Ontario Stroke Evaluation Report 2016:

A Focus on Stroke Rehabilitation

November 2016

ontario stroke network
Advancing the Ontario Stroke System

ICES

Ontario Stroke Evaluation Report 2016:
A Focus on Stroke Rehabilitation

Authors

Ruth E. Hall
Esmé French
Ferhana Khan
Limei Zhou
Beth Linkewich
Deborah Willems
Shelley Huffman
Donelda Sooley
Stefan Pagliuso
Christina O'Callaghan
Jen Levi
Mark Bayley

November 2016

Institute for Clinical Evaluative Sciences

Publication Information

The Institute for Clinical Evaluative Sciences (ICES) is funded by an annual grant from the Ontario Ministry of Health and Long-Term Care (MOHLTC). The opinions, results and conclusions included in this report are those of the authors and are independent from the funding sources. No endorsement by ICES or the MOHLTC is intended or should be inferred.

Parts of this publication are based on data and information compiled and provided by the Canadian Institute for Health Information (CIHI). However, the analyses, conclusions, opinions and statements expressed herein are those of the authors, and not necessarily those of CIHI.

INSTITUTE FOR CLINICAL EVALUATIVE SCIENCES
G1 06, 2075 Bayview Avenue
Toronto, ON M4N 3M5
Telephone: 416-480-4055
Email: **communications@ices.on.ca**

How to cite this publication

Hall RE, French E, Khan F, Zhou L, Linkewich B, Willems D, Huffman S, Sooley D, Pagliuso S, O'Callaghan C, Levi J, Bayley M. *Ontario Stroke Evaluation Report 2016: A Focus on Stroke Rehabilitation.* Toronto, ON: Institute for Clinical Evaluative Sciences; 2016.

ISBN 978-1-926850-70-2 (Print)
ISBN 978-1-926850-71-9 (Online)

This document is available at **www.ices.on.ca**.

Authors' Affiliations

Ruth E. Hall, PhD
Ontario Stroke Network Evaluation Lead and Adjunct Scientist, Institute for Clinical Evaluative Sciences / *Assistant Adjunct Professor,* Institute of Health Policy, Management and Evaluation, University of Toronto

Esmé French, MScPT
Regional Stroke Rehabilitation Specialist, Northwestern Ontario Regional Stroke Network, Thunder Bay Regional Health Sciences Centre

Ferhana Khan, MPH
Senior Research Project Manager, Ontario Stroke Network Evaluation Office and Ontario Stroke Registry, Institute for Clinical Evaluative Sciences

Limei Zhou, PhD
Senior Research Analyst, Institute for Clinical Evaluative Sciences

Beth Linkewich, MPA, OT Reg (Ont)
Chair, Knowledge Translation and Implementation Subcommittee, Ontario Stroke Network / *Regional Director,* North and East GTA Stroke Network, Sunnybrook Health Sciences Centre / *Assistant Professor,* Clinical Sciences Division, Northern Ontario School of Medicine / *Lecturer,* Department of Occupational Science and Occupational Therapy, University of Toronto

Deborah Willems, BScPT, MSc
Regional Rehabilitation Coordinator, Southwestern Ontario Stroke Network, London Health Sciences Centre

Shelley Huffman, BScPT
Regional Stroke Rehabilitation Coordinator, Stroke Network of Southeastern Ontario, Kingston General Hospital

Donelda Sooley MHSc, MSc (S-LP)
Regional Rehabilitation Coordinator, Central East Stroke Network, Royal Victoria Regional Health Centre

Stefan Pagliuso, MPT, BA Kin
Regional Stroke Program Director, Central South Regional Stroke Network, Hamilton Health Sciences Centre

Christina O'Callaghan, BAppSc (PT)
Executive Director, Stroke Services, Cardiac Care Network of Ontario

Jen Levi, BA
Research Assistant, Ontario Stroke Network Evaluation Office and Ontario Stroke Registry, Institute for Clinical Evaluative Sciences

Mark Bayley, MD, FRCPC
Medical Director, Brain and Spinal Cord Rehabilitation Program, Toronto Rehabilitation Institute / *Associate Professor,* Faculty of Medicine, University of Toronto / *Adjunct Scientist,* Institute for Clinical Evaluative Sciences / *Chair,* Stroke Evaluation and Quality Committee, Ontario Stroke Network

Acknowledgements

This report and the ongoing measurement and monitoring of stroke prevention and care in Ontario are the result of many collaborative efforts. The authors wish to acknowledge the contributions of the following individuals and organizations.

Survey Support

Organizations participating in the Ontario Stroke Rehabilitation Survey and providing valuable contextual information (see **Appendix F**)

Ontario Stroke Network stroke rehabilitation coordinators Donna Cheung, Beth Donnelly, Jenn Fearn, Jocelyne McKellar, Sylvia Quant, Nicola Tahair, Janine Theben and Darlene Venditti who provided survey support and content interpretation

Content Review

Linda Kelloway, RN, MN, CNN (C)
Director of Best Practices, Stroke Services, Cardiac Care Network of Ontario

Charissa Levy, MHSc, BScOT, OT Reg (Ont)
Executive Director, Rehabilitative Care Alliance

Ryan Metcalfe, BScH, BEd, MSc
Rehabilitation Program Lead, Canadian Institute for Health Information

Programming and Biostatistics

Huiting Ma, MSc
Research Analyst, Institute for Clinical Evaluative Sciences

Peter Gozdyra, MA
Medical Geographer, Institute for Clinical Evaluative Sciences

Editorial and Content Support

Nancy MacCallum, MLIS
Senior Communications Officer, Institute for Clinical Evaluative Sciences

Patrick Moore, MA
Communications Manager, Stroke Services, Cardiac Care Network of Ontario

Funding Support

Ontario Ministry of Health and Long-Term Care

Contents

About the Organizations Involved in this Report

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 11 Regional Stroke Networks that support the 14 Local Health Integration Networks (LHINs) through: measuring and reporting on performance; partnering to achieve best practices; leading and/or supporting provincial initiatives; 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 11 Regional Stroke Networks, and translating and exchanging knowledge. Currently, the OSN is collaborating with Health Quality Ontario and the Ontario Ministry of Health and Long-Term Care to advise on best practices embedded in stroke quality-based procedures (QBPs), as well as implementation of, monitoring and impact on system performance.

Ontario's Regional Stroke Networks are collaborative partnerships of health care organizations and providers that develop and implement strategies to improve access and outcomes for stroke survivors and their families through the integration of stroke best practices across the care continuum. Each Regional Stroke Network has a regional stroke centre, and many have one or more district stroke centres.[1]

The OSN's role as a backbone organization[2] (organizations with a lean staffing model and ability to mobilize many partners to help further their work) and experience as a boundary spanner[3] (reaching across borders to build relationships, interconnections and interdependencies in order to manage complex problems) have been key success factors.[4]

Effective April 1, 2016, the Ontario Stroke Network and the Cardiac Care Network of Ontario (CCN) have come together as a single entity to ensure a comprehensive and integrated approach to cardiac, vascular and stroke care in Ontario. The newly integrated body is funded by the Ontario Ministry of Health and Long-Term Care.

Institute for Clinical Evaluative Sciences

The **Institute for Clinical Evaluative Sciences** (ICES) is an independent, non-profit organization that uses population-based health information to produce knowledge on a broad range of health care issues. ICES' unbiased evidence provides measures of health system performance a, a cleaner understanding of the shifting health care needs of Ontarians, and a stimulus for discussion of practical solutions to optimize scarce resources.

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 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. ICES knowledge is highly regarded in Canada and abroad, and is widely used by government, hospitals, planners, and practitioners to make decisions about care delivery and to develop policy.

Executive Summary

The majority of patients admitted to Ontario's acute care hospitals for stroke require rehabilitation. Stroke rehabilitation improves independence, reduces hospitalization, saves lives and should be considered the standard of care for stroke survivors. Stroke rehabilitation crosses all care settings including—depending on the extent of the disability—acute care, inpatient rehabilitation, ambulatory clinical care, and home-based and community care. Stroke rehabilitation is provided by an interdisciplinary team of professionals that includes occupational therapists, physiotherapists and speech-language pathologists.

Previous reports produced by the Ontario Stroke Network, in collaboration with the Institute for Clinical Evaluative Sciences, highlighted significant variability in access to stroke rehabilitation services and in stroke best practices across the province. The purpose of this report is to evaluate the current state of stroke rehabilitation in Ontario and provide recommendations for system improvement.

Key Findings

Between April 2014 and March 2015, 14,287 stroke patients were admitted to acute care hospitals in Ontario; of these, 12,604 patients were discharged alive following acute stroke. Approximately 4,400 survivors (35%) were admitted to inpatient rehabilitation, and approximately 4,000 survivors (32%) had at least one home visit from a rehabilitation professional provided through a Community Care Access Centre.

Compared to 2011/12, the most important improvements in stroke inpatient rehabilitative care in 2014/15 were:

- Approximately 1,000 more stroke survivors were receiving the services they needed.
- More stroke survivors with severe disability were admitted to inpatient rehabilitation.
- More stroke survivors met recommended targets for active length of stay, and the amount of daily functional gain increased.

These improvements were achieved within current capacity through collaboration, innovation and creating efficiencies while maintaining a discharged-to-home rate of more than 80%.

In 2014/15, two outcomes of emerging rehabilitative care models revealed that:

- Stroke-focused rehabilitation teams were more likely to have stroke survivors achieve the target for active length of stay in inpatient rehabilitation.
- Facilities with comprehensive outpatient rehabilitation services had a lower proportion of stroke survivors with mild disability admitted to inpatient rehabilitation.

The following areas of stroke rehabilitation were identified for improvement:

- There is wide variation in performance among Local Health Integration Networks and in access to services based on rural or urban residence.
- Limited provision of therapy on weekends, lack of early supportive discharge programs and rehabilitation professional staffing levels below recommended standards may explain the variation in timely access and failure to achieve recommended targets for length of stay in inpatient rehabilitation.
- Stroke survivors discharged to home-based rehabilitation provided by Community Care Access Centres (CCAC) after an acute stroke receive, on average, only five visits for all types of therapy combined (occupational therapy, physiotherapy, speech therapy). Minimal improvements have been observed at the provincial level in home-based CCAC rehabilitation in relation to QBP-recommended levels of 2–3 visits per type of therapy per week for community programs.
- Gaps in data quality and availability prevent a complete evaluation of the Ontario stroke rehabilitation system.

Conclusion

In a relatively brief period of time, three years, access to inpatient stroke rehabilitation services has improved dramatically in Ontario, most notably for stroke survivors with a severe disability. Almost 1,000 additional stroke survivors have received the rehabilitation services they need within the system's current capacity. These results reflect the collaboration of the Ontario Stroke Network, the 11 Regional Stroke Networks and rehabilitation leaders in the 14 Local Health Integration Networks who have identified stroke rehabilitation system improvement as a priority and endorsed guidelines contained in the 2013 release of the *Quality-Based Procedures: Clinical Handbook for Stroke*, which sets out evidence-based processes of care to which staff should adhere.

Key Recommendations

1. The OSN/CCN should collaborate with the Ministry of Health and Long-Term Care, Health Quality Ontario, the Regional Stroke Networks and the Local Health Integration Networks to use the findings presented in this report to stimulate innovation and facilitate system transformation through strategies such as integrated funding models and reorganization and regionalization of services where appropriate.
2. The OSN/CCN should collaborate with the Ministry of Health and Long-Term Care, Health Quality Ontario, the Canadian Institute for Health Information and the Rehabilitative Care Alliance to improve data availability and strive for consistency in quantifying rehabilitation outcomes across settings to better evaluate the system of rehabilitative care. Priorities for data enhancement should include outcome indicators that evaluate patient/survivor experience and quality of life, and the Rehabilitative Care Alliance's pilot to gather standardized data across Ontario's outpatient rehabilitation clinics for the National Ambulatory Care Reporting System (NACRS Clinic Lite).
3. The Local Health Integration Networks and Regional Stroke Networks should share and apply successes made in rehabilitation therapy in the areas of access, timeliness and level of service. Broader implementation of rehabilitation best practices should reduce observed variations in

rehabilitation services among the Local Health Integration Networks.

4. Facilities providing inpatient stroke rehabilitation should identify opportunities to align with stroke quality-based procedures in recommended staffing ratios and evidence-based care, including the delivery of rehabilitation to stroke survivors that is early, specialized, and intensive (i.e., 3 hours per day for at least 6 days a week).

5. Acute care hospitals treating stroke patients should identify opportunities to improve processes of care, including the adoption of a consistent method of assessing patient disability (i.e., AlphaFIM) and 7-day-a-week staffing that support timely transitions, achievement of length of stay targets and reduction of Alternate Level of Care days.

More Ontario stroke survivors are getting the right rehabilitative care in the right place

Stroke inpatient rehabilitative care improvements in 2014/15 compared to 2011/12:

1,000

more stroke **survivors were receiving** the **services** they needed.

25% MORE

stroke survivors with **severe disability** were **admitted**.

29% increase in stroke survivors' daily functional gains.

43% increase in the proportion of stroke survivors that met targets for active length of stay.

Over 80% of stroke survivors continued to be discharged home.

Emerging rehabilitation care models in 2014/15:

Stroke survivors admitted to facilities with **stroke-focused rehabilitation teams** were more likely to meet recommended targets for active length of stay.

Facilities with comprehensive outpatient rehabilitation services had **fewer admissions** for survivors with mild disability. Outpatient rehabilitation is a **more cost-effective setting** for mild disability.

Achieved within current capacity through collaboration, innovation and creating efficiencies

Introduction

Previous evaluation reports prepared by the Ontario Stroke Network[5,6] highlighted significant variation in the performance of stroke rehabilitation indicators at the LHIN and facility level; therefore, the OSN Stroke Evaluation and Quality Committee[a] recommended that a report focused on stroke rehabilitation would be helpful to further drive system change.

This report provides an evaluation of the rehabilitation sector of the stroke care continuum by:

- Providing detailed information on outcomes and progress toward best practices within stroke rehabilitation at multiple levels of analysis (province, LHIN, facility and rehabilitative care model);
- Informing system-level stroke rehabilitation planning as stroke quality-based procedures (QBP) are being implemented[b];
- Providing analyses that will enable the LHINs to compare their performances and identify best practices;
- Highlighting stroke rehabilitation system successes and identifying opportunities for improvement; and,
- Providing recommendations for improving the stroke rehabilitation care system at the provincial, LHIN and regional stroke network levels.

This report examines three post-acute care rehabilitation settings: inpatient rehabilitation, home-based rehabilitation services provided by Community Care Access Centres and outpatient rehabilitation.

For ease of comparison, the report includes graphical presentation of the most recent data available to assess the current state of and progress on best practices.

[a]The Stroke Evaluation and Quality Committee is responsible for measuring, monitoring, evaluating and reporting on the progress of the OSN.
[b]The OSN has collaborated with the Ontario Ministry of Health and Long-Term Care to advise on stroke QBP best practices, including monitoring, reporting system performance, driving system change and implementing best practices across the province.

Data Sources and Methods

Data Sources

This report includes two sources of data:

- health administrative data from the Canadian Institute for Health Information (CIHI) and the Ontario Ministry of Health and Long-Term Care (MOHLTC), and
- responses from the Ontario Stroke Rehabilitation Survey.

Health administrative data

The following data sources, all held at the Institute for Clinical Evaluative Sciences, were used:

- from CIHI: the Discharge Abstract Database (CIHI–DAD), the National Rehabilitation Reporting System (NRS) and the Continuing Care Reporting System – Complex Continuing Care (CCRS-CCC); made available in November 2015; and
- from the MOHLTC: the Home Care Database – Ontario Association of Community Care Access Centres (HCD–OACCAC); made available in August 2015.

Encrypted Ontario health card numbers were used to link patients diagnosed with stroke across the various health administrative databases.

Ontario Stroke Rehabilitation Survey data

The Ontario Stroke Rehabilitation Survey aimed to (1) provide an inventory of rehabilitation services in Ontario; (2) provide context for factors that may be associated with stroke care performance; (3) identify care models within the inpatient and outpatient stroke rehabilitation settings, and (4) evaluate recommendations for stroke quality-based procedures.

The web-based survey was made available to all facilities providing inpatient rehabilitation to stroke survivors and had at least 6 admissions classified as Rehabilitation Client Group 1 (Stroke) aged 18 years and older in the NRS database. The survey questions were developed by the authors of this report and are available at **http://ontariostrokenetwork.ca/publicationsreports/targetedreports/**. All 52 invited facilities responded to the web-based survey between February 24 and April 11, 2016. Respondents were asked to base their responses on resources available at their organization as of March 31, 2015. The survey data presented were self-reported by facilities. The authors did not modify self-reported data; however, each survey response was reviewed by the appropriate regional stroke rehabilitation coordinator, and if clarification was indicated, the response was reviewed with the facility and modified with its approval.

Ethics

This study was approved by the institutional review board at Sunnybrook Health Sciences Centre in Toronto, Ontario.

Stroke Cohorts

Stroke cohorts were generated from administrative databases using codes from the International Classification of Diseases, 10th Revision, Canada (ICD-10-CA); these are listed in **Appendix C**. The most responsible diagnosis was used to identify stroke records for adults aged 18 years or older in the CIHI–DAD. Cases with palliative care as an initial treatment (Z51.5 with the prefix 8) were excluded from CIHI-DAD. Stroke cohorts derived solely from the CIHI-NRS were generated using the Rehabilitation Client Group, RCG 1 and only RCG 1 cases were kept in the stroke cohort derived from CIHI-DAD.

Analyses

Stroke survivor characteristics were determined by using an encrypted health card number to link the acute stroke event captured in the CIHI-DAD to the CIHI-NRS for information on living setting, living arrangements and level of disability. For survivors admitted to complex continuing care, we linked to the CCRS-CCC database for information on living setting, dementia and Alzheimer's disease. A survivor's medical comorbidities were determined by linking the acute stroke event using an encrypted health card number to the CIHI-DAD where up to 25 diagnoses may be recorded on the discharge abstract and a two-year lookback. The ICD-10 diagnostic code was used to determine whether any comorbid condition as defined by Charlson comorbidity index was present.[7,8] A survivor's comorbidity score was calculated using weightings according to Charlson.[8] Patient postal code was linked to the Postal Code Conversion File Plus (PCCF+, Statistics Canada) for neighbourhood income quintile and determination of place of residence (rural or urban) information. Rural was defined as residing in a community with a population less than or equal to 10,000.

Quality of Stroke Rehabilitation Care Indicators

In 2010, the OSN's Stroke Evaluation and Quality Committee reviewed over 150 performance indicators included in the Canadian Stroke Strategy's 2008 Performance Measurement Manual,[9] which is based on the Canadian stroke best practices,[10] and identified a subset of 45 core performance indicators, of which 15 were specific to stroke rehabilitation (see **Appendix A**).[5] From 2011 onward, a subset of 20 indicators covering the care continuum, including 8 specific to rehabilitation, has informed the OSN's annual LHIN report cards.[6]

Each of the rehabilitation best practice indicators aligns with Health Quality Ontario's health system quality framework[11] (i.e., they focus on timeliness, effectiveness, efficiency and equity; see **Appendix A**). This report also includes indicators specific to rehabilitation that were selected by the Stroke Quality-Based Procedures Expert Advisory Panel (see **Appendix B**).[12]

Indicator analyses counted only unique stroke survivors[c]. Where possible, indicators are stratified by level of disability (mild, moderate or severe). Time-based indicators are reported as median values. The median time is the time required for half of the survivors to receive a given service, such as inpatient rehabilitation or home-based rehabilitation therapy. Mean values are also reported because many of the stroke QBP indicators are based on the mean. Unless otherwise noted, indicators are reported based on the LHIN in which a rehabilitation facility is located rather than the LHIN of survivor residence (i.e., examine how well the facilities in a LHIN performed on various indicators).

Sub-analyses using the Ontario Stroke Rehabilitation Survey responses were conducted to examine the impact that rehabilitation care models have on stroke rehabilitation quality indicators (see **Exhibit I**).

EXHIBIT I Models of stroke rehabilitation care in Ontario

Model	Description
Freestanding, stroke-focused	Rehabilitation site is geographically separate from acute care Stroke survivors co-located, rehabilitation professionals focused on stroke care Includes stroke rehabilitation units
Non-freestanding, stroke-focused	Acute and rehabilitation care is provided in the same building or does not require outdoor transportation Stroke survivors co-located, rehabilitation professionals focused on stroke care Includes integrated stroke units
Freestanding, mixed	Rehabilitation site is geographically separate from acute care Rehabilitation professionals serve multiple patient/survivor groups
Non-freestanding, mixed	Acute and rehabilitation care is provided in the same building or does not require outdoor transportation Rehabilitation professionals serve multiple patient/survivor groups
Comprehensive outpatient rehabilitation	Derived from facilities that responded 'yes' on the Ontario Stroke Rehabilitation Survey to having hospital funded/governed rehabilitation services delivered in a hospital setting that are provided by an interprofessional team (at a minimum, an occupational therapist, physiotherapist and speech-language pathologist) specifically assigned to the service, using a case-coordination approach with regular team meetings and the capacity to provide 2–3 visits a week for 8–12 weeks. Does not include programs or services funded or governed by Community Care Access Centres or community-based physiotherapy clinics.[d]

Statistical Analyses

Results are presented for the province and by Local Health Integration Network, facility and model of stroke rehabilitation. (See **Appendix G** for a list of facilities and their rehabilitation resources and care models.) In accordance with the requirements of the *Personal Health Information Privacy Act*, cell counts and calculations based on cell counts of 5 or less are suppressed.

Influenced by the establishment of Echo: Improving Women's Health in Ontario in 2010 and the publication of recent research on sex differences in patient health care in the province, we also present findings for indicators where there are statistically significant differences between men and women.[13] Also in recognition of recent research findings of rural and urban differences in access to stroke best practices in the province, we present findings for indicators where there are statistically significant differences between survivors living in rural regions compared to urban regions.[14]

Current indicator performance was compared to performance 18 months prior to the release of the *Quality-Based Procedures: Clinical Handbook for Stroke*.[12] Tests for trends over time were performed using median quantile regression for continuous variables and Cochran-Armitage trend test for binary variables. One-way ANOVA and Kruskal-Wallis tests were used to compare the mean and median of continuous variables, respectively. To compare the categorical variables, the chi-square test and Fisher's exact test were applied where appropriate. SAS Enterprise Guide version 6.1 software was used for all data analyses.

Stroke QBP indicators for inpatient rehabilitation are presented as maps. The performance of the LHINs and Ontario overall is shown numerically, and the performance of individual facilities[e] is displayed graphically. The maps illustrate facility performance relative to the provincial average based on the care received by survivors admitted in each facility (i.e.,

[c] Community Care Access Centre data presented in this report are based on visits (i.e., survivors can be counted multiple times if services were provided by more than one CCAC).
[d] Aligns with the Rehabilitative Care Alliance definition of outpatient/ambulatory rehabilitation used in their validation study (see http://www.rehabcarealliance.ca/outpatient-/-ambulatory-1).

performance was facility-based rather than population-based).

Shapes are used to indicate the type of facility and its location on the map of Ontario. **Squares** indicate freestanding rehabilitation centres, and **circles** indicate non-freestanding centres.[f] The colour of the shape indicates the performance of each facility in relation to the Ontario average for that indicator. A **green** marker indicates that the facility has performed better than the Ontario average, **yellow** means the facility's performance is equal to the provincial average, and **red** indicates that the facility has performed below average for the indicator.[g] Detailed tables that provide more specific facility-level information are available by contacting **communications@ices.on.ca**.

[e] Only facilities with a sample size of 5 or more were mapped.

[f] Freestanding facilities are physically separate from affiliated acute care facilities; non-freestanding facilities are housed within acute care facilities or do not require outdoor transportation.

[g] For the stroke QBP indicators proportion of mild stroke survivors admitted into inpatient rehabilitation), a value below the provincial average is desirable; therefore, the colours green and red signify below average and above average performance, accordingly.

Summary of Key Findings

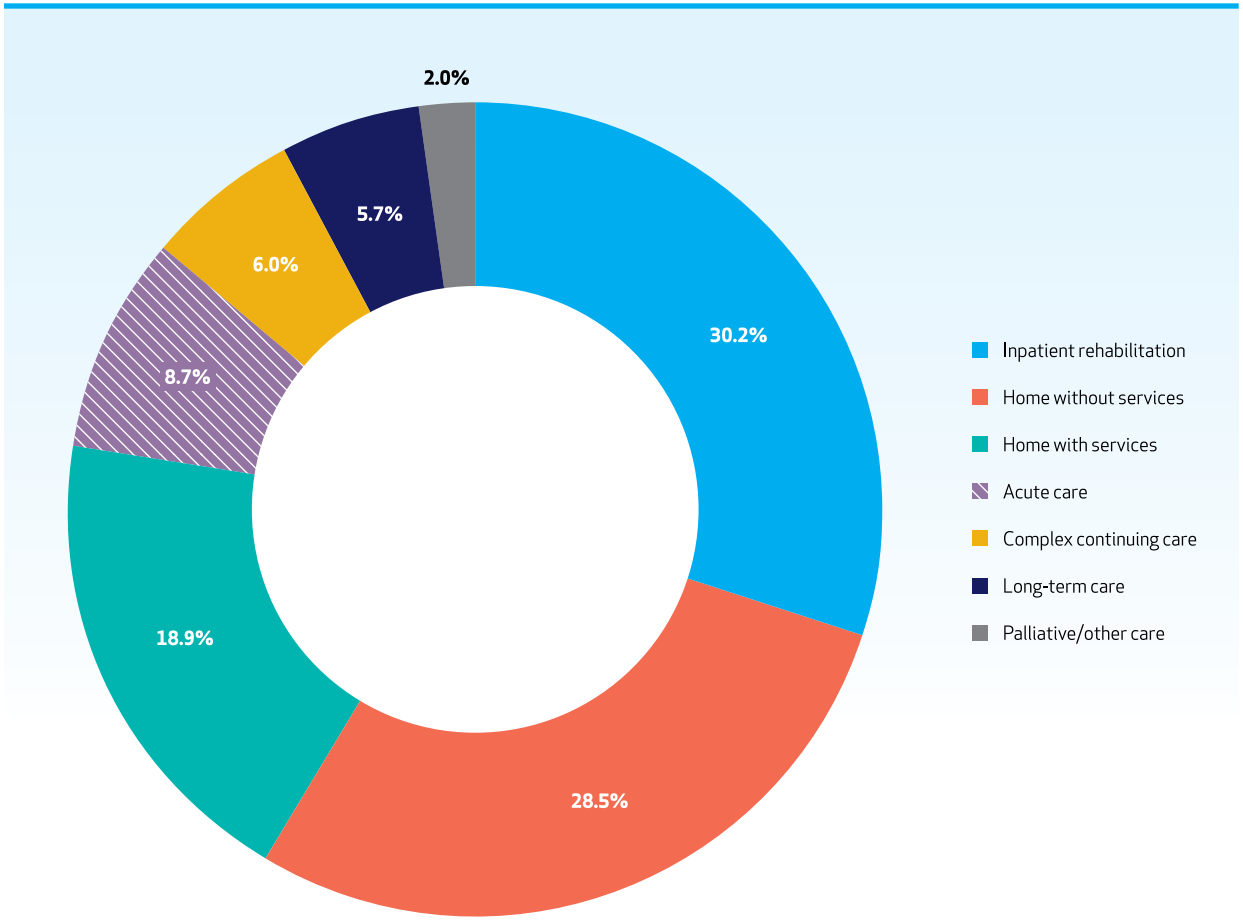
Context of Stroke Rehabilitation in Ontario

The 2013 auditor general's report criticized the province's system of rehabilitation care for its lack of coordination and inequitable access and noted that demand for rehabilitation services is expected to increase in the near future as the first of the baby boomer generation turns 75 in 2021.[15] After orthopedic conditions, stroke is the most common reason for admission to rehabilitation. Stroke rehabilitation can take place in several settings by trained rehabilitation professionals assisting stroke survivors' recovery through a variety of interventions. The release of the two clinical handbooks for stroke QBPs,[1,2,16] lays out the procedures and recommendations to provide evidence-based care.[15] In 2014/15, 14,287 stroke patients were admitted to Ontario's acute care hospitals, of which 12,604 were discharged alive. **Exhibit II** shows their discharge destination from acute care.

The linked analysis of acute stroke discharges in CIHI-DAD to CIHI-NRS revealed that in 2014/15, 4,418 stroke survivors (35.1%) were admitted to inpatient rehabilitation.[h] The number of stroke survivors admitted to inpatient rehabilitation steadily increased from 3,423 in 2011/12 to 4,418 in 2014/15,[5] representing a 29% increase or an additional 995 survivors. The number of stroke survivors admitted to complex continuing care declined slightly from 1,294 in 2010/11[i] to 1,069 in 2013/14.[5] The number of stroke/TIA survivors receiving CCAC-based stroke rehabilitation slightly increased over time, from 7,076 in 2010/11–2011/12 to 7,295[j] in 2013/14–2014/15.[5] The number of survivors receiving outpatient or ambulatory clinic–based stroke rehabilitation is unknown.

[h] The difference in the proportion of stroke survivors discharged from acute care to inpatient rehabilitation (30.2%) and those admitted to inpatient rehabilitation (35.1%) in the same fiscal year likely reflects stroke survivors discharged to alternative settings while awaiting admission to inpatient rehabilitation.
[i] The complex continuing care analysis includes all patients discharged alive following an inpatient stay in acute care who appeared in the CCRS-CCC database within 6 months of discharge from acute care. The most up to date years of data available have been included to allow for a full 6-month window.
[j] In 2013/14–2014/15, there were 6,195 stroke survivors.

EXHIBIT II Reported discharge destination following acute stroke hospitalization, in Ontario, 2014/15



Complex continuing care

The linked analysis shows that less than 10% of stroke survivors (N=1,069) were admitted to a complex continuing care setting following an acute stroke. In complex continuing care, minimal therapy is provided, and long-term care remains a dominant discharge destination.[5] The focus of this report is rehabilitation services; it is recommended that a more in-depth analysis of stroke survivors in complex continuing care should be considered for a future report. See **Appendix E** for characteristics of stroke survivors admitted to complex continuing care following an acute stroke.

Inpatient Rehabilitation

Models of care

All 52 inpatient rehabilitation facilities responded to the Ontario Stroke Rehabilitation Survey. The majority of inpatient rehabilitation facilities (N=37) were non-freestanding (i.e., they were located within acute care facilities or did not require outdoor transportation), and over half of stroke survivors

Data source: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD), 2014/15.
Inclusion criteria: All stroke patients aged ≥18 years admitted to an acute care facility for stroke management and discharged alive.
Exclusion criteria: Patients with elective admissions or patients provided palliative care as an initial treatment plan.

(54.9%) received rehabilitation within them. Almost 2 in 3 survivors (63.9%) received inpatient rehabilitation under the guidance of a stroke-focused rehabilitation team[k] (see **Exhibit 1.1**).

Risk factors and comorbidities

Among stroke survivors admitted to inpatient rehabilitation, 65.7% had hypertension, 32.5% had diabetes, 31.2% had atrial fibrillation and 21.9% had pre-existing hemiplegia or paraplegia. More than half (54.0%) of stroke survivors had a Charlson comorbidity score ≥2, which is considered to indicate more comorbid illness. The level of disability among stroke survivors admitted to inpatient rehabilitation as measured by the median total admission Functional Independence Measure (FIM®)[l] was 70, which is considered moderately disabled.

Living situation

Most stroke survivors (98.8%) admitted to inpatient rehabilitation were living in the community at the time of their stroke; including 85.9% in their home without health services, 7.6% with paid health services and 5.3% in assisted living. Of the stroke survivors living in the community, 69.2% were living with others and 26.7% were living alone at the time of their inpatient rehabilitation admission. Following inpatient rehabilitation, 79.5% of stroke survivors were discharged to the community, including 28.7% to home without health services, 41.6% to home with paid health services and 9.2% to assisted living; 10.4% were discharged to residential care. Of those discharged to the community, 59.3% were arranged to live with others and 14.5% to live alone (see **Exhibit 1.3**).

More stroke survivors are accessing inpatient rehabilitation.

- Among acute stroke survivors, 35.1% were admitted to inpatient rehabilitation in Ontario in 2014/15, an increase from 31.7% in 2011/12 ($p<0.0001$). Approximately 1,000 more stroke survivors were receiving inpatient rehabilitation in 2014/15 compared to 2011/12.
- Women were less likely than men to be admitted to inpatient rehabilitation (33.2% vs. 36.9%; $p<0.0001$) (see **Exhibit 1.4**).
- Stroke survivors in rural communities were less likely to be admitted to inpatient rehabilitation than their urban counterparts (31.2% vs. 35.6%; $p<0.0001$) (see **Exhibit 1.4**).
- Variation remained across LHINs in the proportion of stroke survivors admitted to inpatient rehabilitation, ranging from 27.1% to 42.7% (see **Exhibit 1.4**).

More stroke survivors with severe disability are accessing inpatient rehabilitation.

- There was a 25% increase in the proportion of stroke survivors with severe disability accessing inpatient rehabilitation between 2011/12 and 2014/15 (34.3% vs. 42.8%; $p<0.0001$) (see **Exhibit III**).[5] However, there was little change in the variation among the LHINs.
- There were significant differences in the distribution of mild, moderate and severely disabled stroke survivors admitted to inpatient rehabilitation by sex and by rurality ($p=0.0028$ and $p=0.004$, respectively) (see **Exhibit 1.7**).
- Among female stroke survivors admitted to inpatient rehabilitation, 45.4% were considered severely disabled compared to 40.6% of their male counterparts (see **Exhibit 1.7**).
- Among rural stroke survivors admitted to inpatient rehabilitation, 42.0% were considered severely disabled compared to 42.9% of urban stroke survivors (see **Exhibit 1.7**).

