						X

Local Health Integration Network/ Institution (Site)	Location	OSS Region	Stroke Unit	CT Scanner	MRI	Telestroke Centre ²	Stroke Prevention Clinic ³	AlphaFIM
Carleton Place & District Memorial Hospital	Carleton Place	East – Champlain						
Children's Hospital of Eastern Ontario	Ottawa	East – Champlain		X	X			
Cornwall Community Hospital (McConnell)	Cornwall	East – Champlain		X		X		X ⁴
Cornwall Community Hospital (Second)	Cornwall	East – Champlain						X
Deep River & District Hospital	Deep River	East – Champlain						
Glengarry Memorial Hospital	Alexandria	East – Champlain	X					X ⁴
Hawkesbury & District General Hospital	Hawkesbury	East – Champlain		X		X	X	
Hôpital Montfort	Ottawa	East – Champlain		X	X			X ⁴
Kemptville District Hospital	Kemptville	East – Champlain						
Pembroke Regional Hospital Inc.	Pembroke	East – Champlain	X	X		X	X	X ⁴
Queensway-Carleton Hospital	Ottawa	East – Champlain		X	X		X ⁹	
Renfrew Victoria Hospital	Renfrew	East – Champlain		X				X
St. Francis Memorial Hospital	Barry's Bay	East – Champlain						
Arnprior & District Memorial Hospital	Arnprior	East – Champlain						
The Ottawa Hospital (Civic)	Ottawa	East – Champlain	X	X	X		X	X ⁴
The Ottawa Hospital (General)	Ottawa	East – Champlain		X	X			X ⁴
Winchester District Memorial Hospital	Winchester	East – Champlain		X				X
12. North Simcoe Muskoka								
Collingwood General & Marine Hospital	Collingwood	Central East		X				X ⁴
Georgian Bay General Hospital	Midland	Central East		X				X
Muskoka Algonquin Healthcare (Huntsville)	Huntsville	Central East		X				X ⁴
Muskoka Algonquin Healthcare (Bracebridge)	Bracebridge	Central East		X				X ⁴
Orillia Soldiers' Memorial Hospital	Orillia	Central East		X	X			X ⁴
Royal Victoria Hospital of Barrie ¹²	Barrie	Central East	X	X	X		X	X ⁴
13. North East								
Anson General Hospital	Iroquois Falls	Northeast						
Bingham Memorial Hospital ⁷	Matheson	Northeast						
Blind River District Health Centre/ Pavillon Santé	Blind River	Northeast						
Englehart & District Hospital ⁷	Englehart	Northeast						
Espanola Regional Hospital & Health Centre ⁷	Espanola	Northeast						
Hornepayne Community Hospital ⁷	Hornepayne	Northeast						
Health Sciences North/Horizon Santé- Nord (Ramsey Lake Health Centre) ¹²	Sudbury	Northeast	X	X	X	X	X	X ⁴
Kirkland & District Hospital	Kirkland Lake	Northeast						
Lady Dunn Health Centre ⁷	Wawa	Northeast						
Lady Minto Hospital	Cochrane	Northeast						

Local Health Integration Network/ Institution (Site)	Location	OSS Region	Stroke Unit	CT Scanner	MRI	Telestroke Centre ²	Stroke Prevention Clinic ³	AlphaFIM
Manitoulin Health Centre (Little Current)	Little Current	Northeast						
Manitoulin Health Centre (Mindemoya)	Mindemoya	Northeast						
Mattawa General Hospital	Mattawa	Northeast						
North Bay Regional Health Centre	North Bay	Northeast	X	X	X	X	X	X ⁴
Hôpital Notre-Dame Hospital	Hearst	Northeast						
Sault Area Hospital (Sault Ste. Marie)	Sault Ste. Marie	Northeast	X	X	X	X	X	X ⁴
Sensenbrenner Hospital	Kapuskasing	Northeast						
Services de santé de Chapleau Health Services ⁷	Chapleau	Northeast						
Smooth Rock Falls Hospital ⁷	Smooth Rock Falls	Northeast						
St. Joseph's General Hospital	Elliot Lake	Northeast						
Temiskaming Hospital	New Liskeard	Northeast		X		X		
Timmins & District General Hospital	Timmins	Northeast	X	X	X	X	X	X ⁴
Weeneebayko Area Health Authority	Moose Factory	Northeast						
West Nipissing General Hospital	Sturgeon Falls	Northeast						
West Parry Sound Health Centre	Parry Sound	Northeast		X				X ⁴
14. North West								
Atikokan General Hospital ⁷	Atikokan	Northwest						
Dryden Regional Health Centre	Dryden	Northwest		X		X		X ⁴
Geraldton District Hospital	Geraldton	Northwest						
Lake-of-the-Woods District Hospital	Kenora	Northwest		X		X	X	X
Manitouwadge General Hospital ⁷	Manitouwadge	Northwest						
McCausland Hospital ⁷	Terrace Bay	Northwest						
Nipigon District Memorial Hospital ⁷	Nipigon	Northwest						
Riverside Health Care Facilities (La Verendrye)	Fort Frances	Northwest		X		X	X	X
Sioux Lookout Meno Ya Win Health Centre (District)	Sioux Lookout	Northwest		X			X	
Red Lake Margaret Cochenour Memorial Hospital	Red Lake	Northwest						
Thunder Bay Regional Health Sciences Centre	Thunder Bay	Northwest	X	X	X		X	X ⁴
Wilson Memorial General Hospital	Marathon	Northwest					X	

Notes:

¹ Based on provincial hospital resources as of November 2011.

² A funded Ontario Telemedicine Network site.

³ A Ministry of Health and Long-Term Care-designated secondary prevention clinic (SPC).

⁴ Hospital with AlphaFIM documentation found in charts at time of OSA abstraction.

⁵ For rehabilitation patients only.

⁶ Hospital does not have a designated stroke unit as defined by best practice standards but has clustered beds for stroke patients. All were included in the admission to stroke unit analysis.

⁷ Hospital not included in the 2010/11 Ontario Stroke Audit.

⁸ Cardiovascular clinic; not specific to stroke.

⁹ Stroke prevention clinic not funded by the Ontario Ministry of Health and Long-Term Care. The Peterborough Vascular Health Network (an SPC) is not affiliated with Peterborough Regional Health Centre; the Humber River SPC located at York-Finch serves the Church site.

¹⁰ CT scanner shared between the Perth and Smith Falls sites.

¹¹ Analyzed as a district stroke centre.

¹² For OSA exhibits, analyzed as a district stroke centre in 2002/03, 2004/05 and 2008/09 and as a regional stroke centre in 2010/11. For administrative exhibits, analyzed as a regional stroke centre for all years.

* Includes institutions identified in footnotes 5 and 6.

**Includes institutions identified in footnotes 8 and 9.

Appendix E: Rehabilitation Reporting System Coding for Discharge Destination

Discharge Disposition	Coding Algorithm
Home without services	dliveset = 1
Home with services	dliveset = 2
Other community services	dliveset = 3, 4, 6, 7
Long-term care facility	dliveset = 5
Acute care facility	referto = 02, 03
Deceased	dreason = 8
Unavailable/unknown	dliveset = -50, -70

Appendix F:

Designated Rehabilitation Beds/Facilities by Ontario Stroke System Region, 2003–2010

OSS Region	NRS Facility Number/Type	Institution (Site)
Central East	2771	Southlake Regional Health Centre
	3507	Royal Victoria Hospital of Barrie
	3617	Peterborough Regional Health Centre
	3858	York Central Hospital
	4705	Georgian Bay General Hospital (Penetanguishene)
	3934	Lakeridge Health (Oshawa)
	4307	Markham Stouffville Hospital
	4450	Northumberland Hills Hospital
	4483	Ross Memorial Hospital
	4688	Orillia Soldiers' Memorial Hospital
Central South	1912	Grand River Hospital (Freeport)
	3155	St. Joseph's Health Care System (Hamilton)
	3736	Grand River Hospital (Waterloo)
	3778	Joseph Brant Memorial Hospital
	3880	Hamilton Health Sciences (Juravinski, formerly Henderson)
	3881/Freestanding	Hamilton Health Sciences (Chedoke)
	3912	St. Joseph's Health Centre (Guelph)
	4289	St. Mary's General Hospital
	4342	Hamilton Health Sciences (General)
	4385	Guelph General Hospital
	4433	William Osler Health Centre (Georgetown)
	4678	Brant Community Healthcare System (Brantford)
	4595	Hotel Dieu Shaver Health & Rehabilitation Centre
	4711/Freestanding	Hamilton Health Sciences (Regional Rehabilitation Centre)
	4720	Cambridge Memorial Hospital
East – Champlain	3782/Freestanding	Bruyère Continuing Care Inc.
	4299	Pembroke Regional Hospital
	4329	The Ottawa Hospital (Civic)
	4429/Freestanding	The Ottawa Hospital (Rehabilitation Centre)
	4461	Hôpital Montfort
	4470	Cornwall Community Hospital (General)
	4584	Queensway-Carleton Hospital
	4695	The Ottawa Hospital (General)
4722	Glengarry Memorial Hospital	
Northeast	3413	North Bay General Hospital (St. Joseph's)
	3416	Timmins & District General Hospital
	4061/Freestanding	Health Sciences North [formerly Sudbury Regional Hospital]
	4409	Sault Area Hospital
	4592	West Parry Sound Health Centre
Northwest	3891/Freestanding	St. Joseph's Care Group
South East	2223/Freestanding	Providence Care Centre (St. Mary's of the Lake)
	3990	Quinte Health Care (Belleville)
	4339	Providence Care Centre (St. Vincent)
	4369	Kingston General Hospital
	4647	Brockville General Hospital