[k]Stroke survivors were co-located, and rehabilitation professionals were focused on stroke care.
[l]The FIM® instrument is a trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.

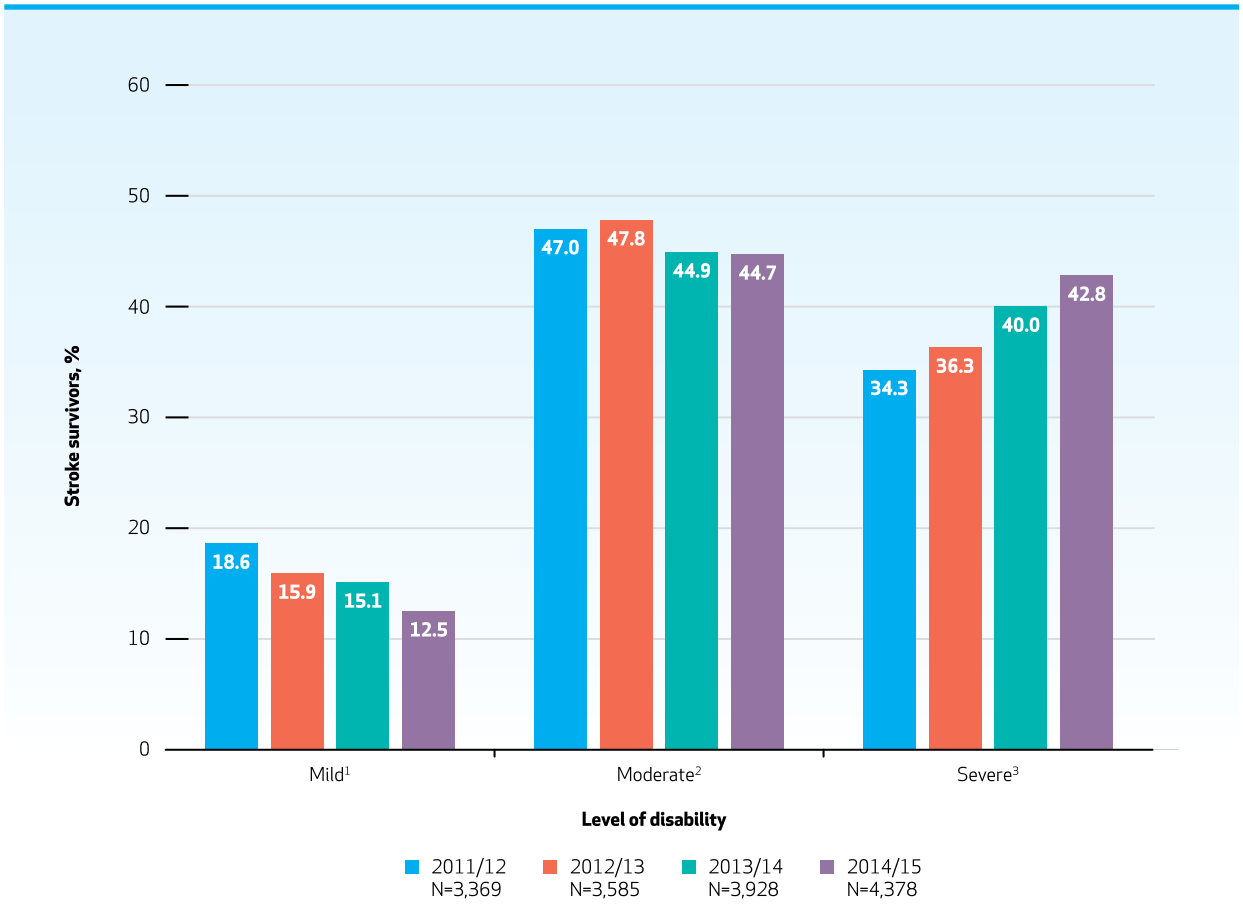
Fewer stroke survivors with mild disability are being admitted to inpatient rehabilitation.

- There was a corresponding decline in the proportion of stroke survivors with mild disabilities admitted to rehabilitation, from 18.6% in 2011/12 to 12.5% in 2014/15 ($p<0.0001$) (see **Exhibit III**); despite this improvement, variation in performance remained across LHINs.[5] This suggests variability in the initiatives to improve patient/survivor flow to outpatient and community-based rehabilitation services.

- Compared to men, a lower proportion of women with mild disability were admitted to inpatient rehabilitation (13.5% vs. 11.3%, respectively) (see **Exhibit 1.7**).

- A higher proportion of rural stroke survivors with mild disability were admitted to inpatient rehabilitation compared to their urban counterparts: 15.8% vs. 12.0%, respectively (see **Exhibit 1.7**).

EXHIBIT III Proportion of stroke survivors admitted to inpatient rehabilitation, by year and level of disability, in Ontario, 2011/12–2014/15



Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and National Rehabilitation Reporting System (NRS), 2011/12–2014/15.

Inclusion criteria: All survivors 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; survivors had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge. Exclusion criteria: Survivors with missing Rehabilitation Patient Group (RPG) assignment.

[1] Includes RPGs 1150 and 1160.

[2] Includes RPGs 1120, 1130 and 1140.

[3] Includes RPGs 1100 and 1110.

Inpatient rehabilitation therapy is limited on weekends, and staffing is not at recommended levels.

- Three facilities offered the core rehabilitation therapies (occupational therapy, physiotherapy and speech therapy) at the recommended stroke QBP ratio (1:6 or less for occupational therapy and physiotherapy and 1:12 or less for speech therapy) (see **Exhibit 1.15**).

- A minority of facilities (20) provided at least one of the core therapy sessions on weekends (see **Exhibit 1.16**).

Wait times for inpatient rehabilitation are improving.

- The proportion of stroke survivors admitted to inpatient rehabilitation within 7 days of their acute stroke improved significantly, from 25.7% in 2011/12 to 32.1% in 2014/15 (p<0.0001) (see **Exhibit 1.17**).[5]

- In 2014/15, the median time from admission to hospital for acute stroke to admission to inpatient rehabilitation was 9 days, a decrease from 10 days in 2011/12 (p<0.0001).[5] However, across the LHINs, the time to inpatient rehabilitation varied from 6 to 14 days (see **Exhibit 1.5**). Compared to 2011/12, the variation in timely access decreased from 10 days to 8 days across LHINs in 2014/15.[5]

- In 2014/15, non-freestanding facilities with stroke-focused rehabilitation teams had the shortest time to rehabilitation (7 days; see **Exhibit 1.14**).

The Ontario Stroke Rehabilitation Survey revealed that several processes are used to determine admissions to inpatient rehabilitation. The 2015 auditor general's report on rehabilitation in Ontario highlighted variation in rehabilitation admission processes as an area for improvement and recommended that all inpatient rehabilitation hospitals implement systems for accepting referrals electronically.[17]

Despite admitting more survivors with a higher level of disability to inpatient rehabilitation, the vast majority still go home.

- There was a 6-point decrease in the median total admission FIM score, from 76 in 2011/12 to 70 in 2014/15 (p<0.0001) (see **Exhibit 1.6**).[5]

- Among inpatient rehabilitation facilities, the level of survivor disability increased, which is a positive trend suggesting improved access to rehabilitation for more disabled survivors and earlier admission to inpatient rehabilitation.

- In 2014/15, women had a lower median total admission FIM score compared to men (67 vs. 72; p<0.0001).

- Non-freestanding facilities with stroke-focused rehabilitation teams admitted more survivors with severe stroke (see **Exhibit 1.14**).

- Despite the increase in the proportion of stroke survivors with severe disability being admitted to inpatient rehabilitation, the majority of survivors (81.9%) continued to be discharged home in 2014/15; this was unchanged from 2011/12.[5] Few stroke survivors (3.5%) were discharged to long-term care following inpatient rehabilitation (see **Exhibit 1.8**).

Stroke survivors are gaining independence more quickly with treatment in inpatient rehabilitation.

- There was a 29% increase in median FIM efficiency. The daily inpatient median FIM increased from 0.7 points in 2011/12 to 0.9 points in 2014/15 (p<0.0001; see **Exhibit 1.3**).[5]

- In 2014/15, facilities with stroke-focused inpatient rehabilitation services had higher FIM efficiency per inpatient day (see **Exhibit 1.14**).

- The overall median active length of stay in inpatient rehabilitation decreased from 29 days in 2011/12 to 26 days in 2014/15 (p<0.0001; see **Exhibit 1.10**).

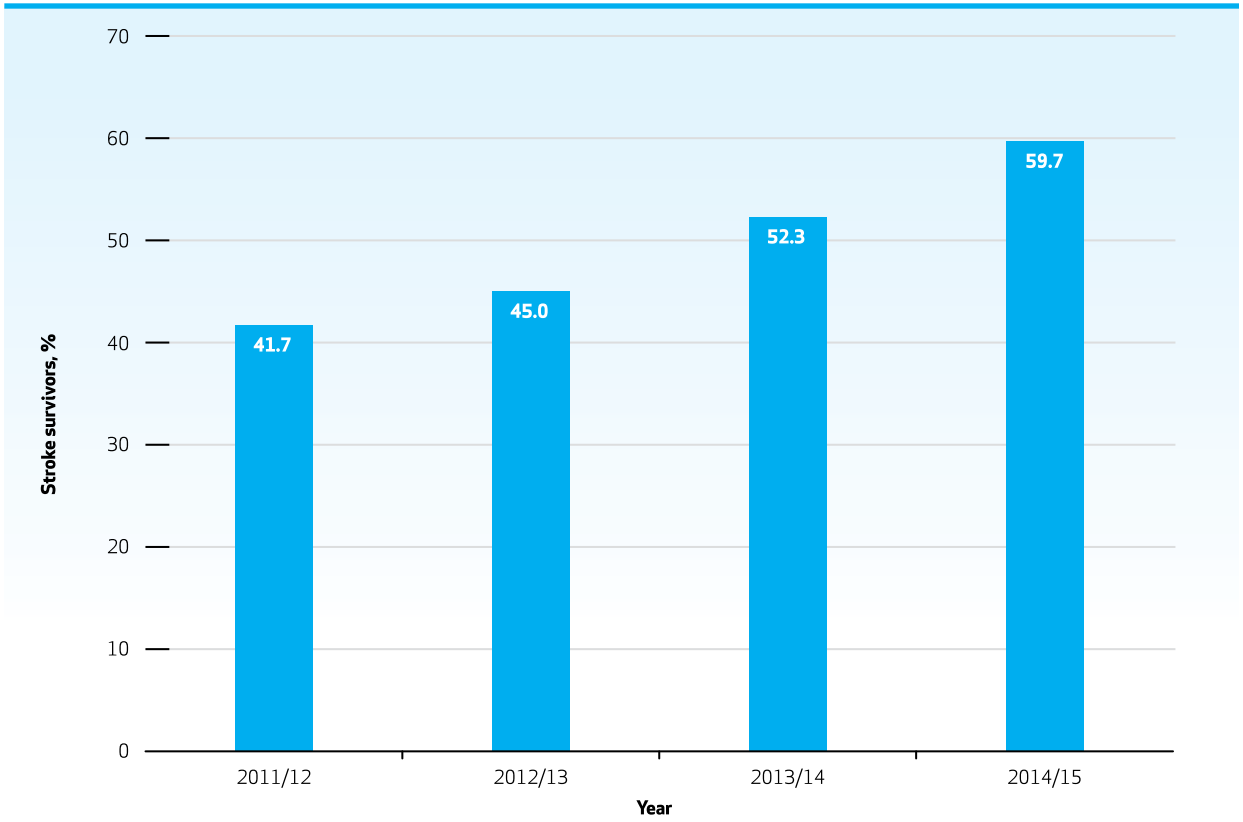
- Among disability groups, the median active length of stay was 13, 24 and 38 days for mild, moderate and severe stroke, respectively. Among

LHINs, variation in active length of stay was greatest in the group with severe stroke (see **Exhibits 1.11–1.13**). This may be a reflection of the variation in access to comprehensive outpatient rehabilitation (ambulatory or home-based).

Active length of stay targets recommended for stroke quality-based procedures for inpatient rehabilitation are being achieved more often.

- There was a 43% increase in the proportion of stroke survivors who achieved the RPG active length of stay target defined in the stroke QBP clinical handbook: 59.7% in 2014/15 compared to 41.7% in 2011/12 (p<0.0001) (see **Exhibit IV**).
- Compared to their urban counterparts, rural stroke survivors were less likely to achieve the RPG active length of stay target (60.5% vs. 54.3%, respectively; p=0.0005).
- The RPG active length of stay target was more likely to be achieved by stroke survivors admitted to facilities with stroke-focused rehabilitation service than by survivors admitted to facilities with non-stroke focused (mixed) rehabilitation services (see **Exhibit 1.14**). **Appendix H** provides the length of stay distribution among stroke survivors who exceeded the RPG active length of stay target.

EXHIBIT IV Proportion of stroke survivors admitted to inpatient rehabilitation achieving Rehabilitation Patient Group targets for active length of stay,[1] 2011/12–2014/15



Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2011/12–2014/15.

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

Exclusion criteria: Surivivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date).

Survey responses from 13 facilities noted that lack of funding or resources presented barriers to achieving stroke QBP recommendations; 11 facilities reported that limited access to outpatient and community-based stroke rehabilitation services affected their ability to meet stroke QBP RPG active length of stay targets and further reduce inpatient rehabilitation admissions for survivors with mild disability.

The pending availability of data measuring **rehabilitation intensity** will help inform processes of care associated with these improvements. Research has shown that less than 3 hours of rehabilitation therapy per day is associated with significantly lower total functional gain compared to 3 or more hours per day, and therapy directed by an occupational therapist, physiotherapist or speech-language pathologist has been shown to be most sensitive to functional gain.[18,19]

> ***"After approximately six weeks in acute care, I was transferred to St. Mary's on the Lake Hospital and things were looking up. Instead of having therapy once every other day as I was used to, now I had therapy four times every weekday. My rate of recovery was amazing."***
>
> ***Richard**, stroke survivor, Kingston, Ontario*

Home-Based Rehabilitation Services

Risk factors and comorbidities

Stroke survivors receiving home-based CCAC rehabilitation services following their acute stroke hospitalization were typically older and less likely to be rural residents, and had a lower prevalence of hemiplegia and paraplegia (10.1% vs. 21.2%) and a higher prevalence of dementia (10.0% vs. 4.2%) compared to stroke survivors receiving these services following inpatient rehabilitation (see **Exhibit 2.1**).

- Among LHINs, there was also wide variation in the proportion of survivors that had home-based CCAC rehabilitation services (see **Exhibit 2.2**). LHINs with stroke-focused, community-based rehabilitation programs had the highest proportion of survivors who had home-based CCAC rehabilitation visits.
- The mean provincial wait time for home-based CCAC rehabilitation services was six days following admission to acute care and five days following admission to inpatient rehabilitation.

There was wide variation among the LHINs in the median wait time for the first rehabilitation therapist visit (see **Exhibit 2.3**). LHINs with stroke-specific, home-based CCAC rehabilitation programs in place had more timely access following inpatient rehabilitation (e.g., the South East and Waterloo Wellington LHINs at 3 and 2 median days, respectively).

The number of home-based CCAC rehabilitation therapy visits across all rehabilitation professions over a 60-day period remains insufficient to obtain optimal outcomes.

- Stroke survivors discharged from acute care to home-based rehabilitation provided by a CCAC received an average of 5 home-based visits[m] over a 60-day period; those discharged from inpatient rehabilitation had an average of 6 home-based visits (see **Exhibit 2.4**).
- Among the LHINs, the average number of home-based CCAC rehabilitation visits over 60 days was 4-18 following inpatient rehabilitation and 4-7 following acute care.

Significant increases in the number of visits are required to support the stroke QBP recommended levels of 2–3 visits per rehabilitation professional per week for 8–12 weeks.[16]

[m]Includes physiotherapy, occupational therapy, speech-language pathology and social work.

> *"Physiotherapy and occupational therapy were really good.... The fact that they came to my home was important as it meant I didn't have to go anywhere. It's hard to get places when you have had a stroke. It takes 45 minutes just to get to Kingston."*
>
> *Stroke survivor receiving CCAC rehabilitation services*

Outpatient and Ambulatory Rehabilitation Services

There is no access to comprehensive early supported discharge programs and limited access to comprehensive outpatient rehabilitation.

Just over half (51%) of all stroke survivors were admitted to inpatient rehabilitation facilities that had comprehensive outpatient rehabilitation (see **Exhibit 3.2**).

The proportion of mild stroke survivors admitted to inpatient rehabilitation was lower among facilities with comprehensive outpatient rehabilitation services compared to facilities without such services (11.5% vs. 13.9%; p=0.0155) (see **Exhibit 3.2**).

Ontario Stroke Rehabilitation Survey revealed a strong need to enhance outpatient rehabilitation service delivery models.

Eighteen sites reported a focus on improving outpatient programs for stroke, including adjusting staff allocations for outpatients, improving the transition from inpatient to outpatient care, and decreasing the wait time to first outpatient or ambulatory clinic visit. In addition, the sites were looking to increase collaboration with community partners such as Community Care Access Centres, cardiac rehabilitation programs and community exercise groups. Survey respondents consistently noted a strong need to enhance outpatient service delivery models, but inadequate funding and resources were identified as barriers to the delivery of programs that meet best practice standards and growing demand.

Limitations

The following limitations should be considered when interpreting the findings in this report.

1. AlphaFIM data collection began in the CIHI-DAD in 2014/15, but insufficient data were available to evaluate the stroke QBP recommendation for inpatient rehabilitation (the setting for stroke survivors with AlphaFIM scores of 40–80) and inform the need for and access to rehabilitation services.
2. Data were not available in existing data sets to evaluate:
   - quality of life and community reintegration indicators.
   - effectiveness and efficiency of home-based CCAC rehabilitation services.
   - the amount of therapy associated with optimal outcomes, as rehabilitation intensity (the amount of time stroke survivors spend in one-on-one therapy in inpatient rehabilitation) was not measured in 2014/15.
   - ambulatory rehabilitation services beyond those provided through Community Care Access Centres.
   - whether the observed reduction in the proportion of survivors of mild stroke admitted to inpatient rehabilitation was a result of access to outpatient rehabilitation services.
3. Outcomes such as death and long-term care admission at one year were not considered.

Conclusions

This report provides a comprehensive examination of the state of stroke rehabilitation in Ontario in 2014/15, 18 months after the release of the *Quality-Based Procedures: Clinical Handbook for Stroke* and following the *2013 Annual Report of the Office of the Auditor General of Ontario*.[12,15] For Ontario stroke survivors, improvements have been observed within inpatient rehabilitation, with little change in home-based CCAC rehabilitation. Compared to results from 2011/12, the 2014/15 analyses show the following:

1. The inpatient rehabilitation setting of stroke care demonstrated improvement.

    - Almost 1,000 additional stroke survivors received the stroke rehabilitation services they needed.
    - Significantly more stroke survivors, particularly those with severe disability, accessed inpatient rehabilitation while maintaining 80% of survivors being discharged back to the community.
    - Increased daily functional gains, as measured by the median FIM efficiency per inpatient day, increased from 0.7 points in 2011/12 to 0.9 points in 2014/15.[5]
    - The proportion of stroke survivors achieving the active length of stay target for their level of disability increased from 41.7% in 2011/12 to 59.7% in 2014/15.

2. For the first time, the impact of inpatient rehabilitation care models and access to comprehensive outpatient rehabilitation teams was examined.

    - Stroke survivors receiving rehabilitation from stroke-focused rehabilitation teams were more likely to achieve their target length of stay compared to facilities without stroke-focused teams (63.7% and 53.6%, respectively).
    - Facilities reporting comprehensive outpatient rehabilitation teams had a lower proportion of survivors with mild disability admitted to inpatient rehabilitation (11.5% vs 13.9%).

3. Despite the progress that was made, several areas of the stroke care system require improvement.

    - There was significant variation among Local Health Integration Networks in the implementation of stroke rehabilitation best practices and meeting stroke QBP recommendations, as well as access to these services for rural and urban populations.

    - There was limited provision of therapy on weekends, no early supportive discharge programs and only 3 facilities with rehabilitation professional staffing levels at recommended standards, which may explain the variation in timely access and failure to achieve the RPG active length of stay target.

    - Stroke survivors discharged from acute care to home-based CCAC rehabilitation received an average of 5 visits from all therapies combined over 8 weeks. Minimal improvements have been observed at the provincial level in home-based CCAC rehabilitation in relation to QBP-recommended levels of 2–3 visits per rehabilitation discipline per week for community programs.

    - Gaps in data quality and availability prevented a complete evaluation of the Ontario stroke rehabilitation system .

In a relatively short period of time (three years), there have been dramatic improvements in access to inpatient stroke rehabilitation services in Ontario, most notably for those with more severe disability. Close to 1,000 additional stroke survivors are receiving rehabilitation services within the current system despite the absence of a new funding policy or accountability agreements. The results reflect (a) the collaboration of the Ontario Stroke Network, the 11 Regional Stroke Networks and the 14 Local Health Integration Networks whose rehabilitation leadership identified stroke rehabilitation system improvement as a priority, and (b) the 2013 release of the *Quality-Based Procedures: Clinical Handbook for Stroke*, which lays out the procedures staff should adhere to when providing evidence-based care.[12]

While the improvements in access to inpatient stroke rehabilitation are impressive, persistent gaps in data prevent a comprehensive evaluation of Ontario's stroke rehabilitation system. Current efforts to increase the availability and quality of data in CIHI's National Rehabilitation Reporting System, Discharge Abstract Database and National Ambulatory Care Reporting System will be foundational to successful implementation of a comprehensive and efficient stroke rehabilitation system. There is opportunity for the stroke system to apply successes from regions where improvements have occurred in terms of access, timeliness and level of rehabilitation therapy service provided within inpatient and outpatient/community rehabilitation and through CCACs; a few of these success stories are highlighted in this report. Building capacity and best practice services in outpatient and community care are critical needs. Broader application of rehabilitation best practices and sharing of successful approaches between LHINs may improve coordination and reduce the variations in rehabilitation services observed.

> ***"The rehabilitation team spent time with me to work toward my goal of independence. This was usually one hour or more with a physiotherapist and an hour with an occupational therapist. The weekends (without the therapists) were hard, as I did not know what to do initially. I was so thankful to receive the intensive therapy that enabled my recovery."***
>
> ***Mark Gardner**, stroke survivor, Kingston, Ontario*

Recommendations

Guided by the findings in this report, the authors recommend the following:

1. The OSN/CCN should collaborate with the Ministry of Health and Long-Term Care, Health Quality Ontario, the 11 Regional Stroke Networks and the 14 Local Health Integration Networks to utilize the report findings to stimulate innovation and facilitate system transformation through strategies such as integrated funding models and the reorganization and regionalization of services where appropriate.

2. The OSN/CCN should collaborate with the Ministry of Health and Long-Term Care, Health Quality Ontario, the Canadian Institute for Health Information and the Rehabilitative Care Alliance to improve data availability and strive for consistency in quantifying rehabilitation outcomes across settings to better evaluate the system of rehabilitative care. Priorities for data enhancement should include outcome indicators that evaluate patient/survivor experience and quality of life, and the Rehabilitative Care Alliance's pilot to gather standardized data across Ontario's outpatient rehabilitation clinics for the National Ambulatory Care Reporting System (NACRS Clinic Lite).

3. The Local Health Integration Networks and Regional Stroke Networks should share and apply successes made in rehabilitation therapy in the areas of access, timeliness and level of service. Broader implementation of rehabilitation best practices should reduce observed variations in rehabilitation services among the Local Health Integration Networks.

4. Facilities providing inpatient stroke rehabilitation should identify opportunities to align with stroke quality-based procedures in recommended staffing ratios and evidence-based care, including the delivery of rehabilitation to stroke survivors that is early, specialized and intensive (i.e., 3 hours a day for at least 6 days a week).

5. Acute care hospitals treating stroke patients should identify opportunities to improve processes of care, including the adoption of a consistent method of assessing patient disability (i.e., AlphaFIM) and 7-day-a-week staffing that support timely transitions, achievement of length of stay targets and reduction of Alternate Level of Care days.

6. The OSN/CCN and the Ministry of Health and Long-Term Care should explore new ways to use existing and emerging technologies to facilitate access and optimize rehabilitation services for those individuals who live in rural and remote locations (e.g., Telemedicine).

7. Local Health Integration Networks and Regional Stroke Networks that do not provide comprehensive community rehabilitation (home-based or outpatient programs) should review the Ontario Stroke Network's 2016 report *Community Stroke Rehabilitation Models* in Ontario to inform their efforts to reduce inpatient rehabilitation admission and length of stay.[20]

8. All inpatient rehabilitation facilities should continue to consistently collect the number of minutes of therapy that survivors receive, using rehabilitation intensity data in the National Rehabilitation Reporting System.

9. Further study into models of care providing recommended levels of community rehabilitation (home-based and outpatient programs) is needed to help inform future demand and approaches to support the varying needs of urban and rural stroke survivors.

10. The impact of the rehabilitation care models identified in this report should be evaluated further, taking into account factors such as onset to rehabilitation, rehabilitation intensity, and acute care and community resources that may influence the outcomes observed in this report.

List of Exhibits

Inpatient Rehabilitation

Inpatient Rehabilitation – Stroke Quality-Based Procedures

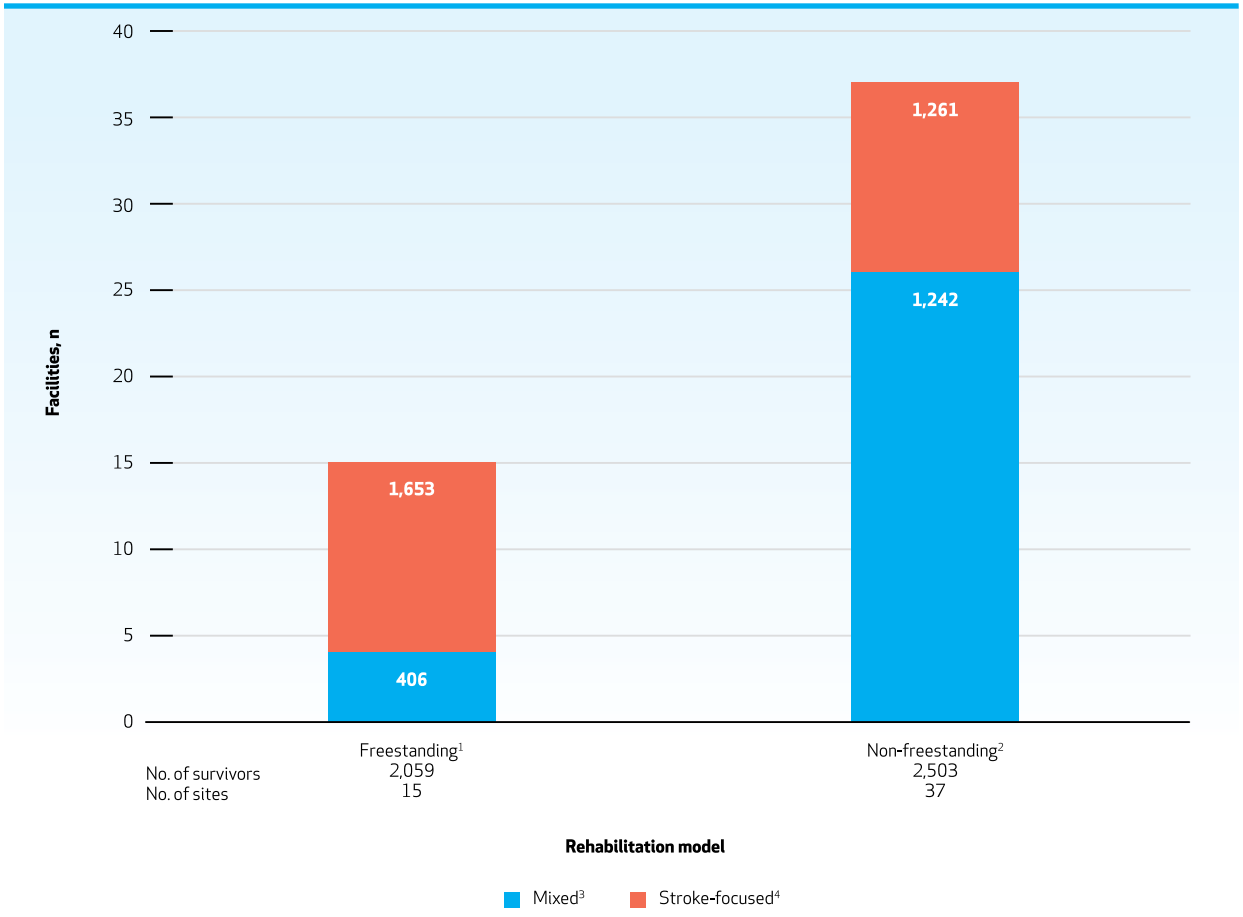
List of Exhibits

Home-Based Rehabilitation Services

Outpatient and Ambulatory Rehabilitation Services

Inpatient Rehabilitation

EXHIBIT 1.1 Number of stroke rehabilitation facilities and survivors, by rehabilitation model and physical setting, in Ontario, 2014/15



Key Findings

- Half of the facilities (26) were non-freestanding (i.e., located in an acute care organization) with a mixed rehabilitation unit.
- Less than half (45.1%) of the stroke survivors receiving inpatient rehabilitation were admitted to a freestanding facility, of which the majority (80.3%) were treated by stroke-focused rehabilitation teams.

Data sources: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS) and Ontario Stroke Rehabilitation Survey, 2014/15.
Inclusion criteria: All inpatient rehabilitation facilities with at least 6 survivor admissions aged ≥18 years classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=52 facilities).

[1] The stroke rehabilitation site is geographically separate from the acute stroke care hospital.

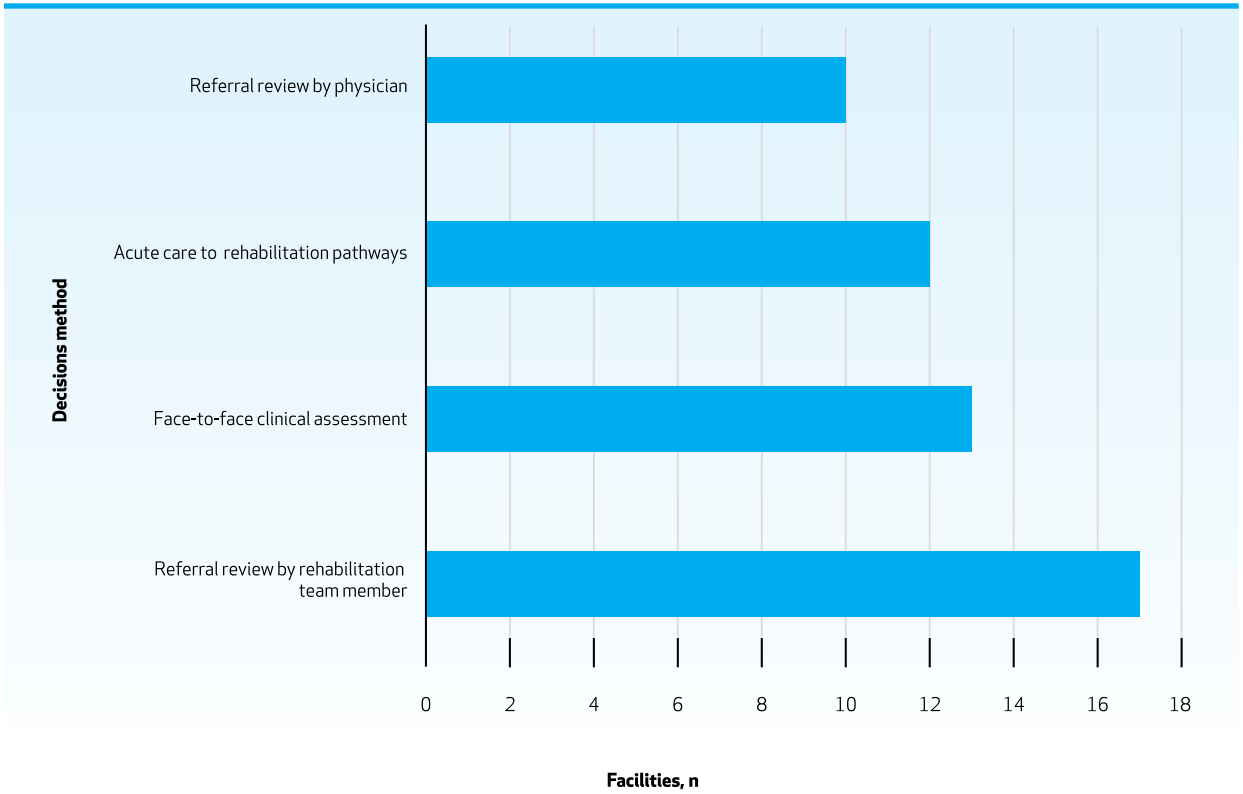
[2] Stroke rehabilitation and acute stroke care take place in the same building.

[3] Rehabilitation professionals serve multiple patient/survivor groups .

[4] Stroke survivors are co-located; rehabilitation professionals are focused on stroke care.

Note: (1) Survey results were self-reported.

EXHIBIT 1.2 Method of decision-making for stroke survivor admission to inpatient rehabilitation, in Ontario, 2014/15



Key Findings

- A rehabilitation team member reviewing referrals was the most frequently reported method (33%) of determining admission into inpatient rehabilitation. Sites indicated they often used more than one method.
- Less than 25% of facilities reported the use of pathways as a method of determining admission to inpatient rehabilitation.

Data sources: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS) and Ontario Stroke Rehabilitation Survey, 2014/15.
Inclusion criteria: All inpatient rehabilitation facilities with at least 6 survivor admissions aged ≥18 years classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=52 facilities).
Notes: (1) Survey results were self-reported. (2) Some facilities used multiple methods for decision making; however, only the most common method was reported in the survey.