OSS Region	NRS Facility Number/Type	Institution (Site)
Southwest	3612	Stratford General Hospital
	3846/Freestanding*	Windsor Regional Hospital (Western)
	3884	St. Joseph's Health Care, London – Parkwood Hospital [integrated]
	3916/Freestanding	St. Joseph's Health Care, London – Parkwood Hospital [freestanding]
	3897	Wingham & District Hospital
	3946	Grey Bruce Health Services (Owen Sound)
	4149	Hotel-Dieu Grace Hospital (St. Joseph's)
	4162	St. Thomas-Elgin General Hospital
	4204	Leamington District Memorial Hospital
	4417	Bluewater Health (Sarnia)
	4649	South Huron Hospital
4361	St. Joseph's Health Services Association of Chatham	
Toronto – North and East	1337/Freestanding	St. John's Rehabilitation Hospital
	4155	Scarborough Hospital (General)
	4156	Scarborough Hospital (Grace)
	4273	Sunnybrook Health Sciences Centre
	4335	North York General Hospital (Branson)
	3439/Freestanding	Baycrest Centre for Geriatric Care
Toronto – Southeast	3941	Rouge Valley Health System (Centenary)
	4151	Rouge Valley Health System (Ajax)
	4279	Toronto East General
	1355/Freestanding	Providence Healthcare
	1436	Bridgepoint Hospital
Toronto – West	3950/Freestanding	Toronto Rehabilitation Institute (Hillcrest)
	4366	St. Joseph's Health Centre
	4293	Humber River Regional Hospital
West GTA	1471/Freestanding	West Park Healthcare Centre
	3288	Credit Valley Hospital
	4136	Halton Healthcare Services (Oakville)
	4150	Trillium Health Centre
	4277	William Osler Health System (Etobicoke)
	4684	William Osler Health System (Civic)

* Windsor Regional Hospital is classified as a specialty facility in the National Rehabilitation Reporting System (NRS), but it is not a freestanding inpatient facility.

Notes:

- (1) Assignment of OSS region is based on the geographic location of the facility/corporation.
- (2) Based on fiscal year 2010/11.
- (3) Freestanding is considered "Specialty" in the NRS database.

Appendix G:**Most Frequent 30-Day Readmission Diagnoses among Stroke/TIA Patients Discharged in Ontario, 2007/08–2009/10**

ICD-10-CA Code	Diagnosis	Frequency (%)
I639	Cerebral infarction, unspecified	7.6
I64	Stroke, not specified as haemorrhage or infarction	6.6
G459	Transient cerebral ischaemic attack, unspecified	5.8
N390	Urinary tract infection, site not specified	2.4
I500	Congestive heart failure	2.3
Z515	Palliative care	2.1
I652	Occlusion and stenosis of carotid artery	1.9
I635	Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries	1.8
I638	Other cerebral infarction	1.7
J189	Pneumonia, unspecified	1.6
I480	Atrial fibrillation	1.3
J690	Pneumonitis due to food and vomit	1.2
I619	Intracerebral haemorrhage, unspecified	1.1
R55	Syncope and collapse	1.1
K922	Gastrointestinal haemorrhage, unspecified	1.1
R53	Malaise and fatigue	1.0
A419	Sepsis, unspecified	1.0
N179	Acute renal failure, unspecified	0.9
I634	Cerebral infarction due to embolism of cerebral arteries	0.9
Z751	Person awaiting admission to adequate facility elsewhere	0.9
I632	Cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries	0.9
J440	Chronic obstructive pulmonary disease with acute lower respiratory infection	0.8
R410	Disorientation, unspecified	0.8
F03	Unspecified dementia	0.8
I2149	Acute subendocardial myocardial infarction, unspecified site	0.7
C793	Secondary malignant neoplasm of brain and cerebral meninges	0.7
I620	Subdural haemorrhage (acute) (nontraumatic)	0.7
I269	Pulmonary embolism without mention of acute cor pulmonale	0.6
R074	Chest pain, unspecified	0.6
I609	Subarachnoid haemorrhage, unspecified	0.6
R42	Dizziness and giddiness	0.6
R568	Other and unspecified convulsions	0.6
E860	Dehydration	0.6
I219	Acute myocardial infarction, unspecified	0.5
I100	Benign hypertension	0.5
I2510	Atherosclerotic heart disease of native coronary artery	0.5
F059	Delirium, unspecified	0.5
E871	Hypo-osmolality and hyponatraemia	0.5
R64	Cachexia	0.5
K529	Noninfective gastroenteritis and colitis, unspecified	0.5
S72100	Intertrochanteric fracture, closed	0.5
Z540	Convalescence following surgery	0.5

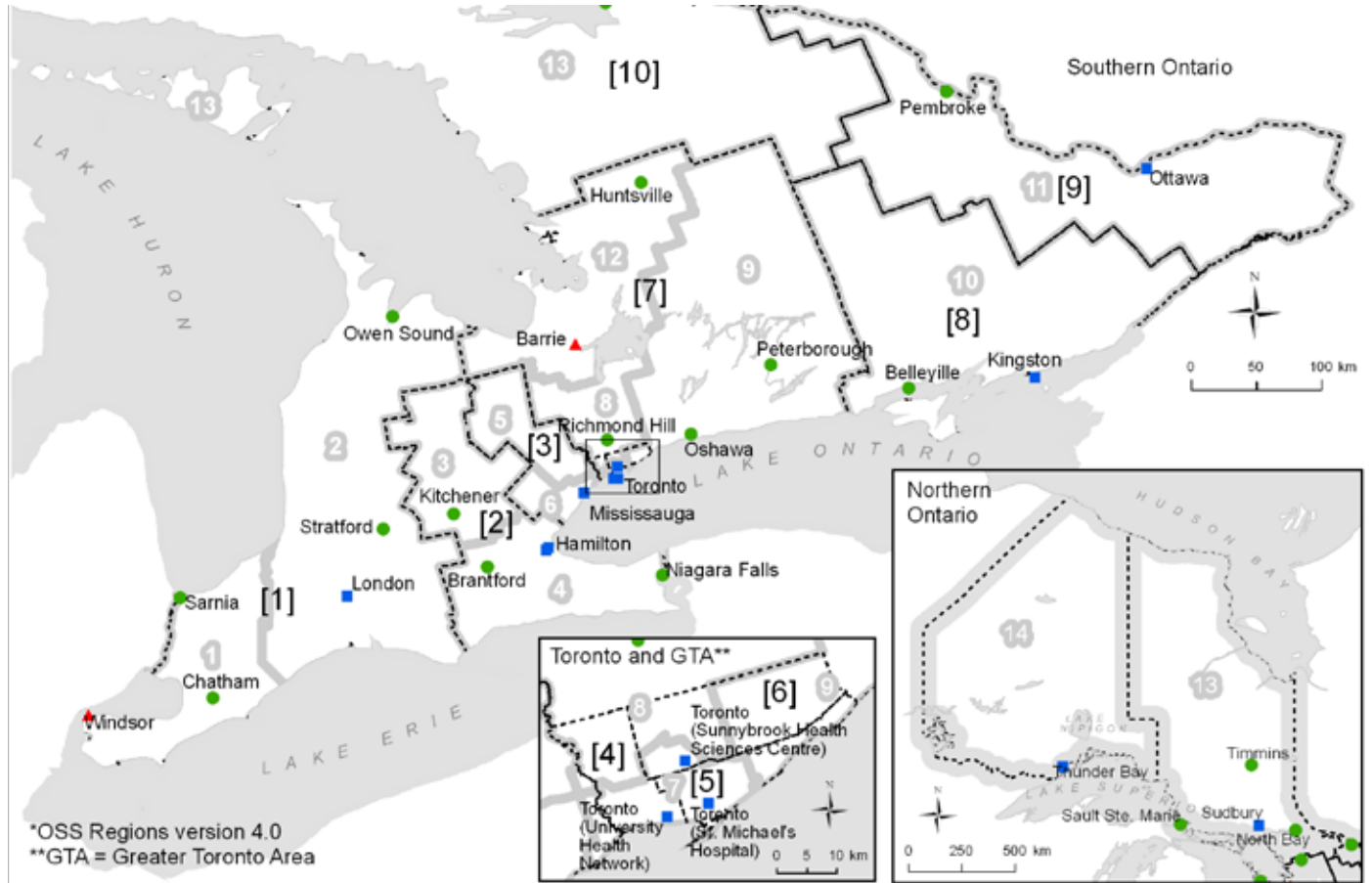
Data source: Canadian Institute for Health Information, Discharge Abstract Database (CIHI-DAD), 2007/08–2009/10.

Inclusion criteria: All patients aged ≥18 years readmitted for any cause to an acute care inpatient setting within 30 days of initial stroke (ischemic or hemorrhagic) or transient ischemic attack event in each year (N=5,582).

Exclusion criteria: Patients with an elective admission or transfer within a facility or between facilities within 24 hours of discharge from either the emergency department or inpatient care.