EXHIBIT 1.3 Characteristics of adult stroke survivors in inpatient rehabilitation, in Ontario, 2014/15

Characteristics/Outcomes	Stroke Survivors
Ontario, n (%)	4,418 (35.0)
Female	2,027 (45.9)
Age, mean (median)	**72 (74)**
Age Group, years, n (%)	
18–45	136 (3.1)
46–65	1,201 (27.2)
66–75	1,033 (23.4)
76–85	1,295 (29.3)
>85	753 (17.0)
Income Quintile, n (%)	
1 (lowest)	1,049 (23.9)
2	956 (21.8)
3	843 (19.2)
4	760 (17.3)
5 (highest)	785 (17.9)
Rural,[1] n (%)	548 (12.4)
Total Admission FIM, median (IQR)	70 (52–86)
Total Discharge FIM, median (IQR)	103 (81–114)
FIM Efficiency Score, median	0.9
Disability Level, n (%)	
Mild	**547 (12.5)**
RPG 1160	176 (4.0)
RPG 1150	371 (8.5)
Moderate	**1,958 (44.7)**
RPG 1140	360 (8.2)
RPG 1130	627 (14.3)
RPG 1120	971 (22.2)
Severe	**1,873 (42.8)**
RPG 1110	1,305 (29.8)
RPG 1100	568 (13.0)
Comorbidities, n (%)	
Hypertension	2,902 (65.7)
Diabetes	1,434 (32.5)
Atrial fibrillation	1,378 (31.2)
Hemiplegia or paraplegia	968 (21.9)
Hyperlipidemia	807 (18.3)
Depression	390 (8.8)

Key Findings

- In 2014/15, 4,418 stroke survivors were admitted to inpatient rehabilitation following an acute stroke hospitalization.
- Women represented 45.9% of the stroke inpatient rehabilitation population and were , on average, six years older than men (77 years vs. 71 years, data not shown).
- Among stroke survivors admitted to inpatient rehabilitation, 80% were between 46 and 85 years of age. Men represented 63.6% of those aged 46–65 and 59.2% of those aged 66–75. Women represented 62.8% of the over-85 age group (data not shown).
- The median total admission FIM® score was 70; 42.8% of inpatient stroke rehabilitation survivors were considered to have severe disability while 12.5% were considered to have mild disability.
- The median total discharge FIM score was 103. There was a 33-point change over active inpatient rehabilitation length of stay and a median FIM efficiency score of 0.9.

EXHIBIT 1.3 Characteristics of adult stroke survivors in inpatient rehabilitation, in Ontario, 2014/15 (continued)

Characteristics/Outcomes	Stroke Survivors	
Comorbidities, n (%) (continued)		
Carotid stenosis	357 (8.1)	
Congestive heart failure	342 (7.7)	
Chronic obstructive pulmonary disease	282 (6.4)	
Cerebrovascular disease	243 (5.5)	
Myocardial infarction	232 (5.3)	
Previous stroke/TIA	168 (3.8)	
Dementia	161 (3.6)	
Renal disease	192 (4.3)	
Peripheral vascular disease	146 (3.3)	
Charlson Comorbidity Index score ≥2	2,386 (54.0)	
Living Setting,[2] n (%)		
	Admission	**Discharge**
Home without health services	3,333 (85.9)	1,113 (28.7)
Home with paid health services	294 (7.6)	1,614 (41.6)
Assisted living	204 (5.3)	357 (9.2)
Residential care	30 (0.8)	403 (10.4)
Boarding house, shelter or public place, other/unknown	20 (0.5)	159 (4.1)
Acute care	n/a	235 (6.1)
Living Arrangements[3] n (%)		
With other(s)[4]	2,685 (69.2)	2,301 (59.3)
Alone	1035 (26.7)	563 (14.5)
Care facility[5]	142 (3.7)	739 (19.1)
Other/unknown	16 (0.4)	70 (1.8)
Transitional/temporary	n/a	88 (2.3)
Acute care	n/a	117 (3.0)

- Hypertension (65.7%), diabetes (32.5%) and atrial fibrillation (31.2%) were the most common comorbidities and risk factors among stroke survivors admitted to inpatient rehabilitation.
- Prior to their acute stroke, over 90% of survivors were at home, either living with others or alone.
- Following inpatient rehabilitation, close to 75% of stroke survivors were discharged home to live with others or alone.
- Less than 1% of survivors were in residential care prior to their acute stroke, but following rehabilitation, 10% of survivors were discharged to residential care.

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors 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; survivors had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge (N=4,418). A survivor's medical comorbidities were determined by linking the acute stroke event using an encrypted health card number to the CIHI-DAD where up to 25 diagnoses may be recorded on the discharge abstract with a 2-year lookback. The ICD-10-CA diagnostic code was used to determine the presence of any comorbid condition as defined by the Charlson Comorbidity Index.

[1] Rural survivors were defined as those residing in communities with a population of 10,000 or less.

[2] Among those with non-missing information in both the admit and discharge living setting code(n=3,881).

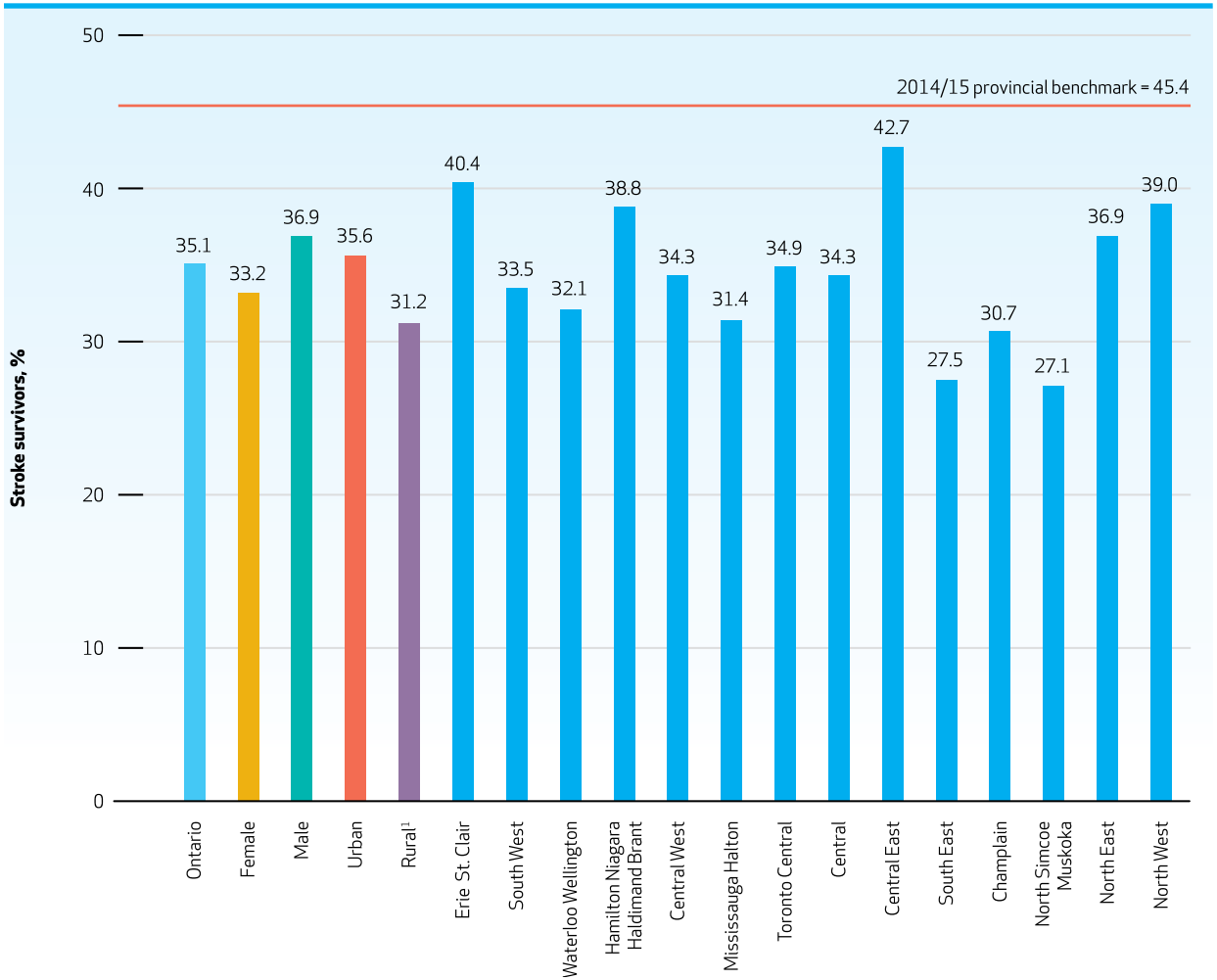
[3] Among those with non-missing information in both the admit and discharge living arrangement code (n=3,878).

[4] Living with others includes spouse/partner, family, non-family (unpaid) or with paid attendant.

[5] Care facility includes living in hospital, long-term care, residential care or nursing home.

Notes: (1) Rurality and income quintile are based on survivors with non-missing postal codes, and RPG results are based on survivors with non-missing RPG. (2) FIM® = Functional Independence Measure; a registered trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.

EXHIBIT 1.4 Proportion of adult stroke survivors admitted to inpatient rehabilitation, in Ontario and by sex, rurality and Local Health Integration Network, 2014/15



Key Findings

- Among stroke survivors, 35.1% were admitted to inpatient rehabilitation following an acute stroke, with significantly more men admitted than women (36.9% vs. 33.2%, p<0.0001).
- Among stroke survivors, 35.6% of those living in urban communities were admitted to inpatient rehabilitation, compared to 31.2% of those living in rural communities (p<0.0001).
- Following an acute stroke, 42.7% of stroke survivors residing in the Central East LHIN were admitted to inpatient rehabilitation compared to 27.1% of those residing in the North Simcoe Muskoka LHIN.

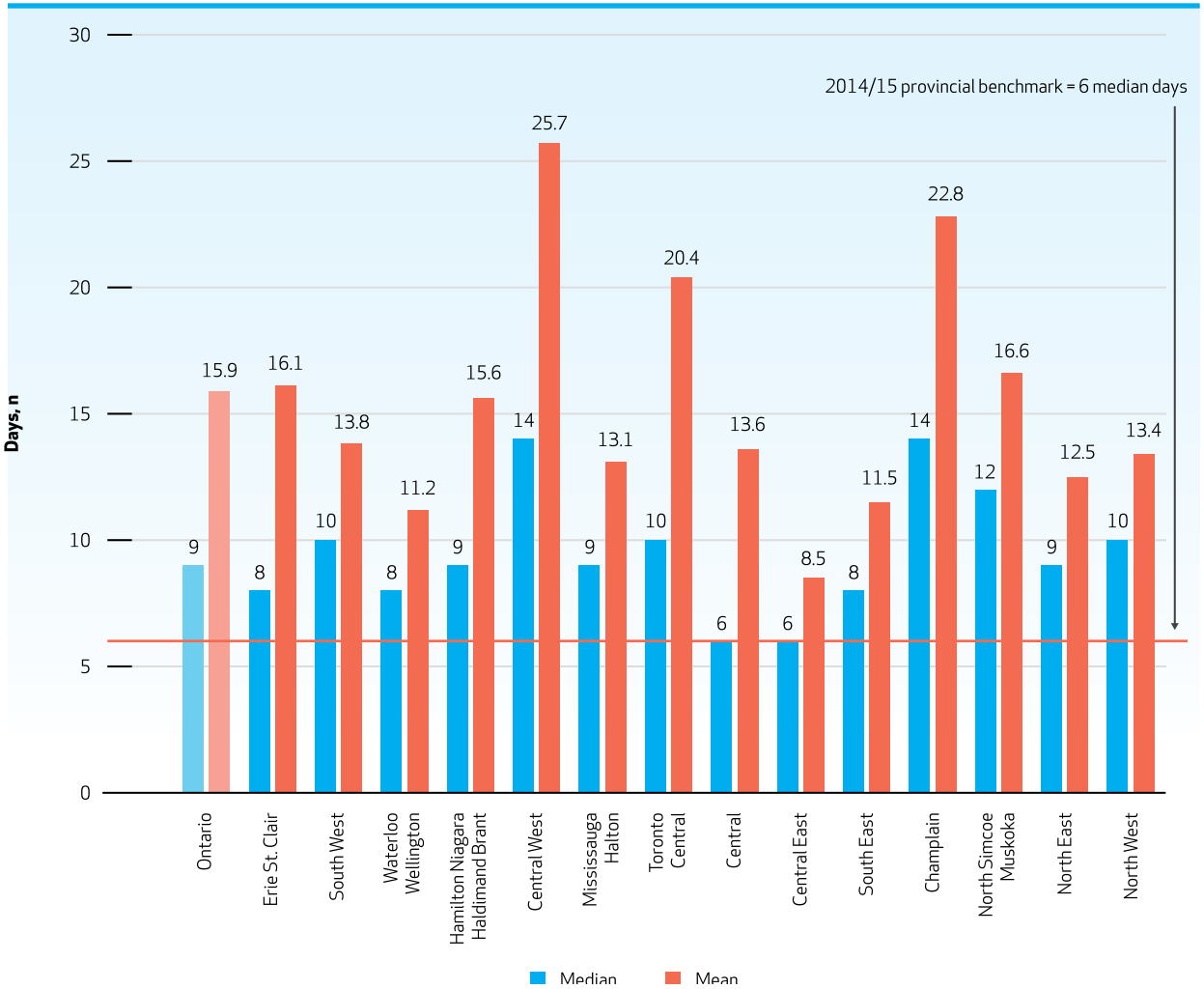
Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors aged ≥18 years with a diagnosis of stroke excluding transient ischemic attack (using ICD-10 codes) discharged from an acute care hospital (N=12,583), admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database, had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge (n=4,412) and a non-missing postal code.

[1] Rural survivors were defined as those residing in communities with a population of 10,000 or less.

Notes: (1) Population-based analysis (i.e., the location of the survivor's residence is used to report regional performance). (2) LHIN populations were determined using the files POPLHIN 2003–2013, POPLHIN_PROJECTED 2014 from the Ontario Ministry of Health and Long-Term Care: IntelliHealth Ontario. (3) For the provincial benchmark calculation, see Hall et al. Ontario and LHIN 2014/15 Stroke Report Cards and Progress Reports: Active Knowledge Exchange to Drive System Integration and Stroke Best Practices. Toronto, ON: Institute for Clinical Evaluative Sciences; 2016.

EXHIBIT 1.5 Median and mean number of days from stroke onset to admission to inpatient rehabilitation for adult stroke survivors, in Ontario and by Local Health Integration Network, 2014/15



Key Findings

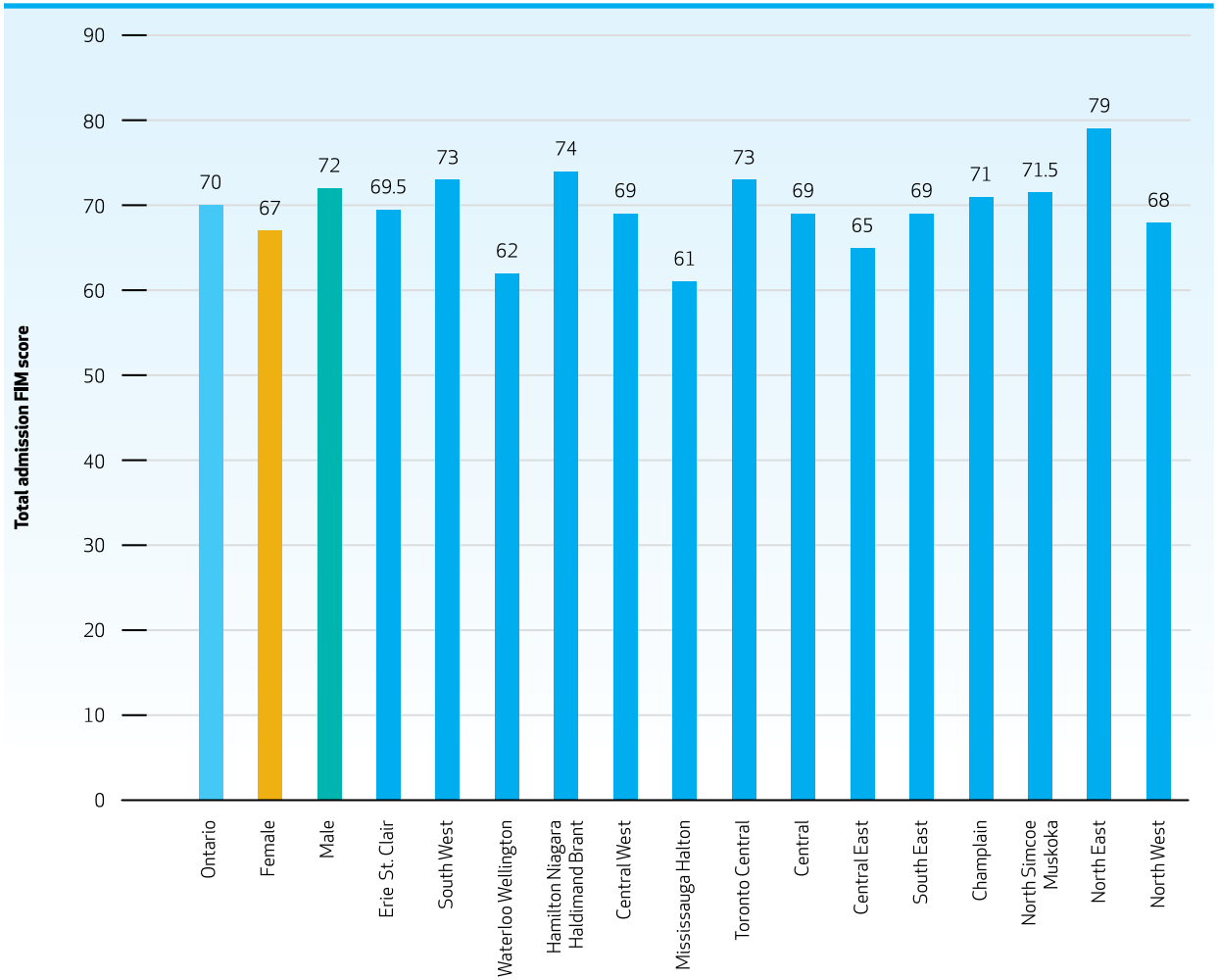
- The median time from an acute stroke hospitalization until admission to inpatient rehabilitation was 9 days.
- Stroke survivors admitted to facilities in the Central and Central East LHINs had the shortest time to inpatient rehabilitation (6 days), and those admitted to facilities in the Central West and Champlain LHINs had the longest (14 days).

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors 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, classified as Rehabilitation Client Group 1 (Stroke) in the NRS database , had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge (N=4,418).

Note: For the provincial benchmark calculation, see Hall et al. *Ontario and LHIN 2014/15 Stroke Report Cards and Progress Reports: Active Knowledge Exchange to Drive System Integration and Stroke Best Practices.* Toronto, ON: Institute for Clinical Evaluative Sciences; 2016.

EXHIBIT 1.6 Median total admission FIM® score for stroke survivors in inpatient rehabilitation, in Ontario and by Local Health Integration Network and sex, 2014/15



Key Findings

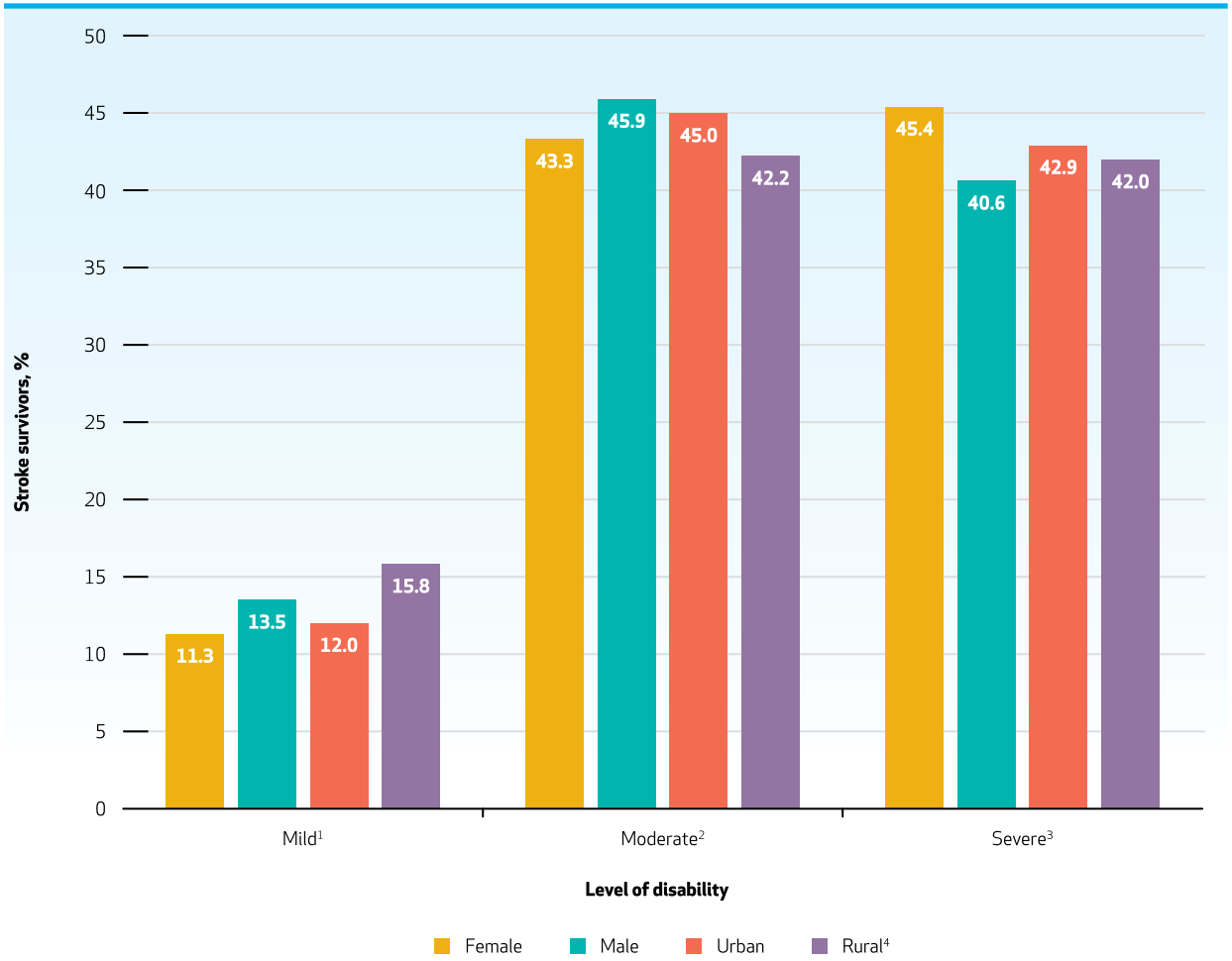
- The median total admission FIM score for stroke survivors was 70.
- Women were admitted to inpatient rehabilitation with a higher level of disability than men (a median FIM score of 67 vs. 72; p<0.0001).
- Among the LHINs, the median total admission FIM score varied by 18 points, ranging from 79 points in the North East LHIN to 61 points for in the Mississauga Halton LHIN. (A lower score indicates a greater level of disability or dependence.)

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors 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; survivors had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge (N=4,418).

Note: FIM® = Functional Independence Measure; a registered trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.

EXHIBIT 1.7 Proportion of stroke survivors in inpatient rehabilitation with mild, moderate and severe disability, by sex and rurality, in Ontario, 2014/15



Key Findings

- The distribution of mild, moderate and severe stroke differed between men and women (p=0.0028).
- A greater proportion of men with mild or moderate disability were admitted to inpatient rehabilitation compared to women (13.5% and 11.3% vs. 45.9% and 43.3%, respectively). A greater proportion of women with severe disability were admitted to inpatient rehabilitation compared to men (45.4% vs. 40.6%).
- The distribution of mild, moderate and severe stroke differed between urban and rural stroke survivors (p=0.0044).
- Rural stroke survivors with mild disability and urban stroke survivors with moderate disability were more likely to be admitted to inpatient rehabilitation.

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors 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; survivors had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge and non-missing postal code and Rehabilitation Patient Group (RPG) (N=4,372).

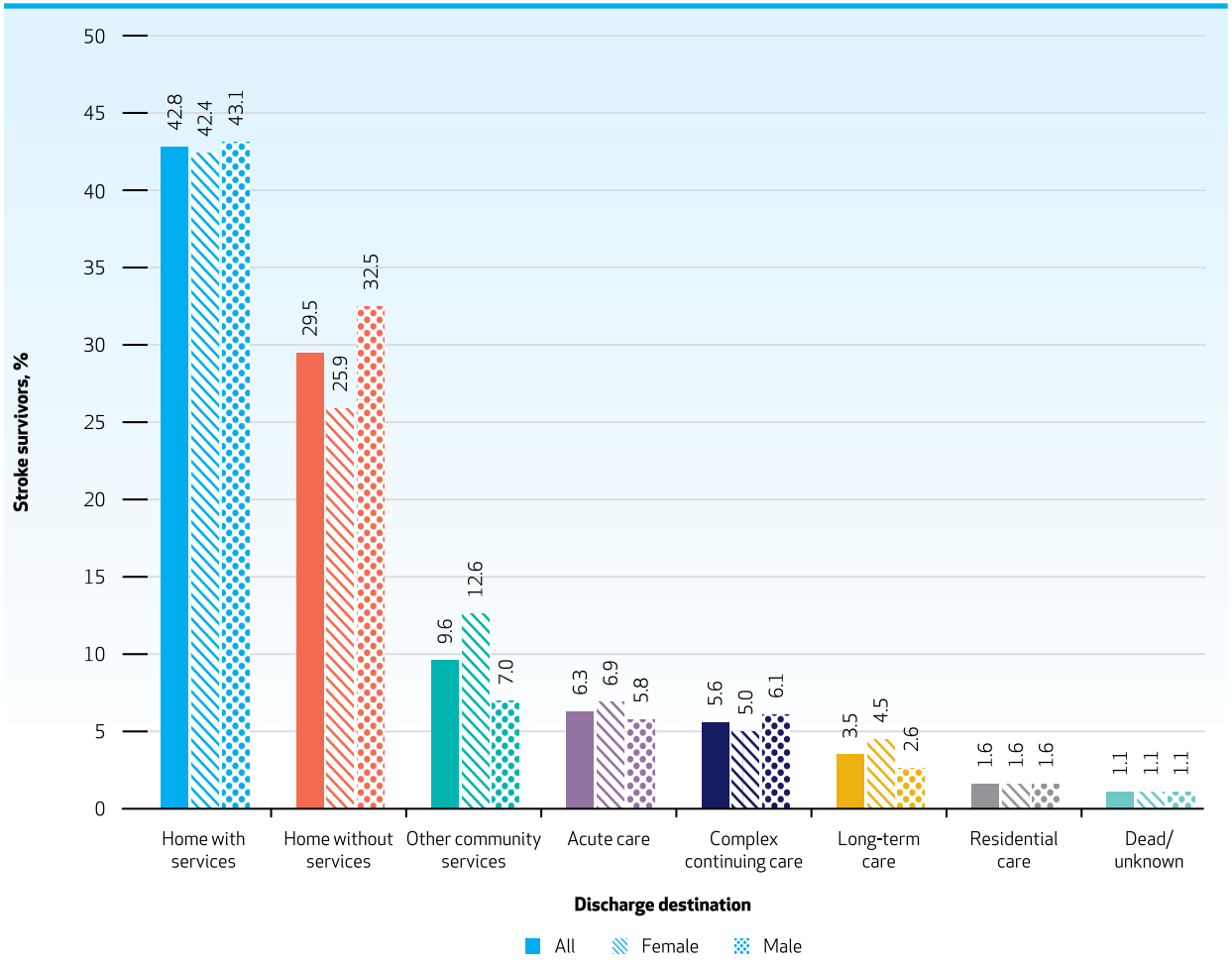
[1] Mild disability = RPGs 1150 and 1160.

[2] Moderate disability = RPGs 1120, 1130 and 1140.

[3] Severe disability = RPGs 1100 and 1110.

[4] Rural survivors were defined as those residing in communities with a population of 10,000 or less.

EXHIBIT 1.8 Discharge destinations of stroke survivors following inpatient rehabilitation, by sex, in Ontario, 2014/15



Key Findings

- Following inpatient rehabilitation, 81.9% of stroke survivors were discharged home with or without services or other community services.
- Following inpatient rehabilitation, 9.1% of stroke survivors were discharged to complex continuing care or long-term care.
- There were significant differences in discharge destinations for women and men ($p<0.0001$). In particular, women were less likely to be sent home without services (25.9% vs. 32.5%), more likely to be discharged home with other community services (12.6% vs. 7.0%) and more likely to be discharged to a long-term care facility (4.5% vs. 2.6%) than men.

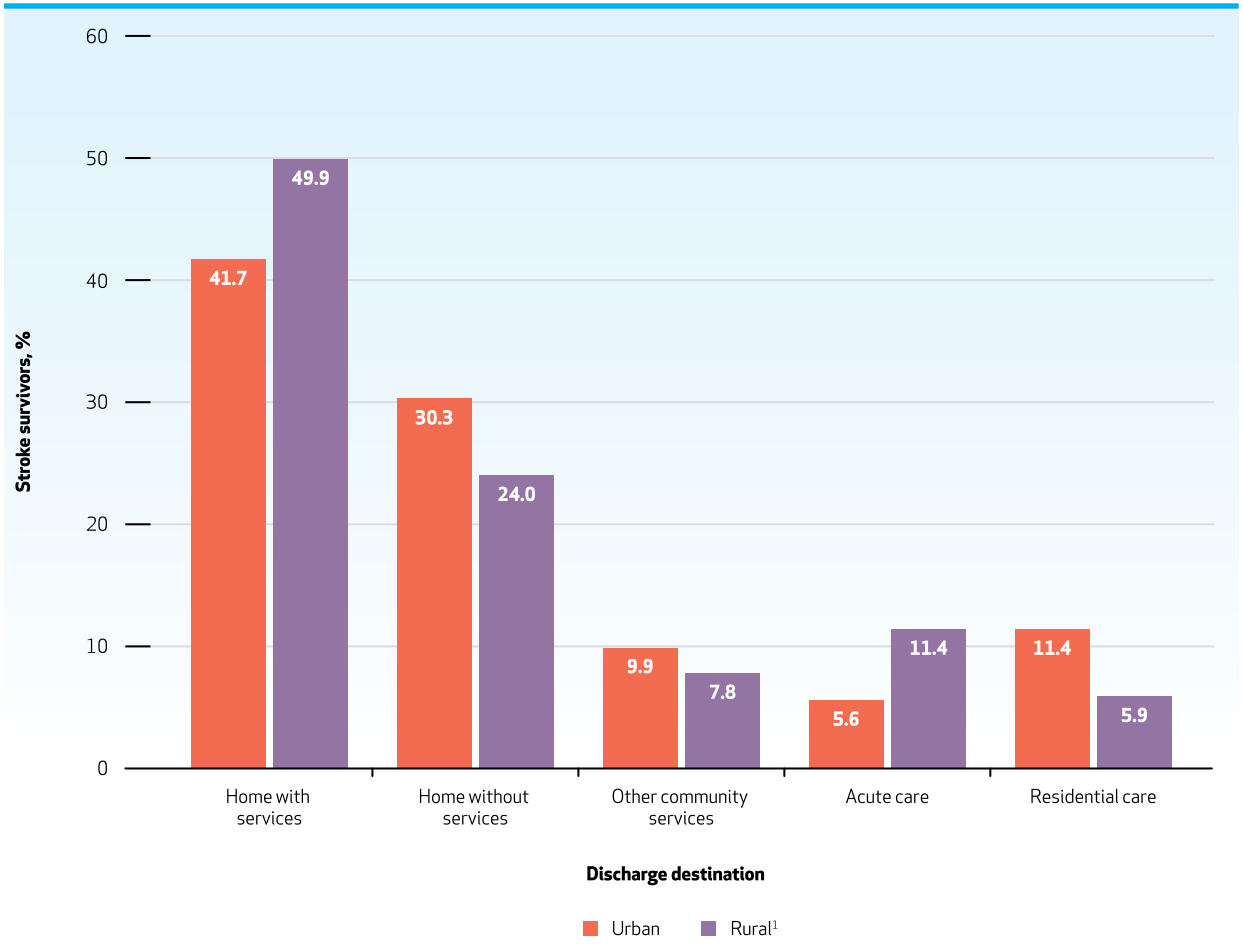
Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors 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; survivors had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge (N=3,772).

Exclusion criteria: Survivors with missing discharge destination.

Note: Residential care discharge disposition in the NRS was separated into complex continuing care (CCC), long-term care (LTC) and residential care using the referred-to facility number. Those with referred-to facility numbers that matched CCC or LTC facility numbers were categorized as CCC or LTC, respectively, and those with blank or other facility codes not matching a CCC or LTC facility number were categorized as residential care. Valid CCC and LTC facility numbers were obtained from the CCRS database.