Appendix H:

Map of LHIN Boundaries, OSS Regions and OSS Stroke Centre Classifications



Local Health Integration Networks (LHINs)	
1. Erie St. Clair	8. Central
2. South West	9. Central East
3. Waterloo Wellington	10. South East
4. Hamilton Niagara Haldimand Brant	11. Champlain
5. Central West	12. North Simcoe Muskoka
6. Mississauga Halton	13. North East
7. Toronto Central	14. North West

— LHIN boundary

OSS Regions		
[1] Southwest	[5] Toronto – Southeast	[9] East – Champlain
[2] Central South	[6] Toronto – North and East	[10] Northeast
[3] West GTA	[7] Central East	[11] Northwest
[4] Toronto – West	[8] South East	

----- OSS boundary

OSS Stroke Centre Classifications	
■	Regional Stroke Centre
●	District Stroke Centre
▲	Enhanced District Stroke Centre

Appendix I: Glossary of Terms

	Term/Acronym	Definition
1.	Academic hospital	University-affiliated facility; member of the Council of Academic Hospitals of Ontario
2.	Acute stroke unit	Specialized, geographically-located hospital unit with a dedicated stroke team and stroke resources
3.	AF	Atrial fibrillation
4.	AlphaFIM	A standardized assessment tool used to evaluate the disability and functional status of patients in acute care 3–5 days following admission for stroke
5.	Alternate level of care (ALC)	An ALC patient is one who has finished the acute care phase of his/her treatment but remains in an acute bed. This classification is invoked when the patient's physician gives an order to change the level of care from acute care and requests a transfer for the patient.
6.	Annual stroke patient volume	Indicates the annual number of hospital separations (inpatient and emergency) for stroke or transient ischemic attack
7.	Charlson score	A comorbidity index score where higher scores indicate more comorbid illness
8.	CCAC	Community Care Access Centre
9.	CCC	Complex continuing care
10.	CNS	Canadian Neurological Scale, designed to assess neurological function in conscious stroke patients. The scale ranges from 0 to 11.5, with a higher score indicating less impairment. A CNS score of 8 or less indicates severe stroke
11.	CSN	Canadian Stroke Network
12.	CSS	Canadian Stroke Strategy (or System)
13.	CT	Computed tomography
14.	District stroke centre	A facility that has written stroke protocols for emergency services, emergency department and acute care, including transport and triage protocols; ability to offer thrombolytic therapy to suitable ischemic stroke patients; timely computed tomography (CT) scanning and expert interpretation; clinicians with stroke expertise; and linkages to rehabilitation and secondary prevention.
15.	ED	Emergency department
16.	Enhanced district stroke centre	A facility established to provide leadership and integration in the regions of Ontario where the designation of regional stroke centre cannot be met. Enhanced district stroke centres were established after the 2002/03 audit had been completed. For the purposes of analysis, calculations for these centres were included in the district stroke centre designation.
17.	GTA	Greater Toronto Area
18.	ICH	Intracerebral hemorrhage
19.	Large community hospital	A hospital that does not qualify as a small hospital, academic hospital, or district or regional stroke centre
20.	Local Health Integration Network (LHIN)	One of 14 not-for-profit corporations established in Ontario by the MOHLTC, each with specific geographic boundaries. Each LHIN is responsible for planning, integrating and funding local health services.

Term/Acronym		Definition
21.	LOS	Length of stay
22.	LSN	Last seen normal; time prior to onset of stroke symptoms
23.	LTC	Long-term care
24.	MOHLTC	Ontario Ministry of Health and Long-Term Care
25.	MRI	Magnetic resonance imaging
26.	Non-designated hospital	An acute care hospital that does not fit the definition of a district or regional stroke centre
27.	OHA	Ontario Hospital Association
28.	OSA	Ontario Stroke Audit
29.	OSN	Ontario Stroke Network; provides provincial leadership and coordination for the OSS
30.	OSS	Ontario Stroke Strategy (or System); a collaborative system of a provider organization and partners who deliver stroke care across the province and care continuum
31.	RAI-MDS	Resident Assessment Instrument–Minimum Data Set; used to assess patients in complex continuing care and long-term care homes
32.	Rankin score	From the Rankin Scale; a measure of functional status after stroke with a range from 0 (no disability) to 6 (death)
33.	Regional stroke centre	A facility that has all the requirements of a district stroke centre plus neurosurgical facilities and interventional radiology
34.	SEQC	Stroke Evaluation and Quality Committee
35.	SPC	Secondary stroke prevention clinic; an ambulatory clinic that aims to reduce recurrent vascular events following an initial stroke
36.	Small community hospital	A facility that generally provides fewer than 3,500 weighted cases, has a referral population of less than 20,000 people, and is the only hospital in its community, as defined by the Joint Policy and Planning Committee
37.	Stroke unit	Specialized, geographically-located hospital unit with a dedicated stroke team and stroke resources
38.	Telestroke	A telemedicine application that provides emergency physicians with immediate access to neurologists with expertise in the assessment and treatment of patients experiencing acute ischemic stroke
39.	TIA	Transient ischemic attack, or “mini-stroke”
40.	tPA	Tissue plasminogen activator
41.	UTD	Unable to determine; based on available data in the patient’s medical records, or on clinical presentation and/or findings

Appendix J:

2010/11 Ontario Stroke Audit Provincial Sample Size by Exhibit

Exhibit ii Ontario Stroke Audit patient characteristics

Table Section	Cohort	Weighted	Sample
Overall	Stroke, transient ischemic attack and patients with uncertain diagnosis	19,570	13,250
Risk factors	Stroke excluding subarachnoid hemorrhage and transient ischemic attack patients	18,290	12,346
Final diagnosis	Stroke, transient ischemic attack and patients with uncertain diagnosis	19,570	13,250
Stroke type	Stroke patients	12,171	8,462

Exhibit 1.5 Number and percentage of adult stroke or transient ischemic attack patients who sought medical attention within the treatment window

Table Section	Cohort	Weighted	Sample
Overall	Stroke, transient ischemic attack and patients with uncertain diagnosis and with a valid postal code	19,387	13,124

Exhibit 1.6 Number and percentage of adult stroke or transient ischemic attack patients who received neuroimaging within 24 hours of presenting to the emergency department and prior to discharge

Table Section	Cohort	Weighted	Sample
Within 24 hours	Stroke, transient ischemic attack and patients with uncertain diagnosis that had an available scan time	17,453	11,941
Before discharge	All inpatient (admitted) stroke, transient ischemic attack and patients with uncertain diagnosis	12,775	8,916

Exhibit 1.7 Number and percentage of ischemic and eligible adult stroke patients who received acute thrombolytic therapy (tPA) and the door-to-needle time

Table Section	Cohort	Weighted	Sample
Ischemic	Ischemic stroke patients	10,158	6,935
Ischemic within 60 minutes	Ischemic stroke patients administered tPA	965	916
Eligible	Ischemic stroke patients who arrived within 3.5 hours of symptom onset and had no contraindications to tPA	2,895	2,268
Eligible within 60 minutes	Ischemic stroke patients who were given tPA after arriving within 3.5 hours of symptom onset and did not have any contraindications to tPA	930	882
Door-to-needle time	All patients administered intravenous tPA	942	894

Exhibit 2.4 Number and percentage of adult patients with stroke or transient ischemic attack admitted to an acute care hospital and treated on a stroke unit at any time during their stay

Table Section	Cohort	Weighted	Sample
Overall	Stroke or transient ischemic attack inpatients	12,771	8,913

Exhibit 2.6 Number and proportion of adult patients with documentation that an initial dysphagia screening was performed during admission to acute care

Table Section	Cohort	Weighted	Sample
Overall	Stroke inpatients excluding those that were unconscious at time of initial assessment	10,316	7,223

Exhibit 2.8b Referral to secondary prevention services among stroke/TIA patients

Table Section	Cohort	Weighted	Sample
From ED	Stroke/TIA patients discharged directly from ED	5,868	3,782
From ED or acute inpatient care	Stroke/TIA patients discharged from ED or inpatient care	15,561	10,471

Exhibit 2.9 Number and percentage of adult ischemic stroke patients without atrial fibrillation who received carotid imaging while in hospital or had an appointment booked for carotid imaging prior to hospital discharge

Table Section	Cohort	Weighted	Sample
Prior to discharge	Ischemic stroke inpatients without atrial fibrillation	6,327	4,283
Booked	Ischemic stroke inpatients without atrial fibrillation who did not have carotid imaging while in hospital	1,345	831

Exhibit 2.11 Number and percentage of adult patients with ischemic stroke or transient ischemic attack who were prescribed three recommended secondary prevention medications on discharge from acute care

Table Section	Cohort	Weighted	Sample
Overall	Ischemic stroke or transient ischemic attack patients discharged alive from an ED or inpatient care	15,839	10,660

Exhibit 2.12 Number and percentage of adult patients with ischemic stroke or transient ischemic attack and atrial fibrillation who were prescribed or recommended anticoagulant therapy on discharge from acute care

Table Section	Cohort	Weighted	Sample
Overall	Ischemic stroke or transient ischemic attack patients with atrial fibrillation discharged alive from an ED or inpatient care	3,331	2,359

Exhibit 2.13 Degree of functional ability at discharge (modified Rankin score)

Table Section	Cohort	Weighted	Sample
Overall	Stroke or transient ischemic attack patients discharged alive from an ED or inpatient care with a modified Rankin score and a postal code	16,549	11,360

Exhibit 2.14a Discharge destinations among stroke/TIA inpatients with modified Rankin scores of 0–2

Table Section	Cohort	Weighted	Sample
Overall	Stroke or transient ischemic attack patients discharged alive from an ED or inpatient care with a modified Rankin score of 0–2 and a postal code	10,198	6,942

Exhibit 2.14b Discharge destinations among stroke/TIA inpatients with modified Rankin scores of 3–5

Table Section	Cohort	Weighted	Sample
Overall	Stroke or transient ischemic attack patients discharged alive from an ED or inpatient care with a modified Rankin score of 3–5 and postal code	6,351	4,418