EXHIBIT 1.9 Discharge destinations of urban and rural stroke survivors following inpatient rehabilitation, in Ontario, 2014/15

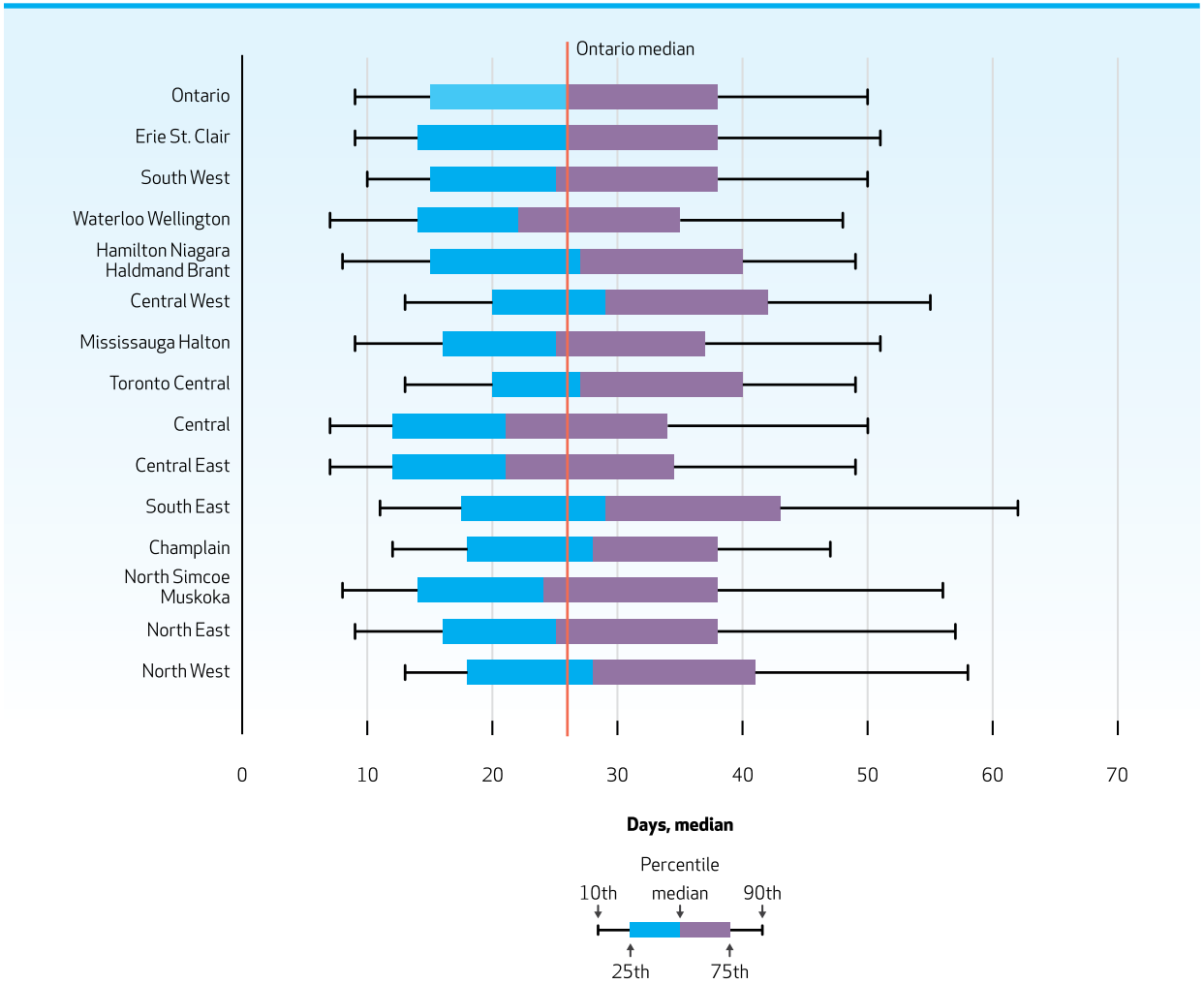


Key Findings

- There was a significant difference in the distribution of discharge destinations following inpatient rehabilitation ($p<0.0001$).
- Among rural stroke survivors , more went home with services, more went to acute care and fewer went to complex continuing care or long-term care, compared to urban stroke survivors (49.9% vs. 41.7% , 11.4% vs. 5.6% and 5.9% vs. 11.4%, respectively).

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and National Rehabilitation Reporting System (NRS), 2014/15.
Inclusion criteria: All survivors 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; survivors had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge (N=3,767).
Exclusion criteria: Survivors with missing postal code and discharge destination.
[1] Rural survivors were defined as those residing in communities with a population of 10,000 or less.
Notes: (1) Residential care includes complex continuing care and long-term care. (2) Survivors with discharge destinations of unavailable, unknown or dead are not shown due to their low numbers.

EXHIBIT 1.10 Median active length of stay[1] in inpatient rehabilitation for stroke survivors, in Ontario and by Local Health Integration Network, 2014/15



Key Findings

- The median active length of stay in inpatient rehabilitation for stroke survivors was 26 days (IQR 15–38).
- Among LHINs, there was an 8-day variation in the median active length of stay. Stroke survivors admitted to facilities in the Central and Central East LHINs had the shortest length of stay (21 days), and those admitted to facilities in the Central West and South East LHINs had the longest (29 days).

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.

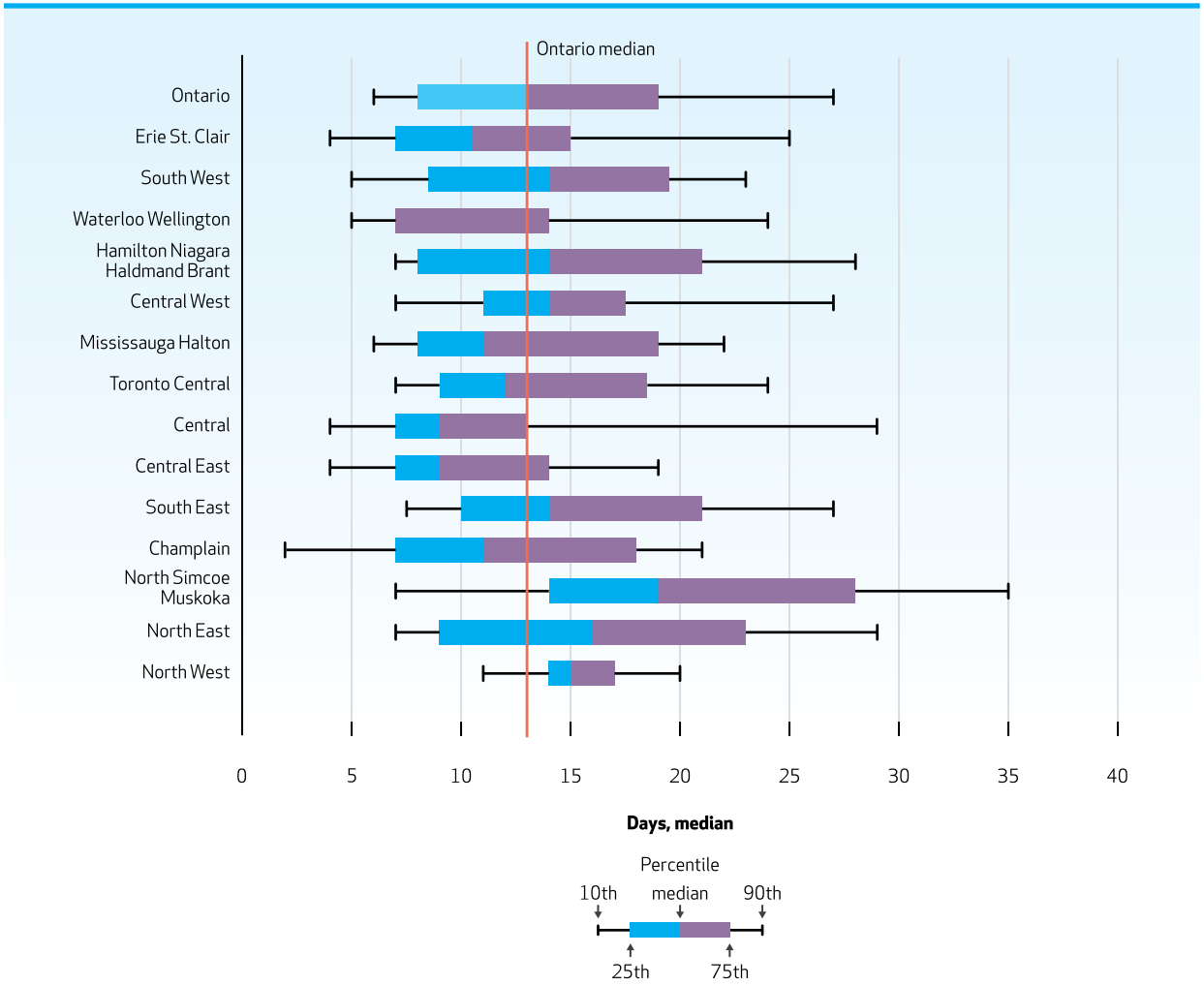
Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=4,619).

Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date and those with a missing Rehabilitation Patient Group.

[1] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date).

IQR = interquartile range

EXHIBIT 1.11 Median active length of stay[1] in inpatient rehabilitation for stroke survivors with mild disability,[2] in Ontario and by Local Health Integration Network, 2014/15



Key Findings

- Among stroke survivors with mild disability, the median active length of stay in inpatient rehabilitation was 13 days (IQR 8–19).
- There was a 12-day variation across LHINs in the median active length of stay for stroke survivors with mild disability.
- Stroke survivors admitted to facilities in the Waterloo Wellington LHIN had the shortest median active length of stay (7 days) and those admitted to facilities in the North Simcoe Muskoka LHIN had the longest (19 days).

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) and mild[2] disability in the NRS database (N=596).

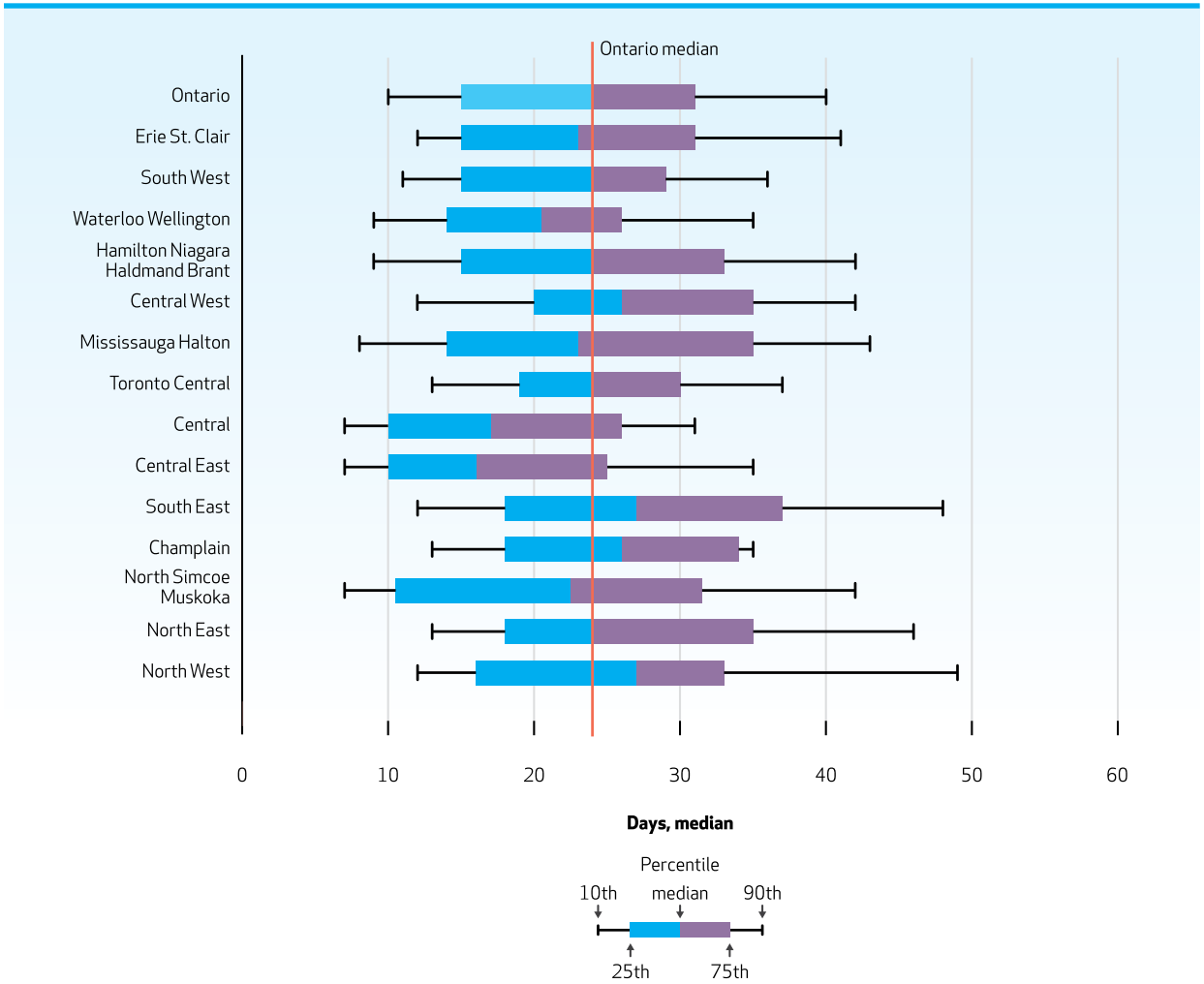
Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date).

[2] Mild disability = Rehabilitation Patient Groups 1150 and 1160.

IQR = interquartile range

EXHIBIT 1.12 Median active length of stay[1] in inpatient rehabilitation for stroke survivors with moderate disability,[2] in Ontario and by Local Health Integration Network, 2014/15



Key Findings

- Among stroke survivors considered to have moderate disability, the median active length of stay in inpatient rehabilitation was 24 days (IQR 15–31).
- Among LHINs, there was an 11-day variation in the median active length of stay for survivors with moderate disability.
- Stroke survivors admitted to facilities in the Central East LHIN had the shortest active median length of stay in inpatient rehabilitation (16 days) and those admitted to facilties in the South East and North West LHINs had the longest (27 days).

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) and moderate disability in the NRS database (N=2,116).

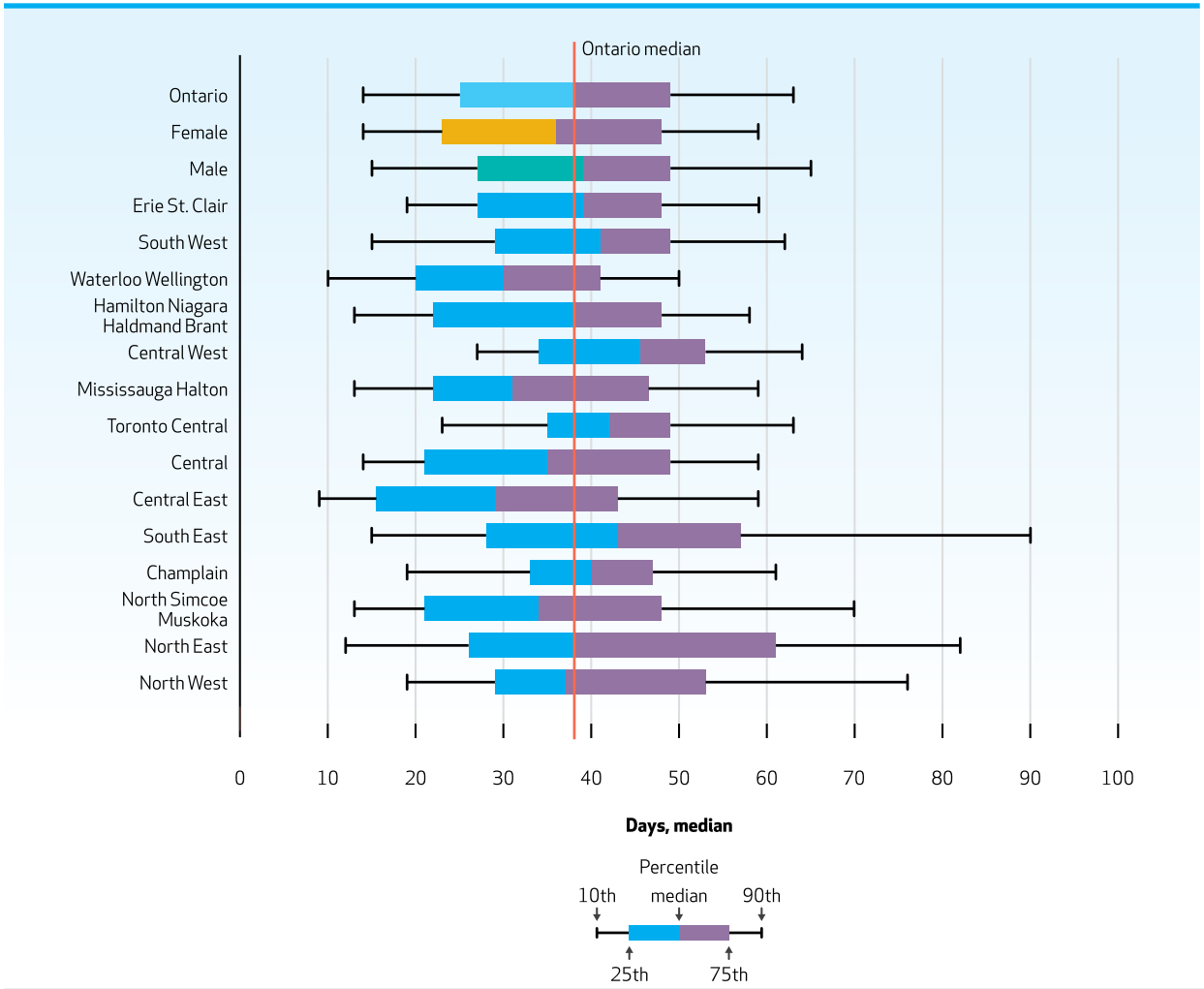
Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date).

[2] Moderate disability = Rehabilitation Patient Groups 1120, 1130 and 1140.

IQR = interquartile range

EXHIBIT 1.13 Median active length of stay[1] in inpatient rehabilitation for stroke survivors with severe disability,[2] in Ontario and by Local Health Integration Network, and sex, 2014/15



Key Findings

- Among stroke survivors with severe disability, the median active length of stay in inpatient rehabilitation was 38 days (IQR 25–49).
- Men with severe disability had a longer median active length of stay compared to women (40.6 days vs. 37.4 days; p=0.0004).
- There was a 16.5-day variation among LHINs in the median active length of stay in inpatient rehabilitation for stroke survivors with severe disability.
- Stroke survivors admitted to facilities in the Central East LHIN had the shortest median active length of stay ,and those admitted to facilities in the Central West LHIN had the longest (29 days and 45.5 days, respectively).

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) and severe disability in the NRS database (N=1,907).

Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date).

[2] Severe disability = Rehabilitation Patient Groups 1100 and 1110.

IQR = interquartile range

EXHIBIT 1.14 Characteristics of stroke rehabilitation facilities, by physical setting and rehabilitation model, in Ontario, 2014/15

Characteristics	Freestanding, Mixed[1]	Non-Freestanding, Mixed[2]	Freestanding, Stroke-Focused[3]	Non-Freestanding, Stroke-Focused[4]
Facilities, N	4	26	11	11
Stroke survivors, N (%)	406 (8.8)	1,242 (27.2)	1,653 (36.2)	1,261 (27.6)
Mild disability,[5†] n (%)	51 (12.6)	233 (18.8)	146 (8.8)	147 (11.7)
Moderate disability,[6†] n (%)	177 (43.6)	529 (42.6)	891 (53.9)	500 (39.7)
Severe disability,[7†] n (%)	178 (43.8)	480 (38.6)	616 (37.3)	614 (48.7)
Indicators				
Median onset days to rehabilitation,[8†]	9	9	12	7
Median total admission FIM score,[8†]	67	72	71	66
Median active length of stay (days),[9†]	28	26	28	21
Facilities achieving the target active length of stay by RPG, %				
Overall[†]	58.1	52.1	61.1	67.1
1150 mild[‡]	14.6	14.4	6.5	21.6
1140 moderate	30.8	37.9	41.3	49.0
1130 moderate[‡]	58.1	54.7	65.2	70.3
1120 moderate[¥]	73.1	71.4	82.4	83.7
1110 severe[¤]	66.7	68.6	64.5	76.7
1100 severe[‡]	65.5	53.8	62.6	70.7
Median FIM efficiency for moderate strokes[†]	1.1	0.9	1.0	1.1
Discharge disposition to home with or without services,[8] %				
Overall[†]	76.2	67.4	78.6	68.0
Mild disability[5¥]	93.5	91.3	96.7	96.2
Moderate disability[6†]	85.7	77.4	87.6	84.7
Severe disability[7†]	61.5	45.4	60.6	45.5

Key Findings

- Freestanding facilities with stroke-focused rehabilitation teams admitted the highest proportion of survivors with moderate strokes while non-freestanding facilities with stroke-focused rehabilitation teams admitted the highest proportion of survivors with severe strokes.
- Non-freestanding facilities with stroke-focused rehabilitation teams had the shortest median time from stroke onset to admission (7 days), and freestanding facilities with such teams had the longest (12 days).
- Among facilities with stroke-focused rehabilitation teams, non-freestanding facilities had the shortest median active length of stay (21 days) and freestanding facilities had the longest (28 days).

EXHIBIT 1.14 Characteristics of stroke rehabilitation facilities, by physical setting and rehabilitation model, in Ontario, 2014/15 (continued)

- Non-freestanding facilities with stroke-focused rehabilitation teams had the greatest proportion of survivors achieving the RPG targets for length of stay, followed by freestanding facilities with such teams.
- Facilities with stroke-focused rehabilitation teams had the higher median FIM efficiency scores compared to facilities with mixed rehabilitation teams.
- Facilities with stroke-focused rehabilitation teams were more likely to send survivors home with or without services, compared to facilities with mixed rehabilitation teams.

Data sources: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS) and Ontario Stroke Rehabilitation Survey, 2014/15.
Inclusion criteria: All inpatient rehabilitation facilities with at least 6 survivor admissions aged ≥18 years classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=52 facilities).
Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Rehabilitation site is geographically separate from acute care with rehabilitation professionals serving multiple patient/survivor groups.

[2] Acute and rehabilitation care is provided in the same building with rehabilitation professionals serving multiple patient/survivor groups.

[3] Rehabilitation site is geographically separate from acute care and stroke survivors are co-located with rehabilitation professionals focused on stroke care (includes stroke rehabilitation units).

[4] Acute and rehabilitation care is provided in the same building and stroke survivors are co-located with rehabilitation professionals focused on stroke care (includes integrated stroke units).

[5] Among survivors with mild disability, Rehabilitation Patient Groups (RPGs) 1150 and 1160.

[6] Among survivors with moderate disability, RPGs 1120, 1130 and 1140.

[7] Among survivors with severe disability, RPGs 1100 and 1110.

[8] Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and National Rehabilitation Reporting System (NRS), 2014/15. All survivors 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; survivors had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge and non-missing RPG assignment.

[9] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date).

[†] Results were statistically significant ($p<0.0001$).

[ǂ] Results were statistically significant ($p<0.05$).

[ɸ] Results were statistically significant ($p<0.001$).

[¤] Results were statistically significant ($p<0.01$).

Notes: (1) Facilities were grouped based on self-reported survey results. (2) FIM® = Functional Independence Measure; a registered trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.

REGIONAL SUCCESS STORY

Waterloo Wellington Local Health Integration Network

In 2012, rehabilitation facilities in the Waterloo Wellington LHIN began to focus on strategies to implement stroke best practices as part of the integration of stroke services in the LHIN. One strategy involved increasing the time survivors participated in goal-directed therapy (e.g., achieving a level of rehabilitation intensity). At Grand River Hospital's inpatient rehabilitation unit, a number of changes were made to achieve the Canadian best practice target of stroke survivors participating in 3 hours of goal-directed therapy per day.

Funding for additional staff allowed Grand River Hospital to achieve the stroke QBP–recommended therapist-to-patient/survivor ratio of 1:6 for physiotherapy and occupational therapy,[16] and in turn enabled stroke-focused teams to be established. As well, the model of care was restructured to incorporate goal-directed therapy into the survivor's daily morning routine and throughout the day.

These changes have resulted in an increase in the number of minutes per day survivors are participating in therapy, from an average of 48 minutes at the beginning of 2015/16 to 100 minutes by the end of 2015/16. Additionally, there have been substantial improvements in many key stroke rehabilitation performance indicators, as well as an improved median FIM efficiency (1.3 in 2015/16 from 0.7 in 2012/13) and an increase in the proportion of survivors achieving the RPG active length of stay target (from 26% in 2012/13 to 71% in 2015/16).

Hospitals in the Waterloo Wellington LHIN continue to collaborate to sustain these improvements for all rehabilitation sites, and create an exceptional patient experience for stroke survivors.

REGIONAL SUCCESS STORY

Toronto Central Local Health Integration Network

The Stroke Report Card for the Toronto Central LHIN showed poor performance on rehabilitation indicators for three consecutive years (2011/12, 2012/13 and 2013/14). Only 27% of stroke survivors accessed inpatient rehabilitation, only 5%–6% were referred to outpatient rehabilitation and just 13% were discharged directly to long-term care from acute care. Furthermore, the length of stay in acute care averaged 13.6 days and 24%–28% of these days were in Alternate Level of Care. Without a standard of best practices for all rehabilitation hospitals in the LHIN, survivor outcomes and system flow could be compromised.

The LHIN developed a business case based on the premise that the adoption of best practices in rehabilitation could save money. The case proposed a consolidation of acute and inpatient stroke rehabilitation programs to establish critical mass, an expansion of outpatient rehabilitation, a redistribution of funds from acute care to the rehabilitation sector (an allocation based on estimates of future volumes for inpatient rehabilitation), and a modest but consistent amount of funding allocated to each rehabilitation site for outpatient rehabilitation.

In 2014/15, $2 million was reallocated from acute services (with associated accountability metrics) to support best practice stroke rehabilitation care. The funding was designed to:

- Establish admission to inpatient rehabilitation 7 days a week.
- Provide inpatient therapy 3 hours a day, 6 days a week.
- Improve access to inpatient rehabilitation for persons with severe stroke.
- Improve access to outpatient rehabilitation for higher functioning survivors (i.e., divert them from inpatient beds).

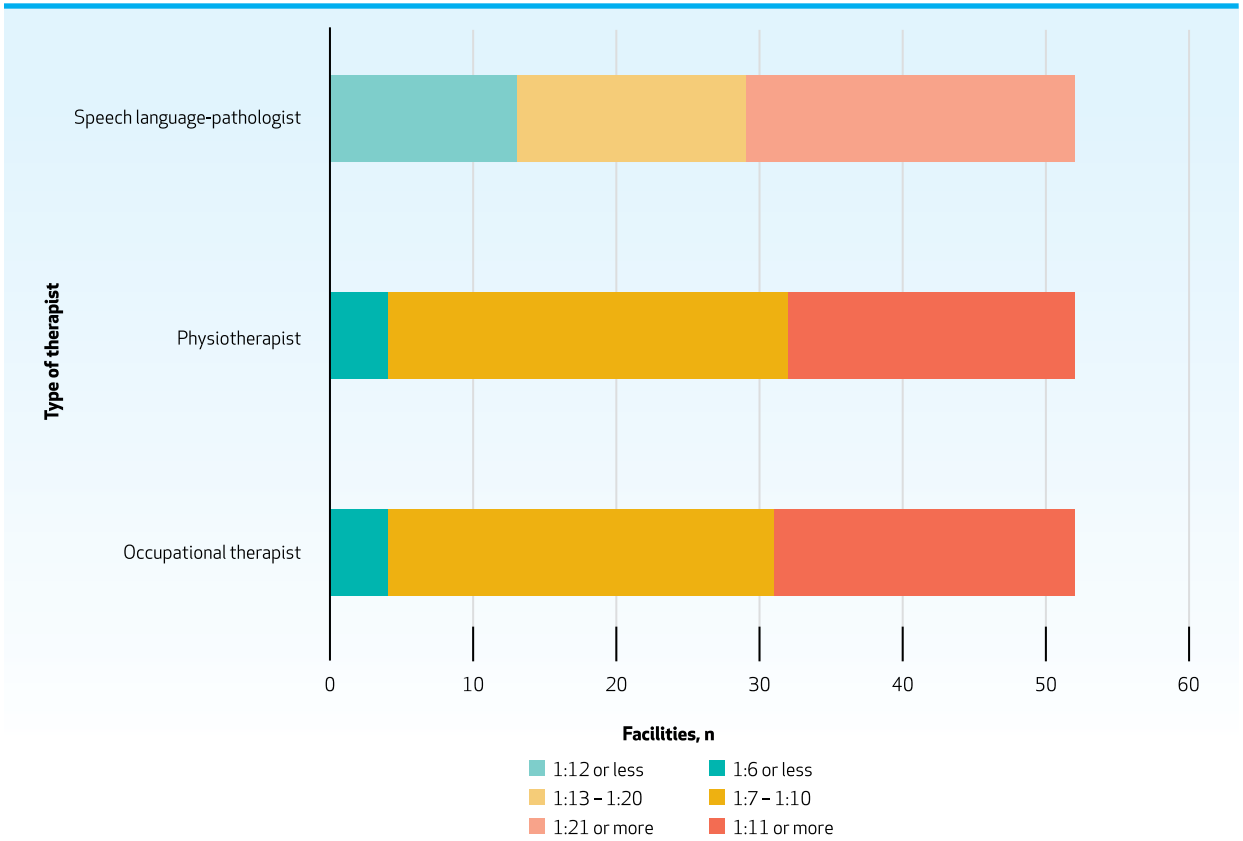
The performance changes seen in 2014/15 compared to 2013/14:

- Alternate Level of Care days decreased by 6.3% in acute care.
- There was a 21% increase in the number of stroke survivors receiving inpatient rehabilitation including 30.7% more survivors with severe stroke.
- The proportion of survivors discharged to long-term or complex continuing care declined by 14.6%
- There was a 37% increase in the number of survivors admitted to outpatient rehabilitation.

The Toronto Stroke Networks provide ongoing support for core best practice implementation at rehabilitation sites. System-level implementation resources include a rehabilitation triage tool, inpatient and outpatient principles for referral and acceptance, transition reporting forms, standardized definitions for data collection (e.g., measuring the number of minutes survivors participate in therapy [rehabilitation intensity]). Additionally, the Toronto Stroke Networks monitor system data with acute care and rehabilitation stakeholders to encourage ongoing improvement. A two-year follow-up analysis on the impact of the financial reallocation is currently being undertaken by the Toronto Central LHIN.

Inpatient Rehabilitation – Stroke Quality-Based Procedures

EXHIBIT 1.15 Ratio of therapists to stroke inpatient rehabilitation beds, by type of therapist, in Ontario, 2014/15

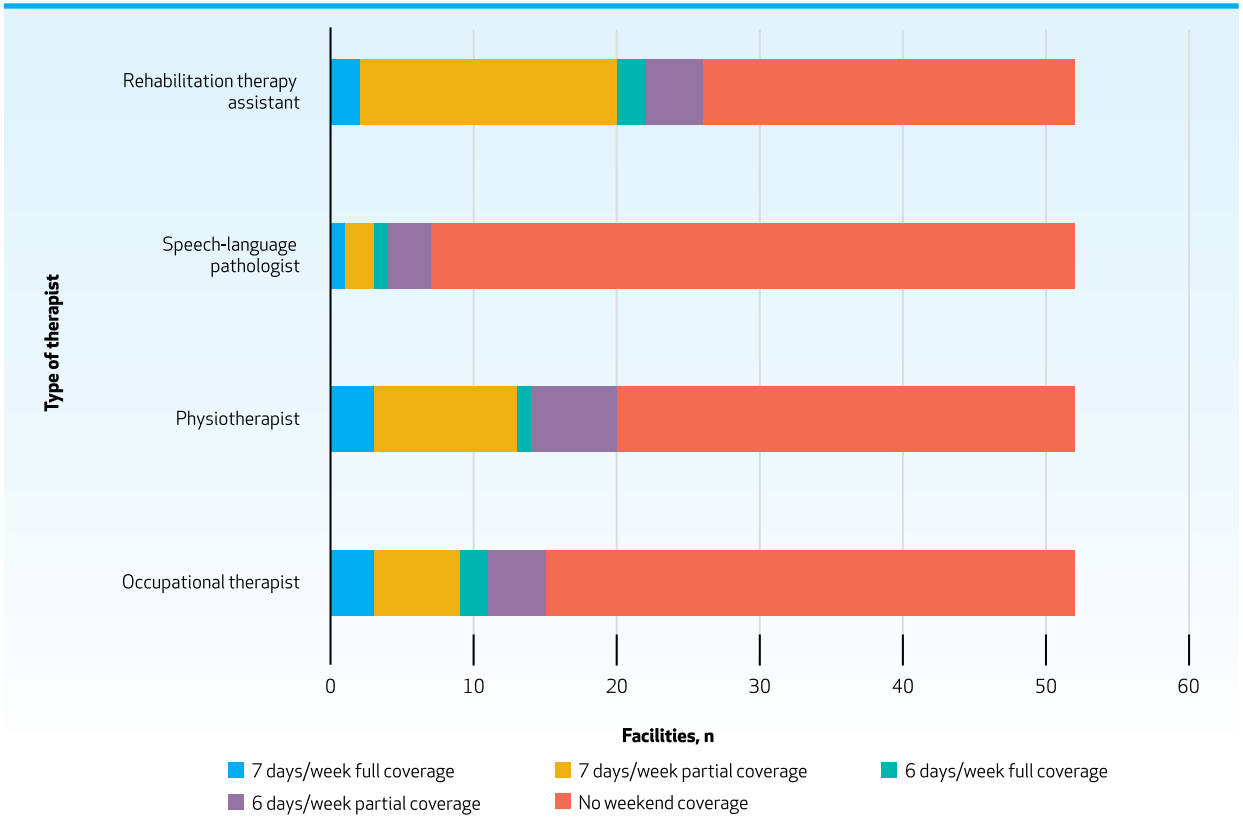


Key Findings

- Very few facilities offered the core rehabilitation therapies (occupational therapy, physiotherapy, speech-language pathology) at the ratios recommended for stroke quality-based procedures (1:6 or less for occupational therapy and physiotherapy and 1:12 or less for speech therapy).
- Thirteen facilities met the speech therapist-to-bed ratio.
- Four facilities met the physiotherapist-to-bed ratio and 4 facilities met the occupational therapist-to-bed ratio.
- Three facilities met the recommended therapist-to-bed ratios for the three core therapies (see **Appendix G**).