Exhibit 2.15 Characteristics of patients who received AlphaFIM assessments

Table Section	Cohort	Weighted	Sample
Overall	Stroke or transient ischemic attack patients with an AlphaFIM score	2,201	1,985

Appendix K: Risk-Adjusted Mortality Models

Variable	Risk-Adjustment Model ¹ for Inhospital Stroke/TIA Mortality, 2010/11			Risk-Adjustment Model ² for 30-Day Stroke/TIA Mortality, 2009/10			Risk-Adjustment Model ³ for One-Year Stroke/TIA Mortality, 2009/10		
	Coefficient	Adjusted OR ⁴ (95% CI)	P Value	Coefficient	Adjusted OR ⁴ (95% CI)	P Value	Coefficient	Adjusted OR ⁴ (95% CI)	P Value
Intercept	-5.638			-5.762			-5.802		
Age	0.037	1.04 (1.03–1.04)	0.121	0.042	1.04 (1.04–1.05)		0.056	1.06 (1.05–1.06)	
Female	-0.071	0.93 (0.85–1.02)		0.032	1.03 (0.94–1.14)	0.53	0.033	1.03 (0.96–1.11)	0.389
Ambulance arrival	1.067	2.91 (2.42–3.49)		1.120	3.07 (2.63–3.57)		0.823	2.28 (2.05–2.54)	
Atrial fibrillation	0.229	1.26 (1.12–1.41)		0.252	1.29 (1.16–1.42)		0.282	1.33 (1.21–1.46)	
Previous stroke/transient ischemic attack	0.488	1.63 (1.19–2.22)	0.002	0.594	1.81 (1.47–2.23)		0.625	1.87 (1.56–2.24)	
History of CAD/CABG/PCI	0.418	1.52 (1.29–1.79)		0.466	1.59 (1.37–1.86)		0.393	1.48 (1.31–1.68)	
History of carotid disease/CEA/CAS	-0.548	0.58 (0.40–0.83)	0.003	-0.631	0.53 (0.37–0.76)		-0.405	0.67 (0.52–0.86)	0.002
Diabetes	0.18	1.20 (1.06–1.35)	0.003	0.002	1.00 (0.89–1.13)	0.97	0.123	1.13 (1.03–1.24)	0.009
Peripheral vascular disease	0.28	1.32 (0.89–1.97)	0.169	0.401	1.49 (1.09–2.04)	0.01	0.534	1.71 (1.27–2.29)	
Hypertension	-0.153	0.86 (0.77–0.96)	0.007	-0.362	0.70 (0.63–0.78)		-0.407	0.67 (0.61–0.73)	
Hyperlipidemia	-0.526	0.59 (0.49–0.72)		-0.724	0.49 (0.39–0.60)		-0.585	0.56 (0.47–0.67)	
Intracerebral hemorrhage	1.233	3.43 (3.01–3.91)		1.348	3.85 (3.33–4.45)		1.097	2.99 (2.64–3.39)	
Subarachnoid hemorrhage	1.232	3.43 (2.59–4.55)		1.186	3.28 (2.43–4.42)		0.849	2.34 (1.78–3.08)	
Transient ischemic attack	-3.584	0.03 (0.02–0.05)		-2.673	0.07 (0.05–0.10)		-1.329	0.27 (0.23–0.30)	

¹ C-statistic = 0.78

² C-statistic = 0.79

³ C-statistic = 0.77

⁴ Odds ratio(OR) was adjusted for patient baseline characteristics set by fitting logistic regression models using generalized estimating equations accounting for within-hospital correlation. Reference category: ischemic stroke.

CI = confidence interval; CAD = coronary artery disease; CABG = coronary artery bypass graft;
 PCI = percutaneous coronary intervention; CEA = carotid endarterectomy; CAS = coronary artery stent

Appendix L: List of Supplementary Exhibits

The following exhibits are available at www.ices.on.ca.

1. Emergency Department Care

Exhibit 1.2s: Age- and sex-adjusted rates of emergency department visits for adult stroke or transient ischemic attack patients per 1,000 subLHIN population, in Ontario and by sub-Local Health Integration Network, 2003/04 and 2008/09–2010/11

Exhibit 1.4s-1: Number and percentage of adult stroke or transient ischemic attack patients transported to hospital by ambulance, in Ontario and by facility, 2003/04, 2008/09–2010/11

Exhibit 1.4s-2: Number and percentage of adult stroke or transient ischemic attack patients transported to hospital by ambulance, in Ontario and by sub-Local Health Integration Network, 2003/04, 2008/09–2010/11

Exhibit 1.5s: Number and percentage of adult stroke or transient ischemic attack patients who sought medical attention within the treatment window, in Ontario and by sub-Local Health Integration Network, 2002/03, 2004/05, 2008/09 and 2010/11