Data source: Ontario Stroke Rehabilitation Survey, 2014/15.
Inclusion criteria: All inpatient rehabilitation facilities with admissions of at least 6 stroke survivors aged ≥18 years who were classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=52 facilities).
Note: Survey results were self-reported.

EXHIBIT 1.16 Level of weekend therapy provided to stroke survivors, by type of therapist, in Ontario, 2014/15

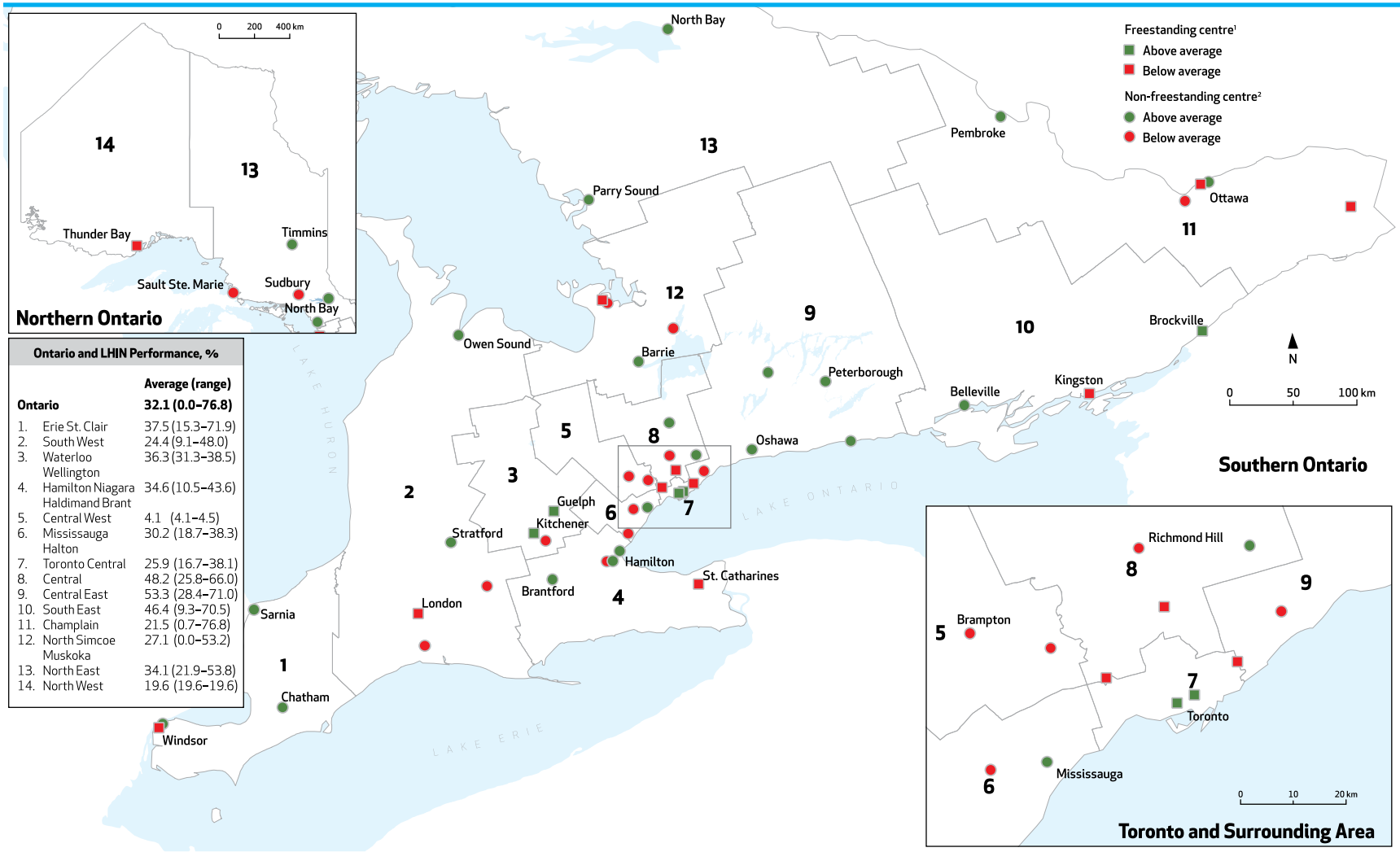


Key Finding

- Twenty of 52 rehabilitation facilities provided at least one of the core therapies on weekends. Of the facilities that provided weekend therapy, speech therapy was the professional service offered the least (7 sites).

Data source: Ontario Stroke Rehabilitation Survey, 2014/15.
Inclusion criteria: All inpatient rehabilitation facilities with admissions of at least 6 stroke survivors aged ≥18 years who were classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=52 facilities).
Note: Survey results were self-reported.

EXHIBIT 1.17 Proportion of adult stroke survivors admitted to inpatient rehabilitation within 7 days of admission to acute care, in Ontario and by Local Health Integration Network and facility performance, 2014/15



Ontario and LHIN Performance, %

		Average (range)
Ontario		**32.1 (0.0–76.8)**
1.	Erie St. Clair	37.5 (15.3–71.9)
2.	South West	24.4 (9.1–48.0)
3.	Waterloo Wellington	36.3 (31.3–38.5)
4.	Hamilton Niagara Haldimand Brant	34.6 (10.5–43.6)
5.	Central West	4.1 (4.1–4.5)
6.	Mississauga Halton	30.2 (18.7–38.3)
7.	Toronto Central	25.9 (16.7–38.1)
8.	Central	48.2 (25.8–66.0)
9.	Central East	53.3 (28.4–71.0)
10.	South East	46.4 (9.3–70.5)
11.	Champlain	21.5 (0.7–76.8)
12.	North Simcoe Muskoka	27.1 (0.0–53.2)
13.	North East	34.1 (21.9–53.8)
14.	North West	19.6 (19.6–19.6)

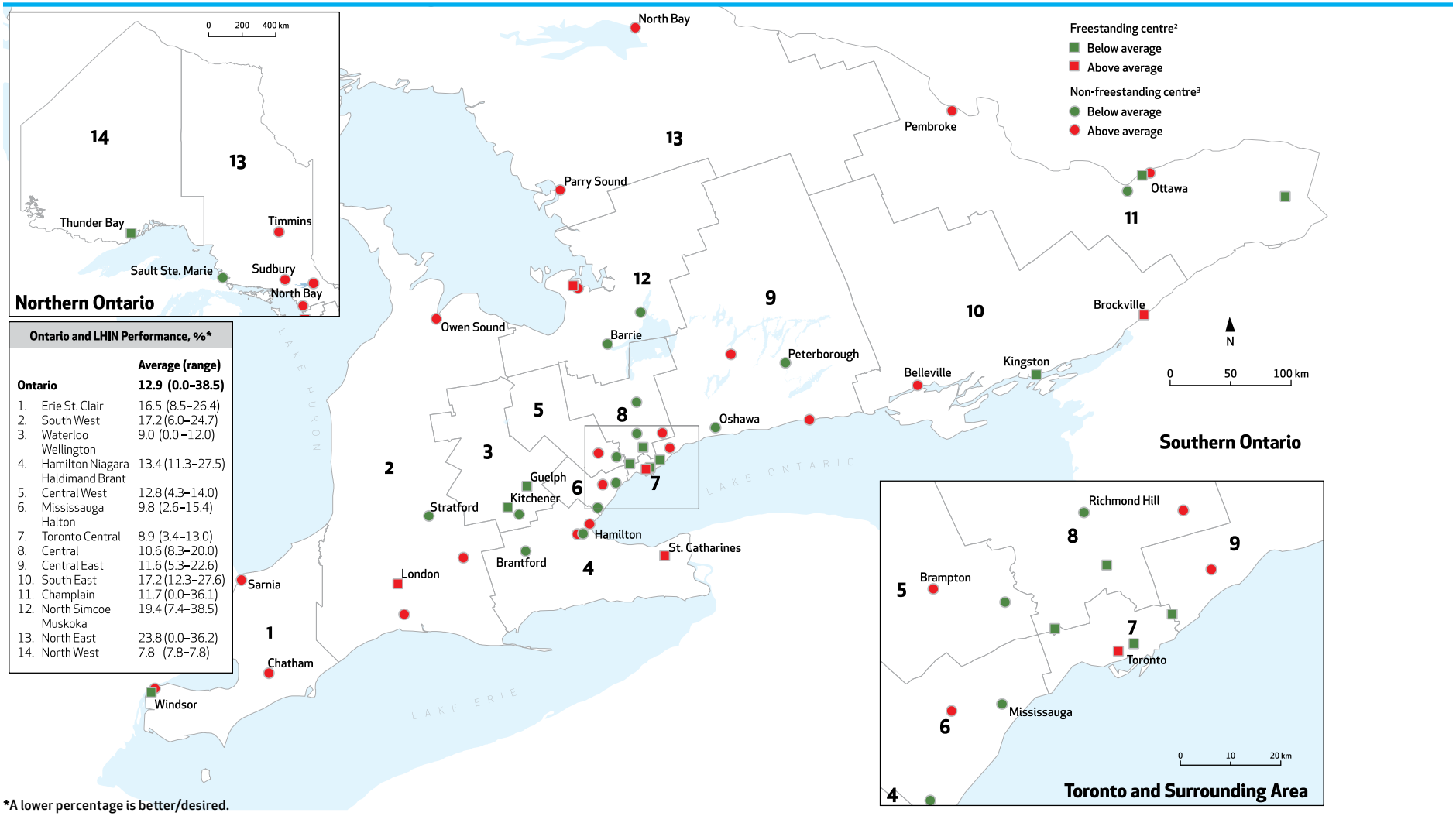
Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD) and the National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors aged ≥18 years with a diagnosis of stroke, excluding subarchanoid hemorrhage and transient ischemic attack (using ICD-10-CA codes), discharged alive 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 (N=4,300).

Exclusion criteria: Survivors with missing admission dates.

[1] Inpatient rehabilitation within a facility physically separated from the acute stroke hospital. [2] Inpatient rehabilitation within an acute care hospital.

EXHIBIT 1.18 Proportion of adult stroke survivors with mild disability[1] admitted to inpatient rehabilitation, in Ontario and by Local Health Integration Network and facility performance, 2014/15



Ontario and LHIN Performance, %*

		Average (range)
Ontario		**12.9 (0.0–38.5)**
1.	Erie St. Clair	16.5 (8.5–26.4)
2.	South West	17.2 (6.0–24.7)
3.	Waterloo Wellington	9.0 (0.0–12.0)
4.	Hamilton Niagara Haldimand Brant	13.4 (11.3–27.5)
5.	Central West	12.8 (4.3–14.0)
6.	Mississauga Halton	9.8 (2.6–15.4)
7.	Toronto Central	8.9 (3.4–13.0)
8.	Central	10.6 (8.3–20.0)
9.	Central East	11.6 (5.3–22.6)
10.	South East	17.2 (12.3–27.6)
11.	Champlain	11.7 (0.0–36.1)
12.	North Simcoe Muskoka	19.4 (7.4–38.5)
13.	North East	23.8 (0.0–36.2)
14.	North West	7.8 (7.8–7.8)

***A lower percentage is better/desired.**

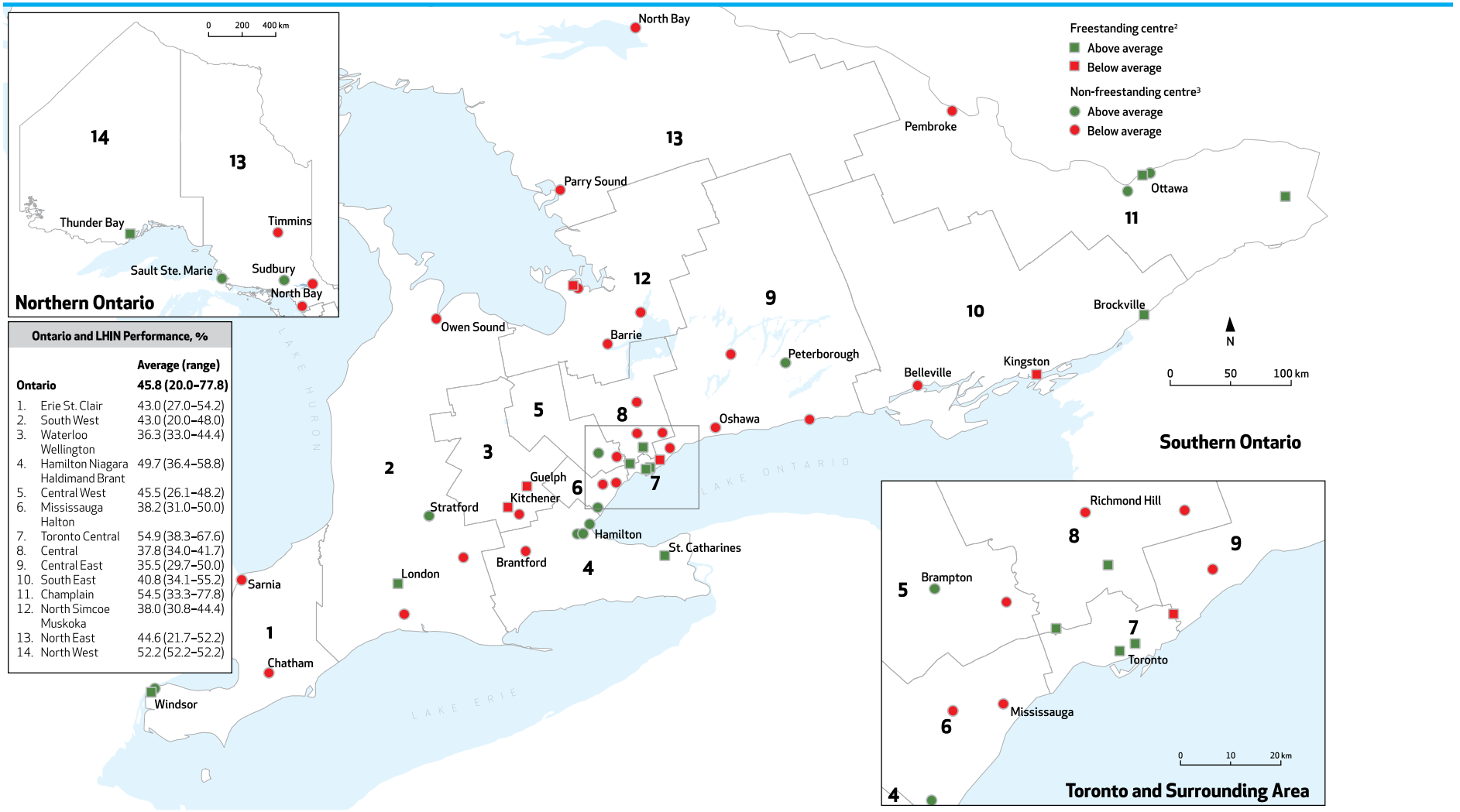
Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=4,619).

Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date and with a missing RPG.

[1] Includes Rehabilitation Patient Groups 1150 and 1160 (mild disability). [2] Inpatient rehabilitation within a facility physically separated from the acute stroke hospital. [3] Inpatient rehabilitation within an acute care hospital.

EXHIBIT 1.19 Proportion of adult stroke survivors with moderate disability[1] admitted to inpatient rehabilitation, in Ontario and by Local Health Integration Network and facility performance, 2014/15

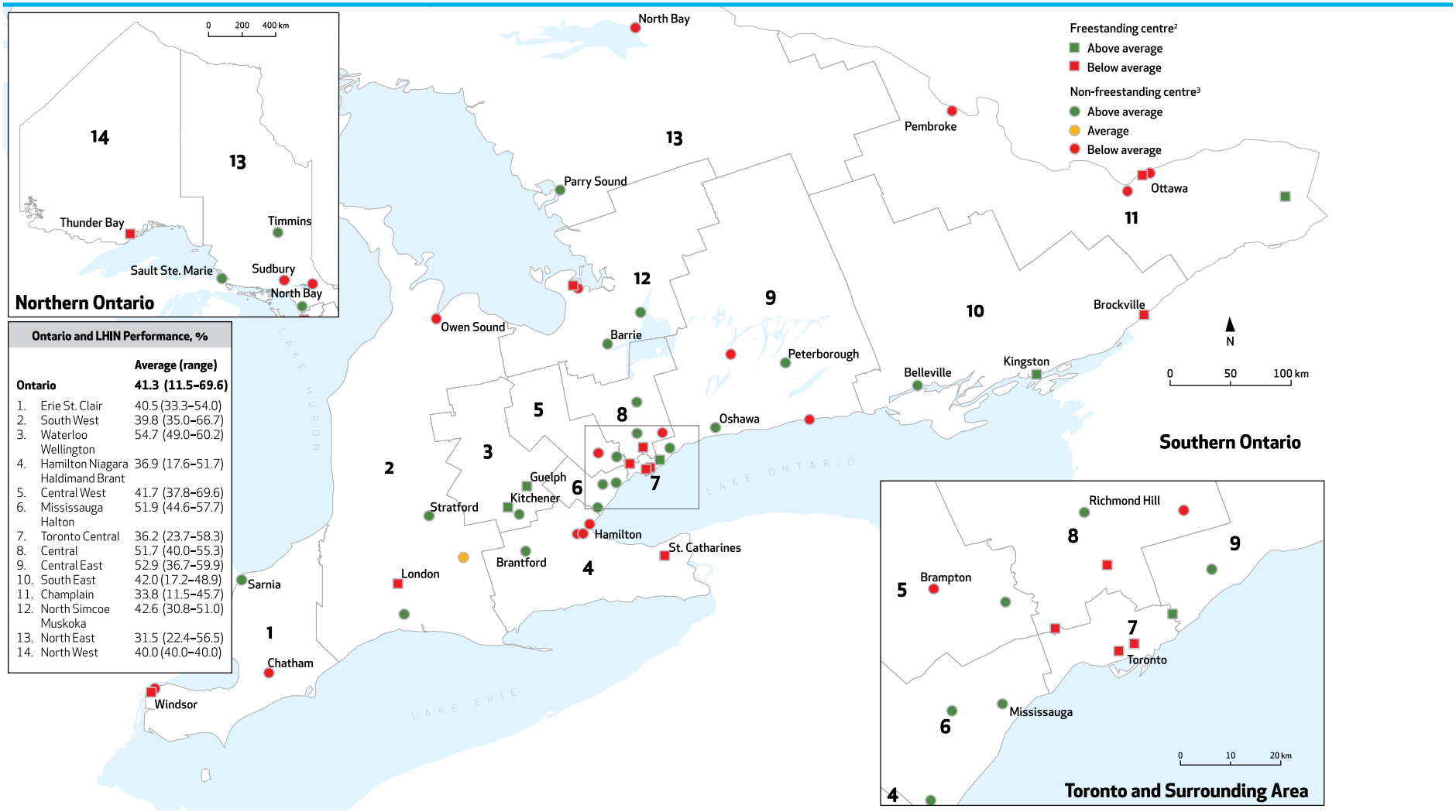


Ontario and LHIN Performance, %

		Average (range)
Ontario		**45.8 (20.0–77.8)**
1.	Erie St. Clair	43.0 (27.0–54.2)
2.	South West	43.0 (20.0–48.0)
3.	Waterloo Wellington	36.3 (33.0–44.4)
4.	Hamilton Niagara Haldimand Brant	49.7 (36.4–58.8)
5.	Central West	45.5 (26.1–48.2)
6.	Mississauga Halton	38.2 (31.0–50.0)
7.	Toronto Central	54.9 (38.3–67.6)
8.	Central	37.8 (34.0–41.7)
9.	Central East	35.5 (29.7–50.0)
10.	South East	40.8 (34.1–55.2)
11.	Champlain	54.5 (33.3–77.8)
12.	North Simcoe Muskoka	38.0 (30.8–44.4)
13.	North East	44.6 (21.7–52.2)
14.	North West	52.2 (52.2–52.2)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.
Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=4,619).
Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date and with a missing Rehabilitation Patient Group (RPG).
[1] Includes RPGs 1120, 1130 and 1140 (moderate disability). [2] Inpatient rehabilitation within a facility physically separated from the acute stroke hospital. [3] Inpatient rehabilitation within an acute care hospital.

EXHIBIT 1.20 Proportion of adult stroke survivors with severe disability[1] admitted to inpatient rehabilitation, in Ontario and by Local Health Integration Network and facility performance, 2014/15



Ontario and LHIN Performance, %		Average (range)
Ontario		**41.3 (11.5–69.6)**
1.	Erie St. Clair	40.5 (33.3–54.0)
2.	South West	39.8 (35.0–66.7)
3.	Waterloo Wellington	54.7 (49.0–60.2)
4.	Hamilton Niagara Haldimand Brant	36.9 (17.6–51.7)
5.	Central West	41.7 (37.8–69.6)
6.	Mississauga Halton	51.9 (44.6–57.7)
7.	Toronto Central	36.2 (23.7–58.3)
8.	Central	51.7 (40.0–55.3)
9.	Central East	52.9 (36.7–59.9)
10.	South East	42.0 (17.2–48.9)
11.	Champlain	33.8 (11.5–45.7)
12.	North Simcoe Muskoka	42.6 (30.8–51.0)
13.	North East	31.5 (22.4–56.5)
14.	North West	40.0 (40.0–40.0)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=4,619).

Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date and with a missing Rehabilitation Patient Group (RPG).

[1] Includes RPGs 1100 and 1110 (severe disability). [2] Inpatient rehabilitation was within a facility physically separated from the acute stroke hospital. [3] Inpatient rehabilitation was within an acute care hospital.

Key Findings

EXHIBIT 1.17

- Thirty-two percent of survivors were admitted to inpatient rehabilitation within 7 days of their acute care admission. A high proportion is desired.

- There was wide variation across Local Health Integration Networks (LHINs) in the proportion of survivors admitted to inpatient rehabilitation within 7 days, with the Central West LHIN having the lowest proportion (4.1%) and the Central East LHIN the highest (53.3%), a 49-point spread.

EXHIBIT 1.18

- Thirteen percent of the stroke survivors admitted to inpatient rehabilitation were considered to have mild disability (RPG 1150 and 1160). (A low proportion is desired.)

- Among the LHINs, there was modest variation in the proportion of mild stroke survivors admitted to inpatient rehabilitation, with the North West LHIN having the lowest proportion (7.8%) and the North East LHIN the highest (23.8%), a 16-point spread.

EXHIBIT 1.19

- Forty-six percent of the stroke survivors admitted to inpatient rehabilitation were considered to have moderate disability (RPG 1120, 1130 and 1140).

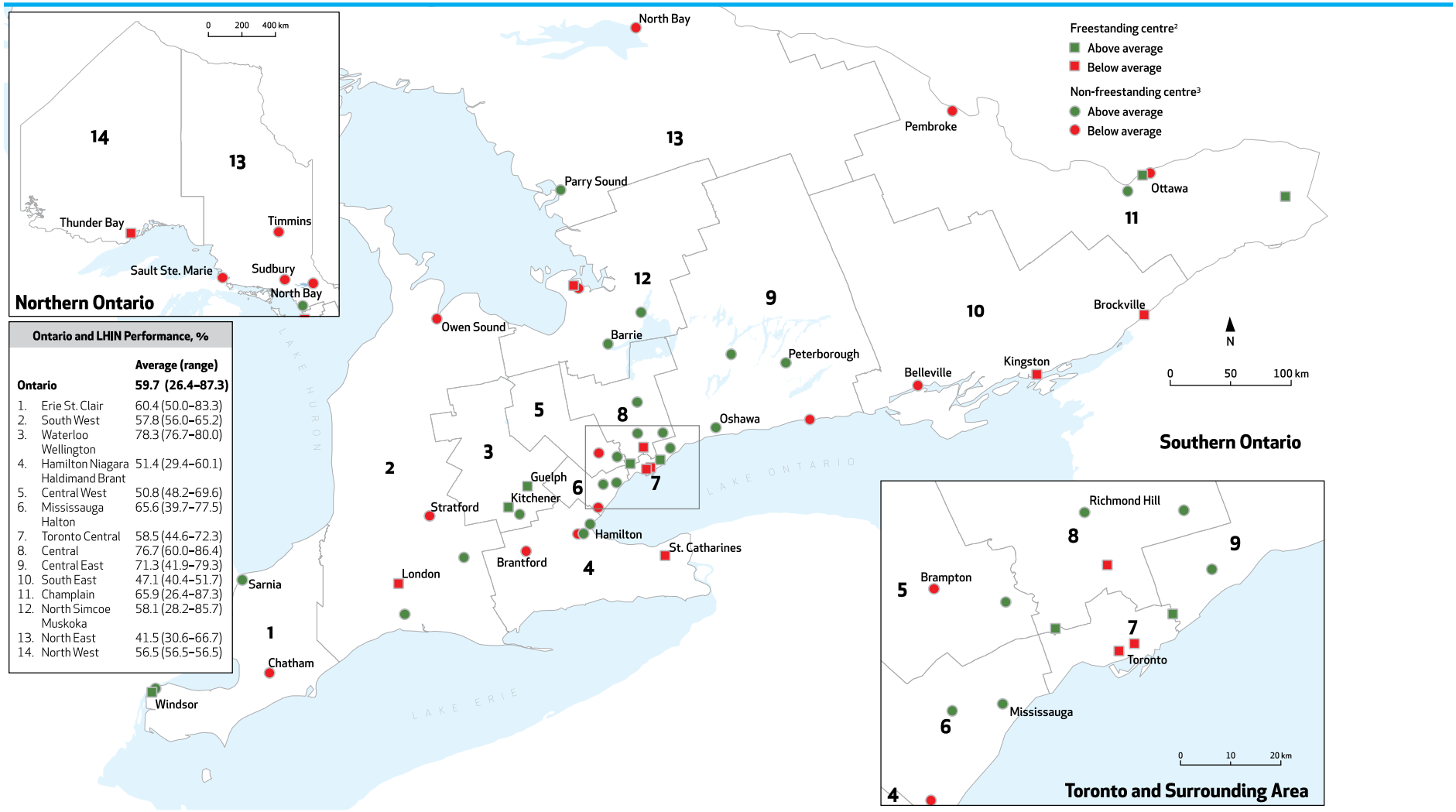
- Among the LHINs, there was modest variation in the proportion of moderate stroke survivors admitted to inpatient rehabilitation, with the Central East LHIN having the lowest proportion (35.5%) and the Toronto Central LHIN the highest (54.9%), a 19-point spread.

EXHIBIT 1.20

- Forty-one percent of the stroke survivors admitted to inpatient rehabilitation are considered to have severe disability. A high proportion is desired.

- There was wide variation across the LHINs in the proportion of severe stroke survivors admitted to inpatient rehabilitation, with the North East LHIN having the lowest proportion (31.5%) and the Waterloo Wellington LHIN the highest (54.7%), a 23-point spread.

EXHIBIT 1.21 Proportion of stroke survivors achieving RPG targets for active length of stay,[1] in Ontario and by Local Health Integration Network and facility performance, 2014/15



Ontario and LHIN Performance, %

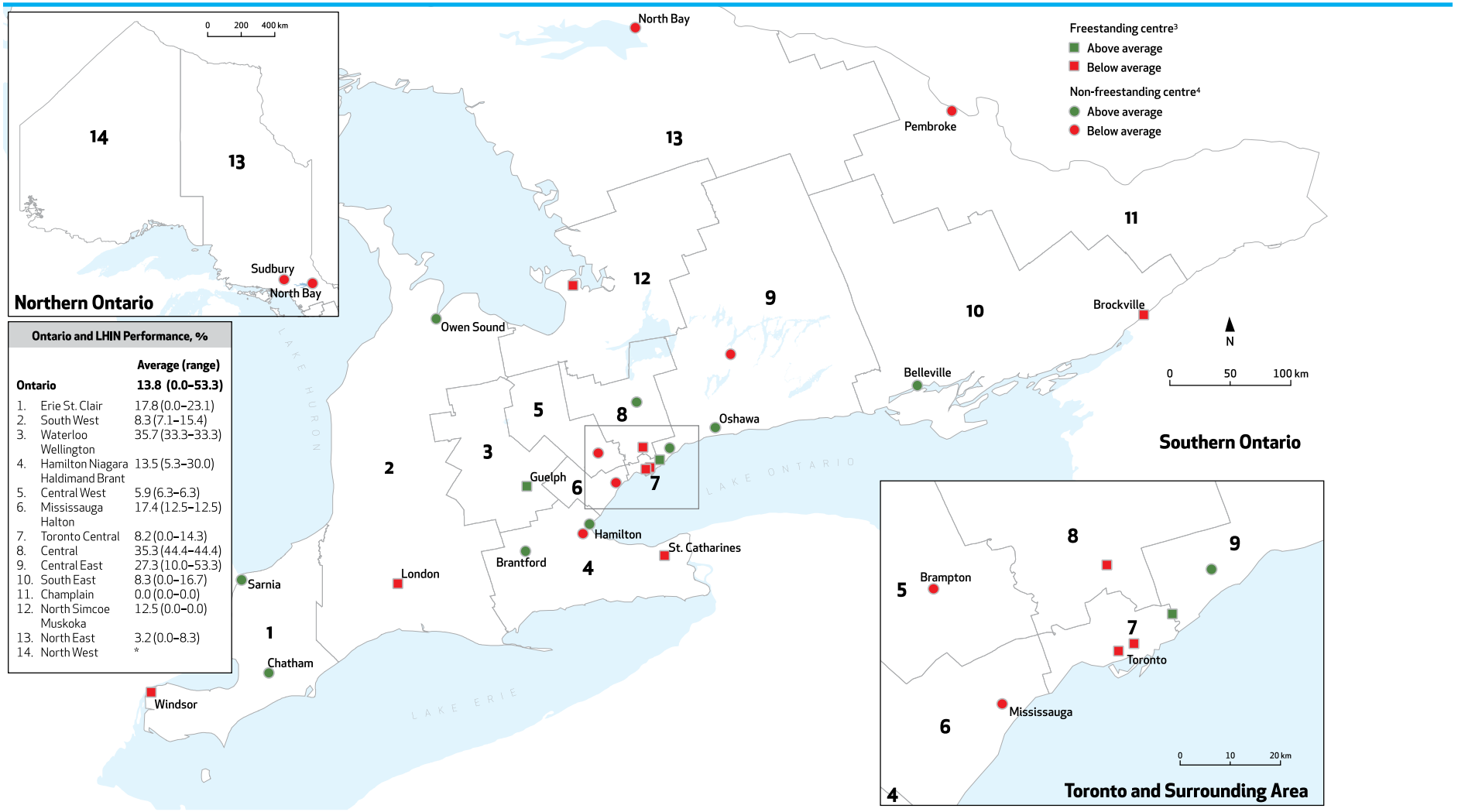
		Average (range)
Ontario		**59.7 (26.4–87.3)**
1.	Erie St. Clair	60.4 (50.0–83.3)
2.	South West	57.8 (56.0–65.2)
3.	Waterloo Wellington	78.3 (76.7–80.0)
4.	Hamilton Niagara Haldimand Brant	51.4 (29.4–60.1)
5.	Central West	50.8 (48.2–69.6)
6.	Mississauga Halton	65.6 (39.7–77.5)
7.	Toronto Central	58.5 (44.6–72.3)
8.	Central	76.7 (60.0–86.4)
9.	Central East	71.3 (41.9–79.3)
10.	South East	47.1 (40.4–51.7)
11.	Champlain	65.9 (26.4–87.3)
12.	North Simcoe Muskoka	58.1 (28.2–85.7)
13.	North East	41.5 (30.6–66.7)
14.	North West	56.5 (56.5–56.5)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.
Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=4,619).
Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date and with a missing Rehabilitation Patient Group (RPG).

[1] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date). [2] Inpatient rehabilitation was within a facility physically separated from the acute stroke hospital. [3] Inpatient rehabilitation was within an acute care hospital.

Note: RPG best practice targets for active length of stay (in days) are 1100 (48.9), 1110 (41.8), 1120 (35.8), 1130 (25.2), 1140 (14.4), 1150 (7.7) and 1160 (0.0).

EXHIBIT 1.22 Proportion of adult mild[1] stroke survivors achieving RPG targets for active length of stay,[2] in Ontario and by Local Health Integration Network and facility performance, 2014/15



Ontario and LHIN Performance, %

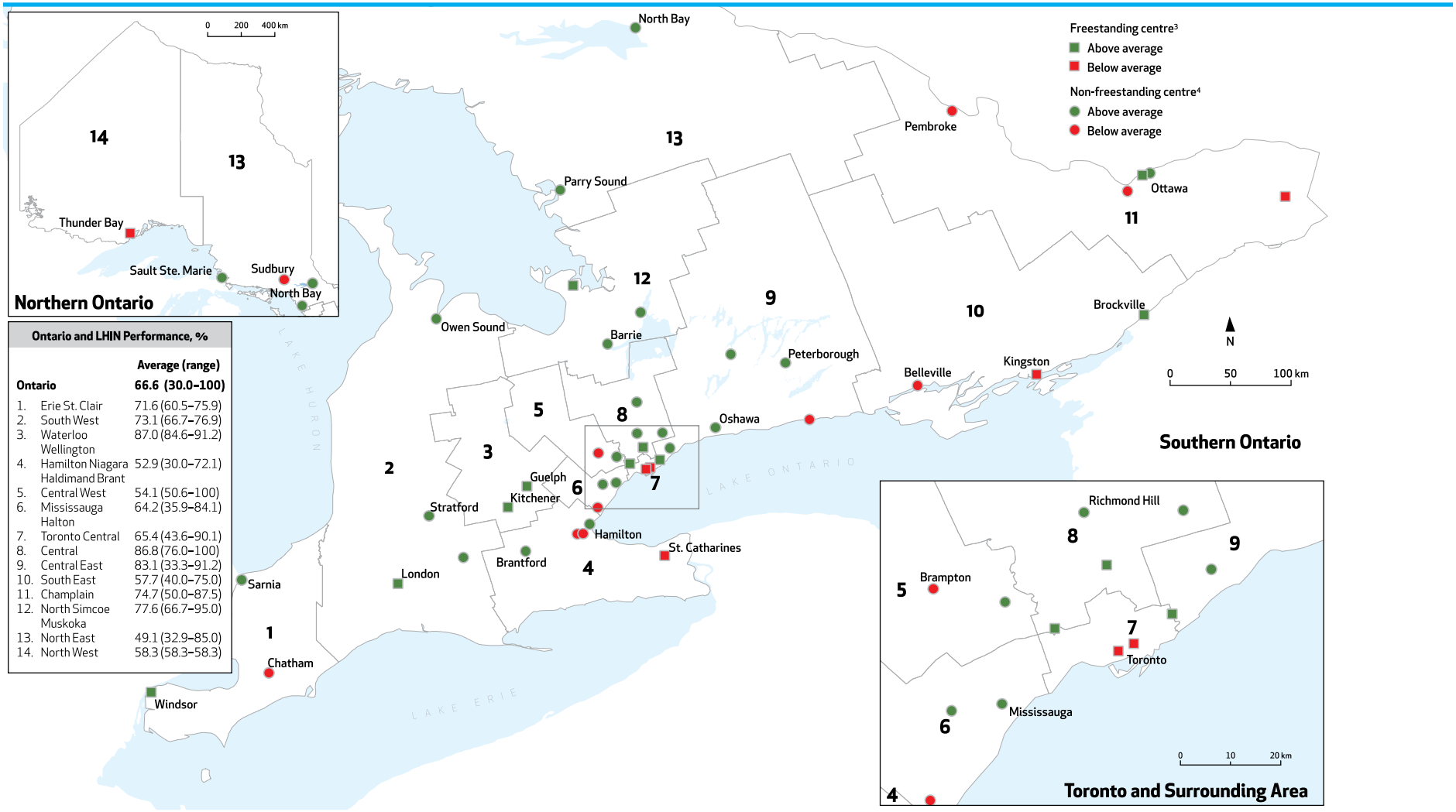
		Average (range)
Ontario		**13.8 (0.0–53.3)**
1.	Erie St. Clair	17.8 (0.0–23.1)
2.	South West	8.3 (7.1–15.4)
3.	Waterloo Wellington	35.7 (33.3–33.3)
4.	Hamilton Niagara Haldimand Brant	13.5 (5.3–30.0)
5.	Central West	5.9 (6.3–6.3)
6.	Mississauga Halton	17.4 (12.5–12.5)
7.	Toronto Central	8.2 (0.0–14.3)
8.	Central	35.3 (44.4–44.4)
9.	Central East	27.3 (10.0–53.3)
10.	South East	8.3 (0.0–16.7)
11.	Champlain	0.0 (0.0–0.0)
12.	North Simcoe Muskoka	12.5 (0.0–0.0)
13.	North East	3.2 (0.0–8.3)
14.	North West	*

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.
Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=412).
Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Includes Rehabilitation Patient Group 1150 (mild disability). [2] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date). [3] Inpatient rehabilitation within a facility physically separated from the acute stroke hospital. [4] Inpatient rehabilitation within an acute care hospital.

Note: RPG best practice targets for active length of stay (in days) are 1150 (7.7) and 1160 (0.0). *Cell value suppressed for reasons of privacy and confidentiality.

EXHIBIT 1.23 Proportion of adult moderate[1] stroke survivors achieving RPG targets for active length of stay,[2] in Ontario and by Local Health Integration Network and facility performance, 2014/15



Ontario and LHIN Performance, %

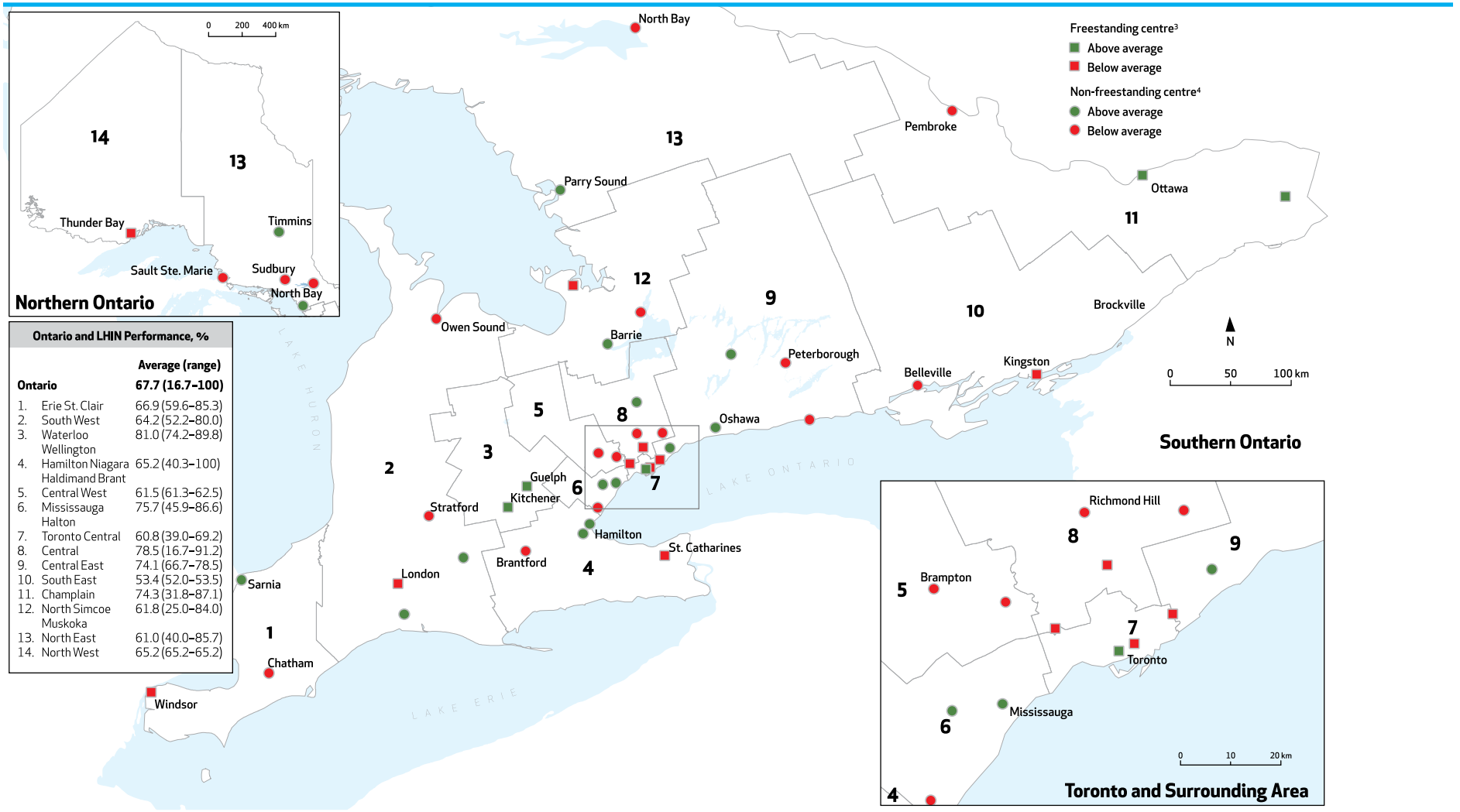
		Average (range)
Ontario		**66.6 (30.0–100)**
1.	Erie St. Clair	71.6 (60.5–75.9)
2.	South West	73.1 (66.7–76.9)
3.	Waterloo Wellington	87.0 (84.6–91.2)
4.	Hamilton Niagara Haldimand Brant	52.9 (30.0–72.1)
5.	Central West	54.1 (50.6–100)
6.	Mississauga Halton	64.2 (35.9–84.1)
7.	Toronto Central	65.4 (43.6–90.1)
8.	Central	86.8 (76.0–100)
9.	Central East	83.1 (33.3–91.2)
10.	South East	57.7 (40.0–75.0)
11.	Champlain	74.7 (50.0–87.5)
12.	North Simcoe Muskoka	77.6 (66.7–95.0)
13.	North East	49.1 (32.9–85.0)
14.	North West	58.3 (58.3–58.3)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.
Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=2,116).
Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Includes Rehabilitation Patient Groups 1120, 1130 and 1140 (moderate disability). [2] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date). [3] Inpatient rehabilitation within a facility physically separated from the acute stroke hospital. [4] Inpatient rehabilitation within an acute care hospital.

Note: RPG best practice targets for active length of stay (in days) are 1120 (35.8), 1130 (25.2) and 1140 (14.4).

EXHIBIT 1.24 Proportion of adult severe[1] stroke survivors achieving RPG targets for active length of stay,[2] Ontario and by Local Health Integration Network and facility performance, 2014/15



Ontario and LHIN Performance, %

		Average (range)
Ontario		**67.7 (16.7–100)**
1.	Erie St. Clair	66.9 (59.6–85.3)
2.	South West	64.2 (52.2–80.0)
3.	Waterloo Wellington	81.0 (74.2–89.8)
4.	Hamilton Niagara Haldimand Brant	65.2 (40.3–100)
5.	Central West	61.5 (61.3–62.5)
6.	Mississauga Halton	75.7 (45.9–86.6)
7.	Toronto Central	60.8 (39.0–69.2)
8.	Central	78.5 (16.7–91.2)
9.	Central East	74.1 (66.7–78.5)
10.	South East	53.4 (52.0–53.5)
11.	Champlain	74.3 (31.8–87.1)
12.	North Simcoe Muskoka	61.8 (25.0–84.0)
13.	North East	61.0 (40.0–85.7)
14.	North West	65.2 (65.2–65.2)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.
Inclusion criteria: All survivors aged ≥18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=1,907).
Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Includes Rehabilitation Patient Groups 1100 and 1110 (severe disability). [2] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date). [3] Inpatient rehabilitation within a facility physically separated from the acute stroke hospital. [4] Inpatient rehabilitation within an acute care hospital.

Note: RPG best practice targets for active length of stay (in days) are 1100 (48.9) and 1110 (41.8).

Key Findings

EXHIBIT 1.21

- Almost 60% of stroke survivors admitted to inpatient rehabilitation achieved Rehabilitation Patient Group (RPG) targets for length of stay.
- Urban stroke survivors were more likely to achieve RPG targets for length of stay compared to rural stroke survivors (60.5% vs. 54.3%; p=0.0005) (data not shown).
- Male stroke survivors were more likely than their female counterparts to achieve RPG targets for length of stay (52.5% vs. 47.5%; p=0.0095) (data not shown).
- Among the LHINs, there was wide variation in the proportion of survivors achieving RPG targets for length of stay, with the North East LHIN having the lowest proportion (41.5%) and the Waterloo Wellington LHIN the highest (78.3%), a 37-point spread.

EXHIBIT 1.22

- Among stroke survivors with a mild disability (RPG 1150 only), 13.8% achieved the RPG target for length of stay.
- Among the LHINs, there was wide variation in the proportion of survivors with a mild disability (for RPG 1150 only) achieving the RPG target for length of stay, with the Champlain LHIN having the lowest proportion (0.0%) and the Waterloo Wellington LHIN the highest (35.7%), a 36-point spread.

EXHIBIT 1.23

- Among stroke survivors with a moderate disability, 66.6% achieved RPG targets for length of stay.
- Among the LHINs, there was wide variation in the proportion of moderate stroke survivors achieving RPG targets for length of stay, with the North East LHIN having the lowest proportion (49.1%) and the Waterloo Wellington LHIN having the highest (87.0%), a 38-point spread.

EXHIBIT 1.24

- Among stroke survivors with a severe disability, 67.7% achieved RPG targets for length of stay.
- Among the LHINs, there was wide variation in the proportion of survivors with a severe disability achieving RPG targets for length of stay, with the South East LHIN having the lowest proportion (53.4%) and the Waterloo Wellington LHIN the highest (81.0%), a 28-point spread.

REGIONAL SUCCESS STORY

Champlain Local Health Integration Network

For many years, the Stroke Rehabilitation Unit (SRU) at Élizabeth Bruyère Hospital had been comparing its Rehabilitation Patient Group (RPG) target for average length of stay with those of its peer organizations in Ontario. Discharge planning was discussed by the clinical team within the first week following admission. In 2012/13, only 33% of the unit's cases met the active length of stay targets recommended by stroke quality-based procedures (QBPs).

With the introduction of the active length of stay targets within the stroke QBPs, the SRU's clinical team moved the discharge planning discussion to the first few days following admission to improve its rate of meeting the targets. Bruyère's decision support team helped the clinical team achieve these targets by providing a weekly report showing each stroke survivor's RPG target discharge date compared to the team's anticipated discharge date. The report highlighted survivors where the team's anticipated discharge dates was later than the RPG target date for the team to discuss and adjust the discharge, if possible. Stroke survivors without an anticipated discharge date established within the first 7–10 days following admission were also flagged. When the NRS assessments were integrated into the survivor's electronic medical record, the survivor stay report was automated and became part of the suite of standard reports available to the team. Additionally, the decision support team provided quarterly reports on the proportion of survivors meeting RPG length of stay targets.

For the second consecutive year, Bruyère is the provincial high performer on the OSN Stroke Report Card indicator, the proportion of inpatient stroke rehabilitation survivors achieving the RPG targets for active length of stay. In 2014/15, Bruyère's performance was 87.3%, with the majority of these survivors being discharged back to the community.

The availability of timely performance data and their integration into the clinical team's weekly routine was vital to success. While the decision support team continues to flag survivors who have stayed beyond the stroke QBP target, the clinical team has the final say on discharge plans, based on the care best suited for each survivor.

Home-Based Rehabilitation Services

EXHIBIT 2.1 Characteristics of adult stroke survivors receiving home-based CCAC rehabilitation services[1] following an acute stroke hospitalization or inpatient rehabilitation, in Ontario, 2013/14–2014/15

Characteristics	After Acute Stroke Hospitalization	After Inpatient Rehabilitation
Ontario[2], n	**2,090**	**1,896**
Female, n (%)	1,140 (54.5)	927 (48.9)
Age, mean (median)	75 (78)	74 (76)
Age Group, n (%)		
18–45	51 (2.4)	46 (2.4)
46–65	407 (19.5)	423 (22.3)
66–75	453 (21.7)	446 (23.5)
76–85	706 (33.8)	621 (32.8)
>85	473 (22.6)	360 (19.0)
Income Quintile, n (%)		
1 (lowest)	486 (23.3)	413 (21.8)
2	450 (21.5)	439 (23.2)
3	390 (18.7)	324 (17.1)
4	413 (19.8)	377 (19.9)
5 (highest)	351 (16.8)	343 (18.1)
Rural,[3] n (%)	241 (11.5)	262 (13.8)
Comorbidities, n (%)		
Hypertension	1,391 (66.6)	1,285 (67.8)
Diabetes	657 (31.4)	615 (32.4)
Atrial fibrillation	536 (25.6)	449 (23.7)
Hyperlipidemia	343 (16.4)	292 (15.4)
Hemiplegia/paraplegia	211 (10.1)	402 (21.2)
Dementia	209 (10.0)	80 (4.2)
Congestive heart failure	194 (9.3)	156 (8.2)
Previous stroke/transient ischemic attack	154 (7.4)	133 (7.0)
Chronic obstructive pulmonary disease	153 (7.3)	136 (7.2)
Renal disease	140 (6.7)	84 (4.4)
Cerebrovascular disease	137 (6.6)	100 (5.3)
Myocardial infarction	132 (6.3)	118 (6.2)
Carotid stenosis	87 (4.2)	96 (5.1)
Depression	84 (4.0)	60 (3.2)
Peripheral vascular disease	57 (2.7)	59 (3.1)
Charlson Comorbidity Index score ≥2	1,016 (48.6)	1,003 (52.9)

Key Findings

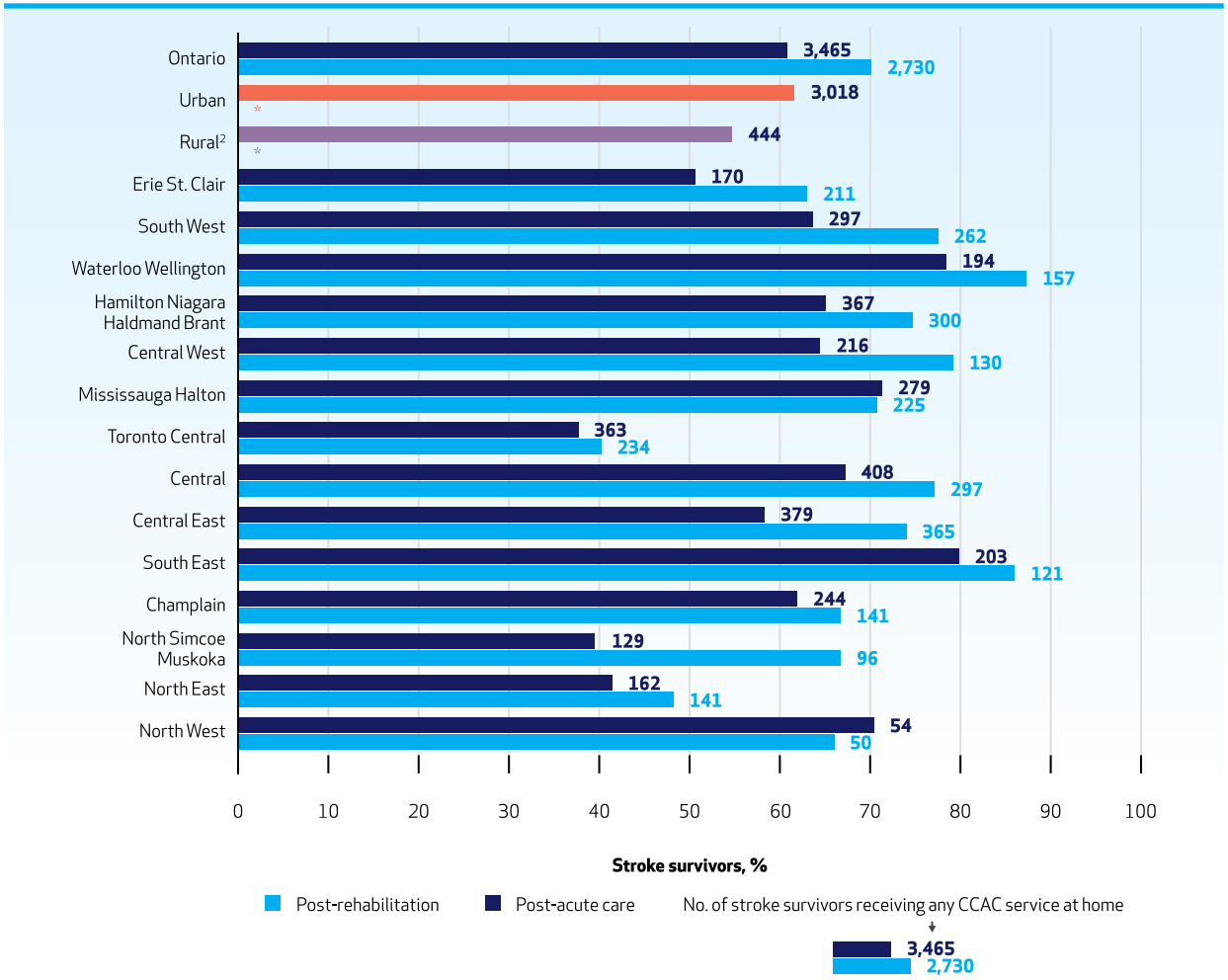
- Slightly more stroke survivors received home-based CCAC rehabilitation services following acute stroke hospitalization (52.4%) compared to those receiving these services following inpatient stroke rehabilitation (47.6%).
- There was a similar prevalence of comorbidities between the two groups of survivors receiving home-based CCAC rehabilitation services, with the exception of hemiplegia/paraplegia where there was more than double the prevalence among survivors following inpatient rehabilitation (21.2% vs. 10.1%), and dementia where there was more than double the prevalence among survivors following acute stroke hospitalization (10.0% vs. 4.2%).

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD), 2013/14–2014/15; Ontario Ministry of Health and Long-Term Care, Home Care Database, 2013/14–2014/15.
Inclusion criteria: All survivors aged ≥18 years discharged from an acute care facility in 2013/14–2014/15 with a stroke-related diagnosis (based on ICD-10 codes) who received at least one home-based CCAC rehabilitation service within 60 days of acute care or inpatient rehabilitation discharge. Exclusion criteria: Stroke survivors with a missing income quintile or postal code.

[1] CCAC home-based rehabilitation services include any of physiotherapy, occupational therapy, speech-language pathology or social work. [2] Based on unique survivors (i.e., does not include multiple survivor visits). [3] Rural survivors were defined as those residing in communities with a population of 10,000 or less.

Note: CCAC-based analysis (i.e., the location of the CCAC was used to report regional performance).

EXHIBIT 2.2 Proportion of adult stroke survivors receiving home-based CCAC rehabilitation[1] services following an acute stroke hospitalization or inpatient rehabilitation, in Ontario and by rurality and Local Health Integration Network, 2013/14–2014/15

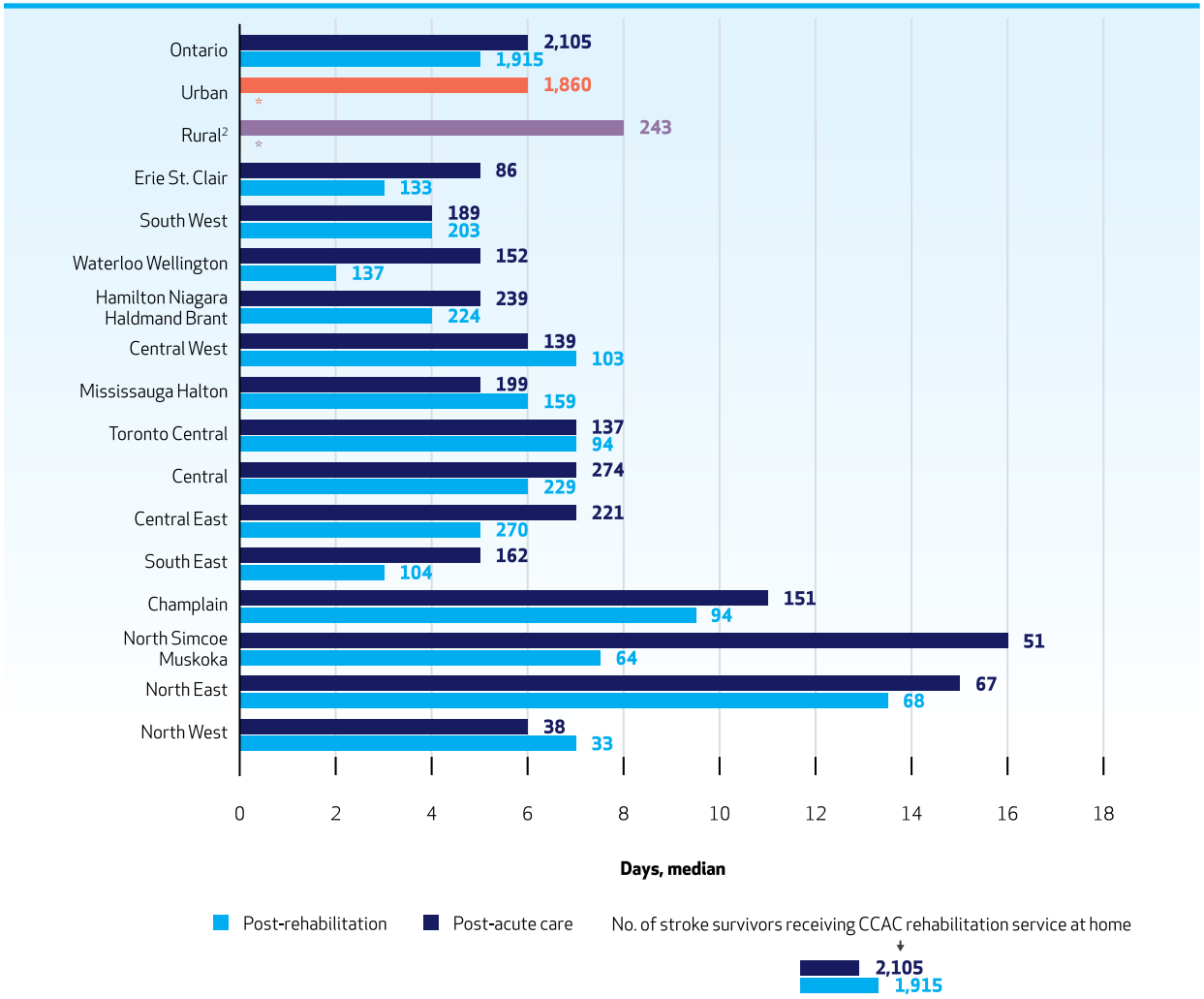


Key Findings

- Following an acute care stay, 60.8% of stroke survivors received home-based CCAC rehabilitation services.
- Following inpatient rehabilitation, 70.1% of stroke survivors received home-based CCAC rehabilitation services.
- Following an acute care stay, 54.7% of rural residents received home-based CCAC rehabilitation services compared to 61.6% for urban residents (p=0.0054).
- Among LHINs, there was a two-fold variation in the proportion of survivors who received home-based CCAC rehabilitation services following the acute stroke hospitalization ranging from 37.7% in the Toronto Central LHIN to 79.8% in the South East LHIN.
- Similar variation was observed following inpatient rehabilitation; 40.2% of survivors received home-based CCAC rehabilitation services in the Toronto Central LHIN compared to 87.3% in the Waterloo Wellington LHIN.

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD), 2013/14–2014/15; Ontario Ministry of Health and Long-Term Care, Home Care Database, 2013/14–2014/15.
Inclusion criteria: All clients aged ≥18 years discharged from an acute care facility in 2013/14–2014/15 with a stroke-related diagnosis (based on ICD-10 codes) who received home care services within 60 days of acute care (N=3,465) or inpatient rehabilitation discharge (N=2,730).
[1] CCAC rehabilitation services include any of physiotherapy, occupational therapy, speech therapy and social work. [2] Rural survivors were defined as those residing in communities with a population of 10,000 or less. * Results for the post-rehabilitation group were not significant and are not shown.
Note: CCAC-based analysis (i.e., the location of the CCAC) was used to report regional performance).

EXHIBIT 2.3 Median number of days to first home-based CCAC rehabilitation service[1] following an acute stroke hospitalization or inpatient rehabilitation, in Ontario and by rurality and Local Health Integration Network, 2013/14–2014/15



Key Findings

- The median time to receive the first CCAC home-based rehabilitation service was longer following acute care hospitalization than following inpatient rehabilitation (6 days vs. 5 days).
- Following an acute stroke hospitalization, rural stroke survivors had longer median wait times to their first CCAC home-based rehabilitation service compared to urban stroke survivors (8 days vs. 6 days; p<0.0001).
- Among LHINs, there was wide variation in the median time to services following rehabilitation, ranging from 2 days in the Waterloo Wellington LHIN to 13.5 days in the North East LHIN. Similarly, there was wide variation following acute stroke hospitalization, ranging from 4 days in the South West LHIN to 16 days in the North Simcoe Muskoka LHIN.

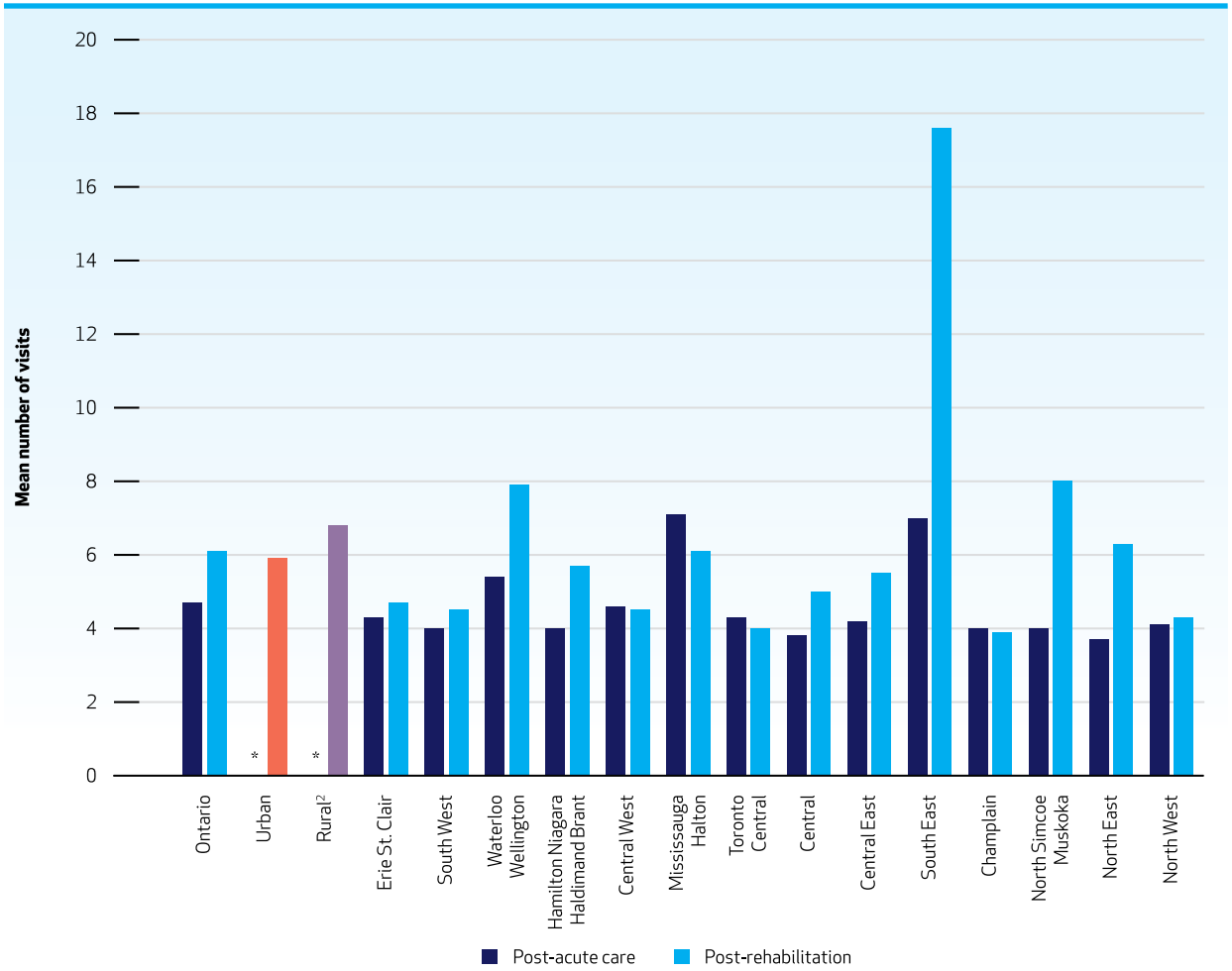
Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD), 2013/14–2014/15; Ontario Ministry of Health and Long-Term Care, Home Care Database, 2013/14–2014/15.

Inclusion criteria: All survivors aged ≥18 years discharged alive from an acute care facility in 2013/14–2014/15 with a stroke-related diagnosis (based on ICD-10 codes) who received at least one home-based CCAC rehabilitative[1] service within 60 days of acute care (N=2,105) or inpatient rehabilitation discharge (N=1,915).

[1] CCAC home-based rehabilitation service include any of physiotherapy, occupational therapy, speech therapy or social work. [2] Rural survivors were defined as those residing in communities with a population of 10,000 or less. *Results for the post-rehabilitation group were not significant and are not shown.

Notes: (1) CCAC-based analysis (i.e., the location of the CCAC was used to report regional performance). (2) The time in days to the first CCAC rehabilitation service was calculated by subtracting the acute care discharge date or inpatient rehabilitation discharge date from the first CCAC rehabilitation service date.

EXHIBIT 2.4 Mean number of home-based CCAC rehabilitation[1] visits provided to adult stroke survivors over 60 days following an acute stroke hospitalization or inpatient rehabilitation, in Ontario and by rurality and Local Health Integration Network, 2013/14–2014/15



Key Findings

- There were more home-based CCAC rehabilitation[1] visits after inpatient rehabilitation than after acute stroke hospitalization, with the exception of 4 LHINs where post-acute stroke hospitalization survivors received slightly more.
- Rural stroke survivors received more CCAC home-based rehabilitation[1] visits following inpatient rehabilitation compared to urban stroke survivors (6.8 mean visits vs. 5.9 mean visits; p=0.0281).
- The mean number of CCAC home-based rehabilitation[1] visits over two months in 2013/14–2014/15 varied from 3.9 in the Champlain LHIN to 17.6 in the South East LHIN in the post-rehabilitation group and from 3.7 in the North East LHIN to 7.1 in the Mississauga Halton LHIN in the post-acute care group.

Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD), 2013/14–2014/15; Ontario Ministry of Health and Long-Term Care, Home Care Database, 2013/14–2014/15.

Inclusion criteria: All survivors aged ≥18 years discharged alive from an acute care facility in 2013/14–2014/15 with a stroke-related diagnosis (based on ICD-10 codes) who received at least one home-based CCAC rehabilitative[1] service within 60 days of acute care (N=2,105) or inpatient rehabilitation discharge (N=1,915).