Exhibit 1.6s: Number and percentage of adult stroke or transient ischemic attack patients who received neuroimaging within 24 hours of presenting to the emergency department and prior to discharge, in Ontario and by facility, 2002/03, 2004/05, 2008/09 and 2010/11

Exhibit 1.7s: Number and percentage of eligible adult stroke patients who received acute thrombolytic therapy (tPA) and the door-to-needle time, in Ontario and by facility, 2002/03, 2004/05, 2008/09 and 2010/11

2. Acute Inpatient Care

Exhibit 2.2s: Number and percentage of adult patients admitted to acute care hospitals for stroke or transient ischemic attack, in Ontario and by OSS region, Local Health Integration Network and stroke type, 2003/04 and 2008/09–2010/11

Exhibit 2.3s: Age- and sex-adjusted inpatient admission rates for adults with stroke or transient ischemic attack per 1,000 subLHIN population, in Ontario and by sub-Local Health Integration Network, 2003/04 and 2008/09–2010/11

Exhibit 2.4s: Number and percentage of adult patients with stroke or transient ischemic attack admitted to an acute care hospital and treated on a stroke unit at any time during their stay, in Ontario and by facility, 2002/03, 2004/05, 2008/09 and 2010/11

Exhibit 2.5s-1: Inpatient length of stay for adults with stroke or transient ischemic attack, in Ontario and by facility, 2003/04 and 2008/09–2010/11

Exhibit 2.5s-2: Inpatient length of stay for all stroke patients and ischemic patients, in Ontario and by OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2008/09–2010/11

Exhibit 2.6s: Number and percentage of adult patients with documentation that an initial dysphagia screening was performed during admission to acute care, in Ontario and by facility, 2002/03, 2004/05, 2008/09 and 2010/11

Exhibit 2.7s: Risk-adjusted in-hospital complication rates for pneumonia among adult patients with stroke or transient ischemic attack, in Ontario and by facility, 2003/04 and 2008/09–2010/11

Exhibit 2.8s: Discharge destination of adult patients with stroke or transient ischemic attack following an acute hospitalization, in Ontario and by facility, 2003/04 and 2008/09–2010/11

Exhibit 2.9s: Number and percentage of adult ischemic stroke patients without atrial fibrillation who received carotid imaging while in hospital or who had an appointment booked for carotid imaging prior to hospital discharge, in Ontario and by facility, 2002/03, 2004/05, 2008/09 and 2010/11

Exhibit 2.10s: Time to carotid intervention within six months of hospitalization for adults with stroke or transient ischemic attack, in Ontario and by facility, 2003/04 and 2008/09–2010/11

Exhibit 2.11s: Number and percentage of adult patients with ischemic stroke or transient ischemic attack who were prescribed three recommended secondary prevention medications upon discharge from acute care, in Ontario and by facility, 2002/03, 2004/05, 2008/09 and 2010/11

Exhibit 2.12s: Number and percentage of adult patients with ischemic stroke or transient ischemic attack and atrial

fibrillation who were prescribed anticoagulant therapy upon discharge from acute care, in Ontario and by facility, 2002/03, 2004/05, 2008/09 and 2010/11

3. Inpatient Rehabilitation

Exhibit 3.4s: Characteristics and outcomes of adult stroke patients in inpatient rehabilitation, in Ontario and by sub-Local Health Integration Network, 2003/04 and 2008/09–2010/11

Exhibit 3.7s–1: Characteristics of adults stroke patients in inpatient rehabilitation, in Ontario and by OSS region and National Rehabilitation Reporting System facility number, 2003/04

Exhibit 3.7s–2: Characteristics of adults stroke patients in inpatient rehabilitation, in Ontario and by OSS region and National Rehabilitation Reporting System facility number, 2008/09

Exhibit 3.7s–3: Characteristics of adults stroke patients in inpatient rehabilitation, in Ontario and by OSS region and National Rehabilitation Reporting System facility number, 2009/10

Exhibit 3.7s–4: Characteristics of adults stroke patients in inpatient rehabilitation, in Ontario and by OSS region and National Rehabilitation Reporting System facility number, 2010/11

4. Home Care Services

Exhibit 4.2s: Community Care Access Centre support services provided to home care clients (active and new) within 180 days following an acute hospitalization for stroke, in Ontario and by Local Health Integration Network, 2006/07–2009/10

5. Patient Outcomes

Exhibit 5.2s: Age- and sex-adjusted revisit or readmission rates within 365 days following stroke or transient ischemic attack, in Ontario and by stroke type, OSS region, OSS classification and Local Health Integration Network, 2003/04 and 2007/08–2009/10

Exhibit 5.3s: Age- and sex-adjusted all-cause readmission rates within 30 days following stroke or transient ischemic attack, in Ontario and by facility, 2003/04 and 2007/08–2009/10