[1] CCAC rehabilitation services include any of physiotherapy, occupational therapy, speech-language pathology and social work.

[2] Rural survivors were defined as those residing in communities with a population of 10,000 or less.

* Results for the post-acute care group were not significant and are not shown.

Note: CCAC-based analysis (i.e., the location of the CCAC was used to report regional performance).

REGIONAL SUCCESS STORY

South East Local Health Integration Network

In 2009, a community-based stroke rehabilitation service delivered through the South East LHIN's Community Care Access Centre (CCAC) was created to increase the timeliness and amount of rehabilitation therapy for stroke survivors living in the largely rural region.

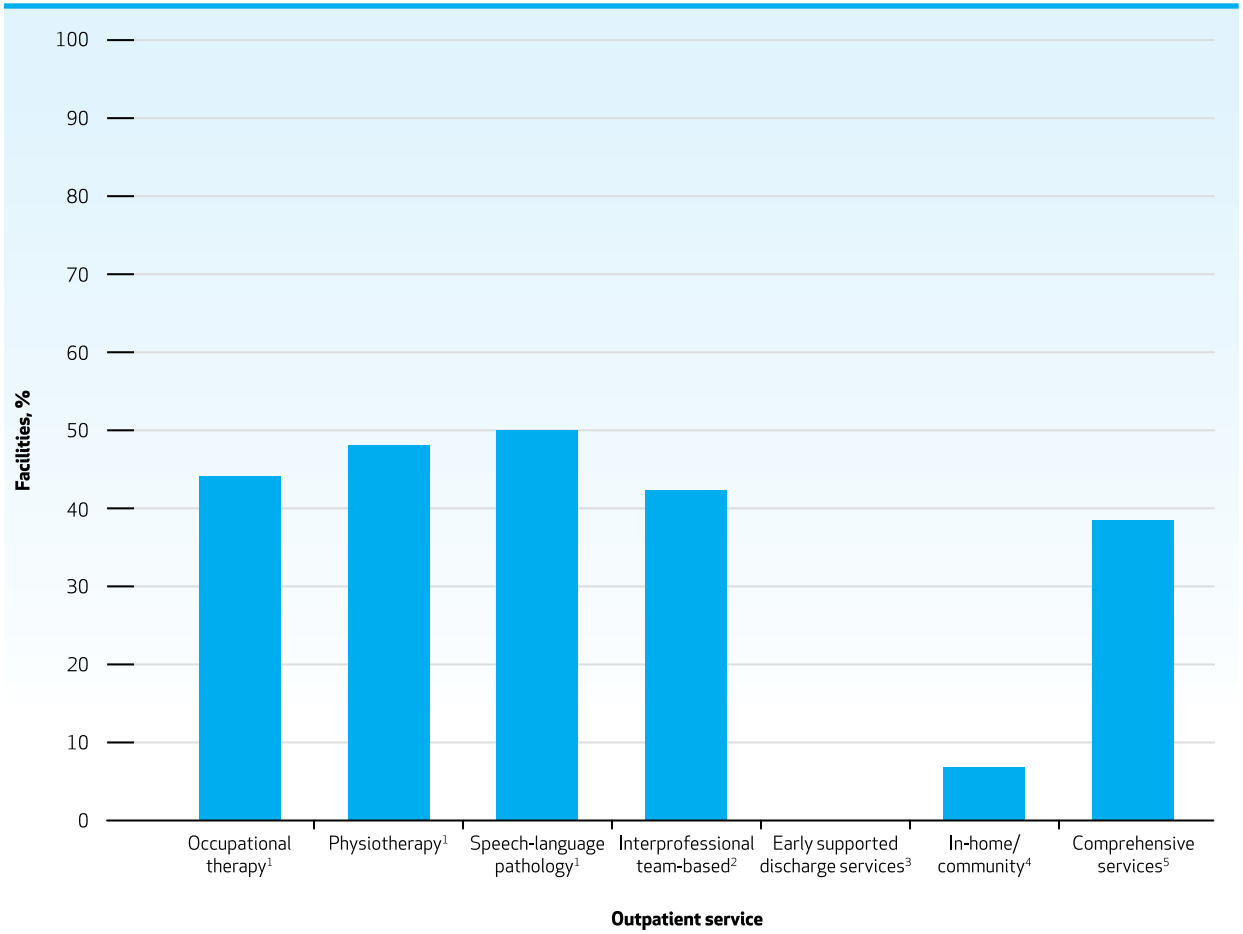
Positive results from a pilot project[21] led to sustained LHIN funding in the CCAC's base budget that was dedicated to the ongoing delivery of enhanced stroke rehabilitation services (physiotherapy, occupational therapy, speech therapy and social work) and providing for a face-to-face transition meeting between hospital and community therapists known as the Discharge Link. For stroke clients discharged to long-term care homes, physiotherapy is provided by the homes. In addition to direct therapy funding, other activities supporting sustainability include regular monitoring with annual communiques, education about program components and processes, adapting processes to current care contexts, and supporting ongoing learning to maintain stroke expertise with opportunities such as "Shared Work Days."

Because this CCAC program is aligned with the LHIN, the program benefits stroke survivors across the LHIN, including those in rural areas. The number of CCAC visits in the LHIN has been stable over the past few years with a mean of 14.1 visits in 2013/14–2014/15, and has remained the highest in the province over the same period. The mean time to first visit of 4 days (in 2013/14–2014/15) has also remained stable. Evaluation results and related program information have been shared across the province, and CCACs in the Waterloo Wellington, Hamilton Niagara Haldimand Brant, and Champlain LHINs are implementing similar pilots or programs.[21] The South East CCAC program was a high performer on the 2014/15 Ontario Stroke Report Card. During a recent community consultation project, one stroke survivor stated: "Physiotherapy and occupational therapy were really good.... The fact that they came to my home was important as it meant I didn't have to go anywhere. It's hard to get places when you've had a stroke."

While the outcomes have been sustained, expectations of the system, the evidence and the demographics of our survivors are changing. The Stroke Network of Southeastern Ontario is following up on the recommendations that emerged from a 2015 community consultation to work with its CCAC in moving toward programs that integrate flexible rehabilitation plans. As well, the changing landscape with stroke QBPs and the clinical evidence that stroke recovery extends beyond 3 months will be considered. Areas of opportunity include continuing to explore the role of rehabilitation assistants in the community model, the use of Telemedicine to meet rural needs for Discharge Link meetings, and increasing capacity to serve unique survivor needs. Innovative service delivery models to meet local needs are being explored (e.g., consideration is being given to the integration of enhanced home-based rehabilitation services with outpatient services).

Outpatient and Ambulatory Rehabilitation Services

EXHIBIT 3.1 Outpatient rehabilitation services available at facilities reporting to the National Rehabilitation Reporting System, in Ontario, 2014/15



Key Findings

- Less than 50% of facilities with inpatient stroke rehabilitation services provided any outpatient, ambulatory or community rehabilitation services.
- Early supported discharge services for stroke were not available in Ontario in 2014/15.
- With the exception of 3 programs in the South West LHIN, in-home (community) rehabilitation programs were not provided by hospital-based teams.
- Without standardized process and outcome data, it is not possible to report on the quality of outpatient services.

Data source: Ontario Stroke Rehabilitation Survey, 2014/15.

Inclusion criteria: All inpatient rehabilitation facilities with at least 6 survivor admissions aged ≥18 years classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=52 facilities).

[1] Services provided by a single discipline; each discipline receives individual referrals and maintains individual wait lists. [2] Interprofessional, team-based, outpatient (ambulatory) rehabilitation services provided by an interprofessional team including, at a minimum, an occupational therapist, physiotherapist and speech-language pathologist, specifically assigned to the outpatient rehabilitation service; services are delivered using a case-coordination approach with regular team meetings. [3] A form of rehabilitation designed to accelerate the transition from hospital to home through the provision of rehabilitation therapies in the community. Early supported discharge should include services provided by a well-resourced, specialized, interprofessional team whose work is coordinated with regular team meetings. Services should be provided 5 days a week at the same level of intensity as in the inpatient setting. [4] An interprofessional team including, at a minimum, an occupational therapist, physiotherapist and speech-language pathology specifically assigned to the in-home rehabilitation service; services are delivered using a case-coordination approach with regular team meetings. (Note: does not refer to CCAC services.). [5] Derived from facilities that responded "yes" on the Ontario Stroke Rehabilitation Survey to having hospital funded/governed rehabilitation services delivered in a hospital setting that are provided by an interprofessional team (at a minimum ,OT, PT and SLP) specifically assigned to the service, using a case coordination approach with regular team meetings and the capacity to provide 2–3 visits a week for 8–12 weeks. Does not include programs or services funded or governed by CCACs or community-based physiotherapy clinics, and aligns with the Rehabilitative Care Alliance definition of outpatient/ambulatory rehabilitation used in their validation study, with the exception of number of visits and team composition (see http://www.rehabcarealliance.ca/outpatient-/-ambulatory-1).

Note: Survey results are self-reported.

EXHIBIT 3.2 Comparison of facilities with and without comprehensive outpatient rehabilitation, by key performance indicators, in Ontario, 2014/15

Indicator	Inpatient Rehabilitation Facilities		P Value
	With Comprehensive Outpatient Rehabilitation[1] (N=19)	Without Comprehensive Outpatient Rehabilitation[1] (N=33)	
Stroke survivors, n	2,310	2,252	
Female, %	46.3	45.6	0.6274
Rural,[2] %	9.9	14.2	<0.0001
Survivors achieving RPG target for length of stay,[3] %	60.6	59.4	0.3943
Median FIM® efficiency[4]	0.9	0.8	0.0854
Median active length of stay[3] for moderate stroke,[5] days	24	22	0.0367
Survivors admitted to inpatient rehabilitation with mild stroke,[6] %	11.5	13.9	0.0155

Key Finding

- Facilities with comprehensive outpatient rehabilitation services had lower proportions of survivors living in rural settings and lower proportions of survivors with mild stroke admitted to inpatient rehabilitation compared to facilities without these services.

Data sources: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), and Ontario Stroke Rehabilitation Survey, 2014/15.

Inclusion criteria: All inpatient rehabilitation facilities with at least 6 survivor admissions aged ≥18 years classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=52 facilities).

Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Derived from facilities that responded "yes" on the Ontario Stroke Rehabilitation Survey to having hospital funded/governed rehabilitation services delivered in a hospital setting that are provided by an interprofessional team (at a minimum, OT, PT and SLP) specifically assigned to the service, using a case-coordination approach with regular team meetings and the capacity to provide 2–3 visits a week for 8–12 weeks. Does not include programs or services funded or governed by CCACs or community-based physiotherapy clinics, and aligns with the Rehabilitative Care Alliance definition of outpatient/ambulatory rehabilitation used in their validation study, with the exception of the number of visits and team composition (see http://www.rehabcarealliance.ca/outpatient-/-ambulatory-1).

[2] Rural survivors were defined as those residing in communities with a population of 10,000 or less.

[3] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date).

[4] Data sources: Canadian Institute for Health Information, Discharge Abstract Database (CIHI–DAD), National Rehabilitation Reporting System (NRS), 2014/15 and Ontario Stroke Rehabilitation Survey, 2014/15.

Inclusion criteria: All survivors 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; survivors had rehabilitation assessments completed in the same fiscal year as the acute care facility discharge.

Exclusion criteria: Those with missing admission FIM scores.

[5] Includes Rehabilitation Patient Groups 1120, 1130 and 1140 (moderate disability).

[6] Includes Rehabilitation Patient Groups 1150 and 1160 (mild disability).

Notes:

(1) Facilities were grouped based on self-reported survey results.

(2) FIM® = Functional Independence Measure; a registered trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.

REGIONAL SUCCESS STORY

South West Local Health Integration Network

In 2009, the South West LHIN created three Community Stroke Rehabilitation Teams (CSRTs) to provide specialized services because stroke survivors were being discharged home without access to adequate ongoing rehabilitation services and because stroke best practices/QBPs recommend that survivors have access to specialist-based rehabilitation services provided by a coordinated interprofessional team in the community. Each team includes nurses, occupational therapists, physiotherapists, speech-language pathologists, social workers, recreation therapists and rehabilitation therapists (as support personnel), and is affiliated with the rehabilitation hospitals in its stroke district. Each team independently collects data to monitor, evaluate and continuously improve its services.

In 2014/15, the three teams received 578 referrals, activated 518 cases for treatment and provided 9,956 total visits for their clients. They aim to provide rehabilitation services to clients for an average of 60 days. The teams provide a mean of 19 visits per client over 60 days, which is significantly higher than the provincial mean of 5.3 visits over 60 days. The teams have been shown to improve client and caregiver outcomes (based on the Functional Independence Measure, the Stroke Impact Scale, the Reintegration to Normal Living Index, the Hospital Anxiety and Depression Scale, and the Bakas Caregiver Outcomes Scale) at discharge and at follow-up six months after discharge from the service.[22] An economic analysis found that the teams' programs were cost-effective.[22]

Most importantly, clients highly value this service. Clients and caregivers reported that the help they received from the team met their needs (97%), contributed to their quality of life (96%) and contributed to their independence (88%).

The CSRTs have struggled with wait times for their service. In late 2015, they received additional funds from the South West LHIN to increase staffing aimed at wait time reduction. To further improve client access to rehabilitation, the CSRTs participated in the Heart and Stroke Foundation's Canadian Partnership for Stroke Recovery initiative called STRIVE-HOME (Stroke Rehabilitation Involving a Videoconferencing Element at Home). This project examined the impact and cost-effectiveness of home-based videoconferencing technology for speech rehabilitation after stroke. The project was a positive experience for the teams, and they are now using this technology in their work.

> ***"Many thanks for everything you have done for us. You have given us our life back."***
>
> ***John S.**, stroke survivor, Stratford, Ontario*

> ***"With the Community Stroke Rehabilitation Team service, he has come so far. . . . We don't take that wheelchair with us anymore."***
>
> *Caregiver of stroke survivor **Gerri M.**, Clinton, Ontario*

References

1. Ontario Stroke Network. District Stroke Centres. Accessed September 6, 2016 at **http://ontariostrokenetwork.ca/patientsfamiles/contact-a-stroke-centre/district-stroke-centres/**.

2. Turner S, Merchant K, Kania J, Martin E. Understanding the value of backbone organizations in collective impact: Part 1 [blog]. *Stanford Soc Innov Rev*. 2012. Accessed September 6, 2016 at **http://www.ssireview.org/blog/entry/understanding_the_value_of_backbone_organizations_in_collective_impact_1**.

3. Williams P. The competent boundary spanner. Public Adm. 2002; 80(1):103-24. Accessed September 6, 2016 at **http://onlinelibrary.wiley.com/doi/10.1111/1467-9299.00296/pdf**.

4. Levina N, Vaast E. The emergence of boundary spanning competence in practice: implications for implementation and use of information systems. *MIS Q*. 2005; 29(2):335-63.

5. Hall R, Khan F, O'Callaghan C et al. Ontario Stroke Evaluation Report 2014: *On Target for Stroke Prevention and Care*. Toronto, ON: Institute for Clinical Evaluative Sciences; 2014. Accessed September 6, 2016 at **http://www.ices.on.ca/~/media/Files/Atlases-Reports/2014/Stroke-Evaluation-Report/Full-Report.ashx**.

6. Hall R, Khan F, Levi J et al. *Ontario and LHIN 2014/15 Stroke Report Cards and Progress Reports: Active Knowledge Exchange to Drive System Integration and Stroke Best Practices*. Toronto, ON: Institute for Clinical Evaluative Sciences; 2016. Accessed September 6, 2016 at **http://www.ices.on.ca/~/media/Files/Atlases-Reports/2016/Ontario-Stroke-Report-2016/ICES_Stroke_Report_2016.ashx**.

7. Quan H, Sundararajan V, Halfon P, et al. Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. *Med Care*. 2005; 43(11):1130–9.

8. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis*. 1987; 40(5):373–83.

9. CSS Information and Evaluation Working Group. *Canadian Stroke Strategy Performance Measurement Manual: A Supplement to the Canadian Stroke Strategy Best Practices Recommendations for Stroke Care (Update 2008)*. Accessed September 6, 2016 at **http://www.strokebestpractices.ca/wp-content/uploads/2012/07/CSS-Performance-Manual-2008_EN.pdf**.

10. Lindsay MP, Gubitz G, Bayley M, et al. *Canadian Stroke Best Practice Recommendations for Stroke Care (Update 2010)*. Ottawa, ON: Canadian Stroke Network; 2010.

11. Health Quality Ontario. *Quality Matters: Realizing Excellent Care for All*. Toronto, ON: Queen's Printer for Ontario; 2015. Accessed September 6, 2016 at **http://www.hqontario.ca/Portals/0/documents/health-quality/realizing-excellent-care-for-all-en.pdf**.

12. Health Quality Ontario; Ministry of Health and Long-Term Care. *Quality-Based Procedures: Clinical Handbook for Stroke*. Toronto, ON: HQO; September 2013. Accessed September 6, 2016 at **http://health.gov.on.ca/en/pro/programs/ecfa/docs/qbp_stroke.pdf**.

13. The POWER Study (Project for an Ontario Women's Health Evidence-Based Report). Accessed September 6, 2016 at **http://powerstudy.ca/**.

14. Koifman J, Hall R, Li S, et al. The association between rural residence and stroke care and outcomes. *J Neurol Sci*. 2016; 363:16–20.

15. Office of the Auditor General of Ontario. Rehabilitation services at hospitals. In: *2013 Annual Report of the Office of the Auditor General of Ontario*. Toronto, ON: Queen's Printer for Ontario; 2013. Accessed September 6, 2016 at **http://www.auditor.on.ca/en/content/annualreports/arreports/en13/2013ar_en_web.pdf**.

16. Health Quality Ontario; Ministry of Health and Long-Term Care. *Quality-Based Procedures: Clinical Handbook for Stroke (Acute and*

Postacute). Toronto, ON: HQO; December 2015. Accessed September 6, 2016 at **http://www.hqontario.ca/Portals/0/Documents/evidence/clinical-handbooks/community-stroke-20151802-en.pdf**.

17. Office of the Auditor General of Ontario. Rehabilitation services at hospitals. In: *2015 Annual Report of the Office of the Auditor General of Ontario*. Toronto, ON: Queen's Printer for Ontario; 2015. Accessed September 6, 2016 at **http://www.auditor.on.ca/en/content/annualreports/arreports/en15/2015AR_en_final.pdf**.

18. Foley N, McClure JA, Meyer M, Salter K, Bureau Y, Teasell R. Inpatient rehabilitation following stroke: amount of therapy received and associations with functional recovery. *Disabil Rehabil*. 2012; 34(25):2132–8.

19. Wang H, Camicia M, Terdiman J, Mannava MK, Sidney S, Sandel ME. Daily treatment time and functional gains of stroke patients during inpatient rehabilitation. *PM R*. 2013; 5(2):122–8.

20. Allen L, Kelloway L; Community Stroke Rehabilitation Models Advisory Committee. *Community Stroke Rehabilitation Models in Ontario*. Toronto, ON: Ontario Stroke Network; 2016. Accessed September 26, 2016 at **http://ontariostrokenetwork.ca/stroke-qbp-resource-centre/wp-content/uploads/sites/2/2014/01/Community-Stroke-Rehabilitation-Models-in-Ontario-Final-June-2016.pdf**.

21. Langstaff C, Martin C, Brown G, et al. Enhancing community-based rehabilitation for stroke survivors: creating a discharge link. *Top Stroke Rehabil*. 2014; 21(6):510–9.

22. Allen L, Richardson M, Meyer M, Ure D, Willems D, Teasell R. Assessing the impact of Southwestern Ontario's Community Stroke Rehabilitation Teams: an economic analysis. Presented at 8th World Congress for Neurorehabilitation, Istanbul, Turkey, April 8–12, 2014.

Appendices

APPENDIX A Stroke Evaluation and Quality Committee Stroke Care Performance Indicators, 2014/15

No.	Indicator	Exhibit No.	Report Card Indicator No.	HQO Quality Domain[1]
Stroke Rehabilitation				
1	Number of stroke patients treated on a stroke unit at any time during their inpatient rehabilitation stay	n/a	–	
2	Proportion of patients achieving RPG target for active length of stay in inpatient rehabilitation	1.14, 1.21, 1.22, 1.23, 1.24, 3.2	15	Efficient, Equitable
3	Proportion of stroke patients discharged from acute care who received a referral for outpatient/community rehabilitation	n/a	12	
4	Proportion of stroke inpatient rehabilitation patients who received a referral for outpatient/community rehabilitation	1.8, 1.9, 1.14, 3.1	–	Equitable, Effective
5	Length of time between stroke onset and admission to stroke inpatient rehabilitation	1.5, 1.14, 1.17	13	Timely
6	Length of time between stroke onset and delivery of first CCAC rehabilitation service	2.3	–	Timely
7	Mean number of minutes per day of direct therapy that inpatient stroke rehabilitation patients received	n/a	14	
8	Length of stay (days) in rehabilitation stratified by RPG (i.e., stratified by admission RPG or FIM®)	1.10, 1.11, 1.12, 1.13, 1.14, 3.2	–	Efficient, Equitable
9	Mean number of rehabilitation visits provided to CCAC patients	2.2, 2.4	17[2]	Efficient, Equitable
10	FIM efficiency for moderately disabled stroke patients in inpatient rehabilitation	1.14, 3.2	16	Efficient, Equitable
11	Inpatient rehabilitation admissions by stroke severity (RPG)	1.7, 1.14, 1.18, 1.19, 1.20, 3.2	18	Equitable
12	AlphaFIM® assessments[3]	1.6, 1.14	–	Equitable
13	Complex continuing care patient profiles	n/a	–	
System Integration				
14	Proportion of patients discharged alive from acute care and admitted to inpatient rehabilitation	1.4	11	Equitable
15	Proportion of patients discharged alive from inpatient rehabilitation to each discharge destination: 1) Home 2) Home with services 3) Acute care 4) Complex continuing care 5) Long-term care	1.8, 1.9, 1.14, 3.1	–	Equitable, Effective

[1] From Health Quality Ontario; Ministry of Health and Long-Term Care. *Quality Matters: Realizing Excellent Care for All*. Toronto, ON: HQO; 2015. Accessed September 6, 2016 at http://www.hqontario.ca/Portals/0/documents/health-quality/realizing-excellent-care-for-all-en.pdf.
[2] The report card indicator reports the mean number of visits at 180 days.
[3] Admission FIM is a proxy for AlphaFIM.
Note: FIM® = Functional Independence Measure; a registered trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.
RPG = Rehabilitation Patient Group

APPENDIX B Quality-Based Procedures – Stroke Indicators, 2012/13–2014/15

No.	Quality-Based Procedures Indicator[1]	Exhibit No.
Performance Dimension: Effectiveness		
1	Proportion of patients with a completed AlphaFIM® who were discharged to inpatient rehabilitation (function score 40–80) or outpatient rehabilitation (function score > 80)	n/a
Performance Dimension: Appropriateness		
2	Proportion of adult survivors admitted to inpatient rehabilitation within 7 days of admission to acute care	1.17
3	Proportion of adult patients with stroke discharged alive from acute care and admitted to inpatient rehabilitation	1.4
4	Proportion of patients admitted to inpatient rehabilitation with mild strokes (RPG 1150 and 1160)	1.18
5	Proportion of patients admitted to inpatient rehabilitation with moderate strokes (RPG 1120, 1130 and 1140)	1.19
6	Proportion of patients admitted to inpatient rehabilitation with severe strokes (RPG 1100 and 1110)	1.2
7	Hours of rehabilitation therapy provided in inpatient rehabilitation	n/a
8	Proportion of adult patients with stroke achieving the RPG active length of stay target in inpatient rehabilitation	1.21, 1.22, 1.23, 1.24

[1] Indicator statements are not as listed in the QBP clinical handbook; they have been modified for ease of understanding the analysis.

Note: FIM® = Functional Independence Measure; a registered trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.

RPG = Rehabilitation Patient Group

APPENDIX C Inclusion Criteria Codes Used in the Report

Classification System	Code
ICD-10-CA Code: Adult Stroke	H34.1, I60 (excl. I60.8), I61, I63 (excl. I63.6), I64
Rehabilitation Client Group: 1 (Stroke)	01.1 Left body involvement (right brain) 01.2 Right body involvement (left brain) 01.3 Bilateral involvement 01.4 No paresis 01.9 Other stroke

APPENDIX D Calculation of Patient/Survivor Discharge Disposition

Inpatient rehabilitation: National rehabilitation Reporting System

Discharge Disposition	Coding Algorithm
Home without services	Disch Living Setting Code (dliveset) = Home without health services (1)
Home with services	Disch Living Setting Code (dliveset) = Home with paid health services (2)
Other community services	Disch Living Setting Code (dliveset) = Boarding house (3); Assisted living (4); Shelter (6); Public place (7)
Complex continuing care (CCC)	Disch Living Setting Code (dliveset) = Residential care (5) and Referred to institute number (insttnum) = CCC facility*
Long-term care (LTC)	Disch Living Setting Code (dliveset) = Residential care (5) and Referred to institute number (insttnum) = LTC facility*
Residential care	Disch Living Setting Code (dliveset) = Residential care (5) and Referred to institute number (insttnum) = blank or does not equal CCC or LTC facility
Acute care	Referred to Code (referto) = Inpatient acute care unit, same facility (02); Inpatient acute care unit, different facility (03)
Died	Discharge Reason Code (dreason) = Person deceased (8)
Unavailable/unknown	Disch Living Setting Code (dliveset) = Not available, temporarily (–50); Asked, unknown (–70)

*CCC and LTC institute numbers were obtained from the Continuing Care Reporting System–CCC and the Continuing Care Reporting System–LTC.

APPENDIX E Characteristics of Adult Stroke Survivors in Complex Continuing Care, in Ontario, 2013/14

Characteristics[1]	Stroke Survivors
Ontario, n	**1,069**
Female, n (%)	575 (53.8)
Age, mean (median) years	76 (79)
Age Group, n (%)	
18–45	10 (0.9)
46–65	203 (19.0)
66–75	235 (22.0)
76–85	349 (32.6)
>85	272 (25.4)
Income Quintile, n (%)	
1 (lowest)	238 (22.3)
2	244 (22.9)
3	181 (17.0)
4	204 (19.2)
5 (highest)	198 (18.6)
Rural Residence, n (%)	**105 (9.8)**

Characteristics[1]	Stroke Survivors
Comorbidities, n (%)	
Hypertension	720 (67.4)
Atrial fibrillation	376 (35.2)
Diabetes	344 (32.2)
Hemiplegia or paraplegia	314 (29.4)
Hyperlipidemia	204 (19.1)
Comorbidities, n (%)	
Dementia	164 (15.3)
Depression	125 (11.7)
Congestive heart failure	116 (10.9)
Myocardial infarction	81 (7.6)
Renal disease	73 (6.8)
Chronic obstructive pulmonary disease	60 (5.6)
Previous stroke/TIA	55 (5.1)
Carotid stenosis	54 (5.1)
Cerebrovascular disease	41 (3.8)
Peripheral vascular disease	32 (3.0)
Alzheimer's disease	23 (2.2)
Charlson Comorbidity Index score ≥2	672 (62.9)

Characteristics[1]	Stroke Survivors
RUG-III Group - Special Rehabilitation Subcategory,[2] n (%)	
Rehabilitation ultra high	42 (3.9)
Rehabilitation very high	39 (3.6)
Rehabilitation high	94 (8.8)
Rehabilitation medium	544 (50.9)
Rehabilitation low	68 (6.4)
Clinically complex	120 (11.2)
Other[3]	162 (15.2)

Data sources: Canadian Institute for Health Information – Discharge Abstract Database (CIHI–DAD), 2013/14, and Continuing Care Reporting System – Complex Continuing Care Database (CCRS–CCC), 2013/14–2014/15.
Inclusion criteria: All survivors discharged alive following an inpatient stroke/TIA (from CIHI–DAD, 2013/14) who appeared in the CCRS–CCC database within 6 months of discharge from acute care.

[1] Based on initial assessment closest to the stroke or TIA inpatient discharge date.

[2] Each Continuing Care Reporting System assessment is categorized into groups that have similar clinical characteristics and levels of resource use.

[3] Includes the following RUG-III categories: extensive care, special care, reduced physical functions, and impaired cognition.

Note: ICD-10-CA codes used for transient ischemic attack include G45 (excluding G45.4) and H34.0.

APPENDIX F Institutional Resources for Stroke Rehabilitation, in Ontario and by Local Health Integration Network, 2014/15

Local Health Integration Network/Institution (Site)	Institution Number	Ontario Stroke Network Region	Physical Setting				Inpatient Model of Care			Professions Designated to Stroke Patients/Survivors	
			RCG-1 Patients/ Survivors Admitted, n	Freestanding	Non-Freestanding		Mixed Rehabilitation Unit[3]	Stroke Rehabilitation Unit[4]	Integrated Stroke Unit[5]	Dietitian	Nurse
					Same Unit as Acute Care[1]	Different Unit from Acute Care[2]					
Ontario			**4,562**	**15**	**11**	**26**	**30**	**12**	**10**	**37**	**49**
1. Erie St. Clair											
Bluewater Health (Sarnia General)	4417	Southwestern Ontario	63			X	X				
Chatham-Kent Health Alliance	4361	Southwestern Ontario	106			X	X			X	X
Hôtel-Dieu Grace Healthcare (Tayfour)	4778	Southwestern Ontario	153	X[9]				X		X	X
Windsor Regional Hospital (Ouellette)	4775	Southwestern Ontario	6		X		X			X	X
2. South West											
Grey Bruce Health Services (Owen Sound)	3946	Southwestern Ontario	73			X	X			X	X
St. Joseph's Health Care London (Parkwood)	3884	Southwestern Ontario	180	X[9]				X		X	X
St. Thomas–Elgin General Hospital	4162	Southwestern Ontario	15			X	X				X
Stratford General Hospital	3612	Southwestern Ontario	50		X				X		X
Woodstock General Hospital Trust	4740	Southwestern Ontario	46			X	X				X
3. Waterloo Wellington											
Cambridge Memorial Hospital	4720	Central South	9			X	X			X	X
Grand River Hospital Corp (Freeport)	1912	Central South	103	X[11]			X			X	X
St. Joseph's Health Centre Guelph	3912	Central South	100	X[9]			X			X	X
4. Hamilton Niagara Haldimand Brant											
Brant Community Healthcare System (Brantford)	4678	Central South	118		X				X	X	X
Hamilton Health Sciences (General - Regional Rehab)	4711	Central South	283			X		X		X	X
Joseph Brant Memorial Hospital	3778	Central South	40			X	X			X	X
Hotel Dieu Shaver	4595	Central South	174	X[9]			X			X	X
St. Joseph's Health Care Hamilton (Charlton)	3155	Central South	17			X	X			X	X
5. Central West											
William Osler Health System (Brampton)	4684	West GTA	164			X	X			X	X
William Osler Health System (Etobicoke)	4277	West GTA	23			X	X			X	X

Professions Designated to Stroke Patients/Survivors							Weekend Admissions		Outpatient or Community Rehabilitation Services Provided					
Occupational Therapist	Physiotherapist	Recreation Therapist	Rehabilitation Therapy Assistant	Social Worker	Speech-Language Pathologist	Physiatrist/ Stroke Physician	Patients/ Survivors Admitted	Therapy Provided	Occupational Therapist	Physiotherapist	Speech-Language Pathologist	Interprofessional Team-Based Services[6]	Early Supported Discharge[7]	In-home (Community) Rehabilitation Services[8]
51	51	25	45	41	47	31	29	30	23	25	26	22	0	3
X	X		X		X		X	X	X	X	X	X		
X	X	X	X	X	X		X	X				X		
X	X		X	X	X	X	X	X	X	X	X			
X	X		X	X	X	X[10]		X						
X	X	X	X	X	X		X							X
X	X	X	X	X	X	X			X	X	X	X		X
X	X		X	X	X		X							X
X	X	X	X	X		X		X			X	X		
X	X		X	X	X	X[10]		X						
X	X	X	X	X	X			X				X		
X	X	X	X	X	X	X[10]		X	X	X	X			
X	X		X	X	X	X	X		X	X	X	X		
X	X	X	X	X	X	X			X	X	X			
X	X		X	X	X		X	X			X			
X	X	X	X	X	X	X			X	X	X	X		
X	X	X	X	X	X	X		X						
X	X	X	X	X	X	X[10]	X	X	X	X	X			
X	X	X	X	X	X		X							

Local Health Integration Network/Institution (Site)	Institution Number	Ontario Stroke Network Region	Physical Setting				Inpatient Model of Care			Professions Designated to Stroke Patients/Survivors	
			RCG-1 Patients/ Survivors Admitted, n	Freestanding	Non-Freestanding		Mixed Rehabilitation Unit[3]	Stroke Rehabilitation Unit[4]	Integrated Stroke Unit[5]	Dietitian	Nurse
					Same Unit as Acute Care[1]	Different Unit from Acute Care[2]					
6. Mississauga Halton											
Halton Healthcare (Oakville)	4136	West GTA	78			X	X				X
Trillium Health Partners (Credit Valley)	4750	West GTA	65			X	X			X	X
Trillium Health Partners (Mississauga)	4755	West GTA	142		X				X	X	X
7. Toronto Central											
Providence Healthcare	1355	Toronto – Southeast	264	X[9]				X		X	X
Sinai Health System (Bridgepoint)	1436	Toronto – Southeast	139	X[11]				X		X	X
University Health Network (Toronto Rehab)	4744	Toronto West	216	X[11]				X		X	X
West Park Healthcare Centre	1471	Toronto West	130	X[9]				X			X
Sunnybrook Health Sciences Centre (St. John's Rehab)	4765	North & East GTA	195	X[11]				X		X	X
8. Central											
Mackenzie Health	3858	Central East	60		X				X		X
Markham Stouffville Hospital	4307	Central East	15			X	X				
Southlake Regional Health Centre	2771	Central East	103		X				X		X
9. Central East											
Lakeridge Health (Oshawa)[12]	3934	Central East	217		X				X	X	X
Northumberland Hills Hospital	4450	Central East	31			X	X			X	X
Peterborough Regional Health Centre	3617	Central East	76		X				X	X	X
Ross Memorial Hospital	4483	Central East	49			X	X			X	X
Rouge Valley Health System (Centenary)	3941	Toronto – Southeast	91		X				X	X	X
10. South East											
Brockville General Hospital	4647	South East	29	X[11]			X				X
Providence Care Centre (St. Mary's of the Lake)	2223	South East	57	X[9]				X			X
Quinte Healthcare Corporation (Belleville)	3990	South East	88			X	X			X	X
11. Champlain											
Bruyère Continuing Care	3782	East – Champlain	158	X[9]				X		X	X
Glengarry Memorial Hospital	4722	East – Champlain	46	X[9]				X			X
Hôpital Montfort	4461	East – Champlain	26			X	X			X	X
Pembroke Regional Hospital	4299	East – Champlain	72		X				X		X
Queensway-Carleton Hospital	4584	East – Champlain	27			X	X			X	X
12. North Simcoe Muskoka											
Georgian Bay General Hospital (Midland)	4798	Central East	14			X	X				
Orillia Soldiers' Memorial Hospital	4688	Central East	27			X	X			X	X
Royal Victoria Regional Health Centre	3507	Central East	49		X				X	X	X

Professions Designated to Stroke Patients/Survivors							Weekend Admissions		Outpatient or Community Rehabilitation Services Provided					
Occupational Therapist	Physiotherapist	Recreation Therapist	Rehabilitation Therapy Assistant	Social Worker	Speech-Language Pathologist	Physiatrist/ Stroke Physician	Patients/ Survivors Admitted	Therapy Provided	Occupational Therapist	Physiotherapist	Speech-Language Pathologist	Interprofessional Team-Based Services[6]	Early Supported Discharge[7]	In-home (Community) Rehabilitation Services[8]
X	X	X	X	X	X	X[10]						X		
X	X	X	X	X	X	X[10]	X	X				X		
X	X		X		X	X	X	X	X	X	X	X		
X	X	X	X	X	X	X	X	X	X	X	X	X		
X	X	X	X	X	X	X	X	X	X	X	X	X		
X	X	X	X	X	X	X	X	X	X	X	X	X		
X	X		X		X	X	X	X	X	X	X	X		
X	X		X	X	X		X	X	X	X	X	X		
X	X		X	X	X	X	X	X						
X	X						X							
X	X		X		X		X							
X	X			X	X	X	X		X	X	X			
X	X	X	X	X	X		X	X						
X	X		X	X	X	X[10]		X	X	X	X			
X	X	X	X	X	X		X	X						
X	X		X	X	X			X	X	X	X			
X	X					X[10]								
X	X		X	X	X	X			X	X	X			
X	X	X	X		X	X[10]	X	X			X	X		
X	X		X	X	X	X					X	X		
X	X		X		X	X[10]								
X	X		X	X	X									
X	X	X	X	X	X	X	X	X		X				
X	X		X	X	X	X	X							
X	X													
X	X		X	X	X							X		
X	X	X	X	X	X		X	X		X		X		

Local Health Integration Network/Institution (Site)	Institution Number	Ontario Stroke Network Region	Physical Setting				Inpatient Model of Care			Professions Designated to Stroke Patients/Survivors	
			RCG-1 Patients/ Survivors Admitted, n	Freestanding	Non-Freestanding		Mixed Rehabilitation Unit[3]	Stroke Rehabilitation Unit[4]	Integrated Stroke Unit[5]	Dietitian	Nurse
					Same Unit as Acute Care[1]	Different Unit from Acute Care[2]					
13. North East											
Health Sciences North (Laurentian)	4061	Northeast	134			X	X			X	X
North Bay Regional Health Centre	4733	Northeast	58			X	X				X
Sault Area Hospital	4409	Northeast	30			X	X			X	X
Timmins and District General Hospital	3416	Northeast	23			X	X			X	X
West Parry Sound Health Centre	4592	Northeast	15			X	X			X	X
14. North West											
St. Joseph's Care Group	3891 & 3892	Northwest	115	X[9]				X		X	X

Facilities were asked to select the physical setting and model of care that best described the inpatient rehabilitation program that served people with stroke in 2014/15.

[1] Acute care and rehabilitation are provided in the same building and on the same ward/unit.

[2] Acute care and rehabilitation are provided by the same organization in the same building but on different wards/units; requires indoor transportation between units.

[3] Rehabilitation is provided to stroke patients/survivors as part of the bed complement on a general or special rehabilitation unit that serves multiple diagnostic groups.

[4] A geographical unit with identifiable co-located rehabilitation beds (e.g., 5A-7, 5A-8, 5A-9, 5A-10) that are occupied by stroke patients 75% of the time; the unit has a dedicated interprofessional team with expertise in stroke care including, at a minimum, nursing, physiotherapy, occupational therapy and speech-language pathology.

[5] Both acute care and rehabilitation components meet OSN stroke unit definition: Acute care and rehabilitation beds are both on a geographical unit with identifiable co-located beds (e.g., 5A-7, 5A-8, 5A-9, 5A-10) that are occupied by stroke patients 75% of the time and have a dedicated interprofessional team with expertise in stroke care including at a minimum, nursing, PT, OT and SLP. Co-location is the act of placing multiple entities within a single location. If the stroke unit has 4 beds, 3 of them must be occupied by a stroke patient 75% of the time.

[6] Interprofessional, team-based, outpatient (ambulatory) rehabilitation services provided by an interprofessional team including, at a minimum, an occupational therapist, physiotherapist and speech-language pathologist specifically assigned to the outpatient rehabilitation service. Services are delivered using a case-coordination approach with regular team meetings.

[7] A form of rehabilitation designed to accelerate the transition from hospital to home through the provision of rehabilitation therapies delivered by an interprofessional team in the community. ESD should include services provided by a well-resourced, specialized, interprofessional team whose work is coordinated with regular team meetings. Services should be provided 5 days a week at the same level of intensity as in the inpatient setting.

[8] Interprofessional team including, at a minimum, an occupational therapist, physiotherapist and speech-language pathologist, specifically assigned to the in-home rehabilitation service, using a case-coordination approach with regular team meetings (Note: does not refer to CCAC services).

[9] A rehabilitation site that is geographically separate from acute care, and falls under a different corporation as affiliated acute care hospitals.

[10] Available on a consultation basis only.

[11] A rehabilitation site that is geographically separate from acute care and falls under the same corporation as the affiliated acute care hospital (i.e., managed by the same CEO and governed by the same board of directors).

[12] Lakeridge Whitby reported for the Outpatient Survey.

GTA = Greater Toronto Area

Professions Designated to Stroke Patients/Survivors							Weekend Admissions		Outpatient or Community Rehabilitation Services Provided					
Occupational Therapist	Physiotherapist	Recreation Therapist	Rehabilitation Therapy Assistant	Social Worker	Speech-Language Pathologist	Physiatrist/ Stroke Physician	Patients/ Survivors Admitted	Therapy Provided	Occupational Therapist	Physiotherapist	Speech-Language Pathologist	Interprofessional Team-Based Services[6]	Early Supported Discharge[7]	In-home (Community) Rehabilitation Services[8]
X	X	X	X	X	X	X	X	X	X	X	X	X		
X	X	X	X	X	X		X	X				X		
X	X	X		X	X	X[10]			X	X	X			
X	X		X	X	X			X	X	X	X			
X	X				X				X	X				
X	X	X	X	X	X	X	X	X	X	X	X	X		

APPENDIX G Facility Classifications by Stroke Inpatient and Outpatient Rehabilitation Care Models, in Ontario, 2014/15

Local Health Integration Network	Institution (Site)	Institution Number	Stroke Inpatient Rehabilitation Care Models[1]		Ratio of Therapists to Stroke Inpatient Rehabilitation Beds			Facilities with Comprehensive[2] Outpatient Rehabilitation Services
					Occupational Therapist	Physiotherapist	Speech-Language Pathologist	
1. Erie St. Clair	Bluewater Health (Sarnia General)	4417	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:12 or less	X
	Chatham-Kent Health Alliance	4361	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:21 or more	X
	Hôtel-Dieu Grace Healthcare (Tayfour)	4778	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	
	Windsor Regional Hospital (Ouellette)	4775	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:21 or more	
2. South West	Grey Bruce Health Services (Owen Sound)	3946	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:21 or more	
	St. Joseph's Health Care London (Parkwood)	3884	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	X
	St. Thomas–Elgin General Hospital	4162	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:12 or less	
	Stratford General Hospital	3612	Non-freestanding	Stroke-focused	1:11 or more	1:11 or more	1:21 or more	
	Woodstock General Hospital Trust	4740	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:21 or more	X
3. Waterloo Wellington	Cambridge Memorial Hospital	4720	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:13 – 1:20	
	Grand River Hospital Corp (Freeport)	1912	Freestanding	Mixed	1:6 or less	1:6 or less	1:13 – 1:20	X
	St. Joseph's Health Centre, Guelph	3912	Freestanding	Mixed	1:11 or more	1:11 or more	1:13 – 1:20	
4. Hamilton Niagara Haldimand Brant	Brant Community Healthcare System (Brantford)	4678	Non-freestanding	Stroke-focused	1:11 or more	1:11 or more	1:21 or more	X
	Hamilton Health Sciences (General – Regional Rehab)	4711	Non-freestanding	Stroke-focused	1:11 or more	1:11 or more	1:13 – 1:20	
	Hotel Dieu Shaver	4595	Freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	X
	Joseph Brant Memorial Hospital	3778	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:21 or more	
	St. Joseph's Health Care System Hamilton (Charlton)[3]	3155	Non-freestanding	Mixed	1:6 or less	1:6 or less	1:12 or less	
5. Central West	William Osler Health System (Brampton)	4684	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:21 or more	
	William Osler Health System (Etobicoke)	4277	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:21 or more	
6. Mississauga Halton	Halton Healthcare (Oakville)	4136	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:21 or more	X
	Trillium Health Partners (Credit Valley)	4750	Non-freestanding	Mixed	1:10 – 1:12	1:10 – 1:12	1:21 or more	
	Trillium Health Partners (Mississauga)	4755	Non-freestanding	Stroke-focused	1:11 or more	1:11 or more	1:21 or more	X
7. Toronto Central	Providence Healthcare	1355	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	X
	Sinai Health System (Bridgepoint)[3]	1436	Freestanding	Stroke-focused	1:6 or less	1:6 or less	1:12 or less	
	Sunnybrook Health Sciences Centre (St. John's Rehab)	4765	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:12 or less	X
	University Health Network (Toronto Rehab)	4744	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:12 or less	X
	West Park Healthcare Centre	1471	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:12 or less	X
8. Central	Mackenzie Health	3858	Non-freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:12 or less	
	Markham Stouffville Hospital	4307	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:21 or more	
	Southlake Regional Health Centre	2771	Non-freestanding	Stroke-focused	1:11 or more	1:11 or more	1:21 or more	

Local Health Integration Network	Institution (Site)	Institution Number	Stroke Inpatient Rehabilitation Care Models[1]		Ratio of Therapists to Stroke Inpatient Rehabilitation Beds			Facilities with Comprehensive[2] Outpatient Rehabilitation Services
					Occupational Therapist	Physiotherapist	Speech-Language Pathologist	
9. Central East	Lakeridge Health (Oshawa)[4]	3934	Non-freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:12 or less	
	Northumberland Hills Hospital	4450	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:21 or more	
	Peterborough Regional Health Centre	3617	Non-freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:21 or more	
	Ross Memorial Hospital	4483	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:21 or more	
	Rouge Valley Health System (Centenary)	3941	Non-freestanding	Stroke-focused	1:11 or more	1:7 – 1:10	1:21 or more	
10. South East	Brockville General Hospital[3]	4647	Freestanding	Mixed	1:6 or less	1:6 or less	1:12 or less	
	Providence Care Centre (St. Mary's of the Lake)	2223	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:12 or less	
	Quinte Healthcare Corporation (Belleville)	3990	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:21 or more	X
11. Champlain	Bruyère Continuing Care	3782	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	X
	Glengarry Memorial Hospital	4722	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	
	Hôpital Montfort	4461	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	
	Pembroke Regional Hospital	4299	Non-freestanding	Stroke-focused	1:11 or more	1:11 or more	1:13 – 1:20	
	Queensway-Carleton Hospital	4584	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:21 or more	
12. North Simcoe Muskoka	Georgian Bay General Hospital (Midland)[5]	4798	Non-freestanding	Mixed	1:11 or more	1:11 or more	1:21 or more	
	Orillia Soldiers' Memorial Hospital	4688	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:21 or more	X
	Royal Victoria Regional Health Centre	3507	Non-freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:12 or less	X
13. North East	Health Sciences North (Laurentian)	4061	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	
	North Bay Regional Health Centre	4733	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	X
	Sault Area Hospital	4409	Non-freestanding	Mixed	1:7 – 1:10	1:11 or more	1:13 – 1:20	
	Timmins and District General Hospital	3416	Non-freestanding	Mixed	1:11 or more	1:7 – 1:10	1:21 or more	
	West Parry Sound Health Centre	4592	Non-freestanding	Mixed	1:7 – 1:10	1:7 – 1:10	1:12 or less	
14. North West	St. Joseph's Care Group	3891/3892	Freestanding	Stroke-focused	1:7 – 1:10	1:7 – 1:10	1:13 – 1:20	X

[1] The four rehabilitation care models include:
- Freestanding, stroke-focused facilities that are geographically separate from acute care, with stroke survivors co-located and rehabilitation professionals focused on stroke care (includes stroke rehabilitation units);
- Non-freestanding, stroke-focused facilities that provide acute and rehabilitation care in the same building with stroke survivors co-located and rehabilitation professionals focused on stroke care (include integrated stroke units);
- Freestanding, mixed facilities that are geographically separate from acute care with rehabilitation professionals serving multiple patient/survivor groups; and
- Non-freestanding, mixed facilities that provide acute care and rehabilitation in the same building with rehabilitation professionals serving multiple patient/survivor groups.

[2] Derived from facilities that responded "yes" on the Ontario Stroke Rehabilitation Survey to having hospital funded or governed rehabilitation services delivered in a hospital setting that are provided by an interprofessional team (at a minimum, an occupational therapist, physiotherapist and speech-language pathologist) specifically assigned to the service, using a case-coordination approach with regular team meetings and the capacity to provide 2–3 visits a week for 8–12 weeks. Does not include programs and services funded or governed by Community Care Access Centres and community-based physiotherapy clinics. Aligns with the Rehabilitative Care Alliance definition of outpatient/ambulatory rehabilitation used in their validation study, with the exception of the number of visits and team composition (see http://www.rehabcarealliance.ca/outpatient-/-ambulatory-1).

[3] Facilities that met staffing ratios recommended by stroke quality-based procedures (see http://health.gov.on.ca/en/pro/programs/ecfa/docs/qbp_stroke.pdf).

[4] Lakeridge Health's Whitby site reported for the outpatient survey.

[5] The Midland site reported for the inpatient and outpatient survey, as its rehabilitation beds were transferred from Penetanguishene in November 2014.
Note: Survey results were self-reported.

APPENDIX H Distribution of Days Past the Active Length of Stay[1] Target for Each Rehabilitation Patient Group, in Ontario and by Local Health Integration Network, 2014/15

		Mild			Moderate				Severe		
		RPG 1150	RPG 1160	Sum	RPG 1120	RPG 1130	RPG 1140	Sum	RPG 1100	RPG 1110	Sum
Ontario	**N**	**355**	**183**	**538**	**218**	**244**	**244**	**706**	**215**	**401**	**616**
	Mean (Median)	**10.1 (7.3)**	**11.0 (10.0)**	**10.4 (8.3)**	**9.9 (6.2)**	**9.9 (5.8)**	**9.4 (7.6)**	**9.7 (6.6)**	**16.2 (9.1)**	**14.5 (8.2)**	**15.0 (8.2)**
	IQR	**(4.3–14.3)**	**(7.0–15.0)**	**(4.3–14.3)**	**(3.2–11.2)**	**(2.3–12.8)**	**(2.6–13.6)**	**(2.6–12.8)**	**(3.1–21.1)**	**(2.2–20.2)**	**(3.1–20.2)**
1. Erie. St Clair	N	37	9	46	15	9	16	40	15	29	44
	Mean (Median)	7.4 (5.3)	9.3 (7.0)	7.8 (5.3)	12.8 (7.2)	13.6 (8.8)	12.7 (13.1)	12.9 (8.5)	14 (8.1)	11.2 (7.2)	12.2 (7.7)
	IQR	(2.3–10.3)	(5.0–9.0)	(2.3–10.3)	(5.2–23.2)	(7.8–20.8)	(3.6–21.1)	(4.9–21.4)	(5.1–15.1)	(3.2–16.2)	(3.7–15.7)
2. South West	N	33	28	61	13	11	19	43	16	37	53
	Mean (Median)	11.0 (9.3)	9.9 (10.0)	10.5 (10.0)	6.7 (6.2)	8.5 (3.8)	9.4 (8.6)	8.4 (5.8)	26.9 (13.6)	11.3 (7.2)	16 (8.1)
	IQR	(6.3–14.3)	(6.0–14.0)	(6.0–14.0)	(3.2–7.2)	(2.8–8.8)	(2.6–12.6)	(2.6–10.6)	(5.1–29.1)	(2.2–13.2)	(3.2–15.1)
3. Waterloo Wellington	N	9	≤5	14	≤5	≤5	≤5	10	10	12	22
	Mean (Median)	7.5 (6.3)	6.0 (7.0)	7.0 (6.3)	6.0 (4.2)	11.8 (11.8)	7.6 (7.6)	8.6 (5.0)	9.4 (5.6)	13.9 (8.2)	11.8 (7.7)
	IQR	(1.3–13.3)	(6.0–7.0)	(3.0–7.0)	(1.7–10.2)	(2.3–21.3)	(2.6–12.6)	(2.2–14.2)	(0.1–23.1)	(4.7–13.7)	(0.2–14.2)
4. Hamilton Niagara Haldimand Brant	N	45	33	78	44	50	54	148	27	54	81
	Mean (Median)	11.2 (8.3)	14.2 (14.0)	12.5 (12.3)	8.9 (6.2)	9.7 (4.8)	9.5 (7.1)	9.4 (6.6)	14.1 (9.1)	10.2 (6.7)	11.5 (7.2)
	IQR	(5.3–14.3)	(8.0–17.0)	(6.3–17.0)	(4.7–9.7)	(2.8–12.8)	(4.6–13.6)	(3.8–12.6)	(5.1–19.1)	(1.2–14.2)	(2.2–14.2)
5. Central West	N	16	7	23	14	14	11	39	13	17	30
	Mean (Median)	9.7 (7.3)	11.7 (13.0)	10.3 (8.3)	9.9 (5.7)	7.9 (5.8)	10.1 (6.6)	9.2 (6.6)	8.9 (5.1)	12.1 (7.2)	10.8 (6.2)
	IQR	(5.3–12.8)	(7.0–17.0)	(5.3–14.3)	(1.2–20.2)	(3.8–11.8)	(5.6–15.6)	(3.6–14.8)	(2.1–14.1)	(4.2–16.2)	(4.1–15.1)
6. Mississauga Halton	N	19	≤5	23	16	13	10	39	10	26	36
	Mean (Median)	8.6 (9.3)	9.8 (10.0)	8.8 (9.3)	5.2 (4.2)	14.9 (12.8)	13.1 (11.1)	10.5 (7.2)	11.4 (9.1)	18.8 (10.2)	16.8 (10.2)
	IQR	(1.3–12.3)	(6.5–13.0)	(1.3–12.3)	(1.2–7.2)	(4.8–24.8)	(7.6–19.6)	(2.8–18.8)	(2.1–16.1)	(6.2–34.2)	(5.7–22.7)
7. Toronto Central	N	56	23	79	47	69	63	179	53	81	134
	Mean (Median)	8.9 (5.3)	12.2 (11.0)	9.8 (7.3)	10.4 (6.2)	6.6 (2.8)	6.9 (4.6)	7.7 (4.8)	12.3 (7.1)	11.6 (6.2)	11.9 (7.1)
	IQR	(3.3–12.8)	(7.0–15.0)	(4.3–14.0)	(1.2–9.2)	(1.8–9.8)	(1.6–7.6)	(1.8–9.6)	(0.1–19.1)	(1.2–15.2)	(0.2–17.1)
8. Central	N	11	≤5	13	≤5	≤5	6	9	≤5	15	20
	Mean (Median)	8.2 (5.3)	5.0 (5.0)	7.7 (5.3)	11.7 (11.7)	5.8 (5.8)	10.3 (9.1)	10.1 (5.8)	7.7 (4.1)	10.9 (8.2)	10.1 (6.7)
	IQR	(1.3–11.3)	(3.0–7.0)	(2.3–8.3)	(0.2–23.2)	(5.8–5.8)	(1.6–18.6)	(1.6–18.6)	(3.1–4.1)	(0.2–23.2)	(1.2–20.2)
9. Central East	N	32	10	42	12	9	7	28	24	40	64
	Mean (Median)	6.8 (5.3)	6.7 (6.0)	6.8 (5.3)	9.1 (9.7)	14.2 (4.8)	7.2 (3.6)	10.3 (7.2)	20.1 (9.1)	18.2 (7.2)	18.9 (8.1)
	IQR	(1.3–8.3)	(4.0–8.0)	(2.0–8.0)	(6.2–12.2)	(1.8–9.8)	(2.6–11.6)	(3.4–11.9)	(4.1–29.1)	(2.2–35.7)	(2.2–33.6)

		Mild			Moderate				Severe		
		RPG 1150	RPG 1160	Sum	RPG 1120	RPG 1130	RPG 1140	Sum	RPG 1100	RPG 1110	Sum
10. South East	N	22	6	28	14	11	≤5	30	15	19	34
	Mean (Median)	10.3 (10.3)	11.5 (12.0)	10.6 (10.7)	11.6 (6.7)	12.4 (11.8)	7.6 (7.6)	11.2 (8.2)	25.8 (16.1)	18.5 (10.2)	21.7 (11.7)
	IQR	(5.3–14.3)	(10.0–14.0)	(6.3–14)	(4.2–20.2)	(5.8–15.8)	(3.6–9.6)	(4.2–15.8)	(7.1–50.1)	(2.2–32.2)	(4.2–41.2)
11. Champlain	N	20	19	39	12	19	15	46	8	21	29
	Mean (Median)	8.2 (6.8)	8.8 (7.0)	8.5 (7.0)	7.3 (6.7)	7.5 (5.8)	8.9 (4.6)	7.9 (5.5)	19.5 (15.1)	14.2 (14.2)	15.7 (14.2)
	IQR	(1.8–12.8)	(3.0–16.0)	(2.3–13.3)	(1.2–9.7)	(0.8–11.8)	(0.6–15.6)	(0.8–12.6)	(3.6–25.1)	(2.2–21.2)	(2.2–21.2)
12. North Simcoe Muskoka	N	21	≤5	22	9	≤5	≤5	11	≤5	17	21
	Mean (Median)	15.1 (13.3)	5.0 (5.0)	14.7 (12.8)	5.9 (5.2)	30.8 (30.8)	8.6 (8.6)	8.4 (6.2)	14.6 (14.1)	13.7 (7.2)	13.9 (13.1)
	IQR	(7.3–25.3)	(5.0–5.0)	(7.3–25.3)	(2.2–9.2)	(30.8–30.8)	(8.6–8.6)	(2.2–10.2)	(10.1–19.1)	(1.2–28.2)	(3.2–27.2)
13. North East	N	30	31	61	13	17	29	59	11	21	32
	Mean (Median)	16.5 (14.3)	12.0 (10.0)	14.2 (13.0)	20.7 (5.2)	13.1 (9.8)	13.2 (12.6)	14.8 (9.8)	24.2 (20.1)	35.2 (23.2)	31.4 (20.6)
	IQR	(8.3–20.3)	(8.0–16.0)	(8.0–19.0)	(3.2–16.2)	(4.8–17.8)	(7.6–15.6)	(5.2–16.8)	(9.1–43.1)	(13.2–36.2)	(11.7–38.2)
14. North West	N	≤5	≤5	9	≤5	16	6	25	≤5	12	16
	Mean (Median)	8.8 (8.3)	14.0 (14.0)	11.7 (11.0)	15.9 (16.2)	14.2 (7.3)	4.8 (3.6)	12.2 (7.6)	22.1 (22.6)	15.6 (12.2)	17.2 (14.7)
	IQR	(6.8–10.8)	(11.0–15.0)	(9.3–14.0)	(9.2–22.2)	(2.8–21.3)	(0.6–7.6)	(2.8–16.2)	(8.1–36.1)	(6.2–23.7)	(6.2–27.2)

Data source: Canadian Institute for Health Information, National Rehabilitation Reporting System (NRS), 2014/15.

Inclusion criteria: All survivors aged >18 years admitted to inpatient rehabilitation and classified as Rehabilitation Client Group 1 (Stroke) in the NRS database (N=1,860) who did not achieve the Rehabilitation Patient Group (RPG) active length of stay target.

Exclusion criteria: Survivors readmitted to rehabilitation on the same day as the first rehabilitation discharge date.

[1] Active length of stay (LOS) refers to the total time spent in inpatient rehabilitation excluding days waiting for discharge from inpatient rehabilitation and service disruptions (e.g., short readmissions into acute care) and was calculated using the admission and ready-for-discharge dates in the NRS database (active LOS = date ready for discharge – admission date).

Note: RPG best practice targets for active length of stay (in days) are 1160 (0.0), 1150 (7.7), 1140 (14.4), 1130 (25.2), 1120 (35.8), 1110 (41.8) and 1100 (48.9).

IQR = Interquartile range

APPENDIX I Glossary

Term	Definition
AlphaFIM®	Standardized method of assessing patient disability and functional status in the acute care setting. Valid scores are between 18 and 126 (the sum of motor and cognition scale scores) where a higher score shows greater independence. AlphaFIM is a registered trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.
Benchmark	A tool used in quality improvement; a process of establishing a standard of excellence for processes of care.
CCAC	Community Care Access Centre
CCC	Complex continuing care
CCN	Cardiac Care Network
CCRS	Continuing Care Reporting System; captures clinical and demographic information for residents receiving facility-based continuing care services.
Charlson Comorbidity Index	An index commonly used in health services research to capture the effect of any of 22 diseases, such as diabetes or congestive heart failure, that a patient may have in addition to the disease of interest that affects an outcome (e.g., mortality, length of stay, cost). Each of the diseases is assigned a value, and the sum of the values produces a patient's Charlson Comorbidity Index. A higher score indicates more comorbid illness.
CIHI	Canadian Institute for Health Information
CIHI-DAD	CIHI's Discharge Abstract Database; captures administrative, clinical and demographic information on hospital discharges (including deaths, sign-outs and transfers). Some provinces and territories also use the DAD to capture day surgery.
CIHI-NRS	CIHI's National Rehabilitation Reporting System; contains client data collected from participating adult inpatient rehabilitation facilities and programs across Canada.
Comprehensive outpatient services	Derived from facilities that responded "yes" on the Ontario Stroke Rehabilitation Survey to having hospital funded or governed rehabilitation services delivered in a hospital setting that are provided by an interprofessional team (at a minimum, an occupational therapist, physiotherapist and speech-language pathologist) specifically assigned to the service, using a case-coordination approach with regular team meetings and the capacity to provide 2–3 visits a week for 8–12 weeks. Does not include programs or services funded or governed by CCACs or community-based physiotherapy clinics, and aligns with the Rehabilitative Care Alliance definition of outpatient/ambulatory rehabilitation used in their validation study, with the exception of the number of visits and team composition (see http://www.rehabcarealliance.ca/outpatient-/-ambulatory-1).
CSRT	Community stroke rehabilitation team
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 scanning and expert interpretation; clinicians with stroke expertise; and linkages to rehabilitation and secondary prevention.
Early Supported Discharge (ESD)	A form of rehabilitation designed to accelerate the transition from hospital to home through the provision of rehabilitation therapies delivered by an interprofessional team in the community. It is intended as an alternative to a complete course of inpatient rehabilitation and is most suitable for patients recovering from mild to moderate stroke. Services should be provided five days a week at the same level of intensity as in the inpatient setting in order to address individual patient needs.
FIM®	Functional Independence Measure. FIM is a registered trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.
FIM efficiency	Measures the average daily change in total FIM score. Calculated as (Discharge total FIM – Admission total FIM) / Total active length of stay
Freestanding stroke-focused	Rehabilitation site is geographically separate from acute care. Stroke survivors are co-located, rehabilitation professionals are focused on stroke care. (Includes Stroke Rehabilitation Units)
Freestanding mixed	Rehabilitation site is geographically separate from acute care. Rehabilitation professionals serve multiple patient/survivor groups.
GTA	Greater Toronto Area
HCD	Home Care Database, from the Ontario Association of Community Care Access Centres
ICD-10-CA	An enhanced version of the ICD-10 (International Classification of Diseases and Related Health Problems, 10th Revision), developed by CIHI for morbidity classification in Canada
Integrated stroke unit	Both acute and rehabilitation components meet the OSN stroke unit definition; i.e., acute and rehabilitation beds are both on a geographical unit with identifiable co-located beds (e.g. 5A-7, 5A-8, 5A-9, 5A-10) that are occupied by stroke patients 75% of the time, and have a dedicated interprofessional team with expertise in stroke care including at a minimum, nursing, PT, OT and SLP.
LHIN	Local Health Integration Network; 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.
Mixed rehabilitation unit	Rehabilitation professionals serve multiple patient/survivor groups
MOHLTC	Ministry of Health and Long-Term Care
Non-freestanding stroke-focused	Acute and rehabilitation care are provided in the same building. Stroke survivors co-located, rehabilitation professionals focused on stroke care. (Includes Integrated Stroke Units)
Non-freestanding mixed	Acute and rehabilitation care are provided in the same building. Rehabilitation professionals serve multiple patient/survivor groups.

Term	Definition
OSN	Ontario Stroke Network; provides provincial leadership and coordination for the 11 Ontario Regional Stroke Networks
QBPs	Quality-based procedures; a specific group of patient services that offers opportunities for health care providers to share best practices that will allow the system to achieve better quality and system efficiencies. *The Quality-Based Procedures: Clinical Handbook for Stroke (Acute)* was developed in two phases. Phase 1, released in April 2013, includes best practices for the emergency department, acute care and inpatient rehabilitation. Phase 2 includes best practices for TIA and stroke prevention clinics, early supported discharge, and outpatient and community rehabilitation, resulting in the release of an updated *Quality-Based Procedures: Clinical Handbook for Stroke (Acute and Postacute)* in December 2015.
RCG	Rehabilitation Client Group; within the CIHI-NRS, the RCG describes the primary reason for admission to rehabilitation.
Regional Stroke Centre	A facility that has all the requirements of a district stroke centre plus neurosurgical facilities and interventional radiology.
Rehabilitative Care Alliance	An Ontario-wide collaborative established in April 2013 by Ontario's 14 Local Health Integration Networks to build on the work of the Rehabilitation and Complex Continuing Care Expert Panel.
Rehabilitation intensity	A measure of the amount of time a patient/survivor spends in individual, goal-directed rehabilitation therapy focused on physical, functional, cognitive, perceptual and social goals to maximize the patient's/survivor's recovery over a 7-day-a-week period. The patient/survivor is engaged in active treatment, which is monitored or guided by a therapist.
RPG	The CIHI-NRS assigns each patient to one of 83 Rehabilitation Patient Groups (RPGs) using a grouping methodology based on the patient's RCG (primary reason for admission), age at admission, motor and cognitive functional status. Within the CIHI-NRS, the RPG describes stroke severity: Mild = RPGs 1150, 1160 Moderate = RPGs 1120, 1130, 1140 and Severe = RPGs 1100, 1110
RUG-III	Resource Utilization Group, Version III; a grouping methodology applied to RAI-MDS 2.0 Canadian version assessment data submitted to the CCRS
SAS	Statistical Analysis System software; used for advanced data analytics
SEQC	Stroke Evaluation and Quality Committee
Shared work days	Opportunity for a learner to spend time with one or more health care providers working in stroke care, to share knowledge and develop hands-on skills; facilitated and supported by a fund provided by the Stroke Network of Southeastern Ontario
SRU	Stroke rehabilitation unit
STRIVE-HOME	Stroke Rehabilitation Involving a Videoconferencing Element at Home
Stroke	Occurs when a vessel in the brain ruptures or is blocked by a blood clot
Stroke-focused	Stroke survivors are co-located and rehabilitation professionals are focused on stroke care; includes stroke rehabilitation units and integrated stroke units
Stroke rehabilitation unit	A geographical unit with identifiable co-located rehabilitation beds (e.g., 5A-7, 5A-8, 5A-9, 5A-10) that are occupied by stroke patients 75% of the time, and has a dedicated interprofessional team with expertise in stroke care including, at a minimum, nursing, occupational therapy, physiotherapy and speech-language pathology.
Discharge Link	An initiative that delivers enhanced rehabilitation therapy in community settings through CCAC-contracted providers
TIA	Transient ischemic attack, or 'mini-stroke'; an episode of temporary and focal cerebral dysfunction of vascular origin, variable in duration, commonly lasting from 2 to 15 minutes but occasionally lasting as long as a day (24 hours); leaves no persistent neurological deficit (from www.strokebestpractices.ca).

Data
Discovery
Better Health

Institute for Clinical Evaluative Sciences
G1 06, 2075 Bayview Avenue
Toronto, Ontario M4N 3M5
www.ices.on.ca

ICES